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What Do We Know About the Labor Share and the Profit Share?
Part III: Measures and Structural Factors

by

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Abstract

Economic theory frequently assumes constant factor shares and often treats the topic as secondary. We will show that this is a mistake by deriving the first high-frequency measure of the US labor share for the whole economy. We find that the labor share has held remarkably steady indeed, but that the quasi-stability masks a sizable composition effect that is detrimental to labor. The wage component is falling fast and the stability is achieved by an increasing share of benefits and top incomes. Using NIPA and Piketty-Saez top-income data, we estimate that the US bottom 99 percent labor share has fallen 15 points since 1980. This amounts to a transfer of $1.8 trillion from labor to capital in 2012 alone and brings the US labor share to its 1920s level. The trend is similar in Europe and Japan. The decrease is even larger when the CPI is used instead of the GDP deflator in the calculation of the labor share.

Keywords: Labor Share; Composition Effect; Income Inequality; Top Incomes; Purchasing Power

JEL Classifications: D33, E24, E25

Contents

1   PLUS ÇA CHANGE, PLUS C'EST LA MÊME CHOSE?

> *One of Kaldor's "long-run growth facts" is the relative constancy of labor's share. Indeed, this fact is so ingrained in many macroeconomists that it is almost sacrilege to use an aggregate production function other than Cobb-Douglas, since this production function implies a constant share of income going to labor. That is to say, if labor's share has shown a distinctive trend, it would go against what most macroeconomists store in their bag of facts.*
>
> – Gomme and Rupert (2004), p. 7

In the 1930s, 40s and 50s the topic of the functional distribution of income was frequently debated. Economists were hard at work trying to measure and understand the shares of labor and capital. It is believed that besides measuring the pace of economic activity the question "who gets what" was a proximate reason for the founding of national accounts in the UK and the US (Kuznets 1933, Krueger 1999). Economists were equally as hard at work on theoretical front, trying to find channels that could explain the stability or fluctuations of the observed shares. In particular, the roles of technology, aggregate demand and institutions were highlighted (see Giovannoni 2013a for a survey). The principal problem of political economy was indeed the functional distribution of income (Ricardo, 1817, Atkinson, 2009).

The last landmark contribution from those years of high theory is that of Kaldor (1961), who famously considered the stability of income shares a "stylized fact."[1] For Kaldor, the economy was operating at near full employment, real wages matched labor productivity, and the labor share was constant. For in the 1960s it was clear that economic growth had returned triumphantly, and it was time to move on from distribution to growth theory. The issue of the distribution of income must

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[1] Kaldor was hardly the only economist believing in constant relative shares. Before him Keynes (1939) considered the stability "a bit of a miracle... a well-known statistical phenomenon... one of the most surprising, yet best established fact [that] appears to be a long run, and not merely a short period phenomenon". Samuelson (1964) turned this stability into a law, "Bowley's law", referring to the works on aggregate wages and national income of British statistician Arthur Bowley, who first documented the empirical regularity of the labor share c.1900. See Bowley (1900, 1920, 1937).

have felt secondary in those times of broad-based gains and shared prosperity. Income distribution disappeared from the economic discourse for a while before it was "brought in from the cold" (Atkinson, 1997) with a revival of interest for the personal distribution of income in the 1990s.

The *functional* distribution of income didn't experience that revival, and fast forward half a century later after Kaldor (1961), many economists are still considering factor shares constant and the issue secondary. Lucas (2003) finds that "*Of the tendencies that are harmful to sound economics, the most seductive, and in my opinion the most poisonous, is to focus on questions of distribution.*" Feldstein (2008), writing as late as 2008, agrees: "*the share of national income going to employees is at approximately the same level now as it was in 1970.*"[2] Greg Mankiw, in his popular introductory textbook Macroeconomics, confirms:

> *Paul Douglas [noticed that] the division of national income between capital and labour had been roughly constant over a long period....More recent US data are also consistent with the Cobb-Douglas production function....Despite the many changes in the economy over the past four decades [the] division of income is easily explained by a Cobb-Douglas production function.*
>
> – Gregory Mankiw (2007), pp. 55-8

Solow (1957) popularized the use of aggregate production functions but also urged caution about their use because the stability of factor shares was "partially a mirage" (Solow 1958). But as the opening quote suggests, the use of the Cobb-Douglas (1928) production functions is widespread these days, and is not the least hindered by the question of whether or not factor shares are constant. For all intents and purposes our theoretical understanding and use of production functions has barely changed during the fifty years that separate us from Kaldor (1961)—on the principle

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that factor shares are, indeed, constant. It is as if the question of distribution had been divorced from that of production.

However, things are starting to change on the empirical side. This is mostly because of the greater availability, over the past decade, of income share statistics. By now we have accumulated evidence for labor shares exhibiting a worldwide downward trend since the early eighties (see the Stockhammer 2013 ILO report for a survey) –the trend seems to have accelerated for some countries over the past decade. This burgeoning inductive literature seems to provide a consensus that biased technological change, international trade, welfare retrenchment / liberalization and above all, financialization, are responsible for the fall in labor shares (see Giovannoni 2014b for a survey).

Interestingly, the renewed interest in factor shares has not taken place in academic circles as much as it has within international organizations and government institutions. Examples include:

- The International Labor Organization (Lübker 2007, Hein and Mundt 2012, Lavoie and Stockhammer 2012, World of Work Report 2011 and 2012, Global Wage Report 2012)
- The United Nations (Cornia 2005, Boushey and Weller 2006, Van Der Hoeven 2010, Rodriguez and Jayadev 2010, Lindenboim 2011, UNCTAD 2012)
- The IMF (Guscina 2006, Jaumotte and Tytel 2007, World Economic Outlook 2007a,b)
- The Federal Reserve (Gomme and Rupert 2004, Jacobson and Occhino 2012a,b)
- The Council of Economic Advisers (Economic Report of the President 2012 and 2013),
- The European Central Bank (Lawless and Whelan 2007)
- The European Commission (Arpaia et al. 2009)
- The OECD (OECD 2012, Bassanini and Manfredi 2012)
- The Bank for International Settlements (Ellis and Smith, 2007)

The issue of the functional distribution of income has also started to permeate the related field of sociology (Lin and Tomaskovich-Devey 2013, Kristal 2013a,b).

This paper is part of this renewed literature and makes the following contributions. In section 2, we start by crossing various datasets to derive what we believe to be one of the first estimates of the *nationwide national* labor share for the United States. We compare this new measure to alternative datasets and provide international comparisons and conclude that the American labor share is surprisingly nearly constant. I note, however, that this is a statistical illusion and that much is happening within the aggregate—Solow(1958)'s "mirage." Section 3 presents the adjustments for various composition effects, including feminization, purchasing power and top incomes. Section 4 concludes.

Two comments are required before diving into the exposition. First, statistical agencies usually report components of aggregate income such as wages, benefits, proprietors' income, net interest, rents and corporate profits.[3] Thus there is no straightforward counterpart to the wages/profits/rents dichotomy used in economics. In practice not all types of income can easily be ascribed to either capital or labor, and we will spend some time explaining how we can make such difference.

Second: in matters of the functional distribution of income, it is especially important to define the terms precisely. There is a certain vagueness in the discourse—such as calling the "wage share" what is really a labor share—that should be addressed from the outset. To remedy this vagueness let's recall that an income "share" depends upon its numerator and its denominator. The denominator is commonly GDP, GDI, national income, or value added. For comparison's sake we will almost always report the shares in the same aggregate, which we choose to be the net national income (NNI, or "national income at factor cost"): GDP minus indirect taxes, minus capital consumption, minus statistical discrepancy plus net foreign income. The choice of numerator leads to the distinction between:

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[3] as well as secondary types of income which are either very small flows, constant through time, do not have an immediate economic meaning, and/or are not the focus of the present study. Incomes of this type are such as business current transfers and payments, taxes on production and imports, taxes on corporate profits, subsidies, and capital consumption.

- The wage share is the share of wages for a chosen measure of income;
- The compensation share includes wages and benefits;
- The labor share consists of wages, benefits and an estimate of the labor component of proprietors' income (see below).

Thus, depending on the choice of numerator and denominator, one can end up with a variety of "shares" that need not tell the same story, hence why this paper tries to provide evidence from different angles and different measures. The first two are generally easy to get; the labor share, less so.

Similarly one should be careful what we call the complement to unity of the labor share. The "capital share" is a misleading term in empirical applications, and the term "profit share" stands for corporate profits only. Following national accounting practices the complement to unity of the labor share will be called the "non-labor share," or better, the "property share."

2 ESTIMATING THE NATIONAL LABOR SHARE

The renewed popularity of the factor shares over the past decade appears to follow the publication of US data by the Bureau of Labor Statistics (BLS) showing a labor share of income falling over the last 30 years (see Figure 1).

Figure 1 which should now be familiar to many, presents the official data for real hourly wages, hourly labor productivity, and the labor share. The latter is the ratio of the former two, at each and every time t:

$$\alpha_t := \frac{W_t}{Y_t} = \frac{w_t N_t}{P_t Q_t} = \frac{w_t}{P_t} / \frac{Q_t}{N_t} \text{ so that } \alpha_t = \frac{w_{r,t}}{A_{L,t}} \qquad (1)$$

Where α_t is the labor's share, W_t is total labor income, Y_t is a measure of income, w_t is the nominal rate of labor income (i.e. wage rate or nominal compensation), N_t is the level of employment (in Man-hours), P_t is the overall price level, Q_t is a measure of output, $w_{r,t}$ is real labor income and $A_{L,t}$ is the productivity of labor.

The numerator and denominator of the last ratio are presented in Figure 1; this is how the BLS computes the labor share.[4] The hourly basis of compensation and productivity is convenient because any change in work duration is de facto accounted for. Based on this data, the labor share has been roughly constant from 1947 to approximately 1983, and declining since then. But one measure is scarcely enough for a generalization. There is a wealth of information to gain from a deeper empirical investigation, and investigation that has not, to this day, and to our knowledge, been extensively carried out.

