

Income and Wealth Inequality in Cyprus: Empirical evidence from the Household Finance and Consumption Survey[§]

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Abstract

We estimate the Gini Coefficient for total income, total wealth, net income and net wealth in Cyprus, using microdata from the Eurosystem Household Finance and Consumption Survey over the years 2009-2017. The results suggest that net income inequality increased slightly from 2009 to 2013, most likely attributed to the economic crisis and its consequences on households. After the end of the crisis and during the recovery period, net income inequality decreased. On the other hand, wealth inequality increased significantly in the recovery period, potentially attributed to the deleveraging behaviour observed by many middle and low-income households, who reduced the liabilities they had accumulated before the economic crisis. Wealthier households appear to have potentially benefited from the increase in real estate prices and the decrease in interest rates during the recovery.

Keywords: HFCS, Inequality, Survey, Wealth, Cyprus

1. Introduction

Economic inequality in a country is created when income or wealth is not distributed equally between the populations and a gap is created between those considered as the rich, at the top percentile of the distribution, and the poor, at the bottom percentile of the distribution (Kuznets, 1995). Income inequality can be harmful to an economy since it impedes growth, and increases poverty and crime, while people choose poor healthcare and education as they lack the funds to invest in better education and better-quality healthcare. Overall, such consequences have a negative effect on the country as it lowers the overall standard of living (Kuznets, 1995). Having that in mind, it is very important to see why nations strive to decrease income and wealth inequality (Furman and Stiglitz, 2017).

Several pertinent studies have highlighted the importance of the topic in the past, with researchers in Cyprus trying to understand the trends in income and wealth inequality, as well as the implications this could have on economic policies. In the most related study, Hajispyrou and Nicolaidou (2007) mentioned that “*the issue remains important for governments in view of concerns that structural changes due to the EU accession and, in general, globalization, may lead to higher inequality*” (page 81). Using data from the Family Expenditure Surveys, conducted by the Statistical Service of Cyprus, the authors employ two different

[§] We would like to thank George Georgiou for his valuable comments and suggestions. All remaining errors are our own. The views expressed in the paper are strictly personal and do not necessarily reflect the views of the institutions the authors are affiliated with.

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measurement methods in order to assess the trend of aggregate inequality in Cyprus over the period 1991-2003. They conclude that the income position of some household groups (single parents, large families and the unemployed) deteriorated over that period. On the policy front, Hajispyrou and Nicolaidou (2007) note that measures tackling gender discrimination can also potentially combat income inequality.

On the other hand, Andreou and Pashardes (2009) examine inequality and poverty from a comparative perspective, using data from the EU Statistics on Income and Living Conditions (EU-SILC, 2007). They find that income inequality and poverty in Cyprus is close to the EU average, even though, as Pashardes and Polycarpou (2008) note, estimates may be biased towards higher inequality given the large size of the black economy at the time. Additionally, they also estimate the distributional effects of the implementation of the pension scheme reforms, which they estimate to have decreased income inequality and poverty rate leading to socially desirable results.

In more recent studies, Pashardes and Polycarpou, (2010) examine the depth of poverty and the employment behaviour of public assistance recipients in Cyprus, proposing potential measures to encourage labour market participation of the beneficiaries. Similarly, Koutsampelas (2011), employs micro data from the 2008/9 Family Expenditure Survey to measure the performance of the Cypriot welfare state on tackling inequality and to assess the anti-poverty impact of social transfers with regard to incidence, intensity and inequality of poverty.

In the most recent study, Koutsampelas and Polycarpou (2013) attempted to provide an early assessment of the short-run distributional effects of austerity measures, just on the onset of the economic crisis in Cyprus and its potential adverse impact on the income distribution. Their results suggest that austerity measures could indirectly rise inequality in Cyprus, given that unemployment risk is asymmetrically distributed.

In the spirit of the above-mentioned studies, we focus on measuring income and wealth inequality in Cyprus through time, using micro data from the Eurosystem Household Finance and Consumption Survey (HFCS). In particular, we estimate the Gini coefficient for total income, total wealth, net income and net wealth in order to measure the evolution of income and wealth inequality over the reference years 2009, 2013 and 2017 of the three waves of the afore mentioned survey. In addition, we also provide an estimate of the distance between the richest and the poorest households in Cyprus, by looking at the ratio of income and wealth between the top and lower decile of the income distribution.

Overall, our results suggest that both total income and total wealth inequality in Cyprus have decreased from 2009 to 2013, likely due to the Cyprus economic crisis that forced deleveraging on many households. From 2013 to 2017, total income inequality registered only a marginal change, while net income inequality appears to have decreased. On the other hand, it seems that the Gini coefficient for both total and net wealth has increased over the same period, suggesting more and wealth inequality in Cyprus after the crisis.

