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Closing Peru's Ethnic Gaps Amidst Sustained Economic Growth

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Prepared by Carlos Chavez, Gonzalo Salinas, and Yuri Zamora

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ABSTRACT: We analyze the recent evolution of ethnic economic inequality in Peru, a major source of social discontent in the country. Household survey data indicates that recent decades of high output growth also witnessed a substantial narrowing of socioeconomic gaps among ethnicities. Most notably, the *Mestizo* ethnic group surpassed the *White* group in income per capita, and *Native American* also experienced a relative improvement. Mincerian regression analysis suggests that the main contributors to these developments were rural-to-urban migration and increased education. Based on our statistical findings, we propose enhancing education and other public services, increasing government revenues, lowering informality, and promoting competition as the main public policies that could accelerate the ongoing narrowing of ethnic gaps.

Closing Peru's Ethnic Gaps Amidst Sustained Economic Growth

Prepared by Cesar Chavez, Gonzalo Salinas, and Yuri Zamora[1]

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Executive Summary

Peru's social stability has been frequently threatened by resentment over lingering economic ethnic gaps related to its European colonization, which started almost five hundred years ago. The discontent narrative broadly denounces that colonizers, instead of engaging in peaceful welfare-enhancing trade with the established Native American population, violently settled in the Andes, largely tore down its civilization, and seized its most important production factors, leaving behind substantial economic gaps between Peruvians of European and Native American origins. While Peru has experienced substantial economic growth and poverty reduction in recent decades, it is also important that ethnic gaps narrow, else, political support for the macroeconomically prudent policies that have sustained its economic dynamism in recent decades could weaken.

Based on an annual series of National Household Surveys (Peru's ENAHOs), this paper analyzes the recent evolution of economic gaps among the country's three largest ethnic groups (*White*, *Mestizo*, and *Native American*). The analysis concludes that the past two decades have fortunately seen a substantial narrowing of ethnic economic inequalities. In fact, the *Mestizo* ethnic group has surpassed the *White* group in income/expenditure per capita. The paper finds that the *Mestizo* progress mainly resulted from its rural-to-urban migration and more years of schooling. The *Native American* population also experienced a narrowing of its gap relative to *White*, albeit at a slower pace than *Mestizo* partly because of it slower rural-to-urban migration. And the very top of the wealth distribution has a modest but growing presence of the non-*White* group.

Based on our statistical findings, we suggest public policy action in four areas that can accelerate ongoing narrowing of ethnic gaps: expansion of public services, government revenue mobilization, reduction of informality, and enhanced market competition. This could more rapidly allow the country to move on from its historic ethnic related animosities and to fully take advantage of its precious ethnic diversity asset.

I.   Introduction

Five hundred years after the European colonization of the American continent, there is still significant discontent about the socioeconomic situation of its indigenous populations.[1] As baldly stated by Peruvian writer Mario Vargas Llosa in his Nobel Prize acceptance speech, "the emancipation of indigenous people...remains a pending issue in all of Latin America. There is not a single exception to this disgrace and shame." Manifestations of this discontent are particularly frequent in Bolivia and Ecuador, including during their 2019 episodes of major social unrest.

Interestingly, Peru escaped the wave of protests in Latin America that year despite it being one of the countries with the largest populations of *Native American* roots and where the social discontent narrative still dwells on the violent colonization of the Andes and its socioeconomic legacy. One common explanation for the absence of major uprisings in Peru is its remarkable economic growth following structural reforms in the 1990s. However, some of these reforms such as trade liberalization and divestment of State-Owned Enterprises (SOEs)[2] potentially had strong distributional effects and it is not clear, a priori, how they affected ethnic inequality.

Noting that a surge of ethnic-based discontent could fuel populism and weaken political support for the macroeconomically prudent policies that sustain Peru's growth, this paper analyzes the recent evolution of economic gaps among the country's three largest ethnic groups (*White*, *Mestizo*, and *Native American*).[3] We find that the past two decades of trade openness, macroeconomic stability, and high economic growth have also seen a substantial narrowing of ethnic economic inequalities. In fact, according to household survey data the *Mestizo* ethnic group has surpassed the *White* group in income/expenditure per capita. Econometric analysis suggests that the *Mestizo* progress mainly resulted from its rural-to-urban migration and related increase in education. The *Native American* population has also seen a narrowing of its gap relative to *White*, although at a slower pace than *Mestizo* partly because of a lower rural-to-urban migration rate. The very top of the wealth distribution has a modest, albeit growing presence of the non-*White* group.

The rest of our paper is organized as follows. Section II briefly describes the roots of ethnic economic inequality in Peru and its associated social discontent. Section III describes the state of

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[1]   Akee and others (2019), Fryer (2011), and Keister and Moller (2000) studied the drivers of inequalities in Latin America and the United States, finding that ethnicity matters for economic and social outcomes.

[2]   Werner and Santos (2015) provide a quantitative identification of the main factors that contributed to sustained high economic growth in Peru.

[3]   *Mestizo* refers to people of mixed *White* and *Native American* ethnicity. Other ethnic groups include Afro-Peruvians and Asian-Peruvians, both adding up to about 3 percent of the population.

postcolonial ethnic economic inequality at the start of the 21st century noting that it remained large despite several decades of rural-to-urban migration of the non-*White* population. Section IV assesses the socioeconomic evolution of ethnic groups in recent decades, while section V identifies statistically the factors behind it. Based on this analysis, Section VI discusses policy reforms that could accelerate the narrowing of postcolonial gaps, and Section VII presents our conclusions.

II. Background to Lingering Postcolonial Discontent

An evident resentment still pervades Peru from the European colonization period and its socioeconomic legacy. The discontent narrative broadly denounces that colonizers, instead of engaging in peaceful trade with the established *Native American* population (and thus transfer technology from the large Eurasian landmass), violently settled in the Andes, largely tore down its civilization, and seized its most important production factors.[4,5] Through centuries, colonizers and their descendants practically monopolized the ownership of the country's main natural resources (mineral wealth and most productive agricultural lands), subjugated and enslaved large segments of the *Native American* labor force, thwarted their human capital formation by depriving them of basic public services, and heavily taxed their economic activities.[6]

Social discontent has been aggravated because this exclusion of the majority of the population from the returns of the country's production factors stood in stark contrast with the markedly communitarian and distributive framework under Inca rule, which notably used the riches of the land to provide education, infrastructure, and food support across its empire.[7] In contrast, by the

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[4] Galeano (1973) and Arana (2019) are two among countless accounts and analyses of the European colonization of America and its economic legacy.

[5] The potential for peaceful welfare-enhancing trade between the *Native American* and European civilizations is evident in a fascinating recount in De la Vega (1915 [1609]) in which a member of the Inca governing caste, marveled at the usefulness of scissors, mirrors, and combs, and said that the Incas would have been more than willing to exchange gold and silver for these manufactured objects from Eurasia.

[6] This violent colonization of American territories indeed could be contrasted to more peaceful interactions among human civilizations even in those earlier centuries, such as Chinese expeditions around the Indian Ocean in the early 15th century (Dreyer, 2006; Levanthes, 1994) or the expansion of the Inca Empire, which notably relied on welfare-enhancing trade and political alliances (Rostworowski, 1999). As archeologist Dago Cooper (curator of the Americas of the British Museum) suggests, the Incas "became a commanding empire not through force, but by using the subtle methods of persuasion": doi: https://www.bbc.co.uk/programmes/b04xdpjy. For sure, chroniclers also documented and commented on extremely violent practices during Inca rule, especially against rebellions, in line with similar practices in other world civilizations at that time.

[7] The distributive nature of the Inca empire is highlighted by several studies from early 16th century chroniclers (for example, Cieza de Leon, 1883 [1553]) to latest comprehensive treaties on the empire (for example, Rostworowski 1999).

early 20th century, most *Native Americans* lived isolated from the material benefits of civilization and globalization in the central and southern Andes, a region that was pejoratively referred to in Peru as *la Mancha India* (the Indian Stain).

When in the 20th century indigenous Peruvians migrated to the cities in large numbers to seek the prosperity that they were deprived from in unproductive rural areas, they had to thrive informally, as described in De Soto (1986).[8] In the cities, migrants had to operate within a racist social fabric and outside the urban institutional framework, which did not clearly recognize their historical right to land and public services until recent decades. This imposed practically unsurmountable obstacles to their incorporation to the formal economy.

This postcolonial legacy of ethnic-based economic exclusion can be contrasted nowadays to the more ethnically homogenous and economically equal East Asian nations. The populations of those countries do not significantly include descendants of colonizers from other continents, and they largely absorbed European technology through trade. A provocative thought is whether the more equal economic development of the East Asian population could be considered as the counterfactual scenario of economic development of the indigenous population of the American continent in the absence of a European colonization.

The social discontent associated with the Peruvian colonial legacy prompted a long-demanded but highly disruptive land redistribution in 1969, as well as a terrorist subversion proposing a communist solution to these historical inequities. This subversion, in fact, originated in the regions of the so-called *Mancha India*.

While 21st century Peru is a highly ethnically blended country in which its citizens cannot surely claim belonging to only *White* or only *Native American* ethnicity, it is commonly denounced that explicit "ethnic rankings" officially established during colonial times (by which citizens with stronger European roots enjoyed higher privileges) are now implicit and still markedly discriminatory. And although colonization occurred half a millennium ago, its socioeconomic outcome has perdured until recently as we show in the following section.

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[8]   Peru's high migration has been largely motivated by search for higher incomes and access to public services, as recently statistically established in Huarancca and others (2020).

III. Ethnic Inequalities at the Start of the Century

Postcolonial economic gaps were still notable by the early 21st century although it is most likely that they narrowed during the 20th century as the rural *Native American* and *Mestizo* population increasingly migrated to urban areas. As we see in histograms of income distribution in 2004-06 (based on National Household Survey (NHS) data, Figure 1), the distribution of the *White* group was above (more rightwards of) the distribution of the *Mestizo* population and the *Mestizo* distribution was above the distribution of the *Native American* population, clearly illustrating the postcolonial pattern of ethnic income inequality. [9] [10]

Figure 1. Distribution of Labor Income per Capita by Ethnicity
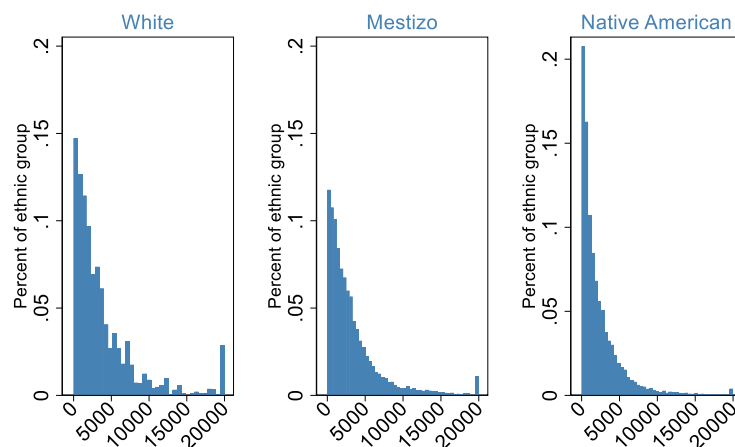
Source: National Institute of Statistics and Informatics and author's estimates
All labor income higher than 20k are considered as 20k.

Practically all the *Native American* ethnic group had incomes below 10,000 Nuevos Soles (local currency units, LCU) per year and was excluded from the top income segment (those with average income per capita above 20,000 LCU per year, aggregated in one bar in the histogram above). The *Mestizo* population had a lower share of it with income below 10,000 LCU than *Native American*

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[9] Ethnic categories in household surveys are based on self-identification questions. Charts in Annex II describe that this categorization is significantly correlated with National Censuses categorizations based on self-identification and native language. The analysis presented in the main text of the paper focuses on monetary income from individuals' principal and secondary economic activities. Figures in Annexes III and IV present similarly analysis based on total income (including transfers and nonmonetary income) and monetary expenditure, respectively. In Annex V presents the same line of analysis based on labor income and excluding zero-income observations. The main conclusions of this paper are robust across all these indicators.

