

Individual Tax Planning and Small Business Creation: Evidence on the Impact of Special Tax Regimes in Chile¹

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Abstract

For many years, the Chilean tax system has had several special tax regimes (STRs) for small businesses and/or specific economic sectors. Even though they may reduce compliance costs, they increase the complexity of the tax system and increase concerns about their potential use as tax avoidance mechanisms for high income taxpayers. This paper analyses whether the use of these special tax regimes is associated with a strategic tax planning decision at the individual level. There are three stylized facts of STRs use that together are consistent with strategic behavior: STRs are frequently used, are mainly used by high income taxpayers, and high income taxpayers are more likely to hold a portfolio of businesses filing taxes under a STR. After rationalizing the stylized facts with a simple analytic model, an econometric analysis is carried out, using administrative data, in order to provide empirical evidence about strategic behaviors regarding STRs use. The results show that after a reform that made one STR more restrictive, reported individual incomes from businesses filing under the STR decreased between 10% and 15%, and income from alternative sources increased, resulting in higher taxable incomes between 4% and 7%. This change in reported income is explained by the more restrictive scenario for avoiding taxes through the use of STR.

Keywords: Special Tax Regimes, Small Businesses, Individual Tax Planning, Tax Avoidance, Income Sheltering, Behavioral Responses to Tax Policy, Horizontal Inequity.

1. Introduction

In a 2010 labor dispute between one of Chile's largest intercity bus companies and one of its employees, the main defense used by the company was that it did not have to keep accounting records as it was not required by the special tax regime of presumptive taxes (*Renta Presunta* or RP) under which the company filed taxes.² This preferential tax regime, theoretically designed for reducing compliance costs of small firms in the transport, mining and agricultural sectors, determines taxable income as a percentage of the fiscal value of some specific company asset. As this income

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²See the interview of the research director of the Chilean IRS in: <http://ciperchile.cl/2012/04/05/reforma-tributaria-experto-propone-bajar-el-iva-a-6-y-subir-el-impuesto-al-decil-mas-rico-a-25/>, accessed on September 15th, 2017.

tax base is usually much smaller than the actual profits earned, it is often convenient to file taxes under the RP tax regime. In order to qualify, business owners face incentives to create smaller firms or firms in the covered sectors with the sole purpose of dressing up income from other sources as income from RP firms.

It is not surprising, then, that more than 60% of businesses taxed under the RP regime report hiring no workers and that 22% of these businesses are classified in productive sectors that do not qualify for the RP regime (Jorratt, 2009, Agostini, 2013).

The Chilean tax system has offered for many years several special tax regimes for small businesses (henceforth STRs), whose original goal was to simplify both the compliance and enforcement of small firms' tax liabilities. According to Jorratt (2013), there are two reasons for the existence of STRs. First, as the Chilean system is highly complex, STRs induce progressiveness by reducing small businesses compliance costs. Second, as taxes paid by small businesses represent a small proportion of total tax revenue, STRs reduce the enforcement costs of the tax authority.

Nevertheless, as a result of the existence of several STRs, each with different features, the tax system becomes more complex motivating the use of STRs as tax avoidance channels among high income taxpayers. More specifically, taxpayers can create small businesses (or split large businesses into several small firms) with the sole purpose of shifting or sheltering personal income to take advantage of the tax benefits the STRs offer. This potential use evidently contradicts the main goals for offering STRs to small businesses.

In this context, the goal of this paper is to analyze whether these STRs are used as tax avoidance channels by high income taxpayers. For this purpose, we use administrative data to evaluate if these regimes are associated with strategic tax planning decisions at the individual taxpayer level. This issue is relevant, as tax avoidance has implications for horizontal inequity, income inequality and efficiency costs (Slemrod and Bakija, 2004).

One of the advantages of our analysis is the use of a novel dataset provided by the Chilean tax authority that includes information from all relevant tax forms filled by all taxpayers in the country, allowing us to characterize the relationship between each individual taxpayer and all the STRs they own.

Three stylized facts arise from a simple analysis of the data. First, STRs are frequently used. Second, STRs are mainly used by high income taxpayers. Third, high income taxpayers are more likely to hold portfolios of STR firms.³ These stylized facts constitute suggestive evidence of strategic behaviors of high income taxpayers regarding STRs use.

After rationalizing the stylized facts using a simple theoretical model, an econometric analysis is carried out in order to provide empirical evidence about strategic behaviors in the context of STR availability. The identification strategy exploits a reform that made the RP tax regime more

³Even though these stylized facts could be a reflection of the fact that high income individuals are richer precisely because they have better entrepreneurial abilities and thus create successful businesses, the evidence provided in the first paragraph of this introduction suggests that there may be significant use of STRs for tax avoidance purposes.

restrictive. Particularly, after the reform it became more difficult for a small firm to opt in for filing taxes under that regime.⁴ The reform was motivated by anecdotes and data like the ones mentioned above, which provided indirect evidence of a tax avoidance usage of STR.

According to the model, if it is true that STRs are strategically used by high income taxpayers for tax planning purposes, then the reform should have induced a strategic reaction. Specifically, incomes reported at the individual level from businesses filing taxes under that STR should have decreased, and incomes reported through alternative income sources should have increased, resulting in higher taxable incomes given the more restrictive scenario for avoiding taxes.

Results confirm the model's predictions. Difference-in-differences estimations show that taxable incomes of the richer taxpayers increased between 4% and 7% after the reform. Substitution patterns previously described lie behind this reaction: while reported incomes from firms filing taxes under RP decreased, reported incomes from other firms (filing taxes under the general regime or under other STRs) and income from independent work increased. In general, these results are consistent with the existence of strategic behaviors regarding STRs usage for tax planning purposes at the individual level.

This paper contributes to the literature in three dimensions. First, to our knowledge, this is the first paper that studies the process of firm creation and tax regime choice as a strategic tax planning decision at the individual level. Second, the empirical strategy is novel as variation is not taken from the marginal income tax rate, as is usual in this literature, but from the conditions required to file taxes under STRs.

Finally, recent papers have found that businesses –especially small ones– also show behavioral responses to tax policy.⁵ Different behavioral reactions have been described. By studying the European tonnage taxes, Elschner (2013) shows that STRs affect businesses' organizational choice. Slemrod et al. (2015) show that asking for additional information reports to US small firms –about payment card sales– increased the likelihood of businesses income being reported, rising small businesses' tax compliance. Strategic behaviors have also been found regarding eligibility thresholds. While Almunia and Lopez-Rodriguez (2015) shows that firms may act strategically to avoid stricter tax enforcements, Kanbur and Keen (2014) argues that thresholds may induce responses associated with non-compliance behaviors. Moreover, by analyzing the VAT threshold in Japan, Onji (2009) shows that large firms had incentives to masquerade themselves into several small businesses in order to be eligible for tax benefits.

As small businesses usually have few owners, firms' behavior may be shaped by thier owners' individual strategic decisions. Therefore, this paper contributes to this literature by proposing a framework that links businesses' behavior to strategic decisions regarding tax planning at the individual level.

⁴As it is shown along the paper, this STR is the most important in terms of its scope among small businesses.

⁵This depends on the global complexity of the tax system. For instance, Engelschalk (2005) argues that in transition economies, the existence of STRs has created room for tax evasion and tax avoidance behaviors through the creation of small businesses.

The remainder of the paper continues as follows. Section 2 describes the main features of the Chilean income tax system, particularly those related to STRs. Section 2 describes the data available while Section 3 presents descriptive statistics supporting the stylized facts. Section 4 proposes a simple model to account for the stylized facts and to derive testable implications for the empirical application carried out in Section 5. Finally, Section 6 concludes.

2. The Chilean Income Tax System

This section describes the main features of the Chilean income tax system as of 2013 with an emphasis on business income and the taxation of shareholders' income. In 2013, almost 40% of total tax revenue (6.6% of GDP) was collected through taxes on personal and corporate income.

Corporate Taxes. Under the general corporate tax regime, firms pay a flat 20% tax rate on accrued profits (the *Primera Categoría* regime, henceforth PC). As will be explained below, the shareholders of companies under this general tax regime benefit from tax deferrals for retained profits. In 2013, nearly 72% of active firms file taxes under this regime (see section 4 below).

At the same time, small firms are allowed to file taxes under several special tax regimes. These special provisions intend to reduce the compliance costs faced by small firms and also the enforcement costs for the Chilean IRS (Jorratt, 2013). If compliance carries fixed costs, then small firms bear a disproportional weight when filing taxes. Moreover, burdensome voluntary compliance may push small firms into informality, a risk that may be reduced by tax simplification. In addition, enforcement costs may be reduced by simplified accounting rules. Finally, preferential treatments seek to help small businesses facing financial constraints and other barriers to growth.

The most frequently used special regime among small businesses is the *Renta Presunta* (henceforth RP) regime. About 15% of active firms paid taxes under this regime in 2013. Companies in three specific economic sectors –agriculture, mining and transport services (both freight and passengers)– are allowed to file taxes under this regime. Instead of taxing actual income or profits, the RP regime taxes presumed income. Under *Renta Presunta* taxable income is the book value of a specific asset or net sales. In the case of agricultural firms, taxable income is the value of the land. In the case of mining companies, taxable income is net sales, whereas in transport services, taxes are paid upon the value of the vehicles used for transportation.

There are sector specific annual sales caps below which companies can file taxes under this simplified system. The 2013 reform changed, however, the way sales are calculated for eligibility restricting the access to the regime.

Before the reform, the sales of all firms for which an individual taxpayer participation exceeded 10% were considered related. Then, if the sum of the sales of all related firms were above a cap, all firms had to switch to the general regime. However, there was one exception: every firm with sales under a second much lower threshold was allowed to keep filing taxes under the RP regime even though the sum of all related sales exceeded the larger cap. This exception motivated business owners to create subsidiary firms with sales just below the lower sales threshold to keep filing taxes

under the RP regime in all of them.

The reform changed the way aggregate sales are computed. According to the new rule, sales of each related firm are added based on the fraction of shares owned by each taxpayer. So the incentive to create subsidiaries is reduced, as the sales of the original firms are added to the sales of the subsidiaries to check for eligibility, increasing the likelihood that each firm exceeds the sales cap (the original firm and its subsidiaries).

The reform also introduced a sales cap for the eligibility of passenger transport services firms. Before the reform, there was no sales restriction that these firms had to meet for eligibility. This change and the modification of the sales aggregation rule will be used below to identify the behavioral response of individual taxpayers to the incentives provided by STRs.

The second most frequently STR used by small businesses is the *14 ter* (henceforth 14T) regime. Under 14T firms paid in 2013 a 20% tax rate on a cash flow basis. Investment and inventories are immediately expensed. This regime simplifies accounting and compliance as it only requires information on income and disbursements. To file taxes as a *14 ter* firm, companies must be VAT taxpayers, have annual sales below 318,000 dollars and register assets below 380,000 dollars. In 2013, 9% of active firms filed taxes under the 14T regime.

Regimes *14 bis* and *14 quáter* (henceforth 14B and 14Q, respectively) allow for broader exemptions, although firms have to comply with stricter requirements for eligibility.

Under the 14B regime, companies do not pay corporate income taxes and are exempted from keeping detailed accounting and from tracking undistributed profits. Shareholders pay taxes only upon the distribution of profits. To be able to file taxes under 14B, newly created firms have to register capital worth less than 64,000 dollars and annual sales below 445,000 dollars. Active firms can switch to this regime if their annual sales over the past three years are below 318,000 dollars. A little over 3% of firms filed taxes under this regime in 2013.

Finally, under the 14Q regime –enacted in 2011–, firms face a zero rate of corporate income tax for the first 91,000 dollars taxable profits. Profits above this amount are taxed under *Primera Categoría* rules. For eligibility, companies have to sell no more than 1,800,000 dollars annually and register assets under 890,000 dollars. Annual sales for eligibility are computed adding up the sales of all related companies reporting income under 14Q. In 2013, less than 1% of active firms filed taxes under 14Q.

Table 1 summarizes the main features of these five corporate tax regimes.

