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## Top income shares, business profits, and effective tax rates in contemporary Chile

### Working paper

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# **Top Income Shares, Business Profits, and Effective Tax Rates in Contemporary Chile\***

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## **Abstract**

We contribute to research on inequality and world top incomes by presenting the first calculations of Chilean top income shares and effective tax rates using individual tax-return microdata from 2005 and 2009. We pay special attention to business income, which dominates at the top. Our analysis includes not only distributed profits, but also the large proportion of accrued profits retained by firms, which are rarely analyzed given the difficulty of identifying individual owners. Our most conservative top 1% income-share estimate is 15%—the fifth highest in the top incomes literature. When distributed profits are adjusted for evasion, the top 1% share reaches 22-26%. When we broaden the income concept to include accrued profits, which we impute to taxpayers using ownership shares calculated from business tax forms, the top 1% share increases to a minimum of 23%. Despite this impressive income concentration, the top 1% pays modest average effective income-tax rates of 15–16%.

## **Keywords**

Top incomes, inequality, taxation, Chile, Latin America

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## 1. Introduction

Latin America has long been recognized as the region characterized by the world's most extreme levels of inequality. A growing body of research in economics and political science strives to understand the causes and consequences of inequality in Latin America, as well as prospects for redistribution and equitable development.<sup>1</sup> However, most empirical research on inequality in Latin America draws on household surveys, which fail to capture information about the very rich.<sup>2</sup> Atkinson and Piketty (2009, 2010) and their collaborators have demonstrated that income tax return data provide far more accurate information on top income shares, even where under-reporting is widespread. To date, however, only a handful of developing countries have been analyzed in this literature, given the difficulty researchers have faced in obtaining access to detailed income-tax return data.<sup>3</sup>

This paper contributes to research and public debate on inequality and redistribution and helps broaden the scope of developing countries analyzed in the top incomes literature by estimating Chilean income shares and effective tax rates from original new datasets compiled with the generous cooperation of Chile's Servicio de Impuestos Internos (SII). Whereas most studies in the top incomes literature rely on tabulated tax-return data or samples of individual tax returns, we obtained access to the full universe of individual Chilean tax returns for 2005 and 2009.<sup>4</sup> We are therefore able to directly report income shares and effective tax rates for top-income fractiles without recourse to fitting or extrapolation techniques. Our analysis accordingly provides the most accurate description of top income shares, income compositions, and tax rates available for contemporary Chile, a country of special interest in Latin America given its reputation for successful poverty reduction, economic growth, and political stability that have nevertheless coexisted with high levels of inequality and popular disaffection.<sup>5</sup> Using our two years of microdata in conjunction with the limited tabulated data published by the SII, we also estimate more approximate top shares for 2004–2011.

A novel feature of this paper is our analysis of not only business profits that are formally distributed to individual taxpayers, but also the very large proportion of profits that are perpetually reinvested in Chilean firms. We thus contribute to emerging research on income from wealth and capital—whether realized or not (Atkinson 2009b, Atkinson and Piketty 2010, Smeeding and Thompson 2010, Roine and Walderström 2012, Piketty and Zucman 2014). Capital income has long been recognized to augment inequality, but it is rarely analyzed given

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<sup>1</sup>Birdsall and Londoño (1997), World Bank (2004), Acemoglu and Robinson (2005), Goñi et al. (2011), Lustig et al. (2012), Haggard and Kaufman (2012), Huber and Stephens (2012), Schneider (2013), Fairfield (2015).

<sup>2</sup>The rich tend to be underrepresented or absent from survey samples given their tiny numbers; sampling procedures are not designed to include them. Moreover, they are more likely than average citizens to refuse to participate. See Atkinson et al. (2010: 669), Korinek et al. (2006), Székely and Hilgert (1999), Groves and Couper (1998).

<sup>3</sup>A few Latin American countries make limited information available. Argentina publishes statistics for the tiny minority (approximately 3%) of adults required to file income-tax declarations; the Chilean tax agency has also recently published some highly-aggregated income-tax return data. Colombia is the only country that has provided extended panel microdata for analysis of inequality and tax incidence (Alvaredo and Londoño 2013); recent data (2009-11) is now available for Uruguay (Burdin et al. 2014).

<sup>4</sup>By contrast, Chilean tax-agency data provided for Agostini et al.'s (2012) tax reform simulations aggregated taxpayers into brackets of 7,422 individuals, and the publicly available tax-agency statistics employed by Lopez et al. (2013) aggregate taxpayers into eight brackets defined by the marginal tax rate schedule; the top bracket contains 13,000-24,000 taxpayers.

<sup>5</sup>The 2011-2012 student demonstrations forced the issues of inequality and progressive taxation onto the national agenda; the Bachelet government (2014-) has proposed major reforms in response to their demands.

data limitations and the difficulty of accurately allocating unrealized income.<sup>6</sup> We imputed accrued profits and accumulated retained profits to Chilean taxpayers using ownership shares calculated directly from businesses tax-return forms. Several recent studies have also attempted to impute accrued profits to Chilean taxpayers, but they employ extremely limited information about ownership, and given their reliance on tabulated data, they are unable to rank taxpayers taking accrued profits into account.<sup>7</sup> These problems are potentially serious; we find that there is significant re-ranking of taxpayers when comparing income definitions that include accrued profits rather than distributed profits; shares of income with accrued profits are substantially higher when taxpayers are ranked according to income including accrued profits as opposed to income including only distributed profits.

Estimating the distribution of retained profits is particularly important in Chile because the country has a unique integrated income tax that creates strong incentives for business owners to avoid formally withdrawing profits. Chile's corporate tax serves as a withholding (an advance payment) against personal income taxes that owners are required to pay when they receive distributed profits. Corporate taxes already collected at the firm level are credited against the recipient's personal income taxes when dividends are distributed, so that profits are not double-taxed. However, distributed profits enter the personal income-tax base, and personal income is subject to progressive marginal tax rates reaching 40%. Because the corporate tax (17% from 2004-2010; currently 20%) is much lower than the top personal income-tax rate (40%), business owners leave the majority of their profits in the firm. According to tax agency figures, on average, only one third of profits are distributed annually (Jorratt 2012: 42). In addition, independent professionals commonly incorporate to avoid paying the much higher personal income tax rates. Retained profits and incorporated income are not always channeled into productive investments. Owners find both legal and illegal ways to consume profits without declaring dividends and hence without paying the corresponding individual income tax; for example, luxury vehicles for personal use may be registered to the firm (avoidance),<sup>8</sup> or distributed profits may simply be omitted from tax declarations (evasion). Income-tax evasion is estimated at 46%, essentially all of which is associated with distributed profits (Jorratt 2009: 7). It is difficult for the tax agency to detect and control under-declaration of distributed profits because the vast majority of Chilean businesses are organized as partnerships and close corporations, rather than publicly-traded corporations; the small number of publicly-traded corporations (amounting to only 0.05% of Chilean firms) are overseen by the Superintendencia de Valores y Seguros and are subject to independent auditing, which minimizes possibilities for evasion. Given these considerations, ignoring retained profits in income distribution studies therefore significantly underestimates the vast material resources at the disposal of Chile's economic elites.

This paper further contributes to the small but growing literature analyzing not only top income shares, but also effective tax rates paid by the very rich (Piketty and Saez 2006, Bach et al. 2012, Alvaredo and Londoño 2013). Such analysis can play an important role in informing policy debates and grounding scholarly analysis of redistributive politics and the ability of the

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<sup>6</sup>Among other problems, many forms of capital income are tax-exempt and hence unreported. On the serious nature of the problem of missing capital income and top income shares, see Atkinson, Piketty and Saez (2010).

<sup>7</sup>López et al. (2013) use aggregate estimates of retained profits and assume based on extremely weak evidence that 85% of retained profits accrue to taxpayers in the top 1%. Agostini et al. (2012) estimate accrued profits from household surveys.

<sup>8</sup>Another frequent avoidance mechanism entails using capital gains to withdraw profits. An owner can buy a property, sell it at a higher price to the business in which he or she owns shares, and pay no tax on the capital gain.

super-rich to defend their material interests.<sup>9</sup> Moreover, we include the corporate tax in our estimates of effective tax rates. The most widely referenced incidence study for Chile excludes profits retained by firms from the definition of individual income and ignores the corresponding corporate taxes because they are credited against future personal income tax payments (Engel et al. 1999: 159). However, the corporate tax is not only an important source of revenue in Chile (43-50% of total income taxes in recent years<sup>10</sup>), it is in practice the only tax that many corporate profits ever pay, given widespread personal income tax avoidance and evasion (Cantallopis et al. 2007). Corporate taxation in Chile therefore can have important implications for both tax capacity and tax equity. Agostini et al. (2013) embrace this view as well; they provide evidence that the tax deferral for capital income (i.e., profits do not enter the individual income-tax base until they are distributed) creates significant horizontal inequity and reduces the progressivity of the income tax system. However, their analysis is limited by lack of access to the business tax-return forms that we obtained in order to estimate ownership shares.

We find that the concentration of income and profits in Chile is among the highest currently estimated in the top incomes literature, although uncertainty associated with the distribution of undeclared distributed profits and the lack of comparable studies analyzing accrued profits prevent us from confidently ranking Chile among the other income-inequality leaders (the US, Argentina, Colombia and South Africa). When only distributed profits are included in the income definition, we conservatively estimate that the top 1% of adults receives an income share of 15% while the top 0.01% receives 1%. These shares increase substantially when we adjust distributed profits for under-declaration. Depending on the assumptions employed to impute undeclared profits, estimated shares for 2005 and 2009 range from 22-26% for the top 1%, and 1.6-7.4% for the top 0.01%. When the income definition includes accrued profits instead of distributed profits, top 1% shares range from 23-26% (unadjusted) to 32-33% (adjusted for under-reporting), while top 0.01% shares rise to between 5-7% (unadjusted) and 9-11% (adjusted for under-reporting). Despite this impressive concentration of income, effective income tax rates paid by the richest Chileans are modest. The top 1% pays an average effective rate of at most 15-16%. Our estimated average effective tax rates including the corporate tax in the numerator and accrued profits in the denominator are also 15% for the top 1%; the effective rate for the US including corporate tax is 24% (Piketty and Saez 2006).

## I. Data and Methods

Whereas multiple previous requests had been denied, in May 2011 Chile's tax agency (SII) graciously agreed to provide us with access to confidential, anonymized individual tax return records from 2005 and 2009 within the tax agency's premises. Compiling our datasets required detailed knowledge about the tax agency's information systems and filing forms and extensive work on the tax agency's computers, as well as a lengthy process for obtaining authorization for the project.

By Latin American standards, our datasets are remarkably comprehensive in terms of the number of individuals they include. Income taxes in Latin America generally exclude the majority of the population; most adults make less than the minimum taxable income given high levels of poverty and inequality. In Chile, approximately 82% of individuals earn less than the taxable threshold (Agostini et al. 2012). Nevertheless, individuals registered with the SII comprised 63% (67%) of adults in 2005 (2009) (many of whom did not receive enough income

<sup>9</sup>Hacker and Pierson (2010), Winters (2011), Fairfield (2015).

<sup>10</sup>SII, Serie Ingresos Tributarios Consolidados, 2009-2011, Santiago, Chile.

to owe taxes). Our datasets contain information on all reported income and taxes paid by these individuals. This section describes the key components of our datasets and the methods used to compile them.

### **a) Income and profits**

Our datasets record income in 8 categories: pensions (aggregated private and public), wages, independent work, rent from real estate, interest earnings, taxable capital gains, dividends and distributed profits, and accrued net business profits.<sup>11</sup> Information on the first seven categories comes directly from forms filed by taxpayers, crosschecked against forms filed by withholding or reporting agents whenever possible. To reconstruct total, pre-tax wage income, deductions for mandatory health insurance payments and contributions to private pension funds were added back to the declared taxable amounts. We exclude the many untaxed forms of interest, capital gains, and rent from our analysis for lack of adequate information, as is the norm in the top incomes literature.<sup>12</sup>

Accrued profits—a unique feature of our datasets—were allocated using ownership shares calculated from business tax forms: the ratio of profits distributed to a particular owner to total profits distributed by the firm. After multiple iterations to trace through interlocking business ownership, 49% (45%) of the total accrued profits for 2005 (2009) were imputed to Chilean taxpayers, 31% (37%) to foreign owners, and 3% (2%) to funds managed by pension and mutual administrators. Profits imputed to foreigners are omitted from our dataset; profits accrued to pension funds were imputed in proportion to taxpayers' pension and wage income (see Appendix 1). We lack ownership information to impute the remaining 17% (16%) of profits reported to the tax agency in 2005 (2009). We employ three alternative approaches for handling these residual profits. The first is to simply omit them. The second entails imputing these residual profits based on the distribution of the accrued profits for which we do have ownership information. The third imputes the residual accrued profits in proportion to the distribution of taxpayers' declared distributed profits. While all of these approaches are ad hoc, they provide a rough estimate of the uncertainty surrounding the distribution of accrued profits.

Our datasets also include retained profits accumulated since 1984, as reported in businesses' "Taxable Profit Fund" (*Fondo de Utilidades Tributables*, FUT) ledgers. These retained profits were imputed to individual taxpayers using the same ownership shares calculated as described above. The tax agency uses the FUT, which was created in 1984 when the Pinochet dictatorship established Chile's integrated income tax system, to keep track of how much tax credit (corporate tax paid by the firm) owners are due when they eventually withdraw these profits and pay individual income taxes. Total FUT profits reported at the end of 2012 were equivalent to Chile's GDP. FUT funds imputed to taxpayers in our datasets make up 56-61% of the total.

