BOWLEY'S LAW: THE DIFFUSION OF AN EMPIRICAL SUPPOSITION INTO ECONOMIC THEORY

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The share of labour income in national product has declined in many advanced economies over the past 30 years or so. However, many economists are still convinced that the wage share remains more or less constant in the long run. This notion of the long-term relative stability of the wage share is considered to be a stylized fact, or even sometimes referred to as a "law of economics". This paper attempts to show how the alleged stability of the labour share of income became known as one of the "great magnitudes in economics". It also shows how this "law" made its way into the three major theories of macroeconomic income distribution, i.e. neoclassical, post-Keynesian, and Kaleckian distribution theory. Since the data actually reveal strong fluctuations of aggregate income shares over time, the conclusion has to be drawn that the major macroeconomic theories of growth and distribution are built around an invalid –or at least highly questionable– assumption about the real world.

La loi de Bowley : la diffusion d'une hypothèse empirique dans la théorie économique.

La part du revenu du travail dans le produit national a baissé dans de nombreux pays développés au cours des trente dernières années. Cependant, nombreux sont les économistes qui demeurent convaincus que la part des salaires reste plus ou moins constante à long terme. La stabilité relative de la part des salaires à long terme est considérée comme un fait stylisé, voire comme une « loi de l'économie ». L'article tente de montrer comment la stabilité alléguée de la part du travail dans le revenu est devenue l'une des « caractéristiques centrales de la science économique ». Il montre aussi comment cette « loi » a pénétré les trois principales théories macro-économiques de la répartition : néoclassique, post-keynésienne et kaleckienne. Puisque les données révèlent des fluctuations marquées dans le temps des parts des revenus, on peut en conclure que les principales théories macro-économiques de la croissance et de la répartition sont construites autour d'une hypothèse erronée – ou très discutable.

Keywords: Aggregate Factor Income Distribution. Wage share. Bowley's Law. Macroeconomic income distribution theories.

Mots clefs : Répartition factorielle des revenus. Part des salaires. Loi de Bowley. Théories macro-économiques de la répartition.

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1. Introduction

One of the oldest issues in economic literature is how the national income is divided between wages, profits and rents. The development of the income shares of the socio-economic classes played an eminent role in the writings of the classical economists. The economists of the early 20th century were also deeply concerned with what determines the shares of national income which the factors of production receive (functional income distribution). In macroeconomics these days, this topic is hardly dealt with. On the contrary, there is a vast amount of literature about income distribution from a microeconomic point of view (personal income distribution).[2] This raises the question: why has functional income distribution ceased to be a central issue for macroeconomics –at least to the mainstream version of it?

There appear to be several reasons for this. One important consideration is the apparent stability of the wage share (and the profit share, respectively) in the long run. The alleged "relative stability" of the aggregate share of national income that goes to labor over time has acquired the status of a *stylized fact* (Nicolas Kaldor) of economic growth.[3] If income shares are stable, there seems to be no need to further investigate which factors determine shares over time. However, the discovery of share stability has dramatic implications: as will be argued in this paper; the main schools of thought of modern growth and distribution theory (neoclassical, post-Keynesian, Kaleckian) were built on the highly questionable assumption that functional income distribution does not vary in the long term.

The paper is structured as follows: In the next section the empirical developments of wage shares (or labor income shares, respectively) in selected advanced economies are briefly discussed. In Section III the dissemination of the law of the constant wage share that now bears Arthur Bowley's name ("Bowley's Law") is considered. Section IV questions whether the tools and methods that were available to Bowley and his contemporaries can justify calling the constant wage share a "great or almost great magnitude in economics" (cf. Simon 1990). This section will also portray how Bowley's Law became a major element of Kaleckian, neoclassical as well as post-Keynesian theories of

2. Few attempts have been made to link factor share developments with questions of personal income distributions (cf. Ryan 1996, Atkinson 1997).

3. Since in the short run the wage share moves counter-cyclically with variations in national income, it is obvious that –if at all– the wage share can only be stable in a long term tendency. Nevertheless some economists (including John Maynard Keynes) believed they had also found short term stability, as will be discussed below.

income distribution. The first strand of work to be examined in this respect will be the rather microeconomic approach of Michał Kalecki in 1938. This is followed by a brief examination of the neoclassical macroeconomic marginal productivity theory of distribution. Finally, it will be shown how the constant wage share idea became part of post-Keynesian growth and distribution theory as a product of Kaldor's paper from 1961. Section V summarizes the general problems in calculating income shares in the pioneering works of modern income distribution theories. In section VI some conclusions are drawn.

2. A stylized fact reconsidered

A considerable part of mainstream economics is still convinced by the idea of a long term stability of income shares (cf. recently Feldstein 2008). However, increasingly more literature acknowledges the long-term decline of the wage share in most countries in the last 30 years or so.[4] Indeed, empirical data show that wage shares have been subject to substantial changes over time in many countries. In the G-7 economies the labor share of income has been declining on average over the past decades (see figure 1).

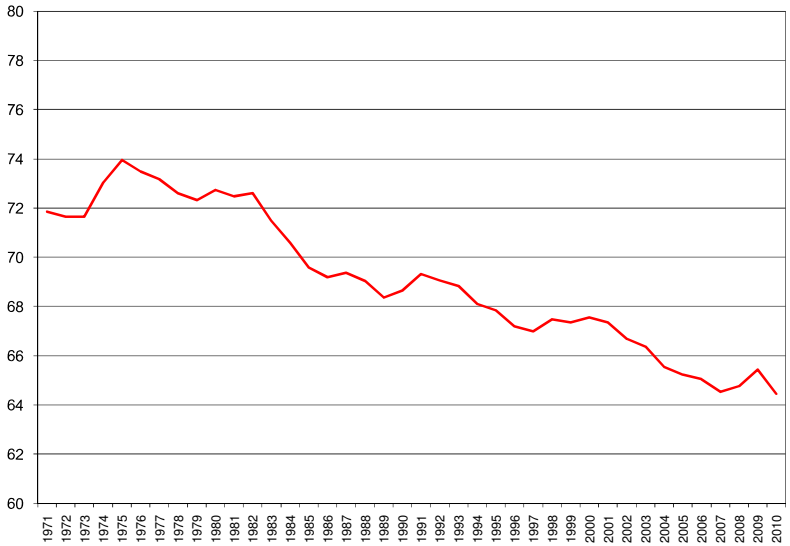

Figure 1: Labor share of income in G7 economies in percent (weighted average), 1970-2010.

4. See for instance Bentolila and Saint-Paul (2003), Bernanke (2007), Blanchard (2006), Carter (2007), Guscina (2006), Orellana et al. (2005), de Serres et al. (2002) und Young (2006) as well as major economic institutions like BIS (2006), IMF (2007), EU-Commission (2007).

Instead of focusing on the wage share, i.e. the share of national income that goes to employees, the above figure uses a broader measure in order to account for all labor income. National accounts provide the share of employees' compensation in total income, but do not separately identify the labor income of other categories of workers (self-employed, employers, and family workers). The most common correction procedure is to augment the employees" compensation with compensation of other categories of workers by assuming that other categories of workers earn the same average wage as employees (Kravis 1959, Krueger 1999). Hence, total labor compensation is the product of the compensation of employees (W) and the ratio of total employment (E) and employees (L). Whereas the wage share ( ) is simply W/Y, the labor share of income (λ*) is then obtained by dividing labor compensation by valued added of the total economy (Y):

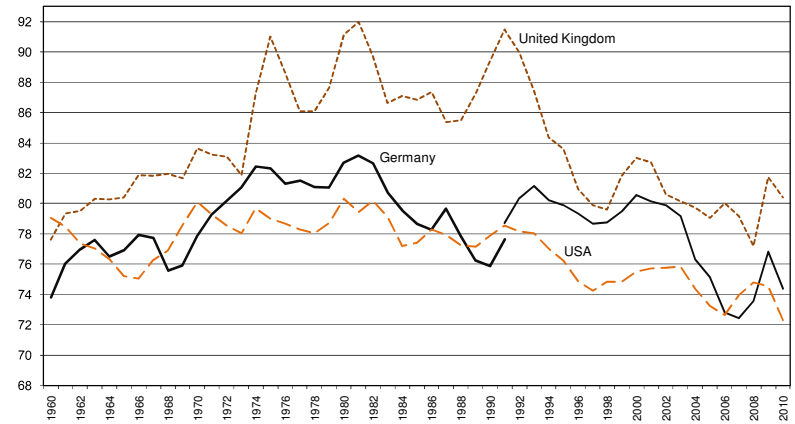

Figure 2: Labor share of income in selected advanced economies I, 1960-2010.