Personal Taxes. Labor and pension income are taxed under the progressive *Segunda Categoría* (henceforth SC) regime. Personal income taxes and corporate income taxes are annually integrated under a global progressive tax, the *Global Complementario* (henceforth, GC). Only distributed profits enter the GC calculation. Retained profits are exempt until distribution. All SC taxes collected monthly from wages are fully credited against the GC tax due. All the corporate taxes already paid at the firm level are credited against the GC tax due as well, whenever profits

Table 1: Main Features of Tax Regimes for Small Businesses in Chile, 2013

	General Regime	14B	14T	14Q	RP
Main benefits	Special treatment for retained profits	Tax base is distributed profit; simplified accounting rules	Tax base is cash flow; simplified accounting rules	Annual profits up to 91,520 USD are exempt	Income imputed from fiscal value of certain assets; simplified accounting rules
Sales limit (USD)	No limit	317,775 active firms; 444,885 new firms	317,775	1,779,540	From 190,665 to 1,525,320 depending upon the sector
Sales limit calculated over	—	The company only	The company only	All related companies under 14Q	All related companies under RP and within the sector
Assets at registry limit (USD)	No limit	64,000 (new firms)	384,000	896,000	No limit
Economic sector	All sectors	All sectors	All sectors	All sectors	Agriculture, mining and transport services

Note: The exchange rate of December 30, 2013 was used to convert Chilean pesos into dollars.

are distributed to the individual shareholders. That is, business taxes paid cannot be claimed as credit until dividends are paid out.

In 2013, the progressive GC taxed the comprehensive income base at marginal rates ranging from 0% to 40%. Annual incomes under 12,600 dollars were exempt. Nearly 80% of individual taxpayers were exempt in 2013.

Discussion. Whenever the tax treatment of income derived from alternative sources differs substantially, taxpayers respond in order to take advantage of the differentials. The STRs analyzed in this paper are likely to have an impact on the ways small firms are legally organized and structured, as well as on the ways income from different sources are reported for tax purposes.

On the one hand, the self-employed may convert labor income into more lightly taxed forms of capital income (e.g., professionals who incorporate can deduct expenses as costs and avoid the higher marginal rates of the *Segunda Categoría* tax). On the other hand, businesses may disguise one kind

of activity as another in order to avoid taxes (e.g., create a RP company whose sole investment is a truck and shift profits from other firms to the trucking company). In addition, a firm may split into multiple smaller firms to become eligible for preferential tax treatments (e.g., to take advantage of the tax exemption under 14Q). Finally, personal consumption can be disguised as retained profits to take advantage of the preferential treatment of undistributed profits (e.g., a second or vacation home can be bought as a profit reinvestment under 14B to fully avoid the associated taxes).

In summary, these STRs provide taxpayers with opportunities for tax avoidance and non compliance. The increased complexity of the income tax system as a whole may also lead to decreased enforcement as it affects the monitoring capacity of the tax authority (Slemrod, 1989).

Given the large gap between the top personal income marginal tax rate (40%) and the much lower effective tax rates paid under the several STRs, higher income taxpayers have the largest incentives to take advantage of the preferential treatments through tax planning strategies.

In Sections 4 and 6 below, we analyze the tax regime choices taken by individual taxpayers in Chile in order to assess whether the observed behavior is consistent with the adoption of tax avoidance strategies, particularly among high income taxpayers.

3. Data

The data used are obtained from administrative records covering all taxpayers, and were provided by the Chilean Internal Revenue Service. More specifically, we had access to two different data sets. The first consists of data from tax form F22 for period 2008-2013. This form is used by firms to file corporate income taxes (*Primera Categoría*) and by individual taxpayers to file personal income taxes (*Global Complementario*). Table 2 shows the number of taxpayers by type filing taxes through form F22.⁶

Table 2: Taxpayers filling F22

	Individuals	Firms
2008	1,972,270	912,353
2009	2,010,200	924,870
2010	2,121,840	941,784
2011	2,231,351	967,561
2012	2,732,401	993,418
2013	2,875,947	966,707

The second data base we use was assembled by the World Bank in collaboration with the Chilean Internal Revenue Service (World Bank, 2015).

⁶Dependent workers who do not have income other than wages and salaries do not need to file the F22 tax form, as all their taxes due have been withheld by their employers. On average, 69.8% of all individual taxpayers are exempt from filling this form.

Using administrative data for all taxpayers in 2013, the World Bank merged income from all sources for all individuals (income reported in the F22 form, wages and salaries of dependent workers not filing *Global Complementario* but reported by employers in tax form F1887, and pensions of taxpayers not filing the F22 reported by pension providers in tax form F1812).

Business profits were allocated to the corresponding shareholders based on ownership data. Since many companies in Chile have other companies as shareholders, an iterative process was used to allocate all profits to individuals. The World Bank performed such iterative process using shareholder information for 2013 and following the methods in Agostini (2013) and Fairfield and Jorratt (2014). We replicated this iterative process for 2012, using ownership shares for 2013 which are the only ones available from the tax authority.

The profits of firms filing taxes under some STRs have to be estimated as these firms do not always report financial profits. For this purpose, Chile's tax authority used cash flow information reported by firms in the tax forms used to file VAT as an approximation.

The accrued income information assembled for each taxpayer allows for an estimation of the entire 2013 income distribution at the individual level. It also allows us to explicitly relate individual taxpayers with the activity of the firms they own. Together, these allow us to make a distributional analysis regarding STRs for a single year. The stylized facts described in the next section use these data.

For the estimation of the effects of the RP regime reform, we use the administrative data in all F22 tax forms and focus on high income taxpayers who perceive income from businesses. One potential concern with these data is that income from RP firms is self-reported by each shareholder and never audited as it is not used in the calculation of taxes due. To address this concern, we use this self-report jointly with the tax credits claimed by firms filing taxes under the RP regime. This variable should be highly correlated with RP earnings. Moreover, the tax credits are audited by the Chilean authority, so they should represent a more reliable measure of the firms' activity.

Table 3 shows descriptive statistics of the data used in the regression analysis. It consists of data on all individual taxpayers filling the F22 tax form in 2012 and 2013, who in 2012 perceived income from businesses, were in the higher four tax brackets of the personal income tax scheme, and were at least 18 years old.

Table 3: Descriptive Statistics

	Obs.	Mean	Std. Dev.
Taxable Income	144,500	2679.43	3519.37
Age	143,510	53.28	13.92
Sex (1=Female)	143,372	0.30	0.46
RP Sector	116,968	0.10	0.30
RP Earnings (UF)	144,500	53.64	470.67
Withdrawals (UF)	144,500	889.81	1588.93
Dividends (UF)	144,500	130.34	1084.79
14T Earnings (UF)	144,500	76.36	417.36
Independent Labor Income (UF)	144,500	262.96	1212.05
Dependent Labor Income (UF)	144,500	1035.28	2208.45

UF is an index that adjusts daily according to the CPI. 1 UF equaled near 45 dollars by the end of 2013.

The variable Taxable Income is the tax base used to determine taxes due according to the *Global Complementario* schedule. The dummy Sex equals 1 if the taxpayer is female and 0 otherwise. The RP Sector dummy equals 1 if the main economic sector of the taxpayer is agriculture, transport or mining, and 0 otherwise. The RP Earnings variable is the income from firms filing taxes to the presumptive income tax regime. The variable Withdrawals is the income from withdrawals from firms filing taxes under the 14B, 14Q or the general regime. The variable Dividends is the income from dividends distributed from limited liability companies. The variable 14T Earnings is income coming from firms filing taxes under the 14T tax regime. The variable Independent Labor Income is the income from independent labor. Finally, the variable Dependent Labor Income is wages and salaries of employees. All monetary variables are measured in UF, which is a unit of account used in Chile for indexation purposes that is adjusted daily to account for inflation.

4. STR Use: Three Stylized Facts

Three stylized facts regarding the use of STRs are described in this section: first, STRs are frequently used among business owner taxpayers; second, STRs are mainly used by high income taxpayers; and finally, top income taxpayers hold a portfolio of businesses filing taxes under different STRs. In the next section, we develop a simple model in order to explain these facts and to obtain predictions that are tested in the sections that follow.

Stylized Fact 1: “STRs are frequently used”

Table 4 shows the fraction of total active businesses filing taxes under each of the small business special regimes in years 2008 to 2013. About one in four firms file taxes under one of these STRs in any given year. The RP regime is the most frequently used as about 15% of all active businesses file taxes as a RP company. The 14Q regime is the least used regime, as less than 1% of all active businesses file taxes under it.

Table 4: Share of Total Active Firms Filing Taxes under a STR Regime

Year	14B	14T	14Q	RP	Any STR
2008	4.53%	5.08%	-	15.93%	24.42%
2009	4.09%	5.67%	-	15.69%	24.48%
2010	3.73%	6.23%	0.10%	15.41%	24.57%
2011	3.38%	6.70%	0.92%	15.09%	25.20%
2012	3.11%	7.29%	0.87%	14.81%	25.20%
2013	3.14%	9.24%	0.96%	15.29%	27.69%

Source: Authors' calculations on the basis of Chile's Internal Revenue Service administrative data. Shares are calculated over total active businesses in each year. The sum of individual STR cells may not match the *Any STR* column, as firms may switch regimes during a year.

Stylized Fact 2: "STRs are mainly used by high income taxpayers"

Panel A of Table 5 shows the fraction of taxpayers that own shares of at least one firm filing taxes under any given STR according to the position of the taxpayer in the 2013 income distribution. Over 30% of taxpayers in the top 0.1% own shares of at least one firm filing taxes under a STR, whereas only 2.6% of the bottom 90% do so. Differences in ownership along the income distribution are especially strong in the RP regime.

Panel B shows the share of total profits of businesses filing taxes under the different STRs that are owned by taxpayers in each income group. Of all profits from STR firms, 44.4% belong to taxpayers at the top 1% (12.1% to the top 0.1% and 32.3% to the next 0.9%). This fraction is in sharp contrast with the 19.6% share of taxpayers at the bottom 90%. The RP and the 14Q regimes show the largest concentration of profits at the top, as almost half of total profits under these regimes belong to the richest 1%.

If STRs are used for tax planning purposes, then we should expect a stronger use by high income individuals: given the progressivity of the income tax schedule, taxpayers at the top face stronger incentives –and also have more resources– to incur in strategic behaviors. Data in Table 5 shows that the use of special tax regimes for small businesses is in fact highly concentrated among the richest individuals. On the one hand, the higher the income, the larger the share of taxpayers owning businesses filing taxes under any given STR. On the other hand, the higher the income, the higher the share of total profits owned by the taxpayers.

Table 5: Ownership of STR Firms

A: Fraction of Taxpayers Owning Shares of STR Businesses					
Regime	0.1%	0.1%-1%	1%-5%	5%-10%	>10%
14B	5.42%	1.81%	0.73%	0.42%	0.34%
14T	6.76%	3.26%	1.81%	1.18%	0.94%
14Q	2.34%	1.57%	0.83%	0.35%	0.08%
RP	21.24%	10.34%	3.95%	2.50%	1.34%
Any STR	30.71%	15.45%	6.87%	4.21%	2.60%

B: Share of Profits by Income Group					
Regime	0.1%	0.1%-1%	1%-5%	5%-10%	>10%
14B	8.74%	27.57%	28.68%	11.76%	23.26%
14T	5.26%	22.93%	27.07%	13.27%	31.47%
14Q	10.04%	36.63%	36.18%	9.18%	7.98%
RP	13.94%	34.41%	24.00%	9.98%	17.67%
Any STR	12.11%	32.27%	25.57%	10.49%	19.55%

Source: Authors' calculations using Chile's Internal Revenue Service data for 2013. Shares in Panel A are calculated over the total number of taxpayers in each income group. Shares in Panel B are calculated over total profits by regime (therefore, each row adds up to 100%).

Stylized Fact 3: “High income taxpayers are more likely to hold portfolios of STR firms”

Table 6 shows the fraction of business-owner taxpayers at different points of the income distribution, who own shares of a single firm (Panel A) or ten or more firms (Panel B).⁷ Panel A shows that 5.7% of individuals at the top 0.1% own one firm only, while over 83% of business owners at the bottom 90% do so. In contrast to this, Panel B shows that 55.7% of individuals at the top 0.1% own shares of at least 10 firms, while only 0.7% of business owners at the bottom 90% do so.

