# Income Inequality Series for Dominican Republic

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## Technical Note

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# 1 Introduction

This document summarises the data and methodology used in the estimation of distributional national accounts for the Dominican Republic since 2012. They were produced in collaboration with the United Nation's Economic Commission for Latin America and the Caribbean (ECLAC).

Estimates combine information from household surveys harmonised by ECLAC, income tax declarations newly made available by the national tax agency (*Dirección General de Impuestos Internos*) and the ministry of economics (*Ministerio de Economía, Planificación y Desarrollo*), and the national accounts annually released by the Central Bank. Although further work will be required to increase the coverage of capital incomes in the tax statistics, the current release represents a notable improvement in data transparency and availability. Prior to this project, no administrative data was accessible for use in such a way in the Dominican Republic.

In what follows, we briefly comment on the main methodological issues and findings of the exercise. For more details, please refer to the full report published in October 2022 by ECLAC (in Spanish: *Desigualdad del ingreso en la República Dominicana 2012-2019: Una revisión a partir de la combinación de fuentes de datos*); or to Alvaredo et al. (2022); De Rosa et al. (2022), which elaborate more on the scientific aspects of this endeavor for ten other Latin American countries.

The document is structured as follows. Section 2 briefly presents the definitions of income and observation unit; section 3 describes the data sources; section 4 explains the methodology; Section 5 presents preliminary results.

# 2 Income definitions and observation units

**Household income**   The definition of household income that we use to present the results for the Dominican Republic corresponds to total income before direct and indirect taxes, but after social contributions deducted from wages. The reason for deducting contributions stems from the inclusion of pensions in the definition of total income. Total household income is then the sum of wages (of dependent, formal, and informal workers), mixed income (of own-account workers, self-employed, and employers of family businesses), property income (dividends, interest), income from rent (including imputed rent for home ownership) and pensions. Inter-household transfers from other

domestic households or foreign households (remittances) are excluded in this definition of income.

**National income** This definition of income adds to household income (net of consumption of fixed capital) the income of the resident corporate sector and the government. These are the primary income of financial and non-financial corporations (net of consumption of fixed capital) – that is, the retained earnings of the companies – and the income of the government from its ownership of assets and income from indirect taxes on production and consumption.

**Observation units** Inequality estimates are based on the income individually reported by the adults dividing the total income of the couples equally ("equal-split" series).

# 3 Data sources

We have three main data sources: household surveys, income tax records and national accounts.

## 3.1 Household surveys

We use the survey microdata harmonized by the Statistics Division of the Economic Commission for Latin America and the Caribbean (ECLAC) of the United Nations (UN), from 2012 to 2020.
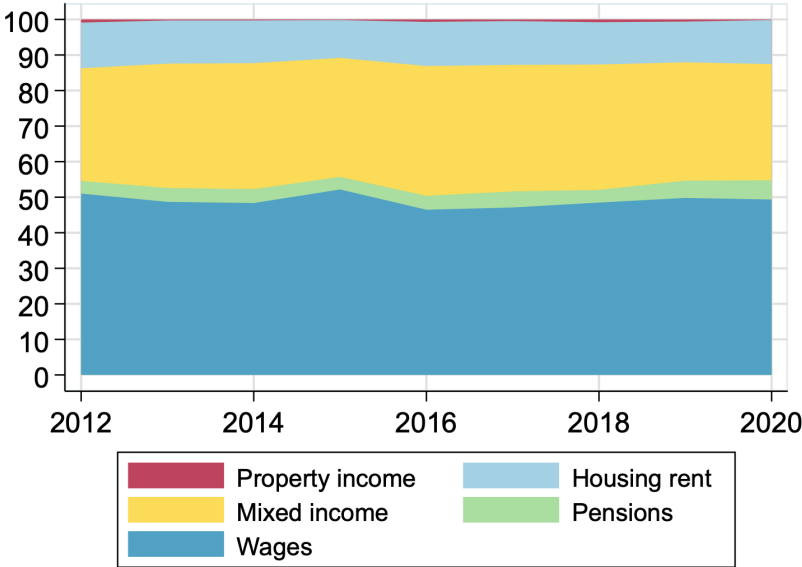
The ECLAC harmonization process is based on the household surveys carried out by the Central Bank of the Dominican Republic: the National Labor Force Survey (ENFT), between 2012 and 2015, and the Continuous National Survey of the Labor Force (ENCFT), as of 2016. The latest samples contain more than 20,000 households and more than 70,000 individuals (which corresponds to 0.7% of the total population).

The purpose of this harmonization process is the compatibility of variables between countries in the region, including the breakdown of income in terms of dependent work, self-employment, income from assets, pensions, imputed rental income, transfers and other income. Imputed rental income as well as some property income is collected at the household level and distributed to adults (over 20 years of age). The declaration of

all these incomes is voluntary without verification by third-party sources (employers or financial institutions).

In more general terms, national surveys are an extremely important point of reference in Latin America, since they are the only source available in almost all countries, from which official statistics on inequality, poverty, unemployment, etc. are extracted. Figure 1 shows the breakdown of income in the surveys harmonized by ECLAC (before any adjustment with auxiliary data) in terms of wages, pensions, mixed income (from self-employment), income from financial property financial and rental income (including imputed income). Salaries and pensions represent 50% of total household income, followed by mixed income (with a slightly over 30% share), while property income is marginal.

**Figure 1:** Composition of survey income in the Dominican Republic



*Note.* Authors' elaboration using ECLAC surveys, which are based on ENFT and ENCFT surveys. Income is pretax. See section 4.1.

## 3.2   Tax Records

The tabulations based on the tax records used were produced by the General Directorate of Internal Taxes (DGII) of the Dominican Republic. The data was constructed from microdata from different forms, processed by the DGII, resulting in a detailed tabulation of total personal income, its breakdown by source, as well as the tax owed. They are made up of the universe of mandatory declarations of taxable income, with verification by third-party sources. In recent years they include 2.5 million people, corresponding to 25% of the total population.

