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Zusammenfassung

In fast allen entwickelten Ökonomien weist der Anteil der Arbeitseinkommen am Volkseinkommen in den letzten dreißig Jahren einen fallenden Trend auf. Dennoch ist innerhalb der Wirtschaftswissenschaften immer noch die Auffassung weit verbreitet, dass die Lohnquote bzw. die Arbeitseinkommensquote langfristig konstant sei. Die relative Stabilität der Lohnquote in der langen Frist wird im Allgemeinen als stilisiertes Faktum angesehen, und ihr wird gelegentlich sogar eine Gesetzmäßigkeit zugesprochen. Dieser Beitrag versucht aufzuzeigen, auf welche Weise die angebliche Lohnquotenkonstanz zu einer der „great magnitudes in economics" erhoben wurde und wie sie in die wesentlichen makroökonomischen Theorien der Einkommensverteilung (Neoklassik, Post-Keynesianisch), Kalecki) Eingang fand. Da der Blick auf die empirische Entwicklung von Lohn- und Arbeitseinkommensquote offenbart, dass diese Größen auch langfristig starken Veränderungen unterworfen sind, muss festgestellt werden, dass die zentralen Theorien der funktionalen Einkommensverteilung auf einer nicht validen – oder zumindest höchst fragwürdigen – empirischen Annahme basieren.

Abstract

The labour share of income in national product has shown a declining trend in many advanced economies over the past 30 years. However, many economists still hold the view that the wage share remains almost constant in the long run. The notion of the relative stability of the wage share in the long run is considers to be a stylized fact or even sometimes called 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 show strong fluctuation of aggregate income shares over the long run, the conclusion is reached that the major macroeconomic theories of growth and distribution are built around an invalid – or at least highly questionable – assumption about the real world.

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I. A stylized fact reconsidered

The division of the national income between wages, profits and rents is one of the oldest issues in the economic literature. In the writings of the classical economists the development of the income shares of the socio-economic classes played an eminent role. Also the economists of the early 20th century were strongly concerned with questions of what determines the shares of national income which the factors of production receive (functional income distribution). In today's macroeconomics this topic is hardly dealt with. Unlike that, there is a vast amount of literature about income distribution from an microeconomic point of view (personal income distribution).[1] Why has functional income distribution ceased to be central to macroeconomics – at least to the mainstream version of it?

There are several reasons for that. An important one is perhaps the seeming stability of the wage (and the profit share, respectively) in the long run[2]. The alleged "relative stability" of the aggregate share of national income that goes to labor in the long run has acquired the condition of a "stylized fact" (Kaldor) of economic growth. And if the income shares are stable, there is no need to investigate further which factors determine shares. But the finding of share stability had even stronger 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 observation that functional income distribution does not vary in the long term.

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

2 In the short run the wage share moves counter-cyclically with variations in national income.

Indeed, recent empirical research has shown that labor income shares are subject to substantial changes over time.[3] In the G-7 economies the labor share of income has been declining on average over the past three and a half decades (see figure 1).

Instead of focusing on the wage share, i.e. the share of national income that goes to employees, the above figure applies a broader measure in order to account for all labor in-

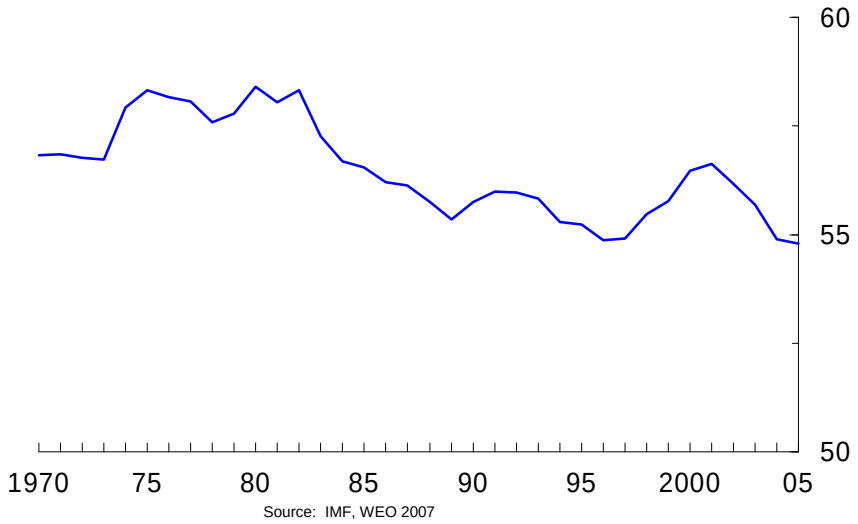


Figure 1: Labor share of income in G7 economies in percent (weighted average), 1970-2005.