When we consider individuals owning at least one 14B firm, the fraction of 0.1% top taxpayers who own only one firm drops to less than 1% while the fraction of individuals owning at least ten firms rises to 77.4%. The reverse is observed when the fraction of taxpayers at the bottom 10% is analyzed. Similar patterns are observed for the other preferential tax regimes for small businesses.

⁷Table B.14 of Appendix B shows fractions of taxpayers holding shares of 1 to over 15 firms.

Table 6: Fraction of Taxpayers Owning Different Number of Businesses

A: One single firm					
Conditional on owning	0.1%	0.1%-1%	1%-5%	5%-10%	>10%
Any business	5.68%	24.97%	49.72%	66.48%	83.18%
14B	0.77%	12.00%	41.44%	63.57%	87.07%
14T	1.48%	17.67%	47.31%	68.79%	90.10%
14Q	2.49%	15.13%	38.82%	56.32%	72.11%
RP	2.28%	14.34%	41.69%	65.00%	82.07%

B: Ten or more firms					
Conditional on owning	0.1%	0.1%-1%	1%-5%	5%-10%	>10%
Any business	55.74%	16.75%	4.52%	1.76%	0.70%
14B	77.38%	35.07%	10.07%	3.11%	0.79%
14T	75.71%	24.34%	5.46%	1.85%	0.35%
14Q	63.70%	21.19%	4.95%	1.46%	0.53%
RP	63.24%	21.45%	5.45%	1.51%	0.31%

Source: Authors' calculations using Chile's Internal Revenue Service administrative data for 2013. Shares are calculated over total taxpayers in each income group, conditioning on owning at least one firm subscribed to the corresponding regime.

Table 7 looks deeper into the ownership of firms subscribed to different STRs. Panel A shows the share of taxpayers who own three or more businesses filing taxes under any given preferential tax regime, conditional on owning at least one business in the regime. Panel B shows the fraction of taxpayers who simultaneously own businesses subscribed to one or more STR, conditional on owning at least one STR firm.⁸

The figures in Panel A show that the likelihood of owning a large number of STR firms under any given regime is many times higher among the wealthiest groups. More specifically, while 6.3%, 5.8%, 4.3% and 12.4% of taxpayers at the top 0.1% own three or more businesses subscribed to the 14B, 14T, 14Q and RP regimes respectively, the corresponding fractions never exceed half a percentage point among the bottom 90%.⁹ The same is true for STR combinations: the share of taxpayers simultaneously holding businesses subscribed to more than one special regime increases monotonically with income, from less than 5% at the bottom 90% to about 15% at the top 0.1%.

In summary, this section's descriptive statistics show that special tax regimes are frequently used. More important, they show that the ownership of these firms is highly concentrated among the wealthiest taxpayers who, at the same time, hold complex portfolios of STR firms. As discussed in Section 2, the main role of these preferential regimes is to reduce the burden of compliance costs for small businesses and of monitoring costs for the tax authority. Nevertheless, the stylized facts suggest that more than favoring low income owners, STR use may be a by-product of the tax

⁸Table B.15 of Appendix B shows detailed data for Panel A, while Table B.16 of Appendix B shows detailed data for Panel B.

⁹As Table B.15 of Appendix B shows, the number of businesses in the same regime a taxpayer may own can reach surprisingly high levels. For example, some taxpayers at the top 0.1% own 41 14B businesses, 19 14T businesses, or 22 RP businesses.

Table 7: STR Portfolio Complexity

A: Individuals Owning 3 or more Firms under any Single STR					
Regime	0.1%	0.1%-1%	1%-5%	5%-10%	>10%
14B	6.31%	1.84%	0.40%	0.43%	0.03%
14T	5.80%	2.16%	0.54%	0.24%	0.05%
14Q	4.27%	2.35%	0.58%	0.33%	0.21%
RP	12.39%	5.12%	1.43%	0.54%	0.12%

B: Combinations of STR Use					
Regime	0.1%	0.1%-1%	1%-5%	5%-10%	>10%
One	84.80%	90.52%	93.56%	94.16%	95.90%
Two	14.14%	9.18%	6.35%	5.78%	4.07%
Three	1.03%	0.29%	0.08%	0.06%	0.03%
All	0.03%	0.01%	0.00%	0.00%	0.00%

Source: Authors' calculations using Chile's Internal Revenue Service administrative data for 2013. Shares in Panel A are calculated over the total number of taxpayers in each income group, conditioning on owning at least one business subscribed to the respective regime. Shares in Panel B are calculated over the total number of taxpayers in each income group, conditional on owning at least one business subscribed to any STR. STR combinations refer to simultaneously owning businesses subscribed to different STRs.

planning decisions of high income individuals.

In the following section we present a simple model that attempts to account for these stylized facts. We also derive testable implications that are empirically explored in Section 6.

5. Model

The model is static. The agent receives exogenous income Y that is strategically broken up into two components, a component that is sheltered from the income tax, Y_s , and an unsheltered component, Y_u , with $Y = Y_s + Y_u$. The unsheltered component pays income tax at marginal rate $\tau_m(Y_u)$, hence the average income tax rate, $\tau(Y_u)$ satisfies

$$\tau(Y_u) + Y_u \tau'(Y_u) = \tau_m(Y_u). \quad (1)$$

In line with Chile's (and most country's) income tax schedule, we assume $\tau_m(0) = 0$ and $\tau'_m \geq 0$.¹⁰

The component Y_s is sheltered in small businesses created for the sole purpose of lowering the agent's tax burden. Income reported by each of these businesses up to L is taxed at a constant rate t . Firms have no incentive to report income above L since they lose eligibility for the RP

¹⁰For simplicity we assume τ_m differentiable at all points and ignore the possibility of discontinuities.

regime should they do so.

Creating businesses comes at a cost captured by the function $c(S)$, where S denotes the number of businesses created. These costs can be interpreted as set up costs or the cost of managing the businesses. We assume $c(0) = 0$, $c' > 0$ and $c'' > 0$.¹¹ We also assume that these costs cannot be subtracted from the tax base. For simplicity and without any relevant loss of generality we ignore integer constraints on S . It then follows that

$$S = \frac{Y_s}{L}, \quad (2)$$

since it is optimal to shelter income in each business to the maximum, L , that benefits from a lower tax rate. It also follows that S is the sum of the agent's participations in all businesses and whether the agent holds entire businesses or only a fraction thereof is irrelevant.

The agent maximizes after tax income, Z . Given the above assumptions, her problem is

$$\max_{0 \leq Y_s \leq Y} Z = [1 - \tau(Y - Y_s)](Y - Y_s) + (1 - t)Y_s - c(Y_s/L). \quad (3)$$

As shown in the expression above, after tax income, Z , has two components. The first component is unsheltered income net of income taxes, $(1 - \tau)Y_u$. The second component is sheltered income net of taxes and setup costs, $(1 - t)Y_s - c(S)$.

The above setup captures, albeit in a simplified way, one of the main features of preferential tax regimes for small enterprises described in Section 2, namely that their benefit expires beyond a certain size-related threshold. This characteristic provides incentives for high income individuals to create many such businesses.

Next we solve the agent's problem. Differentiating (3) w.r.t. Y_s and using (1) yields

$$Z'(Y_s) = [\tau_m(Y - Y_s) - t] - \frac{c'(Y_s/L)}{L}. \quad (4)$$

The marginal benefit from creating an additional enterprise is equal to the difference between the gap between both tax rates and the marginal cost of setting up and managing the additional business (where the latter is normalized by the maximum income that benefits from the preferential regime). The first term in (4) is increasing in sheltered income because the marginal tax rate increases with taxable income. By contrast, the second term is increasing in sheltered income because the marginal cost of creating businesses is increasing. It follows that marginal after tax income is increasing in sheltered income:

$$Z''(Y_s) = -\tau'_m(Y - Y_s) - \frac{c''(Y_s/L)}{L^2} < 0. \quad (5)$$

A first implication of (4) and (5) is that the agent will not set up any business if the cost of setting up the first business is larger than the benefit, that is, if $Z'(0) \leq 0$. This leads to

¹¹The cost function c is closely related to the cost of tax avoidance considered in Slemrod and Yitzhaki (2002) and Slemrod (2001) that is increasing and convex in the amount of taxes sheltered.

Result 1 *The agent will use the special tax regime only if*

$$[\tau_m(Y) - t]L > c'(0). \quad (6)$$

It follows that there exists a strictly positive income threshold \bar{Y} characterized as the largest value of Y that satisfies¹²

$$[\tau_m(\bar{Y}) - t]L = c'(0), \quad (7)$$

such that the agent uses the special tax regime only if $Y > \bar{Y}$. Also, the threshold \bar{Y} is increasing in the preferential tax rate t .

Proof Expression (6) follows from $Z'(Y_s = 0) > 0$. The other statements follow from the assumption that $\tau'_m \geq 0$. \square

The agent's problem (3) will have an interior solution if (6) holds and if $Z'(Y_s = Y) < 0$. The latter is equivalent to:

$$[\tau_m(0) - t]L < c'(Y/L)$$

which holds always given the assumption that $\tau_m(0) = 0$. We are ready to characterize the optimal values of sheltered income and the number of businesses:

Result 2 *Consider \bar{Y} defined in (7) and denote by Y_s^* and S^* the optimal choices of Y_s and S , respectively.*

If $Y \leq \bar{Y}$ we have $Y_s^ = S^* = 0$. By contrast, if $Y > \bar{Y}$, Y_s^* and S^* , are characterized by¹³*

$$[\tau_m(Y - Y_s^*) - t]L = c'(Y_s^*/L) \quad (8)$$

and

$$[\tau_m(Y - S^*L) - t]L = c'(S^*). \quad (9)$$

Proof Follows from (4), (5) and Result 1. \square

Result 2 is consistent with Stylized Facts 1 and 2 from the previous section. Special tax regimes will be used by all individuals with income above \bar{Y} , with \bar{Y} at least as large as the highest income with an average tax rate of t .

The following result shows that, among those agents that create businesses, the number of businesses held increases with income.

Result 3 *Assume the agent's income is larger than \bar{Y} defined in (7). Then Y_s^* and S^* are strictly increasing in Y , with*

$$\frac{\partial Y_s^*}{\partial Y} = \frac{\tau'_m(Y_u^*)L^2}{\tau'_m(Y_u^*)L^2 + c''(S^*)} \in [0, 1), \quad (10)$$

$$\frac{\partial S^*}{\partial Y} = \frac{\tau'_m(Y_u^*)L}{\tau'_m(Y_u^*)L^2 + c''(S^*)} \in [0, \frac{1}{L}), \quad (11)$$

¹²If $\tau'_m > 0$ the value is always unique, otherwise there may be a continuum of values.

¹³If many values of Y_s^* and S satisfy the conditions that follow, choose the largest one.

where $Y_u^* = Y - Y_s^*$.

Proof Follows from implicit differentiation of (8) w.r.t. Y . \square

The intuition for (10) is the following: As the agent's income increases so does the marginal income tax rate she must pay. For this reason, the agent is prepared to pay higher set up costs when her income is higher. Equation (10) above also shows that the marginal propensity to shelter income will lie between zero and one and will be smaller if setup costs grow faster (larger value of c'').

Equation (11) shows that the number of enterprises created will increase with income, as noted in Stylized Fact 3 in the preceding section.

The following result complements Result 3 by providing comparative statics w.r.t. variables other than income.

Result 4 *Under the assumptions of Result 3:*

$$\begin{aligned}\frac{\partial Y_s^*}{\partial t} &= -\frac{L^2}{\tau_m'(Y_u^*)L^2 + c''(S^*)} < 0, \\ \frac{\partial Y_s^*}{\partial L} &= \frac{c'(S^*) + c''(S^*)S^*}{\tau_m'(Y_u^*)L^2 + c''(S^*)} > 0,\end{aligned}$$

where $S^* = Y_s^*/L$ and $Y_u^* = Y - Y_s^*$.

