

FACTORIAL, PERSONAL, AND WEALTH INEQUALITY IN PERU, 1950-2016

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Date received: September 5, 2018. Date accepted: December 22, 2018.

Abstract

Distribution of factorial income, personal income, and wealth in Peru is highly inequitable. In the 1960s, wage share was higher than at international average. It improved from the 1990s onwards, but without reaching previous levels. The corrected Gini personal income coefficient exceeded the official trend. The levels of inequality in productive wealth and assets distribution were higher than those of personal income distribution, in accordance with the international literature on the subject. A proxy of wealth distribution was elaborated, one which factored in both natural persons' and businesses' bank deposits in the national financial system. Some of the results are then compared with those of other Latin American economies.

Keywords: factorial distribution of income; personal income; Gini coefficient; wealth distribution; financial system.

1. INTRODUCTION

The problem of wealth and income inequality is again on the global economic agenda. The big entrepreneurs and politicians note that increasing inequality is a general trend, on the same level as the increase in societal polarization that elevates risks at a global level (WEF, 2018). The issue is on the IMF's agenda, although its current political economic recommendations ignore it. Inequality is analyzed based on the personal distribution of income, rather than the factorial distribution from which it originates. Higher wealth and income inequality cause a variety of negative phenomena in economic, social and political contexts.

The Peruvian economy is a middle-income economy with a population of 31.8 million inhabitants. In 2016, the nominal GDP per capita was US\$6 049 and US\$13 019, on par with buying power (Banco Mundial, 2018). Under the human development indicators (PNUD, 2017), the country is located at position 87 of 188 countries, and when corrected for inequality, it recedes to position 95, according to the data consulted to 2015. The economy in question is open to the exterior, with an external opening of 44.8% of the GDP, with free movement of goods and people.

Between 1990-2017 under the new outwards-oriented development model, with a reduced presence for the State, a real growth of 4.6% yearly average was seen, similar to what was observed between 1950-1980 at an annual 4.8%—a period close to the golden age of capitalism, import substitutions and State-led industrialization. Currently, food and raw material exports are equivalent to 85.8% of the total exports in 2016 (BCRP, 2018), and there is a low inflation rate. Recently, given the induced economic deceleration, in addition to the fall in international prices of raw materials and lowering of taxes, the problem of inequalities in public finances has had a resurgence.

Along with these macroeconomic indicators, governmental authorities offer information periodically regarding personal income distribution and, on occasion, distributive matters, considering the categories of gender, age range and geographic region. The official results regarding personal income distribution since the end of the 1990s have been positive, based on information from the National Household Survey (NHS). They demonstrate a decreasing tendency across time that allows for confirmation that the process of economic opening and liberalization has been positive in terms of equality levels approaching what is seen in economies with higher income per capita. Nonetheless, there is evidence that contradicts these results, because similarly to the majority of economies in the region, the monitoring and systematic evaluation of what happens with factorial (or functional) distribution of income is overlooked, and the distribution of the society's wealth and assets is completely ignored.

The circumscribing of the distributive problem in the personal sphere sidesteps the fact that, in a large part, this result of factorial distribution is established based on the economic or citizen agent's position in productive processes, such as owner of means of production, employee or independent worker (beneficiary of mixed income), and will be closely linked to the distribution of wealth and productive assets.¹ The foregoing was the perspective of classic economists such as Smith (1987), Ricardo (1959) and Marx (1972); later would come Kalecki (1956) and the post-Keynesians, who argue that the income distribution problem based on prices and salaries, degree of monopolization or profit margin, technology, and cost and productive structures are fundamental in determining levels of demand, output and economic growth. One recent discussion regarding this subject appears in Dutt (2017).

Recently, certain IMF economists have noted that higher inequality erodes the possibility of sustainable economic growth (Ostry *et al.*, 2014). Additionally, high levels of inequality fracture and disintegrate the social fabric, promoting phenomena such as greater instability, various forms of violence and even fostering corruption (Figueroa, 2010). In the political sphere, not only does it generate higher instability, but it goes hand in hand with the capturing of the State by the elite and economic groups that intend to redirect public policies to suit their own interests, putting democracy in a vulnerable position (OXFAM, 2016).

The present work has a variety of objectives. Firstly, long series for the different components of factorial income distribution are reconstructed for the period from 1950-2016, as a follow up to previous lines of work (Alarco, 2017). The current series are established based on the most recent domestic accounts of 2007. Complete prior information exists for the previous base from 1994, and others starting in 1950, that should be made compatible. In the case of personal income distribution, and in particular of the Gini coefficient, official information exists from 1997 onwards. However, this data has been questioned by various authors, given that they are contradictions present in it, which also appear when compared to what is presented here. Finally, wealth and productive asset distribution is shown based on information from international sources, and constructed for this analysis based on family's and business' bank deposit distribution at the end of the 1990s.

The information from these three distributive spheres, evaluated using the Gini inequality indicator, are presented and contrasted for the first time here. This exercise, which was calculated for Peru, could also be replicated for other regional economies. In this way, the following questions are expected to be answered: what are the inequality levels at the level of productive, factorial, and personal income wealth distribution in Peru? Do the results correspond to official information, and with each other? How can these results be interpreted, in light of comparable international information?

The article is comprised of five sections plus the conclusions. In the second section, after the introduction, the methodological framework and databases are presented. The third section provides information relative to share of profits, salaries and mixed income in the GDP on the long term and the tracking of work income on the shorter term. Section four is dedicated to the presentation of official and adjusted information addressing income inequality on a personal level. The fifth section offers information from third parties, such as what concerns inequality in productive wealth and bank deposit distribution, and including international comparisons in different areas of analysis.

