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Top earners and earnings inequality during the COVID-19 pandemic

Evidence from Ecuadorian administrative data

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Abstract: This paper aims to assess the extent to which top earners in Ecuador were affected by the COVID-19 crisis compared to other segments of the population. Our analysis uses administrative data for individuals affiliated to social security between January 2019 and December 2021. We identify the top 10, 1, and 0.1 per cent of earners in 2019 and analyse changes in their monthly earnings during the pandemic compared to those of the rest of the registered workforce. Our analysis shows that the only group that experienced a recovery in employment was workers who were not at the top of the pre-pandemic earnings distribution. Conditional on being in registered employment, mean earnings also dropped in the second quarter of 2020 across all earning groups (top and non-top). By the end of 2021, earnings had recovered for non-top earners and the top 10 per cent group. However, earnings remained below pre-pandemic levels in the top 1 per cent and top 0.1 per cent groups. Finally, earning disparities across population subgroups substantially increased among individuals who were not at the top of the earnings distribution.

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1   Introduction

As the COVID-19 pandemic has induced a global recession with heterogenous effects between and within countries, a potentially important variation in income distribution is therefore expected. Some of this variation may result from changes in employment and earnings during the pandemic as well as from varying degrees of state intervention.[1] A common feature of many studies which assess the distributional impact of the COVID-19 pandemic is that, due to data limitations, income during the pandemic has been either simulated or captured by rapidly deployed surveys (Adams-Prassl et al. 2020; Almeida et al. 2021; Bottan et al. 2020; Lastunen et al. 2021; Lustig et al. 2021). There is therefore a requirement for additional research exploiting alternative data sources to complement and expand the evidence provided by early studies. In particular, survey data (and therefore simulated data based on household surveys) usually suffers from under-coverage of top income in a way that strongly biases standard inequality estimates (e.g., Burkhauser, Feng et al. 2012; Burkhauser, Hérault et al. 2018). The problem is extended during years of the COVID pandemic crisis with the result that we lack evidence on the extent to which inequality changes and, in particular, the extent to which high earners are specifically affected by the crisis compared to the rest of the population.

This limitation is true in general but is particularly so in developing countries. The number of low- or middle-income countries for which registers are available is extremely small. Despite a longstanding tradition in distributional studies in Latin American, the limited availability of administrative data—or the lack of relevant covariates in administrative data—means that research focused on top income groups has been less frequent in this region. To date there is available evidence for Argentina (Alvaredo 2010), Colombia (Alvaredo and Londoño Velez 2014), Brazil (Morgan 2017; Souza and Medeiros 2015), Chile (Fairfield and Jorratt De Luis 2016; Flores et al. 2019; López et al. 2013), and Uruguay (Burdín et al. 2014; De Rosa and Vilá 2017).[2] The limited access to administrative data is unfortunate given that such data presents a huge opportunity to learn more about the impact of the pandemic across the earnings distribution, particularly among top earners. Gaining a better idea of the most (and least) affected populations in times of crisis is important for designing policy reforms aimed at enhancing social protection by increasing fiscal capacity.

This paper aims to exploit administrative social security data to assess whether and to which extent top earners in Ecuador experienced changes in earnings during the pandemic compared to other segments of the population. For this we identify the top 10 per cent, 1 per cent, and 0.1 per cent of earners in 2019 and analyse changes in their monthly earnings during the pandemic compared to other registered workers.[3] Our motivations to focus on top earners are twofold. First, recent studies point to a larger impact of the pandemic at the bottom and middle of the income

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[1] The coverage and generosity of social protection measures have varied widely. In general, policies implemented in high-income countries have managed to cushion, to a large degree, the impact of the pandemic on household incomes (Almeida et al. 2021; Clark et al. 2021). However, the role of tax–benefit policies in mitigating the socioeconomic effects of the pandemic in developing countries has been limited (Avellaneda et al. 2021; Lastunen et al. 2021; Lustig et al. 2021). In this sense, the COVID-19 outbreak is likely to have reinforced inequalities in already highly unequal regions.

[2] Distributional analysis based on administrative data for other developing regions remains scarce, with a few recent exceptions (e.g., Aye et al. 2020; Chatterjee et al. 2021; Jouste et al. 2021).

[3] Throughout the paper, we refer to the workforce captured by the data as affiliated or registered employment.

distribution in Latin America, which could exacerbate inequalities in the region (Avellaneda et al. 2021; Lustig et al. 2021).[4] Second, top earners are the main contributors to government revenue from personal income tax and social insurance contributions. Therefore, assessing the extent to which earnings at the top were affected during the pandemic will allow us to study the budgetary implications of the crisis and discuss potential reforms to enhance the tax progressivity affecting the top of the distribution. The context of our research is different from recent evidence (e.g. Angelov and Waldestrom 2021) as we focus on a middle-income country characterized by high levels of inequality, even prior to the pandemic, and a limited role of tax–benefit policies in providing income protection against economic shocks (Jara et al. 2021).

Our analysis provides several interesting findings. First, the Ecuadorian labour market was already presenting signs of deterioration prior to the pandemic. From January 2019 the number of earners affiliated to social security was progressively declining in most industries and only increasing in low-paid sectors. Second, registered employment fell during the second quarter of 2020 across all industries. However, there was no change in the pattern observed prior to the pandemic, with registered work continuing to increase in low-paid sectors and decreasing in other industries until the end of 2021. Third, the evolution of earnings varied across individuals at the very top of the distribution (top 1 per cent and top 0.1 per cent groups) and the rest of the registered population. In all income groups we observe a drop in mean earnings during the second quarter of 2020. However, earnings recovered in 2021 for individuals who were not at the top of the earnings distribution, whereas they remained at similar levels to those observed in 2020 in the top 1 per cent and top 0.1 per cent earning groups. Finally, our results show that earning disparities across certain population subgroups were exacerbated during the pandemic. In particular, the gap in earnings by gender, educational level, and sector of work (public vs. private) widened among individuals who did not belong to top earning groups.

Our research makes two main contributions to the current policy debate. It provides evidence of the extent to which the pandemic has exacerbated inequalities in Ecuador, a country hit hard by the COVID-19 crisis and where public policies provided limited protection against the socioeconomic effects of the pandemic. Understanding which population groups have been the most/least affected by the pandemic is essential for designing social protection policies. In addition, assessing the impact of the pandemic on top earners enables discussion of potential progressive reforms to direct taxation with a view to creating fiscal capacity to build a sustainable welfare system in the country. Indeed, our results show that increasing the progressivity of personal income tax in Ecuador by abolishing generous deductions from personal expenditures and taxing employment bonuses would enhance the redistributive role of fiscal policy in the country. To the best of our knowledge, this is one of the rare studies to exploit administrative data from a middle-income country and one of the first to assess differences in the impact of COVID-19 across the earnings distribution and with a particularly accurate focus on the top of the distribution.[5]

The paper is structured as follows. Section 2 describes the data and the methodology. Section 3 presents changes in employment, earnings, and inequality between January 2019 and December

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[4] These studies rely on simulated income distributions based on household survey data.

[5] To the best of our knowledge, the study by Angelov and Waldestrom (2021) is the only one that exploits administrative data to study income losses across the earnings distribution during the COVID-19 pandemic. Their study makes use of administrative tax and income registers from Sweden and highlights that earnings' losses were concentrated at the bottom of the distribution, whereas earners in the middle and at the top of the distribution experienced almost no change in earnings during the pandemic.

2020 for the whole population captured by social security records in Ecuador. Section 4 focuses on changes in earnings among top earners and across population subgroups (gender, education, etc.) in top groups. Section 5 concludes.

2   Data and methodology

2.1   Data

We use administrative data from the social security register in Ecuador covering the entire universe of workers affiliated to social security over the period from January 2019 to December 2021. The data is structured as a panel with monthly information for all affiliated workers, meaning that we have a period of analysis spanning over 36 months. By construction the data includes only individuals who pay social security contributions, meaning that workers in informal employment are not captured by the data. Moreover, self-employed workers are not required to affiliate to social security by law. Thus, the data only includes self-employed workers who opted to affiliate to social security. As our research focuses on top earners, the absence of informal employees in the data does not represent an important limitation. However, it is possible that the data misses self-employed workers with high earnings who opted not to be affiliated to social security. Throughout the paper we refer to the workforce captured by the data as affiliated or registered employment rather than formal employment because affiliation to social security is optional for the self-employed. Our analysis sample contains information for around 3,000,000 registered workers per month.

The data is exceptionally rich and contains information on earnings from employment and self-employment (for affiliated self-employed workers), days of work per month, sector of economic activity (industry codes), sector of employment (private vs. public), and occupation descriptions. The dataset also contains sociodemographic variables such as age, gender, marital status, and education. Our analysis exploits this information to disaggregate the analysis by population subgroup. Table A1 in the Appendix provides the descriptive statistics for our period of analysis.

Two important limitations of the data used in the analysis are worth highlighting. First, as previously mentioned, only individuals affiliated to social security are observed in the data. In the context of our analysis, this means that we have no information for individuals who exited the data at any point during the period of analysis. Individuals may have exited the data for a number of reasons such as retirement, death, or unemployment, or because they moved to unaffiliated self-employment or to informal employment (i.e. they continued to work as employees but were no longer affiliated to social security). Regarding retirement or death, we were only able to rule them out if the individual re-entered the data at a subsequent point over the period of analysis. However, we have no information for individuals while they were not part of the data. In particular, we do not know whether they were receiving earnings from unaffiliated self-employment or informal employment.

Second, detailed information about different sources of income is not available in the data. More precisely, only earnings related to the social security regime to which the individual was affiliated are recorded in the data. For instance, earnings from employment are recorded for individuals affiliated to the employee's social security regime, whereas self-employment earnings are recorded for individuals affiliated to the self-employed or voluntary regime. This means that we were unable to identify individuals who received multiple sources of income at the same time (employment and self-employment) and we could not observe their combined income. This is an important

limitation of our study because receiving income from multiple sources has been shown to increase the probability of belonging to top income groups in Ecuador (Oliva et al. 2021).

Despite these limitations the data remains the best source of information for studying the month-by-month evolution of earnings at the top of the distribution during the COVID-19 pandemic.

2.2 Methodology

Our analysis follows the growing literature on top incomes based on administrative data (Atkinson 2005; Piketty 2001; Piketty and Atkinson 2007, 2010). To begin with we identify top earners based on total annual earnings in 2019 and we study their labour market trajectory and the evolution of their monthly earnings over the period from 2019 to 2021. More precisely, we focus on three top groups: the top 10 per cent (p90–100), top 1 per cent (p99–100), and top 0.1 per cent (p99.9–100) of earners (based on total annual earnings in 2019). We then compare the labour market trajectory and evolution of monthly earnings of top groups to those of the rest of the sample in the data. Note that throughout the study we refer to our groups as top earners or top income groups. However, we only consider income from registered employment as other sources of income are not available in the data (e.g. income from capital).

The analysis consists of four main parts. First, we assess overall changes in employment, earnings, and inequality for the whole sample of workers present in social security records. Second, we provide a comprehensive characterization of top and non-top earners by socioeconomic indicators available in the data. Such characterizations are still scarce in the literature due to the limited sociodemographic information available in administrative data (Atkinson et al. 2018; Boschini et al. 2020; Oliva et al. 2021; Ravaska 2018). Third, we analyse the labour market trajectory and evolution of the monthly earnings of the top and non-top groups over the 2019–21 period. We exploit the information in the data to look at within-group (top vs. non-top) differences in terms of socioeconomic characteristics. Finally, we discuss the roles of social insurance contributions and personal income tax in reducing earnings inequalities before and during the pandemic, in order to stimulate discussion about potential direct taxation reforms to increase fiscal capacity with a view to expanding social protection systems to deal with future economic crises.

