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Some New Insights on Financialisation and Income Inequality

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Abstract

In this paper, we study the relationship between income distribution and financialisation in the United States after the Second World War. Financialisation is introduced as a two-fold process. On the one hand, it can be understood as an increase in the contribution of the financial sector regarding the composition of production, or a flow dimension. On the other hand, we can see it as an increase in the importance of financial assets in terms of the composition of wealth, or a stock dimension. We make use of the share of financial employment on total employment as a *proxy* of the first dimension while wealth composition is measured as the share of financial assets on corporations' total assets. Applying cointegration techniques, we identified a positive long-run relationship between financialisation and income inequality. Causality goes from the flow dimension to inequality and from inequality to the stock dimension.

Keywords: Financialisation, Income inequality, Wealth, United States.

JEL: O14; O15; O16

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1 Introduction

The United States and many countries in Europe have experienced over the past decades growing income inequality that has not gone unnoticed. As a consequence, there has been a marked revival of interest in the study of the income distribution. The causes and consequences of these trends have been the subject of a large body of scholarship inside and outside social sciences.

Much research has focused on the question of the role of globalisation in this phenomenon (e.g. Alderson and Nielson, 2002; Krugman, 2008; Ezcurra and Rodríguez-Pose, 2013; Jaumotte et al., 2013; Cabral et al., 2016). The debate has often concentrated on the impact of an increasingly integrated world economy on distribution. Indeed, empirical evidence does give some support to the hypothesis of a positive association between trade, financial integration, production relocation and income inequality.

Even though it is challenging to disentangle technological change from globalisation patterns, some authors have directly explored the impact of technology on inequality. A prominent argument is the Skill-Biased Technological Change (SBTC) according to which technical change has favour skilled groups replacing tasks previously performed by the unskilled and especially by the medium-skilled, exacerbating income inequality and job polarisation (Acemoglu, 2002; Autor et al., 2008; Acemoglu and Autor, 2011). If education provides skills, rising inequality becomes the result of the pace of new technology exceeding the ability of schools to supply the necessary skills, that is, technology is "winning the race" against education (Goldin and Katz, 2008). Furthermore, authors in this strand of the literature have also pointed out to the impact of international trade and the role of services through similar channels (Autor et al., 2013; Autor and Dorn, 2013; Acemoglu et al., 2016).

A third explanation has emphasised the role of changes in institutions and social norms. It is hard to parse out cleanly and precisely a separation between globalisation, technology and institutional issues. Still, keeping this in mind, it has been claimed, for example, that the rise and fall of unionisation and a declining minimum wage explain much of the recent increase in inequality (Card and DiNardo, 2002; Western and Rosenfeld, 2011; Volscho and Kelly, 2012). The same follows the increased ability of "superstars" and top executives to set their pay (Dew-Becker and Gordon, 2005; Gordon and Dew-Becker, 2007).

In a similar vein, other scholars have argued that a deregulated financial environment has led to the rise of shareholder value orientation with implications concerning both personal and functional income distribution (Epstein, 2005; Lin and Tomaskovic-Devey, 2013; Dünhaupt, 2017). Stiglitz (2013) for instance has sustained that growing inequality is mostly the result of how we have structured the market economy in the last thirty years. Not by chance, the explosion of top managerial compensation and its link with substantial cuts in top tax rates have been investigated when constructing top income shares time series over the long-run (Atkinson et al., 2011; Piketty and Saez, 2013).

Finally, starting from Kuznets' principle that the structure composition and the stage of development of the economy primarily guide changes in inequality, the fourth group of contributions has decomposed variations on income distribution following wage variations across economic sectors (Conceição and Galbraith, 2001; Galbraith, 2012; Galbraith and Hale, 2014). Such disaggregations have enlightened the roles played by the financial sector, the technology boom and by wartime public spending in driving the evolution of income distribution in the United States.

Our contribution combines elements of these two last groups in the sense that we are interested in the implications of the rise in relative importance of the financial sector to income inequality. The literature on financialisation has extensively documented an "increasing role of financial motives, financial markets, financial actors and financial institutions in the operations of the domestic and international economies" (Epstein, 2005, p. 3). One should notice that the term financialisation remains an unclear concept in social science. Even though a precise definition varies considerably across analysis, the shared premise is that the relative size of the financial sector has grown significantly in the last three decades.[1]

Broader speaking, financialisation is a process of structural change that involves an increase in relative importance of the financial sector and its interactions with the rest of the productive structure. Given that we are dealing with a multifaceted phenomenon, in this paper, we introduce financialisation as a two-fold process. On the one hand, it can be understood as an increase in the contribution of the financial sector regarding the composition of production, or a flow dimension. On the other hand, we can see it as an increase in the importance of financial assets in terms of the composition of wealth, or a stock dimension.

In Social Sciences, we often distinguish between quantities that are stocks and those that are flows. Applied research on financialisation has consistently differentiated between flow and stock measures. In general, activity or flow indicators refer to financial incomes or payments relative to total income, while vulnerability or stock indicators are debt over Gross Domestic Product (GDP). However, those indicators are misleading for several reasons. For instance, modern economies produce less measurable goods and services which potentially creates distortions in how we treat financial and R&D outputs (e.g. Nakamura, 2010; Mazzucato and Shipman, 2014; Pagano, 2014). Moreover, it is important to notice that the ratio of a stock over a flow is, in fact, a time measure. Hence, the debt to GDP ratio fails to capture the stock dimension of the financialisation process.

In order to overcome the main limitations of current metrics, we propose two different measures of financialisation, one for each dimension. Accordingly, we make use of the share of financial employment on total employment as a *proxy* of the first dimension. By not relying on value-added shares or the share of financial income on GDP, the use of employment shares has the advantage of avoiding the accounting problems above mentioned.