### **b) Adjusting for undeclared income**

In addition to estimating top income shares using declared income in the categories described above, which is the norm in the top incomes literature, we estimate shares after adjusting income in three categories to the Chilean Central Bank's national accounting figures:

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<sup>11</sup>Appendix 1 describes the interest earnings, capital gains, and accrued profits categories in more detail.

<sup>12</sup>Despite the difficulties that relying on income definitions dictated by country-specific tax systems creates for cross-national comparisons, this approach appears inevitable for analyses employing tax-agency data, and the associated problems are generally sidestepped in the literature.

independent work, distributed profits, and accrued profits. This section describes our rationale for adjusting these incomes and the procedures employed to impute undeclared income. Appendix 2 provides additional methodological details.

The first two types of income—independent work and distributed profits—are subject to significant under-reporting. Most independent professionals opt to declare expenses under a simplified presumptive regime, which in practice probably inflates expenses and thereby reduces declared income. Regarding distributed profits, as previously discussed, the tax system creates strong incentives for under-declaration and provides many loopholes to access retained profits for consumption, and it is difficult for the tax agency to obtain information from impartial third parties that would help detect inconsistencies on tax declarations.<sup>13</sup> Independent work income calculated from national accounts was 1.3 (1.5) times higher than the total declared to the tax agency in 2005 (2009). The discrepancy for distributed profits was far greater—the national accounts figure was 2.8 (3.2) times greater than the tax agency figure. We believe that this very large gap is explained primarily by evasion. The national accounts value, which is a residual calculated from changes in assets based on information provided by financial institutions, is accepted by Chilean experts as a good approximation of the profits actually distributed to households. The other components of household income in the national accounts come from reliable sources and should be free of significant measurement error, so the accounting discrepancy that would otherwise arise must reflect unreported distributed profits.

Total accrued profits constructed from national accounts surpassed the tax agency total by a lesser but still substantial factor of 1.9 (2.2). This discrepancy is likely explained by a combination of under-declaration, tax benefits that cannot be estimated which should be added back to declared taxable profits (e.g. asset depreciation), and the inherent difficulties of constructing a matching definition of accrued profits from national accounts, which are derived from different data to serve different purposes. Despite the latter issue, we think it best to adjust the imputed accrued profits to national accounts, given the known sources of downward bias that affect our raw estimates.

***Independent work.*** To adjust independent work income in our datasets, we first use Chilean household surveys (CASEN) to estimate the portion of the national accounts figure that accrues to individuals who did not file tax returns. We then impute the difference between this amount and the tax agency total to taxpayers in proportion to their declared independent work income. In other words, we assume that the distribution of undeclared independent work income is identical to the distribution of declared independent work income.

***Distributed profits.*** To adjust distributed profits, we impute the full difference between the national accounts value and the tax agency value to tax filers. We thus assume that non-filers receive negligible capital income,<sup>14</sup> which we believe is appropriate for Chile given the relatively large percentage of adults registered with the tax agency and the evident concentration of capital income in tax agency data; household surveys also suggest that capital income is extremely concentrated (Cantellopts et al. 2007). We employ three alternative methods for imputing undeclared profits. The first method entails allocating the difference between the national accounts total and the tax agency total in proportion to taxpayers' declared distributed profits. This approach likely overestimates evasion among taxpayers who declared substantial distributed profits and underestimates evasion among taxpayers with large accrued profits who declared

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<sup>13</sup>Tax agency access to bank information on checking accounts, which would help detect undeclared business income and independent work income, is highly restricted and cannot be used for general auditing operations.

<sup>14</sup>Alvaredo and Saez (2010) make the same assumption for Spain.

minimal distributed profits. Our second method makes the alternative assumption that evasion is proportional to the difference between taxpayers' accrued profits and the distributed profits that they declare. In other words, we assume that an individual with large accrued profits who declared few distributed profits has engaged in substantial evasion (rather than actually reinvesting profits in the firm). This approach alters the distribution of distributed profits to more closely reflect the distribution of imputed accrued profits. The third approach imputes undeclared profits in proportion to the distribution of retained profits accumulated in the FUT ledger. The assumption here is that the larger the taxpayer's FUT account, the fewer distributed profits the taxpayer has truthfully declared. This approach attempts to capture the view shared by many experts that the FUT serves more to facilitate tax evasion than to stimulate productive investment. Of course, none of these approaches is likely to give an accurate depiction of the actual distribution of undeclared profits, which is by definition unknown. Together with the unadjusted data, however, they serve to delineate the range of uncertainty.

**Accrued profits.** For accrued profits, we assign the difference between national accounts and tax agency totals in proportion to the positive net accrued profits in our datasets. This procedure is likely to overestimate earnings for taxpayers at the top of the accrued-profits ranking, since taxpayers with large net accrued losses do not receive any positive adjustment, even though they too may have either under-declared gains or over-declared losses. We also employ an alternative approach that uses the distribution of gross earnings as the basis for the adjustment. This approach has the advantage that accrued net losses also receive a positive adjustment, which is desirable because our estimates of accrued profits do not correct for tax benefits associated with depreciation; depreciation may account for some of the large net negative values in our datasets.

### c) Income definitions for analyzing top shares

We analyze top income shares using several different income definitions. We begin with a definition based on taxable income that corresponds to earnings realized during the year. This income, denoted  $Y_{Rlzd}$ , includes pensions, wages, independent work, taxable interest, and distributed profits.<sup>15</sup>

We next construct an income  $Y_{AcrdProf}$  that substitutes imputed accrued profits for distributed profits. The logic is to more closely approximate a Haig-Simons income concept—consumption plus changes in net worth—which aims to measure individuals' potential to consume without reducing their wealth during the period in question.<sup>16</sup> This approach is arguably preferable for characterizing material resources at the top when realized capital income is small compared to unrealized capital income (Smeeding and Thompson 2010).<sup>17</sup> Our  $Y_{AcrdProf}$  income definition is particularly appropriate for Chile, given the tendency to under-declare or

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<sup>15</sup>We would like to exclude public pensions, following top incomes studies that focus on market income, but tax agency figures mix public and private pension payments, and we do not have enough information to disaggregate the two. However, Chile's pension system was privatized in 1980, and the residual public system accounted for only 35% of pension payments in 2009. This figure excludes public pension top-ups that are paid to low-income Chileans and financed by tax revenue. Recipients of these public-supported pensions do not earn enough to pay income taxes.

<sup>16</sup>See Haig (1921), Simons (1938).

<sup>17</sup>Our income  $Y_2$  is similar to Smeeding and Thompson's (2010) "More Complete Income," which includes imputed capital income. The authors substitute imputed capital income for reported interest, rents, and dividends to better approximate changes in net worth. For Chile, we lack sufficient information on real estate assets to be able to treat this income source similarly to retained profits.



disguise distributed profits, as well as the fact that few capital gains are taxed. As Atkinson, Piketty and Saez (2010: 677) observe: “When realized capital gains are untaxed and hence not observed, it is important to assess the effects of attributing retained profits to top income.”

We estimate top shares using various related income definitions that either include or exclude capital gains, alter the treatment of pensions, apply alternative adjustment procedures, or do not adjust independent work or profits to national accounts at all. Our preferred definition of income  $Y_{\_AcrdProf}$  excludes capital gains (which are primarily received by businesses), because they may reflect profits generated in previous years rather than income generated during the year in question, and because including imputed capital gains along with accrued profits may result in some double-counting. In addition, since we are particularly interested in examining how top income shares change when examining accrued profits rather than distributed profits, we prefer to leave other components in the income definition unaltered compared to  $Y_{\_Rlzd}$ .

**Core income definitions:**

$Y_{\_Rlzd}$  = pensions + wages + independent work + taxable net interest + taxable rent + distributed profits; declared incomes only

$Y_{\_Rlzd\_NatAcc}$  =  $Y_{\_Rlzd}$  but adjusting independent work and distributed profits to National Accounts

$Y_{\_AcrdProf}$  = pensions + wages + independent work + taxable net interest + taxable rent + imputed accrued profits; declared incomes and accrued profits for which ownership information exists only

$Y_{\_AcrdProf\_NatAcc}$  =  $Y_{\_AcrdProf}$  but adjusting independent work and accrued profits to National Accounts

**Auxiliary definitions:**

$Y_{\_Rlzd\_CG}$  =  $Y_{\_Rlzd}$  + capital gains received by individuals

$Y_{\_Rlzd\_NatAcc\_alt1}$  =  $Y_{\_Rlzd\_NatAcc}$  but using the alternative distributed-profits adjustment method based on the difference between taxpayers’ positive accrued profits and distributed profits

$Y_{\_Rlzd\_NatAcc\_alt2}$  =  $Y_{\_Rlzd\_NatAcc}$  but using the distribution of accumulated retained profits in the FUT to adjust dividends

$Y'_{\_AcrdProf}$  =  $Y_{\_AcrdProf}$  + declared accrued profits in firms without ownership information imputed in proportion to declared distributed profits

$Y''_{\_AcrdProf}$  =  $Y_{\_AcrdProf}$  + declared accrued profits in firms without ownership information imputed in proportion to the distribution of accrued profits for which ownership information exists

$Y_{\_AcrdProf\_CG}$  =  $Y_{\_AcrdProf}$  including capital gains

$Y_{\_AcrdProf\_Pens}$  =  $Y_{\_AcrdProf}$  with imputed accrued profits from pension funds instead of pension payments

$Y_{\_AcrdProf\_NatAcc\_alt}$  =  $Y_{\_AcrdProf\_NatAcc}$  but using the distribution of gross income to adjust accrued profits

**d) Ranking taxpayers**

Our work with the tax agency micro-data produced six datasets based on rankings of individual taxpayers that correspond to each of the four core income definitions listed above, as

well as two alternative adjustment procedures ( $Y_{Rlzd\_NatAcc\_alt2}$ ,  $Y_{AcrdProf\_NatAcc\_alt}$ ). After ranking individuals according to each income definition, the data was aggregated into groups consisting of eleven taxpayers each (rows in our datasets), following the tax agency's protocol for protecting taxpayer confidentiality. When analyzing the additional auxiliary income definitions listed above, we employ the dataset with the ranking that is most closely correlated with the definition in question.

#### e) Control incomes

We estimate control incomes (the denominator for calculating income shares) by combining tax agency data with national accounts, as is standard in the top incomes literature when sizable portions of the adult population do not file tax returns. We construct total amounts of wage income, independent work, distributed profits, and accrued profits from national accounts. To these amounts we add total tax agency figures for taxable rent and interest, for which comparable figures could not be constructed from national accounts. This procedure produces control incomes corresponding to  $Y_{Rlzd\_NatAcc}$  (adjusted distributed profits and other realized income) of approximately 60% GDP, the same value used for Argentina (Alvaredo 2010). This value is also similar to control incomes for other countries analyzed in the Atkinson and Piketty (2009, 2010) top incomes volumes. When we replace distributed profits with imputed accrued profits ( $Y_{AcrdProf\_NatAcc}$ ), our control income increases to 66-67% GDP.

For the income definitions including unadjusted declared profits ( $Y_{Rlzd}$ ,  $Y_{AcrdProf}$ ,  $Y'_{AcrdProf}$ ,  $Y''_{AcrdProf}$ ), we use the total value of declared profits from the tax agency datasets in the control income instead of the national accounts figures, in accord with our assumption that capital income accrues only to tax filers.<sup>18</sup> These control incomes are substantially smaller (which is not surprising given the large discrepancy between capital income reported to the tax agency and capital income calculated from national accounts) (Table 1).

—Table 1 here—

#### f) Control populations

Income taxes in Chile are filed individually. There is no option for married couples to file jointly, and they receive no preferential tax treatments. For the control population, we therefore use estimates of the adult population over age 20, following the usual approach in the top incomes literature.

—Table 2 here—

It should be noted that using households as the unit of analysis would result in lower top income shares, considering that female labor participation is relatively low in Chile.<sup>19</sup> Sanhueza and Mayer (2011: 179-80) illustrate this phenomenon for the top decile and top centile using household survey data; however, they find that differences between shares constructed using household income, per capita household income, and individual income are small. Analyzing

<sup>18</sup>We likewise exclude from the control income the amount of independent work income that we estimate is evaded by tax filers. Including this amount lowers top share estimates only slightly.

<sup>19</sup>Female labor force participation has been rising over the past decade; Chile's rate in 2005 was only 43.4% compared to the OECD average of 61.9%, but it reached 53.6% in 2010 compared to 63.9% for the OECD (<http://stats.oecd.org>).

gender inequality with tax return data is an interesting potential avenue for future research if the tax agency is able to supply such information.<sup>20</sup>

## II. Results: Top Incomes

### a) Realized income shares

We begin our analysis with the standard realized income definition, ( $Y_{Rlzd}$ , Table 3). Top shares are significantly smaller when distributed profits are not adjusted to national accounts compared to scenarios that do adjust profits for under-reporting. For the top 1%, we estimate unadjusted shares of 15-15.5%, whereas evasion-adjusted shares range from 21.6-26.2%. We view the unadjusted shares as lower limits. The adjusted shares are of course educated guesses given that the actual distribution of undeclared profits is unobservable. However, we believe that the upward effect on top income shares is accurate.

Our estimated income shares for the top 10%, 1% and 0.1% do not vary significantly from 2005 to 2009. Shares at the very top show more variation. For the top 0.0001%,  $Y_{Rlzd}$  (unadjusted) and  $Y_{Rlzd\_NatAcc}$  (adjusted) shares are about half as large in 2009, a recessionary year, whereas  $Y_{Rlzd\_NatAcc\_alt1(2)}$  shares are 1.8 (1.3) times larger in 2009.