The tabulation is presented for 28 population groups: the first nine deciles, the top decile broken down into the first nine percentiles, and the tenth broken down into subsequent percentiles. In this way, the complete distribution of tax revenues is available, with a disaggregation level of 0.1% in the upper fractiles. The data provided refers to the period 2012-2020. It should be noted that the central objective of tax declarations is tax collection, which is different from the socio-demographic objective of household surveys.
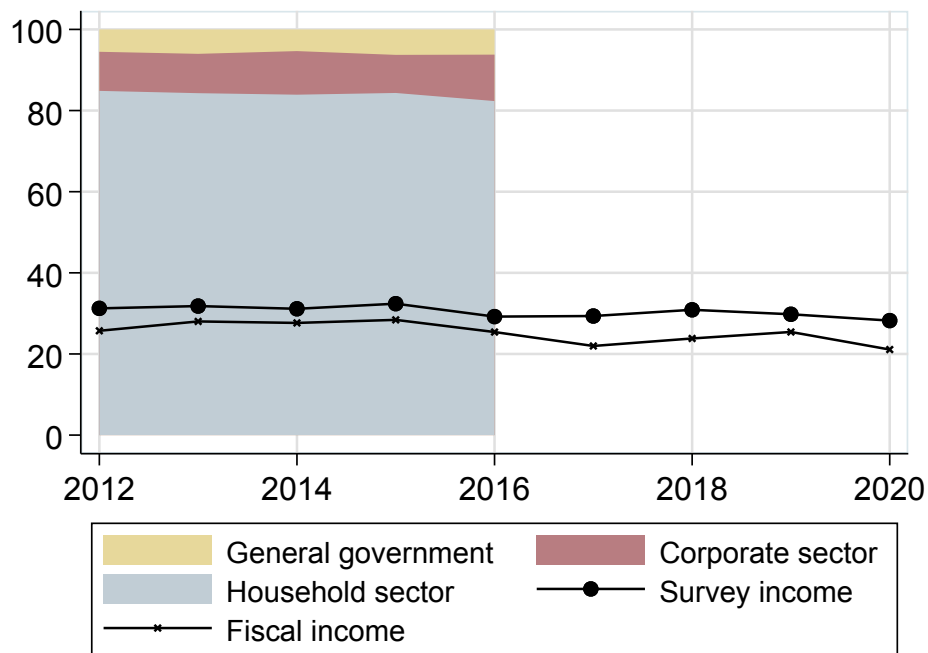
## 3.3 National Accounts

The information on the system of national accounts (SNA) comes from the database of the department of national accounts and economic statistics of the Central Bank of the Dominican Republic. These integrated economic accounts integrate transaction flows between the accounts of Non-Financial Corporations, Financial Corporations, General Government Households, and the Rest of the World.

By way of context, statistical offices usually update their series with a delay of three to five years, and the level of aggregation varies according to the administrative and technical capacity of the country. For example, although the UN recommends distinguishing between gross operating income – income from actual and imputed rental income – and mixed household income – self-employed income (UN, 2009) –, there are some Latin American countries , such as Bolivia, Chile and Ecuador, which continue to present these two incomes in an aggregate. Fortunately, this is not the case in the Dominican Republic. However, in general, we see few countries providing sufficient detail for other variables, such as consumption of fixed capital and household property income. This lack of detail complicates our ability to reconcile the databases with high precision and to compare estimates across countries. Therefore, we face a *trade-off* between the precision of the estimate at the national level and the comparison at the regional level. We added more comments to this issue in the 4.3 section.

Figure 2 offers a comparison of aggregate income in surveys, administrative data and the national accounts, where the latter is decomposed into the share of gross national income made up by household income, corporate income and government income. For the Dominican Republic, surveys barely cover 40% of gross national income, a share that falls slightly after 2015. For 2012-2016 survey income is less than half of household sector income reported in the national accounts. A bit lower is the income reported in tax records (between 20% and 30% of national income), which indicates the degree of under-representativeness of surveys, given that they are meant to represent the entire

**Figure 2:** Comparing income in surveys, tax records and national accounts



*Note.* Own elaboration using ECLAC surveys, which are based on ENFT and ENCFT surveys, administrative data on taxable income from the DGII and national accounts from the Central Bank. Total income in surveys and tax data is represented as a share of gross national income. Income is pretax. Gross national income from national accounts is decomposed into income corresponding to the household sector (in blue), the corporate sector (in gold) and the general government (in red).

population.

# 4   Estimation methods

The transition from the distribution based on income reported in surveys to the distribution of national income reported in national accounts before non-contributory redistribution is achieved in four steps. It is based on the survey harmonized by ECLAC, on which a correction is made to account for income before the payment of direct taxes. In the second step, we adjust the household surveys to include distributional information from tax records. In the third step, we proportionally scale the different types of income to match the national accounts aggregates. Finally, in the fourth step, we impute undistributed corporate profits (retained earnings) and remaining revenue received by general government in the "primary" distribution of revenue. In the sub-sections that follow we detail all of these steps.[1]

## 4.1   Surveys before direct personal taxes

Most household surveys in Latin America report income after personal income taxes. Therefore, to proceed with the adjustment of the survey with tax data and for the scaling to the national accounts aggregates, it is necessary to calculate income before taxes in the survey.

Since data on direct taxes paid by individuals are not collected in the surveys, to estimate income before taxes we consider the information present in the tax data of the DGII. Broadly speaking, we use these data to calculate effective tax rates by income fractiles (see Figure 3) and use these tax rates to calculate pre-tax income in the survey, based on the same fractiles of income to which people belong.[2] The effective tax rates by income fractiles are calculated for the years for which we have access to this data source (2012-2020), and the average effective tax rate by fractile is used to calculate the pre-tax income when tax data is not available.