2. Measuring inequality: a European overview

In the world's richest countries, income inequality seems to have been rising over time: during the 1980s the top 10% of the population had an average disposable income seven times higher than the poorest 10%; today it is 9.5 times higher (Wolff, 1992).

Generally, countries such as Germany, France and the Netherlands have income inequality close to the European Union average, which was about 0.32 in 2013 (Filauro, 2018), the

central Eastern European countries such as Czech Republic, Slovenia and Slovakia also have smaller income inequality levels. However, all southern European countries have above average income inequality (Filauro, 2018).

Until 2008-09, income inequality in the European Union had been increasing (Filauro, 2018). However, the Global Financial Crisis in 2008 had a clear impact on the economic wellbeing of European citizens, since it affected their employment conditions, income levels and social protection benefits (Bubbico and Freytag, 2018).

The financial crisis has caused an increase in the Gini coefficient and income inequality in all the member states of the European Union. More specifically, the largest increase of the Gini coefficient based on market income was recorded in Spain, it was increased by 8 points, followed by Cyprus (7 points), Greece (6 points) and by Ireland, Italy and Portugal (increase by 3-4 points), (Callan et al., 2018). As the authors note, the largest part of this change can be attributed to the loss of income (notably by workers in the leftmost part of the distribution), while automatic stabilizers were important in mitigating part of the losses (Callan et al., 2018).

On the other hand, wealth is accumulated over time, so it is spread out more unequally than income and is thus usually less affected by market changes. In all European countries, wealth distribution is much more concentrated at the top than is income distribution. Countries with lower or average levels of income inequality are not necessarily countries with lower concentrations of wealth. As an example, the United Kingdom is one of the most unequal countries in income distribution, but wealth inequality is around average (Förster et al., 2017). In contrast, EU countries with the lowest income inequality such as Austria, Germany and the Netherlands appear to have the highest wealth inequality in the EU. Similarly, to income inequality, wealth inequality has increased since the financial crisis in the EU (Förster et al., 2017).

3. The Eurosystem Household Finance and Consumption Survey (HFCS)

The Household Finance and Consumption Network (HFCN), which was established in December 2006, consists of survey specialists, statisticians and economists from the ECB, the national central banks of the Eurosystem and a number of national statistical institutes. The HFCN conducts the Eurosystem's Household Finance and Consumption Survey (HFCS), which collects household-level data on households' finances and consumption. In this survey the majority of euro area countries are participating, while it is coordinated by the ECB and it has a triennial frequency.¹ In most euro-area countries, the first wave of the HFCS was conducted in 2010-2011, the second wave in 2013-2015 and the third wave in 2017.

The questions aim to assess the household's consumption, value of real assets, liabilities, businesses, income, pensions as well as other areas of interest. The survey is conducted through personal interviews (Computer Assisted Personal Interviews - CAPI) of household's representatives and is based on a harmonised questionnaire. Its aim is to record, measure and analyse financial and economic data in areas such as savings, investments, lending, consumption, financial transactions and retirement planning decisions, both at the individual level and household level. However, because of the cultural and institutional differences between the euro area countries, there is some flexibility in the questions in each country's questionnaire, so the euro-area countries do not use identical

¹ https://www.ecb.europa.eu/stats/ecb_surveys/hfcs/html/index.en.html
[Household Finance and Consumption Network \(HFCN\) \(europa.eu\)](https://www.ecb.europa.eu/stats/ecb_surveys/hfcs/html/index.en.html)

questionnaires.² It is important to mention that participant’s anonymity is enshrined and in no way personal data is disclosed in any of the analysis based on microdata or aggregated data of the Survey.

In Cyprus, the first wave of HFCS was conducted in 2009, the second wave in 2013 and the third in 2017. The Cyprus questionnaire includes all the core questions from the ECB core blueprint questionnaire, but also has some additional non-core and country specific questions. These are of particular interest for the case of Cypriot households, and relate to properties ownership, loan sizes and their status (performing or non-performing), whether they own any assets in the part of the island not under the effective control of the Republic of Cyprus, their investment holdings, and labour status.³ For this study, in order to focus on inequality, we have opted to create the wealth and income variables, using HCFS questions. Details regarding the generation of the derived variables can be found in Appendix I, while details regarding the imputation process for tackling item non-response and the weighting procedure used in this study are available in Appendix II.