Figure 1 shows Lorenz curves (cumulative income distributions) for the top 10% and top 1% in 2005, plotted directly from our datasets. As expected, the data are closely approximated by Pareto distributions; the estimated Pareto shape parameter is 2.37 (2.46) for the top 1% of the unadjusted 2005 (2009)  $Y_{Rlzd}$  curve.

—Table 3 here—

—Figure 1 here—

### b) Shares with imputed accrued profits

Top income shares including accrued profits instead of distributed profits ( $Y_{AcrdProf}$ , Table 4, Figure 2) are significantly larger, indicating the very high concentration of capital ownership in Chile. Estimates for the top 1% share start from a minimum of 23% when no adjustments are made to the tax agency data ( $Y_{AcrdProf}$ ). These findings agree with other studies that report more significant inequality when working with income concepts that include broader sources of realized and/or unrealized capital income (Smeeding and Thompson 2010, Atkinson and Piketty 2010, Roine and Waldenström 2012).

—Table 4 here—

—Figure 2 here—

To further assess the importance of accrued profits at the top, following Roine and Waldenström's (2012) approach for capital gains, we calculate shares with accrued profits using two different rankings: one including only distributed profits, and one including accrued profits instead. We then compare to shares including distributed profits only (Table 5).

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<sup>20</sup>We thank an anonymous reviewer for this suggestion. See Sanhueza and Mayer (2001: 183) for analysis using household surveys and Carrillo et al. (2013) on the gender wage gap.

The results indicate that retained profits are an important resource for those who are already at the top of the realized income distribution ( $Y_{\text{Rlzd}}$ ), and including accrued profits in the income concept significantly augments inequality. Shares increase substantially when accrued profits are substituted for distributed profits without altering the original ranking of taxpayers. Shares with accrued profits increase further when taxpayers are re-ranked according this income concept. Ratios of shares with accrued profits to those with distributed profits, ranking taxpayers according to the respective income definitions, range from 1.47-1.53. These ratios are similar to ratios of top 1% shares with capital gains to those without in Sweden (Roine and Waldenström 2012).

—Table 5 here—

These results also indicate that rankings corresponding to the two different income concepts differ nontrivially. Indeed, there are taxpayers in our datasets who declare relatively low distributed profits even though their accrued profits are quite large, and taxpayers who receive substantial distributed profits even though their net accrued profits for the year are negative.<sup>21</sup>

Another way to assess the differences in these two rankings entails identifying the percent of taxpayers in a given top  $Y_{\text{Rlzd}}$  fractile who also fall within the same fractile of the  $Y_{\text{AcrdProf}}$  distribution (Table 6). Continuity across the top 1% is quite high—nearly 78%, whereas much smaller percentages of taxpayers in the top 0.01% and top 0.001% were also at the top of the  $Y_{\text{AcrdProf}}$  distribution.

—Table 6 here—

### c) Estimated top shares from published tabulated data (2004–2012)

We hope to build a more extended time series from tax-return microdata in the future. In the meantime, we provide rough estimates of top income shares from published tabulated data (reported income with distributed profits, available only for the years 2004–2012) by applying fixed adjustments based on comparisons with our much more accurate 2005 and 2009 estimates (Table 7).<sup>22</sup> We first estimate shares directly from the tabulated data for 2005 and 2009, substituting the total amount of reported income from the tabulated data for the total reported income in our more detailed datasets. Total income in the tabulated data is less than the total income in our datasets, partly due to accounting differences in the way the tax agency reports the data. We apply standard Pareto interpolation procedures used in the top income literature to estimate income shares for the top 1%, 0.1%, and 0.01% from the tabulated data.<sup>23</sup> These shares agree well with our  $Y_{\text{Rlzd}}$  shares for 2005 and 2009 (1–5% relative difference). We then calculate adjustment factors in order to estimate shares of different income concepts from the

<sup>21</sup>The mismatch between distributed and accrued profits in these latter cases may occur for several reasons. First, businesses may distribute profits accrued during a previous year even if they registered losses in the current year. Second, an individual may hold ownership in multiple businesses, some of which distribute profits but some of which accrue large losses that overwhelmed profits accrued in the other firms. Third, some of the mismatch between distributed and accrued profits may be an artifact of our imperfect reconstruction of accrued profits from taxable profits, due to the difficulties of estimating tax allowances for depreciation.

<sup>22</sup>We thank Emanuel Saez for this suggestion.

<sup>23</sup>See Freenberg and Poturba (1992), Piketty and Saez (2003), and Alvaredo (2007).

tabulated data (Table 8). Adjustment factors for  $Y_{Rlzd\_NatAcc}$  top shares are quite stable for each of the three top fractiles across the two years for which we have tax-return microdata (1–3% relative difference). Adjustment factors for  $Y_{AcrdProf}$  and  $Y_{AcrdProf\_NatAcc}$  are also reasonably stable for the top 0.1% and 1% (2–5% and 6–10% relative difference respectively). We proceed to multiply top fractile shares estimated from the tabulated data for the other years by the geometric mean of our 2005 and 2009 adjustment factors.

For the  $Y_{AcrdProf\_NatAcc}$  top 0.01%, we report shares with two significant figures only. Given the more substantial relative variation between the 2005 and 2009 adjustment factors, applying a constant adjustment factor across the full time series likely produces more error, so these shares should be treated as rougher approximations.

Top income shares are fairly constant from 2004–2011, except for anomalously high 2008 values. The published tax agency data for this year reports an unusually high mean income for taxpayers in the top bracket; access to microdata will be necessary for analyzing why this year appears out of line with the others.

—Table 7 here—

—Table 8 here—

#### **d) International comparisons**

Figure 3 places Chile’s standard top income shares ( $Y_{Rlzd}$ ) in cross-national context. We plot the Chilean estimates from tabulated data along with our microdata estimates, with and without adjusting for under-declaration. When examining Figure 3, it is important to recognize that income definitions depend on tax systems and therefore vary in potentially non-trivial ways; methodological differences in how control incomes are calculated across countries may affect results as well.<sup>24</sup> At present, these difficulties remain unresolved in the top incomes literature. Bearing these caveats in mind, we discuss some tentative comparative conclusions.

When profits are not adjusted to national accounts, Chile’s top 1% shares are higher than most European countries but lower than the four inequality leaders in the World Top Incomes Database (Colombia, Argentina, the U.S., South Africa) (Figure 3.a). However, we think it is more appropriate to use Chile’s adjusted shares in cross-national comparisons. Although adjusting to national accounts is not standard in the top incomes literature, Chile’s tax system creates strong incentives to under-declare distributed profits, and Chile’s tax agency has weak capacity for detecting undeclared distributed profits. Similar incentives do not exist in Argentina or Colombia, where the top personal income tax rate matches the corporate tax rate and dividends do not enter the personal income tax base.<sup>25</sup> While Nordic countries have similar gaps between tax rates on personal (wage) income and capital income, avoidance (income shifting) may be more salient than evasion (undeclared income).<sup>26</sup> Roine and Waldenström (2008: 375) estimate that correcting for evasion in Sweden causes top 1% shares to rise by at most 25%. For Chile, top 1% shares increase by 40–44% in the most conservative adjustment scenario ( $Y_{Rlzd\_NatAcc}$ ); higher fractiles increase by far more.

<sup>24</sup>For more on these issues, see Atkinson, Piketty and Saez (2010).

<sup>25</sup>In Argentina, taxpayers have incentives to over-declare capital income in order to justify changes in patrimony that might otherwise alert officials to investigate for potential evasion or money laundering (AFIP 2008, interview).

<sup>26</sup>Note however that Engstrom and Holmlund (2009: 2426) estimate for Sweden that “self-employed households with unincorporated businesses hide around 50% of their true incomes.” On income shifting in Finland, which is a particular concern among small firms, see Pirttila and Selin (2011).

When profits are adjusted to national accounts, Chile's top 1% share surpasses all other countries in the World Top Incomes Database. Evasion-adjusted top 1% shares for Argentina (Alvaredo 2007) reach similarly high levels.<sup>27</sup> Shares with adjusted profits for Chile's top 0.1% and higher fractiles are sensitive to the method used for imputing undeclared dividends. Adjusted top 0.01%  $Y_{Rlzd\_NatAcc\_alt1(2)}$  shares exceed those in all other countries analyzed (Figure 3.b). Chile's adjusted  $Y_{Rlzd\_NatAcc}$  shares are substantially lower but similar to South Africa. Unadjusted Chilean shares are closer to European shares.

—Figure 3 here—

Turning to our more complete income definition ( $Y_{AcrdProf}$ ), cross-national comparisons become more difficult since the distribution of accrued profits has rarely been analyzed.<sup>28</sup> We tentatively compare Chilean income shares with accrued profits to income shares including capital gains in other countries (Figure 4), assuming for these other countries as Piketty and Saez (2006: 9) do for the U.S. that "...realized capital gains on corporate stock reported on individual tax returns are of comparable magnitude to retained earnings from corporations estimated in National Accounts." Chile's top 1% shares with accrued profits exceed U.S. shares with capital gains. Chile's unadjusted top 0.01% shares are similar to U.S. shares, whereas adjusted top 0.01% shares are significantly higher.

—Figure 4 here—

### e) Mobility at the top

Our data suggests that mobility in Chile among top income fractiles (Table 9) is similar to developed countries. After four years, 60% of taxpayers who were in the top 1% in 2005 remained within that fractile (64% if taxpayers who no longer existed in 2009 are eliminated from the initial group).<sup>29</sup> For the US and Germany, studies have found that the probability of remaining in the top 1% after 3-5 years is 60-68% (Kopczuk et al. 2010: 114, Jenderny 2013: 13). For the top 0.1% in Chile, we find that 43% remained in that fractile four years later; similarly, the probability of remaining in the top 0.1% in Canada is 40-50% (Saez and Veall 2007: 250).

Mobility among fractiles based on accrued profits (Table 10) is slightly lower for all but the top 0.001% of Chileans. 40% of taxpayers remained in the top 0.001%  $Y_{AcrdProf}$  fractile after four years, compared to 32% for the  $Y_{Rlzd}$  fractile.

—Table 9 here—

—Table 10 here—

<sup>27</sup>Alvaredo's methodology for adjusting incomes differs from ours. He views these shares as upper limits that likely overestimate evasion among the very rich.

<sup>28</sup>Atkinson (2009b: 99-100) analyzes how retained profits affect top income shares in the UK during the inter-war period, drawing on limited data available on personally-owned shares.

<sup>29</sup>These figures are based on analysis of individual-level data carried out within the tax agency.

#### **f) Heavy concentration of accumulated retained profits**

Our datasets allow us to examine not only the distribution of profits accrued during the year in question, but also the distribution of retained profits accumulated in the FUT since 1984. These retained profits represent a significant source of wealth in Chile—at least on paper (the FUT is an accounting mechanisms, and many of these profits in practice have probably been withdrawn)—and they are heavily concentrated (Table 11). Depending on the income definition used to rank taxpayers and the year, the top 0.1% owns 36-78% of retained profits. As such, accumulated retained profits are significantly more concentrated than yearly (declared) distributed and accrued profits.<sup>30</sup>

Additionally, our data show that FUT wealth is only loosely correlated with reported income  $Y_{Rlzd}$ . The correlation with reported  $Y_{AcrdProf}$  income is much stronger.

—Table 11 here—

#### **g) Income composition: Importance of profits at the very top**

We focus our analysis of top income compositions on income definitions  $Y_{Rlzd}$  and  $Y_{AcrdProf}$ , without any adjustments for under-reported profits or independent work. Figure 5 shows the share of each income type for the top percentiles. For  $Y_{Rlzd}$ , distributed profits dominate other income sources only for the top 0.001%; wages dominate for lower percentiles within the top 1%. The  $Y_{Rlzd}$  figure also displays the ratio of declared distributed profits to accrued profits. These ratios vary widely, from a minimum of 12% to a maximum of 75%, with no consistent pattern over time or across percentiles. For  $Y_{AcrdProf}$ , accrued profits dominate within the top 0.1%, constituting over 84% of total income in that fractile; less than 13% of accrued profits are distributed. Compared to  $Y_{AcrdProf}$ ,  $Y_{Rlzd}$  income compositions are much more variable over time, even though shares of each source in aggregate personal income change only marginally. Declared distributed profits make up a much lower share of the two top percentile incomes in 2009 (44% and 32% respectively) compared to 2005 (87% and 46% respectively). For comparison, the figures also display capital gains as a percent of total income, even though they are not included in the income definition. For the most part, capital gains are negligible compared to other income sources.

—Figure 5 here—

To get a sense of how individuals in the top 1% can be characterized in terms of their income sources, we rank our rows of 11 aggregated taxpayers by their share of specific income types (wages and pensions, independent work, profits<sup>31</sup>). This procedure follows Bach et al. (2009: 321), except that we are not able to rank at the individual level. However, each row for this purpose can be considered a “typical” taxpayer in the corresponding cohort. Table 12 shows that most of those in the top 1% receive income from a mix of sources. For  $Y_{Rlzd}$ , approximately 9% (16%) receive over 80% of their income from wages in 2005 (2009); 0% report distributed profits in excess of 80% of total income. Independent work plays a much less significant role compared to wages and profits; 98% (99%) of typical taxpayers receive under 30% of their income from this source. For  $Y_{AcrdProf}$ , the fraction of wage-earners (over 80% of

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<sup>30</sup>The top 0.1% receives 17-66% of accrued profits and 12-23% of distributed profits.