2. METHODOLOGICAL FRAMEWORK AND DATABASES

Methodology

The statistical contributions of this article involve: obtaining long series for factorial income distribution between 1950-2016; collecting the Gini for recipients of remunerations and mixed income between 2007-2016; the recalculation of the Gini coefficient based on personal income distribution via Montecarlo simulation exercises; and the calculation of the Gini for distribution of families' and business' bank deposits in the Peruvian financial system, based on the statistics provided by the Bank Superintendence, insurance and AFPS of Peru (SBS).

To obtain salary participation for the period from 1950-1973, data from the Annual Reports and National Accounts of Peru, from the Central Reserve Bank of Peru [Spanish BCRP], were utilized. For the 1973-1979 series, data were used from the National Accounts of Peru 1950-1980, from the National Institute of Statistics [Spanish INE] and from the Annual Report of the BCRP of 1984. For the period from 1979-1990, the CEPAL's Latin American and Caribbean Statistical Yearbook was utilized. For 1990-2007, information was taken from the Latin American and Caribbean Statistical Yearbook and the INEI global Supply and demand, and for 2007-2016, information was taken from the National Statistics Series of the National Institute of Statistics and Information [Spanish INEI].

In the case of mixed income participation, the agricultural component is determined in three periods: for 1950-1976, data were acquired from the BCRP's National Accounts of Peru and Annual Yearbook of 1983. For 1976-2007, an index of the nominal agricultural GDP is constructed, with base 100 in 1990, using the GDP deflator from the BCRP national accounts with base 2007, then multiplied by the real agricultural GDP, which is extracted from these same accounts. The 2007 mixed income is then obtained from the National Accounts calculated by the INEI, and are retroplated. For the period from 2007-2016, information was obtained from the INEI's 2017 National Statistics Series.

For the non-agricultural component, for the series from 1950-1990, data on mixed agricultural income were taken from the BCRP National Accounts of Peru and Annual Yearbook of 1983, 1986, 1989 and 1990. During the period from 1990-2007 an index was compiled of total independent income with base 100 in 1990, and the 2007 observation that appears in the INEI National Statistics Series was used to retroplate (Castillo, 2015). Meanwhile, for 2007-2016 information was obtained from the 2017 INEI National Statistics Series. In the case of participation of the gross operating surplus, the 1950-2016 series was obtained in a residual manner after subtracting the elements of total payroll, mixed income and taxes and subsidies from the nominal GDP.

The methodology for adjusting the Gini of personal income distribution using Montecarlo simulations evaluates the following protocol: from the NHS information, the income deciles of distribution of net total monetary income for each year of the 2004-2016 period are constructed and the sum total of the income mass are calculated. This sum (which would be equivalent to the personal income of households calculated by the surveys) is compared to disposable personal income, that adds wages and salaries (W), the earnings and benefits (B , without excluding dividends or property rentals) and mixed income, plus other components that are obtained from national accounts. This has the following structure:

$$YP_{available} = W + B + Mixed\ income - Direct\ taxes - Social\ contributions - Fixed\ capital\ consumptions + Transfers$$

The difference between disposable personal income and the total sum of net monetary income produces a surplus as a result. This sum would be the income that does not appear in what is reported by the NHS's. Next, three different scenarios for assigning said difference in total monetary income distribution by deciles are constructed. To do this, three different scenarios are specified:

- Scenario I: 10% of the surplus is assigned initially to decile 1, and 90% to decile 10.
- Scenario II: 5% of the surplus is assigned to decile 1, and 95% to decile 10.
- Scenario III: 100% of the surplus is assigned to decile 10.

To introduce a random source in each case, use of the Montecarlo simulations method is considered; the simulations consist in replicating the Gini coefficient by a determined number of times for each determined scenario. For example, it could be replicated in such a case 1 000; 10 000 or 100 000 times. These repetitions or iterations should vary in function by the random component. To do so, it was decided to multiply the assigned surplus proportion by a random number with a uniform distribution, which is found to be between the values of 0 and 1:

$$x \sim U(0,1); f(x) = \begin{cases} 0; & \text{for } x \in [0,1] \\ 1; & \text{for } 0 \leq x \leq 1 \end{cases}$$

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The product of the surplus proportion multiplied by the random number give as a result a new allocation proportion. For example, if scenario I takes as an initial allocation 10% for the first decile of the surplus, the proportion that will be used for the iteration or simulation "i" of said case will be: $10\% * X_i$ of the surplus total. This means that the first decile of the distribution will be assigned $10\% * X_i$, and the proportion $(1 - 10\% * X_i)$ for the last decile. Given these modifications, a new Gini coefficient will be calculated.

Accordingly, as many random numbers as simulations or iterations being considered will be extracted. Additionally, the number of Gini coefficients calculated for each scenario will be equal to the number of iterations being considered. For this correction a number with 1 000 iterations is determined for each scenario. As a result of the 1 000 iterations, the corrected Gini coefficient is calculated as the average of the 1 000 Gini coefficients obtained in each scenario:

$$CG_{corrected} = \frac{1}{N} * \sum_{i=1}^N CG_i; \quad CG_i = f(x_i)$$

Lastly, in the Gini indicator case for salaried employee worker income and mixed income between 2007-2016, and for bank deposits, the standard formula is used, through which the indicator takes a value between 0 and 1. Equal to 0 means that the income/deposits are distributed equally between all of the existing income/deposit ranges; if it is equal to 1, it is concentrated in one interval of income/deposits. The mathematical expression used to determine the Gini coefficient for grouped data is the following:

$$CG = 1 - \sum_{i=1}^{n-1} x_i * (Y_i + Y_{i+1})$$

where:

x_i : relative frequency of group "i" population

Y_i : accumulated frequency of group "i" income

Databases

For the official information on Peru, statistics from the BCRP, INEI previously INE, the Peruvian Ministry of Finance and Commerce and the SBS were employed. International sources include the Bureau of Economic Analysis (BEA), the CEPAL (ECLAC), and Credit Suisse and Allianz; in this last case, the information concerns adult wealth, including the value of productive assets and finances, subtracting the families' assets. The market exchange rate is utilized, given capital's high degree of mobility. First, average wealth per adult is calculated.