Regardless of the usefulness of these rates for calculating income before taxes in surveys, they are an important piece of information to understand the redistributive potential of the personal income tax. Figure 3 shows that direct income taxation begins to operate within the richest decile, so the tax base is relatively small. The effective rates, although moderate, are progressive up to a point, as shown by their increasing relation
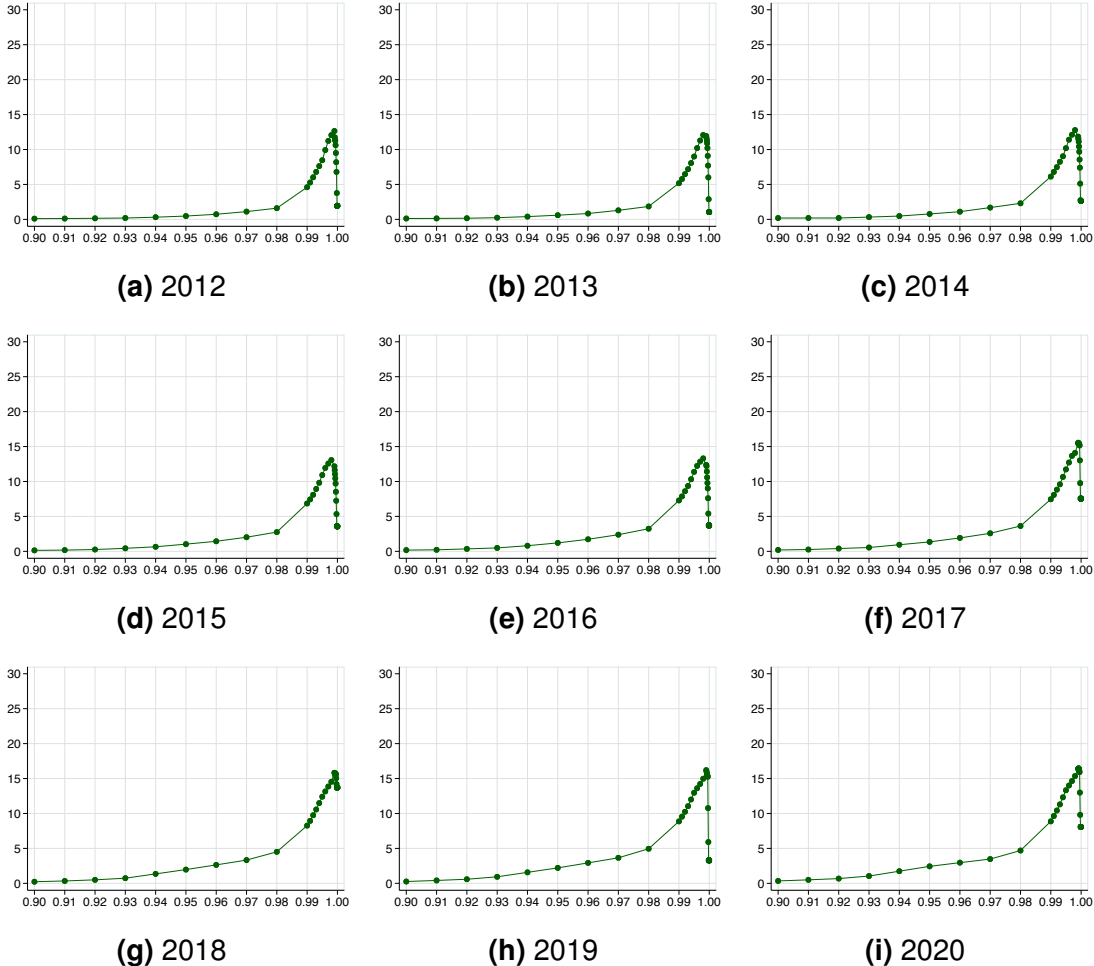
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[1]In this section we provide a brief summary of the methods. For a more detailed description of Distributive National Accounts (DINA), see WIL (2020).

[2]We consider, wherever possible, 127 income fractiles, representing the entire income distribution (the top 99 percentiles) and a very detailed breakdown of the top 1%, where tax rates can experience significant changes.

to income until they reach approximately the upper 0.1%, at which point a marked drop in effective rates is observed. It should be noted that in the final tranches of the top 0.1% an extrapolation was made from the last value observed in the tax tabulations produced by the DGII, so it cannot be ruled out that the drop could be even more pronounced.

**Figure 3:** Effective personal income tax rates in the Dominican Republic



**(a)** 2012     **(b)** 2013     **(c)** 2014

**(d)** 2015     **(e)** 2016     **(f)** 2017

**(g)** 2018     **(h)** 2019     **(i)** 2020

*Note.* Own elaboration based on the tabulations produced by the *Dirección General de Impuestos Internos* (DGII) of the Dominican Republic.

## 4.2 Surveys corrected with tax records

### 4.2.1 Comparison of high incomes

The use of administrative data can refer both to personal income tax returns and to social security wage records. These sources are primarily used to improve coverage of higher income groups in the survey, which are often poorly captured; especially

when registration data is not used in the survey design process, which is the case in all countries of the region.

In general, administrative records not only include people who are wealthier than respondents with higher incomes, but also report larger frequencies for moderately high incomes. Therefore, when we compare the income distributions described in both sources, we generally find that the densities reported by administrative records relative to those in surveys tend to be larger for higher incomes. Since income tax returns are made by all required filers, although they may underreport their income, it is unlikely that they will overreport. Therefore, it seems natural to consider the distribution in the registry data as a lower limit that the survey should try to match, at least when the frequencies in the tax data are higher.