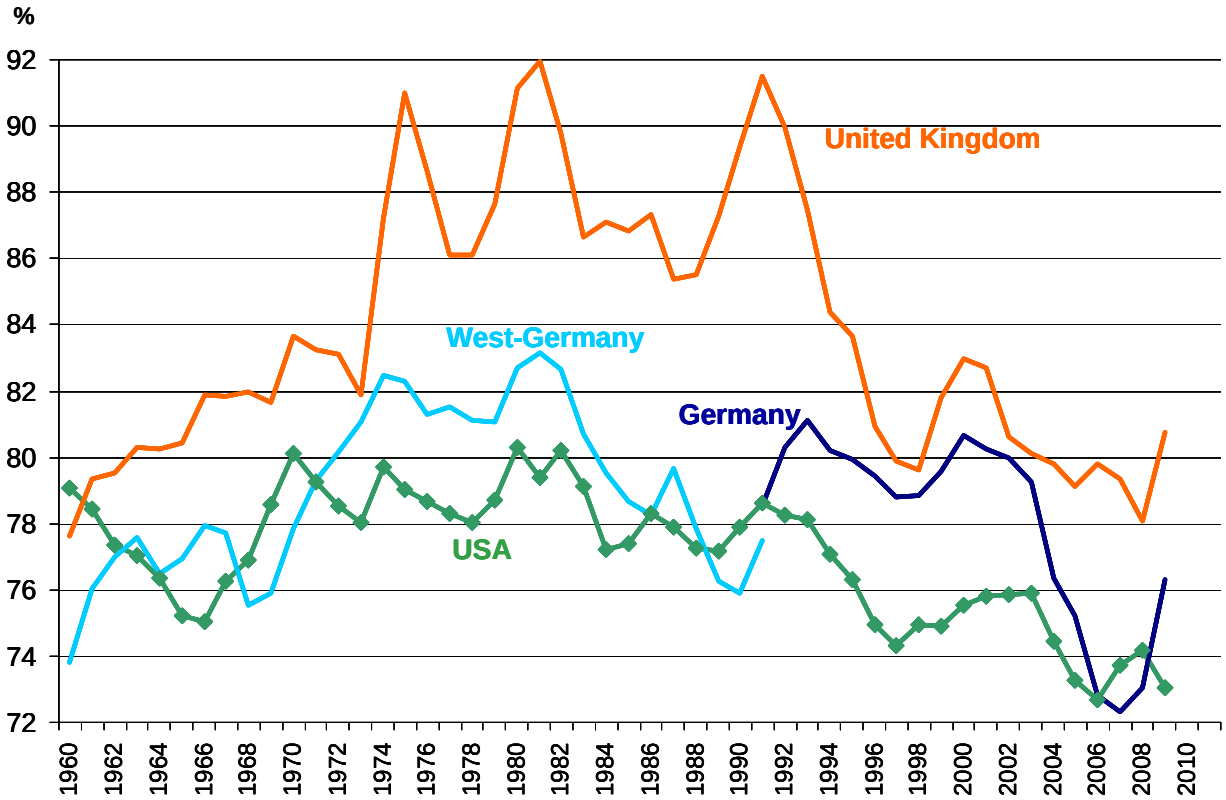
come. National accounts provide the share of employees' compensation in total income, but do not identify separately the labor income of other categories of workers (self-employed, employers, and family workers). The most common correction procedures is to augment the employees' compensation with compensation of other categories of workers by assuming that other categories of workers earn the same average wage as employees (Kravis 1959, Hein and Krämer 1997, Krueger 1999). Labor compensation is hence the

[3] A relevant part of mainstream economics still sticks to the idea of a long term stability of income shares *(Bowley's Law*). However, a growing part of the literature acknowledges the long-term decline of the labor income share in most countries. 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).