Notwithstanding, the main contribution of this article relies on looking at the structure of the economy also regarding stocks. Our empirical exercise measures wealth composition as the share of financial assets on corporations' total assets. Such simplification does not come without a cost since we are deliberating leaving aside households and we do not differentiate financial and non-financial companies. However, while still a good proxy for the size of finance on wealth, it allows us to focus our analysis on corporations that after all are the economic units responsible for production activities. We consider that the financialisation measures proposed in this essay overcome the main limitations of previous indicators used in the literature. In this way, we provide better treatment of the process under analysis in its flow and stock dimensions.

Therefore, this article studies the relationship between income distribution and finan-

[1]The concept of financialisation is particularly controversial and has been defined in many ways that often look mutually inconsistent. A more comprehensive discussion of those issues can be found in Vercelli (2013) and Karwowski et al. (2016).

cialisation in the United States after the Second World War. Applying cointegration techniques, we identify a positive long-run relationship between the share of financial employment and income inequality as well as between the share of financial assets and income inequality. At least in what concerns the traditional Gini index, causality goes from the flow dimension of financialisation to inequality and from inequality to the stock dimension. However, when directly confronting both sides of the financialisation process the latter causes the former.

We begin elaborating further our main argument and giving a preliminary look at the US experience using descriptive data analysis. Section 3 presents our empirical exercise of the relation between financialisation and income inequality. Section 4 concludes with a discussion of our main results.

2 A brief descriptive narrative

The suffix "-isation" has been intensively used in Social Sciences to designate a changing weight and importance of the thing or quality preceding it. Broader speaking financialisation corresponds to an increase in importance of finance in the economy, or the "increasing role of financial motives, financial markets, financial actors and financial institutions in the operations of the domestic and international economies" (Epstein, 2005, p. 3).

Scholars also often distinguish between quantities that are stocks and those that are flows. Such differentiation is particularly useful to this case as it will become more evident in the rest of the paper. Thereby, we introduce financialisation as a two-fold process characterised by (i) an increase in the contribution of the financial sector regarding the composition of production, or flow dimension, and (ii) an increase in the importance of finance concerning the composition of wealth, or stock dimension. In other words, we are interested in capturing the increase in relative importance of the financial sector in terms of its flow and stock dimensions.

Karwowski et al. (2016) have recently presented an extensive review of the empirical literature on financialisation distinguishing between flow and stock measures. In their classification, activity or flow indicators refer to financial incomes or payments relative to total income. On the other hand, vulnerability or stock indicators are debt relative to income. However, those measures are misleading for several reasons.

Modern economies produce less measurable outputs than the traditional manufacturing, mining, and agriculture (see, for example, Nakamura, 2010; Pagano, 2014). Authors such as Mazzucato and Shipman (2014) have shown lately an increase in divergence between value-creation and value-added measures. They attribute such phenomenon to the rise in size and influence of financial institutions and markets. The financial sector value-added has been overstated while pure rent-seeking activities have been counted as productive. This has put into question natural candidates to capture the importance of financial activity vis-a-vis real activity such as gross financial income or the financial sector value added as a share of GDP.

In what concerns the stock indicators of financialisation used in the literature, it is important to notice that the ratio of a stock over a flow is, in fact, a time measure, $units/(units/time) = time$. Hence, the debt to GDP ratio is a useful indicator of financial fragility, but it does not capture the stock dimension of the financialisation process accurately because no reference is made to variations in relative importance.

Given the distortions that inadequate treatment of financial outputs might have in the analysis of income inequality, we propose the share of financial employment on total employment as a *proxy* for the flow dimension of financialisation. The use of employment shares allows us to establish a direct link between financialisation and deindustrialisation. In a sense, deindustrialisation is an integral part of the globalisation, technological and institutional arguments while, at the same time, an enlargement in the share of financial employment is part of a broader upswing in the share of non-manufacture employment. To the extent that deindustrialisation is in general defined as a decrease in manufacture employment, financialisation becomes a different side of the same phenomenon.

In a detailed and relatively recent assessment of financialisation in the United States, Krippner (2005) has contrasted a traditional perspective on long-term economic change concerned with what is produced in the economy *vs* one engaged in understanding where profits are generated. Indicators such as the share of financial employment or financial GDP would be part of the first group. The relative importance of financial to non-financial profits, on the other hand, would capture the second view.

As she did at the time, we do not claim that ours or hers separation is more fundamental or more "true" given that "how one conceptualises structural change in the economy depends very much on one's theoretical purpose" (Krippner, 2005, p. 176). Our motivation is much simpler. Following a long tradition in Economics and other Social Sciences, we aim to provide a more accurate treatment of financialisation from stock and flow composition perspective, and its relation to income inequality. We understand that a significant amount of research has already be done making the differentiation as mentioned above. However, considering the limitations of current indicators, our exercise intends to bring some new insights about this relationship. Furthermore, since we understand financialisation as a process of structural change that involves changes in the relative importance of the financial sector, we aim to emphasise this perspective also regarding the composition of employment and wealth.

Fig. 1 on the left shows the evolution of the share of employment in financial activities between 1950-2010, and the respective lowess curves. We provide a detailed description of the data used in this study in the next section. It is possible to identify a positive trend for the whole period. We can also divide the sample before and after the eighties. While between 1950 and 1980 financial employment increased from 7% to 10% of total employment, in the next thirty years it gets closer to 20%.

Even though we do not report here the evolution of overall non-manufacture employment, it is important to notice that it increased from 75% in 1947 to 91.3% by 2014, an expansion of 16.3%. During the same period, the share of financial employment increased 11.3%, going from 6.7% to 18%. This means that looking to the labour markets, the flow dimension of financialisation is responsible for something around 70% of the deindustrialisation process, $11.3/16.3 = 0.69$. One must say, it is a significant part of the transformation of the productive structure of the US economy.