For the countries that have sufficient existing information, data from balance sheets was utilized, and for those that did not have access, household surveys and similar sources were used. It is important to highlight that the upper layer is usually not captured by such calculations. Then, information for the rest of the economies that do not have such surveys was obtained using econometric regressions.

The range distribution was created given those average wealth levels. For the higher ranges up to USD\$100 000 (2010 and 2011) and USD\$1 000 000 (2012 on), calculations are presented utilizing information taken from Forbes. These calculations are performed with an assumed Pareto distribution. In the first stage the figures for minimum wealth of the richest 0.0001% of the population were obtained. This calculated wealth is used to fill the upper layer, taking the Forbes information into account.

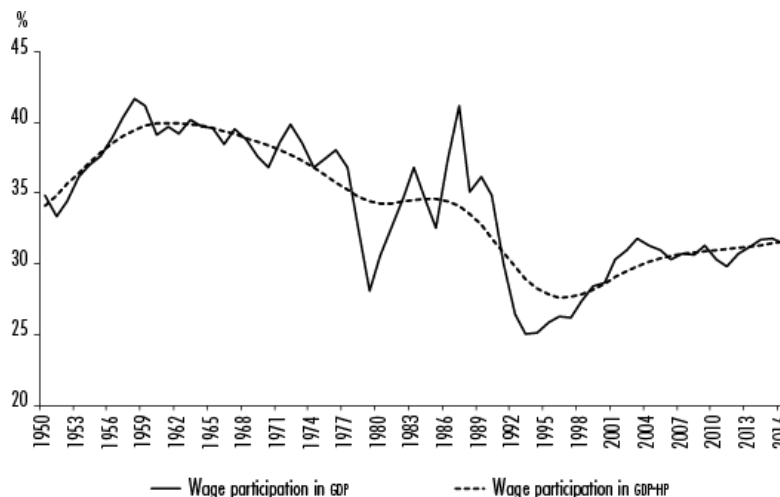
The Allianz data covers financial wealth, including the combination of deposits, shares and bonds, and pension funds. For Argentina, the bank deposit structure information was utilized to estimate the structure of financial wealth. The exchange rate used to convert to euros corresponds to the end of the year. Allianz explains that it uses information from balance sheets or approximations are made using other statistics, such as household surveys. It is noted that in the case of Peru, household surveys were used. The exchange rate used to convert to American dollars comes from Officer (2018), which is a very useful source for valuation of assets in historical studies.

3. FACTORIAL INCOME DISTRIBUTION

Earnings, salaries and mixed income quotas

Below, the evolution of the participation of different income elements with respect to the GDP are demonstrated. The information appears in the values that are observed and with the non-linear tendency obtained via Hodrick-Prescott (HP).² Figure 1 reflects the wage share with respect to the product between 1950-2016 with a sinusoidal trajectory, with peak values at the beginning of the 1960s and a decreasing tendency during the 1970s, an interruption in the 1980s, to then begin to fall again at the beginning of the 1990s when a severe adjustment, stabilization and structural change policy was established. Beginning in the mid-1990s, a growing trend is seen once more, without reaching the levels of the golden age of capitalism.

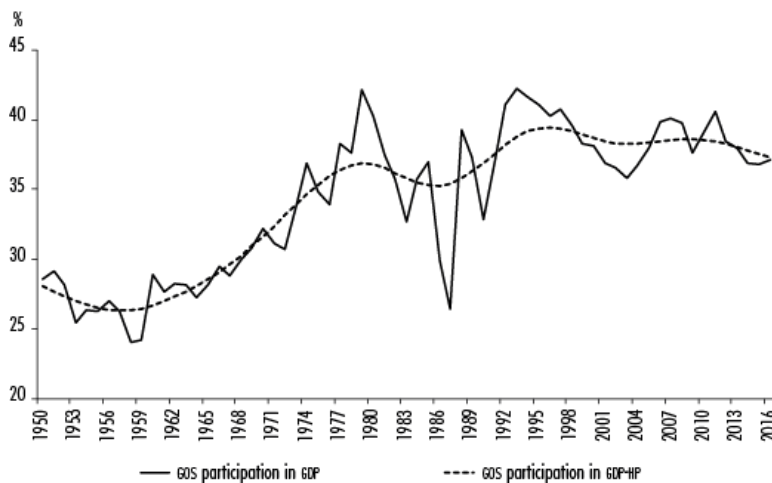
Figure 1. Wage Participation in the GDP and HP Tendency (1950-2016)



Source: prepared by the authors based on BCRP (1984, 2018), Ministry of Finance and Commerce (1959), INE (1981, 1990), CEPAL (1990, 1992, 1994), INEI (2013, 2018), Castillo (2015).

Figure 2 shows the gross operating surplus (earnings)'s participation with respect to the GDP. This series also presents a sinusoidal ascending tendency until the end of the 1990s. Two peaks can be noted in the second five-year-period of the 1970s, and the first five-year-period of the 1990s, just when wage participation was significantly reduced. Starting in the 21st century, higher levels of the earnings share were observed prior to the international financial crisis, and immediately afterwards when the highest prices for raw materials for exportation were obtained. Beginning in 2013, earnings participation was reduced by the lower prices of raw materials.