[10] Annex VI presents histograms of labor income by gender.

but was also largely excluded from the top income segment. The *White* group had a much higher share of it in the top income segment and a much lower share in the lowest segments than the other two ethnic groups.

In a cumulative income distribution for 2004-06 (Figure 2) we see that almost 90 percent of *Native American* had an income per capita below 5,000 LCUs. This is a much higher share than the 75 percent of *White*. The share of *Mestizo* population below average income was closer that of *White* than of *Native American*, likely reflecting the more urban location of *Mestizo*.

Figure 2. Cumulative Distribution of Labor Income (2004-06)

Source: National Institute of Statistics and Informatics and author's estimates.

Similar expenditure distribution patterns across ethnic groups (seen in figures in Annex IV) are also reflected in the ethnic differences on headcount poverty measures. Two-thirds of the *Native American* population was still poor at the start of the 21st century (Figure 3). One quarter of it was extremely poor. The *White* group, on the other hand, had a headcount poverty rate about half of that of *Native American* and its share of extreme poverty was about a quarter of the share of *Native American*. *Mestizo* population had a poverty rate closer to that of *Native American* and its share of extreme poverty was closer to that of *White*. Because extreme poverty is most prevalent in the rural areas, the higher share of *Native American* living in rural areas likely explains their higher extreme poverty rate.

Figure 3. Poverty Rates 2004-06

(Percent)

Source: National Institute of Statistics and Informatics and author's estimates.

Many factors possibly explain these different income distributions and poverty rates including rural versus urban location, school attainment, illiteracy rates, and informality.[11] In 2004-06,

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[11] Informal workers are indirectly identified as those individuals that not to have a formal employment contract.

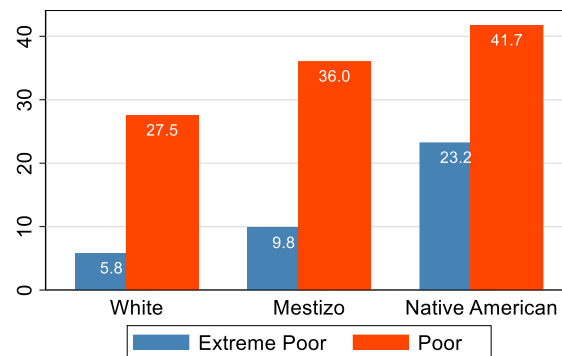almost 40 percent of the *Native American* population lived in the poorer rural areas while only 15 percent of the *White* group lived in those areas (Figure 4). Schooling and literacy had a similar pattern across ethnic groups as most schools are in urban areas. *Native American* had an average of only five years of schooling, considerably below the schooling of both *Mestizo* and *White*.[12]

Figure 4. Selected Socioeconomic Indicators 2004-06
(Percent)

Source: National Institute of Statistics and Informatics and author's estimates.
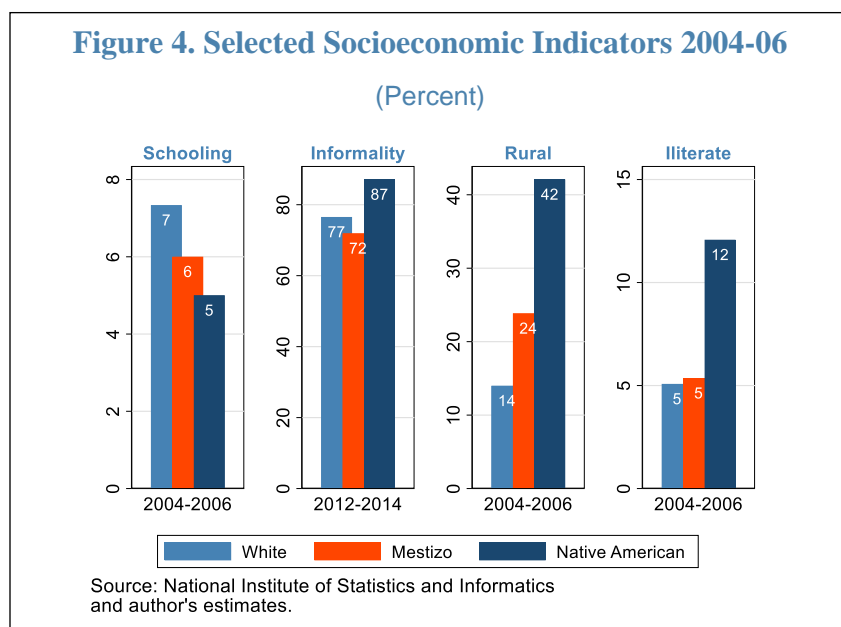
Even though *Mestizo* had less schooling than *White*, illiteracy of both ethnicities was broadly the same, while *Native American* had substantially higher illiteracy. This may also be related to the higher share of *Native American* living in rural areas. Informality, as expected, was much higher among *Native American* but, surprisingly, *Mestizo* had a slightly lower level of informality than *White*.

IV. Ethnic Inequalities During the Growth Miracle

In 2004, at the start of the period under analysis, it was not clear what would be the future evolution of ethnic-related or overall economic inequality. The then recent shift away from the Import Substitution Industrialization (ISI) model was expected to have a major effect on future income distribution dynamics. From a pessimistic point of view, liberating imports that competed with local labor-intensive agriculture and manufacturing could have generated widespread

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[12] Besides gaps in years of schooling, most likely there were significant gaps on quality of education among ethnic groups, which should likely also explain income gaps. Unfortunately, we did not find appropriate education quality access indicators for our period of analysis to statistically test this hypothesis.

unemployment among lower income segments, while the opening of mining to Foreign Direct Investment (FDI) could have had *Dutch disease* effects on more labor-intensive sectors.[13] The elimination of SOEs that provided subsidized services could have similarly enhanced inequality. On the other hand, proponents of the dismantling of ISI hoped that Peru's comparative advantages in other labor-intensive sectors (agriculture, fisheries, textiles, and so on) would increase employment and pointed out that state-provided services by loss-making SOEs did not reach the poorest.

A positive outcome could have also been expected from the analysis on informality in De Soto (1986). Contradicting suggestions that political and economic liberalism perpetuated postcolonial inequities, he highlighted the vibrant entrepreneurship of rural migrants and concluded that a more liberal economic framework would be their main route to prosperity and to the narrowing of inequality. In contrast, he considered the ISI economic framework as mercantilist, benefiting rent seekers among the country's elite instead of the poor.[14] This reasoning implied that the seismic move to a more market-oriented economy in the 1990s stood a higher chance of erasing postcolonial inequities.

Although it goes beyond the scope of this paper to establish the validity of all these hypotheses, household survey data does reject doomsday predictions of widening inequality. During the last two decades, the narrowing of postcolonial economic ethnic gaps has been as impressive as the high overall economic growth and poverty reduction that the country experienced (Figure 5).

Judging by the evolution of several measures of income/expenditure per capita, the *Mestizo* ethnic group has thrived during the Peruvian economic miracle. Its average labor income per capita has surpassed that of *White* (Figure 5), as well as its per capita total income, monetary expenditure, and labor income excluding zeroes (see charts in Annexes III-V). This development is a historical turning point and strongly suggests that postcolonial gaps can be erased under the same democratic and market-oriented economic system that has sustained high economic growth.

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[13] *A priori*, the effect of trade liberalization on economic inequality is not clear. As discussed in Pavcnik (2017), the impact is context specific and "[depends] on the nature of changes in trade policy patterns and the mechanisms involved; on the mobility of workers and capital across firms, industries and geographic locations; and on the position of affected individuals in the income distribution of a country."

[14] In other words, this line of argument states that ISI was far from the social justice alternative envisioned by its proponents but an instrument of the governing descendants of the colonizers to benefit through rent seeking from interventionist policies (import protection, licensing, subsidized credit, public sector employment, price discrimination, among others) that were ultimately financed by taxpayers and consumers including from the *Native American* majority. All this would imply that the shift away from ISI after the 1980s likely allowed for a narrowing of postcolonial inequality.

Figure 5. Average Labor Income per Capita

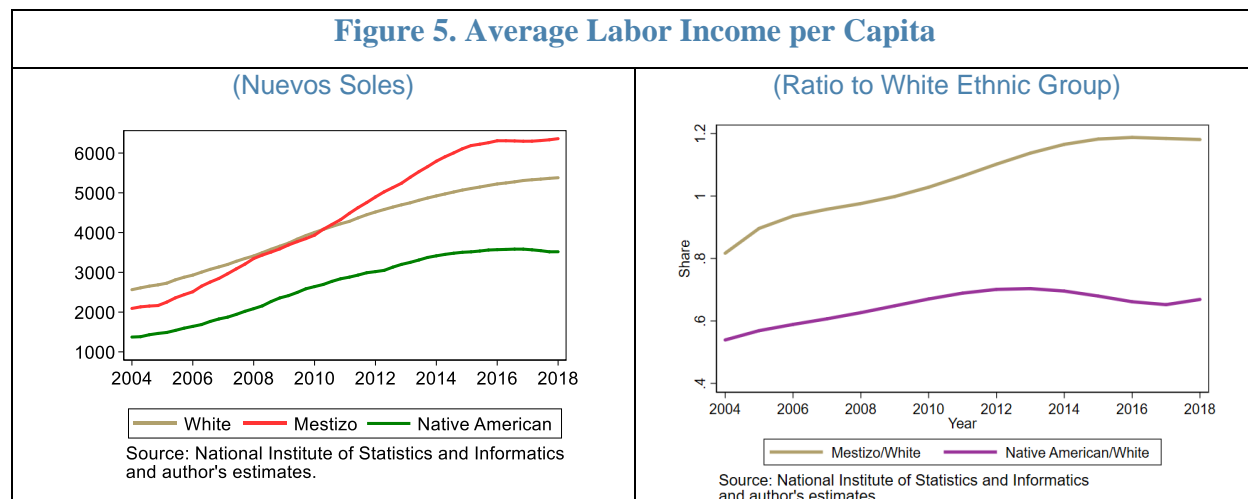| (Nuevos Soles)	(Ratio to White Ethnic Group)

Source: National Institute of Statistics and Informatics and author's estimates.

Source: National Institute of Statistics and Informatics and author's estimates.