This process seems to be correlated with the recent upswing in income inequality. It is well known that the service sector, which includes financial activities, has a more significant income gap between high paying and low paying jobs than does manufacturing.[2] If workers

[2]This does not mean we do not acknowledge that manufacture activities are also heterogeneous. The literature on complexity, for example, has stressed the relation between technology and manufacture as well as possible bridges with income inequality (Hausmann et al., 2014; Hartmann et al., 2017). Moreover, services also exhibit different patterns of growth that vary according to each country development level

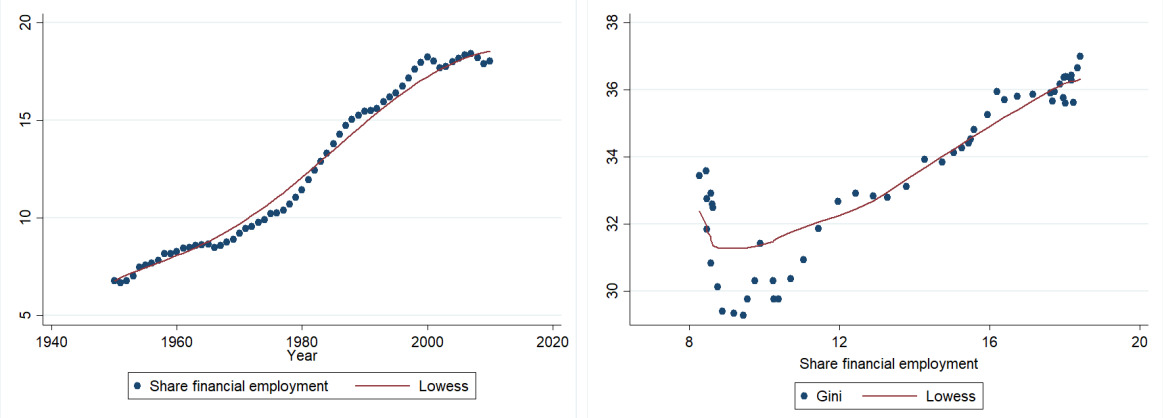

Figure 1: Share of financial employment and income inequality

displaced from manufacture activities used to be in the middle-income percentiles of the population and are not able to be reallocated in non-manufacture activities with higher or equal earnings, we shall expect income distribution to worst off. Labour saving technological change has reduced the demand for many blue-collar jobs while globalisation is creating a global marketplace putting workers of tradable sectors in competition with comparable workers from abroad. Deindustrialisation has weakened the bargaining power of workers producing higher inequality.

Dew-Becker and Gordon (2005) documented that in the United States between 1966 and 2001 no quantile bellow the 90th percentile experienced growth in wages commensurate with the average rate of productivity growth. Yellen (2006) points out that when displaced workers do find new jobs, they take a pay cut of about 17% on average. In early 2000, the size of this wage loss was the highest in at least twenty years. These considerations might also have an impact on the functional distribution of income. A reduction in the wage-share in the past decades has been reported for several countries including the United States by Karabarbounis and Neiman (2014), Dünhaupt (2017) and Hein et al. (2017), among others.

In addition, the increase in the importance of finance is deeply related to the remuneration of corporate officers. The financial sector has developed expertise in a variety of rent-seeking forms that go from taking advantage of asymmetries of information to lending and abusive credit card practices (Stiglitz, 2013). If workers in the financial sector are in the top-income percentiles of the population and manage to increase their wages above productivity gains, we shall also expect a deterioration of income distribution.

Fig. 1 on the right depicts the positive relationship between income inequality and the share of financial employment. Higher levels of income inequality are associated with higher levels of employment in that sector. For a share of financial employment between 8 and 10% there is no clear correspondence between these two variables and, if something, it looks negative. However, an increase in the share of financial employment from 10% to almost 20% is associated with an increase of 7 points in the Gini index. Lowess non-parametric

(Eichengreen and Gupta, 2013).

procedure confirms the main positive trends described so far.

Considering that indicators that resemble debt to income or GDP ratios are inappropriate to capture the stock dimension of financialisation, we use the share of financial assets on corporations' total assets. Corporations' wealth is traditionally defined as net (or residual) wealth of the corporation' sector, i.e. the sum of non-financial and financial assets owned by the corporation sector minus their debt liabilities. In practice, firms are owned in part by the two domestic sectors (private and government) and in part by the rest of the world. Hence, the value of corporations is already included in the financial assets and therefore in the net wealth of these other sectors. If Tobin's Q ratio is equal to one, by construction, net corporate wealth is equal to zero: the full value of corporations is already included in private and public wealth, so there is nothing to add (Alvaredo et al., 2016).

However, in this paper, we are not looking to corporations' net wealth but instead to the composition of corporations gross wealth, i.e. the sum of non-financial and financial assets owned by firms. An increase in the share of financial assets on corporations' gross wealth does not imply that wealth has been created but does mean that there are ongoing changes in the economy. Moreover, those changes might indicate an increase in intermediation and securitisation activities with possible implications in terms of income distribution.

Two more advantages justify our use of the composition of corporates' gross wealth to account for the second dimension of the financialisation process. First, it does capture the composition of a proper stock. This feature is vital if we are to understand financialisation as an increase in relative importance of the financial sector. Secondly, though it leaves aside households and does not differentiate between financial and non-financial companies, it permits us to concentrate on the basic units of production, that is, on corporations.

Fig. 2 on the left presents the evolution of the share of financial assets on corporations' total assets in the last sixty years, and on the right, the positive relation between this *proxy* of wealth composition and inequality. The 1980s divide the sample into two periods. There is a clear structural break in that year that contrasts with a more continuous trajectory in financial employment. Between 1950 and 1980 the share of financial assets increased from 60% to 65%. However, in the next thirty years, we observe an increase to around 85% by the end of the period.