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[4] The BLS uses published and unpublished data to arrive at these results. In particular the BLS adjusts for proprietors' income by assigning the average compensation in the sector to proprietors. This assumes that the compensation share is the labor share for proprietors. See BLS handbook of Methods, chapter 10, available at http://www.bls.gov/opub/hom/

Figure 1 Productivity, Real Compensation and the Labor Share of GDP in the US Nonfarm Business Sector
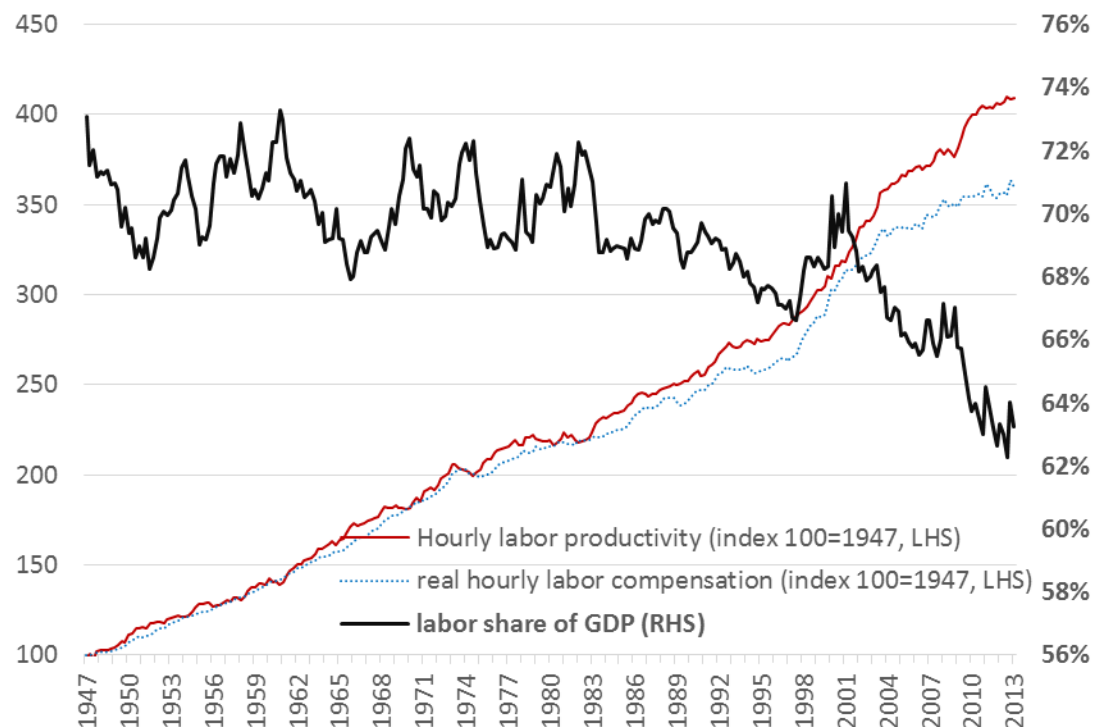
Source: Author's calculations based on the Bureau of Labor Statistics, Multifactor Productivity (MP) and Labor Productivity and Costs (LPC) databases.

Note: Compensation and productivity data have been rescaled to indices 100=1947 to facilitate comparison. The labor share values were obtained by scaling the index values of the LPC database (base 100=2005) by the MP database value of the labor share in total cost of .656 for 2005. Those are estimates to the extent that the MP database includes energy costs as a factor of production which is excluded on the basis of being an intermediate good/service in the LPC database.

2.1 Alternative Data Sources

There are three reasons we want to derive a series of alternative labor shares. The first is that the definition of a labor share is not clear-cut. The results will be different depending on the definition of "labor income" and the choice of the denominator, and the choice of the coverage (the whole economy or a subset).

The second reason is the opacity of the BLS measure, which consists of published (but highly aggregated) and unpublished data. The lack of detail makes it impossible to break down the series or to understand how the index has been created, and on what assumptions.

The third and most important reason is that the BLS labor share covers the nonfarm business sector only —a far cry from the whole economy. The BLS data exclude the general government, nonprofit institutions, paid employees of private households, and the rental value of owner-occupied dwellings (Ryan 2011). *Together, those exclusions represent approximately 20% of national income, or $2.6 billion in 2011, which is nontrivial.*[5]

The reasons advanced by the BLS for the exclusion of those sectors is that their value added is not clear—not that the value doesn't exist, just that it's hard to measure. However, the sectors excluded consist mostly of compensation, so including those sectors will affect the labor share positively—to what extent requires the calculations presented below.[6] This is also real money received by a sizeable fraction of the population with real macroeconomic consequences.

Notwithstanding the issue raised by the BLS, one may want to derive a more comprehensive measure of the labor share, at the national level. To my knowledge this is a task that hasn't been tackled so far, at least not in a systematic way (except an attempt in Giovannoni, 2006).

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[5] See NIPA tables 1.10 - 1.14 and 7.9 for the magnitude reported.
[6] For instance employee compensation is the only form of income for the whole government sector; there are no interest, rents, proprietors' income or profits reported for this 20% chunk of the economy.

Traditionally, raw US data come from the National Income and Product Accounts (NIPA) and is then treated by the BLS—again, not very transparently—to extract the labor share presented above. In the past five years or so, three new international datasets have been made available by the OECD, the European Commission and the United Nations, increasing data availability. Primary sources:

- **NIPA:** The National Income and Product Accounts, compiled by the Bureau of Economic Analysis—a branch of the Department of Commerce. Several tables present data that are relevant to the analysis of the distribution of income but tables 1.10, 1.11 and 1.12, in particular, stand out. Most of the time the data are available on a quarterly basis since 1947 and beginning in 1929 on an annual basis, making the US one of the countries with the best data coverage.

- **BLS:** The Bureau of Labor Statistics, a branch of the Department of Labor, computes a labor share of income in its two databases "productivity and costs" as well as "multifactor productivity". The data is provided on a quarterly basis from 1947 at best, and for different meta-sectors of the economy.

Secondary sources:[7]

- **AMECO:** The Annual Macro-Economic database of the European Commission's Directorate General for Economic and Financial Affairs (DG ECOFIN), presents labor share series on an annual basis for European countries, groups of European countries, as well as the United States. Starting dates vary but most data starts in 1960.

- **OECD-SULCI:** the System of Unit Labor Costs Indicators of the Organisation for Economic Co-operation and Development. The data is available annually for 46 countries or economic areas. The OECD effort mostly consists in compiling labor share data from participating countries' system of

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[7]I exclude databases not covering the US or not providing enough data to derive the whole-economy labor share. Examples include the KLEMS database ("capital, labor, energy, materials and service inputs," European Commission) who presents evidence at the industry level.

national accounts, and harmonizes it so that data is as internationally comparable as possible.

- **UNSNA:** The United Nations System of National Accounts provides a compilation of data of national accounts from member countries and provides adjustments in order to make the data comparable.

The best *nationwide* data for the US can be found at the source, in NIPA Table 1.11 "Percentage Shares in National Income" and is plotted in Figure 2. We immediately see that the share of depreciation, taxes, business transfer payments and subsidies did not change much over the past 80 years. This is surprising; changes in tax receipts (tax cuts) must have matched the changes in depreciation charges (computers depreciate faster). Given the quasi-absence of movement we are better off talking about the relative shares in net national income, which we do in Figure 3, using a simple technique of mixed income apportionment described below.

Figure 2 and Figure 3 hint at an important composition effect. The share of wages has been falling since the early 1970s, while the share of benefits has risen since the late 1960s. NIPA Table 7.8 shows that the growth in benefits is almost entirely due to the increase in cost of two benefits (retirement and health care; see Figure 4). The only plausible explanation I find that matches the timing is the expansion of social security.

Figure 2 Percentage Shares of Gross Domestic Income
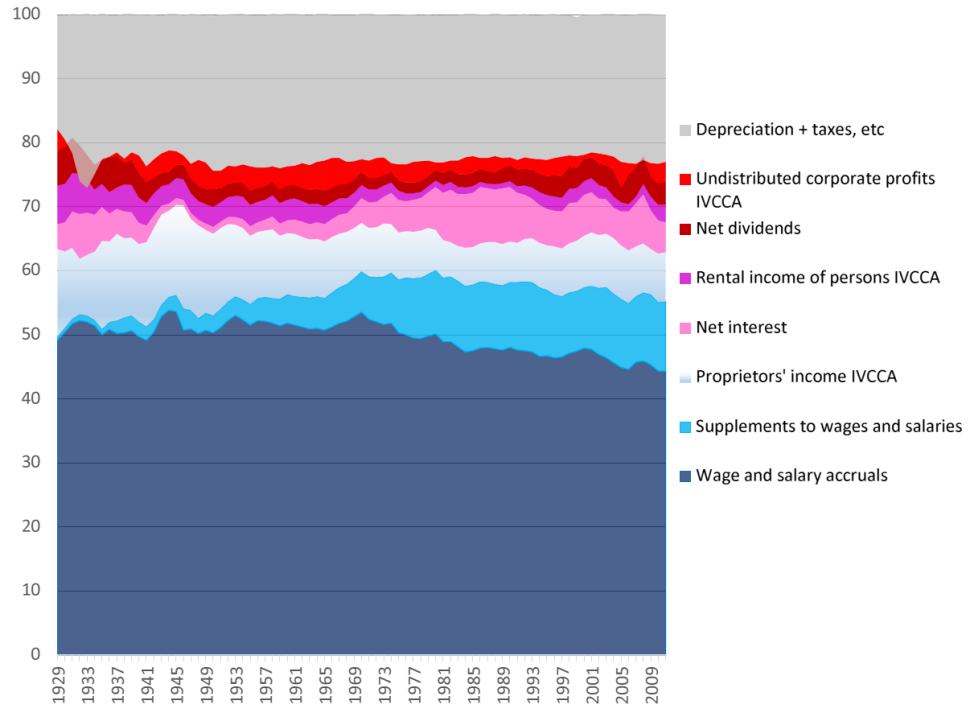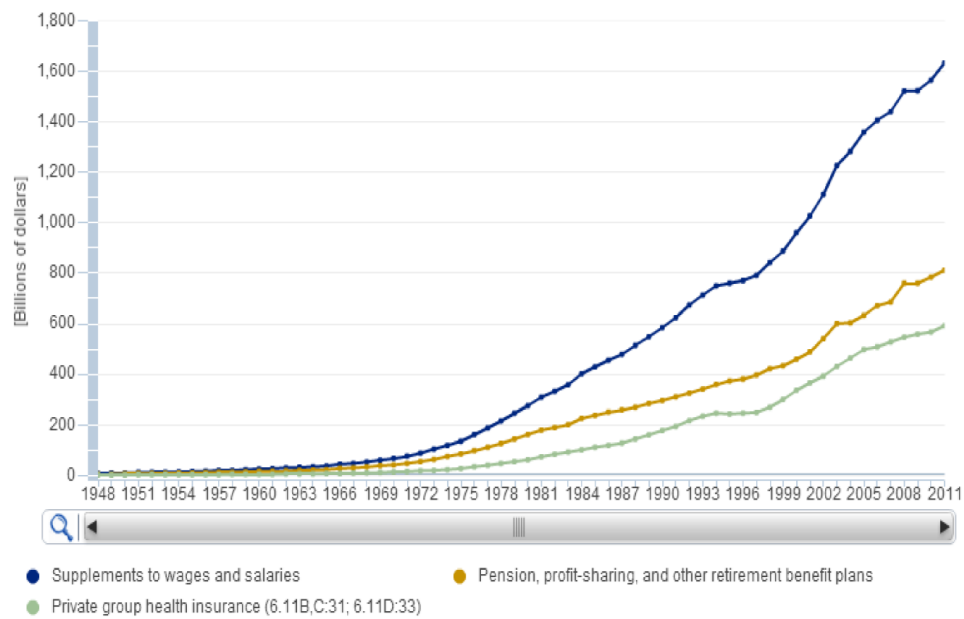