4. Inequality and the Gini coefficient

The Gini coefficient is a measure of wealth or income inequality and it represents the income or wealth distribution of a country’s residents. The values of the Gini coefficient range from 0 to 1, where a Gini coefficient of 0 expresses perfect equality and a Gini coefficient of 1 expresses perfect inequality.

The Gini Coefficient is usually defined mathematically based on the Lorenz curve. The Lorenz curve is a graphical representation of overall income or wealth assumed by the bottom x% of the population. On the x-axis, there is the percentage of households and the percentage of income is on the y-axis. In addition, the line at 45 degrees represents perfect equality of incomes and the Gini coefficient can be thought as the ratio of the area that lines between the line of equality and the Lorenz curve.

An alternative approach is to define the Gini coefficient as half of the relative mean absolute difference, which is mathematically equal to the Lorenz curve definition. The mean absolute difference is the average absolute difference of all pairs of items of the population, and the relative mean absolute difference is the mean absolute difference divided by the average \bar{x} , to normalize for scale. If x_i is the wealth or income of person i , and there are n persons, then the Gini coefficient G is given by:

$$G = \frac{\sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|}{2n \sum_{i=1}^n x_i} = \frac{\sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|}{2n \sum_{i=1}^n x_i} = \frac{\sum_{i=1}^n \sum_{j=1}^n |x_i - x_j|}{2n^2 \bar{x}}$$

In this paper, we estimate the Gini coefficient using the `descogini` and `ineqdeco` commands on Stata, based on the work of Lopez-Feldman (2005), and Jenkins (1999) respectively. More details regarding the computational steps required to reach the results of the following section can be found in the aforementioned references.

² Retrieved from https://www.ecb.europa.eu/pub/economic-research/research-networks/html/researcher_hfcn.en.htm

³ Retrieved from <https://www.centralbank.cy/el/announcements/23122016>

5. Income and Wealth Inequality in Cyprus

Using the HFCS data, tables 1 to 4 below, show the Gini coefficient evolution for Total Wealth and Total Income in Cyprus, for the years 2009, 2013 and 2017. Firstly, the Gini coefficient for Total Income in 2009 stands at 0.45, which is above the European average (0.31), which means that there is more income inequality in Cyprus than in the European Union. There is a decrease in the Gini coefficient in 2013, to 0.4204, which means that income inequality between Cypriot households decreased.

This result appear to have been affected by the financial crisis that unfolded in Cyprus in 2013. The adverse financial effects on Cypriot households, such as significant cuts in salaries, increased unemployment, and the increase in non-performing loans (Cleanthous et al., 2019), generally, caused a substantial reduction in household total income. As it appears, the impact of the financial crisis may have been greater on the rightmost part of the total income distribution, given that the inequality decreased during the crisis.

The picture is different when we examine the evolution of the net income Gini coefficient (table 2), with net income reflecting income after financial instalments (or any regular payments on households' liabilities) are deducted. In 2009, the Gini coefficient was about 0.548, which shows that net income inequality in Cyprus was higher than the Gini coefficient for total income in 2009. The Gini coefficient for net income registered an increase from 2009 to 2013, indicating the net income inequality among Cypriot households increased, albeit to a small extent. This trend appears to have reversed, however, in the post-crisis wave of the survey, in 2017, where the Gini coefficient for net income decreased to 0.503, from 0.554 in the 2014 wave. This result suggests that a large part of the previous inequality was a result of the large amount of debt that was used to boost incomes, e.g. via the over-expansion of the construction and other supporting industries. As banks started to push for repayments and debt-to-asset swaps after the 2013 crash, these people saw a larger-than-expected drop in their income.

TABLE 1

Total Income, Gini Coefficient

Year	Gini
2009	0.446
2013	0.420
2017	0.422

TABLE 2

Net Income, Gini Coefficient

Year	Gini
2009	0.548
2013	0.554
2017	0.503

The Gini Coefficient for total household wealth in 2009 stood at 0.619, whereas in 2013 (table 3), the Gini coefficient was about 0.571, lower than 2009, suggesting that there was lower total wealth inequality in 2013 than in 2009. This result mainly reflects the predominance of

real estate holdings among Cyprus households, a practice that places Cyprus at a disproportionate real wealth level compared to other euro area counterparts, according to the HFCS survey. In addition, the fact that Cyprus has faced a boom-crash cycle in real estate prices (Michail and Thucydides, 2019) is likely the reason for the large ups and downs in the value of total wealth inequality. As such, it should be borne in mind that wealth inequality in Cyprus would effectively reflect real estate holdings inequality, as well as their (subjective) valuation by the respondents. This is evident from table 2, where total wealth inequality jumped higher in 2017, as real estate prices started their recovery.