Original data: EU-Commission (2011), Ameco Database, own calculations; before 1991: West-Germany.

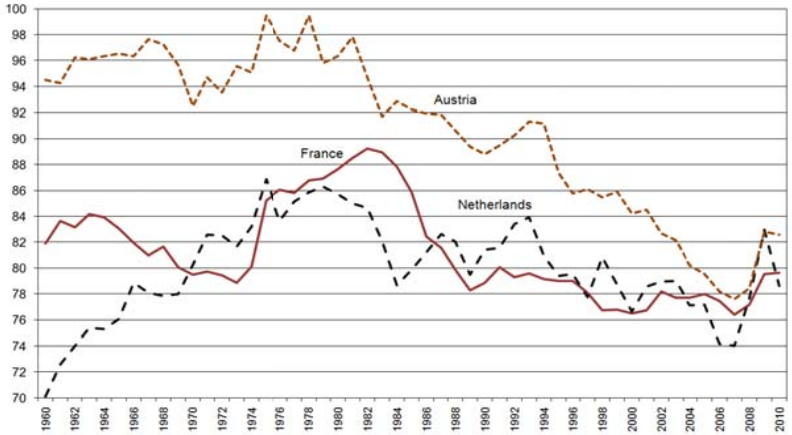

Figure 3: Labor share of income in selected advanced economies II, 1960-2010.

Sources : Original data: EU-Commission (2011), Ameco Database, own calculations.

$$\lambda^* = \frac{W}{Y} \cdot \frac{E}{L} = \frac{\frac{W}{L}}{\frac{Y}{E}} \qquad (1)$$

Looking at individual countries reveals that there are some cross-country differences in the behavior of the labor share, however, in all countries we observe substantial changes of this magnitude over time (see figures 2 and 3).

Between 1960 and 1990 the US exhibits the closest approximation to this stylized fact of growth, with the labor share remaining on a relatively stable level compared to other countries. However, in the last two decades in the USA the share of national income going to labor has also declined considerably. In the UK the labor share of income underwent sizable short-term fluctuations and, as in the USA, has experienced a dramatic fall since the beginning of the 1990s. In continental Europe the general picture shows a tendential rise in the share up to the 1970s/1980s and then a clear downward trend within the last 20-30 years. In Germany and France the labor share peaked in the early 1980s, while in other countries like in Austria and the Netherlands it reached its highest point in the mid-1970s, and fell after that. In some countries the decline was relatively mild (eg in the Netherlands), while in others it showed a steady (and rather strong) decrease

(eg in Austria).[5] These general developments could possibly be ascribed to the respective situation in the labor markets. The continuous success in fighting the unemployment rates after the Second World War resulted in full employment in the 1960s and provided trade unions with increasing bargaining power. Wage hikes above productivity growth resulted. On the contrary, the trend revision around the mid 1970s has strong links to the end of era of full employment.[6]

Comparing the development of the wage share with the labor share of income reveals that there is a stronger decline for the labor share of income than for the "pure" wage share, reflecting a reduction in the share of other categories of workers in the total workforce (self-employed and family workers). However this and other structural effects (like changes in the sectoral composition of national income[7]) were never taken into account by the early writers who believed in the constancy of the wage share.

Summing up, taking into account empirical facts of past decades it is argued here that no justified statement can be made according to which the wage share is stable over time. The question about share stability at the beginning of the first half of the 20th century when modern income distribution theories were developed must be asked. Was the wage share stable at least at that time?

3. The apparent stability of the wage share and its aftermath

3.1. The dissemination of a "great ratio of economics"

The notion of a long-term stable income distribution cannot be found in classical economics. In the works of classical economists like Ricardo, Smith and Marx, income shares of the socio-economic classes are variable in the long-run according to the level of economic development. Ricardo, for instance, in his *Principles* he not only declared the determination of the laws

5. Since the wage share usually rises during or shortly after an economic slump, we observe a strong upward hike in the 2008/09 economic crisis in most countries. However, this is not the case in the US.

6. The respective peaks of the wage share in the mid 1970s and the early 1980s, in particular, which can be observed for many (but not all) advanced nations can be explained by the two major recessions that emerged after the oil price shocks at that time.

7. Cf. de Serres et al. (2002), Ruiz (2005), Krämer (2008).

which regulate distribution as the principal problem in political economy, but also emphasized that income shares are subject to changes over time: "But in different stages of society, the proportions of the whole produce of the earth which will be allotted to each of these classes, under the names of rent, profit, and wages, will be *essentially different.*" (Ricardo 1951-59, vol. I, p. 5; my emphasis)

Today the long-term constancy of the share of labor in national income is considered to be a "great ratio of economics" (cf. Klein/Kosobud 1961) and an integral part of the so-called stylized facts of economic development. Often it is even referred to as an "economic law". Paul A. Samuelson in his textbook *Economics* gave it the name *Bowley's Law* to honour Arthur Lyon Bowley (1869-1957), who was a mathematician and statistician at the beginning of the 20th century in Great Britain (cf. Allen 1968, Stone 1987). Bowley was one of the first economists to collect data on wages and then to apply statistics to their interpretation (cf. Bowley 1900). The term *Bowley's Law* first appeared in the 6th American edition of 1964 on page 736 in Paul A. Samuelson's *Economics* (cf. Samuelson 1964a).[8] Samuelson did not use this term in the first five editions of his book, although he already referred to Bowley and his findings in the development of income distribution. Samuelson wrote about the development of income shares in his first edition of *Economics* in 1948:

> "It is rather remarkable how nearly constant are the proportions of the various categories over long periods of time, between both good years and bad. The size of the total social pie may wax and wane, but total wages seem always to add up to about two-thirds of the total." (Samuelson 1948, p. 227)[9]

However, in the first edition of his highly influential textbook Samuelson did already express some skepticism concerning the principal validity of the law when he stated that "... there is nothing *sacred* about the traditional fraction of two-thirds of the national income going to wages and salaries" (ibid., p. 531; emphasis added). He stressed his reservations even more strongly in the fourth edition of his Economics:

8. About the same time as Samuelson did, Robert Solow used the term *Bowley's Law* in a talk he gave at a conference on income distribution, which was organized in September 1964 by the *International Economic Association* in Palermo (cf. Solow 1968, p. 449).

9. "Total wages" is defined by Samuelson as "wages, salaries, and supplements earned by all employees" (ibid., p. 226), that is including government employees. The labor income part of self-employed is however not taken into account.