Source: Annual data from NIPA Table 1.11

Figure 3 Income Shares of Net National Income, with Proprietor's Income Apportionment
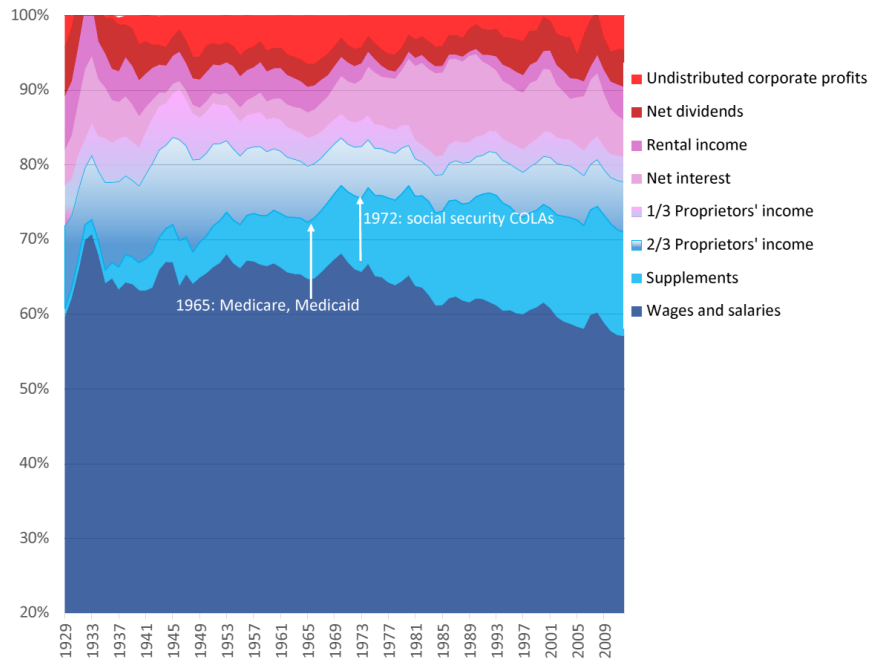
Source: Annual data from NIPA table 1.11 and author's calculations

The fall of the wage share while the benefit share is increasing makes it look as if there has been substitution of one for the other. This does not necessarily mean that employers lowered wages as a result of higher hiring cost due to the creation of Medicare and Medicaid; in fact this question is outside of the scope of the present paper. I will only note that the extension of social security started in 1965 and wages only started to decline starting around 1973. Thus it seems more likely that the oil shocks and resulting inflation led to wage moderation and a fall of the wage share starting in the 1970s. The rise of the share of benefits around this time prevented a fall in the labor share, i.e. existing Federal programs stabilized the distribution of income −which is what those programs were partly intended to do.

Figure 4 Employee Benefits and Two Major Contributors

Supplements to wages and salaries
Pension, profit-sharing, and other retirement benefit plans
Private group health insurance (6.11B,C:31; 6.11D:33)

Source: NIPA Table 7.8

2.2 Apportionment of Proprietors' and Mixed Income

A traditional problem with Figure 2 is that it is an incomplete picture of the labor share unless the labor component of mixed income is extracted and added up. Whereas corporate profits and compensation of employees are unambiguously capital income and labor income, respectively, the case of proprietors' income is less clear-cut (Kuznets 1933, Johnson 1954). Below we present five ways to apportion this "entrepreneurial income."

Johnson (1954): 2/3rds Rule

Figure 3 presents a simple Johnson (1954) solution to this problem: allocate two-thirds of proprietor's income to labor and a third to property. This is a fixed-weight rule of thumb.

Gollin (2002): Assuming Identical Wage Rates

Another apportionment consists in assigning the same average wage to each and every worker regardless of him/her being an employee or self-employed (proprietor). The formula for the labor share becomes (see Gollin 2002).

$$\alpha = \text{employee compensation} \cdot \frac{workforce}{\#employees} / Y \qquad (2)$$

The resulting labor share may be a lower bound, for self-employment covers professions such as doctors, consultants, lawyers and heads of business whose income is more likely to be above the market average than below.

Gomme and Rupert (2004): Assuming Identical Wage Shares

In a famous article Gomme and Ribert (2004) present a way of apportioning "ambiguous income" between "capital" and labor. First the authors recognize that there are incomes which are either unambiguously labor (Y_{UL} = compensation of employees) or unambiguous capital (Y_{UK} = corporate profits, rental income, net interest and depreciation). Second, they assume that the labor share within ambiguous incomes (Y_A = proprietors' income

plus indirect taxes less subsidies) is the same as in the rest of the economy, i.e., $(\alpha = \alpha_A = Y_L / Y)$. In that case, total labor income Y_L is

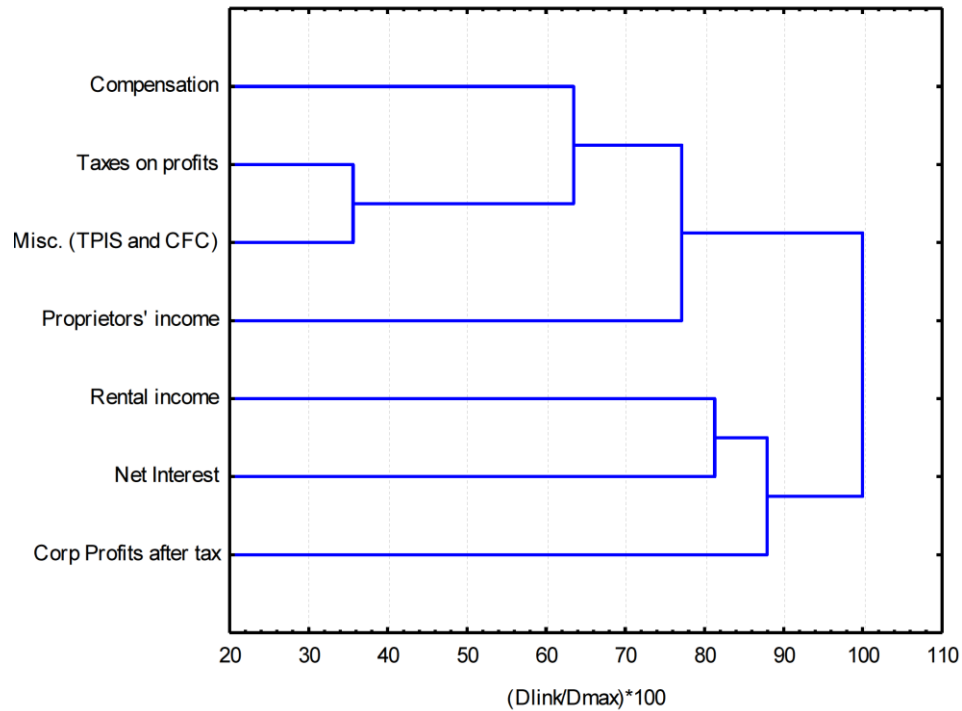$$Y_L = Y_{UL} + \alpha\, Y_A \tag{3}$$

But Y_L is also

$$Y_L = \alpha Y = \alpha\,(\,Y_{UL} + Y_{UK} + Y_A\,) \tag{4}$$

Subtracting the two equations and solving for the labor share we get

$$\alpha = \frac{Y_{UL}}{Y_{UL} + Y_{UK}} \tag{5}$$

Both the Gollin (2002) and the Gomme and Rupert (2004) are variable-weights apportionment methods.

Figure 5 Tree Diagram for Seven Types of Income, 1953-2013

Source: author's calculations. TPIS and CFC stand for taxes on production and imports less subsidies and consumption of fixed capital

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Cluster Analysis

An original method consists of using cluster analysis to split proprietors' income. Consider the fact that at each and every point in time a certain amount of each type of income is generated in the economy. Proprietors' income may be related to those other types of income in a certain way, i.e. it may consist of a certain amount of profits and a certain amount of wages. Thus

$$Propinc = f (comp, \text{ net interest, rental, corp profits, } ...)$$

Cluster analysis can be applied to the dataset in order to find affinity between variables. The way to proceed is to consider the rate of change of each variable since each variable is $I(1)$, and to standardize each variable (to avoid affinity by standard deviation). Cluster analysis provides the classification tree reported on Figure 5, where shorter distances between variables indicate greater affinity.[8]

Table 1 Apportionment Using Regression

Dependent Variable: DLOG(PROPRIETORS)
Method: Least Squares with Breaks
Sample: 1953Q1 2013Q1
Included observations: 241
Break type: Bai-Perron tests of L+1 vs. L sequentially determined breaks
Break selection: Trimming 0.15, Max. breaks 5, Sig. level 0.05
No breakpoints selected
HAC standard errors & covariance (Bartlett kernel, Andrews bandwidth)
Allow heterogeneous error distributions across breaks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(COMP)	0.681531	0.242069	2.815446	0.0053
DLOG(PROFAT+RENTAL+NETINT)	0.073194	0.054194	1.350590	0.1781
C	0.002152	0.004042	0.532428	0.5949

R-squared	0.081313	Mean dependent var		0.014067
Adjusted R-squared	0.073593	S.D. dependent var		0.025726
S.E. of regression	0.024761	Akaike info criterion		-4.546692
Sum squared resid	0.145924	Schwarz criterion		-4.503313
Log likelihood	550.8764	Hannan-Quinn criter.		-4.529215
F-statistic	10.53267	Durbin-Watson stat		1.789548
Prob(F-statistic)	0.000041			

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[8]The analysis was run using Ward's method of classification with Euclidian distances, and the graph has been normalized by the largest affinity = 100.

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Regression Analysis: Constant Elasticities

A regression of proprietors' income on other types of incomes was run and no significant break date could be found, so there is little reason to expect the 77/23% split to have greatly changed across the sample (see Table 1). The regression indicates that proprietors' income is much more related to compensation, with a highly significant and a large coefficient (.68, t-stat 2.82), whereas the property coefficient is small and significant only at 15% confidence (0.07, t-stat 1.35). Those results conform to the results from cluster analysis and to the literature in ascribing a greater share of proprietors' income to labor.

Summary

Figure 6 presents the five labor shares corresponding to the five alternative methods of mixed income apportionment described above, plus the original Gomme and Rupert (2004). All shares are in net national income (or "at factor cost") except for this last measure, which is a labor share in GNP. All methods give very similar results except for the Gollin (2002); this may be due to our use of full employment equivalent measures where employment series should have been used instead. Figure 7 presents the labor share using the average of the top four apportionment methods, i.e. leaving the Gollin (2002) and the original Gomme and Rupert (2004) series aside. This mixture of fixed-weight and flexible-weight methods is our baseline labor share estimate.

Figure 7 depicts a labor share estimate that has been remarkably constant at about 78–84% of NNI (or 62–69% of GNP). This is most striking because today's economy and structure is vastly different from that which prevailed some 80 years ago; yet the share of income accruing to labor has remained roughly within a 5-point corridor (Keynes 1939, Solow 1958). In terms of a trend, the constancy of the relative shares seems to validate the use of Cobb-Douglas production functions. In terms of the level, also, the rule of thumb in choosing 2/3rd or 3/4th as the exponent to factor "labor" seems to have hit the bull's eye. Were we right all along, and nothing happened since Kaldor (1961)?