<sup>31</sup>Income shares from interest and rent are small.

income from wages and pensions) in the top 1% drops to 5% (10%), while the fraction of business people (over 80% from accrued profits) increases to 3%.

When we examine the top 0.01% alone, business activity grows in importance relative to wage income for 2006. 1% of these typical taxpayers report distributed profits surpassing 80% of total  $Y_{Rlzd}$  income compared to just 3% in the wage-earners category. The figures are more dramatic for  $Y_{AcrdProf}$  incomes. Accrued profits exceed 80% of total income for 66% (61%) of typical taxpayers in 2005 (2009), whereas none have wage-income shares over 30%. Accordingly, when we focus on accrued profits rather than distributed profits, the top of the distribution is clearly and consistently dominated by business owners.

The same phenomenon is apparent within the top 0.001% as well; the top of the  $Y_{Rlzd}$  distribution is dominated by wage earners, whereas as the top of the  $Y_{AcrdProf}$  distribution is dominated by business owners. All typical taxpayers in the  $Y_{AcrdProf}$  top 0.001% have accrued profits exceeding 98% of total income. In stark contrast, all typical taxpayers in the  $Y_{Rlzd}$  top 0.001% have wage income shares above 96%. These results further indicate the importance of analyzing accrued profits.

—Table 12 here—

### III. Effective Tax Rates

#### a) Tax data

Our datasets contain information on both individual and corporate income taxes. Chile's individual income tax is divided into two categories. People who earn only wage income pay the “second category tax” (ISC, *impuesto de segunda categoría*) with progressive marginal rates rising from 5% to 40% (Table 13).<sup>32</sup> People who receive any other sources of income instead of or in addition to wages pay the “complementary global tax” (IGC, *impuesto global complementario*), which applies the same progressive rate schedule to the sum total of taxable income.<sup>33</sup> The corporate income tax on accrued profits (IPC, *impuesto de primera categoría*) was imputed to individuals using the same iterative assignment procedure employed to allocate accrued profits (Section I.a). We imputed the small amount of corporate tax corresponding to accrued profits in pension funds (approximately 5% of the total) in proportion to taxpayers' work and pension income,<sup>34</sup> a similar procedure to that employed by Piketty and Saez (2006) for the US.

—Table 13 here—

Amounts registered for the corporate tax and the IGC may be negative, indicating that the tax agency has reimbursed the taxpayer. Loss carry-back is the most common scenario leading to negative corporate taxes. In general, the total annual amount of IGC paid tends to be negative, primarily because the credit for the corporate tax paid by companies when profits accrue tends to

<sup>32</sup>Marginal rates were lowered in 2012 to the following schedule: 4%, 8%, 13.5%, 23%, 30.4%, 35.5%, 40%.

<sup>33</sup>Capital gains are an exception: they are subject to corporate tax but do not enter into the IGC base and hence receive preferential tax treatment.

<sup>34</sup>We estimated corporate tax from pension funds by applying an effective rate (16.8%) calculated from aggregate figures to accrued profits in these funds. We do not take independent work into account when imputing corporate tax from pensions funds since the bulk of pension contributions were made by dependent workers.



exceed the income tax that individuals owe on their distributed profits. However, at the very top of the income distribution, IGC amounts are primarily positive.

### **b) Effective rates ignoring corporate tax**

Table 14 displays effective tax rates defined as individual income taxes paid divided by declared realized income ( $Y_{Rlzd}$ ). We exclude corporate taxes on retained profits, as is most common in incidence studies. However, we do include corporate taxes corresponding to distributed profits—recall that Chile’s corporate tax is credited against individual income taxes owed when profits are distributed. Effective tax rates calculated including capital gains and capital gains taxes differ only marginally from the rates in Table 14, except for the top 0.001% in 2009 (the effective rate drops by 1.7 percentage points when capital gains are included).

Rates do not vary much from 2005 to 2009, with the exception of the top 0.0001%, which paid only 15% in 2005 compared to 31% in 2009. The 2005 rate results from the unusually low tax on distributed profits collected from the owners’ businesses (corporate tax credit).<sup>35</sup>

Effective tax rates vary substantially within the percentiles reported in Table 14. Over an interval of 0.01% around the top 99.9%, the coefficient of variation is 12%. Tax benefits to promote savings are one salient source of horizontal inequity that may help to explain the spread.

Table 14.a includes effective individual income tax rates for the U.S., Germany, Colombia, and Uruguay, the only countries to our knowledge for which similar analyses exist. However, much caution is required when making cross-country comparisons. Given the problem of undeclared dividends, the Chilean rates are upper bounds; concluding that rates at the top are similar in Chile and the two OECD countries would be misguided. Rates at the top are lower and flatter when distributed profits are adjusted to national accounts (Table 14.b). When comparing Chilean and Colombian rates, it is important to note that the strikingly low Colombian rates are sensitive to Alvaredo and Londoño’s (2013: 22) assumption that 33% of income reported as “*ingresos no constitutivos de renta*” are dividends taxed at the firm level.<sup>36</sup> They estimate that if dividends instead comprise 75% of income in this category, the average effective tax rate for the top 0.01% would rise to 14%. That rate is closer to Chilean rates including imputed corporate taxes and accrued profits in the analysis (below).

—Table 14 here—

### **c) Low effective rates including imputed corporate tax and accrued profits**

Given the problem of undeclared distributed profits, we believe effective rates that include the corporate tax and accrued profits provide a better metric of the tax burden at the top in Chile. Table 15 displays average effective tax rates defined as all income taxes paid during the year divided by income accrued during the year ( $Y_{AcrdProf}$ ). Average effective rates for the top fractiles reach at most 17.2%.

The average tax rates reported for the top percentiles again mask significant variation of rates within these groups. This variation is due largely to the fact that total income tax liabilities for the year do not correspond directly to income definition  $Y_{AcrdProf}$  (profits accrued during the year in question, which may or may not be distributed); the individual income tax reflects distributed profits, while the corporate tax reflects accrued profits. As such, taxpayers with large

<sup>35</sup>This result may reflect an error in the data provided by the tax agency; it is possible that a tax return for a non-Chilean national was accidentally included in this top group of eleven taxpayers.

<sup>36</sup>Dividends in Colombia, as in Argentina and many other countries, are taxed only at the firm level.

distributed profits but few accrued profits (or significant losses) have very high effective tax rates calculated with income denominator  $Y_{\text{AcrdProf}}$ . In addition to the distinct tax treatment of retained versus distributed profits, loss carry forward or carry back and use of other tax benefits contributes to horizontal inequities.

For comparative context, Table 15 also displays average effective tax rates for the U.S. calculated by Piketty and Saez (2006), the only study of which we are aware that fully includes the corporate tax in analyzing top fractile tax incidence. The Chilean rates are 40-64% of the U.S. rates. When comparing the Chilean and US effective tax rates, it should be kept in mind that Piketty and Saez's (2006) corporate tax incidence assumptions and imputation methods differ from ours. They impute corporate taxes paid in proportion to individuals' realized capital income, including dividends, capital gains, and interest, whereas we impute corporate taxes paid in proportion to ownership of accrued profits, which we judge more appropriate for Chile.<sup>37</sup> It should also be noted that Piketty and Saez (2006) do not impute reinvested corporate profits in their analysis, since they maintain that realized capital gains on stocks in the U.S. are of comparable magnitude. The Chilean context is very different, given that few companies are publicly traded, only 35% of profits are distributed annually according to tax return data, and total reported capital gains are less than 1% of accrued profits.

—Table 15 here—

## Conclusion

Our highly detailed and disaggregated tax-return data provide the most accurate available estimates to date of top income shares, income compositions, unrealized capital income, and effective tax rates in Chile. Chilean top income shares—whether profits are adjusted to national accounts or not—are among the highest of those countries that have so far been analyzed with similar methods. Including accrued profits in the analysis skews the distribution even more heavily toward the top. Effective tax rates, meanwhile, are modest. Regarding policy implications, the evidence we present suggests that there is substantial room to raise revenue for social spending by taxing Chile's upper income earners and capital owners more heavily, in line with the Bachelet administration's efforts, although analysis of optimal tax policy and its role in public finance lies beyond the scope of this paper.<sup>38</sup> We hope that our empirical data will inform ongoing debates on tax policy and inequality in Chile.

We hope to extend our research during the coming years by building a time series, which would allow analysis of the determinants of top income shares and responses to tax policy changes since democratization. Such analysis could potentially yield different results from OECD findings (Roine et al. 2009, Piketty et al. 2014), given that Latin America is characterized by a distinct type of “hierarchical capitalism” that reinforces economic and political inequalities (Schneider 2013, Schneider and Soskice 2009). Access to more years of data, which the Chilean tax agency will hopefully provide as time and resources allow, will also afford more complete information on business ownership for imputing accrued profits.

More broadly, our analysis highlights the need for greater attention in the top incomes literature to three research agendas. First, more efforts to analyze the distribution of capital

<sup>37</sup>We treat the portion of corporate tax corresponding to pension and insurance funds in a similar manner as Piketty and Saez (2006), imputing this amount in proportion to taxpayers' wage and pension income.

<sup>38</sup>E.g. Saez 2011, Piketty et al. 2014. Recent research suggests capital income could be taxed more heavily without substantial efficiency costs (Diamond and Saez 2011, Christiansen and Tuomala 2008, Saez 2013, Yagan 2014).

income—whether realized or not—could make a significant contribution to our understanding of inequality around the globe, although data constraints will likely remain problematic. As the Chilean case illustrates, realized capital income may correlate only roughly with unrealized capital income at the top of the distribution. Second, more analysis of how tax systems affect income definitions as well as how much and what type of income is actually declared across countries (and over time) is in order. In Chile, the structure of the income tax creates a particular set of incentives that must be taken into account when endeavoring to estimate income shares and effective tax rates that are reasonably comparable with other countries. Additional attention to comparability issues, cross-national systemization, and methodological standards for imputing undeclared income will become increasingly important as tax return data become available in more developing countries. Third, the top incomes literature could fruitfully expand to include more analyses of effective tax rates paid by the rich and super-rich. We are aware of only a handful of studies that undertake such analysis. This line of inquiry could help shed light on the relationship between taxation and inequality at the top of the income distribution and could serve as a valuable input for policy debates on tax reform and analysis of redistributive politics.

## Tables

**Table 1: Control Incomes, % GDP**

	<b>2005</b>	<b>2009</b>
<b>Y_Rlzd</b>	50.7	50.1
<b>YRlzd_NatAcc</b>	59.3	60.2
<b>Y_AcrdProf</b>	54.8	53.6
<b>Y_AcrdProf_NatAcc</b>	66.3	66.9
Y <sup>(*)</sup> _AcrdProf	57.7	56.4
Y_Rlzd_CG	50.8	50.1
Y_AcrdProf_CG	55.0	53.9
Y_AcrdProf_Pen	50.6	49.6

Notes: Y\_Rlzd includes distributed profits. Y\_Rlzd\_NatAcc denotes that independent work and distributed profits are adjusted to National Accounts. Y\_AcrdProf includes accrued profits. Y\_AcrdProf\_NatAcc denotes that independent work and accrued profits are adjusted to National Accounts. Y<sup>(\*)</sup>\_AcrdProf and Y<sup>(\*\*)</sup>\_AcrdProf include imputed residual accrued profits with no ownership information. CG denotes inclusion of capital gains. For Y\_AcrdProf\_Pen, imputed accrued profits from pension funds replace pension payments.

**Table 2: Population and Tax Returns**

	Population over 20 <i>Source: Instituto Nacional de Estadisticos</i>	Tax returns <i>Source: SII</i>
2005	10,750,033	6,808,535
2009	11,582,966	7,731,605

Sources: *Instituto Nacional de Estadisticos* for adult population; own datasets for tax returns.

**Table 3: Realized Income Shares (with Distributed Profits), 2005 (2009)**

	<b>Top 0.0001</b>	<b>Top 0.001</b>	<b>Top 0.01</b>	<b>Top 0.1</b>	<b>Top 1</b>	<b>Top 10</b>	<b>Top 20</b>
<b>Y_Rlzd</b>	0.091 (0.053)	0.335 (0.261)	1.090 (0.988)	4.020 (3.825)	15.54 (15.02)	49.30 (48.93)	63.79 (63.94)
Y_Rlzd_CG	0.091 (0.052)	0.336 (0.299)	1.096 (1.034)	4.054 (3.886)	15.60 (15.10)	49.35 (48.98)	63.83 (63.98)
<b>Y_Rlzd_NatAcc</b>	0.211 (0.106)	0.628 (0.454)	1.817 (1.636)	6.145 (5.911)	21.75 (21.63)	55.41 (55.81)	68.46 (69.21)
Y_Rlzd_NatAcc_alt1	0.974 (1.718)	2.901 (3.663)	6.155 (6.795)	11.97 (12.57)	24.39 (24.88)	55.28 (55.69)	68.24 (68.96)
Y_Rlzd_NatAcc_alt2	0.902 (1.140)	3.051 (3.346)	7.006 (7.379)	13.18 (13.70)	25.86 (26.23)	56.17 (56.63)	68.80 (69.56)

Sources: Authors' calculations from own datasets.

Notes: These Chilean incomes include only distributed profits. NatAcc denotes that profits and independent work are adjusted to National Accounts. Alt1 denotes the alternative adjustment procedure for distributed profits using the difference between taxpayers' positive accrued profits and distributed profits; Alt2 denotes the alternative adjustment procedure for distributed profits using the FUT distribution. CG denotes inclusion of capital gains.