We also have:

$$\begin{aligned}\frac{\partial S^*}{\partial t} &= -\frac{L}{\tau_m'(Y_u^*)L^2 + c''(S^*)} < 0, \\ \frac{\partial S^*}{\partial L} &= \frac{c'(S^*) - \tau_m'(Y_u^*)}{\tau_m'(Y_u^*)L^2 + c''(S^*)}.\end{aligned}$$

Finally, to capture changes in the cost of creating businesses, we replace $c(S)$ by $ac(S)$, where $a > 0$ is a scale parameter that captures how fast marginal costs increase with the number of firms. We then have:

$$\frac{\partial Y_s^*}{\partial a} = -\frac{\tau_m'(Y_u^*)L^2 + ac''(S^*)}{c'(S^*)L} < 0, \quad (12)$$

$$\frac{\partial S^*}{\partial a} = -\frac{\tau_m'(Y_u^*)L^2 + ac''(S^*)}{c'(S^*)L^2} < 0. \quad (13)$$

Proof The expressions follow from implicit differentiation of (8) and (9) w.r.t. t , L and a after replacing $c(S)$ by $ac(S)$. Also, to obtain the expressions for partial derivatives w.r.t. L we use (8) to get rid of an expression involving $\tau_m - t$. \square

The intuition underlying the first three expressions in Result 4 is straightforward. If the benefits associated with the special tax regime decrease, because t increases or L decreases, sheltered income decreases as well.

In general, the identity $S^* = Y_s^*/L$ implies that the partial derivatives for S^* are obtained dividing partial derivatives for Y_s^* by L . The case of the partial derivative w.r.t. L is different since for this case the denominator in Y_s^*/L also varies with the variable of interest. It is therefore not surprising that the sign of the expression we obtained for $\partial S^*/\partial L$ is indeterminate. If $c'(S^*) > \tau'_m(Y_u^*)$ the optimal number of firms increases with L while the opposite happens if $c'(S^*) < \tau'_m(Y_u^*)$.¹⁴

Finally, the intuition for the impact of changes in the cost function is straightforward: a shift upward of this function makes business creation more costly and therefore lowers income sheltered and the optimal number of businesses.

5.1. Extension

We extend the above model to the case with two special tax regimes and denote by Y_{is} income sheltered in regime i with $i = 1, 2$ so that now unsheltered income is given by

$$Y_u = Y - Y_{1s} - Y_{2s}.$$

The preferential tax rate of regime i is t_i , valid for reported business income less than L_i , and the number of businesses that benefits from tax regime i is S_i , with

$$S_i = \frac{Y_{is}}{L_i}, \quad i = 1, 2.$$

We assume two separate cost functions for setting up businesses, one for those of type 1, the other for those of type 2. That is, the cost of setting up and managing S_1 firms of type 1 and S_2 firms of type 2 is

$$c(S_1, S_2) = c_1(S_1) + c_2(S_2) + c_3(S_1 + S_2),$$

with $c_i(0) = 0$, $c'_i > 0$ and $c''_i > 0$. The first two components are important for the results that follow, that is, both tax regimes involve separate cost components. This will be the case, for example, if both regimes apply to different economic sectors and sector-related sunk investments are needed to be eligible for each regime. The third component captures economies of scope between all businesses where the agent has participation, since its role is not essential to derive the results that follow, we assume it is equal to zero.

The agent's problem now is:

$$\begin{aligned} \max_{Y_{1s}, Y_{2s}} Z &= [1 - \tau(Y_u)]Y_u + (1 - t_1)Y_{1s} + (1 - t_2)Y_{2s} - c_1(Y_{1s}/L_1) - c_2(Y_{2s}/L_2), \\ \text{s.t. } Y_{1s} &\geq 0, Y_{2s} \geq 0, \\ Y_{1s} + Y_{2s} &\leq Y. \end{aligned} \tag{14}$$

¹⁴To understand why, assume (8) holds and consider an increase in L with S^* and Y_s^* unchanged. If $\tau'_m(Y_u^*)$ is small enough, the l.h.s. will increase while the r.h.s. always decreases. An increase in S^* will reestablish the first order condition in this case. By contrast, if $\tau'_m(Y_u^*)$ is sufficiently small we may have the r.h.s. decrease and if $c'(S^*)$ is sufficiently small this decrease may be larger than the decrease of the r.h.s. In this case a decrease in S^* will be needed for the first order condition to hold again.

Result 5 Assume the solution to (14) is interior and replace $c_1(S)$ by $ac_1(S)$. Then

$$\frac{\partial Y_{2s}^*}{\partial L_1} = -\frac{[c_1''(S_1^*)S_1^* + c_1'(S_1^*)]L_2^2\tau_m'(Y_u^*)}{c_1(S_1^*)c_2(S_2^*) + [c_1''(S_1^*)L_2^2 + c_2''(S_2^*)L_1^2]\tau_m'(Y_u^*)} < 0, \quad (15)$$

$$\frac{\partial Y_s^*}{\partial L_1} = -\frac{c_2''(S_2^*)}{\tau_m'(Y_u^*)L_2^2} \frac{\partial Y_{2s}^*}{\partial L_1} > 0, \quad (16)$$

$$\frac{\partial Y_{2s}^*}{\partial a_1} = \frac{c_1'(S_1^*)L_2^2\tau_m'(Y_u^*)}{c_1''(S_1^*)c_2''(S_2^*) + [c_1''(S_1^*)L_2^2 + c_2''(S_2^*)L_1^2]\tau_m'(Y_u^*)} > 0, \quad (17)$$

$$\frac{\partial Y_s^*}{\partial a_1} = -\frac{c_2''(S_2^*)}{L_2^2\tau_m'(Y_u^*)} \frac{\partial Y_{2s}^*}{\partial a_1} < 0, \quad (18)$$

where $Y_s^* = Y_{1s}^* + Y_{2s}^*$.

Proof We derive the partial derivatives w.r.t. a_1 , the derivation of partial derivatives w.r.t. L_1 is similar. We also omit the subindex s in Y_{1s} and Y_{2s} in what follows.

From (14) we have that the first order conditions w.r.t. Y_1 and Y_2 are:

$$\tau_m(Y - Y_1 - Y_2) - t_1 = \frac{a_1}{L_1} c_1'(Y_1/L_1), \quad (19)$$

$$\tau_m(Y - Y_1 - Y_2) - t_2 = \frac{1}{L_2} c_2'(Y_2/L_2). \quad (20)$$

Implicit differentiation of both expressions above w.r.t. a_1 , and omitting arguments whenever this does not lead to confusion, leads to:

$$-\tau_m' \left(\frac{\partial Y_1}{\partial a_1} + \frac{\partial Y_2}{\partial a_1} \right) = \frac{c_1'}{L_1} + \frac{c_1''}{L_1^2} \frac{\partial Y_1}{\partial a_1}, \quad (21)$$

$$-\tau_m' \left(\frac{\partial Y_1}{\partial a_1} + \frac{\partial Y_2}{\partial a_1} \right) = \frac{c_2''}{L_2^2} \frac{\partial Y_2}{\partial a_1}. \quad (22)$$

Subtracting (22) from (21) yields:

$$\frac{\partial Y_1}{\partial a_1} = \frac{c_2''L_1^2}{c_1''L_2^2} \frac{\partial Y_2}{\partial a_1} - \frac{c_1'L_1}{c_1''}.$$

Substituting this expression for $\partial Y_1/\partial a_1$ in (22) and solving for $\partial Y_2/\partial a_1$ leads to (17). And substituting the expression for $\partial Y_2/\partial a_1$ from (17) in (20) yields (18). \square

Result 5 establishes what may be viewed as “income” and “substitution” effects when a preferential tax regime becomes less attractive, either because L_1 decreases or because a_1 increases. In both cases total sheltered income decreases, which follows from (16) and (18). This is the income effect and is closely related to the fact that the agent is poorer. At the same time, the individual switches sheltered income from the regime that became less attractive to the one unaffected by the reform, as shown by (15) and (17). This is the substitution effect.

5.2. Testable predictions

The results derived above can be used to formulate testable predictions for taxpayer’s reactions to exogenous changes in the key parameters. Concretely, consider a reform that makes the preferential tax regime less attractive, for example, a reduction in L or an increase in a . Result 4 helps answer this question when there is only one preferential tax regime. Sheltered income decreases and the impact on the number of businesses is ambiguous. Result 5, that considers the case with many preferential regimes, predicts that income sheltered in regimes unaffected by the reform increases while income sheltered in the reformed regime decreases. Also, overall sheltered income decreases.

Testable implications can also be obtained for after tax income, as summarized in

Result 6 *Denote optimal after tax income by Z^* . Then, under the assumptions of Result 3 (only one preferential tax regime) we have*

$$\begin{aligned}\frac{dZ^*}{dL} &= \frac{c'(S^*)S^*}{L}, \\ \frac{dZ^*}{da} &= -c(S^*).\end{aligned}$$

And under the assumptions of Result 5 (many preferential tax regimes) we have

$$\begin{aligned}\frac{dZ^*}{dL_1} &= \frac{c'(S_1^*)S_1^*}{L_1}, \\ \frac{dZ^*}{da_1} &= -c_1(S_1^*).\end{aligned}$$

Proof Follows directly from applying the Envelope Theorem to (3) and (14) □

6. Empirical Evidence on Strategic Behavior

The RP special tax regime underwent two major changes in 2013. First, the maximum amount of assets for a given business that can benefit from this regime was lowered, which may be interpreted as lowering L_1 in the extended version of our model, where we assume that the RP sector is the first sector.¹⁵ Second, the taxpayer’s benefits from *all* businesses she owned could not exceed the above mentioned bound. In principle, this would amount to imposing $S_1 \leq 1$ in the extended version of the model. Since there exist ways of partially circumventing this requirement, such as including children and spouses among business owners, we may capture this new requirement as an increase in the scale parameter a_1 for the cost function $c_1(S)$.¹⁶

¹⁵Of course, as mentioned in Section 2, the RP regime works by imputing profits from the book value of assets, and then including these profits in the individual’s income tax base, which is different from the model even though, arguably, the qualitative implications are similar.

¹⁶Taxes are filed at the individual level in Chile; i.e., there is no joint filing for spouses or other family members.

In this section, we take advantage of this reform to test the model’s predictions. We test four predictions.¹⁷ First, overall tax payments should increase. Second, income sheltered in businesses that benefit from the RP regime should decrease. Third, income sheltered in businesses that benefit from other preferential regimes, which did not change, should increase. Finally, options available to the taxpayer to generate disposable income, such as dividend payments, should be used more.

6.1. Identification Strategy

From the model’s results, it follows that taxpayers that held businesses taxed under the RP regime before the reform, compared with those that did not, should have experienced an increase in their taxable income, a decrease in income reported under the RP regime and an increase of incomes reported under alternative STRs and other income sources.

We follow a difference-in-differences (DID) strategy, comparing taxpayers that obtained income from businesses subscribed to the RP regime with taxpayers who obtained incomes from businesses without access to the RP regime, before and after the reform. More specifically, we define treatment and control groups as follows. An individual taxpayer belongs to the treatment group if in the year 2012 —the year immediately before the reform— she reported income from businesses that subscribed to the RP regime. Contrary, she belongs to the control group if, even though she did report income from firms, no income from a business under the RP regime was reported. Taxpayers with no entrepreneurial activity were excluded from the control group. As the treatment status is not exogenous, sample corrections and complementary robustness checks are carried out below.

The estimated equation is

$$\log Y_{it} = \alpha + \beta T_i + \delta D_t + \gamma T_i D_t + X'_{it} \theta + \varepsilon_{it}, \quad (23)$$

where $\log Y_{it}$ is the (log of the) outcome variable of interest (taxable income or income obtained from various sources) by individual i in period t , T_i is a dummy variable that indicates whether the individual belongs to the treatment group, D_t is a dummy variable equal to 1 if $t = 2013$, $T_i D_t$ is the interaction between both variables, X_{it} is a set of control variables that may include sex, town and economic sector dummies, age and the lagged dependent variable, and ε_{it} is the error term.