3 Overall changes in employment, earnings, and inequality

We start by studying how employment, earnings, and inequality evolved from January 2019 to December 2021. Our focus is on the whole sample of earners affiliated to social security during the period of analysis. The analysis distinguishes employment and earning patterns across industries with two main aims. First, we assess whether there were different pre-pandemic patterns in terms of the evolution of employment and earnings across industries. Second, we study the extent to which different industries were affected during the pandemic and compare their recovery pattern (if any).

3.1 Changes in employment

Figure 1 shows the overall changes in employment for the whole sample of earners affiliated to social security over our period of analysis. While our results show little variation in the number of formal workers over the pre-pandemic period (January 2019 to February 2020), employment dropped sharply during the second quarter of 2020 when strict lockdown policies were introduced to contain the spread of COVID-19. From February 2020 to July 2020, the number of registered

earners fell by 8.1 per cent. As lockdown measures were progressively lifted, employment started to recover. By the end of 2020 employment remained 4.8 per cent lower than in February of the same year. Employment then continued to recover progressively until the end of 2021, when it almost reached pre-pandemic levels (1 per cent lower than in February 2020).

To complement the analysis of the evolution of employment over our period of analysis, Figure A1 in the Appendix shows how the number of earners not affiliated to social security changed between January 2019 and December 2021, based on household survey data from the National Survey of Employment, Unemployment and Underemployment (ENEMDU) (see e.g. INEC 2022). The figure shows that the number of unaffiliated earners was increasing prior to the pandemic. During the second quarter of 2020, the number of unaffiliated earners dropped dramatically by 52 per cent. However, unregistered employment fully recovered by the end of 2020 and continued to increase throughout 2021.

Figure 1: Number of earners affiliated to social security (2019–21)
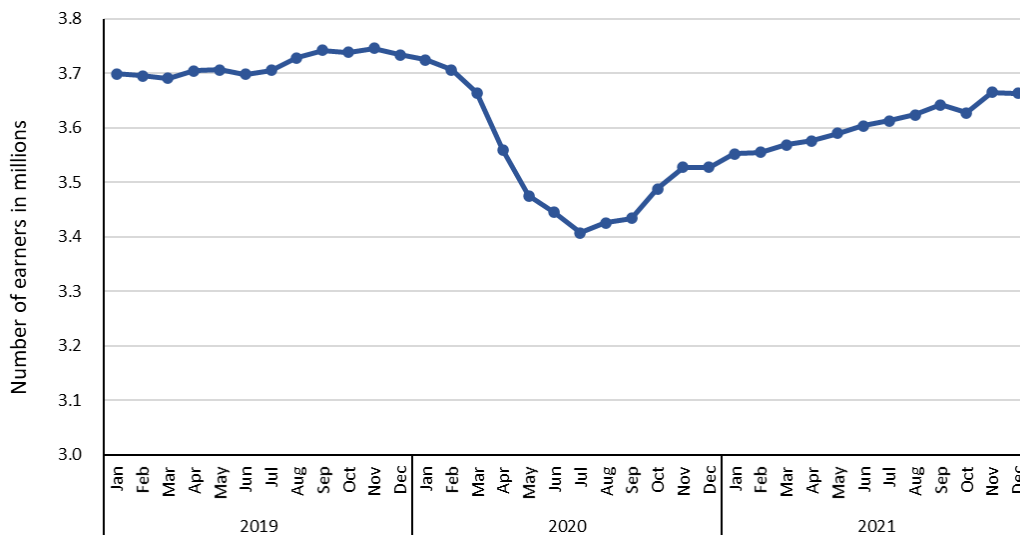
Source: authors' elaboration based on social security records.

As the overall changes in registered employment presented in Figure 1 may hide differences in employment patterns across industries prior to and during the pandemic, Figure 2 presents changes in employment by industry over our period of analysis. For ease of comparison, employment is expressed relative to the number of earners in January 2019.

The comparison of employment patterns across industries shows a number of interesting findings. First, prior to the pandemic, there was already a decreasing trend in the number of earners affiliated to social security in all industries except those classified as 'other' services and activities. The decrease was most pronounced among earners in the wholesale and retail trade, hotels and restaurants sectors, where registered employment fell by 31 per cent between January 2019 and February 2020. The smallest decrease is observed among earners working in public administration and defence, education, health, and social work sectors, representing an 11 per cent drop in employment. However, we observe a large increase of 36 per cent in the number of earners classified as working under 'other' sectors and activities during the pre-pandemic period. This category includes arts and entertainment activities, service activities such as equipment hiring

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services, work in associations or organizations (e.g. political or religious), cleaning and repair services, domestic services, and activities of extra-territorial organizations. In January 2019 this category represented 29 per cent of all earners, whereas it increased to 39.8 per cent in February 2020. This compositional change of the affiliated workforce represents a deterioration of labour market conditions during the pre-pandemic period, as workers in the category of other services and activities had average lower earnings than in other industries (see Figure 4 below).[6]

Figure 2: Number of earners affiliated to social security, by industry (2019–21)
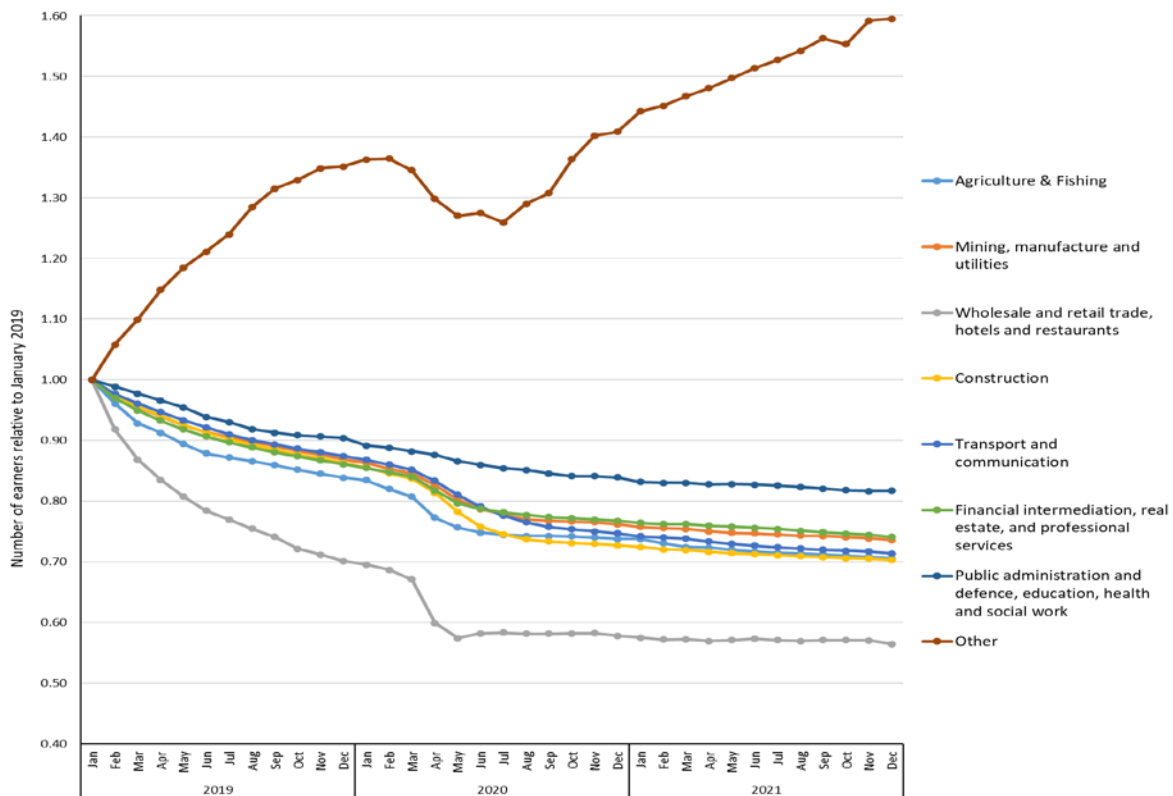
Source: authors' elaboration based on social security records.

Second, in all industries there was a negative impact on employment during the months of March to June 2020 as a result of the lockdown policies implemented by the government. However, the extent to which employment was affected varied across industries. In all industries where employment was decreasing prior to the pandemic, the drop in employment accelerated during the lockdown. The largest drop in employment between February 2020 and June 2020 is observed in the wholesale and retail trade, hotels and restaurants sectors, with a 15 per cent decrease, whereas the smallest drop was in the public administration and defence, education, health, and social work sectors (3 per cent decrease). Employment classified under 'other' services and activities dropped by 7 per cent over the lockdown period.

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[6] Labour market conditions in Ecuador have worsened since 2015 as a result of the drop in commodity prices on which the Ecuadorian economy is dependent. Over the period 2015–19, the country experienced a process of economic slowdown, with average growth of 0.52 per cent (World Bank 2022).

Third, the 'recovery' phase varied widely across industries. In particular, the overall recovery of employment observed from July 2020 to December 2021 (see Figure 1) seems to be explained by the strong increase in the number of earners working in the 'other' services and activities sector, which had already shown an increasing trend prior to the pandemic. Between July 2020 and December 2021, the employment classified under 'other' services and activities increased by 27 per cent, representing 47 per cent of the total workforce affiliated to social security by the end of the period of analysis. For wholesale and retail trade, hotels and restaurants, we observe that employment stabilized after the lockdown period, representing around 57 per cent of the level of employment in January 2019. In all other industries, employment continued to fall until the end of the period of analysis, although at a lower rate than that experienced during the lockdown period.

3.2 Changes in earnings

Next we turn to the evolution of earnings over our period of analysis.

Figure 3: Mean monthly earnings among all affiliated earners (2019–21)
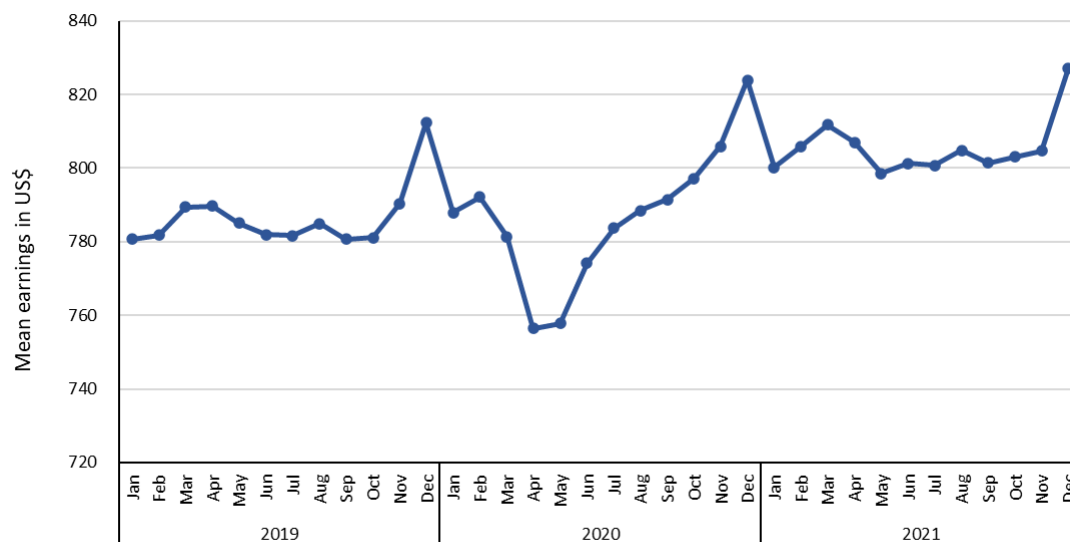
Note: all earnings are expressed at December 2019 levels based on CPI.