**Table 4: Income Shares with Accrued Profits, 2005 (2009)**

	<b>Top 0.0001%</b>	<b>Top 0.001%</b>	<b>Top 0.01%</b>	<b>Top 0.1%</b>	<b>Top 1%</b>	<b>Top 10%</b>	<b>Top 20%</b>
<b>Y_AcrdProf</b>	0.8277 (1.353)	2.468 (2.895)	5.298 (5.458)	10.66 (10.60)	23.25 (23.04)	55.15 (55.23)	68.72 (69.35)
Y'_AcrdProf	0.7997 (1.290)	2.387 (2.780)	5.216 (5.337)	10.86 (10.71)	24.34 (23.88)	56.58 (56.48)	69.78 (70.27)
Y''_AcrdProf	1.058 (1.755)	3.152 (3.750)	6.706 (7.005)	13.09 (13.18)	26.50 (26.44)	58.01 (58.30)	71.07 (71.92)
<b>Y_AcrdProf_NatAcc</b>	1.422 (2.425)	4.232 (5.176)	8.960 (9.617)	17.14 (17.72)	32.02 (32.55)	61.92 (62.60)	73.68 (74.71)
Y_AcrdProf_NatAcc_alt	1.583 (NA)	5.390 (NA)	10.91 (NA)	19.26 (NA)	32.96 (NA)	61.52 (NA)	73.12 (NA)
Y_AcrdProf_CG	0.8543 (1.377)	2.497 (3.028)	5.372 (5.744)	10.82 (11.01)	23.44 (23.42)	55.27 (55.44)	68.79 (69.48)
Y_AcrdProf_Pen	0.8959 (1.460)	2.671 (3.126)	5.734 (5.894)	11.54 (11.45)	25.03 (24.75)	57.32 (57.59)	70.13 (71.10)

Sources: Authors' calculations from own datasets.

Notes: Y' and Y'' include imputed residual accrued profits with no ownership information. In the first case, the residual is imputed in proportion to declared distributed profits; in the second case, it is imputed in proportion to the distribution of accrued profits for which ownership information exists. NatAcc denotes that accrued profits and independent work are adjusted to National Accounts. Alt denotes the alternative adjustment procedure for accrued profits using gross income. CG denotes inclusion of capital gains. Pen indicates that imputed accrued profits from pension funds have replaced pension payments.

**Table 5: Income Shares with Distributed Profits ( $Y_{Rlzd}$ ) vs. Accrued Profits ( $Y_{AcrdProf}$ )  
by Different Rankings; 2005 (2009)**

**a) Unadjusted Incomes**

	<b>Top 0.0001</b>	<b>Top 0.001</b>	<b>Top 0.01</b>	<b>Top 0.1</b>	<b>Top 1</b>	<b>Top 10</b>
<b>Y_Rlzd</b>	0.091 (0.053)	0.335 (0.261)	1.090 (0.988)	4.020 (3.825)	15.54 (15.02)	49.3 (48.9)
<b>Y_AcrdProf ranked by Y_Rlzd</b>	0.109 (0.159)	0.929 (0.430)	2.570 (1.561)	6.986 (5.071)	19.90 (17.50)	51.89 (50.33)
<b>Y_AcrdProf</b>	0.828 (1.353)	2.468 (2.895)	5.298 (5.458)	10.66 (10.60)	23.25 (23.04)	55.15 (55.2)
<b>Ratio of Y_AcrdProf to Y_Rlzd</b>	9.06 (25.77)	7.36 (11.10)	4.86 (5.52)	2.65 (2.77)	1.50 (1.53)	1.12 (1.13)

**b) Incomes adjusted to National Accounts**

	<b>Top 0.0001</b>	<b>Top 0.001</b>	<b>Top 0.01</b>	<b>Top 0.1</b>	<b>Top 1</b>	<b>Top 10</b>
<b>Y_Rlzd_NatAcc</b>	0.211 (0.106)	0.628 (0.454)	1.817 (1.636)	6.145 (5.911)	21.75 (21.63)	55.4 (55.8)
<b>Y_AcrdProf_NatAcc ranked by Y_Rlzd_NatAcc</b>	0.335 (0.315)	1.702 (0.911)	4.191 (2.983)	10.67 (8.667)	26.77 (24.40)	57.90 (56.47)
<b>Y_AcrdProf_NatAcc</b>	1.422 (2.425)	4.232 (5.176)	8.960 (9.617)	17.14 (17.72)	32.02 (32.55)	61.92 (62.60)
<b>Ratio of Y_AcrdProf_NatAcc to Y_Rlzd_NatAcc</b>	6.74 (22.8)	6.74 (11.4)	4.93 (5.88)	2.79 (3.00)	1.47 (1.50)	1.12 (1.12)

Source: Authors' calculations from own datasets.

Notes: Y\_Rlzd includes only distributed profits. Y\_Rlzd\_NatAcc denotes that independent work and distributed profits are adjusted to National Accounts.

Y\_AcrdProf includes accrued profits. Y\_AcrdProf\_NatAcc denotes that independent work and accrued profits are adjusted to National Accounts.

**Table 6: Transitions from Top  $Y_{Rlzd}$  Fractiles to  $Y_{AcrdProf}$  Fractiles (2005)**

<b><math>Y_{Rlzd}</math> fracile</b>	<b>% Also in Top <math>Y_{AcrdProf}</math> fractile</b>
<b>Top 0.001%</b>	<b>19.4</b>
<b>Top 0.01%</b>	<b>27.9</b>
<b>Top 0.1%</b>	<b>45.2</b>
<b>Top 1%</b>	<b>77.6</b>

Sources: Authors' calculations from own datasets.

Notes:  $Y_{Rlzd}$  includes only distributed profits.  $Y_{AcrdProf}$  includes accrued profits.



**Table 7: Top Income Shares Estimated from Published Tabulated Data**

**a) With Distributed Profits:  $Y_{Rlzd}$  ( $Y_{Rlzd\_NatAcc}$ )**

		<b>Top 0.01</b>	<b>Top 0.1</b>	<b>Top 1</b>
2004		1.10 (1.83)	4.18 (6.42)	16.3 (23.1)
<b>2005</b>		1.10 (1.82)	4.06 (6.23)	15.5 (22.1)
	<i>microdata:</i>	<b>1.090 (1.817)</b>	<b>4.020 (6.145)</b>	<b>15.54 (21.75)</b>
2006		0.99 (1.65)	3.71 (5.71)	14.4 (20.5)
2007		1.01 (1.67)	3.77 (5.80)	14.6 (20.7)
2008		2.50 (4.15)	6.11 (9.39)	17.1 (24.3)
<b>2009</b>		0.98 (1.63)	3.79 (5.83)	15.0 (21.3)
	<i>microdata:</i>	<b>0.988 (1.636)</b>	<b>3.825 (5.911)</b>	<b>15.02 (21.63)</b>
2010		0.93 (1.54)	3.55 (5.45)	14.0 (19.9)
2011		0.95 (1.57)	3.66 (5.63)	14.2 (20.1)
2012		0.94 (1.56)	3.56 (5.47)	13.9 (19.7)

**b) With Accrued Profits:  $Y_{AcrdProf}$  ( $Y_{AcrdProf\_NatAcc}$ )**

		<b>Top 0.01*</b>	<b>Top 0.1</b>	<b>Top 1</b>
2004		5.7 (9.9)	11.3 (18.6)	24.7 (34.4)
<b>2005</b>		5.7 (9.8)	11.0 (18.0)	23.5 (32.8)
	<i>microdata:</i>	<b>5.298 (8.960)</b>	<b>10.66 (17.14)</b>	<b>23.25 (32.02)</b>
2006		5.2 (8.9)	10.1 (16.5)	21.9 (30.5)
2007		5.2 (9.0)	10.2 (16.7)	22.1 (30.8)
2008		13 (22)	16.6 (27.1)	25.9 (36.2)
<b>2009</b>		5.1 (8.8)	10.3 (16.9)	22.8 (31.8)
	<i>microdata:</i>	<b>5.298 (9.617)</b>	<b>10.60 (17.72)</b>	<b>23.04 (32.55)</b>
2010		4.8 (8.3)	9.62 (15.8)	21.2 (29.6)
2011		4.9 (8.5)	9.93 (16.3)	21.5 (29.9)
2012		4.9 (8.4)	9.64 (15.8)	21.0 (29.3)

Sources: Authors' calculations using adjustment factors (geometric mean) from Table 8 and [www.sii.cl/estadisticas/contribuyentes/impuestos\\_personales.htm](http://www.sii.cl/estadisticas/contribuyentes/impuestos_personales.htm)

Notes:  $Y_{Rlzd}$  includes only distributed profits.  $Y_{AcrdProf}$  includes accrued profits. NatAcc denotes that profits and independent work are adjusted to National Accounts. \*These estimates likely have more error compared to the lower fractiles (see Table 8.b).

**Table 8: Adjustment Factors**

Ratios of top income share estimates from microdata to estimates from tabulated data

**a)  $Y_{Rlzd}$  ( $Y_{Rlzd\_NatAcc}$ )**

	<b>Top 0.01</b>	<b>Top 0.1</b>	<b>Top 1</b>
2005	1.045 (1.742)	1.016 (1.554)	1.010 (1.414)
2009	1.058 (1.752)	1.034 (1.598)	1.009 (1.453)
<b>Geometric mean</b>	<b>1.051 (1.747)</b>	<b>1.025 (1.576)</b>	<b>1.010 (1.433)</b>
Relative difference (%) <sup>1</sup>	1.24 (0.57)	1.75 (2.84)	-0.14 (2.71)

**b)  $Y_{AcrdProf}$  ( $Y_{AcrdProf\_NatAcc}$ )**

	<b>Top 0.01</b>	<b>Top 0.1</b>	<b>Top 1</b>
2005	5.079 (8.589)	2.695 (4.334)	1.511 (2.082)
2009	5.844 (10.30)	2.867 (4.792)	1.547 (2.186)
<b>Geometric mean</b>	<b>5.448 (9.405)</b>	<b>2.780 (4.557)</b>	<b>1.529 (2.133)</b>
Relative difference (%) <sup>1</sup>	14.05 (18.2)	6.16 (10.1)	2.35 (4.90)

Sources: Authors' calculations from own datasets and

[www.sii.cl/estadisticas/contribuyentes/impuestos\\_personales.htm](http://www.sii.cl/estadisticas/contribuyentes/impuestos_personales.htm)

Notes: NatAcc denotes that profits and independent work are adjusted to National Accounts.

<sup>1</sup>Relative difference = (2009 factor – 2005 factor)/(geometric mean)

**Table 9: Mobility in Chile and Germany**  
**Percent remaining in top fractile (Chile: after 4 years; Germany: after 3 years)**

	Chile, Y_Rlzd		Germany <sup>1</sup>
	Conditional	Unconditional	Unconditional on fractile membership after 3 years
Top 0.001%	32.4	30.6	~50
Top 0.01%	45.5	42.2	~50
Top 0.1%	50.2	47.1	~56-59
Top 1%	64.4	60.3	~67

Sources: Authors' calculations from own datasets; <sup>1</sup>Jenderny 2013: 13.

Notes: German fractiles based on individuals aged 20-65 only, 2002-03. Y\_Rlzd includes only distributed profits.

**Table 10: Mobility Among Top Fractiles in Chile (2005)**  
**Percent remaining in respective top fractile after 4 years (conditional)**

	Y_Rlzd	Y_AcrdProf
Top 0.001%	32.4	40.2
Top 0.01%	45.5	36.8
Top 0.1%	50.2	45.2
Top 1%	64.4	60.5

Sources: Authors' calculations from own datasets.

Notes: Y\_Rlzd includes only distributed profits. Y\_AcrdProf includes accrued profits.

**Table 11: Shares (%) of Total Retained Profits (FUT), 2005 (2009)**

		<b>Top 0.0001%</b>	<b>Top 0.001%</b>	<b>Top 0.01%</b>	<b>Top 0.1%</b>	<b>Top 1%</b>	<b>Top 10%</b>
<b>Taxpayer Ranking</b>	<b>Y_Rlzd</b>	1.301 (4.136)	8.965 (6.251)	20.40 (17.16)	41.40 (36.10)	75.52 (69.24)	95.25 (93.30)
	<b>Y_Rlzd_NatAcc</b>	3.168 (4.648)	9.813 (8.331)	21.86 (20.44)	46.29 (42.45)	81.73 (78.11)	96.48 (95.25)
	<b>Y_Rlzd_NatAcc_alt2</b>	6.525 (7.725)	21.76 (22.61)	48.36 (47.98)	78.31 (77.68)	95.09 (94.68)	99.40 (99.42)
	<b>Y_AcrdProf</b>	5.319 (5.457)	18.53 (17.62)	40.42 (35.07)	65.11 (57.04)	82.10 (73.32)	89.41 (81.32)
	<b>Y_AcrdProf_NatAcc</b>	5.319 (5.457)	18.49 (17.64)	40.58 (35.28)	66.79 (58.87)	84.21 (75.97)	89.91 (81.95)
	<b>Y_AcrdProf_NatAcc_alt</b>	5.867 (NA)	19.32 (NA)	43.56 (NA)	71.80 (NA)	90.04 (NA)	95.35 (NA)

Source: Authors' calculations from own datasets.