> "The late Sir Arthur Bowley ... noted how remarkably constant over almost a century is wage's share of national income. No one understands why this should be so. (... in recent decades it seems to be growing more than Bowley's constancy hypothesis would indicate)." (Samuelson 1958, p. 196, Fn 1)[10]

Long before the naming of wage share constancy as Bowley's Law and its inclusion in a textbook, the seemingly stylized fact of a stable functional income distribution was acknowledge by several economists from different schools of thought. Among others J.M. Keynes (1939), M. Kalecki (1938, 1954), P. Douglas (1934), P.A. Samuelson (1948), N. Kaldor (1955-6), W. Krelle (1962), O. Lange (1964), R. Goodwin (1967), J. Roemer (1978) and G. Mankiw (1992) refer to it. The alleged constancy of the wage share brought about astonishment[11], the naive belief that it is a law of nature[12], as well as an annoyance about the inability to refute it.[13] Bowley's Law is still one of the most important stylized facts of growth and distribution theories.

Several schools of thought have put forward the thesis that there is little room for flexibility when determining wages because they are a product of economic laws. The wage fund theory of classical economic thought is an example of this, as is Ferdinand Lassalle's *iron law of wages*. This idea saw its high point in the dispute between Tugan-Baranowsky (1913) and Böhm-Bawerk (1914) in *Macht oder ökonomisches Gesetz?* (Power or economic law?). What makes Bowley's Law different is its predictive nature, if it is true that the wage share changes little over time, then organized labor has no hope of increasing its share of the national product in the long term. When discussing adequate wage policy Bowley's Law is frequently taken as proof that politics and even the class struggle is not able to change income distribution in the long term. The marginal productivity theory of distribution and the idea that competitive markets lead to a fair equilibrium wage and that increasing wages above the equilibrium level will result in unemployment provides an

10. In one of the later editions of *Economics* Samuelson and Nordhaus (1992, p. 555) state: "The share of wages and salaries in national income has edged up very slightly over the long run." In Samuelson/Nordhaus (2009) it reads as follows "…the share of national income going to labor has changed very little since 1970. This is one of the remarkable features of the income distribution in the United States" (ibid., p. 285).

11. Keynes (1939, p. 48): "... the result remains a bit of a miracle"; Schumpeter (1939, p. 575): "... a mystery".

12. Weintraub (1959, p. 35): "... a parallel to Newton's gravitational constant *g* ... " "... the 'magic constant'of economic analysis" (ibid., p. 43).

13. Robinson (1966, p. 81): "... the mystery of the constant relative shares remains as a reproach to theoretical economics".

effective theoretical argument. Indeed the law of constant wage share can be viewed as a modern version of the wage fund applied to a growing economy.

In different strands of theories, which include neoclassical, post-Keynesian and the Kaleckian approach to distribution theory, arguments are presented as to why income distribution does not change in the long run. How Bowley's Law made its way into the three major theories of macroeconomic income distribution will be outlined in the following section.

3.2. Michał Kalecki and the "law" of a constant wage share

3.2.1. Kalecki and Keynes on wage share stability

In 1938 Michał Kalecki noticed that the share of wages in the value added in the business sector was unusually constant:

> "As we see on the basis of statistical data the relative share of manual labor in gross income shows only small changes both in the long run and in the short period. We shall try to explain this 'law' and establish conditions under which it is valid." (Kalecki 1938, p. 100)

Kalecki was not only was the first economist who called the apparent stability of the wage share a "law", he was also the first one who tried to develop a theoretical explanation for it. However, it was John Maynard Keynes in particular who was responsible for making this "law" well-known. In 1939 Keynes regarded the alleged stability of the wage share as another piece of evidence that counteracted his original idea of an anti-cyclical movement of the real wage. He again erroneously called the stability of the wage share "... one of the most surprising, yet best-established, facts in the whole range of economic statistics ..." (Keynes, CW VII, p. 408). Keynes goes on:

> "I mean the stability of the proportion of the national dividend accruing to labor, irrespective apparently of the level of output as a whole and of the phase of the trade cycle." (Ibid., p. 408)

Keynes' acceptance of the wage share stability first found expression in his article from 1939, *Relative Movements of Real Wages and Output* (Keynes, CW VII, p. 394-412). Here he abandoned the general validity of the first classical postulate, which he still had accepted in chapter two of his *General Theory*, according to which the real wage equals the marginal product of labor. Until then Keynes had regarded the inverse relationship between the real wage and

employment as "one of the best established of statistical conclusions", as he wrote in 1937 in a letter to Ohlin (Keynes, CW XIV, p. 190). It was the empirical work of Dunlop (1938) and Tarshis (1939) that caused Keynes to modify his original belief. He pointed out that the inverse relationship between the real wage and employment would not hold "if we start from a level of output very greatly below capacity..." (Keynes, CW VII, p. 405). The validity of the first classical postulate not only rests on the assumption of full utilization of capacity but also on the assumption of a fixed stock of capital, as Keynes realized.[14]

Table 1: Relative Share of Manual Labor* in the National Income of Great Britain (in %).

1911	40.7	1924	43.0	1928	43.0	1932	43.0
		1925	40.8	1929	42.4	1933	42.7
		1926	42.0	1930	41.1	1934	42.0
		1926	43.0	1931	43.7	1935	41.8

*Shop assistants excluded

Source: Kalecki (1939, p. 199).

Table 2: Relative Share of Manual Labor* in the National Income of U.S.A. (in %).

1919	34.9	1923	39.3	1927	37.0	1931	34.9
1920	37.4	1924	37.6	1928	35.8	1932	36.0
1921	35.0	1925	37.1	1929	36.1	1933	37.2
1922	37.0	1926	36.7	1930	35.0	1934	35.8

*Shop assistants excluded

Source: Kalecki (1939, p. 200).

In order to prove the constancy of wage shares in Great Britain and in the USA Keynes reproduced two tables in his 1939 article (cf. table 1and table 2) from a work of Kalecki (Kalecki 1939). In order to "assemble" his own data Kalecki himself used different sources which applied different methodologies. According to modern standards the data which Kalecki used

14. Cf. Hagemann (1988) for general considerations on the interaction between wages and employment in Keynes's works and, in particular, on Keynes's modification of the first classical postulate (p. 200).

to show the development of wage shares in Great Britain and in the USA are questionable.

In another article that was published in *Econometrica*, Kalecki (1938) identified the degree of monopoly as the major factor determining income distribution. Here Kalecki colated statistical information about wage shares in Great Britain and the USA from 1880 to 1935. Keynes referred to a revised version of this article that appeared one year later as the first chapter of *The Distribution of the National Income,* in Kalecki's *Essays in the Theory of Economic Fluctuations* (Kalecki 1939). The figures published here use more recent data and are slightly modified compared with the *Econometrica* article. The data were taken from the same authors as in Kalecki (1938).[15] The sources Kalecki used were studies and calculations made by Arthur L. Bowley (1920 and 1937)[16] and Colin Clark (1937) for Great Britain. For the USA he used data from Wilford L. King (1930) and Simon Kuznets (1937).[17]

A careful examination of contemporary sources shows that many differences can be found in the way wage shares are defined and calculated today. In addition the reliability of the data must be questioned. For these reasons the stability of the wage share, even in the times of Keynes and Kalecki, cannot be clearly confirmed.

3.2.2. Sources and methods of national accounting before 1940

In order to effectively calculate wage shares data is not only required for the national wage bill, but also for national income. For this reason, the history of national income accounting is closely linked to the history of calculating wage shares. Great Britain in particular developed new methods of calculating national income. The first theories of income formation and

15. Overall total three similar versions of Kalecki's article exist. The third version appeared in 1954 in Kalecki's *Theory of Economic Dynamics* (Kalecki 1954) as chapter 2 named *Distribution of National Income*. The sources Kalecki used here differ substantially from the sources that were used for the first two articles. Since the articles that appeared fifteen years earlier had a greater influence for the dissemination of Bowley's Law, I will focus on these works in what follows.