From an uneven distribution of financial assets favouring those in the top income percentiles of the population, we expect an increase in income inequality if returns on the financial sector are higher than in the real sector.[3] A change in corporate governance towards shareholder value also benefits asset holders through an increase in the dividend payout ratio and rising stock prices (Dünhaupt, 2017; Hein et al., 2017). The magnitude of this effect further depends on the size of finance on wealth composition. This hypothesis is quite plausible considering, for example, that the rate of return on fortunes increases with their size (Wade, 2014). An increase in the share of financial assets from 70 to 85% is associated with an increase of 4 points in the Gini index. Still, for values below 70%, there is no clear correspondence, a pattern already identified for employment. Lowess curves

[3]For a preliminary discussion of these issues from a functional income distribution perspective see Dávila-Fernández et al. (2017). Recently, Piketty (2014, 2015) has suggested that the size of the gap between the rate of return on capital, r, and the economy's growth rate, g, is one of the important forces that can account for the historical magnitude and variations of wealth inequality. It is interesting to notice that if we divide Piketty's broad definition of capital between financial and non-financial assets, $r > g$ becomes $\theta i + (1 - \theta)r > g$ where i is the rate of return of financial assets, θ is the share of financial assets over total assets, and r is strictly the rate of return on capital.

confirm the main trends as we can see in Fig. 2.

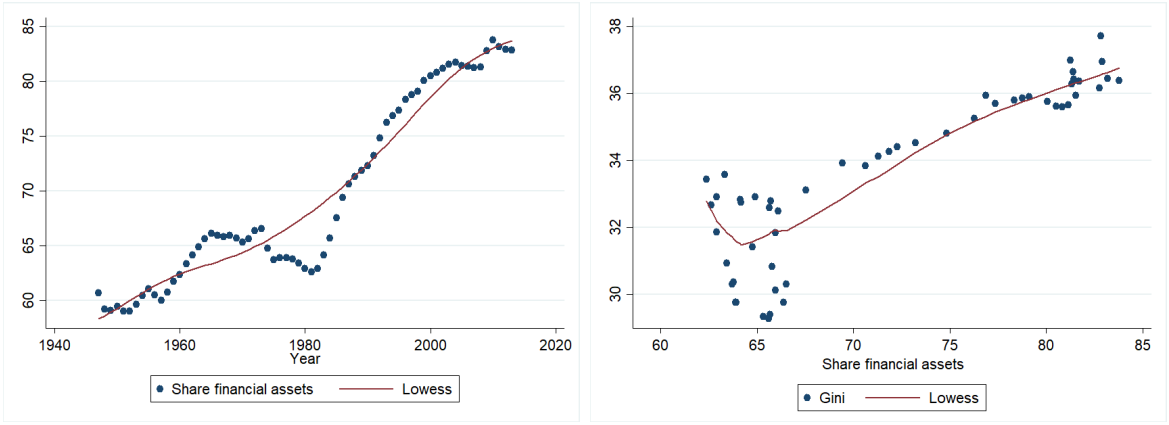

Figure 2: Share of financial assets on corporates total assets and income inequality

3 A cointegration exercise

Our dataset is annual and comprehends the period after the Second World War. We use the Gini net index provided by the Standardised World Income Inequality Database (SWIID) available from 1960-2014. The share of financial assets over total corporations' assets was computed using data provided by the World Wealth and Income Database (WW&ID) from 1947 to 2013. Corporations' financial assets correspond to the sum between corporate equity, fund shares, off-shore wealth, corporate currency, deposit banks, loans, corporate pension funds and life insurance. Corporate non-financial assets are equal to the sum of business, housing and other non-financial assets. Finally, the share of financial employment was provided by the Groningen Growth and Development Centre from 1950 to 2010. In what follows, we converted data to the logarithmic form.

To ascertain the existence of a long-run relationship between financialisation and income inequality, we use country-specific cointegrating techniques. While still constrained by parametric assumptions, this approach overcomes two of the main shortcomings of the usual cross-country regressions. First, by focusing exclusively on the time dimension of the data, it avoids some heterogeneity problems. Second, the omitted variable issue does not affect the reliability of our estimates. This is because an omitted variable will either be stationary – in which case the estimated coefficients are invariant to its inclusion - or it will be non-stationary – in which case we will not be able to obtain a stable cointegrating relationship if we leave it out.[4]

Considerable attention has been paid over the past decades to testing the existence of relationships in levels between variables. Different approaches are available in the literature,

[4]Only if an omitted variable is strongly correlated with one of the variables in the cointegration analysis we can end up with spurious estimates. For a further discussion and references on the econometric properties of the time-series approach and its advantages or disadvantages in comparison to cross-country analysis, see Gobbin and Rayp (2008).

for example: (i) the Engle-Granger two-step residual-based procedure; (ii) the Johansen system-based reduced rank regressions, or (iii) the Hansen instability test. Those tests, however, require series to be unequivocally non-stationary and integrated of the same order. This might be a problem when it is not known with certainty whether the underlying regressors are trend or first-difference stationary.

Ascertaining the order of integration of the variables under analysis becomes an essential precondition to establishing whether the use of traditional cointegration techniques is warranted. In this respect, we performed the traditional Augmented Dickey-Fuller (ADF) and the Dickey-Fuller test with GLS detrending (DF-GLS). The share of financial employment and Gini index were found to be integrated of order one while the share of financial assets is at least integrated of order two (see tables A1 and A2 in the appendix). This posits a problem since under such conditions we cannot proceed with our exercise.

Notice, however, that from visual inspection we identified a structural break around the 1980s for the share of financial assets. Multiple breakpoint Bai-Perron test identifies several repartition breaks for Gini (1986, 1994, 2004), the share of financial employment (1959, 1970, 1981, 1993, 2002), and the share of financial assets (1961, 1988, 1998). As Perron (1989) points out, structural change and unit roots are closely related and might invalidate conventional unit root tests. An extensive literature has followed outlining unit root tests that remain valid in the presence of a break. Hence, we also performed the Dickey-Fuller test allowing for a structural break as reported in the appendix (see tables A3 and A4). Results indicate that series are at most integrated of order one, though the share of financial employment and assets might be I(0).

Hence, we make use of the Auto-Regressive Distributed Lag (ARDL) bounds testing procedure developed by Pesaran and Shin (1998) and later extended by Pesaran et al. (2001). This methodology has several advantages over other cointegration methods as it allows the undertaking of analysis regardless of whether the variables are a mixture of stationary, I(0), and integrated of order one, I(1), which is our case. All models estimated are bivariate. Unless explicitly said otherwise, all tests performed and estimated models included dummy variables to capture the structural break effects. We assigned a dummy variable for each indicator. They assume value 1 for years with breaks and 0 for years with no break.