Our contention is that much has happened to the *composition* of the labor share.

## 2.3 Robustness Check and International Comparisons

So far, our inquiry has been conducted without placing it into context. Before moving on we need to compare our results to alternative data series (which use a different methodology) and to the experience of other countries (which may have fared differently). In order to provide an apples-to-apples comparison we will make use of the international datasets mentioned in section 2.2. It is worth stressing that comparing the same measure (the labor share) across datasets will invariably introduce small discrepancies—mostly because of different definitions, methods, and scope.

Figure 6 National Labor Shares Estimates Using Alternative Proprietors' Income Apportionments
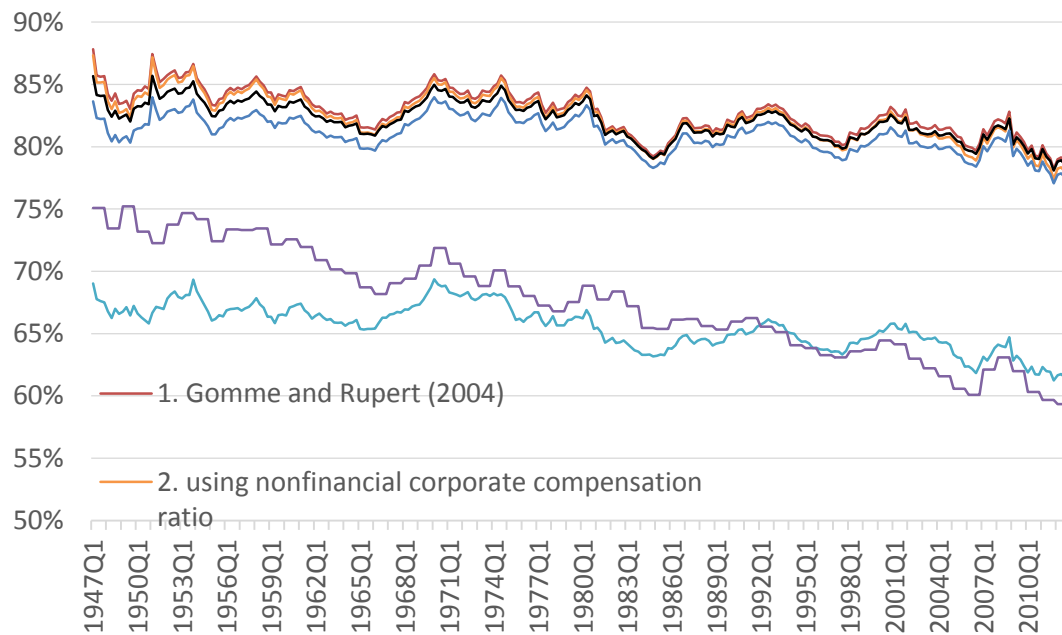
Source: author's calculations based on NIPA Table 1.10

Figure 7 Estimated US Labor Share Based on NIPA Data
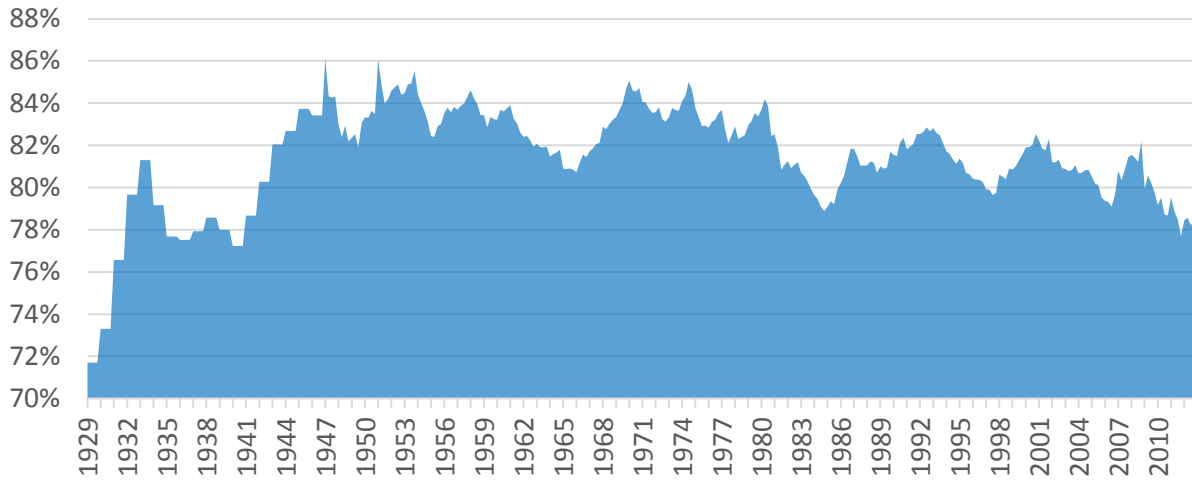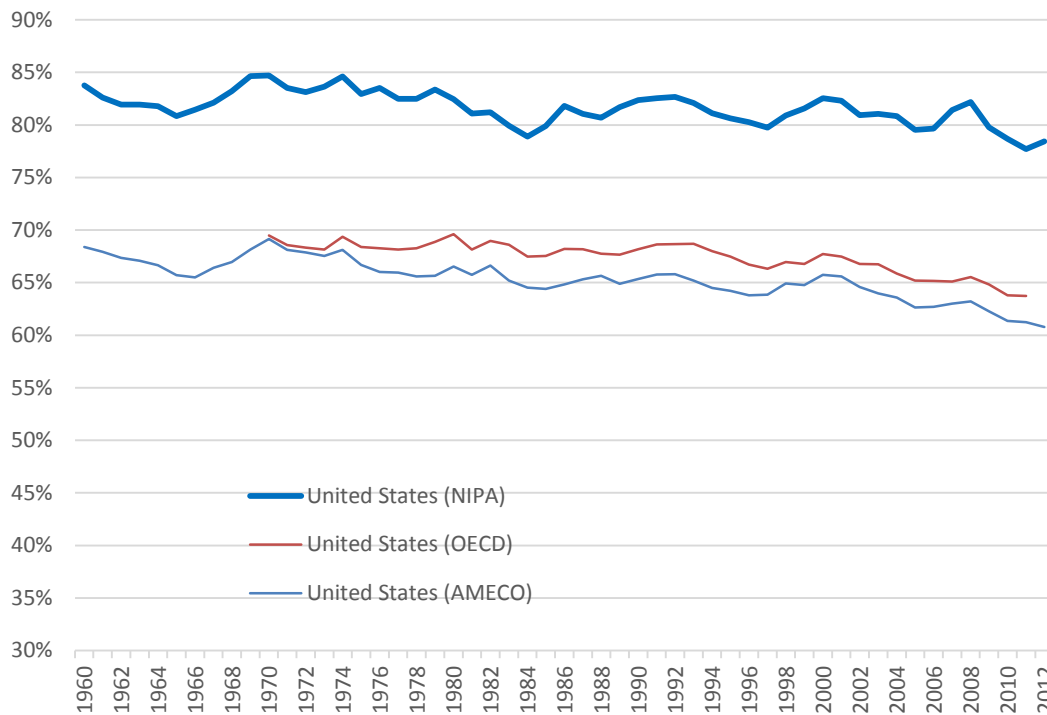
Source: author's calculations

Comparison with Existing Datasets

Figure 8 presents a comparison between our measure of the US labor share and that provided by the OECD and the European Commission. Our measure is in line with those alternative datasets; all paint the same picture of a quasi-constant labor share fluctuating within a 5-point corridor of whatever measure of income is used. The correlation between our measure and existing datasets is high, ranging from 0.72 with the OECD measure, to 0.85 with the AMECO measure with a median correlation of 0.78 with the BLS measure (which considers only the nonfarm business sector, not reproduced here, see Figure 1).

Our labor share estimate has several advantages over existing measures. First, it provides greater coverage than anything else available. Our measure starts in 1929 using annual frequency and in 1947 using quarterly frequency, which is far ahead of the earliest start date (1960, AMECO). Plus, there simply isn't any quarterly data available besides our own except, again, for the BLS measure plotted on Figure 1, valid for the private sector only, and only available beginning in 1947. Second, our measure provides a middle ground in terms of methodology as it comes from the average of four alternative mixed income apportionment methods, while alternative labor share sources only use one method, generally assuming identical wage rates across the board (AMECO, OECD). Third, our measure is more transparent; all the details of our measure were presented in the pages above. Fourth, because our

measure is transparent it is decomposable. It is easy to understand that the complement to unity of our measure is the "property share" and we have shown what the share includes. All in all, our measure of the labor share has very desirable properties and is strongly correlated with the existing data.

Figure 8 Comparison of Alternative Data Sources for the US Labor Share

Sources: as indicated on graph; NIPA compiled by the BEA (author's calculations, see above), AMECO by the European Commission.

International Comparisons

Figure 9 presents a comparison between the US labor share and the labor shares in Mexico, Canada and Japan (top panel) and the UK, France and Germany (bottom panel). The US and Canada present the smoothest evolution and the greatest stability. While most countries experienced a rise in their labor shares in the 1970s following the oil shocks and the growth slowdown, the American and Canadian labor shares remained remarkably constant. Similarly, all other countries' labor shares fell in the 1980s, partly as a compensation for their previous rise, although the fall went further. It is not uncommon to see labor shares 10 points below their pre-1980 levels by 2006. The 2008 crisis elevated European labor shares again by the same mechanism

that prevailed in the 1970s, namely that output fell faster than real wages. Overall, therefore, one is presented with the image of labor shares exhibiting substantial variation, especially if one talks in terms of billions of dollars, euros, pounds or yen instead of percentage points. Labor shares, however, are generally not violently unstable. They tend to fluctuate within a 10-15-point range, exceptionally more, as in the case of Mexico in the early 1980s. And within this relative stability the US and Canada presents the most stable labor shares. Why this is the case is beyond the scope of this paper.

Another way to look at the data is to compare the United States to Europe and Japan as separate blocs. This can be done by superimposing our measure of the labor share on data from the AMECO database, as in Figure 10. Again the American labor share stands out as the most stable. However if one deducts the top 1% incomes from the US labor share its evolution becomes similar to that of Japan and Europe (see section 3.3 below). Overall the bottom 99% labor share in the U.S., and the economy-wide labor shares of Japan and the EU-12 have fallen by about 10-15% of net national income.

3   COMPOSITION EFFECTS AND ADJUSTMENTS

A point which has not been addressed so far in the literature is the effect of structural changes. When the economy's structure changes, the labor share experiences a composition effect and we expect the labor share to change due to structural, as opposed to purely economic, reasons. We are interested in seeing if some of the major structural changes having occurred over the past few decades were of sufficient magnitude to sway our conclusions as to the stability of the labor share.