**Figure 4:** Relation between the top 1% in tax data and surveys



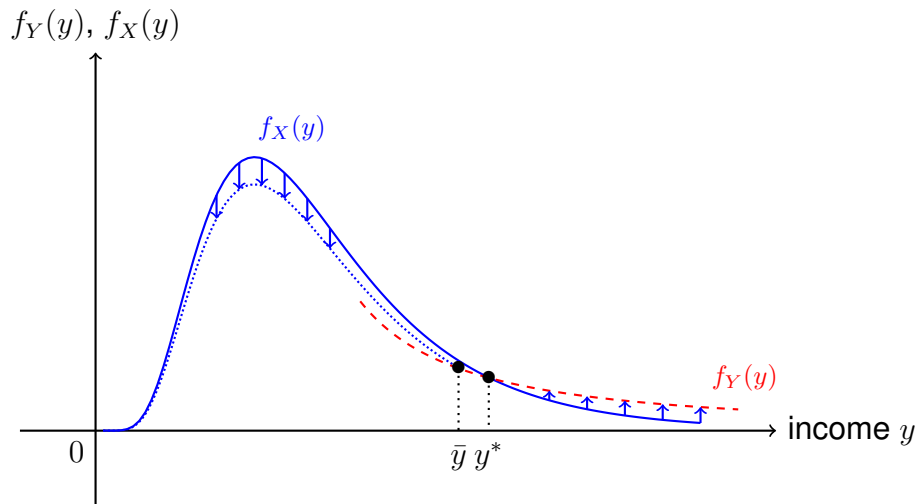**(a)** Average income                      **(b)** Income threshold

**Note.** Own elaboration using ECLAC surveys, which are based on ENFT and ENCFT surveys, administrative data on taxable income from the DGII and national accounts from the Central Bank. Total income in surveys and tax data is represented as a share of gross national income. The definition of income is the original definition in surveys, that is net of direct personal incomes. For the comparison we deduct the tax paid from the gross income in the tax data.

In order to illustrate this important point for the case of the Dominican Republic data, Figure 4 presents a comparison between the richest 1% in the data produced by the DGII and in the household surveys (before any adjustments). Figure 4a shows the relationship between the averages of both upper percentiles. The main message that results from the comparison is that the average income of the top 1% in the tax data is between 4 and 5 times higher than in the surveys, a ratio that is not outside the orders of magnitude found for other Latin American countries (Alvaredo et al., 2022). Reported income is higher in the registry and the divergence between both sources of information is found in the upper fractiles. Indeed, both sources are quite close at the richest 1% threshold level (as Figure 4b shows). This is an indication that the correction based on register data will have effects exclusively within the richest 1%. It is also worth noting

that in both cases the relationships do not deteriorate over time, showing a certain stability. This is evidence that the income gap between the surveys and tax data for high-income groups remains relatively stable.

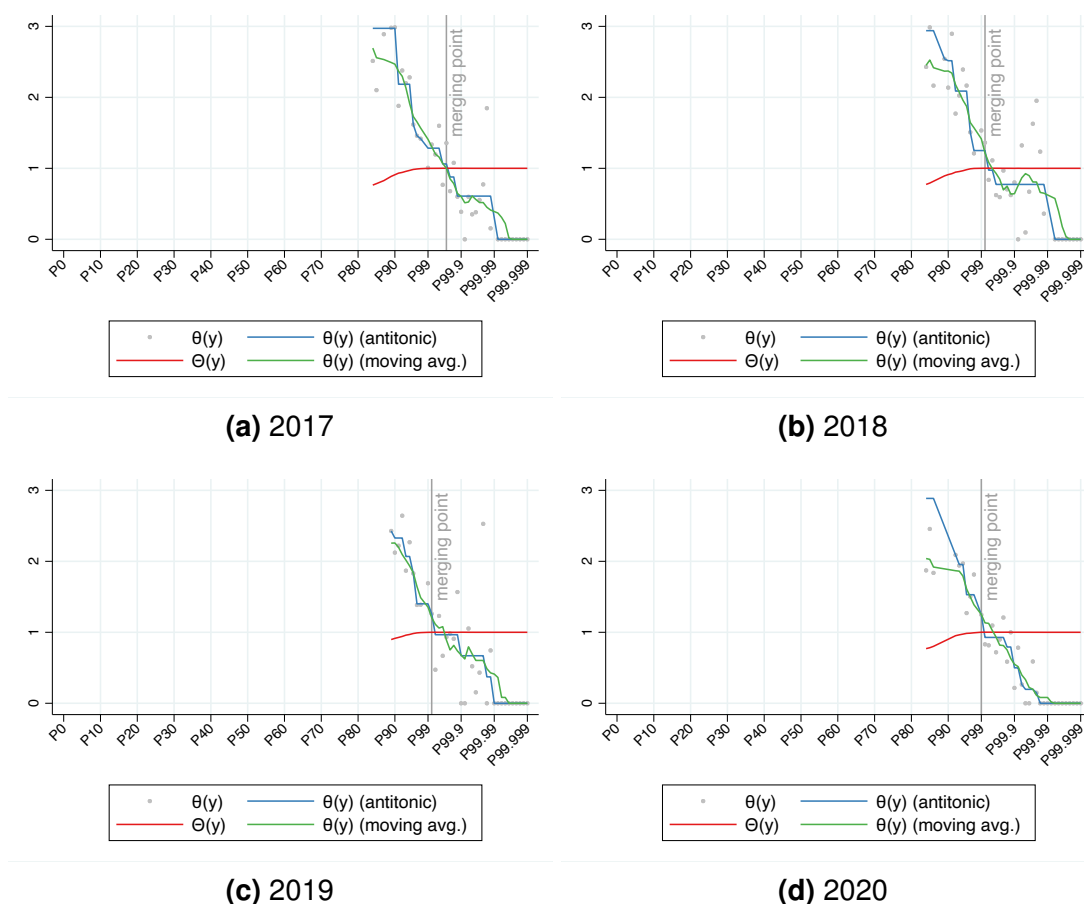**Figure 5: The intuition behind reweighting**



**Note.** Reproduced from Blanchet et al. (2022). The blue continuous line represents the density in the survey $f_X$. The red discontinuous line represents the density in tax data $f_Y$. Above the merging point $\bar{y}$, the reweighted survey has the same distribution as the tax data. Below the merging point, the survey density is reduced uniformly to maintain the same total population, creating the dotted blue line.