Also encouraging is that the *Native American* population has prospered in the past two decades and is closing its gap relative to *White*, although at a much slower pace than *Mestizo*. There appears to be, however, a recent stagnation in average labor income per capita of *Native American* in 2016-18 but their average total income (Figures in Annex III) and labor income excluding zeroes (figures in Annex V A.4) continued to grow in those years.[15] If we extrapolate the pace of gap-narrowing of income between 2004 and 2018 to the future, it will be by the mid-2040s (within a generation) when *Native American* will reach the average income of *White*.[16]

This slower narrowing of the *Native American* income gap seems to be partly related to its slower migration out of rural areas, as its income gap in urban areas narrowed much faster (Figure 6). After having an average income 40 percent lower than *White* in 2004, by 2018 its income was 20 percent lower. And note that the average

Figure 6. Average Labor Income per Capita in Urban Areas (Nuevos Soles)

Source: National Institute of Statistics and Informatics and author's estimates.
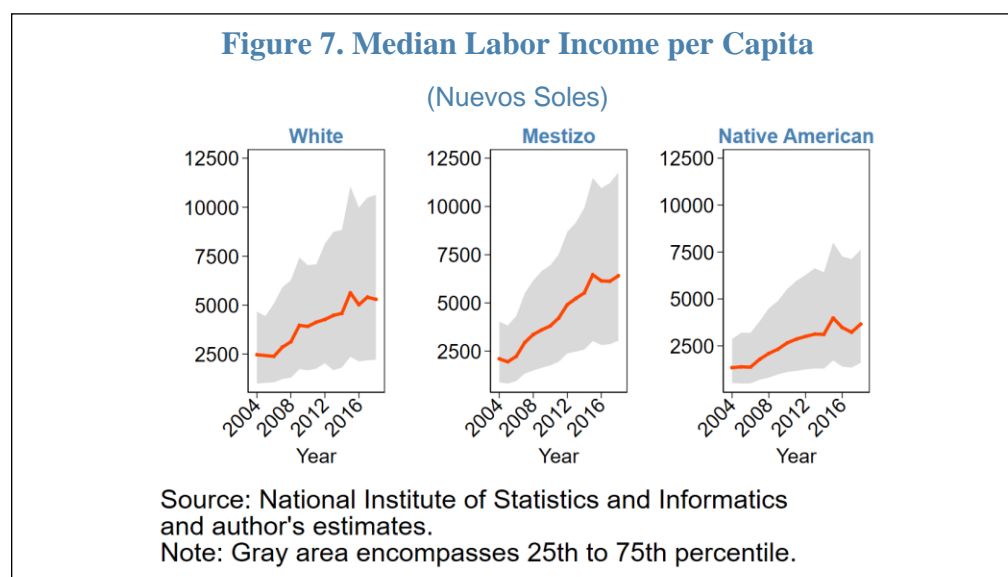
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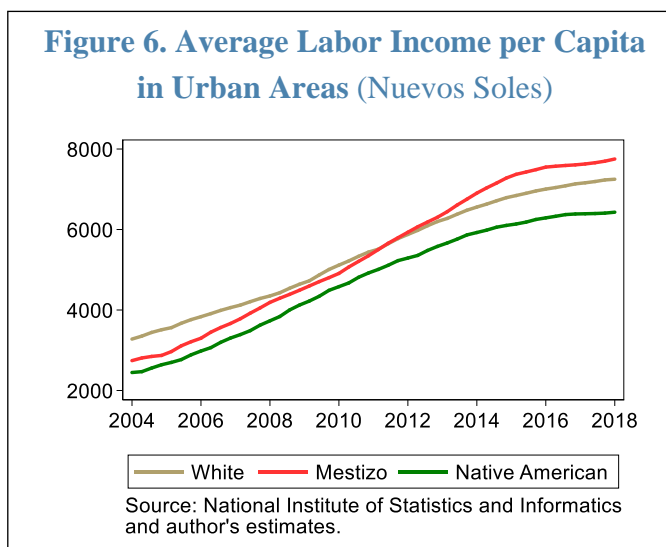
[15] There is a noteworthy reduction in the share of *Native American* in the total population. This change may respond to changes in sampling, an increase in ethnic mixture, or subjective changes in self-identification, and requires deeper analysis.

[16] Noteworthy also, the *Afro-Peruvian* has seen as similar reduction in income gap relative to *White*.

income of *Native American* in urban areas did not as significantly stagnate in 2016-18 as was the case for the entire ethnic group.[17]

Charts showing the evolution of the median and the 25th-75th percentile range of the labor income distribution by ethnic group confirm that the narrowing of gaps described above is not just a development of the averages but of the entire distributions (Figure 7). Comparing income histograms by ethnicity in 2016-18 to those in 2004-06 also provides a more comprehensive view of the narrowing of gaps evidenced in the averages (Figure 8). In 2016-18, the share of *Mestizo* with income above 20,000 LCU was slightly superior to the share of *White*. And while the share of *Native American* above this income line is considerably lower than shares of the other two ethnic groups, the difference relative to *White* has considerably narrowed.

Figure 7. Median Labor Income per Capita

(Nuevos Soles)

Source: National Institute of Statistics and Informatics and author's estimates.
Note: Gray area encompasses 25th to 75th percentile.

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[17] It is also plausible that the average income of Native American may be underestimated because some rural-to-urban migrants change their self-identification to Mestizo.

Figure 8. Distribution of Labor Income per Capita

by Ethnicity 2016-18
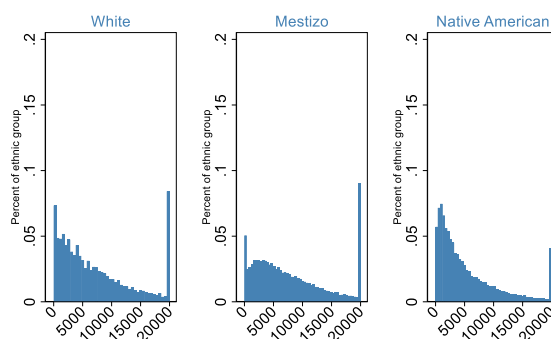
Source: National Institute of Statistics and Informatics and author's estimates
All labor income higher than 20k are considered as 20k.

Cumulative income distributions in 2016-18 indicate that the *Mestizo* income surpassed *White* mainly in the lower income range (Figure 9). While both ethnicities had a similar share of their population in the range above 15,000 LCU, *Mestizo* had a lower share of its population below 5,000 LCU than *White*. *Native American* still had a much higher share of its population below 5,000 LCU than the other two ethnicities, but its share came down by about 25 percentage points between 2004-06 and 2016-18.

Figure 9. Cumulative Distribution of Labor Income 2016-18
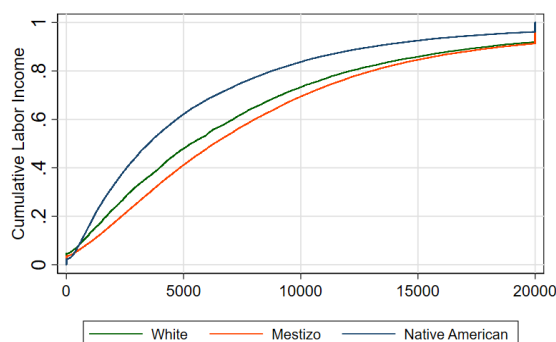
Source: National Institute of Statistics and Informatics and author's estimates.

Average expenditures by ethnicity narrowed as much as incomes (as seen in figures in Annex IV) and this is reflected in the evolution of headcount poverty by ethnic groups (Figure 10). Poverty of both *Native American* and *Mestizo* declined by about 15 percentage points, while poverty of *White* declined by 8 percentage points. Extreme poverty of *Native American*, which was much higher than that of the other two ethnic groups by the start of the century, came down by 7 percentage points, the highest decline among the three groups.

The narrowing of income/expenditure gaps among ethnic groups is consistent with the fall in standard measures of overall expenditure inequality (Figure 11). Between 2003 and 2017, all expenditure quintiles except the top one increased their share of total expenditure. In fact, during that period the lowest two quintiles experienced the highest expenditure growth while the top quintile saw a decline in its share of total expenditure. Despite this decline, the top quintile still has a much higher share than other quintiles (about 50 percent).

Figure 10. Poverty Rates 2016-18

(Percent)
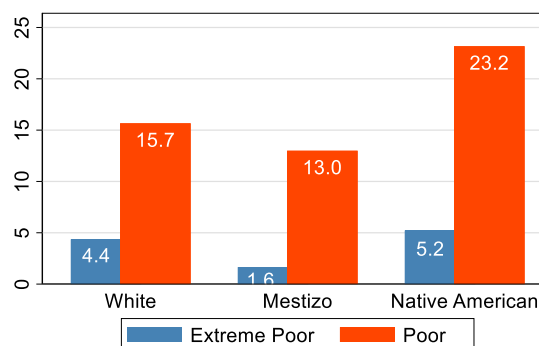
Source: National Institute of Statistics and Informatics and author's estimates.

Figure 11. Evolution of Expenditure by Quintiles

Change in expenditure share by quintiles in Peru over time

Source: IMF FAD Social Protection & Labor - Assessment Tool (SPL-AT)

Expenditure share by quintiles in Peru Index

Source: IMF FAD Social Protection & Labor - Assessment Tool (SPL-AT)
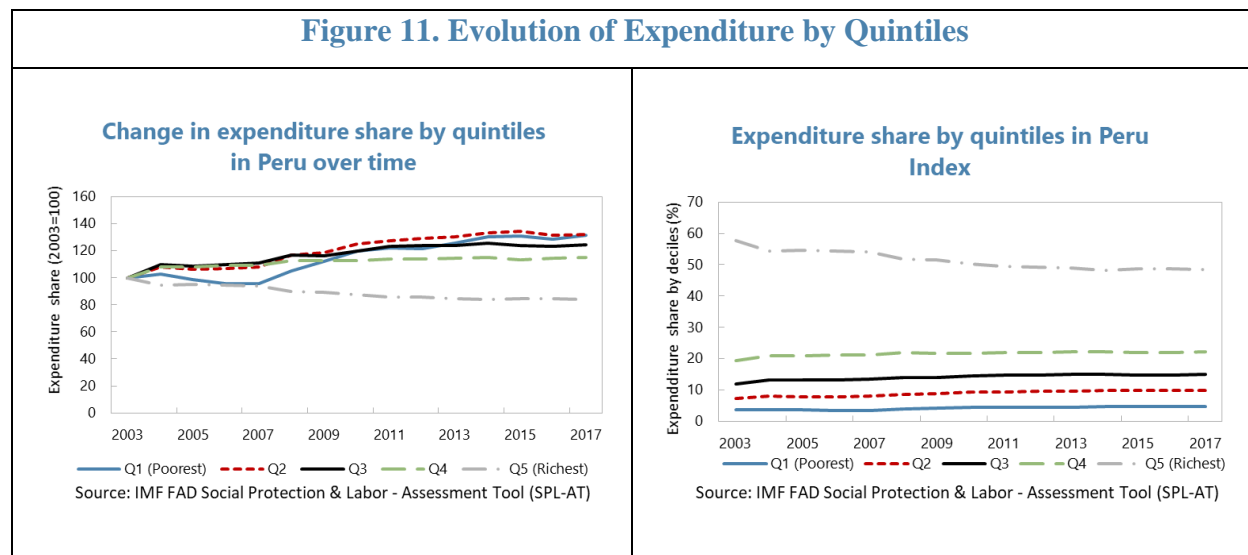
This evolution in expenditure by quintiles is reflected in a significant decline in the Gini coefficient between 2006 and 2016, from 0.48 to 0.42 (Figure 12). As a result, Peru has a Gini coefficient that is more significantly below the median for Latin American and the Caribbean countries. Nonetheless, Peru's Gini is above the average for emerging market economies, particularly those in East Asia, such as South Korea. The need to further narrow inequality is evident if we consider that the Gini of Peru is not very different from the Gini of Chile, one of the countries that saw most significant social turmoil in 2019 largely due to discontent on income inequality.