Notes: Y\_Rlzd includes only distributed profits. Y\_Rlzd\_NatAcc denotes that independent work and distributed profits are adjusted to National Accounts; unreported profits are imputed in proportion to declared profits. Y\_Rlzd\_NatAcc\_alt2 denotes the alternative adjustment procedure for distributed profits using the FUT distribution. Y\_AcrdProf includes accrued profits. Y\_AcrdProf\_NatAcc denotes that independent work and accrued profits are adjusted to National Accounts; unreported profits are imputed in proportion to declared profits. Y\_AcrdProf\_NatAcc\_alt denotes the alternative adjustment procedure for accrued profits using gross income.

**Table 12: Percent of Typical Taxpayers by Share of Income Type, 2005 (2009)**  
**Unadjusted reported income**

**a) Top 1%**

	Y_Rlzd			Y_AcrdProf		
	Wages & Pensions	Independent Work	Distributed Profits	Wages & Pensions	Independent Work	Accrued Profits
<b>90-100%</b>	1.0 (2.6)	0 (0)	0 (0.01)	0.6 (1.6)	0 (0)	1.3 (1.1)
<b>80-90%</b>	7.8 (13.0)	0 (0)	0 (0)	4.3 (8.3)	0 (0)	1.9 (1.9)
<b>70-80%</b>	21.2 (27.8)	0 (0)	0.1 (0.04)	14.0 (18.6)	0 (0)	3.1 (2.9)
<b>60-70%</b>	30.1 (30.2)	0 (0)	0.4 (0.09)	23.3 (23.7)	0 (0)	4.8 (4.6)
<b>50-60%</b>	24.4 (18.4)	0 (0)	2.4 (1.3)	23.9 (20.3)	0 (0)	8.6 (7.8)
<b>40-50%</b>	11.4 (6.4)	0.1 (0.03)	9.0 (6.0)	16.2 (12.8)	0.1 (0.03)	14.3 (12.9)
<b>30-40%</b>	3.3 (1.2)	1.6 (0.56)	22.9 (18.9)	8.9 (7.2)	1.0 (0.28)	21.5 (19.3)
<b>20-30%</b>	0.7 (0.3)	19.8 (5.7)	31.3 (32.0)	4.6 (3.8)	7.9 (4.2)	24.0 (23.2)
<b>10-20%</b>	0.1 (0)	26.6 (29.4)	24.8 (28.9)	2.3 (2.4)	30.2 (24.1)	15.5 (17.5)
<b>0-10%</b>	0.0 (0)	51.9 (64.3)	9.2 (12.8)	2.0 (1.5)	60.8 (71.4)	4.9 (8.9)

**b) Top 0.01%**

	Y_Rlzd			Y_Acrd_Prof		
	Wages & Pensions	Independent Work	Distributed Profits	Wages & Pensions	Independent Work	Accrued Profits
<b>90-100%</b>	0 (1.9)	0 (0)	0 (0)	0 (0)	0 (0)	66.3 (61.0)
<b>80-90%</b>	3.1 (3.8)	0 (0)	1.0 (0)	0 (0)	0 (0)	31.6 (28.6)
<b>70-80%</b>	9.2 (14.3)	0 (0)	1.0 (0)	0 (0)	0 (0)	1.0 (10.5)
<b>60-70%</b>	19.4 (30.5)	0 (0)	1.0 (0)	0 (0)	0 (0)	1.0 (0)
<b>50-60%</b>	18.4 (21.0)	1.0 (0)	10.2 (7.6)	0 (0)	0 (0)	0 (0)
<b>40-50%</b>	24.5 (19.0)	0 (1.0)	14.3 (13.3)	0 (0)	0 (0)	0 (0)
<b>30-40%</b>	15.3 (7.6)	6.1 (2.9)	28.6 (19.0)	0 (0)	0 (0)	0 (0)
<b>20-30%</b>	8.2 (1.9)	19.4 (6.7)	25.5 (31.4)	1.0 (2.9)	0 (0)	0 (0)
<b>10-20%</b>	1.0 (0)	35.7 (34.3)	14.3 (23.8)	15.3 (25.7)	6.1 (3.8)	0 (0)
<b>0-10%</b>	1.0 (0)	37.8 (55.2)	4.1 (4.8)	83.7 (71.4)	93.9 (96.2)	0 (0)

Source: Authors' calculations from own datasets.

Notes: Rows of 11 aggregated taxpayers are ranked by their share of each income type. Values in each column sum to 100 (%), with the exception of Accrued Profits for the top 1% in 2005: the residual 0.2% of these taxpayers have negative accrued profits. Y\_Rlzd includes only distributed profits. Y\_AcrdProf includes accrued profits.

**Table 13: Chile's Individual Income Tax Rate Structure, 2005 (2009)**

Threshold (UTA)*	Marginal Rate (%)	Percent of Taxpayers	Percentile of Adult Population
0-13.5	0	84.1 (81.7)	
13.5-30	5	10.5 (12.0)	Top 10.4 (12.5)
30-50	10	2.9 (3.3)	Top 3.56 (4.30)
50-70	15	1.2 (1.4)	Top 1.64 (2.06)
70-90	25	0.6 (0.7)	Top 0.87 (1.13)
90-120	32	0.4 (0.5)	Top 0.49 (0.64)
120-150	37	0.2 (0.2)	Top 0.23 (0.29)
150 and above	40	0.2 (0.2)	Top 0.13 (0.16)

Source: SII and authors' calculations.

Note: Chile's tax system is fully inflation-adjusted. \*One UTA equaled 378,852 pesos (USD 674) in 2005 and 442,356 pesos (USD 804) in 2009.

**Table 14: Average Effective Tax Rates (%), Excluding Corporate Tax on Retained Profits****a) Chilean Rates with no adjustments for undeclared income**

	Chile <sup>a</sup>		Colombia <sup>b</sup>		Uruguay <sup>c</sup>	U.S. <sup>d</sup>	Germany <sup>e</sup>
	2005	2009	2006	2009	2009	2004	2005
Top 0.0001%	15.43	30.95	NA	NA	NA	NA	28.7
Top 0.001%	27.21	30.14	7.3	4.8	NA	NA	31.0
Top 0.01%	29.14	28.28	8.3	7.1	NA	25.6	32.9
Top 0.1%	25.31	25.12	8.7	7.7	14.4	24.8	33.7
Top 1%	15.41	16.40	7.5	7.1	15.9	20.8	30.5
P 99.99-100	29.14	28.28	8.3	7.1	NA	26.2	NA
P 99.9-99.99%	23.89	24.03	NA	NA	NA	25.1	NA
P 99.5-99.9%	14.62	16.05	7.7	7.6	NA	23.8	NA
P 99-99.5%	8.73	10.30	5.6	5.7	NA	21.4	NA

Sources and Notes: <sup>a</sup>Authors' calculations from own datasets using income denominator Y\_Rlzd (includes only distributed profits); <sup>b</sup>Alvaredo & Londoño 2013: individual income tax including corporate tax on dividends; <sup>c</sup>Burdin et al. 2014; <sup>d</sup>Piketty & Saez 2006: individual income tax only, taxpayers ranked excluding capital gains; <sup>e</sup>Bach et al. 2012.

**b) Chilean rates adjusted for undeclared income**

	Income denominator					
	Y_Rlzd_NatAcc		Y_Rlzd_NatAcc_alt1		Y_Rlzd_NatAcc_alt2	
	2005	2009	2005	2009	2005	2009
Top 0.0001%	15.35	14.93	15.92	8.34	8.89	8.71
Top 0.001%	19.37	15.71	15.85	8.59	8.49	8.69
Top 0.01%	20.24	15.38	16.27	9.23	10.16	9.13
Top 0.1%	19.07	14.47	17.27	11.03	11.73	10.69
Top 1%	15.35	12.15	15.47	12.04	12.10	11.85
P 99.99-100	20.24	15.38	16.27	9.23	10.16	9.13
P 99.9-99.99%	18.59	14.11	18.31	13.15	13.79	12.52
P 99.5-99.9%	15.08	11.72	16.08	14.63	14.07	14.72
P 99-99.5%	12.23	10.69	10.27	10.81	10.21	10.80

Source: Authors' calculations from own datasets.

Note: Numerator includes imputed corporate tax on undeclared dividends, approximated by applying the global average withholding rate for the year. This approach likely overestimates the amount of tax actually paid.

Y\_Rlzd\_NatAcc adjusts independent work and distributed profits to National Accounts; undeclared distributed profits are imputed in proportion to declared distributed profits. Alt1 denotes the alternative adjustment procedure for distributed profits using the difference between taxpayers' positive accrued profits and distributed profits; alt2 denotes the alternative adjustment procedure for distributed profits using the FUT distribution.

**Table 15: Effective Tax Rates (%), Including Corporate Tax on Retained Profits**

	Chile		U.S.
	2005	2009	2004
Top 0.0001%	15.66	13.92	NA
Top 0.001%	15.22	14.17	NA
Top 0.01%	15.96	15.13	31.2
Top 0.1%	17.20	16.54	29.2
Top 1%	15.15	15.47	24.3
P 99.99-100	15.96	15.13	30.8
P 99.9-99.99%	18.43	18.03	30.0
P 99.5-99.9%	15.90	16.73	28.1
P 99-99.5%	9.91	11.53	25.1

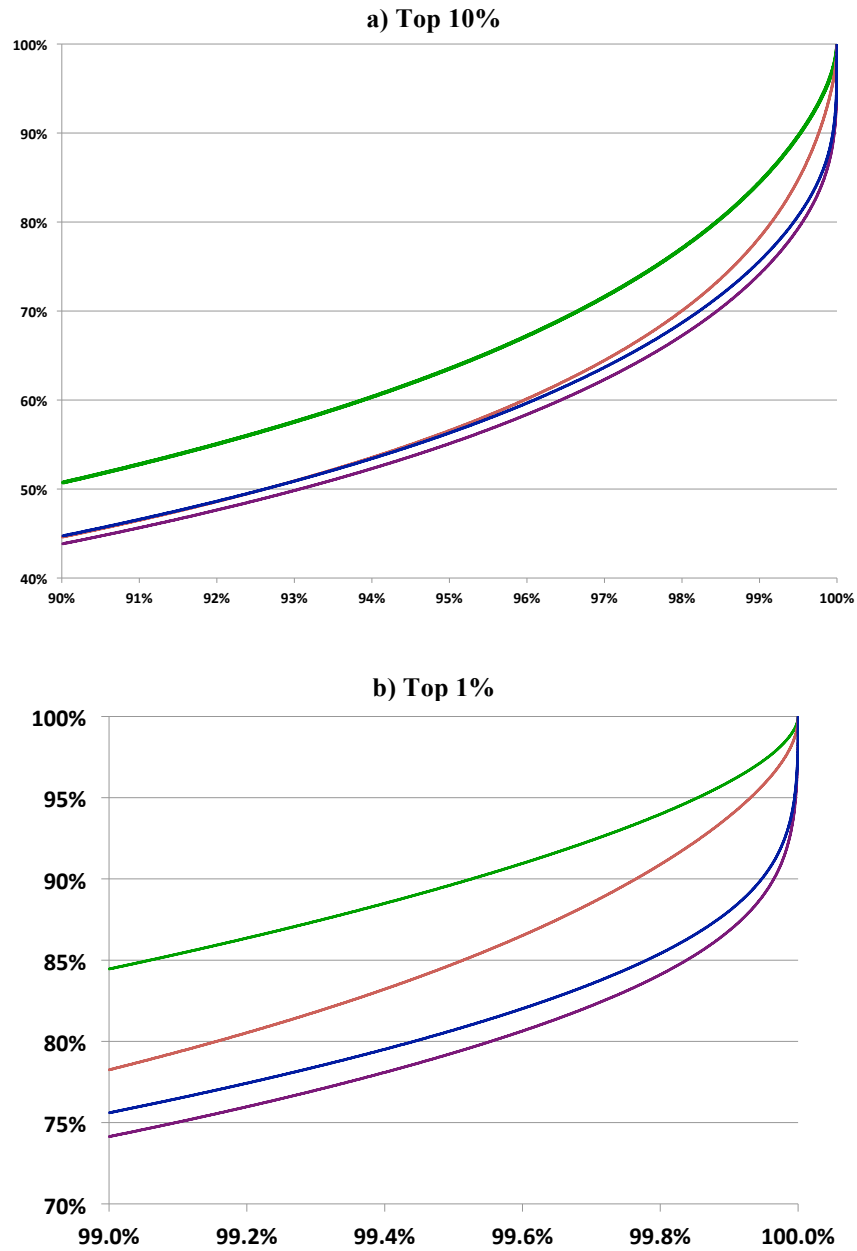
Sources: Authors' calculations from own datasets; Piketty & Saez 2006 for the U.S.

Note: Chilean rates calculated with income denominator  $Y_{AcrdProf}$  (reported incomes with accrued profits).