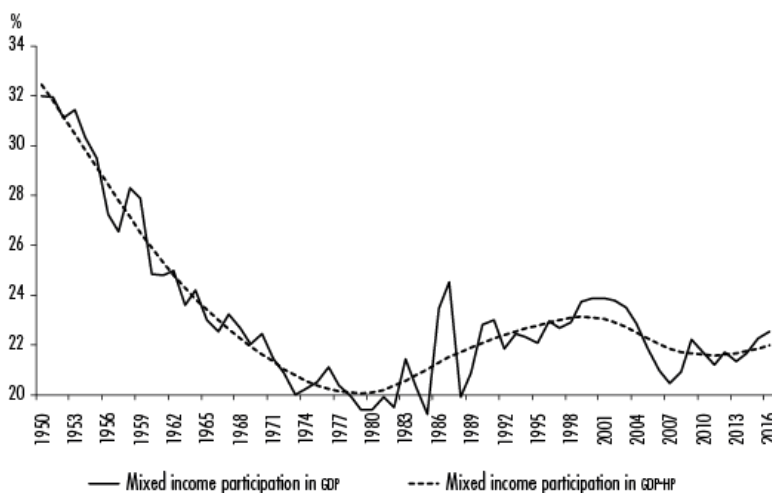
Figure 2. Participation of the Gross Operating Surplus in the GDP and HP Tendency (1950-2016)



Source: prepared by the authors based on BCRP (2018), Ministry of Finance and Commerce (1951, 1959), INE (1981, 1990), CEPAL (1981, 1990, 1992, 1994, 2001), INEI (2013, 2018), García (2013), World Bank (2018), Seminario (2015).

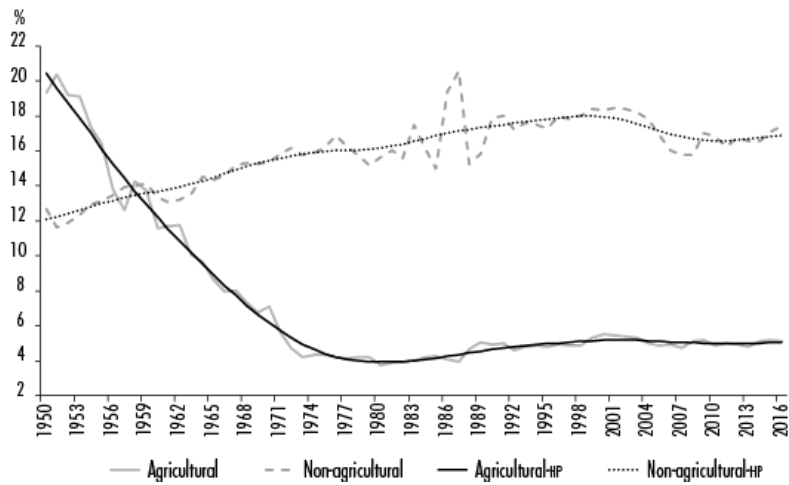
The participation of mixed income (independent workers earning on their own account from the urban and rural sectors) is seen in Figure 3. This series' tendency is to decrease until the mid-1970s, at which time a growth in the modern urban sector is produced compared to the agribusiness-rural sector, and which accommodates the largest contingents of independent workers (farmers). Starting in the 1980s and 90s, a growth can be observed in this participation as a result of wage share reduction, as they were seen in the non-agricultural sector (primarily commerce and services), as can be assessed in figure 4. Additionally, mixed rural income participation reaches a minimum at the beginning of the 1980s, after which a slight rising tendency can be observed as a result of higher growth relative to agricultural production for the interests of the internal market, and higher traditional and non-traditional exports by a variety of farmers' groups.

Figure 3. Participation of Mixed Income in the GDP and HP Tendency (1950-2016)



Source: prepared by the authors based on BCRP (1984, 2018), Ministry of Finance and Commerce (1951, 1959), INE (1981, 1990), CEPAL (1990, 1992, 1994), INEI (2013, 2018), García (2013), Seminario (2015), Castillo (2015).

Figure 4. Participation of Agricultural and Non-Agricultural Mixed Income in the GDP and HP Tendency (1950-2016)

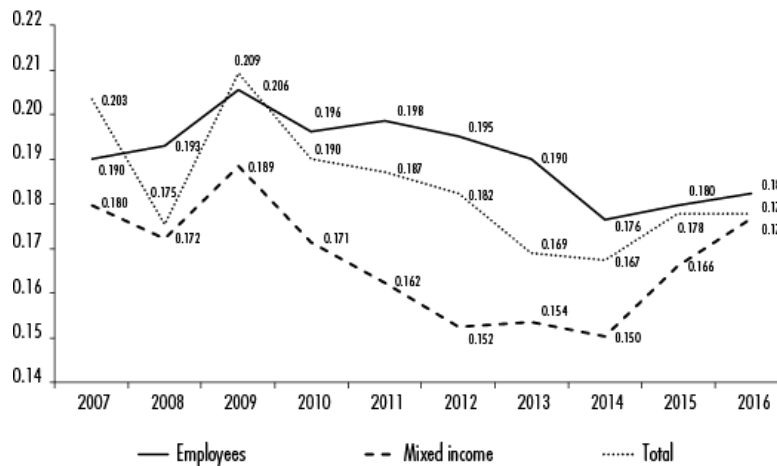


Source: prepared by the authors based on BCRP (1984, 2018), Ministry of Finance and Commerce (1951, 1959), INE (1981, 1990), CEPAL (1990, 1992, 1994), INEI (2013, 2018), García (2013), Seminario (2015), Castillo (2015).

Gini for employees and independent workers

The official detailed information on the working population, the wages and salaries total and mixed income for 13 productive sectors and the nation as a whole, between the base years 2007 and 2016, allows for an inequality indicator to be obtained for both income categories—though it should be noted that this applies for a short and recent period. Unfortunately, the other national account bases do not allow for a reassessment with the same sector classification. Figure 5 exhibits the Gini indicator reached based on average income from each productive sector, along with receivers of remunerations and independent workers. In addition, the results of a joint evaluation of both groups is presented.

Figure 5. Gini Coefficient for Employees, Mixed Income and Total 2007-2016



Source: prepared by the authors based on INEI (2017).

One first element to emphasize is that inequality, considering the average sectoral incomes, is reduced: by around 0.2 in the case of employees and less in that of independent workers who have a more egalitarian distributive structure. A second element is that inequality varies across time, being higher during the years of economic deceleration, like in 2009 and between 2014-2016, with the result that average intersectoral incomes are more spread out. By contrast, during the years of higher economic growth, the wage and income dispersion is reduced. A third element is the positive correlation between inequality in the formal sector (employees) and independent workers, since both grow in times of crisis, while when economic growth is higher, they decrease.