Figure 12. Gini Inequality Indicators

Peru FAD Gini Coefficient, 2016 vs 2006

Source: IMF FAD Social Protection & Labor - Assessment Tool (SPL-AT)

Inequality/Distributional Indicators context: Peru and comparators, Most Recent Available Year

Source: IMF FAD Social Protection & Labor - Assessment Tool (SPL-AT)
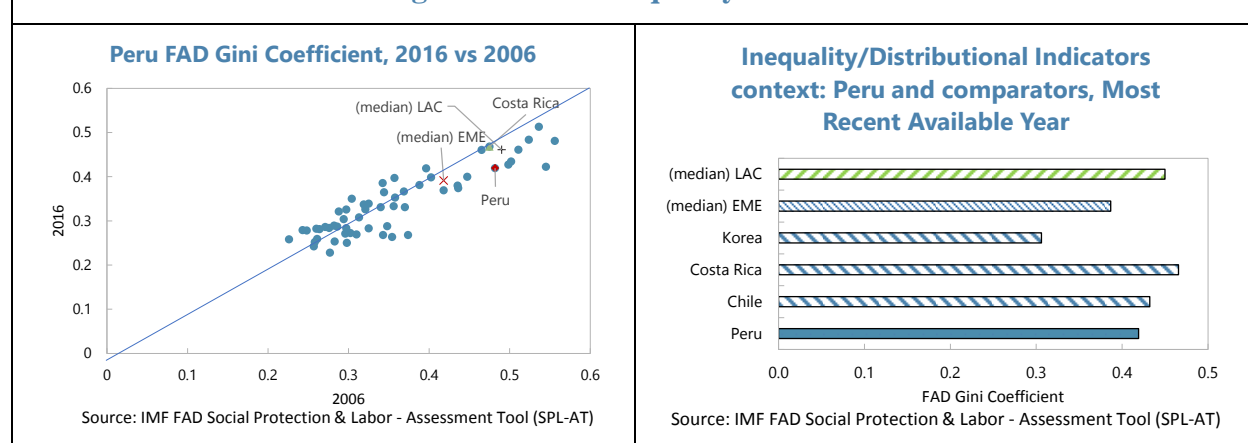
While household survey data indicates that the postcolonial economic pattern of ethnic related inequality is substantially disappearing for most of the population, slower changes are seen yet in the highest wealth echelons, which are very influential from a political economy perspective. The upper end of the income distribution is commonly underrepresented in household surveys so we look for other sources that can help gauge ethnic composition of that segment. A listing of the top Peruvian families by 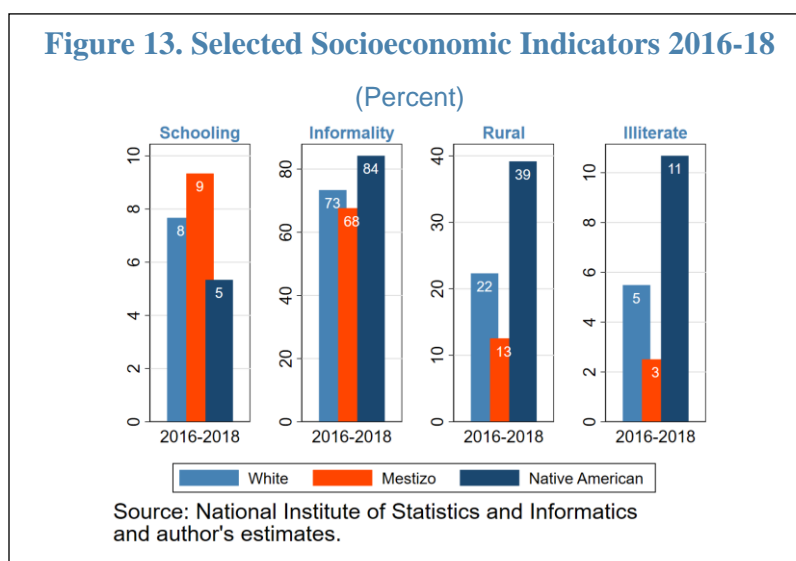wealth (Linares, 2019) indicates that only three out of the 17 top families belong to *Mestizo* and the rest belong to *White*. Nonetheless, the last decades have seen the emergence of several *Mestizo* and *Native American* family groups that may not have reached yet the top 17 families, but their ascendance suggests that it is just a matter of time before the ethnic composition at the very top becomes ethnically diverse.

Further presence of non-*White* at the very top would be a welcomed development to secure political stability because historically it has been alleged that the fortunes of the *White* ethnic group were largely inherited and/or unfairly favored by a postcolonial racist social fabric that facilitated their access to production factors. There is also discontent because a *White*-only elite may not feel identified with the non-*White* majority and therefore may not be as prone to favor strong social policies. Evidence from other countries supports these fears of such ethnic tribalism.[18]

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[18] For example, Alesina and others (2001), Luttmer (2001), Gilens (1999), find that voters tend to oppose transfers away from their own ethnic group.

V. Drivers of Equalization

The substantial equalization of income among ethnic groups is likely related to a significant narrowing of gaps in several factors that are commonly associated with income outcomes (Figure 13). One of them can be rural-to-urban migration. Partly due to agglomeration effects, workers in urban areas tend to have structurally higher income than those in rural areas, and *Mestizo* has been the ethnic group that has most significantly migrated to urban areas between 2004-06 and 2016-18. Rural-to-urban migration of *Native American* was much less significant.[19]

Figure 13. Selected Socioeconomic Indicators 2016-18
(Percent)

Source: National Institute of Statistics and Informatics and author's estimates.

Moving to urban areas crucially improves access to education services, and this is also likely a crucial factor why *Mestizo* has also seen the highest increases in school attainment since 2004-06. Notably, by 2016-18, *Mestizo* had surpassed *White* in years of schooling.[20] *Native American* has also seen substantial improvements in years of schooling and literacy rates but still considerably lags in these important indicators.

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[19] Although beyond the scope of this paper, we speculate that the higher rural-to-urban migration of *Mestizo* relative to *Native American* may be explained by *Mestizo*'s closer relation to the European culture dominant in urban areas, including language, knowledge, family ties, or even physical appearance.

[20] Unlike household surveys, the 2017 census (INEI, 2018) indicates equal educational attainment between *White* and *Mestizo* groups. This is also historically impressive. Moreover, the census confirms that illiteracy is lower for *Mestizo* than for *White*.

Informality gaps were largely unchanged between 2012-14 and 2016-18 but no strong conclusion about its contribution to income gap narrowing can be inferred from this shorter period. Regression analysis below provides stronger evidence about the negative effect of informality on income. Interestingly, according to ILO statistics that go back to the start of the century indicate that non-agricultural informal employment markedly came down from 90 to 60 percent (Figure 14).

Figure 14. Informality in Peru
(Percent)

Source: World Bank and author's estimates.
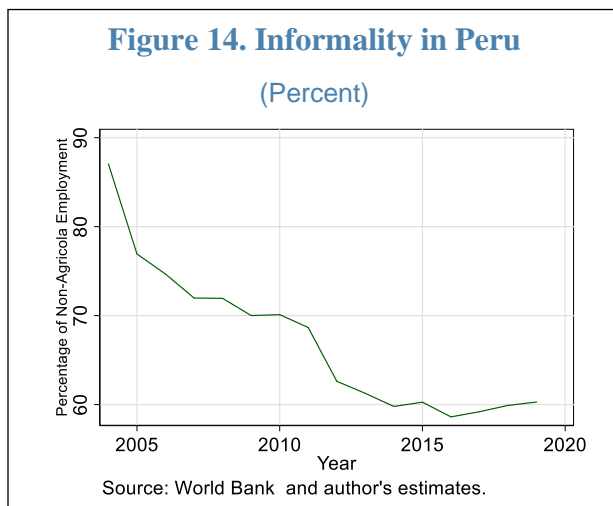
The road to progress of the *Mestizo* is more deeply understood from a sectoral perspective (Table 1). Between 2005 and 2018 the share of *Mestizo* population working in agriculture came down by about 15 percentage points and its share working in services increased by an equivalent amount during that period. This largely reflects the rural-to-urban migration of this ethnic group, as urban immigrants commonly engage in the informal supply of services. *Native American* also significantly shifted its occupations from agriculture to urban services but to a much lower degree than *Mestizo*.

Table 1. Share of Workers by Sector by Ethnicity
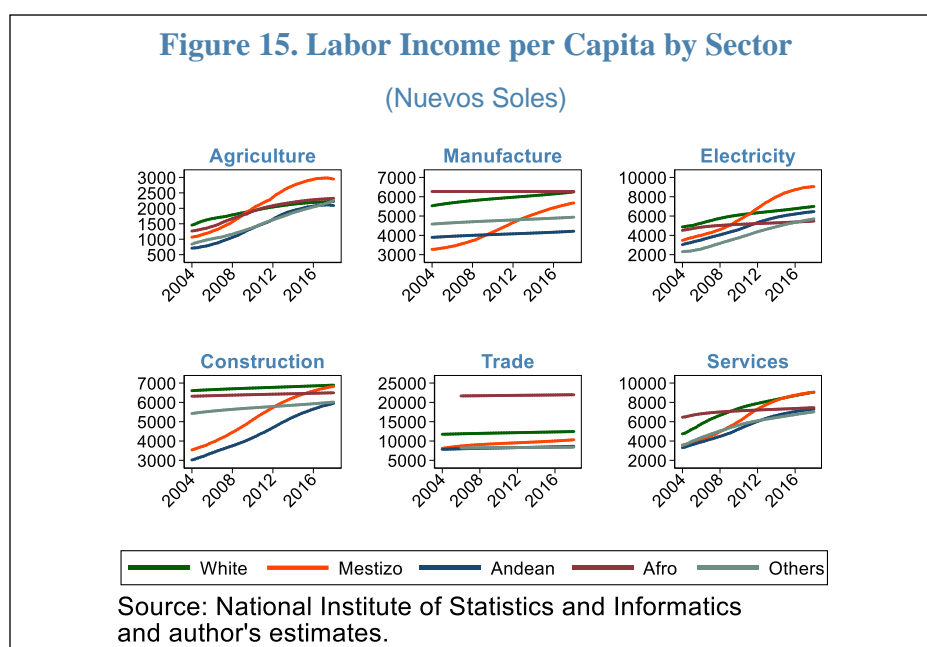(Percent)

Year	Sector	White	Mestizo	Native American	Afro	Others
2005	Agriculture	18.08	31.26	48.93	41.39	42.54
	Mining	0.35	0.72	0.2	0.35	0.66
	Manufacture	13.59	8.6	7.86	5.38	7.54
	Electricity	0.66	1.53	1.27	0.93	0.39
	Construction	0.15	0.28	0.11	0	0.84
	Trade	2.7	2.72	2.82	1.85	2.85
	Services	64.49	54.89	38.81	50.15	45.68
2018	Agriculture	26.29	16.8	42.47	37.1	25.11
	Mining	0.2	0.54	0.16	1.32	0.74
	Manufacture	8.56	9.37	7.25	8.85	8.64
	Electricity	0.9	1.11	0.74	0.75	0.47
	Construction	0.12	0.22	0.07	0.11	0.22
	Trade	4.17	5.4	4.21	4.61	6.96
	Services	59.76	66.55	45.1	47.26	57.87

Source: National Institute of Statistics and Informatics and author's estimates.

Despite significant rural-to-urban migration of both *Mestizo* and *Native American*, their share of population working in manufacturing did not experience a significant change even though this sector is largely urban. This may be explained by the fact that participation in this sector generally

requires a high level of education, which rural emigrants commonly do not have. Similarly interesting, *White* lowered the share of its population in manufacturing and increased it in agriculture. This may be a result of increasing well-paid jobs in agriculture production for exporting. This may also explain the growing income of agricultural workers of other ethnicities.

The much higher average income in urban services relative to agriculture provides a clear incentive for migration and *Mestizo* is the ethnicity that most significantly responded to this incentive. *Mestizo* also experienced faster income growth than other ethnicities within sectors (Figure 15). This implies that there are other factors besides sectoral composition that explain *Mestizo*'s superior performance. Its higher increase in educational attainment may be one such factor.

Figure 15. Labor Income per Capita by Sector

(Nuevos Soles)

Source: National Institute of Statistics and Informatics and author's estimates.

Econometric analyses based on Mincerian earnings functions for the period 2004-2018 provide further evidence that migration and increased education attainment significantly explain the narrowing of ethnic income gaps. We perform a two-step growth contribution analysis to estimate the role of each Mincerian income determinant to income changes. First, we econometrically estimate the elasticity of income with respect to all income determinants by ethnic group, and then we multiply the change in the level of each income determinant between 2004 and 2018 by its correspondent elasticity.