Source: authors' elaboration based on social security records.

Figure 3 presents the mean monthly earnings among all earners (i.e. those with non-zero earnings) in 2019–21. All earnings are expressed at December 2019 levels based on the Consumer Price Index (CPI). The results show larger fluctuations in earnings than in employment over the period of analysis. In particular, the large peaks in earnings in the months of December are related to the payment of end-of-year bonuses, such as the 13th month payment. The smaller peaks around March and April are related to the payment of the 14th month payment.[7] Consistently with the evolution of employment, earnings also fell in the second quarter of 2020. Mean earnings fell by

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[7] The 13th month payment corresponds to an additional month's full salary and is paid in the month of December each year. The 14th month payment corresponds to a payment equivalent to a month's national minimum wage, which in December 2019 was equal to US$394. This payment needs to be made by mid-April each year. Profit-sharing payments are also usually made during the month of March.

4.3 per cent in May 2020 compared to February 2020. Earnings then recovered sharply until the end of 2020 and surpassed the pre-pandemic levels before stabilizing during 2021.

As is the case for employment, the evolution of mean earnings among all registered earners may hide differences in levels and trends across industries. Therefore, Figure 4 depicts changes in mean monthly earnings by industry.

Figure 4: Mean monthly earnings among all affiliated earners, by industry (2019–21)

Note: all earnings are expressed at December 2019 levels based on CPI.

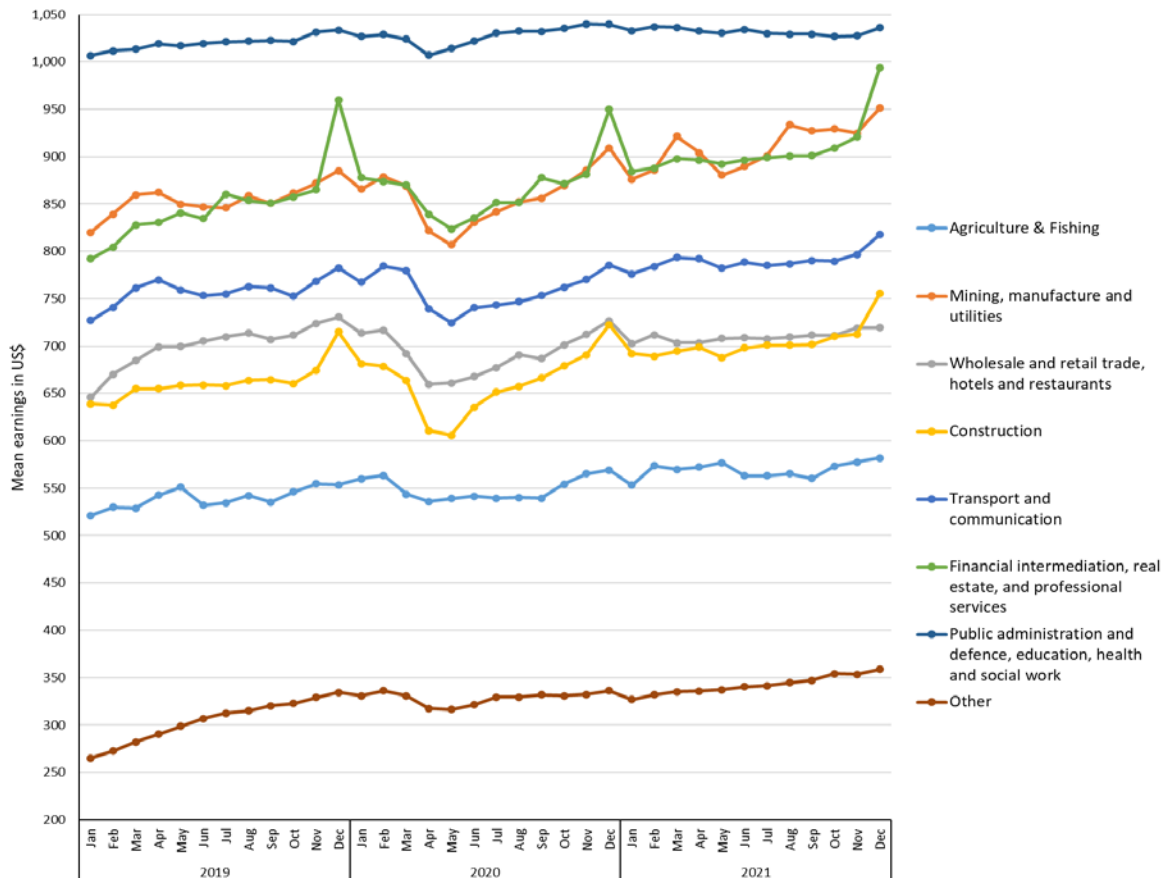Source: authors' elaboration based on social security records.

The graph provides a number of interesting findings There were very large differences in mean earnings across industries and these differences persisted throughout the pandemic. Mean earnings were on average 3.2 times higher in public administration and defence, education, health and social work (where mean earnings were the highest) than in other services and activities (where mean earnings were the lowest). This is particularly worrying because, as discussed before, prior to the pandemic and after the lockdown period, employment was increasing in the low-paid sector of other services and activities, whereas employment was decreasing in other industries. The results point to a deterioration of the labour market which had already started before the pandemic and which has been exacerbated.

During the pre-pandemic period (January 2019 to February 2020), mean earnings increased slightly. In most industries earnings increased by between 6 and 11 per cent, whereas they remained broadly stable for earners working in public administration and defence, education, health and

social work, and other services and activities. The only industry which experienced a large increase (27 per cent) in earnings prior to the pandemic was other services and activities.

During the second quarter of 2020, mean earnings dropped in all industries, although to different extents. Between February 2020 and May 2020, the largest drop was observed in the construction sector, representing a 10 per cent decrease in mean earnings. Important drops (around 8 per cent) were also experienced in the mining, manufacture and utilities, wholesale and retail trade, and hotels and restaurants sectors. Earnings remained broadly stable for those in public administration and defence, education, and health and social work.

Finally, as strict lockdown measures started to be progressively removed, mean earnings recovered in all industries, although to different extents. Between June 2020 and November 2021, mean earnings increased most in the construction sector (by 11 per cent), followed by mining, manufacture and utilities (by 11 per cent) and financial intermediation, real estate, and professional services (by 10 per cent). Note that we use November 2021 as a reference because mean earnings in December 2021 were much higher due to the payment of end-of-year bonuses. However, the same industries are ranked highest if we compare December 2021 to June 2020. The smallest increase (1 per cent) is observed for workers in public administration and defence, education, health and social work. Note that the earnings recovery observed after the period of lockdown may be explained by the following two factors: cuts in earnings were implemented during the lockdown period across many industries, and the increase in earnings may also reflect the fact that lower-paid individuals within each industry were more likely to lose their jobs during the pandemic, which would have increased mean earnings automatically.

3.3 Changes in earnings inequality

We end this section by looking at the evolution of earnings inequality over our period of analysis. Figure 5 shows changes in the Gini coefficient from monthly earnings. Note that the calculation is based only on individuals with non-zero earnings and therefore it does not capture the impact of employment losses or, more precisely, exits from the social security register.

Figure 5: Gini coefficient from monthly earnings among all earners (2019–21)
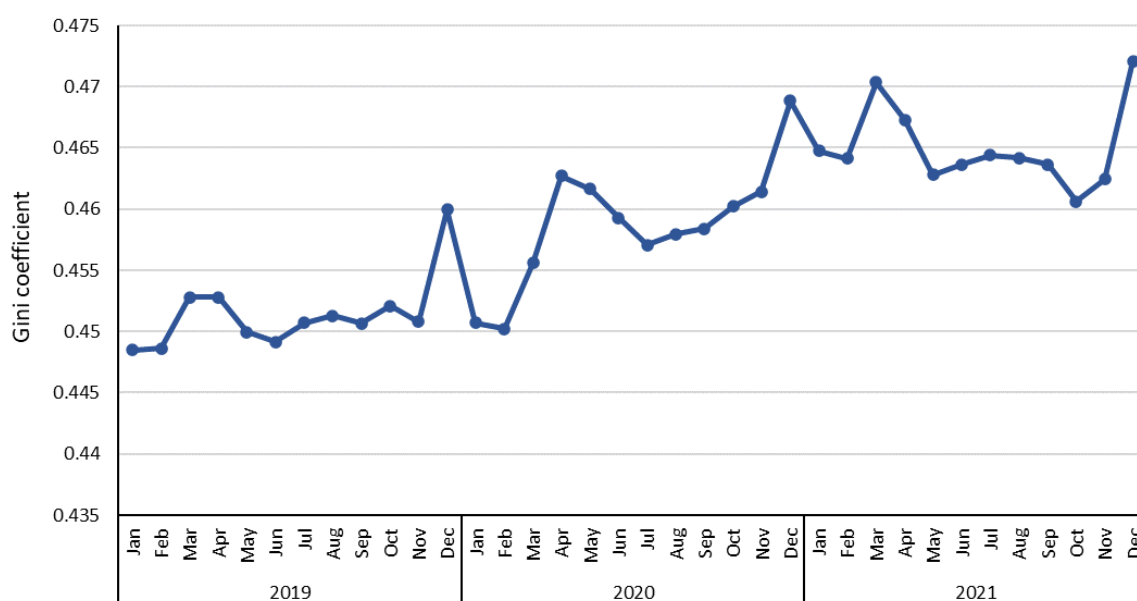
In all years we observe peaks in inequality in the months of March/April and December which are related to the 13th and 14th month payments. However, during the pandemic, rather than observing a peak in March/April, we observe an upward shift in inequality. In fact the Gini coefficient increases by 2.8 per cent (from 0.45 to 0.463) from February to April 2020 and then remains higher on average compared to 2019 levels.

4 Top earners and the COVID-19 pandemic

This section focuses on the evolution of employment and earnings, distinguishing between top and non-top earning groups. As previously mentioned, the earning groups are defined based on their annual earnings from employment in 2019. We begin with a description of the socioeconomic characteristics of top earners and then analyse the labour market trajectory and evolution of monthly earnings of the top and non-top groups over the 2019–21 period, looking at differences across gender and sector of work.

4.1 Characteristics of top earners in Ecuador

This section describes the characteristics of top earners in 2019. To put things into perspective, the thresholds that identify the top 10 per cent and top 1 per cent in our data are broadly in line with the thresholds that identify the top 10 per cent and top 1 per cent of all earners (affiliated and not affiliated to social security) in household survey data from ENEMDU in December 2019. However, the threshold that identifies the top 0.1 per cent is larger in social security records, confirming the problems related to under-coverage of top income in survey data. Table 1 compares the characteristics of individuals who do not belong to the group of top earners (non-top) and those in the top 10 per cent, top 1 per cent, and top 0.1 per cent groups in 2019.