The Gini coefficient for net wealth in 2009 was about 0.674 (table 4), higher than the Gini coefficient of total wealth, as well as the Gini coefficient of net income. In addition, in 2013 the Gini coefficient remained stable, while in 2017, the Gini coefficient increased further to 0.717. This particularly high level of inequality, as well as its overall increasing trend, suggests two possible outcomes: first, the rightmost part of the wealth distribution (i.e. the richest household) appears to have been less indebted and, second and most important, they were the ones which appear have benefited the most from the economic recovery since 2015.

TABLE 3
Total Wealth, Gini Coefficient

Year	Gini
2009	0.619
2013	0.571
2017	0.648

TABLE 4
Net Wealth, Gini Coefficient

Year	Gini
2009	0.674
2013	0.674
2017	0.717

Tables 5, 6, 7 and 8 present the ratio between people who belong in the top percentage of the income distribution and households who are at the bottom percentage of the wealth distribution. From table 5 it is evident that in 2009, households who belonged in the top 10% of the population had 9 times more total income than households who belonged in the bottom 10%. The ratio between households in the top 10% and ones that belonged in the bottom 50% was smaller, at 2.63. In 2013, resulting from the financial crisis, the ratio of the total income between households in the top 10% and bottom 10% decreased. Households at the bottom have about 7.9 times less total income than households at the top, which means that inequality between the very rich and very poor households in Cyprus decreased.

In table 6, households who belonged in the top 10% of the population in Cyprus had 79.4 times more wealth than households in the bottom 10% did. In 2013, there was a small decrease but in 2017, households in the top 10% had 174.32 times more wealth than households in the bottom 10%, indicating a big increase in wealth inequality among Cypriot households from 2009 to 2017. This again supports the view that the rightmost part of the

wealth distribution (i.e. the richest households) were the ones that benefited the most from the post-2015 economic recovery.

TABLE 5
Total Income

Year	p90/p10	p90/p50	p10/p50	p75/p25
2009	9.319	2.63	0.282	3.158
2013	7.916	2.655	0.335	2.985
2017	7.425	2.456	0.331	3.109

TABLE 6
Total Wealth

Year	p90/p10	p90/p50	p10/p50	p75/p25
2009	79.452	4.679	0.059	4.704
2013	76.364	3.81	0.05	3.958
2017	174.32	4.103	0.024	6.476

In 2009, households in the top 10% had about 15 times higher net income than households who belonged in the bottom 10% of the distribution (table 7). In 2013 there was a big increase in that ratio, households at the top 10% had 73.5 more net income than the ones at the bottom 10%. This situation was likely a result of the significant decrease in household income at the bottom 10% of the population. In 2017, inequality between Cypriot households who belonged at the top 10% and bottom 10% became even larger than 2013, since the total income of the richest households was about 173 times more than the poor ones.

TABLE 7
Net Income

Year	p90/p10	p90/p50	p10/p50	p75/p25
2009	14.92	2.858	0.192	3.643
2013	73.529	2.778	0.038	3.641
2017	9.90	2.64	0.267	3.26

TABLE 8
Net Wealth

Year	p90/p10	p90/p50	p10/p50	p75/p25
2009	337.513	5.271	0.016	7.88
2013	1405.202	4.553	0.003	6.494
2017	1293.103	4.884	0.004	20.676

Finally, as it is evident from table 8, in 2009 households who belonged in the top 10% of the population had 337.5 times more net wealth than households who belonged in the bottom

10%. Similarly to net income, in 2013 there was a big increase in the ratio of net wealth between households at the top and at the bottom of the population. In particular, households at the top 90% have 1405.2 times more net wealth than households at the bottom 10% of the population. In 2017, there was a small decrease in the ratio, with households at the top having 1293.1 more net wealth than households at the bottom of the Cypriot population.

6. Concluding remarks

In this paper, we focus on measuring the Gini coefficient in the income and wealth distributions in Cyprus, over the past 10 years. In particular, we have estimated the Gini coefficient for the years 2009, 2013 and 2017, for total income, total wealth, net income and net wealth, using microdata from the Eurosystem Household Finance and Consumption Survey. Our results show that, in conjunction with earlier studies (e.g. Hajispyrou and Nikolaidou, 2007), the Gini coefficient for net income inequality increased to a small extent between the years 2009 - 2013, most likely a result of the crisis which affected the Cypriot economy in 2012-2015. In contrast, we find that in the 2013-2017 period, net income inequality has decreased, while the Gini coefficient for net wealth has registered an increase.