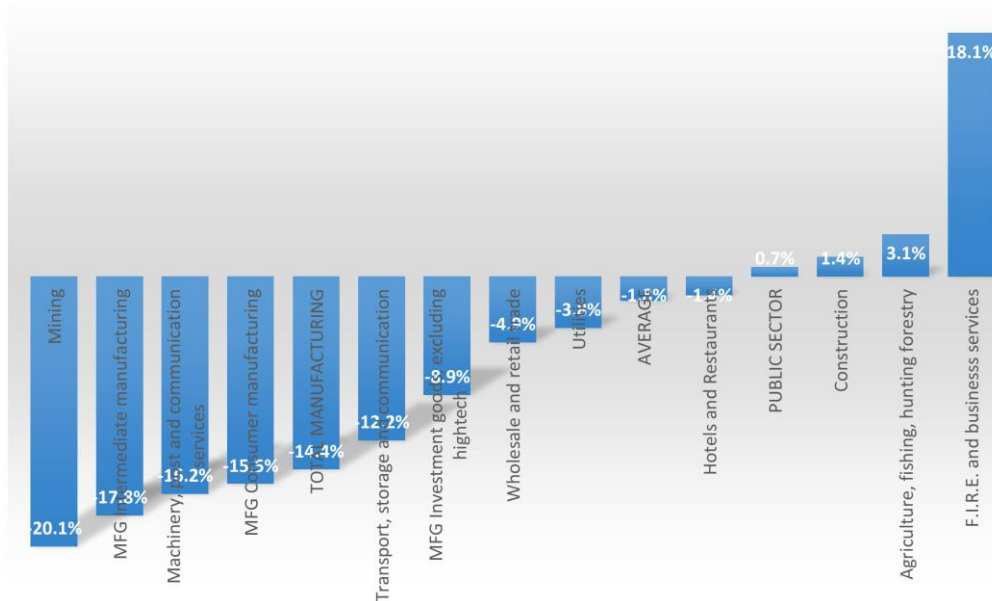*Figure 9* The US Labor Share in International Perspective
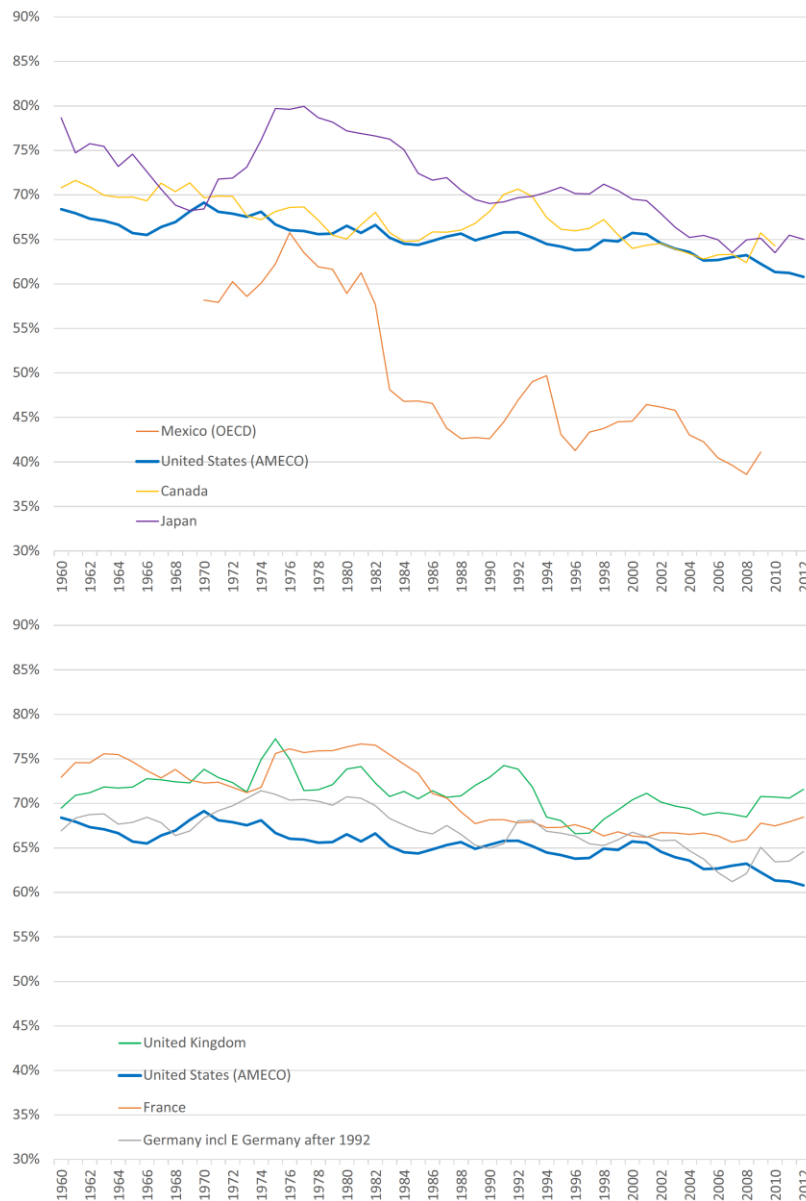
Source: See text

Figure 10 The American Labor Share, Compared
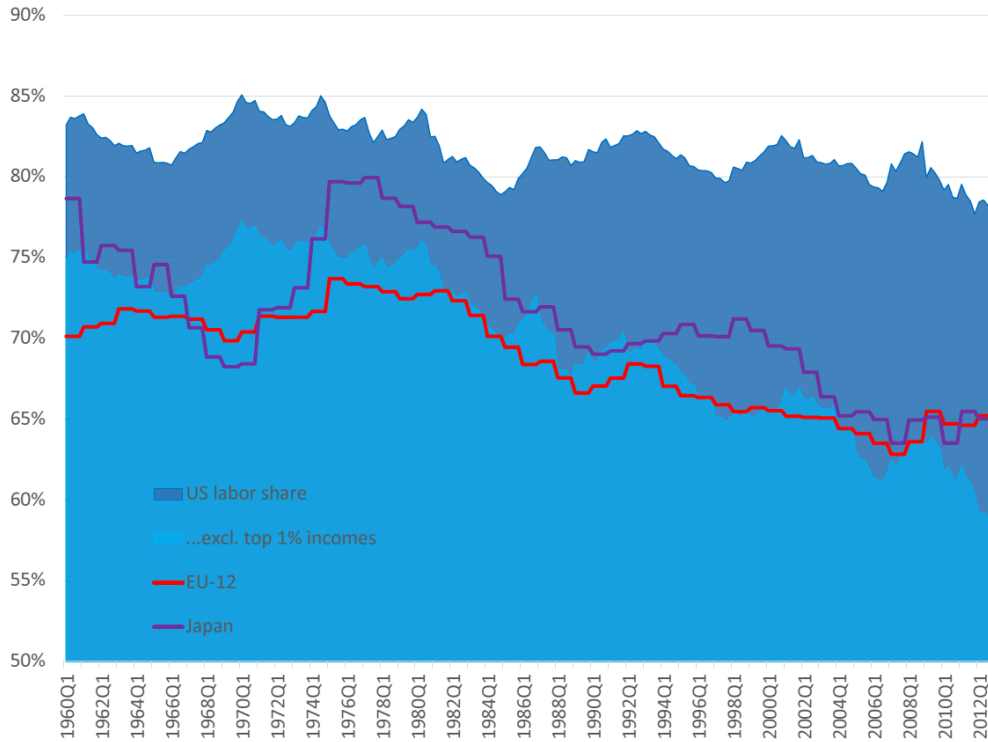
Source: for US data: Bureau of Economic Analysis NIPA and author's calculations; for European and Japanese data: European Commission AMECO (quarterized).

*Figure 11* Change in the Compensation Share, 1977–2007

Source: EU-KLEMS and author's calculations. The compensation share is in gross value added.

3.1   Sectoral Changes

The first type of structural change is the generic one which relates to changes in the weight of sectors in the economy. Over time, certain industries lose employment and others gain; the overall labor share will go up if the net job gains occur in sectors with a higher labor share. To assist the reader in grasping this sectoral composition effect, Figure 12 presents average employment changes by sector and Figure 11 presents the changes in the observed compensation shares.

Figure 11 indicates that the compensation shares in trade, utilities, hospitality, construction and agriculture industries remained relatively constant. Besides those sectors, we are left with as polarized a picture as possible, with a large compensation share drop in manufacturing (-14 points) and a large gain in finance (+18 points). Both sectors have about the same average weight in value added over the sample, so gains of one canceled out the losses from the other, on average. Overall the sectoral shares show much variation but they seem to cancel out at the aggregate level (Solow 1958). Indeed the average change of the US compensation share over 1977-2007 has been a mere -1.8 points.

Figure 12 Average Yearly Job Changes, 1979–2012
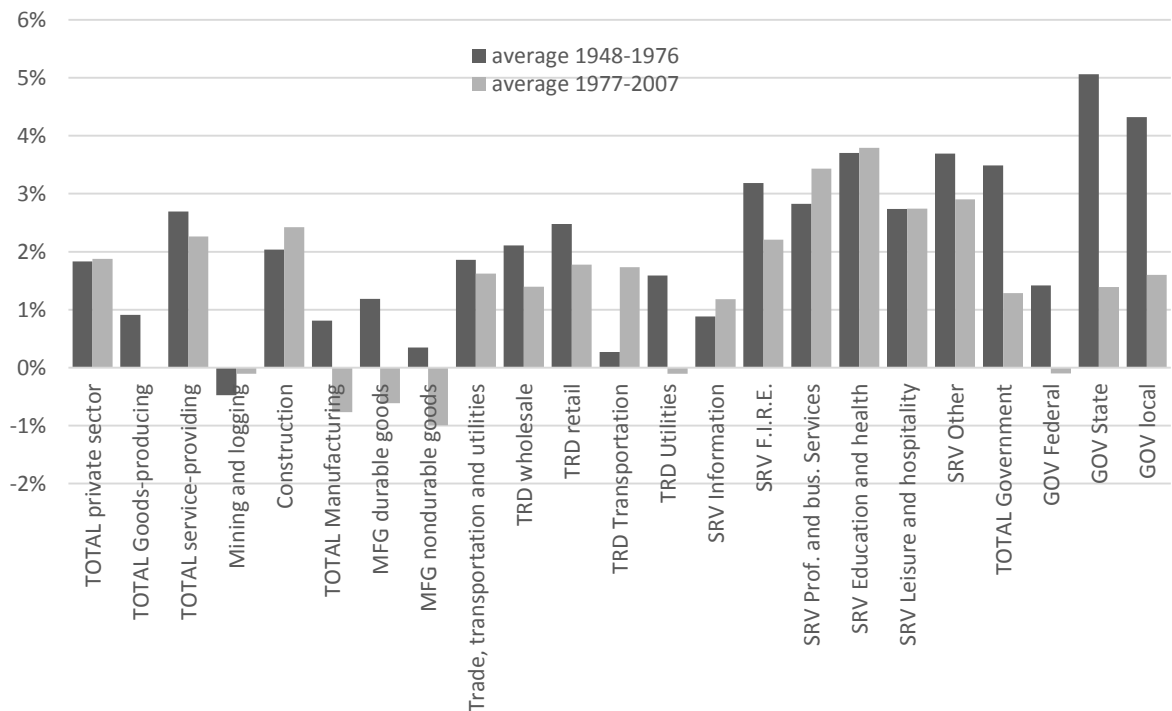
Source: BLS and author's calculations

There are other points to note beyond this remarkable stability. The first is that the drop in manufacturing's compensation share happened with job losses (Figure 12), while the increase in finance's compensation share took place with average employment growth. Much research is still needed into the causes, but those trends are compatible with a trade / technology-displaced-workers explanation in the manufacturing sector (see Elsby et al., 2013) and a skills-biased technological change, or monopoly power, explanation in the finance industry. The disaggregated data point to the many reasons for the fall in the US labor share. Second, Figure 12 points to the erosion of manufacturing and public sector employment and a reinforcement of the service sector. So overall the employment shift is that from higher wages, higher unionization sectors to lower wages, and lower unionization sectors. The slowdown in government hiring is particularly noticeable.