Table 1: Characteristics of top earners in 2019 (%)

	Non-top	Top 10%	Top 1%	Top 0.1%
Women	41.1	44.6	36.3	22.8
Employees	76.6	97.9	98.5	98.9
Self-employed	23.4	2.1	1.5	1.1
Public sector	5.7	47.4	38.1	2.5
Tertiary education	8.9	43.2	45.1	27
Agriculture and fishing	6.6	2.4	2.4	4.5
Mining, manufacture, and utilities	9.5	15.4	19.5	30.5
Wholesale and retail trade, hotels and restaurants	2.3	2.2	2.3	2.7
Construction	16.7	13.0	15.4	24.8
Transport and communication	4.8	5.9	6.5	8.8
Financial intermediation, real estate, and professional services	5.3	8.4	10.7	15.6
Public administration and defence, education, health and social work	7.7	46.8	39.3	8.2
Other	47.0	5.9	3.9	4.8

Note: top income groups are defined based on total annual earnings in 2019.

Source: authors' elaboration based on social security records.

In terms of gender the percentage of women is slightly lower in the non-top group (41.1 per cent) compared to the top 10 per cent group (44.6 per cent). The share of women decreases for higher income groups, representing 36.3 per cent and 22.8 per cent of earners for the top 1 per cent and top 0.1 per cent groups, respectively. Despite the lack of detailed information about different sources of income, the gender composition of top earning groups is broadly in line with that of top income groups analysed by Oliva et al. (2021) for Ecuador based on tax records data.[8]

With regard to employment status, the data contains information about employment status related to social security affiliation. As such the categories are mutually exclusive and, as previously mentioned, it is not possible to identify individuals who combined sources of income, e.g. income from employment and self-employment. Table 1 shows that employees represent the largest employment category in all groups, with 76.6 per cent of employees in the non-top group and more than 97 per cent in the top earning groups. As previously mentioned, the data does not allow us to capture the fact that individuals with combined sources of income are more likely to be at the top of the income distribution, as shown by Oliva et al. (2021).

Table 1 also shows differences in the presence of public sector workers across income groups. The prevalence of public sector workers is high in the top 10 per cent and top 1 per cent earning groups, representing 47.4 per cent and 38.1 per cent of earners, respectively. At the highest end of the earnings distribution (the top 0.1 per cent group), only 2.5 per cent of individuals work in the

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[8] Oliva et al. (2021) use administrative data from the Ecuadorian tax administration which contain yearly information on income from employment, self-employment, and capital income.

public sector. The prevalence of public sector workers is also low among individuals who do not belong to top income groups, accounting for 5.7 per cent of earners.

There are also important differences between the non-top and top earning groups in terms of educational attainment. Among workers who do not belong to top earning groups, only 8.9 per cent have tertiary education, whereas the shares are 43.2 per cent and 45.1 per cent in the top 10 per cent and top 1 per cent groups, respectively. The share of workers with tertiary education decreases in the top 0.1 per cent group, amounting to 27 per cent. These results are in line with findings by Oliva et al. (2021) who document a smaller prevalence of individuals with tertiary education in the top 0.1 per cent income group compared to the top 1 per cent group, particularly among women. However, the share of workers with tertiary education in the top 0.1 per cent group is much lower in our study than in that of Oliva et al. (2021)

Finally, the industry composition of non-top and top earning groups varies widely. The largest share of earners in the non-top group (47 per cent) work in industries classified as other services and activities. This is consistent with the results presented in the previous section which showed that mean earnings are the lowest for individuals working in this category. Moving to the top 10 per cent and top 1 per cent groups, the largest share of earners work in public administration and defence, education, health and social work. However, the share of earners in this sector drops in the top 0.1 per cent group. In that group, the largest share of earners (30.5 per cent) is found in mining, manufacturing and utilities, followed by construction (24.8 per cent) and financial intermediation (15.6 per cent).

4.2 Changes in employment and earnings among top earners during the pandemic

We now turn to the comparison of changes in employment and earnings across earning groups. We start by analysing differences in the evolution of employment and earnings among non-top earners and each of our top earning groups. We then turn to differences across population subgroups within each of these earning categories.

Figure 6 presents changes in employment among non-top earners (Panel A), the top 10 per cent (Panel B), top 1 per cent (Panel C), and top 0.1 per cent (Panel D) groups over our period of analysis. For ease of comparison, employment is expressed relative to the number of earners in January 2019 in each group.

Figure 6: Number of earners affiliated to social security, by income group (2019–21)
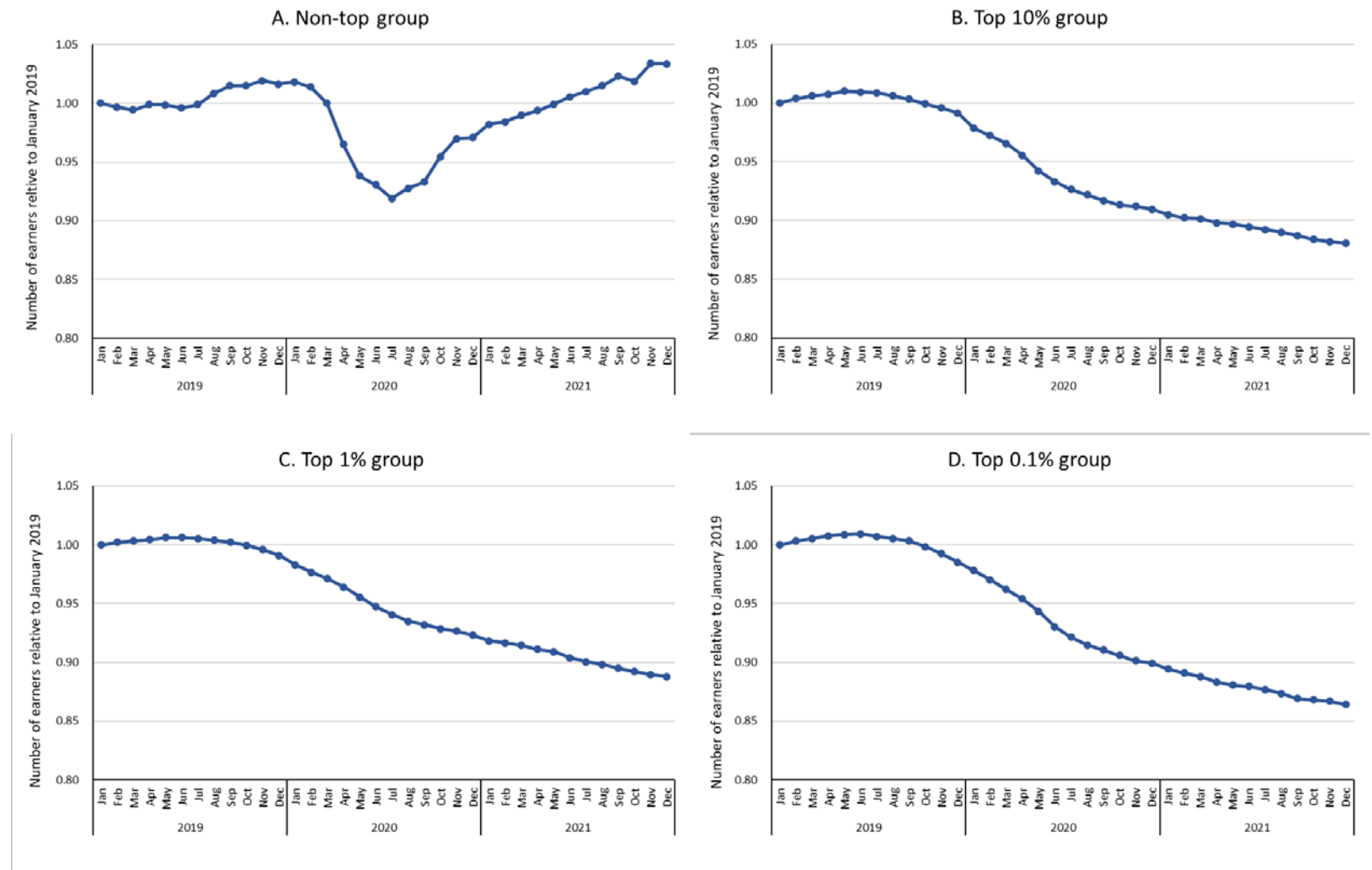
Note: top income groups are defined based on total annual earnings in 2019.

Source: authors' elaboration based on social security records.

The results show that the evolution of employment follows a different pattern across earning groups over the period of analysis. For the non-top group employment dropped precisely in March 2020, when the period of strict lockdown due to the pandemic was introduced. In this group the number of earners dropped sharply (by 9.3 per cent) from February 2020 to July 2020. Employment then progressively recovered. By December 2020 the number of earners was 4.2 per cent lower than at pre-pandemic levels. However, by then end of 2021, employment among non-top earners was 2 per cent higher than in February 2020. The recovery in employment experienced among non-top earners is the result of the increased number of people working in other services and activities (see Figure 2 above).

By contrast, in all top earning groups, registered employment fell continuously until December 2021. Interestingly, a decrease in the number of workers prior to the pandemic in all top earning groups was already observed. This is in line with the drop in the number of workers affiliated to social security in most industries during 2019, as depicted in Figure 2. In all three top groups the fall in employment became steeper from March 2020 to July 2020. Employment then continued to decrease but at a lower rate. The group that experienced the largest drop in employment was the top 0.1 per cent group, with a 10.9 per cent decrease between February 2020 and December 2021.

We now turn to the evolution of earnings across our earning groups. Figure 7 presents mean monthly earnings among registered earners in each of our groups. The results show a number of interesting findings.

The variation in earnings in the pre-pandemic period is more pronounced among individuals in the top 1 per cent and top 0.1 per cent groups. In particular, the peaks in earnings observed in March and December are more prevalent in these groups and are related to the payment of bonuses, as previously mentioned. The more pronounced peaks at the top of the earnings distribution are reflected in higher levels of inequality in March and December, as depicted by the changes in the Gini coefficient in Figure 5.

In all groups we observe a sharp decline in mean earnings between March 2020 and May 2020, the period of strict national lockdown. However, the magnitude of the shock in earnings differs across groups. The drop in earnings is broadly similar among non-top earners and the top 10 per cent, representing a decrease in earnings of 4.2 per cent and 5.9 per cent, respectively. The decrease is more pronounced at the very top. Earnings dropped by 9.5 per cent in the top 1 per cent group and by 19 per cent in the top 0.1 per cent group.

Finally, the evolution of earnings after the second quarter of 2020 differs widely across groups. For the non-top group we observe a progressive increase in mean earnings. Mean earnings in each month of 2021 were higher than in their counterparts in 2019, the pre-pandemic year. For instance, mean earnings in December 2021 were 7.1 per cent higher than in December 2019. In the top 10 per cent group, earnings recovered but they did not increase compared to 2019. Mean earnings in each month of 2021 were slightly lower than those in their counterparts in 2019. Lastly, no actual recovery is observed in terms of mean earnings in the top 1 per cent and top 0.1 per cent groups. For the last two groups a month-to-month comparison shows that since March 2019 mean earnings remained consistently below the levels observed in 2019. In fact, mean monthly earnings in 2020 and 2021 were very similar for these higher income groups.