In what follows, our estimation strategy consists in investigating the relation between financialisation and inequality in separate models. The analysis also includes the investigation of Granger causality and the estimation of long-run coefficients.

3.1 Assessing income inequality

A series of four ARDL models were estimated, all of them including income distribution either as dependent or explanatory variable. In order to avoid potential serial correlation issues, the order of lags was obtained using the Akaike (AIC) informational criteria. We allow for automatic lag selection imposing a maximum of 4 lags for dependent and independent variables. Some models were found to have serial correlation, in which case, we maintained the automatic lag selection criteria but increased the maximum number of lags until we removed it.

If two series are cointegrated, this means that they have a long-term relationship, which prevents them from wandering apart without bound. Pesaran et al. (2001) and Narayan (2005) provided supply bounds on the critical values for the asymptotic distribution of the

F-statistic. Table 1 reports our estimates of the ARDL/Bounds cointegration test.

Table 1: Bounds cointegration test

Dependent	Explanatory	Model	F-statistic
Gini	Share finan. emp.	ARDL(2,0)	5.015386**
Share finan. emp.	Gini	ARDL(2,2)	3.637056*
Gini	Share finan. assets	ARDL(3,3)	2.288055
Share finan. assets	Gini	ARDL(5,2)	4.315043**

*, **, and *** stand by 10%, 5% and 1% of significance

The calculated F-statistic is higher than the 5% of significance critical value for two out of four models. When Gini is used as the dependent variable, we found a cointegration relationship with the share of financial employment. For the cases where income distribution appeared as the explanatory variable, a cointegrating relationship was obtained only with the share of financial assets. That is, we identify the existence of a long-run relationship between the variables under analysis. Financialisation and income distribution are related.

As a next step, we test for causality by incorporating the lagged error-correction term that represents the long-run causal relationship (Narayan and Smyth, 2006; Odhiambo, 2009). This is done only for those cases were we found cointegration. Results are provided in Table 2.

Table 2: Granger non-causality test

Causal flow	ECM coefficient	R^2
Share finan. emp. $\Longrightarrow$ Gini	-0.175581***	0.426188
Gini $\Longrightarrow$ Share finan. assets	-0.062804***	0.704534

*, **, and *** stand by 10%, 5% and 1% of significance

The significance of the coefficient of the lagged error-correction term indicates that there is a distinct unidirectional causal flow going from the flow measurement of financialisation to inequality and from inequality to the stock measure of financialisation. For both cases, the ECM coefficient is negative implying that there is convergence to the long-run equilibrium solution. In the first case, 17% of any movements into disequilibrium are corrected for within one period. In the second case, we have 6% of correction within one period.

It is also worth to notice that convergence to equilibrium is much faster for employment shares than for wealth composition. This result is expected considering that changes in stocks are supposed to happen slower than adjustments of flows. As a final step, we report long-run coefficients in Table 3. Our estimates support the proposition that there is a positive relation between financialisation and income inequality.

Recall that all variables were converted to logarithmic form. An increase of 1% in the share of financial employment is related to an increase of 0.26% in Gini net. Moreover, an increase of 1% in income inequality is followed by an increase of 1.6% in the share of financial assets. Results are in line with previous studies that have also documented an association between financialisation and inequality (e.g. Sjöberg, 2009; Dünhaupt, 2014). Still, it is interesting to notice the sequence of events, with income distribution as an intermediator between the two dimensions of financialisation. Changes in the importance

of the financial sector regarding the composition of production impact income distribution that amplifies this effect on the composition of wealth.

Table 3: Long-run coefficients, ARDL models

Dependent variable: Gini				
Variable	Coefficient	Std. Error	t-statistic	Prob.
Share finan. emp.	0.261200	0.038488	6.786467	0.0000
C	2.832504	0.099155	28.56629	0.0000
Dependent variable: Share financial assets				
Variable	Coefficient	Std. Error	t-statistic	Prob.
Gini	1.607426	0.228275	7.041621	0.0000
C	-1.325467	0.792512	-1.672489	0.1020

Although the idea that deindustrialisation is behind the rise of inequality in the U.S. finds an echo in the literature, our exercise also brings some insights in this respect.[5] For instance, deindustrialisation has been interpreted initially as a reduction in the share of manufacture employment. As previously reported in this article, around 70% of this reduction corresponds to a rise in the share of financial employment. To the extent that, in this particular case, financialisation can be seen as a mirror to deindustrialisation, we have here also a correspondence between deindustrialisation and the rise of income inequality in the United States.

Taking as departure point Kuznet's principle that changes in income inequality largely depend on the sectoral composition of the economy, the results presented indicate that the composition of wealth is to some extent guided by the composition of the flow behind it, that is, production. Stocks represent accumulation and capture the "state of the system". Of course, they start with some initial value and after that change by flows into or out of them. Nevertheless, they provide the basis for making choices. It follows that the composition of the stock provides the basis for making the choices that are going to determine the composition of the flow.

Even though the increase in the share of financial assets on corporates' gross wealth does not imply that wealth has been created, it does suggest that the structure of the economy is changing. In particular, it indicates an increase in financial intermediation and securitisation. This process has strong ties with changes in financial employment. The observed increase in the share of financial employment has exacerbated income inequality leading to a further movement towards financial assets. The recent rise in income inequality is strongly linked with the increase in the importance of finance concerning production and wealth composition. This result is particularly relevant if we acknowledge the fact that current measures used in the literature fail to capture the stock dimension of the financialisation process adequately.