4. PERSONAL INCOME DISTRIBUTION

Official results

The official results for measuring inequality in personal income distribution drawn from the NHS are shown in Table 1, in which data calculated from incomes and registered outflows in that survey are distinguished. In both cases, the tendency is clearly decreasing, reflecting decreasing inequality that is reported internally and by international organizations. It must be stressed that with these results, the personal income distribution would be less inequitable than in all of the other members of the Pacific Alliance, such as: Chile, Colombia and Mexico. Accordingly, it would be close to what is reported for the highest income economies.

Table 1. Official Results for Gini Coefficient Based on NHS (2004-2016)

	2004	2005	2006	2007	2008	2009	2010
Income Gini	0.49	0.51	0.50	0.50	0.48	0.47	0.46
Spending Gini	0.41	0.41	0.42	0.41	0.38	0.39	0.37
	2011	2012	2013	2014	2015	2016	
Income Gini	0.45	0.45	0.44	0.44	0.44	0.44	
Spending Gini	0.36	0.36	0.35	0.35	0.35	0.34	

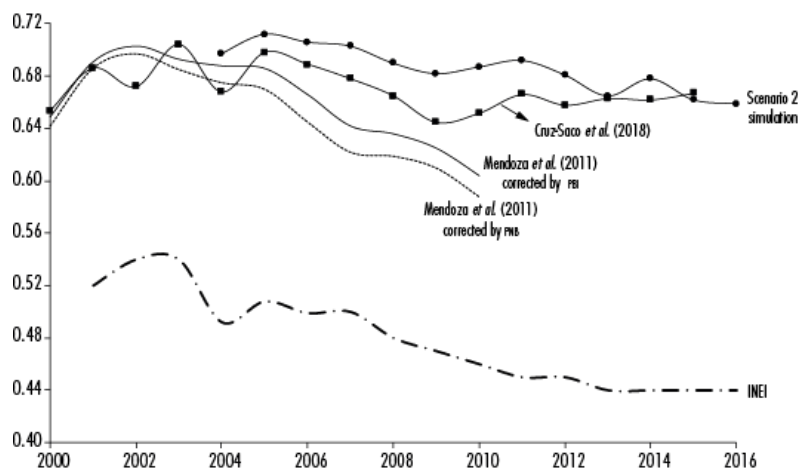
Source: prepared by the authors based on INEI (2017).

These results are questioned by a range of academics for a variety of reasons, and new non-official calculations are offered. In the first place, the extrapolation at a national level of the NHS results only allows for reaching an amount equivalent to half of the national income. Secondly, the survey underestimates all of the income and spending from the upper income decile. In this regard, a data analysis indicates that the wealthiest households are actually part of the middle-income sectors. An underestimation is also found in the case of the lowest income decile of society.

Adjustments to the Gini

Adjustments to the definition of income, incorporating transfers and taxes, may be established; additionally, information on aggregate consumption is used to correct spending inequality (Mendoza *et al.*, 2011). These authors assume a decreasing poverty rate and argue that income inequality has been decreasing at a slower rate than poverty. Given these aspects, in Figure 6 shows the adjusted Gini for the fluctuating GDP around 0.6, with a maximum value of 0.7 in 2002; meanwhile, the adjusted Gini for GDP would end up in 2010 around 0.59, with a maximum value of 0.69, which are figures higher than the official ones.

Figure 6. Evolution of Gini for Official Income, Mendoza *et al.*, Cruz-Saco *et al.*, and adjustments according to the authors



Source: prepared by the authors based on INEI (2017), Cruz-Saco *et al.* (2018) and Mendoza *et al.* (2011).

On the other hand, calculations by Yamada *et al.* (2016) give concerted attention to the income differences extrapolated based on the surveys and the income estimated from the national accounts, which they also redistribute uniformly across the distribution which would have a log-normal form. With these suppositions, new results are obtained which are closer to official numbers, which fluctuate between 0.65 in 2004 to 0.51 in 2004. Cruz-Saco *et al.* (2018) correct the problem of the upper layer, taking a Pareto distribution to eliminate the downward bias of the surveys. The difference between disposable income in national accounts and what is extrapolated in surveys is imputed completely to the upper layer. Given these assumptions, inequality remains high (between 0.69 in 2001 and 0.67 in 2015).

According to the methodology of reallocation of the difference between income information derived from national accounts and that extrapolated from the surveys noted in section 2 of this article, and using Montecarlo simulation exercises, three scenarios are offered for the income Gini. In the first case, 90% of the difference is assigned to the upper decile and 10% to the lower decile, generating a fluctuation between 0.68 in 2004 and 0.64 in 2016 (see table 2). The second scenario posits that 5% is assigned to the low-income decile and 95% to the high one, generating a Gini between 0.70 and 0.66. In the last scenario, all of the difference between incomes is assigned to the wealthiest decile of the population, with a resulting Gini between 0.72 in 2004 and 0.68 in 2016.

Table 2. Gini Coefficient with Montecarlo Simulation (2004-2016)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Gini obtained from monetary income total-NHS	0.545	0.547	0.543	0.546	0.524	0.522	0.512	0.506	0.505	0.489	0.496	0.493	0.499
Gini for income	0.490	0.510	0.500	0.500	0.480	0.470	0.460	0.450	0.450	0.440	0.440	0.440	0.440
Scenario 1*	0.677	0.689	0.686	0.682	0.668	0.661	0.664	0.670	0.660	0.646	0.656	0.642	0.639
Scenario 2**	0.697	0.712	0.706	0.703	0.690	0.682	0.687	0.692	0.681	0.665	0.678	0.662	0.659
Scenario 3***	0.718	0.734	0.729	0.725	0.711	0.701	0.708	0.715	0.703	0.686	0.699	0.682	0.678

*10% of the surplus is assigned to decile 1 and 90% to decile 10, ** 5% of surplus is assigned to decile 1 and the other 95% to decile 10, *** 100% of the surplus is assigned to decile 10.