Figure 7: Mean earnings, by income group (2019–21)
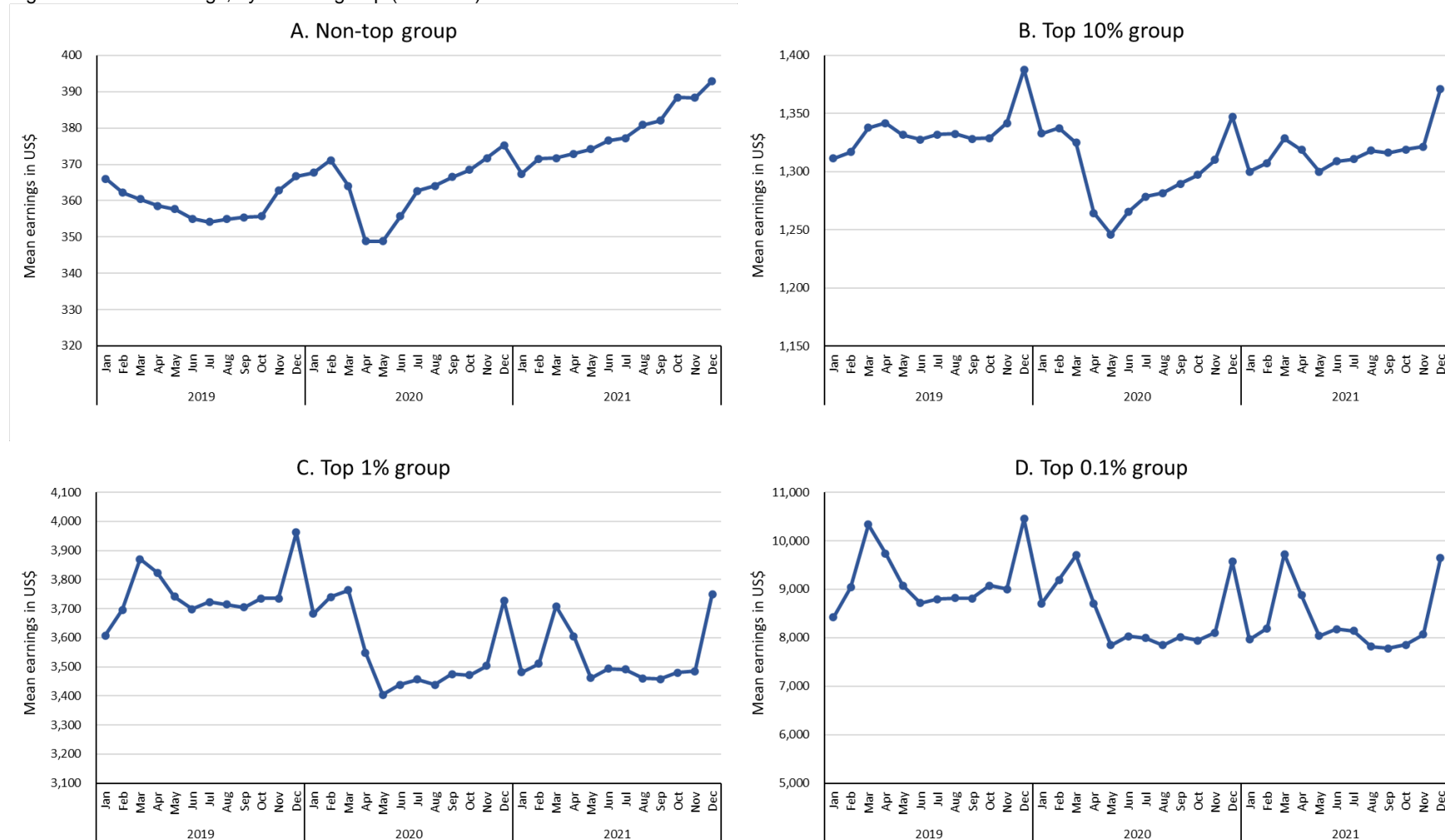
Note: top income groups are defined based on total annual earnings in 2019. All earnings are expressed at December 2019 levels based on CPI.

Source: authors' elaboration based on social security records.

The remainder of this section discusses differences in the evolution of earnings by population subgroups, namely in terms of gender (men vs. women), sector of work (public vs. private), and educational attainment (non-tertiary vs. tertiary).

Figure 8 shows gender differences in the evolution of earnings across our four earning groups. A number of findings are worth highlighting. First, gender differences in earnings were already prevalent across all groups before the pandemic. Between January 2019 and February 2020, women's earnings were on average 16 per cent lower than men's earnings among non-top earners, 10 per cent lower in the top 10 per cent group, 14 per cent lower in the top 1 per cent group, and 10 per cent lower in the top 0.1 per cent group. During the second quarter of 2020, men and women's earnings fell in all groups, reaching their lowest levels in May 2020. Between February and May 2020, the drop in earnings was broadly similar across gender among non-top earners (6 per cent decrease) and in the top 0.1 per cent group (15 per cent decrease). However, over this period, the drop in earnings was 3 percentage points and 1 percentage points. larger for men than for women in the top 10 per cent and top 1 per cent groups, respectively.

Finally, there are gender differences in terms of the evolution of earnings from May 2020 to the end of the period of analysis. Among non-top earners, women's earnings in December 2021 were 5 per cent higher than in December 2019, whereas men's earnings increased by 7.4 per cent. In the top 10 per cent group, men's earnings at the end of the period reached almost the same level as in December 2019, whereas women's earnings remained 1.3 per cent lower. At the very top (top 1 per cent and top 0.1 per cent), men's earnings recovered slightly more than women's, but, for both groups, they remained lower at the end of 2021 compared to 2019. The evolution of earnings across gender during the pandemic translates into an increase of the gender gap in earnings among non-top earners, whereas at the very top (top 1 per cent and top 0.1 per cent groups) the gap slightly narrows.

Figure 9 turns to differences between private and public sector workers. Important differences are also observed between these two groups. First, earnings in the public sector were consistently higher than in the private sector in the group of non-top earners, whereas the opposite is observed in top earning groups. Second, earnings in the public sector increased throughout the pandemic among non-top earners, recovered after the lockdown period in the top 10 per cent group, and remained broadly stable throughout the period of analysis in the top 1 per cent group. Only in the top 0.1 per cent group do we observe a decrease in public sector earnings, of around 14 per cent between February 2020 and December 2021. Third, larger changes in earnings are observed among private sector workers during the pandemic. In all income groups a drop in earnings is observed between February 2020 and May 2020. Over this period mean earnings dropped by 7.4 per cent among non-top private earners and up to 14.8 per cent for those in the top 0.1 per cent group. From May 2020 to end 2021, the evolution of private sector earnings varied across groups. For non-top earners mean earnings in each month of 2021 were higher than their counterparts in 2019. For the top 10 per cent group, mean earnings in 2021 recovered compared to 2020 but remained lower than those in 2019. Lastly, in the top 1 per cent and top 0.1 per cent groups, mean earnings in 2021 remained as low as during the first year of the pandemic.

Figure 10 compares the evolution of earnings for registered workers with and without tertiary education. Interestingly, we observe that mean earnings were consistently higher for those with tertiary education than for those without tertiary education in the non-top and top 10 per cent groups, whereas the opposite pattern is depicted in the top 1 per cent and top 0.1 per cent groups. In all income groups we observe a drop in earnings during the second quarter of 2020. However, the extent to which earnings fell varies by educational attainment, as does the evolution of earnings after the period of strict lockdown.

Figure 8: Mean earnings, by income group and gender (2019–21)
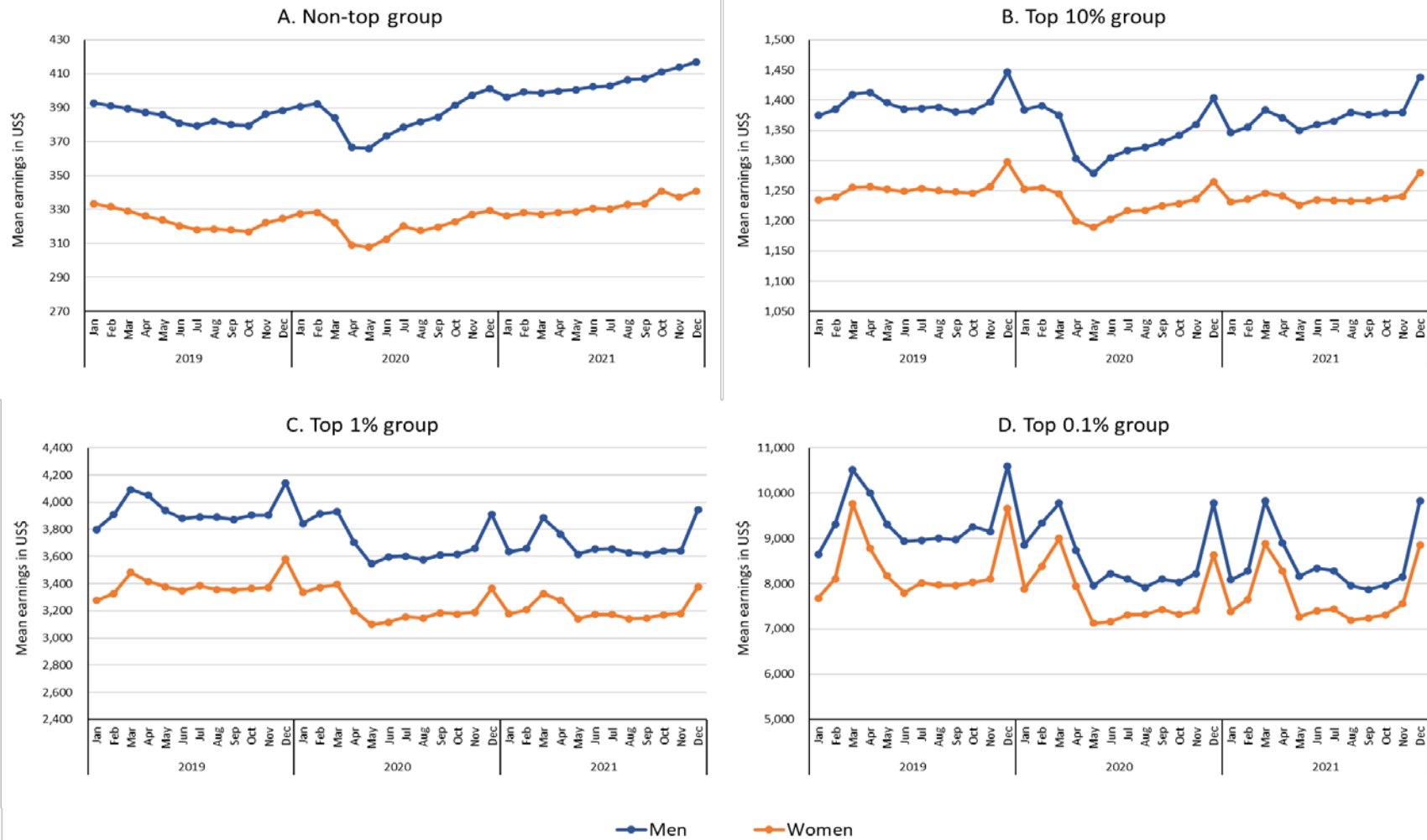
Note: top income groups are defined based on total annual earnings in 2019. All earnings are expressed at December 2019 levels based on CPI.

Source: authors' elaboration based on social security records.

Figure 9: Mean earnings, by top income group and sector (2019–21)

Note: top income groups are defined based on total annual earnings in 2019. All earnings are expressed at December 2019 levels based on CPI.