16. In his first version in 1938 Kalecki quotes Bowley's book *The Change in the Distribution of the National Income, 1880-1913* (Bowley 1920). In the second version (Kalecki 1939) he uses *Wages and Income in the United Kingdom since 1860* (Bowley 1937) that had appeared in the meantime and became a long-time standard in that field.

17. In Kalecki (1938) he uses an unpublished work of Kuznets. In Kalecki (1939) it is the meanwhile published work *National Income and Capital Formation, 1919-1935* (Kuznets 1937) that is quoted.

the first empirical calculations and assessments of national income originated in Great Britain, as well.[18] Already in the 17th century William Petty and Gregory King were amongst the first to convincingly calculate a broad measure of national income (cf. Studenski 1958). Nevertheless a debate about the correct categories of national income accounting lasted until about the 1940s, when the terms and concepts of national accounting finally received the form that is so well known today. Many of the definitions used for national income accounting were frequently changed until then. Therefore, calculating wage shares was also based on rather shaky ground. It was a great advantage when at the end of the 18th century the method of calculation for the national income changed in Great Britain. The reintroduction of income tax in 1842 provided more reliable data than that which had been taken from trade and production statistics. This is why the methods that used the factor-earnings approach instead of the expenditure approach gained in importance (cf. Studenski 1958, p. 111). Arthur L. Bowley, whose studies and publications were widely noticed and influential, also implemented the new approach (cf. Darnell 1981, p. 151). Bowley, besides his general interest in national income accounting, had a special interest in the development workers' income. For this reason he became a pioneer in the collection of wage data in Great Britain. This assured that sufficient data on the wage bill in Great Britain existed. However, at that time the wage share or a labor share was constructed in a very different way from today.

As regards the numerator of the wage share, one has to remember that today gross wages and salaries before taxes plus social contributions of the employer define it. This means that the numerator of the wage share as constructed by Kalecki and his contemporaries differed from the method used today in two respects. Firstly, gross income of employees did not usually include the social contributions of the employer, as it is today (cf. Bowley 1937, p. 72). And secondly, even more importantly, only wages but no salaries were taken into account.

In Great Britain data for the national wage bill is available from 1860, in part thanks to Bowley's work. Although it was not as difficult to calculate the national wage bill in comparison to the calculation of total national income, it was still not without difficulty as Bowley himself had to admit:

> "In brief, I do not think that the statistics are sufficient for any fine measurement of income, earnings or wages prior to 1880; there is indeed suffi-

18. In Germany national income was also calculated for official statistics early on (cf. Tooze 1999, 2001).

cient uncertainty after that date." (Bowley 1937, p. 99)

In the 1950s the data was revised and one consequence was significantly higher values for the period from 1920 to 1938 in comparison to the calculations of Bowley and Clark (cf. Chapman 1953). For instance, the recalculated wage bill for 1924 was 11.7% higher than Clark thought while in 1926 1.1% and in 1938 9.7% lower than Bowley's original figures. Here the most important problem is not so much the constant error, but the relatively large deviations from the actual figure. It is important to note here that Chapman himself believed the margin of error in his own estimations to be around 5% to 10% (ibid., p. 41).

The early calculators of wage shares faced even greater problems when dealing with its denominator. Measuring national income even in the period between the end of the First World War in 1919 and the start of the Second was still fraught with many problems. Simon Kuznets (1941) estimated the degree of error in the calculation of national income to be as much as 20%.[19] As one goes further back the problem becomes not only one of finding the correct data base but also different definitions of national product used by the studies. As a result of the "statistical revolution" (cf. Arndt 1979, p. 121) shortly before the Second World War – itself a product of the Keynesian Revolution and the military mobilization in Great Britain – common standards for national accounting were established. At this time *national income* or *gross national product* were defined. National income, a common term today, was first used by Colin Clark (Cairncross 1988, p. 14). Even in Clark's 1937 book *National Income and Outlay,* used by Kalecki in his 1939 article, this term did not appear. In 1952 the OECD was still asking its member states to introduce an internationally comparable classification of the systems of national accounts (cf. UNO 1952).[20]

Bowley used three categories to calculate national income: *wages*, *income assessed to income tax* and *intermediate income*. He further subdivided *income assessed to income tax* into *taxable income* and *tax evasion* of which *tax evasion* clearly can only be roughly estimated. The second category is based mainly on estimations made by tax authorities while the third category, *intermediate*

19. King (1930, p. 34) admitted that his data could have margins of error up to 40%.

20. Only in 1941 was the first official calculation of the national product of Great Britain (for the period 1938-1940) published (cf. Studenski 1958, p. 457). In the USA the term GNP substituted in 1941 the so far used term "national income". Behind this was the necessity of creating a comprehensive economic statistics in order to lay the foundations of the "rearmament program". This created the basis of the U.S. intervention in the Second World War (cf. Gilbert/Jaszi 1944, p. 44f.).

income, is the residual and consists mainly of non-wage income below the tax-exempted amount (cf. Bowley 1937, p. 79). One has to come to the conclusion that from today's perspective Bowley's calculations are flawed. One reason is that the tax system was subject to many changes in the period he examined. However, his calculation of wages was more accurate and therefore his data base on the development of wages in Great Britain became the standard of empirical income distribution research. Many later studies made reference to Bowley's work in this field. His conclusion taken from his data collection for wages laid the foundations to what later would be known as Bowley's Law:

> "The general conclusion that there was no important change in the proportion of earned income to total income between 1880 and 1913 or between 1911, 1913 and 1924 remains. There is a stability of the various classes of income considered." (Bowley 1937, p. 97)

Although this was written in 1937 it is clear that Bowley was aware of the constancy of long-term income distribution. In his important study on the development of income distribution in Great Britain that appeared in 1920, Bowley already speculated about share constancy (cf. Bowley 1920, p. 25). Yet its full expression came only in *Wages and Income in the United Kingdom since 1860* (Bowley 1937) where he was able to examine his idea in detail by using long-run data series. Bowley was the first economist to clearly state the idea of a constant wage share. As such it now carries his name as *Bowley's Law*, yet it is important not to lose sight of the fact that the empirical foundations for the constant wage share are not as solid as Bowley thought.

3.2.3. Kalecki's conclusions

The studies carried out by Clark (1937), King (1930) and Kuznets (1937), used quite different definitions and calculation methods especially concerning the way they calculated the national product and were flawed by major problems with the accuracy of data (cf. Krämer 2006, p.154). Nevertheless, Kalecki used these three sources from the 1930s plus Bowley's studies to create two tables about the development of the relative share "of manual labor in national income" in Great Britain and in the USA. In order to construct the national wage bill for Great Britain and the USA Kalecki modified the data in some important respects (cf. ibid.). He therefore got, in his own words, no more than a "hypothetical wage bill" (cf. Kalecki 1939, p. 200).

With these data Kalecki calculated a maximum value of the wage share in Great Britain of 43.7% in 1931 and a minimum value of 40.7% in 1911 (cf. table 1). In the USA according to Kalecki's calculations the maximum value of the wage share was 40.2%, while the minimum value was 39.3% (using King's 1925 measurement including shop assistants and Kuznets' 1923 measurement without shop assistants; cf. table 2). His conclusions about the empirical part of his work were that the share of manual labor in national income is constant in the short run and in the long run and could therefore be called a "kind of law", which immediately challenged him to explain it theoretically (cf. ibid.).

Kalecki was fully aware of the problems regarding the methods and data accuracy of Bowley and Clark's data, and he was not alone in his concerns. In a letter to Kalecki, Keynes commented on the draft of Kalecki's *Essays in the Theory of Economic Fluctuations.* Keynes asked Kalecki whether he could use Bowley's 41%value of the wage share for 1880 without modifications for a reprint of his *Economic Journal* article. Osiatynski, Kalecki's editor, assumes that either Kalecki never answered Keynes or, if he did answer, that the letter was received by Keynes too late, since Keynes used Kalecki's original figure (cf. Kalecki CW I, p. 512). This assumption, however, is contradicted by the existence of the following footnote in Keynes's article: "Dr Kalecki tells me that, if this was adjusted so as to be comparable with the figures given above, it would be about 42.7% ..." (cf. Keynes 1939, p. 409, fn 4) This shows that Kalecki was aware of the problems in principle when he put together data from many different sources.