The significant increase in net wealth inequality could perhaps be attributed to the deleveraging phase the Cyprus economy has been experiencing since the start of the recovery period, forcing many middle and low-income households to consolidate and reduce loans. On the other hand, higher-income households have possibly benefited from the increase in real estate prices and the reduction in interest rates, perhaps also suggesting that the recovery benefited such households more. Another possible justification would be the austerity measures imposed between the period 2011-2012, which as Koutsampelas and Polykarpou (2013) suggest, may have caused distributional issues.

Overall, the findings of this paper suggest that (in)equality cannot be considered to be stable across time, and that large changes can occur in the case of strong changes in the macroeconomic environment. Fortunately, economic policy can have an important role in reducing inequality, with the literature (Koutsampelas, 2013; Pashardes and Polykarpou, 2010) suggesting a variety of policies, such as child benefits, and other forms of fiscal reforms and public assistance. Naturally, targeting such forms of assistance to the proper recipients is of the outmost importance in order for the lowest end of the income and wealth distribution to benefit the most.

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Appendix I - HFCS Aggregate Variables

Total Household Income = gross labour income (PG0110) + gross income from self-employment (PG0210) + gross income from public pensions (PG0310) + gross income from occupational and private pension plans (PG0410) + gross income from unemployment benefits (PG0510) + income from public/regular social transfers (HG0110) + gross rental income from real estate property (HG0310) + gross income from financial investments (HG0410) + gross income from private businesses other than self-employment (HG0510) + income from regular private transfers (HG0210) + gross income from other sources (HG0610)

Household Net Income after serving debt = Total household monthly income (**Total Household Income** /12) - Total monthly expenses of the household (payments on loans and/or other liabilities = HB2001 + HB2002 + HB2003 + HB2200 + SUM(HB400\$X) + HB4205 + HC1004X + HC1200 + HC0110)

Total Liabilities = Total outstanding amount on collateralised debt (on the main residence and on other real estate owned by the household = HB1701 + HB1702 + HB1703 + HB2100 + SUM(HB370\$X) + HB4105) + Total outstanding amount on non-collateralised debt (credit facilities, overdraft balance, outstanding balance on credit cards, consumer or personal loans, or any outstanding amount on non-collateralised loan etc. = HC0220 + HC0320 + HC0361 + HC0362 + HC0363 + HC0370 + HC0801 + HC0802 + HC0803 + HC1100)

Total Real Assets = Current value of the main residence of the household (HB0900) + current value of other real estate owned by the household (HB2801 + HB2802 + HB2803 + HB2900) + value of any valuables owned by the household (HB4710) + Total value of cars (HB4400)

Total Financial Assets = value of sight accounts (HD1110) + value of saving accounts (HD1210) + market value of mutual funds (HD1330) + market value of bonds (HD1420) + value of publicly traded shares (HD1510) + value of additional assets in managed accounts (HD1620) + value of any other financial assets (options, futures, index certificates, etc.) HD1920

Total Household Wealth / Total assets = Total real assets + Total financial assets

Net Wealth = Total assets - Total Liabilities

Appendix II - Imputation and Weights

In the HFCS, observations for which no valid response was received from the households should be imputed. Item non-response (missing values in the variables) is tackled by imputing the missing non reported figures using multiple stochastic imputation method. MI in the HFCS is based on the assumption of "missing at random", meaning that the distribution of the complete data only depends on the observed data, conditional on the determinants of item non-response and other covariates.

Consequently, this complete set of variables has to be incorporated to the imputation models (Barceló, 2006). HFCS datasets include five imputates (imputed sets of values) for each missing observation. In Cyprus and many other participating countries MeDaMi (Stata software package) was used to correct for item non-response software package called ICE (Royston, 2004) is based on the same multiple imputation algorithm and implementation of

Gibbs sampling as €MIR, which developed for the purpose of multiply imputing HFCS data. The main part of the program, the imputation model itself, is based on the FRITZ program created for the imputation of the Survey on Consumer Finances at the Federal Reserve Board. The program is structured as an SAS macro embedded in a wider framework determined by the implementation of Gibbs sampling (Eurosystem HFCN, 2016a,b).

With regards to weighting, the standard HFCS procedure for computing and adjusting survey weights takes into account: (i) the unit's probability of selection; (ii) coverage issues; (iii) unit non-response; and (iv) an adjustment of weights to external data (calibration). The methodology is coherent with existing international standards (Eurostat, 2011a and United Nations, 2005). Possible discrepancies between the presented figures in this paper and the respective ones calculated by the ECB in the HFCS Statistical Tables can be attributed to the different methodology in the use of weights. In this paper we weight the sample figures to the population using only the household weights (design weights adjusted for oversampling of the wealthy and unit non-response).