Source: prepared by the authors based on INEI (2017).

5. DISTRIBUTION OF WEALTH AND ASSETS

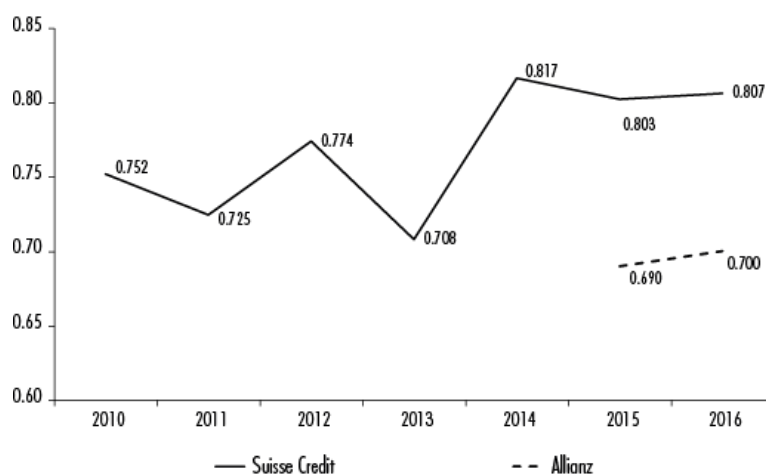
International studies

Credit Suisse (2017) makes periodic calculations regarding wealth and its distribution for the majority of the world's economies. In the Peruvian case, it was estimated that adults who have some form of wealth increased in a sustainable way by 17.8 million in 2010 and 19.8 million in 2016. The range of less than USD\$10 000 has a larger adult population during the period of analysis, and despite presenting some variations it was able to expand by 12.4 million in 2010 and 11.9 million in 2016, plus 2.3 million that rise to the range of higher wealth. Meanwhile, adults with wealth of USD\$10 000 to USD \$100 000 and US\$100 000 to USD\$1 million had the tendency to increase with the maximum of 7.3 million in 2016 and 574 thousand adults, respectively.

There is also information available regarding Peruvians with wealth greater than US\$1 million starting in 2012, growing from 18 500 people in 2012 to 39 600 people in 2016. Within this group, the interval from US\$1 to US\$5 million is the biggest portion and is more than double the past three years, passing from 15 800 in 2012 to 33 300 adults in 2016, while the range from US\$5 to US\$10 million registered a maximum of 3 300 adults in 2016. Lastly, the group of adults with wealth greater than US\$1 billion saw a significant increase, from only 2 adults in 2012 to 10 adults in 2016.

In Figure 7, the Gini value for productive wealth estimated by Credit Suisse is presented, and the corresponding value for the Allianz net financial assets. In both cases, the inequality levels are higher, with values around 0.7 in the case of financial assets, and between 0.7 and 0.82 in the case of productive wealth. Additionally, the trend is increasing with slight fluctuations during the specified years.

Figure 7. Evolution of Gini Coefficient for Wealth in Peru, according to Allianz and Credit Suisse (2010-2016)



Source: prepared by the authors based on Allianz (2016 and 2017) and Credit Suisse (2010-2017).

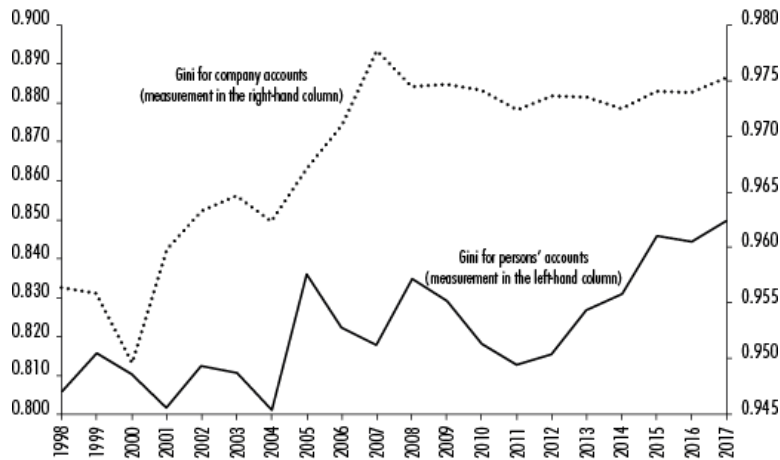
Distribution of bank deposits

Regarding productive wealth and its distribution, there is no existing national information available. Nonetheless, it is possible to perform a calculation of inequality in terms of possession of financial assets based on the information that is periodically provided by SBS, which presents statistics quarterly and at the end of the year regarding the number of bank accounts and total deposits, by age group and differentiated ranges for natural or physical persons' and legal entities with profit motives (companies). All apparent deposits, savings deposits, deposits to terms and CTS³ of the financial system are considered. Based on this information it is possible to determine how deposits are distributed and to calculate the corresponding Gini. The fact that a physical person or company can have various accounts would not affect the results nor the conclusions of the calculation being performed.

In Figure 8 it can be observed that the Gini, which measures the concentration of bank deposits per account, has greater values between 0.8 and 0.85 reflecting higher inequity in the case of physical persons. When values for companies with profit motives are monitored, inequality is higher, given that it would be located

between 0.95 and 0.975. Additionally, when the trend is observed between 1998 and 2017, it increases for both sets of accounts. Inequality is higher on par with its tendency to grow. It is also important to note that a broader period of analysis was not considered, for the modification of thresholds which define each deposit range and account number, given the effects that inflation can have on them.