The reader may ask how sustainable this process is in the very long-run. It is true

[5]For example, Moller et al. (2009) include a "deindustrialisation" variable when addressing income inequality in the United States. However, they use a within-county panel approach. On the other hand, studies like Alderson and Nielsen (2002) or Jaumotte et al. (2013) rely on traditional cross-country regressions.

that the share of financial employment or financial assets cannot growth forever since, in the limit, all employment or assets would become financial. Even then, financialisation, as described in this article, will come to an end because there will not be anymore an increase in relative importance of the financial sector. Still, we have provided evidence that this once and for all change in the sectoral composition of the economy has important implications for income distribution.

In order to assess a valid inference and not spurious regressions, we checked residuals of all ARDL for serial correlation using Breusch-Godfrey LM test. If residuals are correlated, the estimated coefficients would be biased and inconsistent. We conclude that our estimates are consistent. Results are reported in the appendix (see table A5).

4 Final considerations

The United States and many countries in Europe have experienced growing income inequality over the past decades that has not gone unnoticed. There is a broad agreement among social scientists that technological change, international trade and social norms are playing a role in this process. Starting from Kuznets' principle that changes in inequality are largely guided by the structure composition and the stage of development of the economy, we introduced financialisation as a two-fold process characterised by (i) an increase in the contribution of the financial sector in terms of the composition of production, and (ii) an increase in importance of finance in terms of the composition of wealth.

Given the distortions that inadequate treatment of financial outputs might have in the analysis of income inequality, we proposed the share of financial employment on total employment as a *proxy* of our first dimension of financialisation. The use of employment shares allowed us to avoid accounting problems and to establish a link between financialisation and deindustrialisation as different sides of the same process. We brought wealth composition into the analysis through the share of financial assets on corporations' total assets. We consider that this stock measure of financialisation overcomes the main problems of the misleading debt to GDP ratio.

Using cointegration techniques we identified a positive long-run relationship between the share of financial employment and income inequality as well as between the share of financial assets and income inequality. An increase of 1% in the flow measure of financialisation increases Gini net in 0.26% while a 1% increase in inequality is associated with an increase of 1.6% of the stock indicator. At least in what concerns the traditional Gini index, causality goes from the flow dimension to income distribution and from distribution to the stock dimension.

Deindustrialisation has been interpreted initially as a reduction in the share of manufacture employment. As previously reported in this article, around 70% of this reduction corresponds to a rise in the share of financial employment. To the extent that, in this particular case, financialisation can be seen as a mirror to deindustrialisation, we have here also a correspondence between deindustrialisation and the rise of income inequality in the United States. Our main findings are summarised in a simple diagram. An increase in the share of financial employment increases income inequality which in turn is reflected in increases in the share of financial assets on wealth (maybe) due to an expansion of financial intermediation and securitisation.

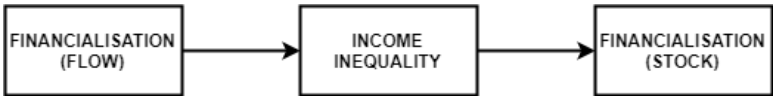

Figure 3: A summarising diagram

Results presented allow us to propose that the composition of wealth is to a great extent guided by the composition of the stock behind it, that is, production. This means that overall the recent rise in income inequality is strongly linked with the increase in the importance of finance regarding employment composition. Though the two of them have received significant attention of scholars in the last years, we hope this paper has brought some new insights, especially in what concerns the role of wealth composition in the economy.

References

[1] Acemeglu, D. (2002). Technical Change, Inequality, and the labor Market. *Journal of Economic Literature* 40(1), 7-72.

[2] Acemoglu, D. (2003). Factor prices and technical change: from induced innovation to recent debates. In Aghion, P.; Frydman, R.; Stiglitz, J. and Woodford, M. (eds.) *Knowledge, Information, and Expectations in Modern Macroeconomics*. Princeton University Press, Princeton.

[3] Acemoglu, D. and Autor, D. (2011). Skills, Tasks and Technologies: Implications for Employment and Earnings. In Ashenfelter O. and Card, D. (ed.) *Handbook of Labor Ecconomics*. Elsevier 4(5).

[4] Acemoglu, D.; Autor, D.; Dorn, D.; Hanson, G. and Price, B. (2016). Import Competition and the Great US Employment Sag of the 2000s. *Journal of Labor Economics* 34(S1): S141-S198.

[5] Alderson, A. and Nielsen, F. (2002). Globalization and the Great U-Turn: Income Inequality Trends in 16 OCDE countries. *American Journal of Sociology* 107(5), 1244-1299.

[6] Alvaredo, F.; Atkinson, A.; Chancel, L.; Piketty, T.; Saez, E. and Zucman G. (2016). Distributional National Accounts (DINA) Guidelines : Concepts and Methods used in WID.world. *WID.world Working Paper*.

[7] Atkinson, A.; Piketty, T. and Saez, E. (2011). Top Incomes in the Long Run of History. *Journal of Economic Literature* 49(1): 3-71.

[8] Autor, D. and Dorn, D. (2013). The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market. *American Economic Review* 103(5), 1553-1597.

[9] Autor, D.; Dorn, D.; and Hanson, G. (2013). The Geography of Trade and Technology Shocks. *American Economic Review*. 103(3), 220-225.

[10] Autor, D.; Katz, L. and Kearney, M. (2008). Trends in U.S. wage inequality: revising the revisionists. *Review of Economics and Statistics* 90(2), 300-323.

[11] Autor, D.; Dorn, D.; Katz, L.; Patterson, C. and Van Reener, J. (2017). Concentrating on the fall of the labor share. *NBER Working Paper*, 23108.

[12] Cabral, R.; García-Díaz, R. and Mollick, A. (2016). Does globalization affect top income inequality?. *Journal of Policy Modelling* 38(5), 916-940.

[13] Card, D. and DiNardo J. (2002). Skill-Biased Technological Change and Rising Wage Inequality: Some Problems and Puzzles. *Journal of Labor Economics* 20(4), 733-783.

[14] Conceição, P. and Galbraith, J. (2001). Toward an Augmented Kuznets Hypothesis. In Galbraith, J. and Berner, M. (ed.), *Inequality and Industrial Change: A Global View*. Cambridge: Cambridge University Press.