Given the problem with the collection of reliable data and that some rather crude assumptions were also being used, Kalecki's conclusion about share constancy is to be treated with great skepticism. On examining Kalecki's work it was finally Keynes who demanded more accurate research and better theoretical explanations, because the constancy of the wage share seemed like a "miracle" to him (cf. Keynes, CW VII, p. 409).

In his later work also Kalecki showed some skepticism and more or less finally departed from Bowley's Law. In the third, already mentioned version of Kalecki's writing on the development of the wage share, his *Theory of Economic Dynamics* (Kalecki 1954), Kalecki now used a new study by Bowley (1942) for Great Britain and statistics for the U.S. provided by the *Survey of Current Business*. Confronted with new data and the availability of longer data series, Kalecki made more careful comments concerning the wage share development in the long run: "No *a priori* statement is therefore possible

as to the long-run trend of the relative share of wages in income." (Kalecki 1954, p. 31) As a consequence, from then on Kalecki focused on the analysis of the movements of the wage share in the business cycle.

3.3. The constant wage share in the neoclassical approach to distribution

Paul Douglas deserves credit for incorporating the constant wage share in the standard approach of neoclassical growth and distribution theory by "inventing" the Cobb-Douglas production function. However, it was not Douglas' original intention to create a production function around the notion of constant income shares. This came about at a later stage almost as a "by-product" of developing his production function. Douglas' intended to create a production function that fitted long-term data series in the USA on labor, capital and output. The Cobb-Douglas production function is useful for analyzing income distribution, but this was not originally his intention. Following Bronfenbrenner (1968) it was a subsequent idea concerning other fields of application of this type of production function. In his 1934 book *Theory of Wages* Douglas estimated the production elasticity of labor between 60% and 70% and found a rather high coincidence with the then subsistent wage share. The mathematician Charles Cobb called Douglas attention to Euler's theorem which implied the complete exhaustion of the product, if production factors are remunerated according to their marginal product. Only then did it became clear to him that – together with the assumption of an elasticity of substitution of one – income shares would not be subject to changes in his production theory. This was in full accordance with Bowley's Law. Douglas, therefore, developed *en passant* and virtually unintentionally a theoretical basis for the constant wage share that is based purely on "a law of production". Douglas later described the development of the Cobb-Douglas production function (cf. Douglas 1967). His report makes it quite clear that he was sympathetic with the idea that there were some similarities between neoclassical theory and Newton's physical conception of the world. Douglas was obviously searching for regularities and laws in production and distribution:

> "I personally have faith that there is a fundamental unity in economic as in physical life ... There is law and relative regularity everywhere else – why not in production and distribution?" (Ibid. p. 22)

When applying a Cobb-Douglas production function income shares do not vary and distribution cannot be changed due to endogenous factors.

Income distribution shares are equal to the production elasticities of capital and labor, the exponents in this function, and distribution is therefore determined "technically". Douglas' seminal contribution to production theory, therefore, left hardly any room for the role of a social theory regarding conflicts over the distribution of the product.

Beside Paul Douglas John Hicks must also be mentioned in this context. Although Hicks is one of the most important authors for neoclassical share theory, he did not "design" his theoretical conceptions in order to reproduce a constant wage share. In his book with the title *The Theory of Wages* (Hicks 1932) – almost identical to that of Paul Douglas' *Theory of Wages* (1934) – the notion of the elasticity of substitution plays a major role. In Hicks' book which was published two years before Douglas' the interdependence between the elasticity of substitution, income shares and the bias of technical progress was systematically laid out for the first time (cf. Rothschild 1994, p. 66-68). Occasionally Hicks has been accused of having had the explicit intention of constructing his theory in such a way that constant income shares would result (cf. Scitovsky 1964, p. 28, King/Regan 1988, p. 54). And indeed, later in his revised version Hicks wrote about his intentions concerning the first edition of his book:

> "I did have an eye on statistics, which I was trying to explain, or help to explain. These were the Bowley and Stamp calculations of the British National Income and its Distribution, which (at the time when I was writing) were available only for the two years, 1911 and 1924." (Hicks 1963, p. 335)[21]

However, on reading the first edition of Hicks' book, one finds, contrary to the quotation given above, Hicks referring to Bowley's work from 1920, instead of 1911 or 1924 as Hicks stated.[22] In Bowley (1920) the magnitude for the "share of property in the National Income of Britain" in 1880 and 1913 is said to be 37.5% each (ibid., p. 130). Yet, Hicks modified this value in the same way Bowley himself did in his later studies: Hicks subtracted the property income that was received from abroad. He therefore came up with new values of 34% for 1880 and of 31% for 1913. From this it follows that the profit share had shown a slight decrease in that period. Based on his theoretical knowledge and being aware that the capital-labor ratio had shown a historically increasing tendency, Hicks concluded that the elasticity

21. Cf. Bowley/Stamp (1927).

22. On the development of Hicks's thoughts on this matter and the differences between the first and second edition of his *Theory of Wages;* cf. Solow (2008).

of substitution in the real economy must be less than one and must also fluctuate in the course of time (cf. Hicks 1963, p. 130). Therefore, when Hicks looked back later he asserted that the model developed by Douglas showed many similarities with his own, but made it clear that

> "..[it] was in one respect a special model. He assumed that the elasticity of substitution between capital and labor was always unity (giving constant relative shares) ..." (cf. ibid., p. 312)

It was exactly this assumption that Hicks, contrary to Douglas, did *not* use. Although Hicks developed the concept of the elasticity of substitution – a major tool for neoclassical theory – we should keep in mind that Hicks cannot be made causally responsible for the introduction of share constancy into neoclassical distribution theory. Hicks has rather shown in detail the conditions that have to be fulfilled in a neoclassical framework, if constant income shares should be modeled.

When neoclassical growth theory shaped its contours in the middle of the 1950s, the notion of constant income shares was present in almost all major works. Robert Solow somehow tauntingly observed:

> "Ever since the investigations of Bowley and Douglas it has been widely believed that the share of the national income accruing to labor is one of the great constants of nature, like the velocity of light or the incest taboo. ... Even if it is sometimes observed that the pattern of distributive shares shows long-run shifts or short-run fluctuations, the former can be explained away and the latter neglected on principle." (Solow 1958, p. 618)

In his seminal paper on growth theory Solow (1956) discussed the influence of different production functions on share distribution in several passages. He stressed several times that it is in the nature of a Cobb-Douglas production function to generate a constant income distribution. Yet, Solow demonstrated some disbelief concerning the miracle of the constant wage share compared to the majority of other researchers in his field. In his "Skeptical Note on the Constancy of Relative Shares" he challenged the alleged tendency of the aggregate wage share to fluctuate more strongly than the individual wage shares in single industries, rather than the constancy of the wage share in the long run (cf. Solow 1958).

In fact, signs of mistrust such as those discussed by Solow were very rare. In general, the vast amount of literature on neoclassical growth and distribution theory that subsequently appeared was based implicitly or explicitly on the assumption of a constant distribution of income. From the middle of the

1960s – ten years after Solow's (1956) and Swan's (1956) pioneering work and five years after Kaldor formulated his stylized facts – the notion of a constant wage share represented the general scientific standard in economic theory. As Drandakis/Phelps (1966, p. 823) once put it: "Distributive shares have been remarkably constant in most western economies ... the modern economist has almost ceased to wonder at Bowley's Law." This was the result of the acceptance of Kaldor's stylized facts by neoclassical growth theorists. Solow explicitly referred to these stylized facts towards the end of the debate on growth theory in the 1950s and 1960s (cf. Solow 1970, p. 2).