Figure 8. Evolution of Gini Coefficient for Deposits by Persons' and Companies 1998-2017

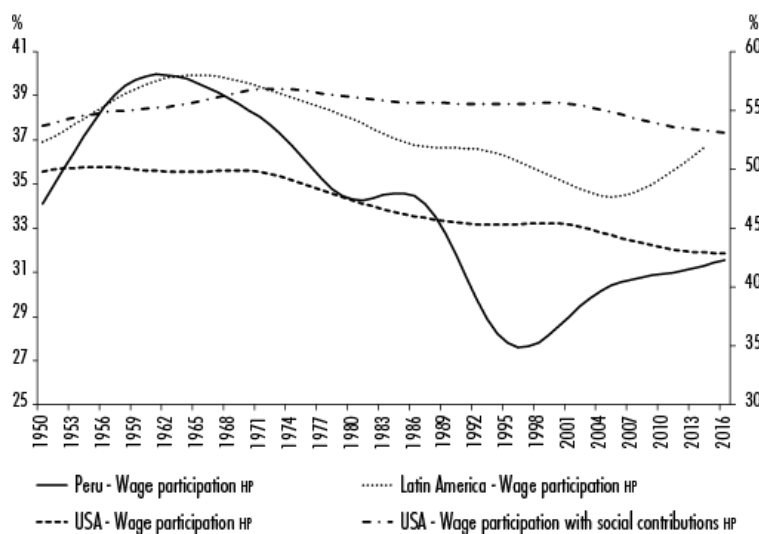


Source: prepared by the authors based on the SBS (2017).

Some international comparisons

In Figure 9, the changes in wage and salary participation in Peru are compared with respect to the GDP, the same motive for the Latin American average calculated by Alarco (2017) and the United States of America. The column on the left-hand side represents the information for the Andean country and Latin America; while the right-hand column shows information for the United States of America procured from the BEA (2018). For the regional information, social contributions are included, and in the United States of America case the data are presented without and with these social contributions. For all of the years, with the exception of the late 1950s, wage participation in the GDP of Latin America is higher than the Peru values; additionally, the decreasing trends starting in the mid-1970s is lower than what is observed for the South American country, where the fall in wage share is more dramatic. In Peru's case, a slight improvement at the beginning of the second quarter of the 1980s is recorded, to later have a substantial reduction in the first quarter of the 1990s as a result of adjustment and stabilization programs, and the structural reforms of that decade. After this period, a recuperation is seen, without arriving at the previous historical levels.

Figure 9. Wage Participation as Regards GDP in Peru, Latin America and the United States of America 1950-2016 HP tendency



Source: prepared by the authors based on the Bureau of Economic Analysis – BEA (2018).

Information for the United States of America without social contributions is clearer, as it evidences the decreasing tendency observed beginning in the 1970s with respect to levels of the 1950s and 60s. During the 1990s, the fall is curbed to then contract once again beginning in the early years of the 21st century onwards.

Despite this negative tendency in wage share participation, the absolute levels are higher than those observed in Latin America and Peru that are associated both with higher levels of income as well as lower informality levels. When the information for the United States of America is demonstrated with social contributions, the

fall in wage quota is lower in the same time period, registering a maximum level at the beginnings of the 1970s and lower in 2016. The wage share has lost around 5 percentage points of the GDP.

Lindenboim (2008) integrates partial series regarding wage participation in the product for a group of developed countries since the 1950s, and for others in the region since 1980. The conclusion is clear in the first economies where the rise on this point until the mid-1970s is observed, to demonstrate its stagnation and later fall associated with the Fordism crisis, with the exception of Denmark. In the case of the diverse economies of the Latin American region, a descending tendency with specific oscillations is seen. Only Chile and Colombia show growth until particular moments in time. Neira (2010) reconstructs the information for total payroll participation in the GDP with the cost of factors for 14 countries, and the Latin American weighted aggregate with the output on par with buying power in dollars consistent with 1970 between 1950-2000, and the corrected versions based on census information including for independent workers and mixed income. The conclusion for the case of the set, with the information presented without any processing, is one ascending phase until the mid-1960s, to reach its maximum level (peak) in 1983 and a second maximum point in the mid-1990s, and a subsequent decrease. Nonetheless, in the author's judgement, there are strong variations between the different countries.

Abeles *et al.* (2014) present the information and analyze the period from 1990-2019, considering the total payroll participation in the GDP as well as a variety of calculations for work income of independent workers in 15 countries, and the whole region. The authors conclude that for both measurements the tendency is descending, even with some exceptions for total payroll participation, like the cases of Argentina, Brazil, Chile and Costa Rica.

Other historical works that address longer periods exist, like Frankema (2009) who evaluates the economies of Argentina, Brazil and Mexico between 1870-2000. All of the wage participation series in the output are cyclical with decreasing tendencies beginning in the 1960s and 70s of the 20th century. Additionally, Bértola *et al.* (2008) analyze the countries of the Southern Cone and determine an increasing tendency in inequality between 1870-1920. There are also studies for shorter periods by the OIT (2012) that reflect both the disparities in Latin American economies and the rise in wage quota in Argentina and Brazil in recent years.

In Tables 3 and 4, comparative information is presented regarding the results of inequality measurements in productive wealth and financial assets distribution in Peru, with respect to certain selected economies. In this final case, the information provided by Allianz on inequality in financial assets distribution is used, while in the case of productive wealth it comes from Credit Suisse.

Table 3. Gini Coefficients of Financial Assets in Selected Countries in 2015 and 2016

<i>Country</i>	<i>Gini 2015</i>	<i>Gini 2016</i>	<i>Average by country</i>
Germany	0.73	0.73	0.73
Argentina	0.67	0.68	0.68
Brazil	0.73	0.73	0.73
Chile	0.73	0.74	0.74
Colombia	0.73	0.74	0.74
Spain	0.56	0.58	0.57
France	0.65	0.66	0.66
Mexico	0.70	0.71	0.71
Peru	0.69	0.70	0.70
United Kingdom	0.75	0.75	0.75
United States of America	0.81	0.81	0.81
Annual average	0.70	0.71	0.71

Source: prepared by the authors based on Allianz (2016, 2017).