[15] Dávila-Fernández, M.; Oreiro, J.; Punzo, L. and Bimonte, S. (2017). Capital in the Twenty First Century: Re-interpreting the fundamental contradiction of capitalism. *Journal of Post Keynesian Economics* 40(2), 168-182.

[16] Dew-Becker, I. and Gordon, R. (2005). Where Did the Productivity Growth Go? Inflation Dynamics and the Distribution of Income. *Brooking Papers on Economic Activity* 2, 67-127.

[17] Dünhaupt, P. (2014). An empirical assessment of the contribution of financialization and corporate governance to the rise of income inequality. Working Paper, Institute for International Political Economy (IPE), 41.

[18] Dünhaupt, P. (2017). Determinants of labour's income share in the era of financialisation. *Cambridge Journal of Economics* 41(1), 283-306.

[19] Eichengreen, B. and Gupta, P. (2013). The two waves of service-sector growth. *Oxford Economic Papers* 65(1), 96-123.

[20] Epstein, G. (2005). Introduction: Financialization and the world economy. In Epstein, G. (ed.), *Financialization of the world economy*, pp. 3-16. Cheltenham: Edward Elgar.

[21] Ezcurra, R. and Rodríguez-Pose, A. (2013). Does Economic Globalization affect Regional Inequality? A Cross-country Analysis. *World Development* 52(C), 92-103.

[22] Galbraith, J. (2012). *Inequality and instability: A study of the world economy just before the crisis*. New York: Oxford University press.

[23] Galbraith, J. and Hale, T. (2014). The Evolution of Economic Inequality in the United States, 1969-2012: Evidence from Data on Inter-industrial Earnings and Inter-regional Incomes. *World Economic Review* 3, 1-19.

[24] Gobbin, N. and Rayp, G. (2008). Different ways of looking at old issues: a time-series approach to inequality and growth. *Applied Economics* 40(7), 885-895.

[25] Goldin, C. and Katz, L. (2008). *The race between education and technology*. Cambridge Massachusetts: Harvard University Press.

[26] Gordon, R. and Dew-Becker, I. (2007). Selected Issues in the Rise of Income Inequality. *Brooking Papers on Economic Activity* 2, 169-190.

[27] Granger, C. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods, *Econometrica* 37(3), 424-438.

[28] Hartmann, D.; Guevara, M.; Jara-Figueroa, C.; Aristarán, M.; and Hidalgo, C. (2017). Linking Economic Complexity, Institutions, and Income Inequality. *World Development* 93, 75-93.

[29] Hausmann, R.; Hildago, C.; Bustos, S.; Coscia, M. and Simoes, A. (2014). *The Atlas of economic complexity: Mapping paths to prosperity.* MIT Press.

[30] Hein, E.; Dünhaupt, P.; Alfageme, A. and Kulesza, M. (2017). Financialization and Distribution from a Kaleckian Perspective: The United States, the United Kingdom, and Sweden ComparedBefore and after the Crisis. *International Journal of Political Economy* 46(4), 233-266.

[31] Hidalgo, C., Klinger, B., Barabási, A. and Hausmann, R. (2007). The product space conditions the development of nations. *Science* 317, 482-487.

[32] Incera, A. (2017). Drivers of change in the European youth employment: a comparative structural decomposition analysis. *Economic Systems Research* 29(4), 463-485.

[33] Jaumotte, F.; Lall, S. and Papageorgiou, C. (2013). Rising Income Inequality: Technology, or Trade and Financial Globalization?. *IMF Economic Review* 61(2), 271-309.

[34] Karabarbounis, L. and Neiman, B. (2014). The Global Decline of the Labor Share. *Quarterly Journal of Economics*, 61-103.

[35] Karwowski, E.; Shabani, M. and Stockhammer, E. (2016). Financialisation: Dimensions and Determinants. A Cross-country Study. Post Keynesian Economics Study Group, Working Paper 1619.

[36] Krippner, G. (2005). The financialization of the American Economy. *Socio-Economic Review* 3, 173-208.

[37] Krugman, P. (2008). Trade and Wages, Reconsidered. *Brooking Papers on Economic Activity.*

[38] Lin, K. and Tomaskovic-Devey, D. (2013). Financialization and U.S. Income Inequality, 1970–2008. *American Journal of Sociology* 118(5), 1284-1329.

[39] Mazzucato, M. and Shipman, A. (2014). Accounting for productive investment and value creation. *Industrial and Corporate Change* 23(4), 1059-1085.

[40] Moller, S.; Alderson, A. and Nielsen, F. (2009). Changing Patterns of Income Inequality in U.S. Counties, 1970-2000. *American Journal of Sociology* 114(4), 1037-1101.

[41] Nakamura, L. (2010). Intangible Assets and National Income Accounting. *Review of Income and Wealth* 56, Special Issue 1, S135-S155, 2010.

[42] Narayan, P. (2005). The saving and investment nexus for China: evidence from cointegration tests. *Applied Economics* 37, 1979-1990.

[43] Narayan, P. and Smyth, R. (2006). Higher education, real income and real investment in China: evidence from Granger causality tests. *Education Economics* 14,107-125.

[44] Odhiambo, N. (2009). Energy consumption and economic growth nexus in Tanzania: an ARDL bounds testing approach. *Energy Policy* 37, 617-622.

[45] Pagano, U. (2014). The crisis of intellectual monopoly capitalism. *Cambridge Journal of Economics* 38, 1409-1429.

[46] Perron, P. (1989). The Great Crash, the Oil Price Shock, and the Unit Root Hypothesis. *Econometrica*, (57): 1361-1401.

[47] Pesaran, M. and Shin, Y. (1998). An autoregressive distributed-lag modelling approach to cointegration analysis. *Econometric Society Monographs* 31, 371-413.

[48] Pesaran, M.; Shin, Y. and Smith, R. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association* 94, 621-34.