4. The constant wage share and the "Kaldor line"

Finally, how Kaldor reached his conclusion of share constancy and which empirical sources he relied on must be discussed. In *A Model of Economic Growth* Kaldor (1957) assembled some major empirical trends of macroeconomics (cf. ibid., p. 260):

(i) Constant wage and profit shares in the long run,

(ii) Capital-labor ratio and labor productivity expanding at almost the same growth rate, which leaves the capital coefficient constant;

(iii) Together with (i) it follows that the rate of profit remains unchanged.

In 1961 Kaldor called these empirical findings – which he considered to be indispensable for any sound economic growth model – *stylized facts*; although in his 1961 article the collection of empirical facts appeared in a slightly differing version. By that time the methodological idea behind it was already almost generally accepted in economics. And there was a broad agreement, too, as to what should be included in the list of stylized facts of economic growth and distribution. Therefore Kaldor's 1961 article must be considered as one of the three major lines through which the notion of the constant wage share disseminated in economics.

Kaldor is, however, not the first post-Keynesian writer who accepted the notion of share constancy. It is well known that a variety of concepts of the neutrality of technical progress that each leaves income distribution unchanged exists. This feature of neutral technical progress was explicitly described and obviously held as a possible assumption by Post-Keynesians such as Harrod (1948, p. 23) and Joan Robinson (1952, p. 94-96 and 1956, p. 160 and p. 170f).

Kaldor presented his 1961 paper already in 1958 at the famous Corfu conference on capital theory. Since he did not carry out any empirical studies himself, one has to scrutinize the empirical works Kaldor referred to in order to examine how reliable Kaldor's sources were. For both his papers the main source on which Kaldor based his selection of stylized facts was work done by Phelps Brown and Weber published in 1953 in the *Economic Journal* (cf. Kaldor 1961, p. 2 and Kaldor 1957, p. 260).

The article by Phelps Brown and Weber starts off with a statement which exemplifies that Kaldor referred to their work in a way that corresponds with their original intentions. Indeed it was the very purpose of Phelps Brown and Weber to create a catalogue of empirical facts for constructing growth theories:

> "It is possible to make some statistical application of the outline drawn in recent discussion of the theory of economic growth, and this paper will present estimates of capital accumulation and the components of income in the United Kingdom since 1870, in an endeavour to throw light on the relation between accumulation and productivity, the determinants of the rate of accumulation, and the effect of accumulation on the distribution of income." (Phelps Brown/Weber 1953, p. 263)

Phelps Brown and Weber's work was also confronted with the difficulties of accurately developing suitable definitions for statistical income categories. The authors used "earnings as a proportion of home-produced national income" as a measure for income shares (ibid., p. 266). According to their findings this variable was 55% between 1870 and 1914, rose to 66% by 1924 and stayed at that level until 1938. The definition for national income used by Phelps Brown and Weber ('home-produced national income') was in accordance with the previously discussed historical studies. However, using earnings meant that wages and salaries were added up to form the wage bill for the first time. Phelps Brown and Weber used data series collected by Phelps Brown/Hart (1952), whilst this study in turn referred to Bowley (1937) and Prest (1948). These works of Bowley and Prest are the basic studies for the "Kaldor line" on which all other investigations in this context also rest. As is shown in detail in Krämer 1996 (p. 89) the Bowley and Prest studies faced similar difficulties in constructing income categories, especially the national product. As Prest once admitted:

> "It must be made clear at the outset that these figures are not by any means the most accurate that could be produced ... Nevertheless, as there have been a number of requests for the figures, it has been decided to

publish them at this stage ...” (Prest 1948, p. 31)

The definitions vary in the course of time and a lot of guess work was necessary to reach final results. First of all, there is a major difference in the addition of salaries to the national wage bill by Phelps Brown/Hart. Namely, salaries were not included by Bowley and by Kalecki. However, sometimes the income of shop assistants was included by Bowley and Kalecki, and sometimes even the labor income part of self-employed, such as e.g. shop keepers, was not taken into account. Kalecki added depreciation to national income, whereas Bowley and Prest did not, so they calculated the share of wages in net income and Kalecki in gross income. Another important difference that influences the size of the wage share is the treatment of the income of government employees. Kalecki subtracted that income category, although with some questionable assumptions about the size of the governmental wage bill. Contrary to that, the other studies included wages paid by the government. To sum up, the methods of calculating wage shares differed so substantially, that any comparison is hardly possible.

5. The pioneering works and their general problems in calculating income shares

Some of the difficulties the empirical studies faced in the past are of general nature with regard to income accounting. Other are of a more specific nature and have to do with the calculation of wage shares. The general problems were found to be threefold:[23] Firstly, at the time considered no official authority existed that collected and evaluated economic data in a systematic manner. The fundamental challenge, therefore, was to put data together from different sources. Secondly, it was only much later that common standards were established on how to define income categories like the national product. And thirdly, in order to come to conclusions about the development of income shares in the long run, it was necessary to make the available data somehow compatible with each other in order to create time series data. Due to a lack of consistency, this was possible only after some far reaching assumptions and modifications in many cases. The special problems that existed with regard to the calculations of wage shares have not so much to do with the fact that the contemporary definitions differ from today's. The major issue is the bias that occured unsystematically, when definitions of the numerator and the denominator of the wage share were

23. Cf. Krämer (1996, p. 93) for more details.

changed. Additionally, definitions differ not only from author to author, but the same researcher also altered the way he constructed the respective variables from time to time.

There is one last but major point to which we have not referred up to now, although it is one of the most important objections against all the historical studies. The share of wages in national income is subject to change simply if the number of workers (or labor income receivers) changes in relation to the number of self-employed. Therefore, although the average income of a worker does not change, the wage share increases as the number of self-employed declines. This has generally been the case in most of the advanced economies in the 20th century, as many farmers had to give up their farms and little shop keepers had to close down because of the establishment of big supermarkets. Under these circumstances a constant wage share implies a lower per capita income of an average worker and therefore a deterioration of the relative income position of the laborers. Amazingly enough, except for one, in none of other historical empirical studies was this factor of influence taken into account, and no attempt was made to modify the wage share in this respect. It was only in Phelps Brown and Hart (1952) that this factor was mentioned.[24]

6. Conclusions

Neither at Bowley's time nor in the recent past has functional distribution of income remained the same. As figures 2 and 3 show, wage shares and modified wage shares (i.e. the wage share corrected with an assumption for the labor income of the self-employed) have not been constant in the last 50 years. Also during a longer period – that is from 1870 onwards – substantial changes occurred (cf. Kaelble/Thomas 1991). Despite all possible caveats, in the author's opinion it can quite unambiguously be seen that income shares also vary in the long run.

However, one has to admit, that objections could be made against this statement. The door left open for drawing a different conclusion on this matter is the term “relative stability“ which most authors use. It is clear that literal constancy of the wage share cannot be meant. The question remains: up to which threshold can the wage share be considered as “relatively stable”?

24. Phelps Brown and Hart (1952) presented values for the change in the relative amount of workers in the total labor force in three big countries. However, although being aware of this influencing factor they did not calculate a modified wage share.

Since there is no objective basis for this, no statistical or econometric test will be able to provide an answer to this question. Therefore, it is eventually left to the individual judgment, as to whether there is share constancy or not.