### 4.2.2 Reweighting surveys with tax records

To adjust the surveys with the information present in tax data, we use the method described in Blanchet et al. (2022), which primarily uses the relationship between the survey income densities and the income densities in the tax data to adjust the survey weights. Figure 5 shows the intuition behind this reweighting process. To measure the size of the adjustment associated with the use of tax records, we can compare the density of the right tails of the income distribution in the surveys and the records, respectively.

Figure 6 compares the frequencies at the top of the distribution for each of the sources. The reference on the vertical axis is the survey-over-register ratio symbolized by the symbol $\theta$. When it is less than 1, that is, when the blue and green lines go below the red line, the survey underestimates the population at a certain income level with respect to the DGII records. We can also see that the merging point found by the algorithm, which is the point from which we are going to join the distributions of the survey and tax records, is quite high in the distribution. A merging point at P99 or higher means that the survey's measurement problem is essentially concentrated within the richest 1%.

**Figure 6:** Merging points between survey and tax data distributions



**(a)** 2017



**(b)** 2018



**(c)** 2019



**(d)** 2020

*Note.* This figure compares the densities observed in the right tail of surveys with the densities in the right tail of tax data. The Theta coefficients ($\theta$) represent the first density of the second, respectively. When the fraction is below 1, the population in the right tail of the surveys is underestimated with respect to the population reported in tax statistics. The merging point is the point at which the blue line (standard frequency) crosses the red line (cumulative frequency).

From a regional perspective, the discrepancy in terms of densities, between surveys and tax records, is quite limited. This, despite the fact that the income registered in the richest 1% is five times higher in the tax registers. In other countries such as Chile, Brazil or Mexico, the discrepancy between both sources can affect around 5% of the population. However, the case of the Dominican Republic is not an exception, since similar profiles have been found previously, for example, in the case of Uruguay, which, like the Dominican Republic, had high quality and detailed tax information.

## 4.3   Scaling to household income in national accounts

The third part of the estimation method reconciles microeconomic data (surveys adjusted with tax records) and macroeconomic data (national accounts). Table 1 summarizes our comparison of household sector income concepts. For labor income, as the salaries

in the survey are net of social contributions, we subtract the contributions from the compensation of employees in national accounts before scaling the total of surveys to this aggregate. For real estate income, the surveys measure the rental income imputed to owner occupiers, which coincides with a large part of the operating surplus of national accounts households. The other part of this aggregate is made up of the effective rental income from residential real estate, which the SNA fails to separate from the operating surplus. The surveys also measure effective rental income, but it is usually included in the capital income variable, alongside financial income. Fortunately, for the Dominican Republic we can distinguish between income from financial and non-financial property, which allows us to scale the rents (imputed and effective) to the operating surplus. What we fail to distinguish both in the surveys and in the SNA is the effective income from commercial real estate, but we do not believe that it is an important part of the mixed income in the SNA compared to income from self-employment or employers of non-incorporated enterprises.

Beyond rental income, property income includes financial income. This aggregate of the surveys can be scaled to the aggregate of property income in the SNA. However, this macroeconomic aggregate includes not only the income that individuals actually receive (interests, dividends, etc.), but also the income received by insurance funds, pension funds, and investment funds. At this time, we do not have the level of detail necessary to divide the part of financial property income received by these funds in most countries of the region. Nor do we account for the interest paid by households due to lack of distributional information in this regard. Accordingly, we scale financial property income to total property income in national accounts. Finally, since all countries' national accounts aggregate pensions with other social transfers, we scale all social transfers in the survey to this aggregate, maintaining the ratio between pensions and other benefits from the original survey. To do this, we remove private transfers received by households from other households in the country or from households abroad (remittances) from the "other income" variable in the survey.

For the empirical reconciliation we start from five categories of income. Figure 7 shows the adjustment factors used to scale these revenues to the corresponding national accounts aggregates, described above. This is done proportionally to the totals recorded at the individual level in the previous step (that is, proportionally to the survey income after adjustment with administrative data).[3] Assuming that the national accounts adequately measure national income, we can confirm that the surveys underestimate all types of income, but by different magnitudes. Rents (effective and imputed) in the surveys come to represent 90% or more of the macroeconomic aggregate of national

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[3]See Figure **??** for a comparison of income from the original ECLAC surveys and the corresponding aggregates from the national accounts.
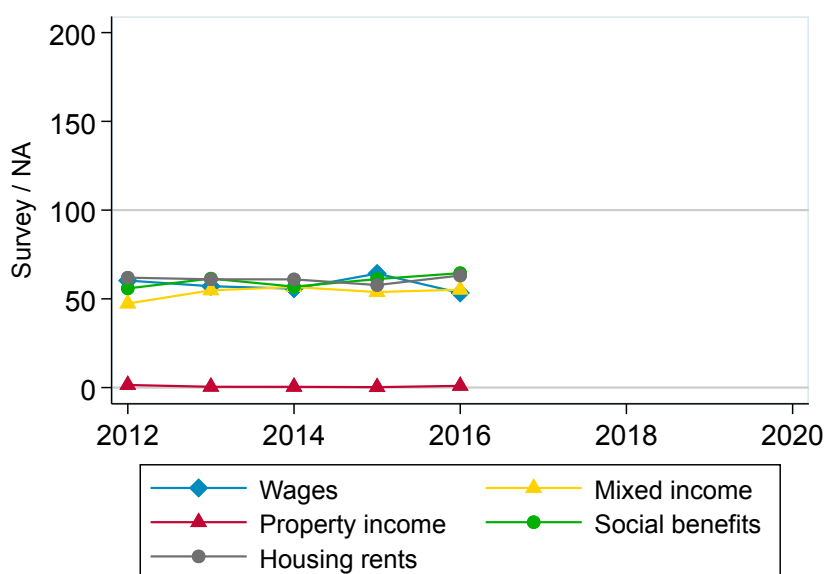
**Table 1:** Conceptual relation between incomes in surveys and national accounts