We use OLS (Table 2) and GMM (Table 3) regressions to estimate these elasticities for each ethnic group.[21] GMM regressions account for potential endogeneity between income and years of schooling by instrumentalizing the latter variable through the years of schooling of the individual's father and family (see methodological description in Annex I). Both OLS and GMM results indicate coefficients with the theoretically expected signs and high statistical significance for practically all the variables included.[22]

Table 2. OLS Estimates of Mincerian Earnings Function (2004-18)

Dependent Variable: Log of Income Per Capita	White	Mestizo	Native American
Schooling	0.065***	0.061***	0.052***
Work Experience	0.002	0.000	0.012***
Work Experience^2	-0.000	0.000*	-0.000***
Male	0.024*	-0.007*	-0.018***
Sector	-0.004	-0.005***	-0.005***
Hours Worked	0.008***	0.006***	0.007***
Marital Status	0.077***	0.046***	-0.063***
Agriculture Sector	0.437***	0.458***	0.643***
Public Employment	0.136***	0.195***	0.236***
Without Contract	0.369***	0.306***	0.279***
Lima	0.329***	0.227***	0.229***
Rural	-0.300***	-0.261***	-0.338***
Year	0.061***	0.069***	0.075***
Constant	-115.201***	-130.589***	-142.998***
N	23350	321952	222642
adj. R-sq	0.418	0.402	0.424

Source: National Institute of Statistics and Informatics and author's estimates. *p<0.05, **p<0.01,***p<0.001. Pooled Cross-Sectional Regressions with OLS estimates using National Household Survey and considering Mincerian Earnings Function for White, Mestizo, and Native American. The dependent variable is the Labor Income Per Capita, and the standard error is robust.

Table 3. GMM Estimates of Mincerian Earnings Function (2004-18)

Dependent Variable: Log of Income Per Capita	White	Mestizo	Native American
Schooling	0.1039***	0.1083***	0.0969***
Work Experience	0.0168***	0.0131***	0.0289***
Work Experience^2	-0.0001***	-0.0001***	-0.0003***
Male	-0.0158	-0.0207***	-0.0533***
Sector	-0.0051	-0.0080***	-0.0045*
Hours Worked	0.0118***	0.0103***	0.0107***
Marital Status	-0.0669***	-0.0876***	-0.1122***
Agriculture Sector	0.0618	0.0933***	0.1489***
Public Employment	0.1387***	0.1661***	0.2386***
Without Contract	0.3027***	0.2374***	0.1648***
Lima	0.0303	0.1130***	0.2813***
Rural	-0.1619***	-0.1202***	-0.1221***
Year	0.0619***	0.0651***	0.0665***
Constant	-117.8222***	-124.4381***	-127.8294***
N	17550	243816	153986
Sargan-Hansen Test (p-value)	0.06	0.05	0.05

Source: National Institute of Statistics and Informatics and author's estimates. *p<0.05, **p<0.01,***p<0.001. IV-GMM regressions considering the years of schooling of father and average years of schooling of the household as Instrumental Variables based on Mincerian Earnings Function. The dependent variable is the Labor Income Per Capita, and the standard error is robust.

OLS point estimates suggest that an additional year of education is associated with 5-6 percent additional income. [23] GMM estimates corroborate the significance of education with higher coefficients. For parsimony we use OLS results in the analysis while keeping in mind that they may underestimate the impact of education relative to GMM.[24] Living in rural areas is associated

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[21] Regression specifications do not include mining royalties because data for this variable is only available for 2007-18. Including this variable does not significantly affect coefficients and statistical of other variables as seen in the of Annex VII.

[22] Work experience has negative and insignificant impact in some regressions but note that this variable is not a direct observation of the years of work experience of an individual but a subtraction of current age minus schooling years less six years. Such indirect estimate may weaken the estimation accuracy of its coefficient.

[23] The estimated OLS coefficient of education is broadly in line with estimated coefficients for a large number of countries presented in Montenegro and Patrinos (2014).

[24]   As suggested in Card (1995), when estimating a Mincerian model the estimated coefficients of schooling over income are higher under instrumental variables than under OLS, which is the case in our estimations.

with a 30-50 percent lower income than living in urban areas.[25] All regressions also include the year of observation as a time trend and its coefficient is positive and statistically significant, reflecting the trend growth of the Peruvian economy during this period.

We finalize the growth contribution analysis by multiplying the point estimates of each variable in the Mincerian regressions times the change in the average of the respective variable between 2004-06 and 2016-18 by ethnicity. Table 4 presents these products, highlighting in bold the highest values. In that table it is evident that increased years of schooling and changes in the variables related to migration (*Agriculture, Lima, Rural*) are the most significant contributors to the superlative progress of *Mestizo*.[26]

Increase in years of schooling has also been an important determinant of income growth of *Native American* but to a lower extent than *Mestizo*. And the lower migration of *Native American* results in a low estimated contribution of migration-related variables (*Agriculture*, *Rural*, *Lima*) to its income growth during this period.

The final row in Table 4 and Figure 16 indicate the predicted change in income for each ethnic group based on the model variables. The model-predicted change in

Table 4. Contribution to Change in Log of Income from 2004-06 to 2016-18

Variable	Native American	Mestizo	White
Years of Schooling	**0.03**	**0.09**	**0.02**
Work Exxperience	**0.08**	0.01	0.03
Gender	0.00	0.00	0.00
Zone	0.00	0.00	0.00
Sector	0.00	0.00	0.00
Hours Worked	-0.02	0.00	-0.02
Marital Status	0.00	0.00	0.00
Agriculture Sector	-0.03	**0.04**	-0.01
Public Employment	0.00	0.00	0.00
Without Contract	0.00	0.00	0.00
Lima	-0.01	**0.01**	-0.01
Rural	-0.02	**0.03**	-0.01
Predicted Total	0.04	0.20	-0.01

Source: National Household Survey and author's calculations.
Note: Based on OLS estimated coefficients of a Mincerian earnings function. Values highlighted in bold are those above 0.01 and based on statistically significant coefficients.

Figure 16. Contribution to Change in Labor Income per Capita from 2004-06 to 2016-18

Source: National Institute of Statistics and Informatics and author's estimates

Mestizo's income relative to *White's* is about 0.21, which is about 80 percent of the actual change

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in their relative incomes during this period. This indicates that the impressive overtake of the average income of *Mestizo* relative to *White* is largely explained by the Mincerian model, especially by the education and migration variables.

A central question in the analysis of ethnic income gaps that we have not touched upon yet is whether these gaps are related to ethnicity itself (likely to ethnic discrimination) rather than to factors correlated with ethnicity such as education and migration. A simple approach to identify the pure impact of ethnicity on income is to add ethnic-related dummy variables to the Mincerian regressions above. We add a *Race* dummy variable defined as one for *White* and zero for *Native American* (Table 5).

When the period of analysis is 2004-18, the estimated dummy coefficient implies that belonging to *White* as opposed to *Native American* has been associated with a 9 percent higher income. Put in different terms, belonging to *White* by itself has been equivalent to about one and a half years of additional education. Note that the effect implied by this coefficient is lower than the one estimated in Ñopo (2012) which, using an extension of the Blinder Oaxaca decomposition, finds that

Table 5. OLS Estimates of Mincerian Earnings Function Including Ethnicity Dummy

Dependent Variable: Log of Income Per Capita	White	Mestizo	Native American
Schooling	0.1039***	0.1083***	0.0969***
Work Experience	0.0168***	0.0131***	0.0289***
Work Experience^2	-0.0001***	-0.0001***	-0.0003***
Male	-0.0158	-0.0207***	-0.0533***
Sector	-0.0051	-0.0080***	-0.0045*
Hours Worked	0.0118***	0.0103***	0.0107***
Marital Status	-0.0669***	-0.0876***	-0.1122***
Agriculture Sector	0.0618	0.0933***	0.1489***
Public Employment	0.1387***	0.1661***	0.2386***
Without Contract	0.3027***	0.2374***	0.1648***
Lima	0.0303	0.1130***	0.2813***
Rural	-0.1619***	-0.1202***	-0.1221***
Year	0.0619***	0.0651***	0.0665***
Constant	-117.8222***	124.4381***	127.8294***
N	17550	243816	153986
Sargan-Hansen Test (p-value)	0.06	0.05	0.05

Source: National Institute of Statistics and Informatics and author's estimates. *p<0.05, **p<0.01,***p<0.001. IV-GMM regressions considering the years of schooling of father and average years of schooling of the household as Instrumental Variables based on Mincerian Earnings Function. The dependent variable is the Labor Income Per Capita, and the standard error is robust.

Table 6. OLS Estimates of Mincerian Earnings Function Including Informality Variable

Dependent Variable: Log of Income Per Capita	White and Native American	White	Native American
Schooling	0.04***	0.06***	0.04***
Work Experience	0.00***	-0.00	0.00***
Work Experience^2	-0.00***	-0.00	-0.00***
Male	0.01	0.04*	0.01
White (==1)	0.11***		
Sector	0.00	-0.01*	0.00
Hours Worked	0.08***	0.10***	0.08***
Marital Status	0.14***	0.19***	0.13***
Agriculture Sector	0.56***	0.49***	0.57***
Public Employment	0.06***	0.04	0.06***
Lima	0.59***	0.55***	0.58***
Rural	-0.46***	-0.48***	-0.46***
Informal Employment	-0.34***	-0.35***	-0.33***
Year	0.02***	0.04***	0.02***
Constant	-34.62***	-79.03***	-29.62***
N	98759	11353	87406
adj. R-sq	0.434	0.474	0.413

Source: National Institute of Statistics and Informatics and author's estimates. *p<0.05, **p<0.01,***p<0.001. Pooled Cross-Sectional Regressions with OLS estimates using National Households Survey and considering Mincerian Earnings Function on White and Native American, and including in the first column a dummy that is equal to 1 if the respondent is White and 0 if the respondent is Native American. The dependent variable is the Labor Income Per Capita, and the standard error is robust.

belonging to *White* is associated with a 17 percent higher income.[27] [28]

But there seems to be an important silver lining as the ethnicity dummy coefficient has considerably declined throughout this period. In 2004-06 being *White* as opposed to *Native American* was associated with a 22 percent higher income, whereas in 2016-18 it was associated with a much lower 8 percent higher income.

If regressions include only more recent years (2014-18) they can include an informality variable in household surveys that more directly asks surveyed individuals about their formal status (only available since 2012). Remarkably the estimated coefficient of that informality variable implies that being informal is associated with about 30 percent lower income (Table 6).

VI. Recommended Policies: Saving Capitalism from Postcolonial Inequality

While it is a welcomed finding that the structural reforms that have sustained high economic growth seem compatible with the narrowing of ethnic inequality, there is significant room for policy action to further reduce gaps. The disruptive land redistribution and the bloody subversion in the 20th century stand as clear reminders that, if not properly contained, social discontent in Peru can lead to events that vastly contract economic activity, destroy wealth, increase poverty, and even cost numerous lives.

Discontent could, in fact, strengthen with economic prosperity as larger shares of the population access education, learn and become more sensitive about historical injustices, questioning the factors behind their relative status, the origins of their governing class, and racist features of the social fabric they face.[29] All socioeconomic sectors should thus be interested in reducing historical inequities through redistribution policies that are closest to Pareto-optimal.

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[27] The methodology used in Ñopo (2012) improves identification of the gap explained by ethnicity by considering heterogenous distributions among ethnic groups as described in that study. However, this methodology does not allow for estimation of the coefficients of other factors that determine the income gap between races, which is the main objective of our study.

[28] Galarza and Yamada (2012) provide field-based evidence of labor market ethnic discrimination, which could be a main factor explaining the significance of the racial dummy.

[29] Dee (2004); Hillygus (2005); and Solis (2013) provide statistical evidence that educated individuals are more politically aware, more critical of government, and more politically active.

With this objective in mind and based on our statistical findings, we suggest four main policy areas to reduce ethnic-related and overall economic inequality in the country: (i) further expanding education and other public services; (ii) increasing government revenue to finance public services; (iii) reducing informality; and (iv) promoting competition. Surely, our suggestions need to be more deeply explored through more specific analysis that, for example, corroborate the impact of social policies on the evolution of ethnic income gaps, as we suggest in the concluding section.

Expanding public services to the still excluded Native American population

The significant size of the estimated impact of increased years of schooling in reducing ethnic gaps underscores the importance of further expanding education. Despite recent progress, *Native American* is still at a disadvantage, not only on years of schooling, but most likely also on education quality. OLS estimates in Table 2 suggest that if the *Native American* group would increase its years of schooling to the level of *Mestizo,* it could narrow its income gap relative to *White* from 0.62 to 0.8, while GMM estimates in Table 3 suggest it would practically eliminate this gap.