Figure 13 Estimates of the Composition Effect
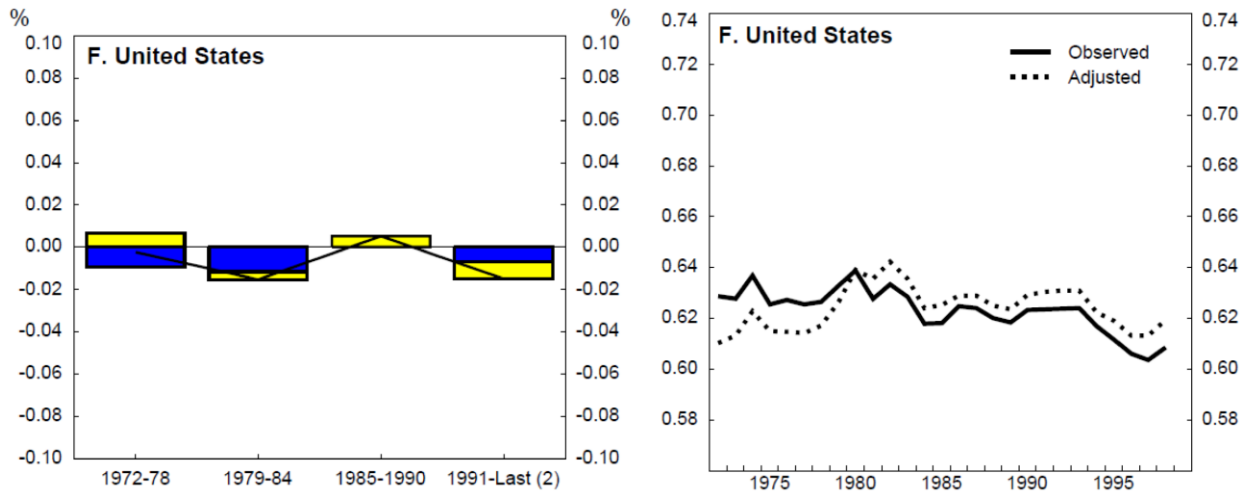
Source: de Serres et al. (2002), whole economy estimates. Blue represents the effect of changing sector weights, i.e., the composition effect, while yellow indicates the effect of changing labor shares within sectors.

We may have a better look still at the composition effect by proceeding to a shift-share decomposition (Arpaia et al. 2009, de Serres et al. 2012). By definition, the aggregate labor share α_t is the average of all sectoral labor shares α_{it} weighted by w_{it}, the weight of sector i in total value added:

$$\alpha_t := \frac{W_t}{Y_t} = \frac{\sum W_{it}}{Y} = \frac{\sum \frac{W_{it}}{Y_{it}} Y_{it}}{Y} = \frac{\sum \alpha_{it} Y_{it}}{Y} = \sum w_{it}.\alpha_{it} \qquad (6)$$

where W denotes labor income. Differentiating with respect to time, we get the shift-share:

$$\Delta \alpha_t = \underbrace{\sum \bar{w}_{it}.\Delta\alpha_{it}}_{\substack{\text{effect of varying} \\ \text{shares within sectors}}} + \underbrace{\sum \Delta w_{it}.\bar{\alpha}_{it}}_{\substack{\text{effect of changing} \\ \text{sector weights}}} \qquad (7)$$

which states that the overall wage share can come from the changes in sectoral labor shares when sector weights remain constant, or from changes in sector weights when labor shares remain constant. In other words, the first summation represents changes in sectoral labor shares, while the second summation represents the effect of a change in sectoral composition.

Arpaia et al. (2009) and de Serres et al. (2002) look at the composition effect for a panel of OECD countries and find that generally the composition effect is dominated by the sectoral shares effect. However, in the case of the US the composition effect has been strong: de Serres et al. (2002) estimate that about 50% of the variation in the labor share is due to changing sector weights, as opposed to falling labor shares within sectors. De Serres et al. (2002) find that when the composition effect is removed, the US labor share becomes even more stable (see Figure 13). Thus there is a sizable composition effect consisting in labor moving across sectors, in particular towards less unionized and more service-oriented, but this is hardly the reason why the labor share fell.
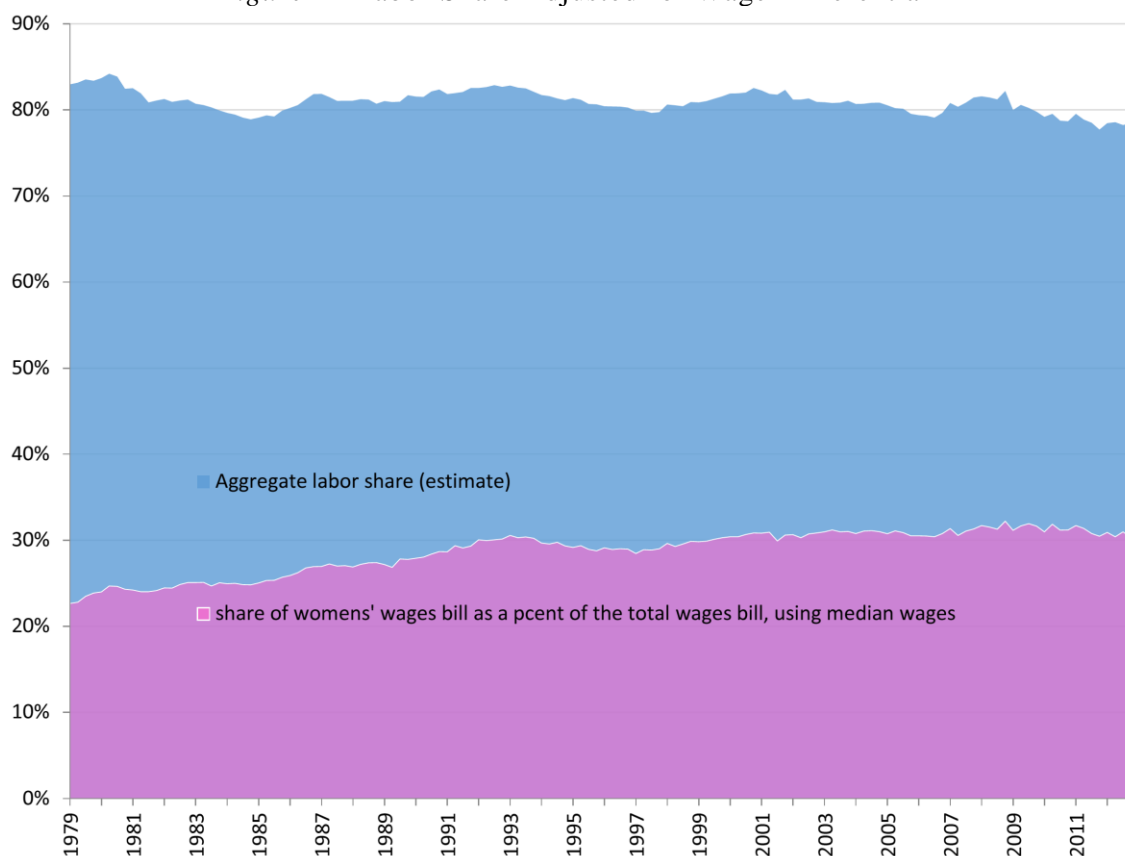
3.2   Feminization

A major structural change of the last half century is the greater participation of women in the labor force. Comparing the labor share of 2013 to that of 1980 is not an apples-to-apples comparison because of this greater participation and because women's incomes are only a fraction of men's. We expect the labor share with greater women participation to be lower.[9]

There is no official data presenting a breakdown of the labor share by gender, so we will have to make do. Figure 14 represents the aggregate labor share together with a measure of feminization of the labor force; the women's share of income is women's employment times women's median wage, all as a percentage of aggregate income. The measure is not perfect but it may still hold clues. Until 1990 the aggregate labor share has remained quasi-constant while women were participating more and women's relative wage was increasing, but after 1990 the overall labor share started to fall while feminization remained constant. Thus in the case of the United States, feminization and labor share are not very much correlated. At most, we can say that women's greater participation stabilized the labor share by preventing it from falling further, which it would have done if the labor force consisted only of men.

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[9] A note of caution should be made. An adjusted labor share is purely a thought experiment made under many assumptions, especially that the "alternative scenario" was a possibility. Thus, any gap between the actual and adjusted labor share should not be taken at face value; better use the gap magnitude as an indication of how strong the composition effect, or structural change, has been.

Figure 14 Labor Share Adjusted for Wage Differential

Source: BLS Data and author's calculations

An alternative approach is presented in Finnoff and Jayadev (2006), who use regressions to study the correlation between feminization and the labor share in a panel of countries, using different control variables acting as proxies for welfare retrenchment, trade unionism, protectionism, capital openness, the unemployment level and the degree of labor market flexibility. All variables are statistically significant to the labor share, but the share of women in the labor force is consistently (across specifications) highly significant and with a large estimated coefficient, varying between -0.27 and -0.68. Thus Finnoff and Jayadev prove our expectation correct: there is strong negative correlation between feminization and the share of labor. If the US doesn't seem to exhibit such a strong correlation it may because other variables are left out of the analysis, such as the share of the top 1%. Further examination of the specific case of the US is required, but this is beyond the scope of the present paper.