Dependent variables used for estimating equation (23) are taxable income (TI), income from businesses registered in the RP regime (RP), withdrawals from businesses subscribed to the 14B regime, 14Q regime or the general regime (W),¹⁸ dividends (i.e. withdrawals from publicly traded corporations) (D), income from businesses registered as 14T firms ($14T$), income from independent work ($Ind.Work$), and income from dependent work ($Dep.Work$).

¹⁷In some cases the relation to the model in Section 4 is close, in other cases they should be described as “broad implications”.

¹⁸It would be interesting to use withdrawals from businesses subscribed to different regimes separately. Unfortunately, only aggregate withdrawals data from these regimes is available.

Given that Chile’s Internal Revenue Service does not manage information about the profits of firms under the RP regime –because tax liabilities are imputed from the fiscal value of the fixed assets– we use two proxies of individual RP earnings. First, we use self-reports of RP income ($RP1$), a noisy measure that is not audited by the tax authority. Second, we use the information on tax credits from businesses registered as RP firms ($RP2$). We expect this variable to be correlated with RP earnings and, more important, to be more reliable, as tax credits are based on the value of the firms’ assets on which the tax authority effectively manages information (and, contrary to the previous case, can be potentially audited).

The coefficient of interest in equation (23) is γ , which represents the percentage change of the outcome variable in response to the reform of the RP regime. If businesses subscribed to the RP regime were effectively associated with income sheltering behaviors at the individual level, as the model of Section 4 suggests, γ should be positive when the dependent variable is taxable income and negative when it is income from the RP regime. The coefficient is also expected to be positive when we use income from firms that benefit from sheltered regimes other than the RP regime, and when we use income from alternative sources (dividends, withdrawals and income from independent work). Finally, we expect γ to be zero (a placebo test) when the dependent variable is income from dependent work.

Equation (23) is estimated via OLS using panel data to control for changes in the income distribution (Saez, 2004) and using clustered standard errors at the individual level. As a robustness check, equation (23) is also estimated using fixed-effects model, a model in differences and incorporating periods previous to 2012, the latter to control for trends.

The sample is restricted to taxpayers over 18 years old belonging to the four highest tax brackets, since only these brackets have marginal income tax rates higher than the corporate rate (20%) and therefore are likely to have incentives to use the STRs. In terms of the model in Section 5, these taxpayers are likely to have income above \bar{Y} defined in Result 1.

6.2. Assessing the Identification Strategy

Since individual taxpayers are not randomly assigned to the treatment and control groups, in this subsection we perform a number of tests assessing the internal validity of our identification strategy. We first assess the balance in covariates, and then we check for parallel pre-reform trends in the dependent variables.

To assess balance in covariates we follow Imbens and Rubin (2015) and compute four statistics to measure the differences between treatment and control group covariate distributions. Normalized differences, ND_{tc} , is a scale-free statistic for measuring differences in distributions’ locations. The logarithm of the ratio of standard deviations, Γ_{tc} , is a statistic for measuring differences in distributions’ dispersion. Finally, the fraction of the treated (control) observations whose covariate values are in the tails of the other group’s distribution, π_t^α and π_c^α is used to assess the support’s overlap.¹⁹ Technical details about the statistics and their empirical implementation ($\hat{N}D_{tc}$, $\hat{\Gamma}_{tc}$,

¹⁹ α accounts for the level of confidence, i.e. defines the *tails* of the distribution.

$\hat{\pi}_t^{0.95}$ and $\hat{\pi}_c^{0.95}$) are discussed in Appendix C.

As a rule of thumb, values larger than 0.25 for $\hat{N}D_{tc}$ and $\hat{\Gamma}_{tc}$, and larger than 0.1 for $\hat{\pi}_t^{0.05}$ and $\hat{\pi}_c^{0.05}$, may imply sensitivity to specification in linear regression methods.²⁰ When treatment and control groups are unbalanced, Imbens and Rubin (2015) suggest estimating a propensity score for the treatment status and excluding observations with a probability of being treated that is *too small* or *too high*. As a robustness check we reestimate all specifications excluding all observations with propensity score below 0.1 or above 0.9.

The four measures are calculated for a large set of variables that are assumed to be relevant for the analysis. Table 8 shows the statistics for the sample before and after the propensity score correction. All variables are measured in the pre-reform year, i.e. 2012. By construction, the only variables that are unbalanced to an important degree are those associated with the RP regime, which is not surprising, since RP earnings are used to define the treatment status and, therefore, are expected to be different between groups. In general, other variables do not show relevant differences. Moreover, the balance improves considerably after sample trimming: leaving aside RP related variables, no variable shows significant unbalances regarding distribution means, and only two variables display modest differences regarding distribution dispersion.

Table 8: Assessing Balance: Four Measures

	Full Sample				Trimmed Sample			
	$\hat{N}D_{tc}$	$\hat{\Gamma}_{tc}$	$\hat{\pi}_C^{0.05}$	$\hat{\pi}_T^{0.05}$	$\hat{N}D_{tc}$	$\hat{\Gamma}_{tc}$	$\hat{\pi}_C^{0.05}$	$\hat{\pi}_T^{0.05}$
Taxable Income	0.09	0.14	0.05	0.06	0.07	0.17	0.05	0.05
L.Taxable Income	0.11	0.06	0.09	0.06	0.07	0.09	0.07	0.04
Age	0.27	-0.03	0.08	0.05	0.07	0.05	0.04	0.06
Sex (1=Female)	-0.15	-0.08	0.01	0.01	0.02	0.02	0.00	0.00
RP Sector	0.69	0.69	0.24	0.20	0.64	0.52	0.00	0.00
RP Earnings	0.56	-	1.00	1.00	0.89	-	1.00	1.00
Withdrawals	-0.14	0.46	0.02	0.03	-0.05	0.28	0.02	0.04
Dividends	0.01	-0.66	0.03	0.02	0.01	0.22	0.03	0.02
14T Earnings	0.09	0.12	0.02	0.04	0.06	-0.08	0.02	0.03
Ind. Work Earnings	0.03	0.31	0.02	0.03	-0.03	0.01	0.02	0.03
Dep Work Earnings	0.07	-0.02	0.02	0.03	-0.01	-0.01	0.03	0.02

Note: Red bold is assigned to values above 0.25 (0.1), in absolute value, for the two first (last) statistics. Black bold is assigned to values between 0.1 and 0.25 (0.05 and 0.1), in absolute value, for the two first (last) statistics. *Trimmed Sample* stands for the sample that excludes propensity score tails. *L. Taxable Income* is the lag of the taxable income. $\hat{\Gamma}_{tc}$ is not computable for *RP Earnings* as sample variance of the control group is 0.

Table 9 presents summary statistics for the full and trimmed samples. Although using propensity scores improves the balance between both groups, differences between the original samples are not large.²¹

²⁰See Imbens and Wooldridge (2008) and Imbens and Rubin (2015).

²¹It follows that the potential loss of external validity associated with using trimmed sample is unlikely to be of any relevance.

Table 9: Descriptive Statistics

	Full Sample			Trimmed Sample		
	Obs.	Mean	Std. Dev.	Obs.	Mean	Std. Dev.
Treatment	144,500	0.15	0.36	78,260	0.20	0.40
Taxable Income	144,500	2679.43	3519.37	78,260	2684.03	2804.54
Age	143,510	53.28	13.92	78,260	56.80	12.47
Sex (1=Female)	143,372	0.30	0.46	78,260	0.19	0.39
RP Sector	116,968	0.10	0.30	78,260	0.14	0.34
RP Earnings (UF)	144,500	53.64	470.67	78,260	61.49	253.44
Withdrawals (UF)	144,500	889.81	1588.93	78,260	554.92	907.60
Dividends (UF)	144,500	130.34	1084.79	78,260	144.73	688.06
14T Earnings (UF)	144,500	76.36	417.36	78,260	92.12	419.21
Ind. Work Earnings (UF)	144,500	262.96	1212.05	78,260	393.79	1430.08
Dep. Work Earnings (UF)	144,500	1035.28	2208.45	78,260	1256.17	2215.58

Note: *Trimmed Sample* stands for the sample that excludes propensity score tails. *UF* is an inflation adjusted unit of account.

We also provide evidence that trends for outcome variables of the treatment and control groups in the absence of treatment are parallel, an assumption needed for the difference-in-differences approach to be valid (Angrist and Pischke, 2009). Figures in Appendix D show that the previous trends of most dependent variables are approximately parallel. In the few cases where this is not the case (withdrawals, dividends and 14T income), the variables in the control groups are increasing at a higher rate in the pre-reform period. As an additional check, below we also estimate equation (23) using longer periods (in order to control for previous trends) and a fixed-effects model. All results are robust to these alternative specifications consistent with the validity of our identification strategy.

6.3. Results

We begin by estimating the impact on taxable income of the reform that limited the benefits of the RP regime. We estimate (23) with taxable income in the role of Y_{it} , both for the full sample and for the trimmed sample.

Table 10 reports the estimates we obtain for the impact coefficient γ . Columns marked (1) have no controls, columns marked (2) control for sex, age, town and economic sector fixed effects and columns marked (3) add lagged taxable income to those considered in (2). The results are consistent across specifications. In all cases the estimated coefficient is highly significant, both in economic and statistical terms, and has the sign predicted by our model. For example, reported taxable income increases by 6.8% for the trimmed sample when all controls are included.

Table 11 presents the impact of the reform on proxies for income under the regime that was reformed (the RP regime) and a regime that was not reformed (the 14T regime).²²

²²See Section 5.1 for how exactly the proxies are calculated.

Table 10: Main Result: Taxable Income

	Full Sample			Trimmed Sample		
	(1)	(2)	(3)	(1)	(2)	(3)
Taxable Income	0.0697*** (0.0071)	0.0699*** (0.0079)	0.0956*** (0.0086)	0.0462*** (0.0081)	0.0465*** (0.0081)	0.0680*** (0.0088)
Additional Regressors:	No	Yes	Yes	No	Yes	Yes
Lagged Variables:	No	No	Yes	No	No	Yes
Observations:	144,500	115,703	114,672	78,260	77,982	77,982

Note: Estimated coefficients from regression (23) using taxable income in place of Y_{it} . *Trimmed Sample* stands for the sample that excludes propensity score tails. Years considered: 2012 (pre RP-reform) and 2013 (post RP-reform). *Additional regressors* include sex, age, economic sector fixed effects and town fixed effects. *Lagged variables* include lagged taxable income and, when being different, lagged dependent variable. Standard errors clustered at the individual level are reported in parenthesis.

The model predicts that income sheltered under the RP regime should decrease given that benefits from this regime are considerably less attractive after the reform. The first two sets of estimates in Table 11 confirm this prediction. Income reported under the RP regime fell for both measures of this income (self-reported RP earnings and RP tax credits). For example, for the trimmed sample and using all controls, RP-related tax credits fell by 15.8%. Again, the estimates are consistent across specifications.

The last set of estimates in Table 11 show the effect of the RP reform on another special tax regime. This time income reported under the 14T regime plays the role of Y_{it} when estimating (23). As predicted by the model, individuals substitute across special tax regimes and increase their use of one of them when using another has become more costly.

Table 11: Main Results: Income Sheltered Under Specific Regimes

	Full Sample			Trimmed Sample		
	(1)	(2)	(3)	(1)	(2)	(3)
RP Earnings (1st measure)	-0.556*** (0.0161)	-0.560*** (0.0176)	-0.878*** (0.0201)	-0.588*** (0.0191)	-0.585*** (0.0191)	-0.903*** (0.0215)
RP Earnings (2nd measure)	-0.0804*** (0.00792)	-0.0851*** (0.00900)	-0.136*** (0.0128)	-0.101*** (0.00975)	-0.0973*** (0.00977)	-0.158*** (0.0139)
14T Earnings	0.142*** (0.0151)	0.137*** (0.0167)	0.213*** (0.0244)	0.158*** (0.0184)	0.158*** (0.0186)	0.264*** (0.0273)
Additional Regressors	No	Yes	Yes	No	Yes	Yes
Lagged Variables	No	No	Yes	No	No	Yes
Observations	144,500	115,703	114,672	78,260	77,982	77,982

Note: Estimated coefficients from regression (23) using RP earnings (both measures) and 14T earnings, in place of Y_{it} . *Trimmed Sample* stands for the sample that excludes propensity score tails. Years considered: 2012 (pre RP-reform) and 2013 (post RP-reform). *Additional regressors* include sex, age, economic sector fixed effects and town fixed effects. *Lagged variables* include lagged taxable income and, when being different, lagged dependent variable. Standard errors clustered at the individual level are reported in parenthesis.