The persistence of extreme poverty in rural areas and some peri-urban areas by itself indicates there is a need to expand to those sectors the reach of education and other public services, including:

- *Health services and water access:* The Covid-19 pandemic further exposed vast inequalities in these areas and, as a result, it is now widely and strongly demanded that these gaps be eliminated.
- *Poverty-alleviation programs*: Several poverty-alleviation programs have been established in recent decades, which contributed to poverty and inequality reduction, as shown in Ramirez-Rondan and others (2020). But this effort must be extended to better reach the extremely poor.
- *Rural connectedness*: Enhanced transport and telecommunications infrastructure is key to improve market access and increase income in rural areas. This may also enable more rural-to-urban migration, an important factor in reducing income/expenditure inequality as our statistical analysis suggests.

Strengthening public services to help *combat racial discrimination* is also crucial, especially by enhancing related communication/education programs and judicial support to victims of discrimination. Eradicating racism is not only important to narrow economic gaps but also to strengthen the identity of most Peruvians. As noted in Fukuyama (2018), "individuals often want not recognition of their individuality, but recognition of their sameness to other people. People also want that their identity is recognized and respected" and this absence of recognition can potentially destabilize the political/economic system as much as economic inequities can.

Expanding public services importantly requires improving subnational spending and/or directly transferring income to users of public services. According to the Peruvian Constitution, subnational governments are largely responsible for providing key public services, including health and education, but they have a significantly weaker spending capacity than the central government.[30] A faster and complementary route to improve living standards of the poorest regions while subnational governments strengthen capacity could be to expand cash transfers, including through so-called *Cash-for-oil* initiatives that directly transfer hydrocarbon and mineral revenues to the population (Devarajan and others, 2013; Moss and others, 2015). For sure, a rigorous cost-benefit evaluation of this alternative in the Peruvian context is needed before approving its implementation.

Revenue mobilization to finance enhanced public services

Financing this expansion in public services requires enhanced revenue mobilization, preferably after the economy fully recovers from the pandemic and ongoing global shocks. Revenue mobilizing measures suggested in the IMF's 2021 Article IV Staff Report can yield additional 1 percentage point of GDP in revenues.[31] Currently the sales tax is the country's largest revenue source, accounting for about half of the central government revenues. The relatively low contribution of direct taxes suggests there is room to increase their intake, which in general can be done by addressing evasion and expanding the tax base, while avoiding high tax rates that discourage economic growth. [32]

Efforts to increase tax revenues can facilitate a substantial reduction of poverty in Peru. For instance, if the additional one percent of GDP of revenue expected from IMF-recommended mobilization policies would be transferred to the 6.5 million poor individuals (in 2019, prior to the pandemic) it would provide them with a stipend of about US$30 per month. This would make a crucial difference in their standard of living, funding a third of the minimum consumption basket. Similarly, and in theory at least, cash transfers of 1 percentage point of GDP could fully eradicate extreme poverty.

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[30] Besides weak spending capacity, Nakatani and others (2022) suggest through cross country analysis that governance arrangements and corruption matter for the subnational provision of education/health services.

[31] The Staff Report recommends increased use of electronic invoicing, the maturation of tax measures introduced in 2017-2018 (including changes to the excise schedules), the implementation of the OECD/G20 Inclusive Framework on BEPS, the expiration of tax benefits of some large mining projects, and other efforts at revenue administration (including streamlining of tax auditing processes).

[32] Through comparative tax analysis, Acosta and Pienknagura (2021) identify areas for tax revenue mobilization in Latin American countries including Peru.

Given recent scandals of government corruption in the country, further revenue mobilization faces considerable skepticism. Revenue mobilization should thus be matched with measurable progress in expanding crucial public services or cash transfers to the poor and extremely poor. Transferring some share of mining revenues to the population, as suggested above, can likewise make the benefits from taxation more visible.

Reducing informality by supplementing economic growth with streamlined regulations

Formalization could significantly help reduce the *Native American* income gap. As we showed above, this ethnic group has a higher rate of informality, which is statistically associated with much lower income.

Peru has made significant efforts to reduce informality for decades. The government has partly focused on reducing excessive red tape, which De Soto (1986) found to impose an enormous obstacle to the formalization of rural immigrants. This study argued that a lack of understanding of the reality that immigrants face results in regulatory requirements that the low-productivity informal firms cannot meet.

More recently, however, there are indications that Peru has regressed in the softening of business regulations relative to other countries. In fact, Peru's *Doing Business* ranking fell from 39th in 2010 to 76th in 2019. This may explain why the trend reduction in informal non-agricultural employment presented earlier stopped and slightly reversed after 2012. This report identified particularly cumbersome procedures to start a business and pay taxes.

Another important regulatory obstacle to formalization could be Peru's relatively high minimum wage. Firms are required to pay 14 minimum monthly salaries per year. Until recently, the minimum wage was of 930 LCU and was increased to 1,025 LCU in May 2022. In 2019, prior to pandemic related shocks, the ratio of the annual minimum wage to the average income per capita in Peru was 0.58, which is in the highest fifth among upper-middle

Figure 17. Minimum Wage to GDP per Capita
(Ratio in 2019)
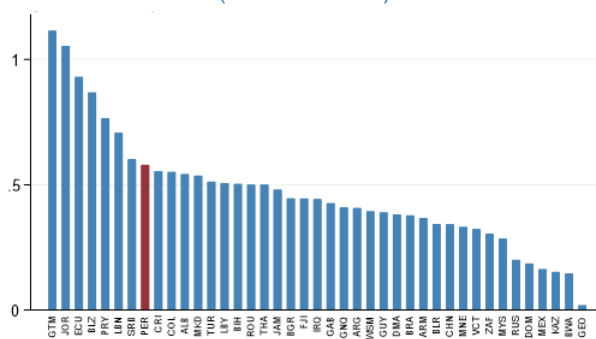
Source: IMF World Economic Outlook, US State Department, and IMF Staff Estimates.
Notes: ISO-3 Country Codes. Includes upper-middle income countries according to World Bank classification

income countries (Figure 17). In fact, this ratio is in the highest tenth when adding high income countries. To bring it down to the international average ratio of 0.4 in 2019 would have required lowering the minimum wage to 641 LCU.

The annual minimum wage divided by the average income of *Native American* (estimated based on household surveys) is 0.99, strongly suggesting this is a major restriction to formalization of *Native American*. The minimum wage that would have aligned this ratio to the international average was 366 LCU.

Conceptually, lowering this high ratio could be either done through lowering the minimum wage (softening the regulation) and/or increasing the productivity of informal firms. Lowering the minimum wage is a widely questionable and politically challenging measure. Therefore, the practical solution should be mainly focused on increasing productivity through continued economic growth while controlling excessive growth in the minimum wage.[33]

Promoting competition at the top

Encouraging competition in the largest economic sectors would promote mobility at the very top of the wealth distribution, where there is still only a small presence of non-*White*. In fact, there is strong popular demand for less concentrated market structures in key sectors of the economy.

Enhancing market contestability and political management of these demands needs to be technically rooted. There are no legally determined private sector monopolies but there could be oligopolistic markets and their identification and regulation requires technical analysis.

Available statistical evidence needs to be carefully interpreted to fully understand potentially oligopolistic market structures. Regarding the banking sector, for example, the IMF's 2018 Financial Stability Assessment Program (FSAP) noted that the top four banks in Peru account for 83 percent of bank assets, and that banks' very high profit ratios can be related to high lending–deposits spreads (above 10 percent).[34] Yet, Moron and others (2010) find through a Corrected Residual Demand model that high market concentration does not imply lack of contestability.

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[33] Another alternative commonly considered to deal with relatively high national minimum wages is to segment it by groups broadly according to their productivity level (by firm size, region, or economic sector). Of course, doing this can be technically and politically challenging.

[34] The Fund report indicated that the banking regulator is limited in scope to regulate banks' conduct and that there is a need to enhance the legal and institutional frameworks to oversee competition, market conduct, and consumer protection.

VII. Concluding Remarks

Our analysis strongly suggests that the openness to international trade and macroeconomic stability that have sustained strong economic growth and poverty reduction in Peru have been consistent with the narrowing of postcolonial ethnic inequalities. It would thus be ideal that any policy strategy to further reduce ethnic-related gaps preserves Peru's growth policy pillars and concentrates on Pareto-efficient reforms.

To avoid social policies that weaken growth pillars, the government should avoid many ISI policies that resulted in a severe income per capita contraction. Specifically, the fiscal derailment and hyperinflation in the late 1980s, partly a consequence of bankrupt SOEs, suggest better focusing government action on directly reducing inequalities by expanding and improving education, health, infrastructure, justice, and promotion of competition. The large market distortions, product shortages, and informality fueled by excessive regulations and price controls during ISI, highlight the importance of acknowledging market forces in the design of redistributive policies. Strategies to reduce inequality at the very top of the income distribution should also be mindful of fiscal sustainability and market efficiency considerations, concentrating mainly on promotion of competition and technically determined progressive taxation.

Our Mincerian regression-based analysis suggests that expanding education and rural-to-urban migration were the main factors in narrowing ethnic gaps. It also indicates that ethnicity on its own is still an important income determinant although much less than at the start of the century.

Further research could apply other analytical frameworks to corroborate or better understand these findings, as well as explore many related questions that are not addressed in this paper. For example:

- What was the impact of specific structural reforms in the 1990s on ethnic inequality? What was the evolution of ethnic inequality during the ISI period?
- What has been the role of fiscal policy in reducing income inequality? How redistribution policy through direct taxation and the social safety net affected income inequality? Research in this area could help predict how much revenue mobilization and enhance public services can help in narrowing ethnic gaps in the future. What role did the scaling up of public investment played in promoting socioeconomic progress? There is some evidence that the development of public infrastructure facilitated the migration from rural-to-urban areas, while cash transfer programs reduced poverty in rural areas (Jaramillo 2014).

- The significance of rural-to-urban migration in Peru's economic development is in line with a Lewis (1954) model framework. It would thus be interesting to explore what will happen to ethnic gaps when the economy gets closer to the Lewis turning point, in which there is no more excess rural labor. What would be the implications for ethnic inequality projections?

Based on our statistical analysis, we suggest policy actions in four broad areas (expansion of public services, government revenue mobilization, reduction of informality, and promotion of competition) that can help accelerate the ongoing narrowing of ethnic income gaps. We refrain from making policy proposals that are more controversial and require further analysis, such as affirmative action or adding an ethnic emphasis to all public policies.

Technically sound (not populist redistribution policies) that preserve macroeconomic stability and are cognizant of market incentives could responsibly help to fully eliminate postcolonial ethnic inequalities. This would allow the country to move on from historical ethnic related animosities and fully take advantage of its precious ethnic diversity asset.

Annex I. Mincerian Regressions: Methodological Description

To identify potential income determinants, we broadly base regression specifications on Mincer (1974), which uses a semi-logarithmic income function:

(1) $\ln(w_i) = \alpha + \beta_1 Educ_i + \beta_2 Exp_i + \beta_3 Exp_i^2 + BX_i + \mu_i$

Where $\ln(w_i)$ is the natural logarithm of the income of individual i; $Educ_i$ is years of schooling; Exp_i represents the approximate years in the labor market (as estimated by $age_i - Educ_i - 6$); and X_i is a vector of control variables including gender, rurality, economic sector, marital status, among others. Coefficients β_i can be interpreted as the average rate of return on income of the related explanatory variable.

Years of schooling could be endogenous to income, see Card (1995) and Card (1999). For this reason, researchers have used different instruments to try to eliminate endogeneity between these two variables. For example, Angrist and Krueger(1991a) use as instrument calendar quarter-of-birth dummies while Angrist and Krueger(1991b) use a quarter-of-birth and date-of-birth interaction in addition to quarter-of-birth effects as instruments. Gong (2018) argues that the years of schooling of an individual's parents is a more suitable instrument in countries with high migration.