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3.3   Purchasing Power

A third adjustment can be made to measure the purchasing power of labor. We are, after all, not so much interested in what the labor share looks like, but more interested in how much labor can buy. By definition, the labor share $\alpha_t = \frac{w_{r,t}}{A_{L,t}}$ is deflated by the GDP deflator[10] while "purchasing power" is a concept traditionally assessed using the CPI deflator. In normal circumstances both deflators would be growing at the same pace so that which deflator is used wouldn't matter. However, the CPI and the GDP deflators have not evolved jointly in recent decades (see Figure 15). The evolution of the IPD and the CPI was parallel until 1980 but the two measures started to diverge thereafter, with the CPI growing faster −a cointegration break if you will. Thus, the labor share and the purchasing power of labor have diverged since 1980; the purchasing power of labor is actually lower than what the labor share indicates. Another way of looking at this is to consider the decomposition

$$\alpha = \frac{wN}{p_{GDP}Q} = \underbrace{\frac{wN}{p_{CPI}Q}}_{\substack{\text{purchasing} \\ \text{power of} \\ \text{labor}}} \cdot \underbrace{\frac{p_{CPI}}{p_{GDP}}}_{\substack{\text{rel. price} \\ \text{of wage} \\ \text{goods}}} \tag{8}$$

When the two deflators are the same the labor share measures the purchasing power of labor. But when the CPI grows faster the purchasing power of labor is lower than the observed labor share, and part of the observed labor share is driven by the relative price of consumption goods. This finding echoes that of Karabarbounis and Neiman (2013) who find that roughly half of the worldwide fall in corporate labor shares has been due to the fall of the relative price of investment goods.

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[10] In what follows I call GDP deflator what is also known as the implicit price deflator or IPD, and more particularly I refer to its consumption component, the personal consumption expenditure (PCE) deflator. The Consumer Price Index (CPI) measures inflation for a basket of consumption goods and is measured for urban households. The CPI tracks actual inflation pretty well (see the MIT's billion price project at http://bpp.mit.edu/usa/).

Where does the CPI and PCE discrepancy come from? For starters, both are computed in different ways by different statistical agencies, as Table 2 illustrates. Then comes the coverage: by construction the CPI does not cover the price of capital, which declined since the 1980s. Another difference seems to come from the higher weights given to housing and gas in the CPI, making it more realistic of a price index for the majority of the (urban) population. The GDP deflator seems more appropriate to higher incomes for whom shelter and gas are smaller fractions of total expenditures, and for whom the price of capital matters most.

Table 2 Some CPI and PCE Differences

	CPI	PCE
Computed by	BLS, Dept of Labor	BEA, Dept of Commerce
Type of index measure	Laspeyres	Fisher superlative. Accounts for product substitutions
Weights	Consumer expenditure survey	Census surveys
Scope	All urban households	All households and nonprofits
Features	• Only household out-of-pocket expenses are counted • Larger shelter and gas weights	• Full cost and price is reflected in the index • Smaller shelter and gas weight

Source: BLS (2011). PCE stands for Personal Consumption Expenditure deflator, which is the "consumption" component of the IPD.

When one takes the labor share of the bottom 99% incomes and deflates this with the CPI instead of the GDP deflator, one gets Figure 16, which indicates a drop of about 20% of purchasing power in 2013 compared to 1980. Half of that drop is due to the rise of the top 1% incomes, and the other half to a higher deflator. Thus, prices and their measurement play a large role, possibly as large as the increase of inequality. The magnitude of the fall of the labor share could as well have been under-reported so far in this paper, and the fall could be as much as 20% when one compares purchasing power.

Figure 15 The CPI and GDP Deflators
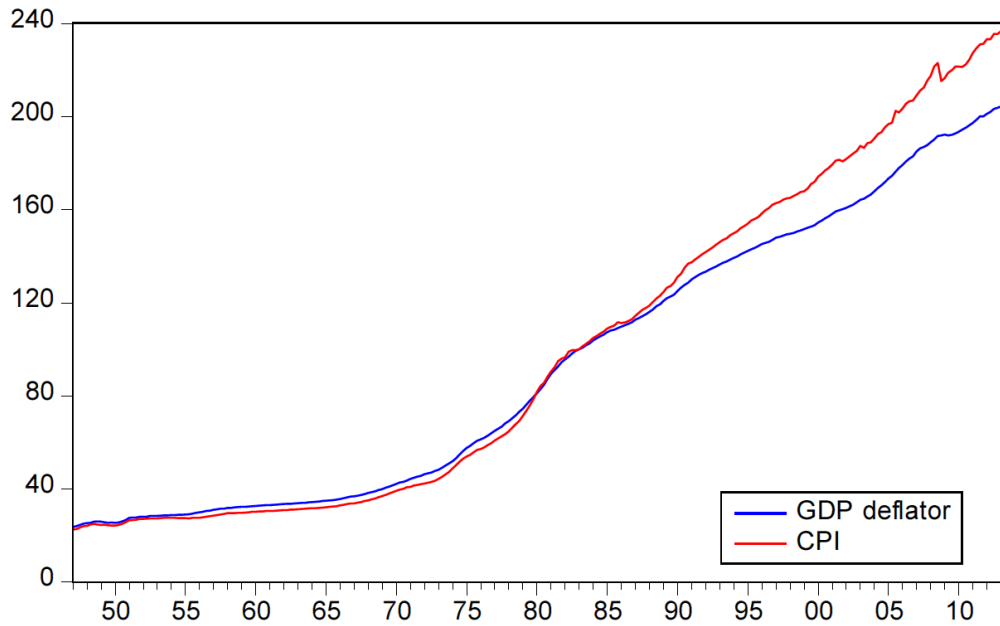
Sources: GDP and PCE deflator from the NIPA, CPI-U for all urban consumers from the BLS. Data has been indexed base 100 in 1947 to facilitate comparisons.

*Figure 16* Purchasing Power of the Non-top 1% Labor Share

Source: See text

32
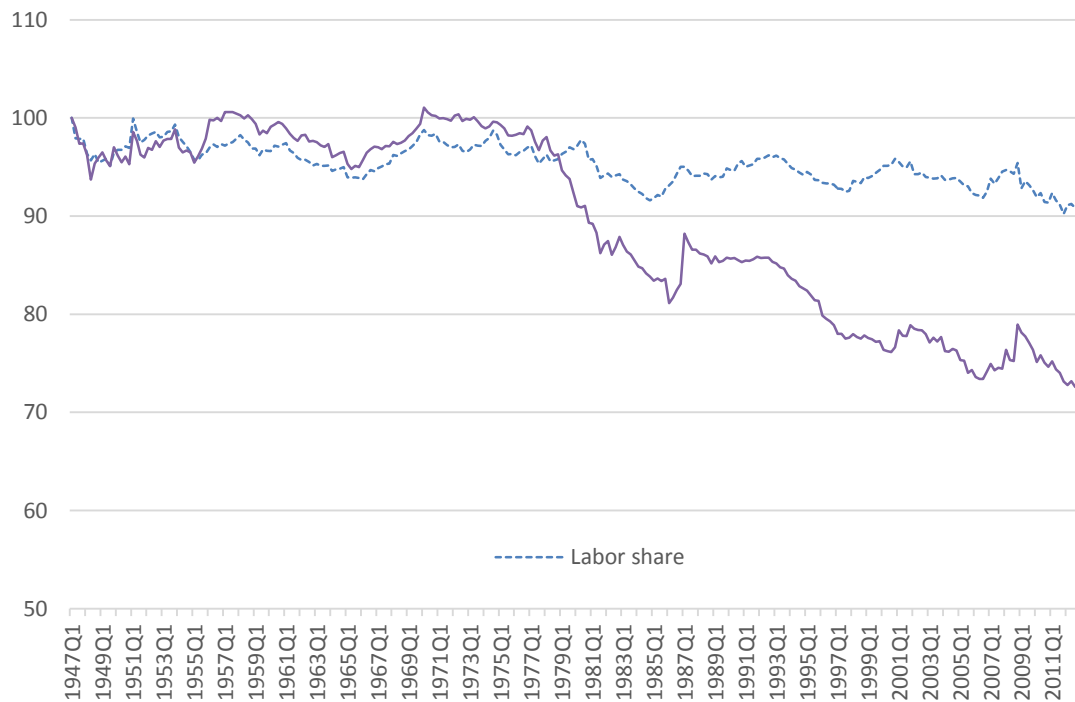
Table 3 Top Income Thresholds and Average Incomes, 2012

	Income threshold, 2012	Average income, 2012
Top 10%	$112,000	$254,000
Top 5%	$158,000	$378,000
Top 1%	$372,000	$1.022m
Top 0.1%	$1.55m	$4.661m
Top 0.01%	$7.205m	$21.269m

Source: World Top Incomes Database of the Paris School of Economics (Piketty and Saez, 2006)

Figure 17 Top Income Threshold Shares
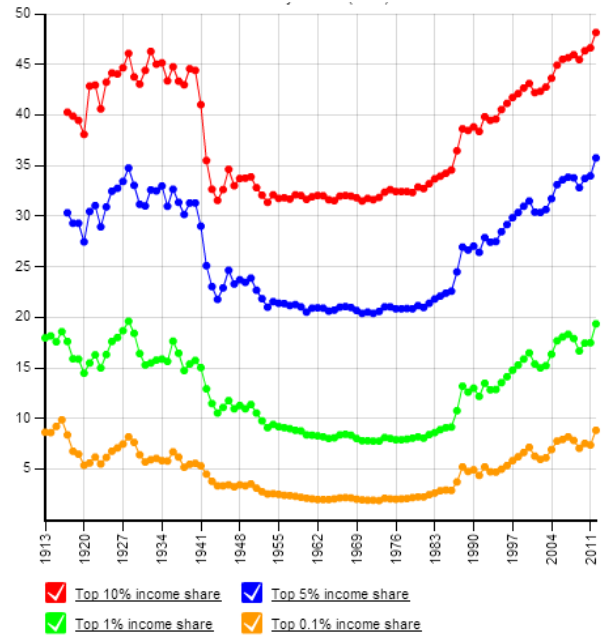
Source: World Top Incomes Database of the Paris School of Economics (Piketty and Saez, 2006)

3.4   Top Incomes

One of the most striking features of the last decades has been the worldwide rise of top incomes. This is a particularly strong feature in the United States and has been well documented in the World Top Incomes Database (Piketty and Saez, 2007)—see Table 3 and Figure 17. The World Top Incomes Database presents annual data, for many top incomes thresholds, for the average income, the income share, as well as the distribution of such income in wages, rents, interest, etc. The National Income and Product Accounts (NIPA), Table 1.10 presents data for aggregate incomes since 1929 on an annual basis and since 1947 on a quarterly basis. Together, NIPA data and the World Top Income Database allow us to devise relative shares for non-top incomes, over the long period.[11]