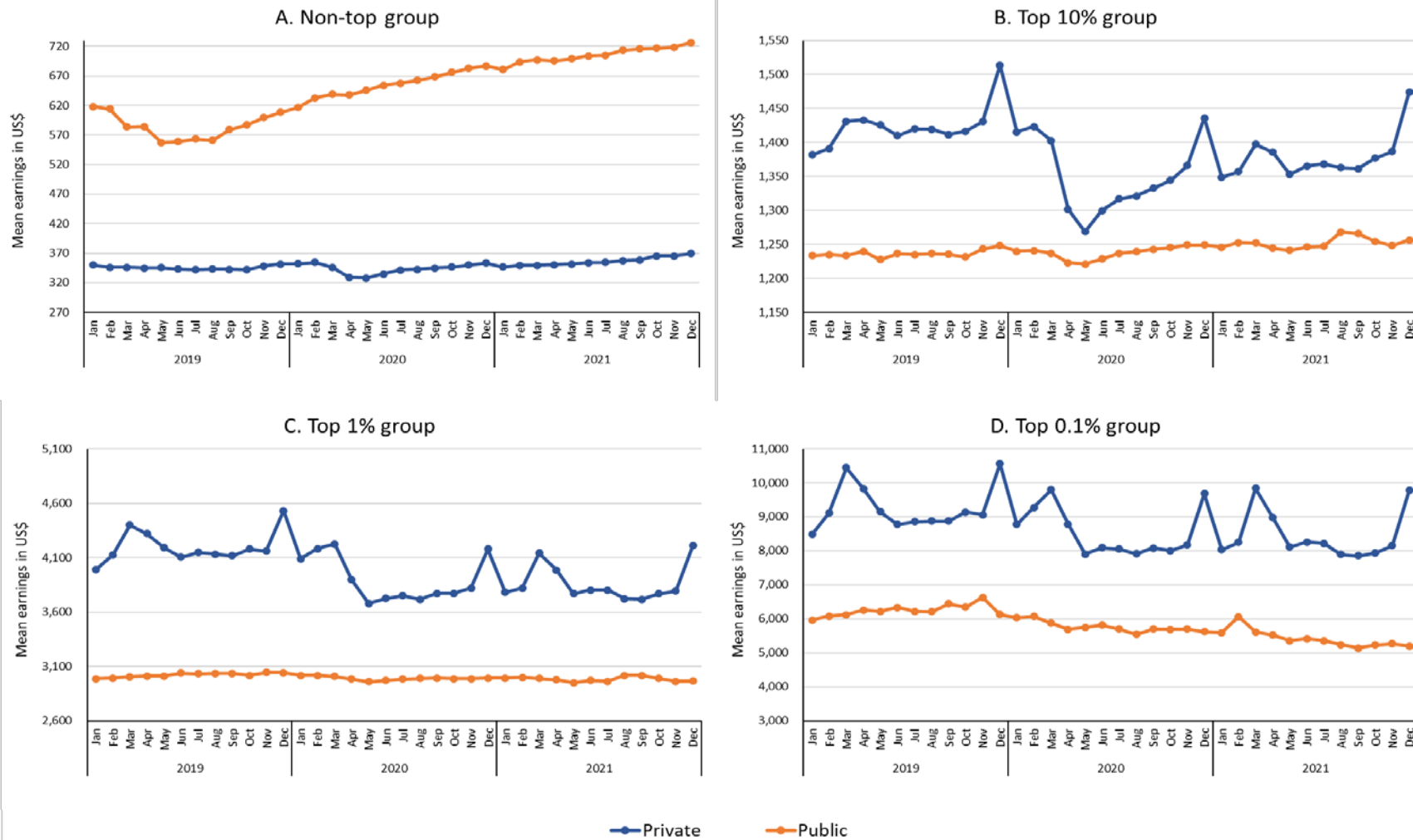Source: authors' elaboration based on social security records.

Figure 10: Mean earnings, by income group and education level (2019–21)

Note: top income groups defined based on total annual earnings in 2019. All earnings are expressed at December 2019 levels based on CPI.

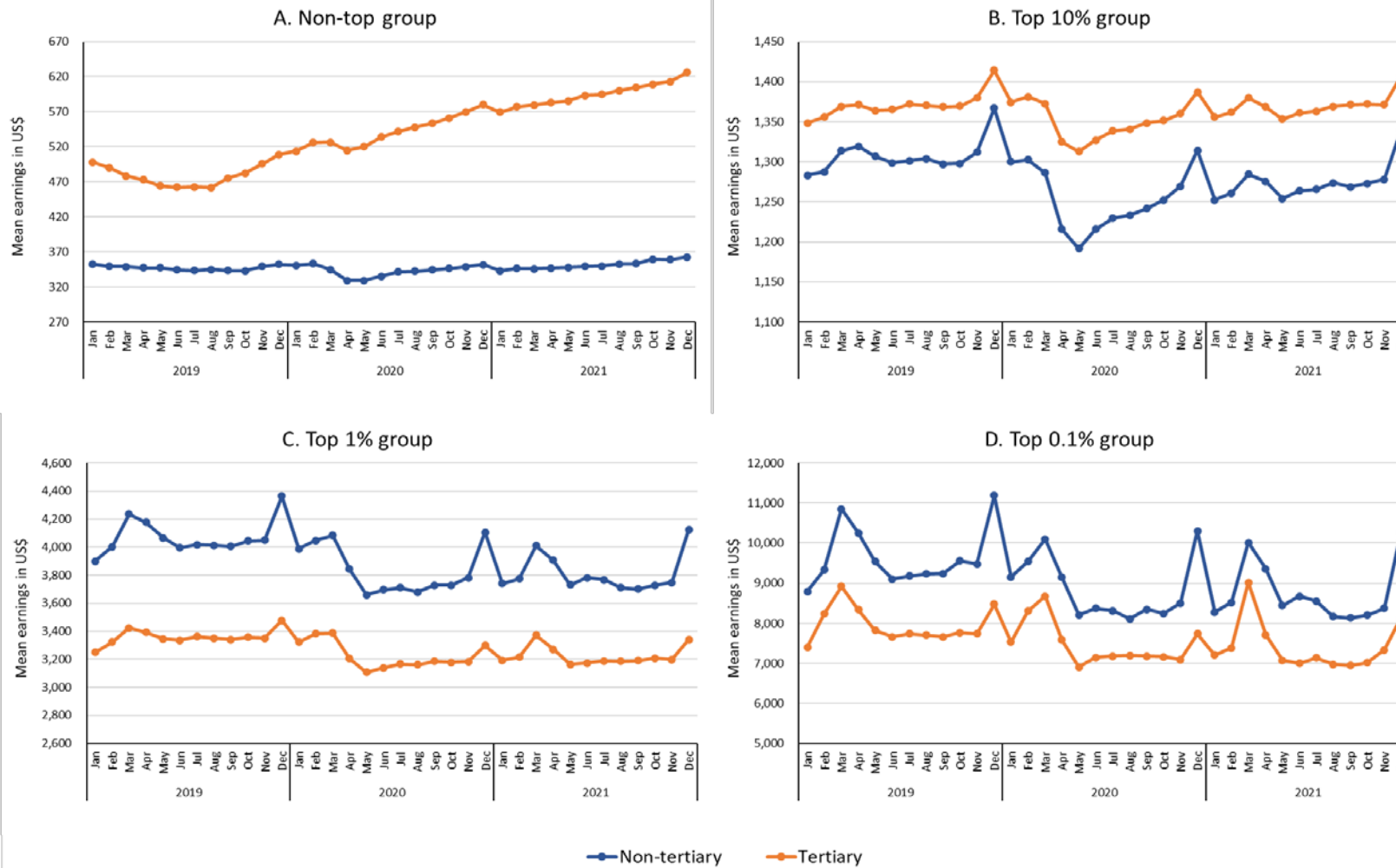Source: authors' elaboration based on social security records.

During the second quarter of 2020, mean earnings in the non-top group dropped by only 1 per cent for those with tertiary education compared to a 7 per cent decrease for those without tertiary education. In the higher income groups the drop in earnings was more pronounced for both groups. In the top 10 per cent and top 1 per cent groups, the drop in earnings was larger for those without tertiary education. The pattern is reversed in the top 0.1 per cent group, where the earnings of those with tertiary education dropped by 16.8 per cent compared to 14 per cent for those with lower education. After the lockdown period, earnings recovered and increased for both groups of non-top earners. However, the increase in earnings was much larger among non-top earners with tertiary education. By December 2021 the mean earnings of workers with tertiary education in the non-top group were 1.7 times higher than those of workers with lower education compared to 1.4 times in December 2019. In the top 10 per cent group, the mean earnings in 2021 of those with tertiary education reached the pre-pandemic levels, whereas they remained lower for those without tertiary education. Finally, at the very top (top 1 per cent and top 0.1 per cent groups), the mean earnings in 2021 remained at the same levels as in 2020, independently of the level of education.

5   Fiscal policy and earnings inequality

So far, our analysis has focused on the evolution of pre-tax earnings and has pointed to a deterioration of labour market conditions which began prior to the pandemic. It has also shown that the pandemic increased earnings inequality and reinforced disparities across population groups. This section therefore assesses the role played by fiscal policy, namely social insurance contributions and personal income tax, in reducing earnings inequality. Looking at the role of fiscal policy in the context of the pandemic is also important in discussing potential reforms aimed at increasing fiscal capacity to strengthen social protection to face future crises.

Figure 11 compares pre-tax (blue) and post-tax (orange) mean earnings across the top and non-top income groups. Average tax rates (including social insurance contributions and personal income tax) are around 9 per cent for non-top earners and are mainly explained by social insurance contributions because individuals in this income group fall below the exempted tax threshold.[9] Indeed, the exempted threshold is high in Ecuador (as in many Latin American countries), representing 2.4 times the annualized minimum wage. Average tax rates are around 12 per cent, 19.6 per cent, and 36.5 per cent for the top 10 per cent, top 1 per cent, and top 0.1 per cent groups, respectively. Personal income tax therefore has a redistributive effect, as it reduces income at the top, but its redistributive effect is modest. Previous research has shown that personal income tax reduces the Gini coefficient by around 0.01 points (Jara and Varela 2019).

The modest redistributive effect of tax policy in Ecuador is the result of several characteristics in the design of social insurance contributions and personal income tax. In terms of social insurance contributions, as previously mentioned, it is not compulsory for the self-employed to affiliate to social security. This can create an incentive for self-employed workers with high earnings not to contribute to social security. In terms of personal income tax, three characteristics limit its redistributive role: (i) the high exemption threshold; (ii) exempting the 13th and 14th month payment from tax payments; and (iii) the presence of generous deductions for personal expenditures. The combination of these characteristics reduces the tax mass (with fewer

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[9] Two main social security regimes apply in Ecuador: (i) the general regime is applied to employees at a rate of 9.45 per cent for most industries and a rate of 11.45 for the banking sector, and (ii) the self-employed can opt to affiliate to the voluntary regime, which has a rate of 17.6 per cent.

individuals entering the tax brackets after deductions are considered) and the tax revenue (reducing the amount of tax collected among those who fall into the tax brackets). These aspects of the tax policy deserve attention as reforms aimed at increasing the progressivity of personal income tax could contribute to reducing inequality. Moreover, additional revenues from increased taxation could be used to improve welfare policies and protect households in the event of future economic shocks.

To illustrate the potential for personal income tax reforms to reduce inequality, we simulate the effect of a hypothetical reform. The counterfactual scenario consists of two changes: (i) we include the 13th and 14th payments as part of taxable income, and (ii) we remove all deductions for personal expenditures. Both changes should increase the progressivity and the redistributive role of personal income tax.

Figure 11 shows the effect of our hypothetical reform on mean earnings. The dashed line shows post-tax mean earnings under our counterfactual scenario. In all top income groups mean earnings decrease as a result of higher personal income tax payments. Under our hypothetical reform, average tax rates increase by 7.2 percentage points in the top 10 per cent group, 12.6 percentage points in the top 1 per cent group, and 8.8 percentage points in the top 0.1 per cent group. Moreover, tax revenue increases by 40 per cent under this hypothetical reform, which could be used, at least partly, to enhance social protection against future economic crises.