The main argument put forward in this paper is, however, that the data on which Bowley's Law is based do not meet the high validation standards required. This is indeed a weak foundation for assuming the constancy of income shares, an assumption which plays an important role in various strands of distribution theories. Flaws in the collection and interpretation of the data are coupled with evidence from the last few decades of quite considerable fluctuations in wage shares. This implies that neoclassical, post-Keynesian and, with some notable exceptions, also Kalecki's distribution theory were all built on a highly questionable presupposition. Although Kalecki followed Bowley's law initially, his theory of income distribution is more open to variable income shares, since distribution here is determined by exogenous factors like the degree of monopoly, or relative economic power of the socio-economic classes (cf. Sylos-Labini 1984, Hein and Krämer 1997, Hein 2008). However, since most modern theories of macroeconomic income distribution are still founded on the assumption of wage share constancy, the challenge for today's economists is to develop an approach that does not depend on Bowley's Law.

References

Allen Roy G.D. (1968). Bowley, Arthur Lyon. In *International Encyclopedia of the Social Sciences.* New York: Gale. Vol. 2: 134-137.

Arndt Heinz W. (1979). Clark, Colin. In *International Encyclopedia of the Social Sciences, Biographical Supplement.* New York: Macmillan. Vol. 18: 121-124.

Atkinson Tony (1997). Macroeconomics and the distribution of income. in P. Arestis, G. Palma, M. Sawyer (eds) *Markets, Unemployment and Economic Policy: Essays in Honour of Geoff Harcourt.* London and New York: Routledge. Vol. 2: 207-222.

Bentolila Samuel and Gilles Saint-Paul (2003). Explaining movements in the labor share. *Contributions to Macroeconomics* 3(1): 33 p. (bepress.com)

Bernanke Ben (2007). The level and distribution of economic well-being. Remarks before the Greater Omaha Chamber of Commerce, Omaha, Nebraska on 6 February 2007. www.federalreserve.gov/boarddocs/speeches/2007/20070206/default.htm.

BIS (Bank for International Settlements) (2006). *76th Annual Report.* Basel.

Blanchard Olivier (2006). European unemployment: the evolution of facts and ideas. *Economic Policy* Vol. 45: 7-59.

Bleaney Michael (1976). *Underconsumption Theories.* London: Lawrence and Wishart.

Böhm-Bawerk Eugen von (1914). Macht oder ökonomisches Gesetz? *Zeitschrift für Volkswirtschaft, Sozialpolitik und Verwaltung* Vol. 23; reprinted in E. von Böhm-Bawerk (1924). *Gesammelte Schriften.* Vienna and Leipzig: Hölder-Pichler and Tempsky, 230-300.

Bowley Arthur L. (1900). *Wages in the United Kingdom in the Nineteenth Century*, Cambridge: Cambridge University Press.

— (1920). *The Change in the Distribution of the National Income, 1880-1913.* Oxford: Clarendon Press.

— (1937). *Wages and Income in the United Kingdom since 1860.* Cambridge, Cambridge University Press.

— (1942). *Studies in the National Income 1929–1934*, Cambridge: Cambridge University Press.

— and Josiah C. Stamp (1927). *The National Income: 1924.* Oxford: Clarendon Press.

Bronfenbrenner, Martin (1968). Neo-classical macro-distribution theory. In IEA, *Distribution of the National Income*, J. Marchal, and B. Ducros (pref.). London and New York: Macmillan, 476-507.

Carter Scott (2007). Real wage productivity elasticity across advanced economies, 1963-1996. *Journal of Post Keynesian Economics* (29) 4: 573-600.

Cairncross, Alec (1988). The development of economic statistics as an influence on theory and policy. In D. Ironmonger, J. O. N. Perkins, and T. V. Van Hoa (eds) *National Income and Economic Progress: Essays in Honour of Colin Clark*. New York: Macmillan, 11-20.

Chapman Agatha L. (1953). *Wages and Salaries in the United Kingdom, 1920-1938.* Cambridge: Cambridge University Press.

Clark Colin (1937). *National Income and Outlay.* London: Macmillan.

Darnell Adrian C. (1981). A.L. Bowley, 1869-1957. In D. P. O'Brien, J. R. Presley (eds), *Pioneers of Modern Economics in Britain.* London: Macmillan, 140-174.

Serres Alain de, Stefano Scarpetta, Christine de la Maisonneuve, (2002). Sectoral shifts in Europe and the United States: how they affect aggregate labor shares and the properties of wage equations. Paris: OECD Economics Department, *Working Papers*, 326.

Douglas Paul H. (1934). *The Theory of Wages.* New York: Macmillan.

— (1967). *The Theory of Wages.* New York: Kelley.

Drandakis Emmanuel M. and Edmund S. Phelps (1966). A model of induced invention, growth and distribution. *Economic Journal* Vol. 76: 823-840.

Dunlop John T. (1938). The movement of real and money wage rates. *Economic Journal* Vol. 48: 413-434.

EU-Commission (2007). *Employment in Europe 2007*, Luxemburg.

— (2011). *AMECO-Database.* European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN), Brussels, http://ec.europa.eu/economy_finance/db_indicators/ameco/index_en.htm (update: 08.03.2011).

Feldstein Martin (2008). Did wages reflect growth in productivity? *Journal of Policy Modeling* 30(4): 591-594.

Gilbert Milton and George Jaszi (1944). National product and income statistics as aid to economic problems. *Dun's Review*, February, 9-11 and 32-38; quoted after: W. Fellner and B. F. Haley (1946) (ed. for the American Economic Association), *Readings in the Theory of Income Distribution.* London: Allen & Unwin, 44-57.

Goodwin Richard (1967). A growth cycle. In C. H. Feinstein (ed.) *Socialism, Capitalism and Economic Growth, Essays presented to Maurice Dobb.* Cambridge: Cambridge University Press, 54-58.

Guscina Anastasia (2006). Effects of globalization on labor's share in national income. *IMF Working Paper* 06/294.

Hagemann Harald (1988). Lohnhöhe und Beschäftigung in Keynesscher Sicht. In H. Hagemann, O. Steiger, (eds) *Keynes'* General Theory *nach fünfzig Jahren.* Berlin: Duncker & Humblot, 183-213.

Harrod Roy F. (1948). *Towards a Dynamic Economics.* London: Macmillan.

Hein Eckhard (2008). *Money, Distribution Conflict and Capital Accumulation. Contributions to 'Monetary Analysis'.* Basingstoke: Palgrave Macmillan.

— and Hagen Krämer (1997). Income shares and capital formation: Patterns of recent developments. *Journal of Income Distribution* 7(1): 5-28.

Hicks John R. (1932). *The Theory of Wages.* London: Macmillan.

— (1936). Distribution and economic progress: A revised version. *Review of Economic Studies* 4(1): 1-12; reprinted and quoted after John R. Hicks (1963) *The Theory of Wages.* 2nd ed. London: Macmillan, 286-303.

— (1963). *The Theory of Wages.* 2nd ed. London: Macmillan.

IMF (International Monetary Fund) (2007). The globalization of labor. *World Economic Outlook*, Chap. 5. Washington: IMF.

Kaelble Harmut and M. Thomas (1991). Introduction. In Y.S. Brenner, H. Kaelble and M. Thomas (eds) *Income distribution in historical perspective.* Cambridge: Cambridge University Press, 1-56.

Kaldor Nicholas (1955-6). Alternative theories of distribution. *Review of Economic Studies* Vol. 23; quoted after N. Kaldor (1980a) op. cit., 209-230.

— (1957). A model of economic growth *Economic Journal* Vol. 67: 591-624; quoted after N. Kaldor (1980c) op. cit., 259-300.

— (1961). Capital accumulation and economic growth. In F. A. Lutz, D. C. Hague (eds) *The Theory of Capital*, quoted after N. Kaldor (1978) op. cit., 1-53.