Given the high migration rate in Peru we use Gong (2018) proposed instrument in addition to the household's average years of schooling. In a GMM two-stage regression framework with small sample correction (Windmeijer, 2005) we first predict an individual's education through the following specification:

(2) $Educ_i = \lambda_1 Father_i + \lambda_2 Family + BZ_i + v$

Where $Father_i$ is and $Family_i$ years of schooling of the individual's father and family, respectively. Z_i is the vector of explanatory variables in Xi (in equation 1) in addition to exp and exp^2. The second stage regression then replaces $Educ_i$ in equation (1) by the predicted years of schooling in the first stage regression ($\overline{Educ_i}$):

(3) $\ln(w_i) = \alpha + \beta_1 \overline{Educ_i} + \beta_2 Exp_i + \beta_3 Exp_i^2 + BX_i + u$

Annex II. Self-Identification as Native American in Census vs. National Household Survey
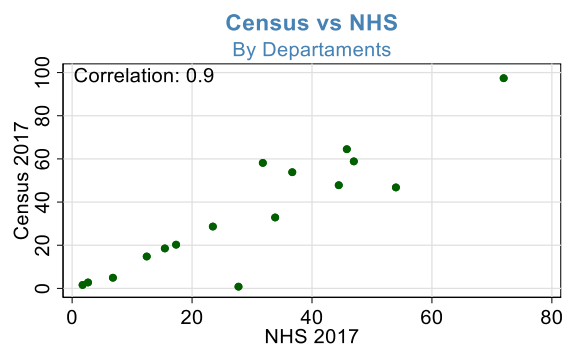
Census vs NHS
By Departaments

Correlation: 0.9

Source: National Institute of Statistics and Informatics and author's estimates

Census vs NHS
By Provinces

Correlation: 0.94

Source: National Institute of Statistics and Informatics and author's estimates

Census vs NHS
By Districts

Correlation: 0.89
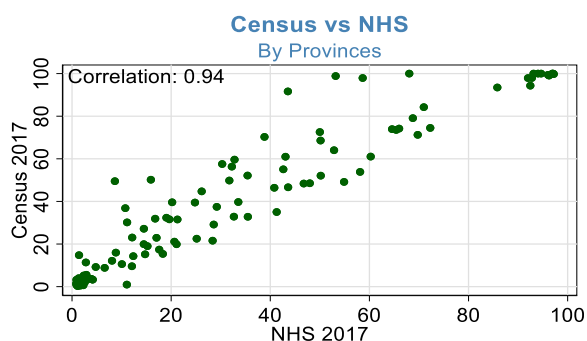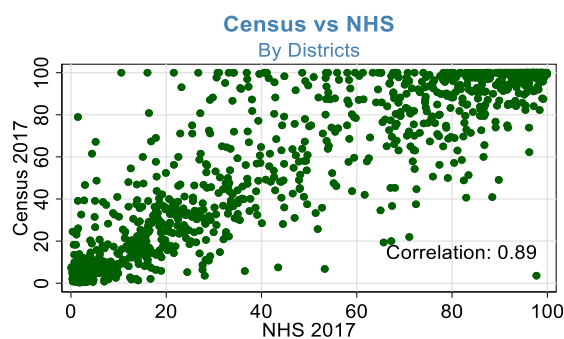
Source: National Institute of Statistics and Informatics and author's estimates

Annex III. Analysis Based on Total Income

Distribution of Population's share by Total Income Per Capita(2004-06)
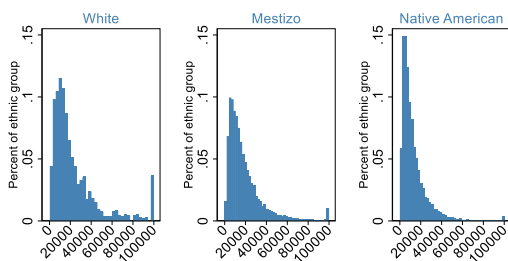
Source: National Institute of Statistics and Informatics and author's estimates.
All labor income higher than 100k are considered as 100k.

Distribution of Population's share by Total Income Per Capita(2016-18)
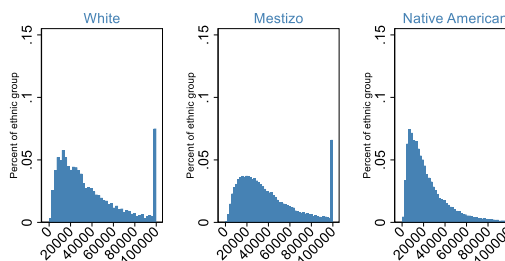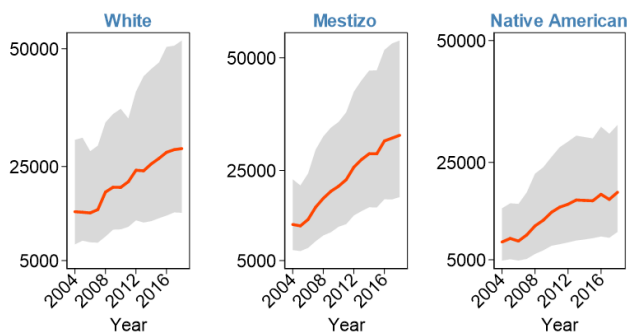

Source: National Institute of Statistics and Informatics and author's estimates
All labor income higher than 100k are considered as 100k.

Cumulative Distribution of Total Income 2004-06
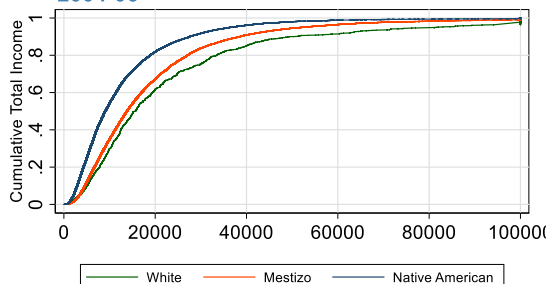
Source: National Institute of Statistics and Informatics and author's estimates.

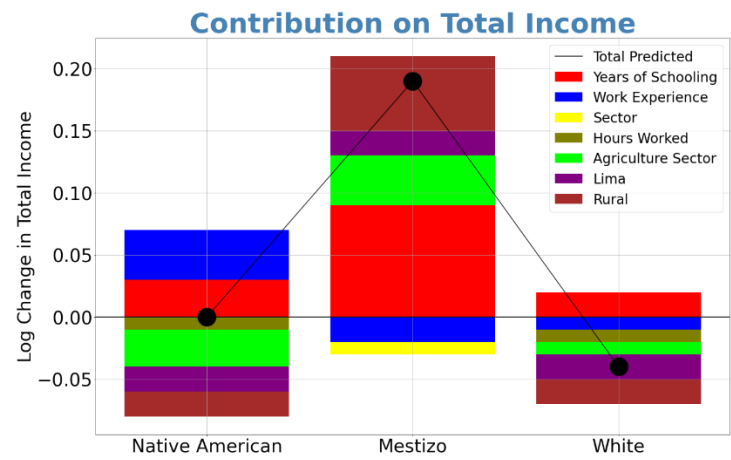**Cumulative Distribution of Total Income 2016-18**
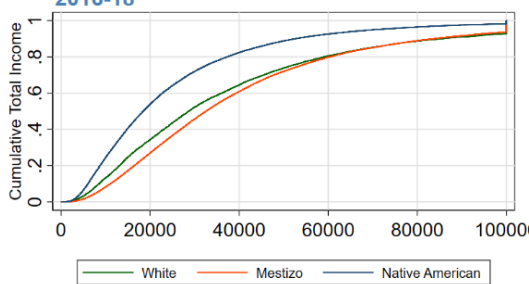
Source: National Institute of Statistics and Informatics and author's estimates.

Median Total Income
Nuevos Soles

Source: National Institute of Statistics and Informatics and author's estimates.
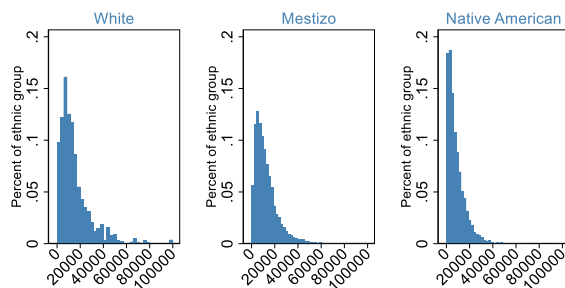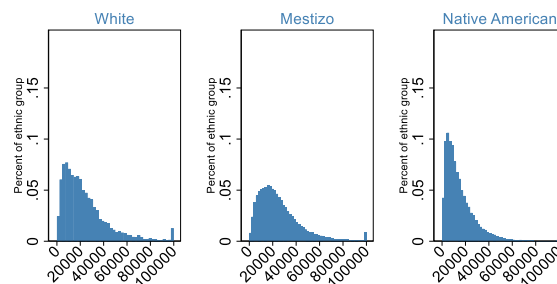
Contribution on Total Income

Source: National Institute of Statistics and Informatics
and author's estimates.

Annex IV. Analysis Based on Monetary Expenditure

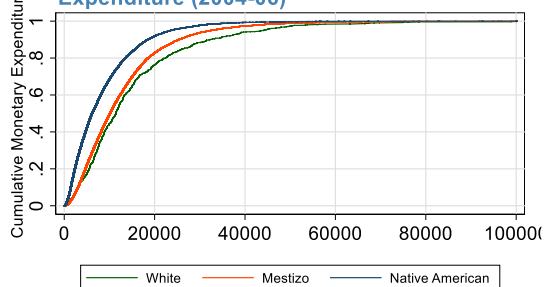**Distribution of Population's share by Monetary Expenditure (2004-06)**

Source: National Institute of Statistics and Informatics and author's estimates
All labor income higher than 100k are considered as 100k.

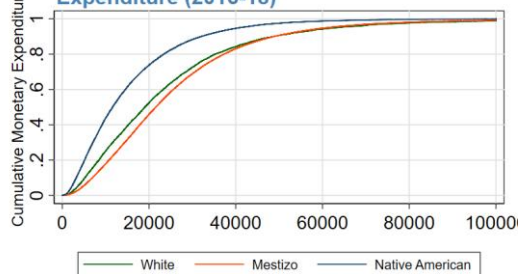**Distribution of Population's share by Monetary Expenditure (2016-18)**

Source: National Institute of Statistics and Informatics and author's estimates
All labor income higher than 100k are considered as 100k.

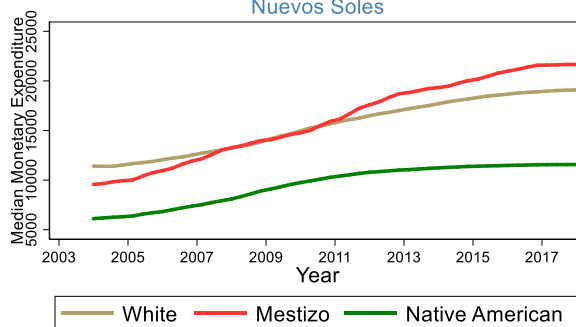**Cumulative Distribution of Monetary Expenditure (2004-06)**

Source: National Institute of Statistics and Informatics and author's estimates.

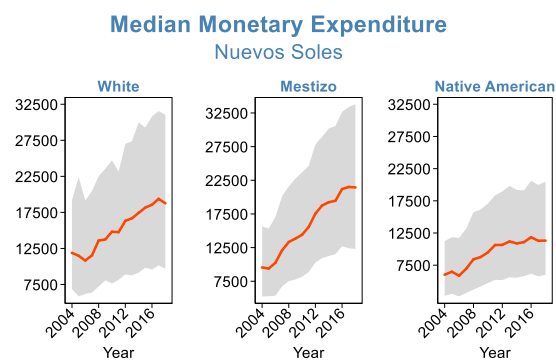**Cumulative Distribution of Monetary Expenditure (2016-18)**

Source: National Institute of Statistics and Informatics and author's estimates.