## Figures

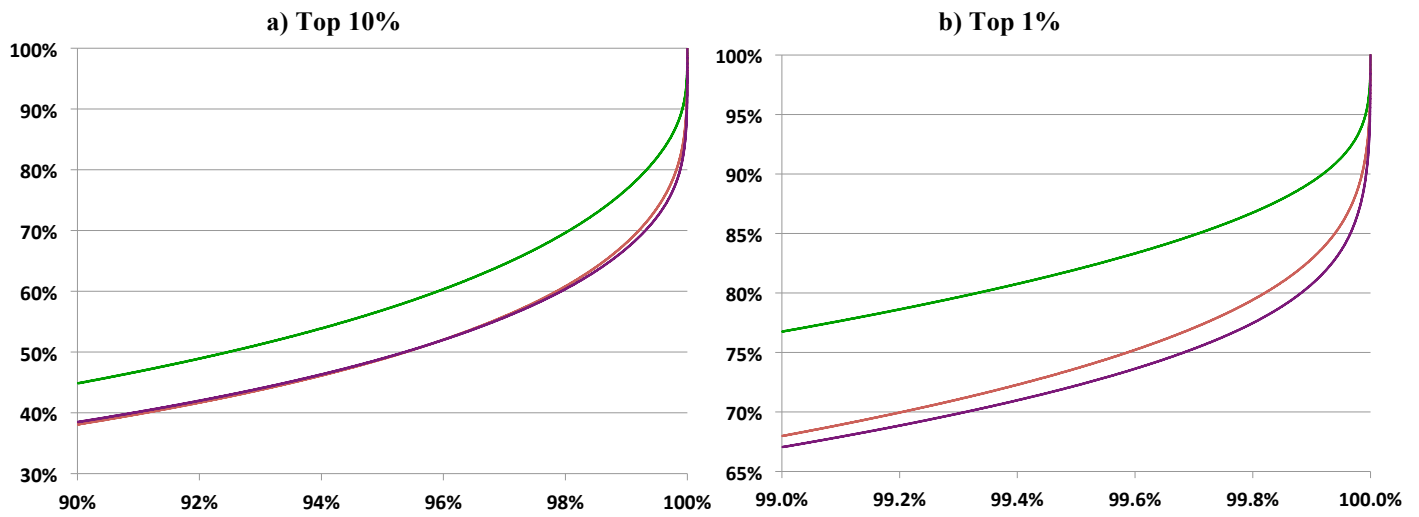
**Figure 1: Lorenz Curves, 2005 Realized Income**



Source: Authors' calculations from own datasets.

Note: Y\_Rlzd (green), Y\_Rlzd\_NatAcc (red), Y\_Rlzd\_NatAcc\_alt1 (blue), Y\_Rlzd\_NatAcc\_alt2 (purple). Incomes with only distributed profits. NatAcc denotes that profits and independent work are adjusted to National Accounts. Alt1 denotes the alternative adjustment procedure for distributed profits using the difference between taxpayers' positive accrued profits and distributed profits; alt2 denotes the alternative adjustment procedure for distributed profits using the FUT distribution.

**Figure 2: Lorenz Curves, 2005 Income with Accrued Profits**

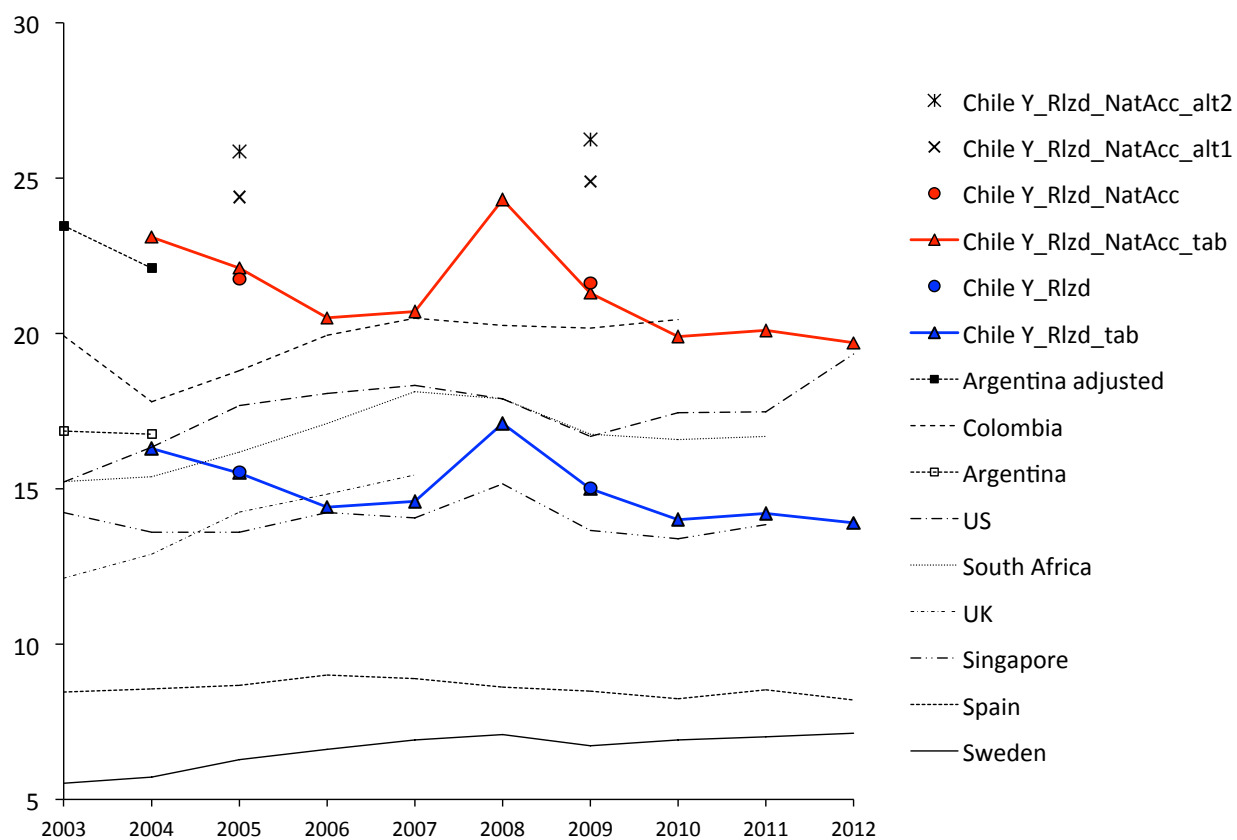


Source: Authors' calculations from own datasets.

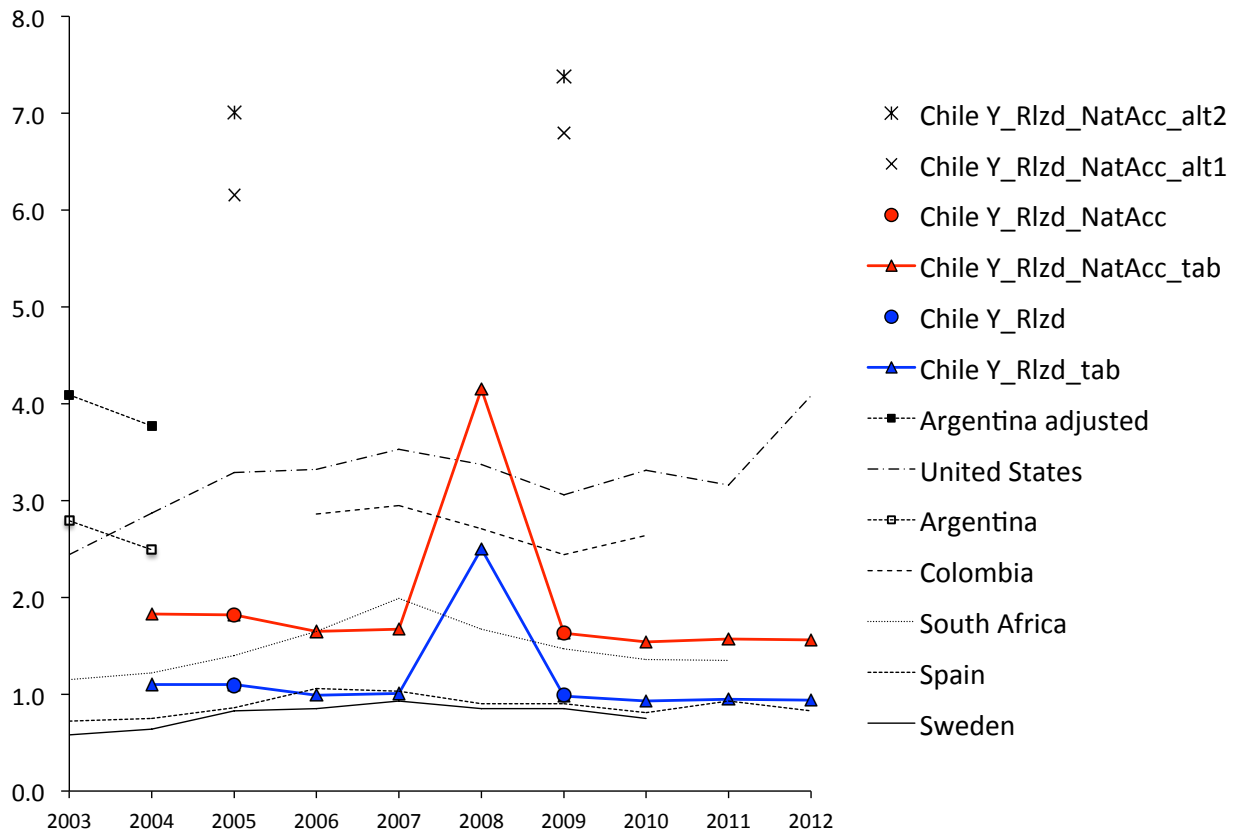
Note: Y\_AcrdProf (green), Y\_AcrdProf\_NatAcc (red), Y\_AcrdProf\_NatAcc\_alt (purple). Incomes with accrued profits. NatAcc denotes that profits and independent work are adjusted to National Accounts. Alt denotes the alternative adjustment procedure for accrued profits using gross income.

Figure 3: Standard Realized Income Shares (%), Excluding Capital Gains.