— (1978). *Further Essays on Economic Theory.* London: Duckworth.

— (1980a). *Essays on Value and Distribution.* 2nd ed. London: Duckworth.

— (1980b). General introduction to collected economic essays. In N. Kaldor (1980a) op. cit., vii-xxxi.

— (1980c). *Essays on Economic Stability and Growth.* 2nd edition, London: Duckworth.

Kalecki Michał (1938). The determinants of the distribution of the national income. *Econometrica* 6(2): 97-112.

— (1939). The Distribution of the National Income. *Essays in the Theory of Economic Fluctuations*, London; reprinted in W. Fellner and B. F. Haley (1946) (ed. for the American Economic Association). *Readings in the Theory of Income Distribution*, Philadelphia, 197-217.

— (1954). *Theory of Economic Dynamics.* London/ George Allen & Unwin.

Keynes John Maynard (1939). Relative movements of real wages and output. *Economic Journal* 49: 34-51; quoted after John M. Keynes (1971ff.) *op. cit.* Vol. VII: 394-412.

— (1971ff.). *The Collected Writings of John Maynard Keynes* Vol. I-XXX. London: Macmillan.

King John and Philip Regan (1988). Recent Trends in Labor's Share. In Y. S. Brenner, J. P. G. Reijnders, A. H. G. Spithoven.(eds) *Theory of Income and Wealth Distribution.* Brighton, Wheatsheaf, New York: St. Martin's Press, 54-86.

King Willford I. (1930). *The National Income and its Purchasing Power.* New York: National Bureau of Economic Research.

Klein Lawrence R. and Robert F. Kosobud (1961). Some econometrics of growth: Great ratios of economics. *Quarterly Journal of Economics* 75(2): 173-198.

Krämer Hagen (1996). *Bowley's Law, Technischer Fortschritt und Einkommensverteilung.* Marburg: Metropolis.

— (2006). The notion of the constant wage share in income distribution theories. In Y. Stathakis, G. Vaggi (eds) *Social Change and Economic Development in the History of Economic Thought.* London: Routledge, 144-167.

— (2008). Strukturwandel und Einkommensverteilung. In H. Hagemann, G. Horn, J. Krupp, (eds) *Aus gesamtwirtschaftlicher Sicht. Festschrift für Jürgen Kromphardt.* Marburg: Metropolis, 409-434.

Kravis Irving B. (1959). Relative income shares in fact and theory. *American Economic Review* 49(5): 917-949.

Krelle Wilhelm (1962). *Verteilungstheorie.* Wiesbaden: Gabler.

Krueger Alan B. (1999). Measuring labor's share. *American Economic Review* 89(2): 45-51 (Papers and Proceedings).

Kuznets Simon (1937). *National Income and Capital Formation 1919-1935: A Preliminary Report.* New York: National Bureau of Economic Research.

— (1941): *National Income and its Composition, 1919-1938.* New York: National Bureau of Economic Research.

Lange Oskar (1964). *Entwicklungstendenzen der modernen Wirtschaft und Gesellschaft.* Vienna: Europa-Verlag.

Lutz, Friedrich A. and D. C. Hague (eds) (1968). *The Theory of Capital.* London: MacMillan.

Mankiw N. Gregory (1992). *Macroeconomics.* New York: Worth Publishers.

Orellana M., D. Paternoster, and S. V. Sørensen (2005). Consumption, investment and saving in the EU: an assessment. *European Economy – Occasional Paper* 20, Directorate General for Economic and Financial Affairs, Brussels, European Commission.

Phelps Brown E. Henry and Bernard Weber (1953). Accumulation, productivity and distribution in the British economy, 1870-1938. *Economic Journal* 63(2): 263-288.

— and P. E. Hart (1952). The share of wages in national income. *Economic Journal* 62(2): 251-277.

Prest A. R. (1948). National income of the United Kingdom 1870-1946. *Economic Journal* Vol. 58: 31-62.

Ricardo David (1951-59). *The Works and Correspondence of David Ricardo.* Vol. I-XI, ed. by P. Sraffa, with the collaboration of M. H. Dobb. Cambridge: Cambridge University Press.

Robinson Joan (1952). *The Rate of Interest and Other Essays.* Quoted after the 2nd edition (1979), *The Generalisation of the General Theory and Other Essays.* London: Macmillan.

— (1966). *An Essay on Marxian Economics*, 2nd edition. London: Macmillan.

Roemer John (1978). The effect of technological change on the real wage and Marx´s falling rate of profit. *Australian Economic Papers* 17: 152-166.

Rothschild Kurt W. (1994). The theory of wages revisited. In H. Hagemann, O. F. Hamouda (eds) *The Legacy of Hicks. His Contribution to Economic Analysis.* London and New York: Routledge.

Ryan Paul (1996). Factor shares and inequality in the UK. *Oxford Review of Economic Policy* Vol. 12: 106-126.

Samuelson Paul (1948). *Economics: An Introductory Analysis*, 1st edition. New York: McGraw-Hill.

— (1958). *Economics: An Introductory Analysis.* 4th edition. New York: McGraw-Hill.

— and William Nordhaus (1992). *Economics.* 14th edition. New York et al., McGraw-Hill.

— and — (2009). *Economics*, 19th edition. New York: McGraw-Hill/ Irwin.

Schumpeter Joseph A. (1939). *Business Cycles. A Theoretical, Historical and Statistical Analysis of the Capitalist Process*, Vol. 1 and Vol. 2. New York and London: McGraw-Hill.

Simon Julian L. (1990). Great and almost great magnitudes in economics. *Journal of Economic Perspectives* Vol. 4: 149-156.

Solow Robert M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics* Vol. 70: 65-94.

— (1958). A skeptical note on the constancy of relative shares. *American Economic Review* 48(4): 618-631.

— (1968). Distribution in the long and in the short run. In J. Marchal, B. Ducros (eds), *The Distribution of National Income*. New York: St. Martin's Press, 449-446.

— (1970). *Growth Theory: An Exposition.* Oxford: Clarendon Press.

— (2008). Distribution and economic progress' after seventy years. In R. Scazzieri, A. Sen, S. Zamagni (eds), *Markets, Money and Capital. Hicksian Economics for the Twenty-First Century.* Cambridge: Cambridge University Press.

Stone J. R. N. (1987). Bowley, Arthur Lyon (1869-1957). In J. Eatwell, M. Milgate, P. Newman (eds), *The New Palgrave* Vol. I. London: Macmillan, 270.

Studenski Paul (1958). *The Income of Nations.* New York: New York University Press.

Swan Trevor W. (1966). Economic growth and capital accumulation. *Economic Review* Vol. 32: 334.

Sylos-Labini Paolo (1984). *The Forces of Economic Growth and Decline.* Cambridge,Ma. and London: MIT Press.

Tarshis Lorie (1939). Changes in real and money wages. *Economic Journal* Vol. 49: 150-154.

Tooze J. Adam (1999). Weimar's statistical economics: Ernst Wagemann, the Reich's Statistical Office, and the Institute for Business-Cycle Research, 1925-1933. *The Economic History Review* 52(3): 523-543.

— (2001). *Statistics and the German State, 1900-1945: The Making of Modern Economic Knowledge.* Cambridge and New York: Cambridge University Press.

Tugan-Baranowsky Michael (1913). S*oziale Theorie der Verteilung.* Berlin: Springer.

UNO (1952). *A System of National Accounts and Supporting Tables, Studies in Methods.* Series F, Nr. 2, New York.

Weintraub Sidney (1959). *A General Theory of the Price Level, Output, Income Distribution, and Economic Growth.* Philadelphia: Chilton.

Young Andrew T. (2006). One of the things we know that ain't so: Why US labor's share is not relatively stable? *Working Paper*, April. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=65078.