| Survey | National Accounts | Comparable incomes | Less comparable incomes |
|---|---|---|---|
| Salaried work | Compensation of employees (D1) | Wages, salaries (D11) | Social security contributions (D61) |
| Rental income | Operating surplus (B2) | Imputed rent of owner occupiers | Effective rent of residential buildings |
| Non-salaried work | Mixed income (B3) | Self-employed income | Effective rent of non-residential buildings |
| Investment income | Property income (D4) | Interests received (D41r) Dividends (D42) | Interests paid (D41u) Rent of natural resources (D45) Investment income of insurance policy holders (D441) Investment income of pension funds (D442) Investment income of investment funds (D443) |
| Other incomes | Social transfers (D62) Other transfers (D7) | Pensions Other cash benefits | Unemployment insurance Sick leave Private transfers (remittances) |

*Note.* Sourced from De Rosa et al. (2020). Incomes from the SNA correspond to household sector incomes.

accounts. Between 50-60% of coverage at the beginning of the period come salaries, mixed income and pensions, whose representativeness improves over time, with the exception of salaries between 2015 and 2016. Property income practically does not exist in the survey, with coverage of 1% or less in recent years.

**Figure 7:** Empirical relation between incomes in surveys and national accounts
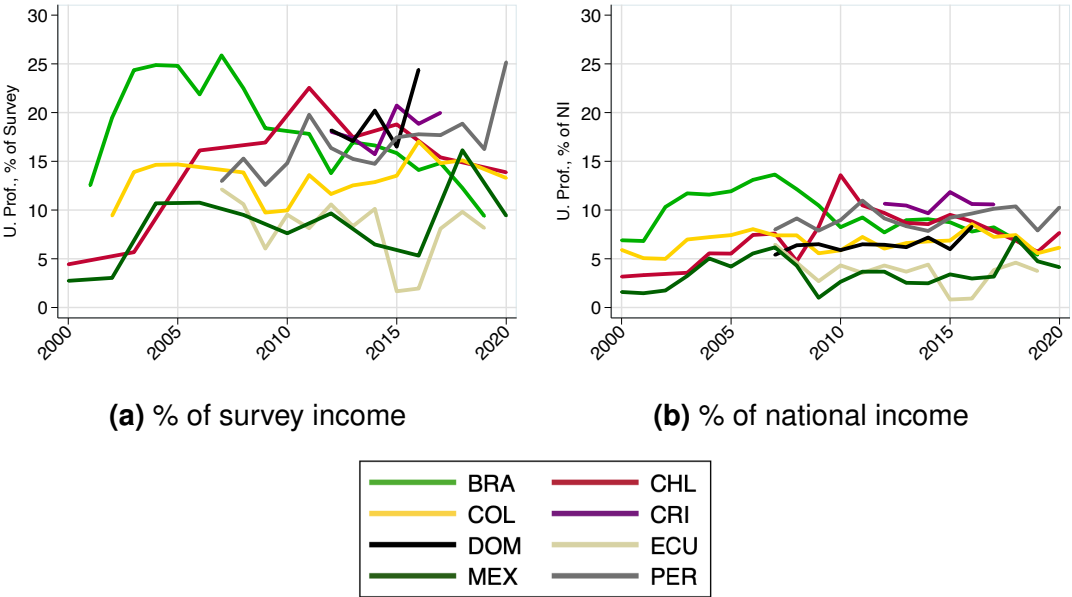


*Nota.* Own elaboration using ECLAC's harmonized surveys, based on ENFT and ENCFT surveys, DGII tax data and national accounts from the Central Bank. The scaling factors represent the ratio of each component of survey income (salaries, property income, mixed income, rents (effective and imputed) and social transfers, divided by their corresponding aggregate in national accounts. For example a value of 50 indicates that a only half of the income component reported in national accounts is recorded in the survey.

## 4.4 Imputation of other national income

The final step in the "primary" income sequence (including pensions) is to impute the remaining income needed to reach national income (before redistribution). By definition, these do not match any of the income variables that are present in the distributional data we use. Basically, this stage is reduced to the allocation of corporate profits not distributed to households. Since other income is imputed proportionally, only retained earnings have a real distributional impact. To estimate this aggregate, we start from the net balance of primary income of the corporate sector, both financial and non-financial, from the World Inequality Database (`https://wid.world`). This aggregate already excludes the participation of foreign shareholders in retained earnings. To account for and exclude the government's share, we use its share of property income as a proxy (D4 in the SNA). Therefore, we subtract the same proportion from the net balance of primary income of the corporate sector. Figure 8 shows the total amount of undistributed profits, both as a percentage of total income declared in the reweighted surveys, and as a percentage of gross national income in Latin America. These retained earnings are volatile as they depend on reported profits and the companies' decision to distribute dividends each year. In the Dominican Republic, these gains represented 5-6% of national income and 18-20% of the survey's income, before 2016 when they rose to 8% and 24%, respectively. As in all cases when we work with macroeconomic aggregates, for years without national accounts data we impute the totals for these years using the average of the aggregate of the years with available data.