Summing up, our empirical estimations are consistent with the three main predictions from a model

where individuals strategically set up businesses to minimize their after tax income. A reform that makes one of these regimes less attractive increases overall taxable income, decreases income reported under the reformed regime and increases income reported under alternative regimes. Next we consider two robustness checks.

Table 12 looks at the medium term impact of the reform. Instead of comparing 2012 with the year immediately after the reform, this table compares the two years that followed, 2014 and 2015. We only report estimates for the trimmed sample, even though results with the full sample are similar. The results from Table 10 continue holding. In fact, for the latest year available, the magnitude of the effects is very similar to that the year immediately after the reform.

Table 12: Main Results: Taxable Income in Post-Reform Years

Years	(1)	(2)	(3)
2012–2013	0.0462*** (0.00807)	0.0465*** (0.00812)	0.0680*** (0.00880)
Observations:	78,260	77,982	77,982
2012–2014	0.0344*** (0.0113)	0.0369*** (0.0113)	0.0472*** (0.0111)
Observations:	77,438	77,394	77,153
2012–2015	0.0460*** (0.0145)	0.0493*** (0.0145)	0.0616*** (0.0135)
Observations:	76,236	76,202	75,938
Additional regressors:	No	Yes	Yes
Lagged Variables:	No	No	Yes

Note: Estimated coefficients from regression (23) using taxable income in place of Y_{it} . Results shown for the *Trimmed Sample*, i.e. the sample that excludes propensity score tails. Years considered: 2012 (pre RP-reform) and 2013, 2014 and 2015, respectively (different post RP-reform years). *Additional regressors* include sex, age, economic sector fixed effects and town fixed effects. *Lagged variables* include lagged taxable income and, when being different, lagged dependent variable. Standard errors clustered at the individual level are reported in parenthesis.

Table 13 considers the impact of the RP reform on other margins available to taxpayers to substitute for lower disposable incomes resulting from a more stringent RP regime. The first two sets of estimates consider with withdrawals (W) and dividends (D) obtained from businesses in the role of Y_{it} in (23). The businesses considered include both those under the general tax regime and those under special tax regimes other than the 14T considered above, as we do not have information to analyze these sources of income separately. As suggested by a generous interpretation of our model, the taxpayer increases the use of alternative sources of income after the RP reform, by 17% in the case of withdrawals and by 27% in the case of dividends, when we consider the specification with all controls.

Under Chilean tax law, business owners can pay themselves honoraria under certain conditions,

for tax purposes these incomes are recorded as Independent Work Earnings. The third set of estimates in Table 13 have these earnings as dependent variable and show that they increased by 10.5% for our preferred specification. By contrast, when we consider Dependent Work income, which correspond mainly to salaries unrelated to business ownership, the impact of the reform is much smaller and not significant in two out of three estimates.²³

Table 13: Main Results: Additional Options to Generate After Tax Income

	(1)	(2)	(3)
Withdrawals	0.130*** (0.0244)	0.129*** (0.0248)	0.270*** (0.0346)
Dividends	0.115*** (0.0171)	0.116*** (0.0174)	0.170*** (0.0254)
Ind. Work Earnings	0.0839*** (0.0179)	0.0829*** (0.0181)	0.105*** (0.0257)
Dep. Work Earnings	-0.0151 (0.0136)	-0.0171 (0.0140)	0.0341* (0.0186)
Additional regressors:	No	Yes	Yes
Lagged Variables	No	No	Yes
Observations	78,260	77,982	77,982

Note: Estimated coefficients from regression (23) using withdrawals, dividends, independent work earnings and dependent work earnings, in place of Y_{it} . Results shown for the *Trimmed Sample*, i.e. the sample that excludes propensity score tails. Years considered: 2012 (pre RP-reform) and 2013 (post RP-reform). *Additional regressors* include sex, age, economic sector fixed effects and town fixed effects. *Lagged variables* include lagged taxable income and, when being different, lagged dependent variable. Standard errors clustered at the individual level are reported in parenthesis.

Summing up, the robustness test we perform confirm our findings. The impact of the reform on total reported tax earnings persisted over time and other sources under the control of taxpayers were used to generate income to substitute for lower income from the RP regime. By contrast, we found no significant change for income sources beyond taxpayer control.

7. Conclusions

This paper analyzes whether the special tax regimes for small businesses in Chile are used for strategic tax planning decisions at the individual level. The paper contributes to the study of firm creation and tax regime choice decisions in the context of tax avoidance, an issue of particular importance for tax policy.

²³ Our results are also robust to estimating a fixed-effects model, estimating a model in differences and considering previous periods for controlling for previous trends (leads). The appendix with these results is available upon request.

The empirical evidence based on administrative tax data is consistent with the existence of strategic behaviors regarding STR use. Firstly, descriptive statistics show that STRs are frequently used, mainly by high income taxpayers, and that its use appears to be part of a portfolio decision.

Secondly, the econometric analysis supports the hypothesis of tax avoidance as after a reform that made the RP regime stricter, individual taxable incomes increased through a redistribution of income reported from different sources. In particular, income from firms filing taxes under the RP regime decreased, while other entrepreneurial incomes –both from businesses taxed under the general regime and other STRs– as well as from independent labor earnings, all increased. Based on the predictions of a simple theoretical model consistent with the stylized facts, our results seem consistent with the hypothesis of tax planning at the individual level through the use of STRs.

The existence of significant strategic behavior related to the use of STRs is relevant for the design and evaluation of tax policy both in efficiency and equity terms. Tax avoidance has implications for horizontal tax equity, as taxpayers with the same income end up paying different amounts of taxes. It also has implications for after tax income inequality as high income taxpayers are significantly more able to avoid taxes. Finally, tax avoidance through STRs has efficiency costs as valuable resources and time are spent creating firms, and hiring accountants and tax lawyers (Slemrod and Bakija, 2004).

Social preferences about these normative issues should be incorporated in the design of optimal tax systems (Mirrlees, 1971; Diamond, 1998; Saez, 2001; Saez and Stantcheva, 2016). That is, the design, implementation and evaluation of STRs should consider that they can potentially be used for tax planning and tax avoidance purposes. While helping small firms face barriers to growth and while reducing tax compliance costs of small firms may both be desirable, it is important to assess whether there are specific policies that effectively address these goals without encouraging unintended behaviors like tax avoidance.

Appendix A. Estimation of Financial Profits of Businesses Subscribed to STRs

As businesses subscribed to STRs are not forced to carry detailed internal accounting, financial profits are not observed. Nevertheless, the Internal Revenue Service of Chile carried out a procedure for estimating financial profits for these businesses in year 2013. In this Appendix we briefly describe the procedure carried out by the Chilean tax authority.²⁴

The central assumption is that financial profits are proportional to cash flow. Then, from other forms filled by the businesses, it is possible to compute a cash flow measure for every business i , CF_i , defined by

$$CF_i = S_i - E_i - R_i,$$

where S_i are the sales, E_i are the expenses, and R_i are all wages and salaries paid. This is calculated for all businesses, regardless the tax regime associated., i.e. for the ones taxed by the general scheme and the ones subscribed to STRs.

Consider a set of businesses, A , that do not report profits given they are registered as STR firms. This set is defined by observables (for example, size or economic sector). Then, consider a set of businesses similar in observables, \hat{A} , that are taxed under the general regime and, therefore, report information about profits. For those businesses, it is possible to calculate a factor, $F_{\hat{A}}$, from the following relation

$$F_{\hat{A}} = \frac{\sum_{i \in \hat{A}} P_i}{\sum_{i \in \hat{A}} CF_i},$$

where P_i are the profits of firm i in \hat{A} . Then, for businesses in A it is possible to estimate profits, P_i , from the following relation

$$P_i = F_{\hat{A}} CF_i, \quad \forall i \in A,$$

i.e. by assuming a proportional relation between profits and cash flow. The groups of businesses taxed by the general regime considered for calculating the factors for the different regimes are

- 14B regime: Businesses with sales under 317,775 USD
- 14T regime: Businesses with sole proprietorship legal status and sales under 317,775 USD
- Agricultural RP regime: Businesses of the agricultural sector
- Mining RP regime: Businesses of the mining sector
- Freight Transportation RP regime: Businesses of the freight transportation sector
- Passengers Transportation RP regime: Businesses of the passengers transportation sector

²⁴Businesses subscribed to the 14Q are excluded from this analysis, as the relevant information is available for them.

Appendix B. Additional Tables for Stylized Fact 3

Table B.14: Disaggregation of Table 6

A: 0.1% (97.45%)					
Firms	All Regimes	14B	14T	14Q	RP
1	5.68%	0.77%	1.48%	2.49%	2.28%
2	5.64%	1.23%	2.59%	2.85%	2.63%
3	5.65%	1.54%	3.08%	3.20%	4.35%
4	5.68%	2.31%	3.21%	4.98%	5.18%
5	4.46%	2.62%	2.71%	4.63%	4.32%
6	3.96%	2.15%	2.47%	4.27%	3.84%
7	3.99%	3.69%	3.33%	4.27%	4.43%
8	3.60%	2.15%	2.34%	3.91%	3.41%
9	3.03%	3.23%	1.60%	2.14%	3.22%
10	2.57%	2.92%	1.48%	3.56%	3.10%
11	2.72%	1.08%	2.84%	1.78%	3.10%
12	2.33%	1.85%	2.22%	4.27%	2.94%
13	2.33%	1.23%	1.73%	4.27%	2.67%
14	2.25%	1.38%	1.97%	2.85%	2.35%
15	1.91%	1.23%	0.99%	2.49%	2.08%
>15	44.21%	70.62%	65.97%	48.04%	50.10%

B: 0.1%-1% (71.40%)					
Firms	All Regimes	14B	14T	14Q	RP
1	24.97%	12.00%	17.67%	15.13%	14.34%
2	17.89%	9.04%	16.60%	14.66%	14.85%
3	11.63%	9.29%	11.01%	12.60%	12.46%
4	7.98%	8.32%	7.43%	10.54%	9.89%
5	5.82%	5.87%	5.99%	8.06%	7.99%
6	4.34%	4.95%	5.28%	5.65%	5.77%
7	3.44%	5.41%	3.69%	4.41%	4.44%
8	2.78%	3.62%	3.18%	2.77%	3.55%
9	2.30%	3.83%	2.58%	2.59%	2.65%
10	2.10%	2.60%	2.24%	2.41%	2.61%
11	1.71%	2.55%	1.79%	2.18%	2.18%
12	1.49%	2.65%	1.67%	1.82%	1.72%
13	1.29%	2.55%	1.70%	1.71%	1.65%
14	1.15%	2.45%	1.45%	1.41%	1.62%
15	0.95%	1.68%	1.02%	1.18%	1.31%
>15	10.16%	23.18%	16.71%	12.89%	12.97%

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C: 1%-5% (37.38%)

Firms	All Regimes	14B	14T	14Q	RP
1	49.72%	41.44%	47.31%	38.82%	41.69%
2	21.82%	19.93%	22.09%	24.91%	23.31%
3	9.36%	10.52%	10.37%	12.56%	11.99%
4	4.95%	5.68%	4.91%	7.10%	6.67%
5	3.06%	4.07%	3.28%	4.15%	3.86%
6	2.13%	2.61%	2.32%	2.18%	2.39%
7	1.57%	1.89%	1.49%	1.75%	1.74%
8	1.17%	1.78%	1.23%	1.55%	1.26%
9	0.89%	1.12%	0.86%	1.08%	0.87%
10	0.83%	0.89%	0.67%	0.95%	0.76%
11	0.65%	0.98%	0.59%	0.73%	0.87%
12	0.50%	0.98%	0.55%	0.35%	0.62%
13	0.41%	0.66%	0.39%	0.58%	0.54%
14	0.33%	0.69%	0.41%	0.50%	0.42%
15	0.29%	0.49%	0.33%	0.28%	0.45%
>15	2.33%	6.28%	3.19%	2.53%	2.56%