Finally, Figure 12 shows the effect of our counterfactual reform on earnings inequality when measured by the Gini coefficient. The blue line depicts the Gini coefficient from pre-tax earnings. The orange line represents the Gini coefficient from post-tax earnings under the actual personal income tax in each year under analysis. The dashed red line represents the Gini coefficient from post-tax earnings under our counterfactual reform. Under the actual system, the Gini coefficient is reduced by 0.01 points as a result of the role of social insurance contributions and personal income tax. The effect is broadly in line with previous research using tax–benefit microsimulation based on household survey data (Jara and Varela 2019). The effect of our hypothetical reform is substantial as the Gini coefficient is reduced by 0.03 points in 2019 and 2020 and by 0.04 points in 2021 when inequality from pre-tax earnings is compared to inequality in post-tax earnings under our reform. The slightly larger effect of personal income tax in 2021 under our counterfactual scenario means that such reform would have mitigated slightly the effect of the pandemic on post-tax earnings inequality during 2021.

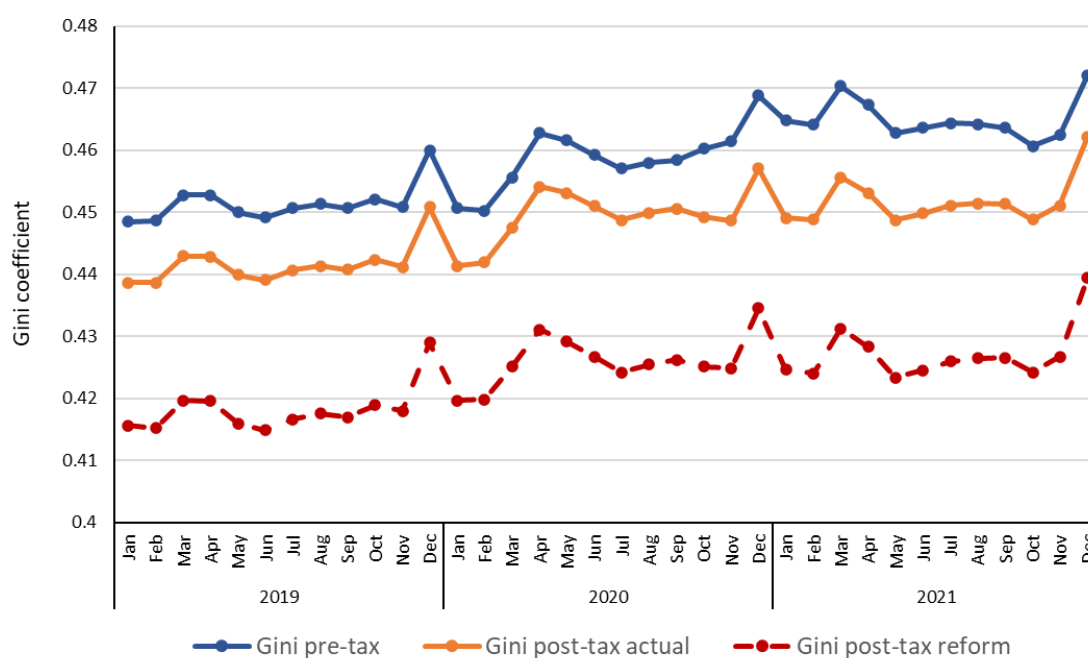Figure 11: Pre-tax vs. post-tax earnings, by income group (2019–21)
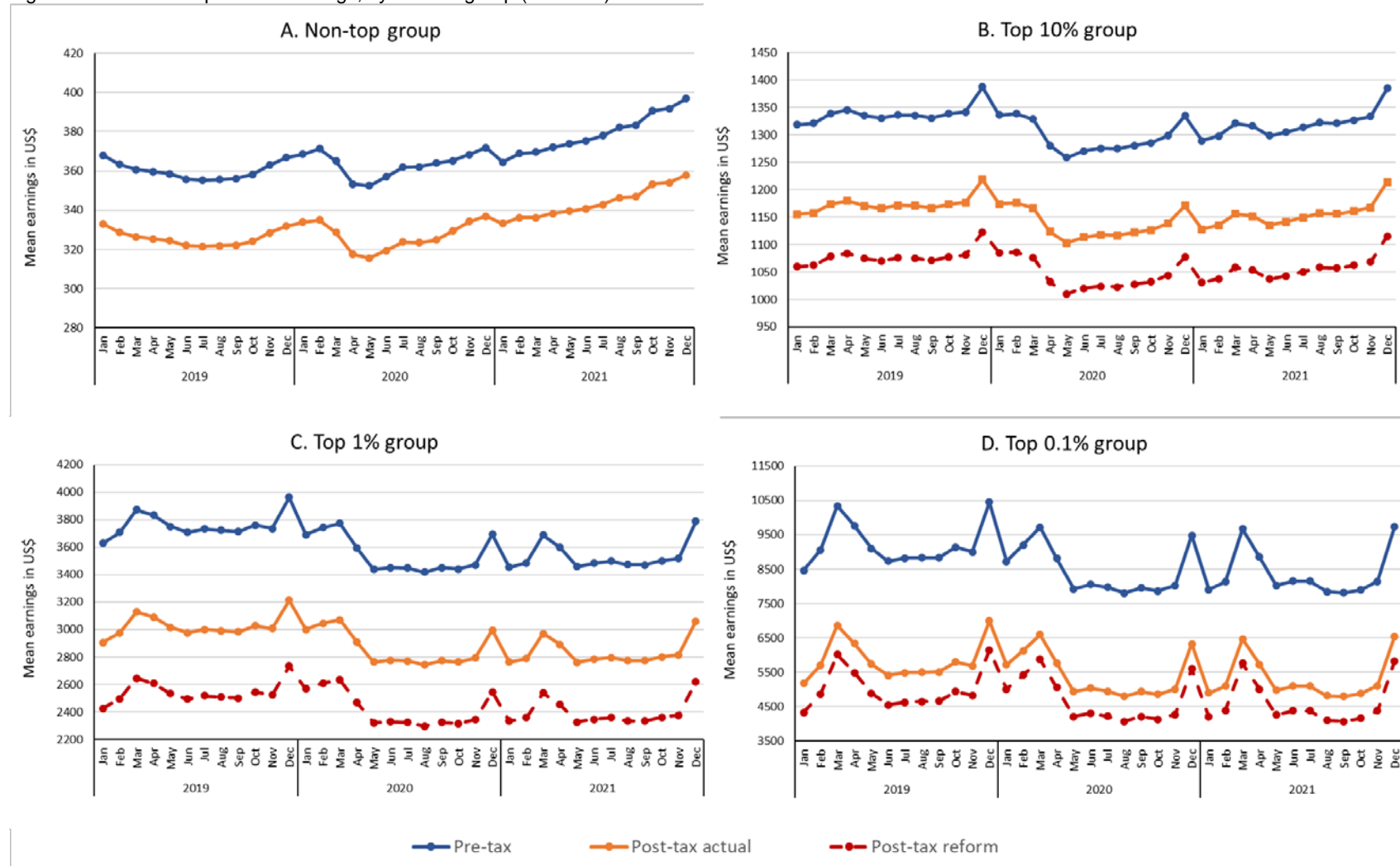
Note: top income groups defined based on total annual earnings in 2019. All earnings are expressed at December 2019 levels based on CPI.

Source: authors' elaboration based on social security records.

Figure 12: Gini coefficient from pre- and post-tax monthly earnings (2019–21)

Source: authors' elaboration based on social security records.

6   Conclusion

Evidence from household survey data has highlighted an increase in income inequality in Latin America as a result of the COVID-19 pandemic (Almeida et al. 2021; Bottan et al. 2020; Lustig et al. 2021). However, household survey data is usually affected by problems of under-coverage of top income, which prevent us from assessing changes in income among the richest fraction of the population and how this affects standard inequality estimates (e.g., Burkhauser, Feng et al. 2012; Burkhauser, Hérault et al. 2018).

This paper aimed to assess differences in the evolution of earnings and earnings inequality prior to and during the COVID-19 pandemic, distinguishing between individuals who were at the top of the earnings distribution before the pandemic and the rest of the registered employed population. For this, we made use of rich administrative data from social security records in Ecuador containing sociodemographic information that enabled us to look at differences in earnings across population subgroups. Our analysis therefore complements previous research focused on the impact of the pandemic on earnings but based on household survey data.

Our analysis shows that, prior to the pandemic, the Ecuadorian labour market was already experiencing a deterioration. We observed a progressive decline from January 2019 in the number of earners affiliated to social security in most industries, which was compensated for by a progressive increase in employment in low-paid services and activities. In the wake of the pandemic, the decline in registered employment intensified as a result of the lockdown policies implemented to contain the spread of COVID-19. After the strict lockdown period, the pre-pandemic pattern in registered employment persisted, with an increasing number of earners entering low-paid sectors of work. Looking at the results across top and non-top income groups, we observed diverging patterns in terms of the evolution of mean earnings. In all groups we observed a sharp decline in mean earnings during the strict national lockdown period. However,

the magnitude of the shock and the evolution of earnings thereafter differed across groups. The decrease in earnings was more pronounced for the top 1 per cent and top 0.1 per cent group than for lower-income groups. Moreover, by 2021, mean earnings at the very top remained as low as those observed during the first year of the pandemic, whereas they recovered when we considered individuals who did not belong to top income groups or the top 10 per cent group. Finally, the evolution of earnings during the pandemic varied across population subgroups. In particular, earnings disparities in terms of gender, educational attainment, and sector of work (public vs. private) increased among individuals who were not at the top of the earnings distribution.

In addition to providing a detailed description of the evolution of earnings during the pandemic, our study contributes to the discussion on the role of fiscal policy in reducing income inequality in low- and middle-income countries. Two features of the design of personal income tax in Ecuador limit the redistributive role of personal income tax. These are exemption of the 13th and 14th month payments from tax payment and the presence of generous deductions from personal expenditures. A simple hypothetical reform abolishing these features of personal income tax showed that further redistribution could be achieved. Moreover, increased fiscal capacity could serve to finance reforms to social protection programmes with a view to protecting households in the event of future economic crises.

Personal income tax reforms in line with those simulated in this paper have been seriously considered recently. Indeed, a major personal income tax reform was introduced in Ecuador in 2022 with the aim of making the tax system more progressive. As part of the reform, deductions for personal expenditures have been significantly reduced. However, discussions about reforms to enhance social protection have lagged behind, despite evidence about the limited role of social policies in protecting households during the pandemic in Ecuador and the absence of social assistance programmes acting as automatic stabilizers due to their design as proxy means-tested benefits.

References

Adams-Prassl, A., T. Boneva, M. Golin, and C. Rauh (2020). 'Inequality in the Impact of the Coronavirus Shock: Evidence from Real Time Surveys'. *Journal of Public Economics*, 189: 104245. https://doi.org/10.1016/j.jpubeco.2020.104245

Almeida, V., S. Barrios, M. Christl, S. De Poli, A. Tumino, and W. van der Wielen (2021). 'The Impact of COVID-19 on Households' Income in the EU'. *Journal of Economic Inequality*, 19: 413–31 https://doi.org/10.1007/s10888-021-09485-8

Alvaredo, F. (2010). 'The Rich in Argentina Over the Twentieth Century, 1932-2004'. In A. Atkinson, T. Piketty, and E. Saez (eds).*Top Incomes: A Global Perspective*. Oxford: Oxford University Press.