**Figure 8:** The magnitude of undistributed profits



**(a)** % of survey income  **(b)** % of national income

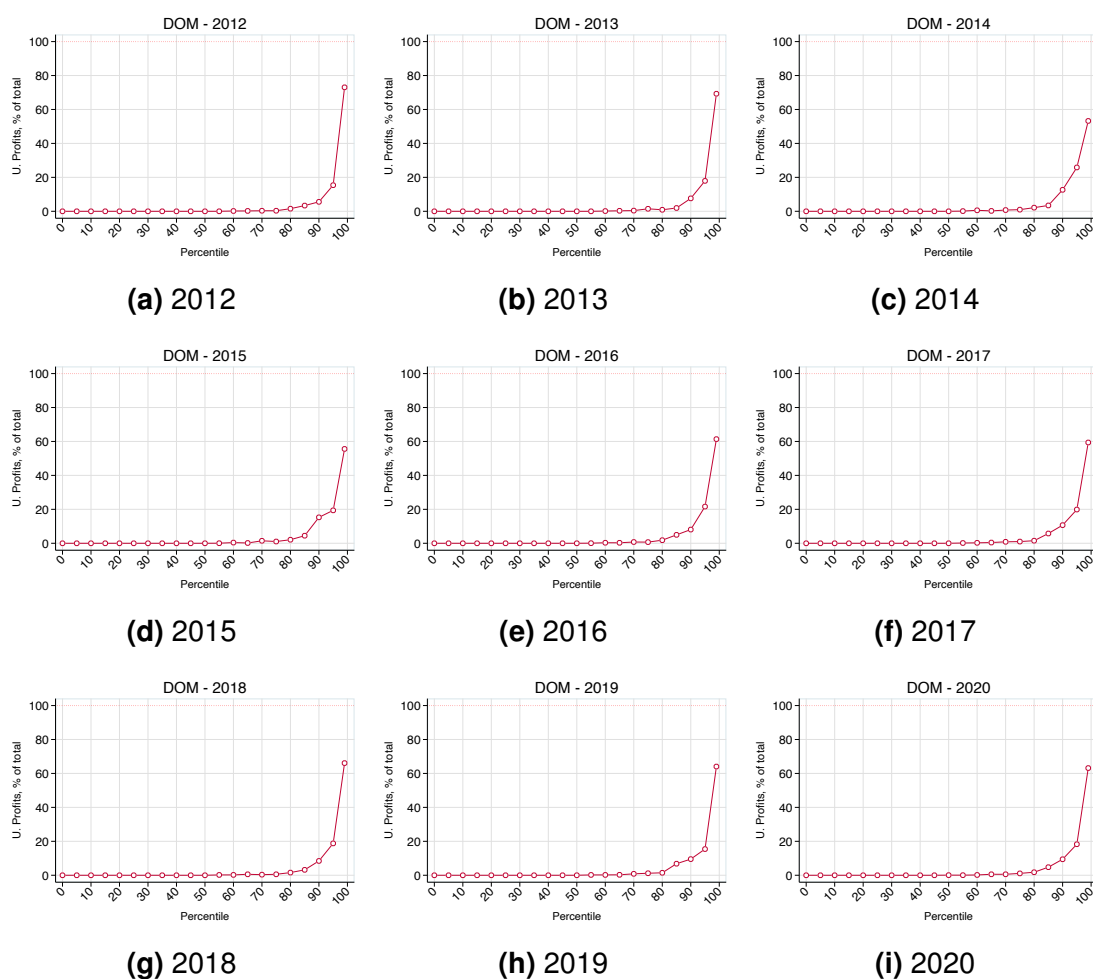| | | |
|---|---|---|
| BRA | CHL | |
| COL | CRI | |
| DOM | ECU | |
| MEX | PER | |

*Nota.* Own elaboration using ECLAC's harmonized surveys, based on ENFT and ENCFT surveys, DGII tax data and national accounts from the Central Bank.

To distribute the aggregate of retained earnings to households, we need information on the ownership of the incorporated companies. Given the scarcity of wealth surveys in the region, we use variables from income surveys as proxies. That is, we distribute retained earnings proportionately to the sum of reported dividends and employers' total income, where an employer's income refers to the total income of persons who report being employers when asked about their occupation. Figure 9 shows the incidence of this imputation in the distribution of income in the re-scaled survey for the Dominican Republic. In general, most of it is attributed to the top decile of the distribution, with the top 1% receiving between 40% and 60% of the total amount depending on the year.

The last part of national income that we count is taxes on products and production, net of subsidies (D2-D3 in the SNA). We use the share of national income that these taxes represent in the Organization for Economic Co-operation and Development (OECD) tax base as the imputing aggregate (see OECD/ECLAC/CIAT/IDB (2022)). These taxes, which include consumption taxes, such as VAT, are imputed proportionally to primary income (excluding pensions), that is, they are added to the total primary income of the economy, attributed to households in the previous steps.