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[11] The correspondence between categories of income between the two datasets has been carried the following way. In the Piketty and Saez (2006) dataset, "wages, salaries and pensions" was
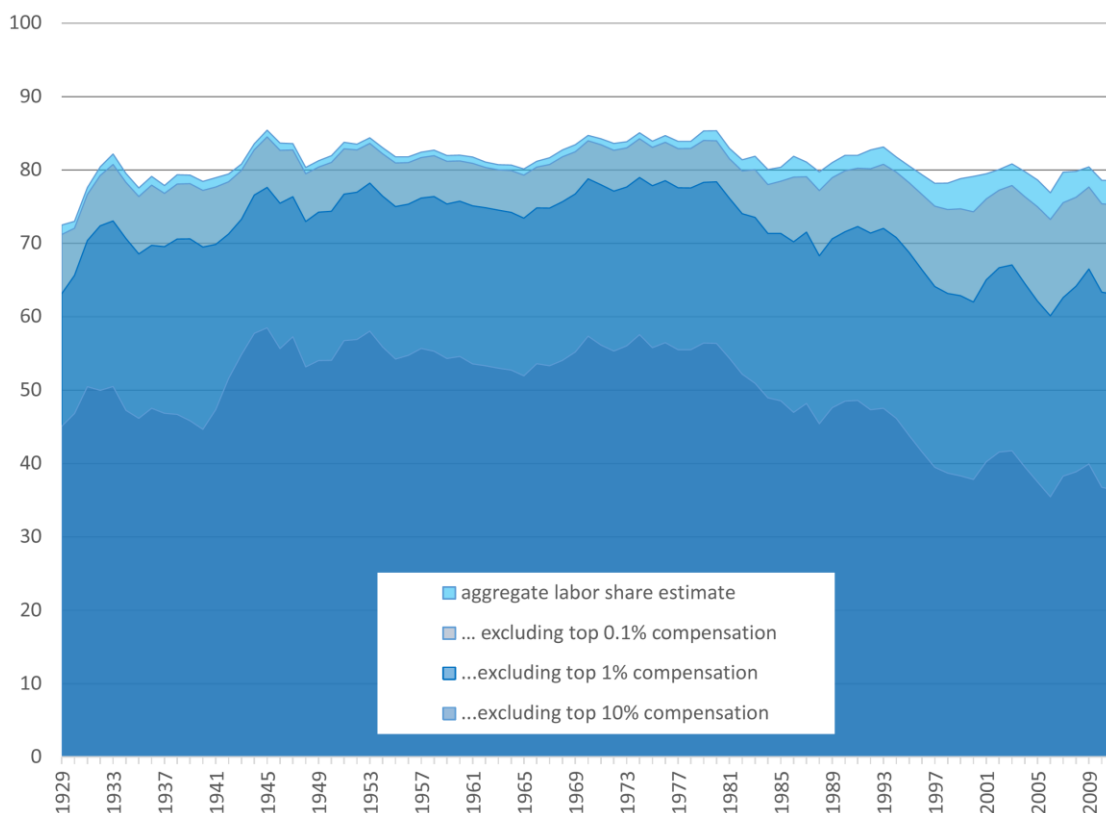
The Labor Share and Top Incomes

It may be interesting to see how the rise in top incomes weighs on our measure of the labor share: what would the labor share be for the bottom incomes? Figure 18 presents the results. What we find is that the income reported as wages by top incomes is a substantial part of aggregate income, and that subtracting those wages from the aggregate labor share significantly alters it. We find that the labor shares for the bottom 90%, 99% and 99.9% have decidedly fallen since the early 1980s, so much so that the labor share is lower today than at any other period since 1930. The fall took place over 1980-2012 and it is substantial, ranging between 8 and 18 points of the net national income, depending on which top income category is retained. This is the equivalent of an annual transfer of $1 to $2.25 trillion from labor to "capital" (using 2012 data). Recall, for comparison, that our best estimate of the aggregate labor share has it falling 5 points of net national income over the same period. Thus, whatever the forces shape the labor share, one of the most powerful is the concentration of incomes at the top.

The Property Share and the Top 1%

Another decomposition can be provided, this time on the property side. What would the property share be if one treats the top 1% of incomes as economic rents? Figure 19 provides the answer, this time using quarterly data to provide more light to the recent era. We find a very similar story—indeed, complementary; the property share was remarkably stable from the postwar period until 1980 and started rising thereafter. The reason for this increase is not to be found in profits (corporate or noncorporate), which have remained constant—though they are currently on their historical upper bound. All in all, about 5% of the increase of the property share can be ascribed to different types of income, to which one must add 10–15% due to the rise of the top 1% and their capital gains.

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understood as including benefits (=NIPA's "compensation"), while "entrepreneurial income" was understood as being mixed income, hypothesized to generously consist of 2/3 wages and 1/3 profits.
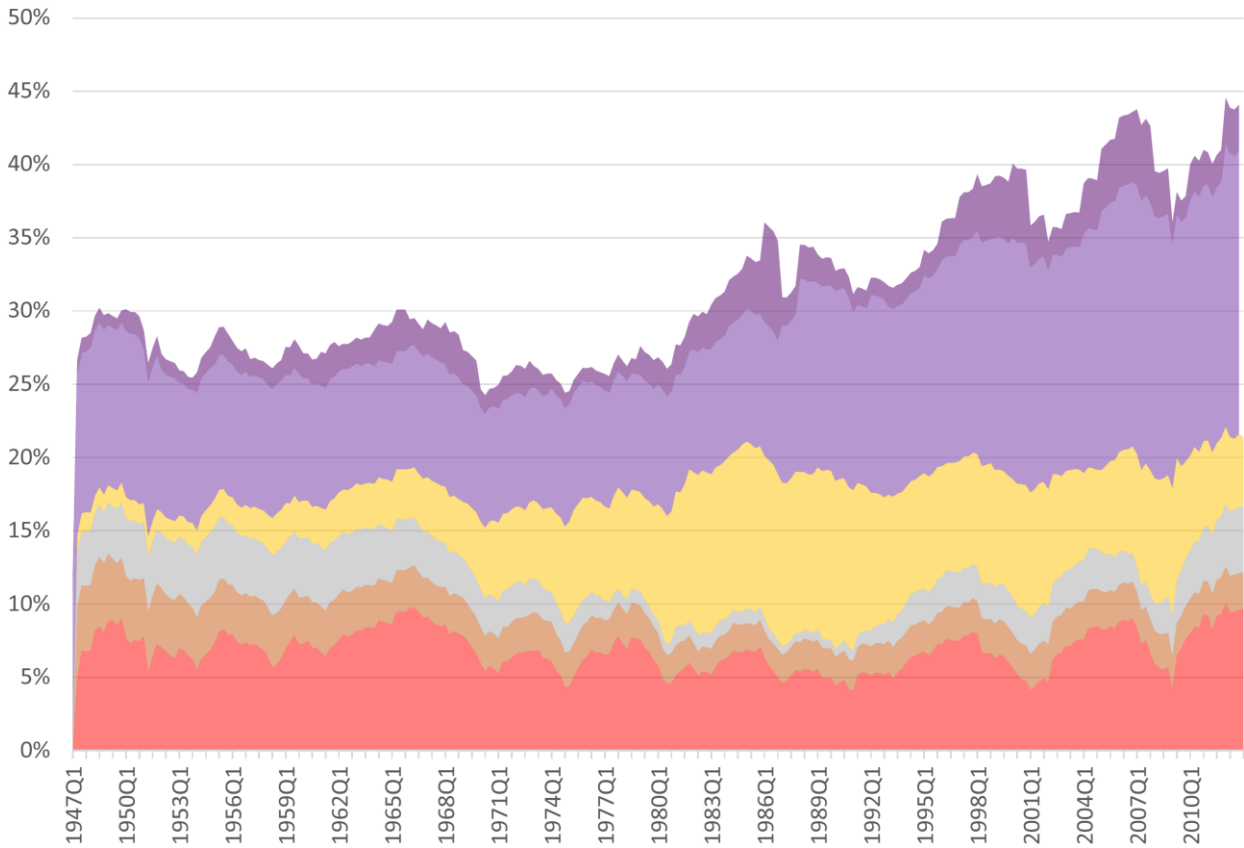
Figure 18 The Aggregate Labor Share and the Contribution of Top Incomes, 1929–2011

Source: Author's calculations based on NIPA data and the World Top Incomes Database of the Paris School of Economics (Piketty and Saez, 2006) available at http://topincomes.parisschoolofeconomics.eu

Note: Each labor share is the ratio [(1) - (2)]/(3) where (1) for the whole economy: employee compensation plus 2/3rd proprietors' income (Johnson 1954 adjustment), (2) is the is the same measure for the top x%, and (3) is the National Income net of taxes, subsidies and depreciation.

Figure 19 The Aggregate Property Share: Contribution of the Profit Share and the Top 1% Income

Source: Author's calculations based on NIPA data and the World Top Incomes Database of the Paris School of Economics (Piketty and Saez, 2006) available at
http://topincomes.parisschoolofeconomics.eu
Note: noncorporate profits, or the profit component of self-employment value added, was derived using Johnson (1954) 1/3rd rule. However the whole top 1% income share was added.

4 CONCLUDING REMARKS

In this paper, we used a variety of datasets to derive a dense series of labor shares for the whole US economy. The constancy of the share over the past 70 years is a remarkable feat in itself which deserves the qualification of "a bit of a miracle" (Keynes, 1939). However, the aggregate labor share also suffers from important composition effects so that the miracle is at the same time "a bit of a mirage" (Solow, 1958). Within the aggregate, financial and top incomes grew tremendously at the expense of labor compensation, at the pace of 15 points of net national income or $1.8 trillion in 2012 alone. It is not that labor compensation has fallen in relative terms; all evidence points to most gains going to the top incomes and a muddling through middle-class. As a result, the average American worker has experienced a triple squeeze: (1) overall, there is relatively less money going to labor; (2) of the "labor money," less is going to the bottom 99% as wages; and finally (3) the purchasing power of the bottom 99% wages has gone down due to higher-than-assumed inflation.

Our findings have clear implications for future research. As far as economic theory is concerned the proximate implication is that, while the use of constant-shares production functions may be acceptable, their use with the sole purpose of estimating production is missing the big composition effect and the polarization of incomes at the top. Thus, it is hard to continue to divorce the questions of distribution from those of production. With such a tremendous change in the distribution of factor rewards underlying the function, one might expect income distribution to have implications for production as well. Indeed there seem to be links between income concentration, inequality and instability. This is the realm of "inequitable" or "unbalanced" growth, the implications of which we are only starting to understand (Krugman 2007, Galbraith 2012, Palley 2012, Reich 2013, Stiglitz 2012).

Another contribution simply lies in the data this paper provides, which can be used for various theoretical and empirical inquiries. The data would serve the purpose mentioned above—that is to identify the channels through which inequality, factor shares and instability play out, if at all. The rich dataset presented in this paper can also be used to find determinants and correlates of the factor shares themselves

and, for that purpose, quarterly data is much preferred. The labor share data can also be used for research in international trade, or anywhere (real unit) labor costs matter. That, alone, could be the topic of a separate paper.

Our findings also have clear practical and policy implications beyond the ones suggested above. First, again, presenting the evidence allows for better informed policy. Knowing how much labor has lost to "capital" can be useful. Knowing that government programs such as social security have helped stabilize the labor share can be useful. Knowing that the worsening position of labor is not so much due to corporate profits increasing but rather the top 1% increasing, could be of practical importance for tax design. In those days of political polarization, economic policy decisions have ultimately proven to be as much about politics as economics, if not more; but perhaps better data can lead to a more informed discourse.

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