Alvaredo, F., and J. Londoño Velez (2014). 'High Income and Income Tax in Colombia, 1993-2010'. *Revista de Economía Institucional*, 16(31): 157–94.

Angelov, N., and D. Waldestrom (2021). 'COVID-19 and Income Inequality: Evidence from Monthly Population Registers'. IZA Policy Paper 178. Bonn: IZA Institute of Labor Economics.

Atkinson, A.B. (2005). 'Top Incomes in the UK over the 20th Century'. *Statistics in Society*, 168(2): 325–43. https://doi.org/10.1111/j.1467-985X.2005.00351.x

Atkinson, A.B., A. Casarico, and S. Voitchovsky (2018) 'Top Incomes and the Gender Divide'. *Journal of Economic Inequality*, 16: 225–56. https://doi.org/10.1007/s10888-018-9384-z

Avellaneda, A., R. Chang, D. Collado, D., H.X. Jara, A. Mideros, L. Montesdeoca, D. Rodriguez, J. Torres, and O. Vanegas (2021). 'Assessing the Cushioning Effect of Tax-Benefit Policies in the

Andean Region During the COVID-19 Pandemic'. CeMPA Working Paper 8/21. Colchester: Centre for Microsimulation and Policy Analysis, University of Essex.

Aye, G.C., L. Harris, and J.T. Chiweza (2020). 'Monetary Policy and Wealth Inequality in South Africa: Evidence from Tax Administrative Data'. WIDER Working Paper 2020/174. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2020/931-0

Bottan N, B. Hoffmann, and D. Vera-Cossio (2020). 'The Unequal Impact of the Coronavirus Pandemic: Evidence from Seventeen Developing Countries'. *PLOS ONE*, 15(10): e0239797. https://doi.org/10.1371/journal.pone.0239797

Boschini, A., K. Gunnarsson, and J. Roine (2020). 'Women in Top Incomes: Evidence from Sweden 1971–2017'. *Journal of Public Economics*, 181: 104115. https://doi.org/10.1016/j.jpubeco.2019.104115

Burdín, G., F. Esponda, and A. Vigorito (2014). 'Inequality and Top Incomes in Uruguay: a Comparison Between Household Surveys and Income Tax Micro-data'. WID.world Working Paper Series 2014/1. Available at: https://wid.world/document/wid_working_paper_2014_1_uruguay/ (accessed 11 January 2023).

Burkhauser, R.V., S. Feng, S.P. Jenkins, and J. Larrimore (2012). 'Recent Trends in Top Income Shares in the United States: Reconciling Estimates from March CPS and IRS Tax Return Data'. *Review of Economics and Statistics*, 94(2): 371–88. https://doi.org/10.1162/REST_a_00200

Burkhauser, R.V., N Hérault, S.P. Jenkins, and R. Wilkins (2018). 'Top Incomes and Inequality in the UK: Reconciling Estimates from Household Survey and Tax Return Data'. *Oxford Economic Papers*, 70(2): 301–26. https://doi.org/10.1093/oep/gpx041

Chatterjee, A., L. Czajka, and A. Gethin (2021). 'Can Redistribution Keep Up with Inequality? Evidence from South Africa 1993-2019'. World Inequality Lab Working Paper 2021/20. Available at: https://wid.world/document/can-redistribution-keep-up-with-inequality-evidence-from-south-africa-1993-2019-world-inequality-lab-wp2021-20/ (accessed 11 January 2023).

Clark, A.E., C. D'Ambrosio, and A. Lepinteur (2021). 'The Fall in Income Inequality During COVID-19 in Four European Countries'. *Journal of Economic Inequality*, 19: 489–507. https://doi.org/10.1007/s10888-021-09499-2

De Rosa, M., and J. Vilá (2017). 'Distributional National Accounts for Uruguay 2009-2014: Fallin Inequality Through the Lens of DINA'. Available at: http://wordpress.wid.world/wp-content/uploads/2017/12/063-DINA-Uruguay-slides.pdf

Fairfield, T., and M. Jorratt De Luis (2016). 'Top Income Shares, Business Profits, and Effective Tax Rates in Contemporary Chile'. *Review of Income and Wealth*, 62(1): S120–S144. https://doi.org/10.1111/roiw.12196

Flores, I., C. Sanhueza, J. Atria, and R. Mayer (2019). 'Top Incomes in Chile: A Historical Perspective on Income Inequality'. 1964–2017. *Review of Income and Wealth*, 66(4): 850–74. https://doi.org/10.1111/roiw.12441

INEC (2022). 'National Survey of Employment, Unemployment and Underemployment (ENEMDU)'. Available at: https://www.ecuadorencifras.gob.ec/estadisticas-laborales-noviembre-2022-2/ (accessed 4 October 2022).

Jara, H.X., L. Montesdeoca, and I. Tasseva (2021). 'The Role of Automatic Stabilizers and Emergency Tax–Benefit Policies During the COVID-19 Pandemic: Evidence from Ecuador'. *European Journal of Development Research*, 34: 2787–809. https://doi.org/10.1057/s41287-021-00490-1

Jara, H.X., and C. Varela (2019). 'Tax-benefit Microsimulation and Income Redistribution in Ecuador'. *International Journal of Microsimulation*, 12(1): 52–82. https://doi.org/10.34196/IJM.00194

Jouste, M., T. Kaidu Barugahara, J.Okello Ayo, J. Pirttilä, and P. Rattenhuber (2021). 'The Effects of Personal Income Tax Reform on Employees' Taxable Income in Uganda'. WIDER Working Paper 2021/11. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2021/945-7

Lastunen, J., P. Rattenhuber, K. Adu-Ababio, K. Gasior, H.X. Jara, M. Jouste, D. McLennan, E. Nichelatti, R.C. Oliveira, J. Pirttilä, M. Richiardi, and G. Wright (2021). 'The Mitigating Role of Tax and Benefit Rescue Packages for Poverty and Inequality in Africa Amid the Covid-19 Pandemic'. WIDER Working Paper 2021/148. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2021/088-7

López, R., E. Figueroa, and P. Gutiérrez (2013). 'La "parte del león": Nuevas estimaciones de la participación de los súper ricos en el ingreso de Chile'. Serie Documentos de Trabajo, 379:1–32. Santiago: Universidad de Chile.

Lustig, N., V.M. Pabon, F. Sanz, and S.D. Younger (2021). 'The Impact of COVID-19 and Expanded Social Assistance on Inequality and Poverty in Argentina, Brazil, Colombia and Mexico'. CEQ Working Paper 92. New Orleans, LA: Department of Economics, Tulane University.

Morgan, M. (2017). 'Falling Inequality beneath Extreme and Persistent Concentration: New Evidence for Brazil Combining National Accounts, Surveys and Fiscal Data, 2001-2015'. WID.world Working Paper Series 2017/1212. Available at: https://wid.world/document/extreme-persistent-inequality-new-evidence-brazil-combining-national-accounts-surveys-fiscal-data-2001-2015-wid-world-working-paper-201712/ (accessed 11 January 2023).

Oliva, N., H.X. Jara, and P. Rattenhuber (2021). 'What Explains The Gender Gap In Top Incomes In Developing Countries?: Evidence From Ecuador'. WIDER Working Paper 2021/109. Helsinki: UNU-WIDER. https://doi.org/10.35188/UNU-WIDER/2021/049-8

Piketty, T. (2001). *Les hauts revenus en France au 20ème siècle*. Paris: Grasset.

Piketty, T., and A. Atkinson (eds) (2007). *Top Incomes over the Twentieth Century: a Contrast between Continental European and English-Speaking Countries*. Oxford: Oxford University Press.

Piketty, T., and A.B. Atkinson (2010). *Top Incomes: A Global Perspective*. Oxford: Oxford University Press.

Ravaska, T. (2018). 'Top Incomes and Income Dynamics from a Gender Perspective: Evidence from Finland 1995–2012'. Working Paper 469. Palma di Mallorca: ECINEQ, Society for the Study of Economic Inequality. Available at: https://ideas.repec.org/p/inq/inqwps/ecineq2018-469.html (accessed 28 May 2021).

Souza, P. H., and M. Medeiros (2015). 'Top Income Shares and Inequality in Brazil, 1928-2012'. *Sociologies in Dialogue*, 1(1).

World Bank. (2022). 'World Bank Open Data'. Available at: https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?end=2021&locations=EC&most_recent_year_desc=true&start=2007 (accessed 4 October 2022).

Appendix

Table A1: Descriptive statistics (averages of each year)

	2019	2020	2021
Women	42.1%	39.3%	36.2%
Employment income only	82.6%	81.9%	82.3%
Self-employment income only	17.4%	18.1%	17.7%
Public sector	17.5%	17.8%	17.1%
Tertiary education	18.6%	19.9%	20.3%
Agriculture & fishing	5.4%	4.9%	4.5%
Mining, manufacture and utilities	11.2%	10.2%	9.4%
Wholesale and retail trade, hotels and restaurants	2.3%	1.8%	1.7%
Construction	15.7%	13.9%	12.6%
Transport and communication	5.1%	4.6%	4.1%
Financial intermediation, real estate, and professional services	6.2%	5.7%	5.3%
Public administration and defence, education, health and social work	18.8%	18.1%	16.9%
Other activities	35.4%	40.7%	45.5%
Mean number of observations per month	3,715,413	3,531,842	3,606,404

Source: authors' elaboration based on social security records.

Figure A1: Number of earners not affiliated to social security (2019–21)
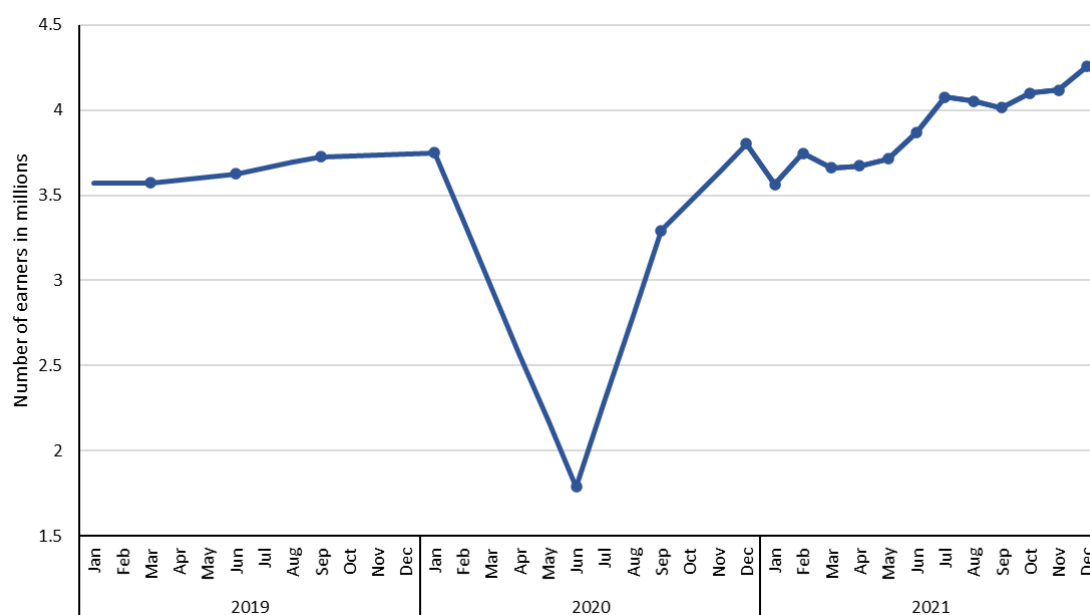
Source: author's elaboration based on ENEMDU.