**Figure 9:** Proportion of undistributed profits imputed by centile of income



**(a)** 2012

**(b)** 2013

**(c)** 2014

**(d)** 2015

**(e)** 2016

**(f)** 2017

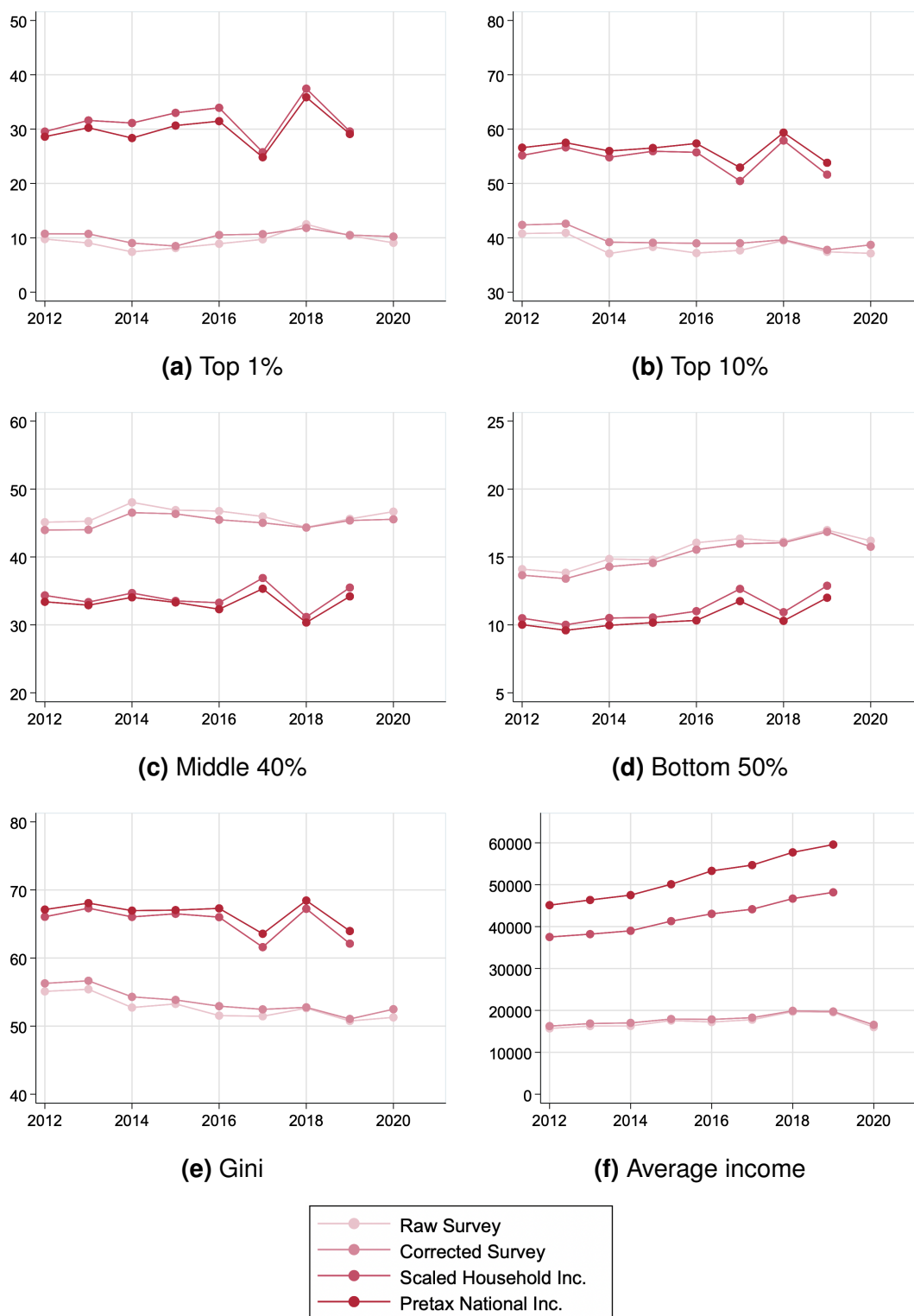**(g)** 2018

**(h)** 2019

**(i)** 2020

***Nota.*** Own elaboration using ECLAC's harmonized surveys, based on ENFT and ENCFT surveys, DGII tax data and national accounts from the Central Bank.

# 5 Results

In this section we present a summary of the results in graphical form. Figure 10 shows the evolution of different distributional indicators, according to each of the adjustment steps: the raw survey (before taxes), the adjustment with administrative data, the scaling to household income from national accounts and the result after imputations leading to national income.

The first thing to note is that, as expected, each stage of correction increases income and inequality. Figure 10f shows how the average income of the entire distribution increases significantly after integrating the national accounts data (the series with the two darker colors). Average income doubles after scaling microeconomic incomes to their macroeconomic aggregates, and nearly triples when primary incomes from other institutional sectors are added to arrive at national income. We can see that

**Figure 10:** Distributive indicators and average income in the Dominican Republic



**(a)** Top 1%

**(b)** Top 10%

**(c)** Middle 40%

**(d)** Bottom 50%

**(e)** Gini

**(f)** Average income

Raw Survey
Corrected Survey
Scaled Household Inc.
Pretax National Inc.

*Note.* Own elaboration. the figures represent individual income, with the income of couples split equally, in four steps. The first step estimates indicators of pretax income in ECLAC's harmonized survey; the second step estimates them after reweighting the survey with the information from DGII tax statistics; the third step scales the incomes of the reweighted survey to the corresponding aggregates from the national accounts produced by the Central Bank; the fourth step imputes the remaining incomes from national accounts needed to reach net national income. Results for 2020 are not shown for the scaled household income series and the pretax national income series due to lack of up-to-date macroeconomic data.

average national income – an indicator used for international comparisons – increased considerably faster than the survey's average income, even after adjusting for tax data. That is, the economy grew at a higher rate than household income in the microeconomic data – a phenomenon recognized in the global literature (Ravallion, 2003; Deaton, 2005; Bourguignon, 2015; Nolan et al., 2019)), and which can affect distribution trends between series.

It is possible to analyze how these changes in total income coverage are distributed among the population. Inequality increases in levels after each adjustment, because these adjustments affect mainly the right tail through the use of administrative data on upper incomes and national accounts to scale or impute incomes that are relatively more concentrated, in particularly those of capital. In all cases, the change in level is strongly conditioned by the assumptions and data combination methods, both discussed above. At the same time it is difficult to justify other more reasonable imputation assumptions with the data available to date.

The result shows that after the adjustments, the part of total income received by the income groups in the bottom 90% of the distribution lost participation, both the poorest 50% (figure 10d) and the next 40% (fig 10c). The key result is at the top of the distribution, where most of the income discrepancies are attributed to the wealthiest percentiles. There we see how the participation of the richest 10% goes from 40% to more than 50%, and that of the richest 1% from 10% to more than 20%, placing the Dominican Republic among the countries with the highest concentration of national income. The set of these changes in different parts of the distribution cause the Gini coefficient to increase significantly in level, increasing by more than ten points. Regarding trends, the macroeconomic adjustments appear to broadly confirm the downward inequality trajectory.

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