Median Monetary Expenditure
Nuevos Soles

Source: National Institute of Statistics and Informatics and author's estimates.
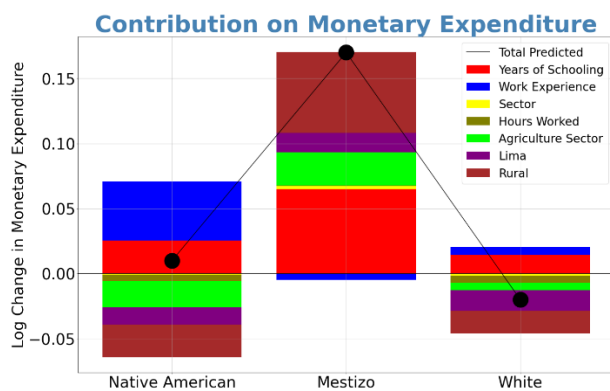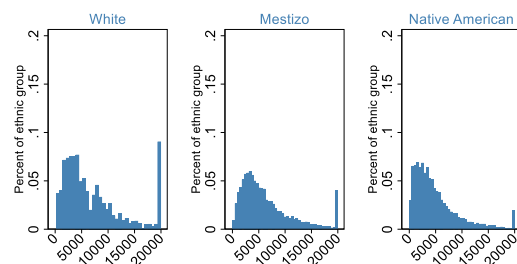
Median Monetary Expenditure
Nuevos Soles

Source: National Institute of Statistics and Informatics
and author's estimates.

Source: National Institute of Statistics and Informatics
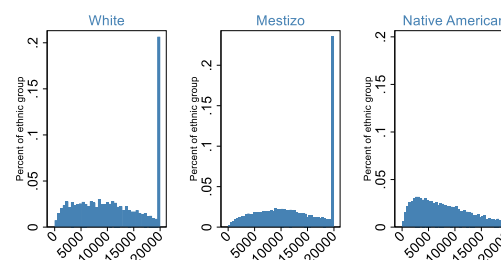and author's estimates

Annex V. Analysis Based on Labor Income Excluding Zeroes

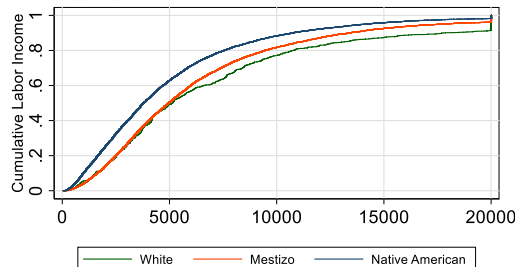**Distribution of Population's share by Labor Income Per Capita(2004-06)**

Source: National Institute of Statistics and Informatics and author's estimates. All labor income higher than 20k are considered as 20k.

Distribution of Population's share by Labor Income Per Capita(2016-18)

Source: National Institute of Statistics and Informatics and author's estimates. All labor income higher than 20k are considered as 20k.

Cumulative Distribution of Labor Income 2004-06

Source: National Institute of Statistics and Informatics and author's estimates.

Cumulative Distribution of Labor Income 2016-18

Source: National Institute of Statistics and Informatics and author's estimates.

Labor Income Per Capita
Nuevos Soles

Source: National Institute of Statistics and Informatics and author's estimates.

Median Labor Income Per Capita
Nuevos Soles

Source: National Institute of Statistics and Informatics
and author's estimates.

Contribution on Labor Income Per Capita
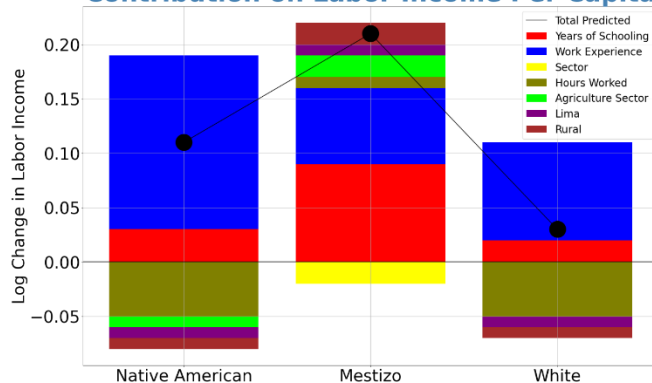
Source: National Institute of Statistics and Informatics
and author's estimates

Annex VI. Labor Income by Gender

Distribution of Population's share by Labor Income Per Capita(2004-06)
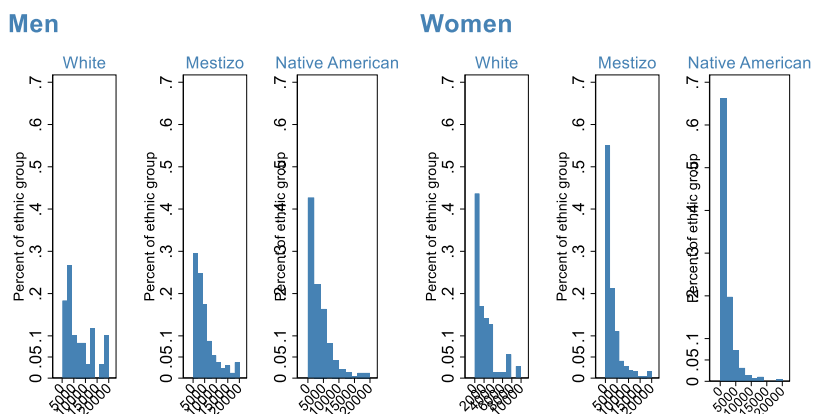
Men   **Women**

Source: National Institute of Statistics and Informatics and author's estimates.
All labor income higher than 20k are considered as 20k.

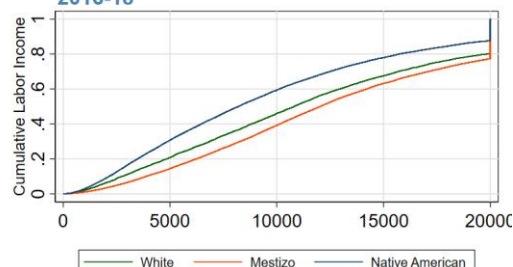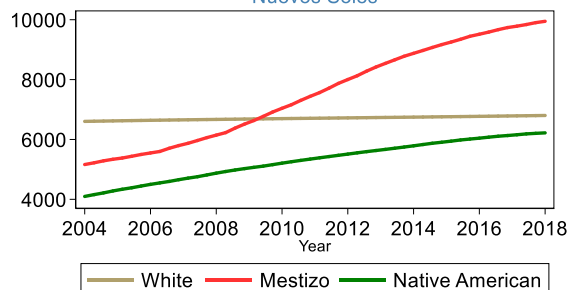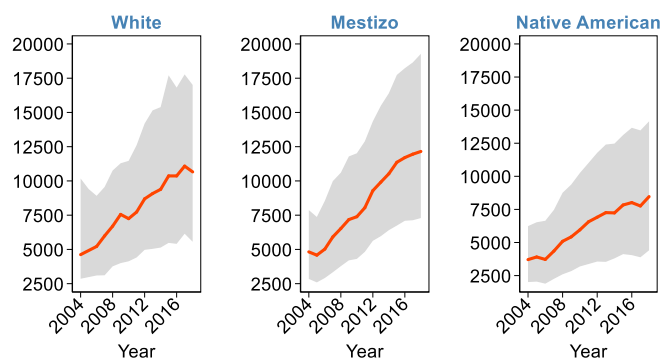## Distribution of Population's share by Labor Income Per Capita(2016-18)

Men   **Women**

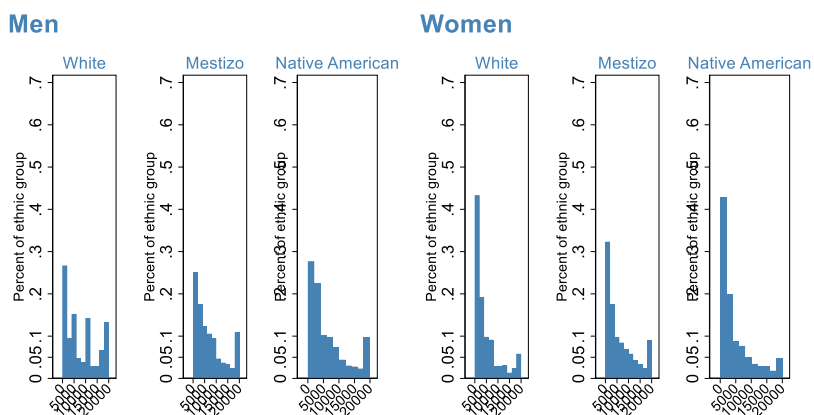Source: National Institute of Statistics and Informatics and author's estimates.
All labor income higher than 20k are considered as 20k.

Annex VII. OLS Mincerian Estimates 2007-18

OLS Estimates Coefficients of Mincerian Earnings Function 2007-18

Dependent Variable: Log of Income Per Capita	White	Mestizo	Native American
Schooling	0.063***	0.060***	0.048***
Work Experience	0.002	0.001*	0.012***
Work Experiencie^2	-0.000	-0.000	-0.000***
Gender	0.027*	-0.004	-0.013**
Sector	-0.005	-0.005***	-0.005**
Hours Worked	0.008***	0.007***	0.007***
Marital Status	0.073***	0.037***	-0.057***
Agriculture Sector	0.457***	0.452***	0.621***
Public Employment	0.147***	0.195***	0.241***
Wihout Contract	0.382***	0.299***	0.263***
Lima	0.299***	0.223***	0.221***
Rural	-0.306***	-0.258***	-0.341***
Mining Canon	-0.000**	0.000***	0.000***
Year	0.050***	0.058***	0.058***
Constant	-93.331***	-108.967***	-110.204***
N	20955	273931	185738
adj. R-sq	0.408	0.368	0.398

Source: National Institute of Statistics and Informatics and author's estimates. *p<0.05, **p<0.01,***p<0.001. Pooled Cross-Sectional Regressions with OLS estimates using National Household Survey and considering Mincerian Earnings Function for White, Mestizo and Native American.

Annex VIII. Contributors to Income Change by Political Jurisdiction

With Provincial Standard Errors

Contribution to change in log of Income from 2004-6 to 2016-18			
Variable	Andean	Mestizo	White
Years of Schooling	**0.09**	**0.24**	**0.05**
Work Expperience	**0.26**	0.02	0.00
Gender	-0.01	0.00	0.00
Zone	0.00	0.00	0.00
Sector	-0.02	0.06	-0.02
Hours Worked	-0.05	0.01	-0.05
Marital Status	-0.01	0.00	0.00
Agriculture Sector	0.00	**0.00**	0.01
Public Employment	0.00	0.00	0.00
Without Contract	0.00	0.02	0.00
Lima	0.00	**0.01**	0.00
Rural	0.01	**-0.01**	0.00
Predicted Total	0.27	0.34	-0.02

Source: National Household Survey and author's calculations
Note: Based on OLS estimated coefficients of a Mincerian earnings function. Values highlighted in bold are those above 0.01 and based on statistically significant coefficients.

With Regional Standard Errors

Contribution to change in log of Income from 2004-6 to 2016-18			
Variable	Andean	Mestizo	White
Years of Schooling	**0.03**	**0.09**	**0.02**
Work Expperience	**0.08**	0.01	0.02
Gender	0.00	0.00	0.00
Zone	0.00	0.00	0.01
Sector	0.00	0.00	0.00
Hours Worked	-0.02	0.00	-0.02
Marital Status	0.00	0.00	0.00
Agriculture Sector	-0.03	**0.04**	-0.01
Public Employment	0.00	0.00	0.00
Without Contract	0.00	0.00	0.00
Lima	-0.01	**0.01**	-0.03
Rural	-0.02	**0.03**	-0.01
Predicted Total	0.04	0.20	-0.02

Source: National Household Survey and author's calculations
Note: Based on OLS estimated coefficients of a Mincerian earnings function. Values highlighted in bold are those above 0.01 and based on statistically significant coefficients.

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PUBLICATIONS

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