[49] Pesaran, M.; Shin, Y. and Smith, R. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics* 16(3), 289-326.

[50] Piketty, T. and Saez, E. (2013). Top Incomes and the Great Recession: Recent Evolutions and Policy Implications. *IMF Economic Review* 61(3), 456-478.

[51] Piketty, T. (2014). *Capital in the Twenty-First Century*. Cambridge Massachusetts: Harvard University Press.

[52] Piketty, T. (2015). About Capital in the Twenty-First Century. *American Economic Review* 105(5), 48-53.

[53] Sjöberg, O. (2009). Corporate Governance and Earnings Inequality in the OECD Countries 1979- 2000. *European Sociological Review* 25(5), 519-33.

[54] Stiglitz, J. (2013). *The Price of Inequality: How Today's Divided Society Endangers Our Future*. New York:W.W. Norton & Company.

[55] van der Zwan, N. (2014). Making sense of financialization. *Socio-Economic Review* 12, 99-129.

[56] Vercelli, A. (2013). Financialization in a Long-Run Perspective. *International Journal of Political Economy* 42(4), 19-46.

[57] Volscho, T. and Kelly, N. (2012). The Rise of the Super-Rich: Power Resources, Taxes, Financial Markets, and the Dynamics of the Top 1 Percent, 1949 to 2008. *American Sociological Review* 77(5), 679-699.

[58] Wade, R. (2014). The Piketty phenomenon and the future of inequality. *Real World Economics Review* 69, 2-17.

[59] Western, B. and Rosenfeld, J. (2011). Unions, Norms, and the Rise in U.S. Wage Inequality. *American Sociological Review* 76(4), 513-537.

[60] Yellen, J. (2006). Economic Inequality in the United States. Speech to the Center for the Study of Democracy, Economics of Governance Lecture. University of California, Irvine.

Appendix

Table A1 reports a summary of ADF and DF-GLS unit root tests in levels for two dimensions of financialisation and income inequality. Outcomes indicate that we cannot reject the null hypothesis that series are non-stationary in levels.

Table A1: Unit root tests (levels)

	Share financial employment (t-statistic)	
Method	Intercept	Trend and intercept
ADF	-1.845990	-0.784212
DF-GLS	0.390764	-1.390072
	Share financial assets (t-statistic)	
Method	Intercept	Trend and intercept
ADF	-1.081258	-2.412301
DF-GLS	-0.583155	-2.374531
	Gini (t-statistic)	
Method	Intercept	Trend and intercept
ADF	-0.298750	-2.551861
DF-GLS	-0.345902	-1.445929

*, **, and *** stand by 10%, 5% and 1% of significance. SBIC automatic lag-lengh selection

We proceed reporting in table A2 a summary of unit-root tests for variables in first differences. Employment shares and Gini are found to be stationary while the share of financial assets it is not.

Table A2: Unit root tests (first differences)

	Share financial employment (t-statistic)	
Method	Intercept	Trend and intercept
ADF	-4.802604***	-5.144403***
DF-GLS	-2.894712***	-3.814785***
	Share financial assets (t-statistic)	
Method	Intercept	Trend and intercept
ADF	-2.784285*	-2.663430
DF-GLS	-0.866853	-1.784651
	Gini (t-statistic)	
Method	Intercept	Trend and intercept
ADF	-4.798761***	-4.824245***
DF-GLS	-4.854743***	-4.749295

*, **, and *** stand by 10%, 5% and 1% of significance. SBIC automatic lag-lengh selection

In other words, the share of financial employment and income distribution seem to be integrated of order 1 while the share of financial assets is at least integrated of order two. However, these tests do not take into account the possibility of structural breaks. Table A3 brings our results of the DF unit-root tests with a structural break for the variables in levels.

Table A3: Structural Break unit root tests (levels)

	DF - Structural Break (t-statistic)			
Variable	Intercept	Break year	Trend and intercept	Break year
Share financial employment	-4.432819*	1977	-2.778716	1980
Share financial assets	-4.420055*	1982	-4.324244	1965
Gini	-3.455419	1977	-3.629620	1984

*, **, and *** stand by 10%, 5% and 1% of significance. SBIC automatic lag-lengh selection

The share of financial employment and financial assets are stationary at 10% when we do not include a trend. Still, we cannot reject the null of non-stationarity once we introduce a trend. Furthermore, income distribution is also found to be non-stationary. Table A4 reports a first differences unit root tests allowing for structural break. We can now state that once we control for a structural break series are at most integrated of order one.

Table A4: Strucural Break unit root tests (first differences)

	DF - Structural Break (t-statistic)			
Variable	Intercept	Break year	Trend and intercept	Break year
Share financial employment	-5.832861***	2000	-6.270547***	1977
Share financial assets	-4.449756**	1957	-6.026640***	1982
Gini	-6.082168***	1969	-6.195527***	1971

*, **, and *** stand by 10%, 5% and 1% of significance. SBIC automatic lag-lengh selection

Table A5 provides Breusch-Godfrey serial correlation test for the errors of the ARDL models of subsection 3.1. We cannot reject the null of no-serial correlation. Hence, our estimates are consistent.

Table A5: Breusch-Godfrey serial correlation test

Breusch-Godfrey Serial Correlation LM test (2 lags included)				
ARDL	F-statistic	0.152497	Prob. F(2,41)	0.8590
(2,0)	Obs*R-squared	0.361813	Prob. Chi-Squared(2)	0.8345
ARDL	F-statistic	0.510063	Prob. F(2,38)	0.6045
(2,2)	Obs*R-squared	1.281036	Prob. Chi-Squared(2)	0.5270
ARDL	F-statistic	1.788349	Prob. F(2,39)	0.1807
(3,3)	Obs*R-squared	4.284306	Prob. Chi-Squared(2)	0.1174
ARDL	F-statistic	1.020224	Prob. F(2,39)	0.3699
(5,2)	Obs*R-squared	2.585334	Prob. Chi-Squared(2)	0.2745

Prob. indicates asymptotic one-side p-values