a) Top 1%



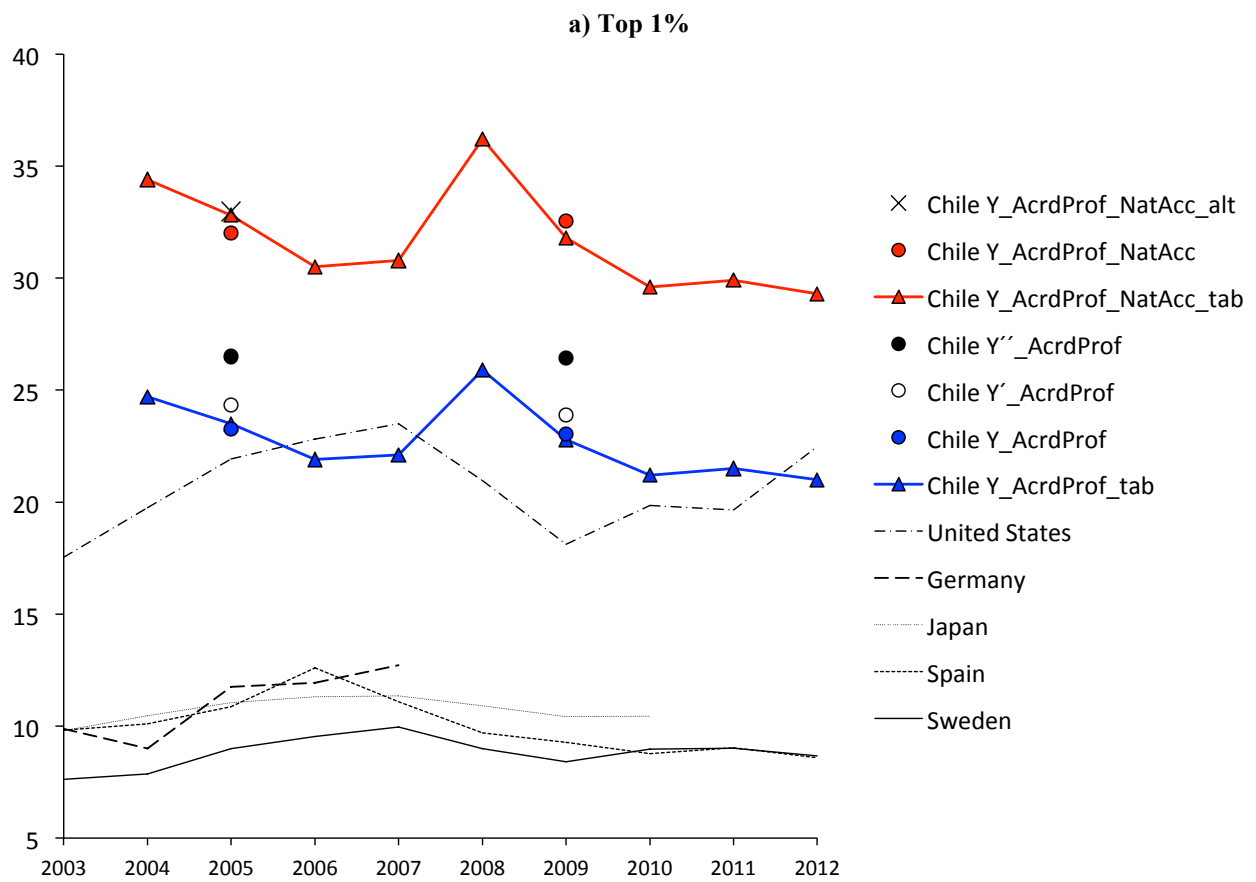
**b) Top 0.01%**

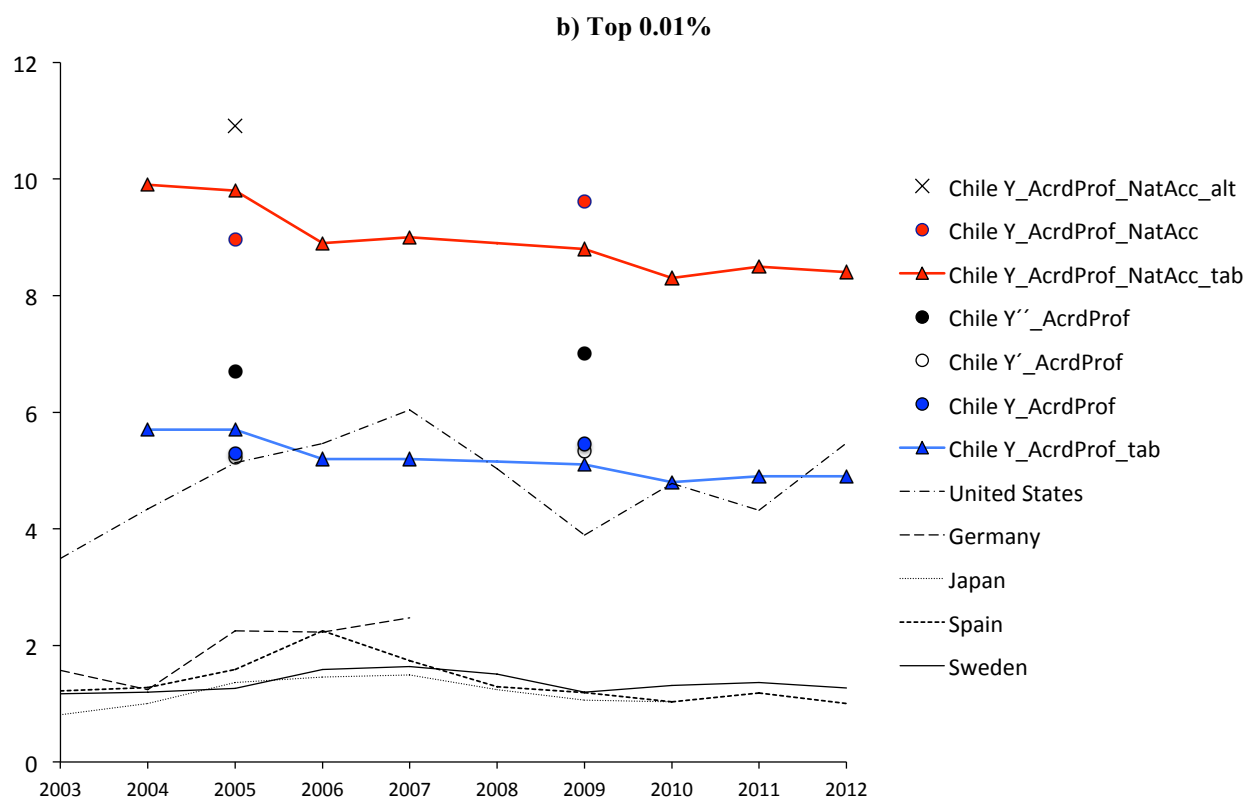


Sources: Authors' calculations from own datasets and published tabulated data (Chile); World Top Incomes Database; Alvaredo 2007 (evasion-adjusted Argentine shares).

Notes: The standard realized income definition includes only distributed profits. For the Chilean estimates, NatAcc denotes that profits and independent work are adjusted to National Accounts. Alt1 denotes the alternative adjustment procedure for distributed profits using the difference between taxpayers' positive accrued profits and distributed profits; alt2 denotes the alternative adjustment procedure for distributed profits using the FUT distribution. Tab denotes estimates from published tabulated data (Section II part c). The 2008 values for estimates from the tabulated data are outliers that likely reflect an error in the published data.

**Figure 4: Income Shares (%), Including Accrued Profits (Chile) or Capital Gains**





Sources: Authors' calculations from own datasets and published tabulated data (Chile); World Top Incomes Database.

Notes: Y' and Y'' include imputed residual accrued profits with no ownership information. In the first case, the residual is imputed in proportion to declared distributed profits; in the second case, it is imputed in proportion to the distribution of accrued profits for which ownership information exists. NatAcc denotes that accrued profits and independent work are adjusted to National Accounts. Alt denotes the alternative adjustment procedure for accrued profits using gross income. Tab denotes estimates from published tabulated data (Section II part c). The 2008 values for estimates from the tabulated data are outliers that likely reflect an error in the published data; they are not displayed in the Top 0.01% chart because the derivation procedure amplifies their extremity (see Tables 7 and 8).

**Figure 5: Top Income Compositions, % of Total**  
*See separate file*

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## Appendix 1: Income Categories

### Interest earnings

This category includes inflation-adjusted earnings from deposits in financial institutions, as well as capital gains from mutual and investment funds, capital gains classified as habitual (e.g. stocks bought and sold within one year), and interest earned on voluntary pension savings (above the legally required minimum contributions). Only real interest earnings are taxable in Chile.

### Capital gains

Non-habitual capital gains are classified under the separate capital gains category. As with interest earnings, reported capital gains are non-negative. Chile taxes only specific types of non-habitual capital gains. Capital gains from selling real estate and stocks in publicly-traded corporations are tax exempt and hence are not reported to the tax agency. Capital gains received by businesses, which account for the majority of declared capital gains in Chile, were imputed to individual taxpayers following the same procedure used to impute accrued profits (below). Like capital gains, most forms of rental income are tax-exempt.

### Accrued profits

Accrued profits were estimated by adding losses accumulated from previous years to declared taxable profits (Chile allows unlimited loss carry-forward). Allowances for accelerated depreciation should also be added to taxable profits; however, tax returns do not contain sufficient information to make this correction.

Ownership shares for imputing accrued profits were calculated from business tax forms as the ratio of profits distributed to a particular owner to total profits distributed by the firm during the year in question. We obtained information to calculate ownership shares for the years 2003, 2005, 2007, and 2009. For firms that distributed profits during only one of these four years, we assume that ownership did not change significantly over time. This situation arose only for partnerships, which change ownership less frequently than corporations.

Accrued profits were allocated in proportion to these ownership shares. Multiple iterations were necessary to trace interlocking business ownership down to the level of individual taxpayers. Through this procedure, 49% (45%) of the total accrued profits for 2005 (2009) were imputed to Chilean taxpayers, 31% (37%) to foreign owners, and 3% (2%) to funds managed by pension and mutual administrators.

We lack ownership information for a sizable number of businesses that did not report any distributed profits during any of the years for which we obtained information—not only 2005 and 2009, but also 2003 and 2007, for which the tax agency agreed to provide us with the specific data needed to calculate ownership shares.<sup>1</sup> Profits accrued to these firms constituted approximately 17% (16%) of total profits reported to the tax agency in 2005 (2009). We employ three alternatives to handle these residual profits: 1) omission; 2) imputation based on the distribution of accrued profits for which we do have ownership information; 3) imputation in proportion to the distribution of taxpayers' declared *distributed* profits. All of these approaches are ad hoc, but they provide a rough estimate of the uncertainty surrounding the distribution of accrued profits. All three approaches assume that the information we have fully identifies members of the Chilean business class. It should be noted that we impute accrued net losses in

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<sup>1</sup>Data from these two additional years allowed us to reduce profits with no ownership information by roughly 40%.

the same manner as accrued net profits; as such, our datasets contain rows with large negative entries in this income category.

Accrued profits in pension funds were imputed in proportion to taxpayers' pension and wage income. (Independent workers were not required to contribute to pension funds, and their voluntary savings in pension funds tended to be small.) This procedure is highly approximate, given that we lack information on taxpayers' accumulated pension contributions that would be needed to calculate ownership shares for members of any given pension plan administrator (AFP). However, our procedure captures the general idea that this form of capital income accrues to labor rather than business owners. Because profits accrued in these funds are comparatively small, they do not have a significant effect on top income shares.

## **Appendix 2: Adjusting for Undeclared Income**

### **Independent Work**

To adjust independent work income in our datasets, we first use Chilean household surveys (CASEN) to estimate the portion of the national accounts figure that accrues to individuals who did not file tax returns. We assume that non-filers did not earn enough to owe income taxes. While some non-filers may be tax evaders, we believe it is highly unlikely that the tax agency lacks records on any independent workers who belong to the ranks of Chile's top income earners. The amount of independent work income calculated from CASEN that corresponds to the same number of individuals who file tax returns exceeds the tax agency figure. We impute the difference to taxpayers in proportion to their declared independent work income. The estimated evasion rate for this income type is 16.0% (30.6%) in 2005 (2009).

For this procedure, we rank the household survey data by independent work income. If we rank the survey data by total income instead and match to tax-filers on that basis, the adjustment amount changes only marginally.

### **Distributed Profits**

#### *a) Imputing undeclared profits in proportion to declared distributed profits*

This procedure does not alter the distribution of distributed profits. We assume a uniform evasion rate of 64.6% (68.4%) in 2005 (2009) based on the discrepancy between national accounts and tax agency totals.

Ideally, profits distributed directly to individual taxpayers by publicly-traded corporations should first be subtracted from declared dividends. These dividends are not subject to under-declaration, because the tax agency checks amounts reported by shareholders against records provided by these corporations. However, the vast majority (at least 90%) of shareholders in publicly-traded companies are businesses, not individuals; only 3-7% of dividends are distributed directly to individuals. The potential for bias in our adjustment procedure associated with inflating dividends received by taxpayers who own direct shares in publicly-traded corporations is thereby minimal. Moreover, we lack information to distinguish dividends emitted by publicly-traded companies from profits distributed by other firms. The owners of privately-held businesses that receive dividends from publicly-traded corporations may in turn access those dividends without declaring distributed profits to the tax agency. In fact, the low prevalence of direct individual ownership in publicly-traded companies likely reflects the avoidance and evasion incentives created by the income tax system.

*b) Imputing in proportion to the difference between accrued and declared distributed profits*

This approach entails allocating undeclared distributed profits estimated from national accounts to taxpayers in our unadjusted datasets who have positive differences between their accrued profits and their distributed profits. The assumption is that taxpayers with large accrued profits who declare very few distributed profits are engaged in evasion. This approach captures the inherent incentives that the tax system creates for underdeclaring dividends, yet it of course fails to distinguish taxpayers who actually do reinvest their profits in the firm from those who do so only on paper.

Taxpayers with net losses (instead of positive accrued profits) receive no imputed undeclared distributed profits. Likewise, taxpayers whose declared distributed profits exceed their accrued profits receive no imputed undeclared distributed profits. Among the population of taxpayers with positive accrued profits whose declared distributed profits are of a smaller value, we allocate undeclared distributed profits in proportion to the distribution of total net positive differences between accrued and distributed profits in the unadjusted datasets.

In contrast to adjustment method (a), method (b) alters the distribution of distributed profits substantially. Because the value of imputed undeclared profits is so large, the adjusted distribution is similar to the distribution of positive accrued profits.

*b) Imputing in proportion to retained profits accumulated in the FUT*

In this scenario, taxpayers are assumed to underdeclare distributed profits in proportion to the amount of retained profits accumulated in their FUT accounts, in accord with the view that the FUT serves largely as a mechanism for tax evasion. This procedure also significantly alters the distribution of distributed profits.

## **Accrued Profits**

The national accounts figure was obtained starting from the gross operating surplus, subtracting fixed capital consumption (depreciation), subtracting imputed home-owner rent and mixed income, adding net interest, royalties, and rent payments, and finally subtracting the state-owned copper company's operating surplus. For 2009, due to changes in national accounts formatting, we must also subtract mixed income (independent work and sole proprietorship). To this figure, we add back sole proprietorship income from tax agency figures; this amount cannot be distinguished from independent work in the national accounts figures.

We attribute the full difference between the national accounts and tax agency figures to domestic businesses only. The rationale is that mining companies account for the majority of foreign-owned profits (roughly 95%), and national accounts figures obtain data on this sector's profits directly from these companies' public balance sheets. Any evasion that these foreign companies might engage in therefore is not captured in the national accounts figure. Applying this adjustment procedure yields accrued domestic profits of 23% GDP for 2005 and 24% GDP for 2009.

*a) Imputing undeclared accrued profits in proportion to net positive declared accrued profits*

We impute the difference between the national accounts and tax agency figures only to taxpayers in our unadjusted database with net positive accrued profits. Taxpayers with net losses receive no adjustment, for lack of any information that could be used to discern a reasonable distribution. We then assume that the distribution of the accrued profits we must impute from

national accounts follows the distribution of the positive accrued profits in our unadjusted datasets. This procedure likely overestimates accrued profits at the top of the distribution.

*b) Imputing undeclared accrued profits in proportion to gross earnings*

We also employ an alternative approach that uses businesses' gross earnings as the basis for adjustment. This option has the advantage that accrued net losses as well as net profits receive a positive adjustment. This positive adjustment for net losses is desirable given that our estimates of accrued profits do not correct for tax benefits associated with depreciation, which may account for some of the large negative values in our datasets. Data on gross earnings comes directly from business tax returns; gross earnings were imputed to individual taxpayers using the same method employed for accrued profits.

**Other Income Sources**

We make no adjustments to wage income or pensions reported to the tax agency. Employers withhold taxes on wages, so it is unlikely that tax agency data suffers from under-reporting. It is possible that some individuals with taxable wage-incomes are absent from the tax agency's records because they work for employers operating in the informal sector, but we think it is reasonable to assume that the informal sector by and large does not include individuals who fall within the ranks of the top 10%. Wage income from national accounts for 2005 (2009) exceeded the tax agency figure by 31% (27%); we allocate this amount entirely to the bottom of the income distribution. In the case of pensions, tax agency information comes directly from the pension fund administrators, so these data should not be affected by under-declaration either.

We do not adjust reported capital gains, rent, or interest earnings in our datasets for lack of information on the total amounts of income in these categories beyond what is available in tax agency records. It should be noted that rental income and capital gains may suffer from substantial under-reporting, since the tax agency does not receive information on these income sources from parties other than the taxpayers themselves.