D: 5%-10% (19.77%)

Firms	All Regimes	14B	14T	14Q	RP
1	66.48%	63.57%	68.79%	56.32%	65.00%
2	18.55%	19.10%	18.52%	24.67%	20.31%
3	5.88%	6.70%	5.37%	8.58%	6.48%
4	2.69%	2.80%	2.21%	3.96%	3.01%
5	1.51%	1.30%	1.05%	1.79%	1.39%
6	1.00%	1.14%	0.68%	1.42%	0.82%
7	0.77%	0.71%	0.69%	0.80%	0.61%
8	0.54%	0.63%	0.31%	0.42%	0.43%
9	0.40%	0.47%	0.35%	0.33%	0.30%
10	0.42%	0.47%	0.18%	0.24%	0.15%
11	0.28%	0.32%	0.20%	0.33%	0.29%
12	0.20%	0.16%	0.23%	0.09%	0.17%
13	0.17%	0.12%	0.13%	0.14%	0.10%
14	0.14%	0.16%	0.13%	0.42%	0.10%
15	0.11%	0.12%	0.08%	0.09%	0.10%
>15	0.87%	2.24%	1.09%	0.38%	0.75%

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E: >10% (9.03%)					
Firms	All Regimes	14B	14T	14Q	RP
1	83.18%	87.07%	90.10%	72.11%	82.07%
2	10.68%	8.36%	7.19%	18.66%	13.46%
3	2.61%	2.02%	1.33%	4.33%	2.50%
4	1.10%	0.65%	0.43%	1.81%	0.79%
5	0.60%	0.50%	0.22%	1.25%	0.35%
6	0.41%	0.25%	0.17%	0.64%	0.22%
7	0.30%	0.13%	0.08%	0.27%	0.12%
8	0.18%	0.09%	0.06%	0.23%	0.08%
9	0.14%	0.10%	0.03%	0.12%	0.07%
10	0.12%	0.04%	0.04%	0.03%	0.04%
11	0.09%	0.06%	0.06%	0.08%	0.06%
12	0.08%	0.03%	0.03%	0.02%	0.04%
13	0.05%	0.02%	0.03%	0.06%	0.02%
14	0.03%	0.01%	0.01%	0.02%	0.02%
15	0.03%	0.02%	0.01%	0.00%	0.02%
>15	0.42%	0.66%	0.21%	0.37%	0.14%

Source: Authors' calculations using Chile's Internal Revenue Service data for 2013. Shares are calculated over total taxpayers in each income group, conditioning of having ownership on at least one business subscribed to the regime specified in the first row. In each panel's title, number in parenthesis accounts for the share of taxpayers with ownership on at least one business in the income group considered.

Table B.15: Disaggregation of Panel A of Table 7

A: 0.1%					
Regime	1	2	3-10	>10	Max
14B	81.54%	12.15%	4.31%	2.00%	41
14T	83.97%	10.23%	5.43%	0.37%	19
14Q	80.43%	15.30%	4.27%	0.00%	6
RP	64.20%	23.42%	11.68%	0.70%	22
B: 0.1%-1%					
Regime	1	2	3-10	>10	Max
14B	91.07%	7.10%	1.79%	0.05%	41
14T	91.38%	6.47%	2.16%	0.00%	7
14Q	87.40%	10.24%	2.35%	0.00%	8
RP	80.44%	14.43%	4.95%	0.17%	41
C: 1%-5%					
Regime	1	2	3-10	>10	Max
14B	96.07%	3.53%	0.40%	0.00%	7
14T	94.86%	4.60%	0.54%	0.00%	6
14Q	93.37%	6.05%	0.58%	0.00%	4
RP	90.10%	8.47%	1.41%	0.02%	14
D: 5%-10%					
Regime	1	2	3-10	>10	Max
14B	97.40%	2.17%	0.43%	0.00%	4
14T	96.78%	2.98%	0.24%	0.00%	5
14Q	95.47%	4.20%	0.33%	0.00%	5
RP	94.32%	5.14%	0.54%	0.00%	10
E: >10%					
Regime	1	2	3-10	>10	Max
14B	99.16%	0.81%	0.03%	0.00%	4
14T	98.82%	1.13%	0.05%	0.00%	4
14Q	97.42%	2.36%	0.21%	0.00%	4
RP	97.74%	2.14%	0.12%	0.00%	14

Source: Authors' calculations using Chile's Internal Revenue Service data for 2013. Shares are calculated over total taxpayers in each income group, conditioning on having ownership on at least one business subscribed to the regime specified in the first column. *Max* accounts for the larger value found in the data.

Table B.16: Disaggregation of Panel B of Table 7

Regime	0.1%	0.1%-1%	1%-5%	5%-10%	>10%
Only 14B	10.64%	8.86%	8.96%	8.50%	11.98%
Only 14T	12.97%	15.04%	21.94%	23.83%	33.19%
Only 14Q	4.94%	8.27%	10.98%	7.80%	3.03%
Only RP	56.26%	58.34%	51.68%	54.03%	47.71%
14B+14T	1.93%	0.50%	0.24%	0.22%	0.11%
14B+14Q	0.24%	0.23%	0.16%	0.07%	0.03%
14B+RP	3.77%	1.85%	1.13%	1.20%	1.03%
14T+14Q	0.14%	0.25%	0.20%	0.11%	0.03%
14T+RP	6.16%	5.08%	3.94%	3.81%	2.76%
14Q+RP	1.90%	1.27%	0.68%	0.37%	0.10%
14B+14T+14Q	0.05%	0.01%	0.00%	0.00%	0.00%
14B+14T+RP	0.73%	0.24%	0.06%	0.04%	0.02%
14B+14Q+RP	0.24%	0.05%	0.02%	0.02%	0.01%
14T+14Q+RP	0.00%	0.00%	0.00%	0.00%	0.00%
All	0.03%	0.01%	0.00%	0.00%	0.00%

Source: Authors' calculations using Chile's Internal Revenue Service data for 2013. Shares are calculated over total taxpayers in each income group, conditional on having ownership on at least one business subscribed to a STR. Combinations are interpreted as having ownership shares over businesses subscribed to different STRs.

Appendix C. Statistics for Assessing Balance

In this section, details about the statistics proposed by Imbens and Rubin (2015) for assessing balance in covariates are discussed.

The first one, *normalized differences*, is a scale-free way for measuring the difference in locations of the distributions. It is defined by

$$ND_{tc} = \frac{\mu_t - \mu_c}{\sqrt{(\sigma_t^2 + \sigma_c^2) / 2}},$$

where t and c denote treatment and control groups, respectively, and (μ_i, σ_i^2) are the population mean and variance of group i , for $i = t, c$, of a given variable X . This measure can be empirically implemented by

$$\hat{N}D_{tc} = \frac{\bar{X}_t - \bar{X}_c}{\sqrt{(s_t^2 + s_c^2) / 2}},$$

where $\bar{X}_i = \frac{1}{N_i} \sum_{j \in i} X_j$ and $s_i^2 = \frac{1}{N_i - 1} \sum_{j \in i} (X_j - \bar{X}_i)^2$, with N_i denoting the number of observations belonging to group i , for $i = t, c$. Imbens and Rubin (2015) suggest that $\hat{N}D_{tc}$ is better than the t-statistic for looking for differences in distributions. The central point is that the idea behind assessing balance is not to look if there is enough information to assure that covariate means are different, but to analyze whether or not differences are large enough to invalidate a posterior econometric application. The scale-free nature of the statistic is beneficial for that purposes.

For looking for differences in distributions' dispersion, the authors propose the use of the logarithm of the ratio of standard deviations,

$$\Gamma_{tc} = \ln\left(\frac{\sigma_t}{\sigma_c}\right) = \ln(\sigma_t) - \ln(\sigma_c),$$

which can be empirically implemented by

$$\hat{\Gamma}_{tc} = \ln(s_t) - \ln(s_c).$$

Finally, the analysis can be complemented by calculating the fraction of treated (control) observations whose covariate values are in tails of the other group's distribution. The idea is to look whether the comparison between units of the different groups will rely too much on extrapolation. Fixing a confidence value α , the probability mass that is outside the tails of the other group's distribution is

$$\pi_i^\alpha = \left(1 - F_i\left(F_j^{-1}(1 - \alpha/2)\right)\right) + F_i\left(F_j^{-1}(\alpha/2)\right),$$

where F_i is the cumulative distribution function for $i = t, c$ and j is the other group. With F unknown, this statistic can be empirically implemented using the empirical distribution functions

$$\hat{F}_i(x) = \frac{1}{N_i} \sum_{j \in i} 1_{X_j \leq x},$$

where $1_{X_j \leq x}$ is an indicator variable that takes value 1 if $X_j \leq x$, and

$$\hat{F}_i^{-1}(q) = \min_{-\infty < x < \infty} \{x : \hat{F}_i(x) \geq q\},$$

for $i = t, c$. Then, fixing $\alpha = 0.05$, statistics can be empirically implemented by

$$\hat{\pi}_i^{0.05} = \left(1 - \hat{F}_i\left(\hat{F}_j^{-1}(0.975)\right)\right) + \hat{F}_i\left(\hat{F}_j^{-1}(0.025)\right).$$

Appendix D. Previous Tendencies for the Trimmed Sample

Figure D.1: Previous Tendencies: Taxable Income

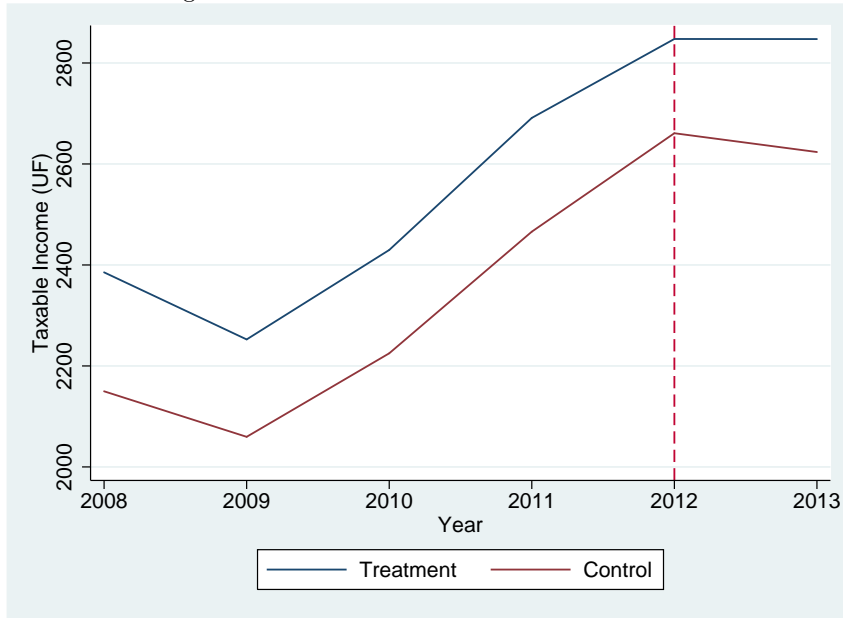


Figure D.2: Previous Tendencies: RP Earnings (1st Measure)