Table 4. Evolution of Gini Coefficients for Wealth in Selected Countries in 2010-2016

Country	2010	2011	2012	2013	2014	2015	2016	Average by country
Germany	0.684	0.750	0.777	0.771	0.771	0.775	0.789	0.760
Argentina	0.747	0.675	0.782	0.796	0.809	0.818	0.787	0.773
Brazil	0.796	0.756	0.812	0.821	0.823	0.830	0.829	0.810
Chile	0.647	0.782	0.774	0.814	0.789	0.795	0.805	0.772
Colombia	0.795	0.792	0.788	0.797	0.768	0.769	0.762	0.782
Spain	0.565	0.634	0.662	0.661	0.671	0.671	0.680	0.649
France	0.758	0.754	0.755	0.690	0.697	0.703	0.720	0.725
Mexico	0.780	0.725	0.780	0.780	0.759	0.759	0.779	0.766
Peru	0.752	0.725	0.774	0.708	0.817	0.803	0.807	0.769
United Kingdom	0.717	0.670	0.675	0.677	0.682	0.678	0.732	0.690
United States of America	0.809	0.824	0.852	0.851	0.846	0.850	0.862	0.842
Annual average	0.732	0.735	0.766	0.761	0.767	0.768	0.777	0.758

Source: prepared by the authors based on Allianz (2010-2017).

To this effect, when the situation of financial assets distribution from Allianz is evaluated, the situation in Peru is inequitable, but is located under the simple average of the selected economies in 2015, while in 2016 it is slightly above the average. Inequality in the possession of financial assets in Peru is under the level of all of the other Latin American economies except Argentina. Additionally, it is under the European levels, except the United Kingdom. According to the Allianz calculations, the United States of America is the economy with the highest levels of financial asset concentration.

The panorama changes when information from Credit Suisse is analyzed, in relation to the distribution of productive wealth (see Table 4). In all the years, Peru has a Gini coefficient above the simple average of the selected economies, except in 2011 and 2013. Still, Peru is found to be under the average of the rest of the selected Latin American economies, which are: Argentina, Brazil, Chile and Colombia, with the exception of Mexico. Additionally, the average inequality level during the period of analysis in Peru is found to be above the values seen for the European economies being analyzed, which are: Germany, France and Spain. Of all of the selected economies, the United States of America shows the highest concentration of wealth levels, and the United Kingdom shows a Gini coefficient higher than that of Peru.

6. CONCLUSIONS

In Peru, inequality in wealth distribution, factorial distribution and of income is elevated. Though calculations of productive wealth are private, Gini coefficients above 0.7 are demonstrated for the period of 2010-2016. Values of the Gini coefficient for physical persons' bank deposits are growing from values of 0.8 and 0.85 between 1998-2017. Additionally, the various adjustments of the Gini for personal income distribution fluctuate between 0.6 and 0.7, that constitute elevated values with respect to international standards. The official Gini for personal income distribution is clearly underestimated.

Gini values for wealth obtained from Credit Suisse, like the ones elaborated in the present study, are higher than the results of various adjustments to the Gini for personal income distribution. The results of net financial wealth, shown by Allianz, are slightly higher than those calculated for income inequality. Wealth inequality is higher than inequality in personal income distribution. This result is in line with the arguments of a variety of international studies, elaborated by Van Bavel and Frankema (2013).

The recently elevated Gini coefficients have as one explanatory factor the decreased participation of wages and mixed income in the GDP; while the earnings quota in the output is growing and has stayed higher in the past few years. This tendency is not limited to Peru, as it shares a similar trajectory to what has occurred at the Latin American and international levels, in that the greater participation of wages in the GDP is seen during the golden age of capitalism, and decreases in its neoliberal phase.

The non-linear tendency of total payroll participation in the GDP in Peru shows a decreasing trend with a first peak in the 1960s, a peak in the 1990s, and from there a recuperation in the second part of the same decade, stagnation and slight growth at the end of the period. Total payroll participation in the GDP is lower than the average for Latin America and the majority of developed economies, as substantiated by the information regarding the United States of America. The gross operating surplus participation shows a growing trend until the second quarter of the 1990s, to then exhibit a decreasing trend as a consequence of the fall in exportation prices of Peruvian raw materials. It should be highlighted that two stages in earnings participation are seen in the second quarter of the 1970s and the second quarter of the 1990s.

Regarding mixed income participation in the GDP, a decreasing tendency is registered until the end of the 1970s, to then see growth until 2000. Subsequently, a slight decreasing and then increasing trend is seen in the last years of the series. The first part of the general mixed income series is explained by the decreasing tendency of income in the agricultural sector, which afterwards demonstrates a very small increasing trend until the present. Non-agricultural income also maintains a slight increasing tendency with some fluctuations across time. These fluctuations demonstrate an inverse relationship to the GDP.

Given concerns of space it is not possible to analyze in detail all of the results that have been obtained here. The fragmentary and partial nature of the available statistics should be acknowledged; at the same time, the creation and improvement of official information on these topics should be proposed. The design and application of an explanatory model of inequality based on wealth and productive assets distribution are left to the future, in order to proceed with the factorial and

then personal distribution. An analysis of the impacts of inequality are not addressed. The study is circumscribed by presenting inequality based on its standard Gini indicator, omitting other indicators that would exceed the space available. A historical analysis is not performed either, which would explain the detailed changes in the different results, nor are proposals given to address higher inequality, among other issues.

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¹ The study will not approach other forms of wealth, such as: value of natural capital, agricultural land and forest resources, human capital, immovable goods for household use and other assets not used productively.

² This demonstrates results equivalent to a size 10 mobile average, without losing any observations.

³ Modality of obligatory deposit for employees that is established based on monthly income and which is collected when the worker is fired or retired from the company where they worked.