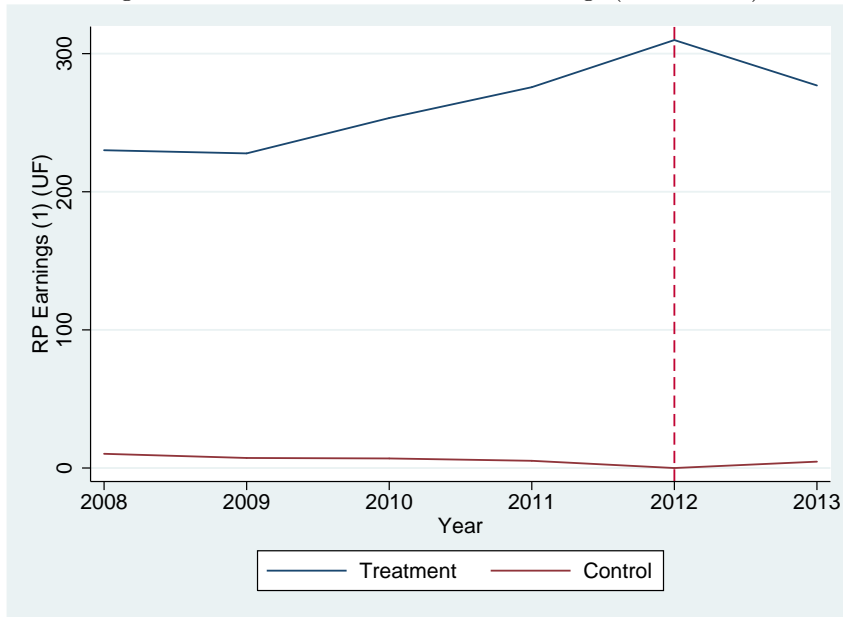


Figure D.3: Previous Tendencies: RP Earnings (2nd Measure)

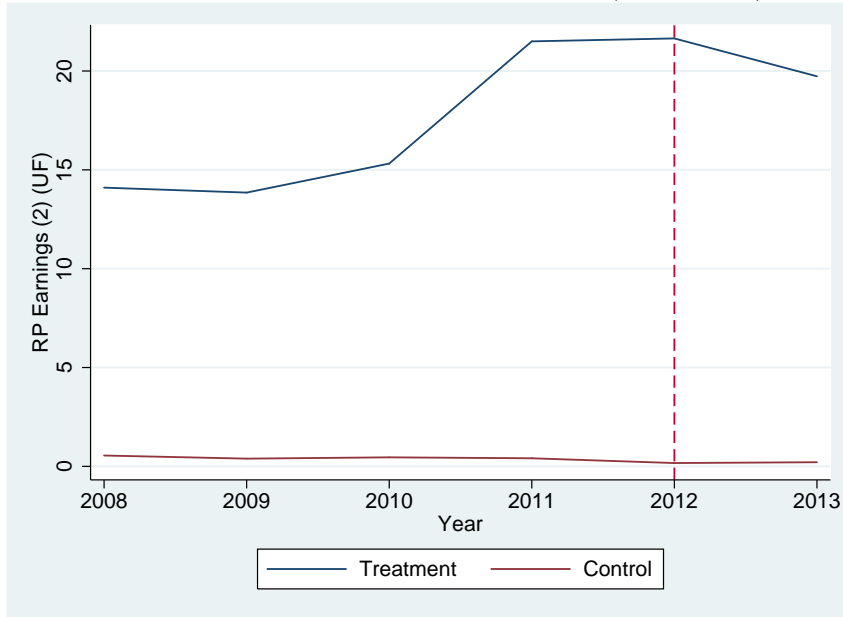


Figure D.4: Previous Tendencies: Withdrawals

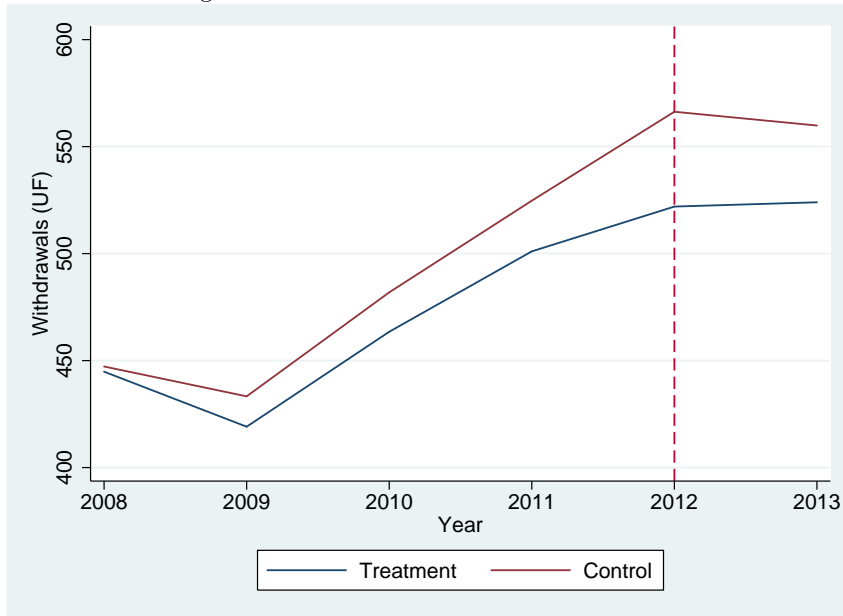


Figure D.5: Previous Tendencies: Dividends

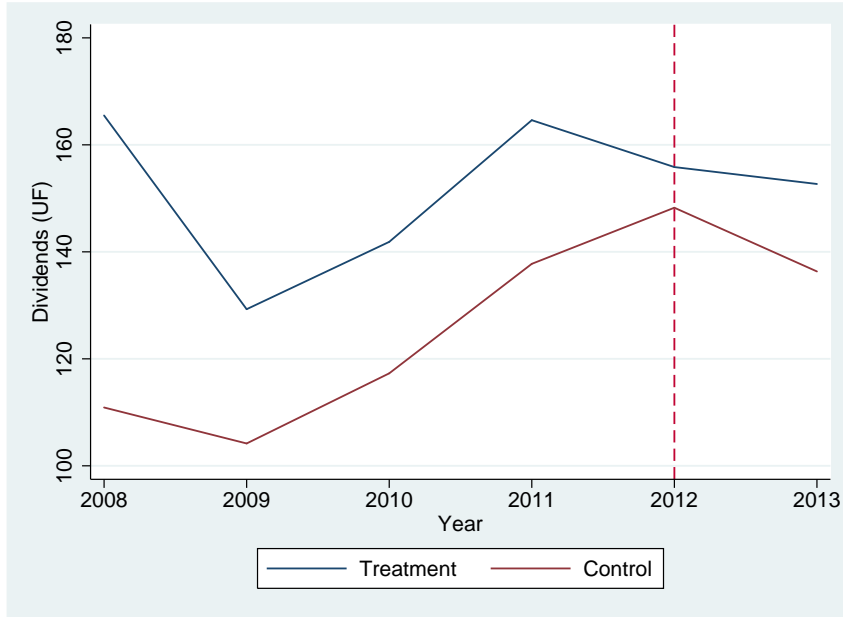


Figure D.6: Previous Tendencies: 14T Earnings

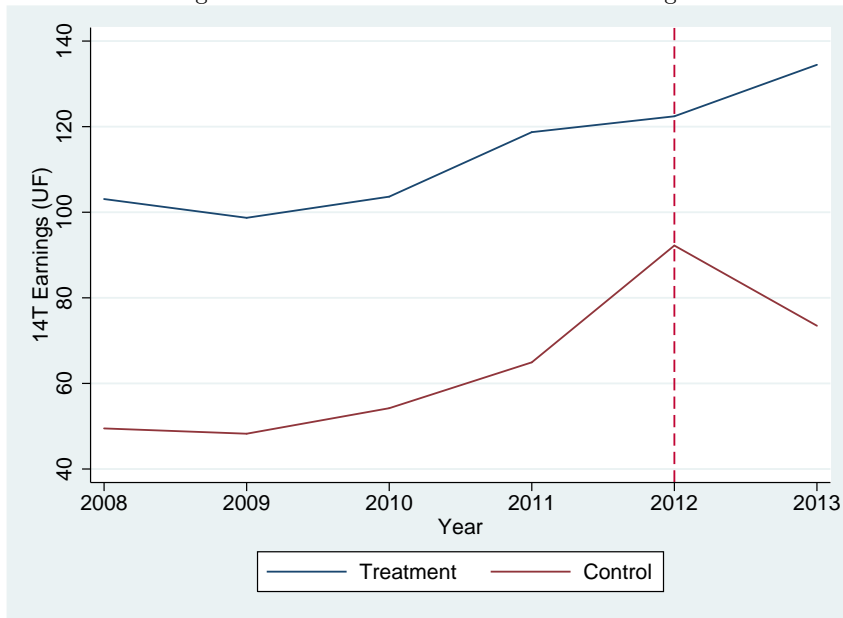


Figure D.7: Previous Tendencies: Ind. Work Earnings

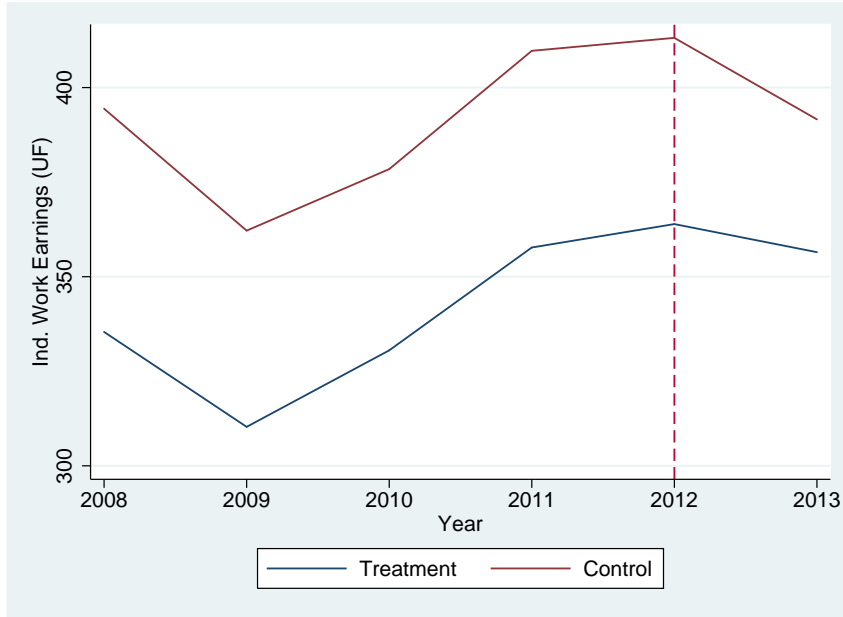
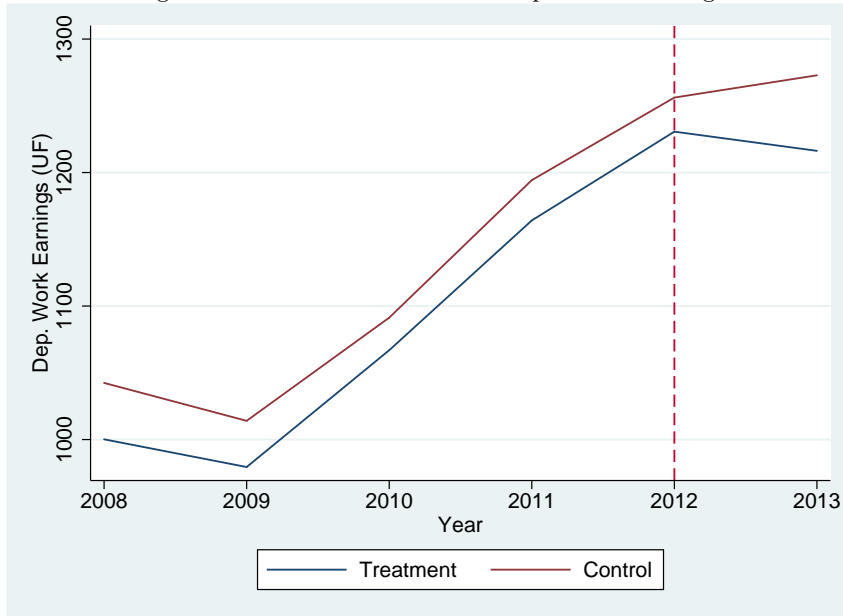


Figure D.8: Previous Tendencies: Dep. Work Earnings



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