product of the compensation of employees (W) and the ratio of total employment (E) and employees (L). Whereas the wage share (λ) 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):

$$\lambda^{*} = \frac{W}{Y} \cdot \frac{E}{L} = \frac{\frac{W}{L}}{\frac{Y}{E}}$$

Looking at single countries reveals that there are some cross-country differences in the behavior of the labor share (see figures 2 and 3). In the past 50 years or so the US exhibits the closest approximation to this stylized fact of growth, with the labor share remaining on a (compared to other countries) relative stable level. In the UK it underwent sizable short-run fluctuations, but it experienced a deep fall in the beginning of the 1990s. Also in



Source: EU-Commission 2010: AMECO-Database as of 22 October 2009; own calculations.

Figure 2: Labor share of income in selected economies I, 1960-2009.

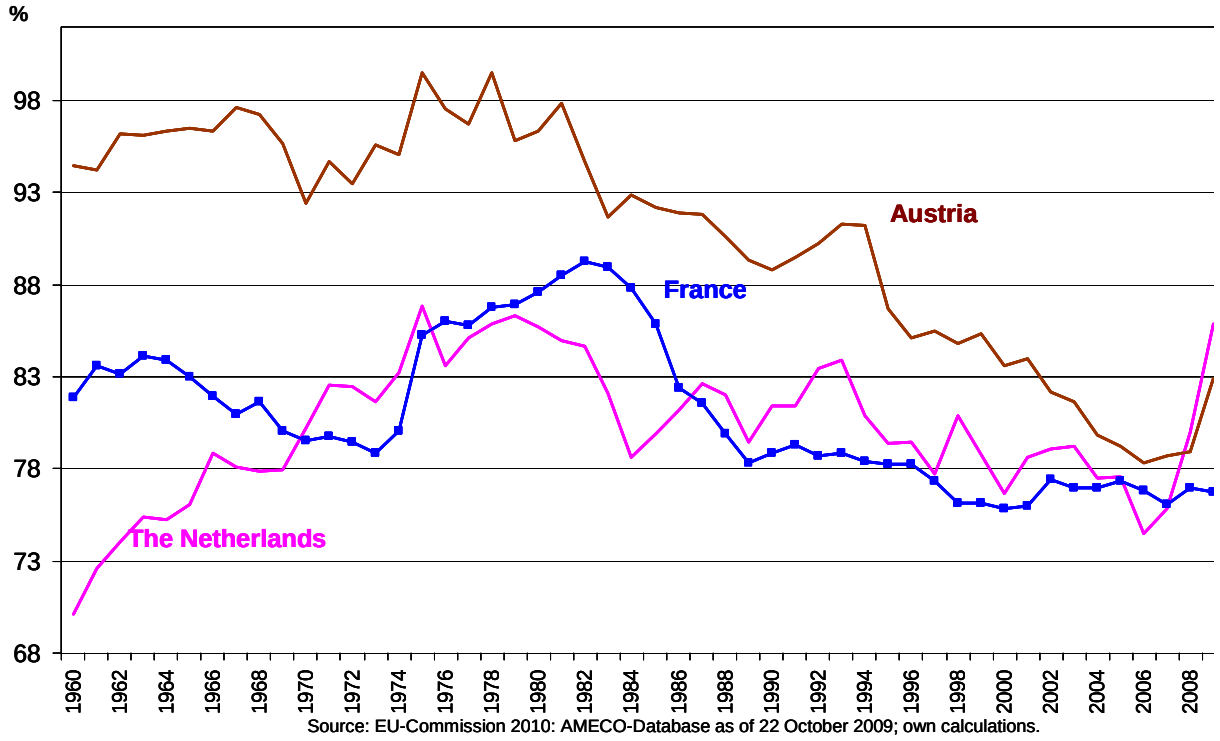


Figure 3: Labor share of income in selected economies II, 1960-2009.

continental Europe the general picture shows 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 Austria and the Netherlands it did so in the mid-1970s, and fell after that. In some countries the decline was relative mild (eg France), while in others it showed a steady and rather strong decrease (eg Austria).[4]

These developments can be ascribed to the respective situation on the labor market. The continuous improvements which reduced after war unemployment rates during the 1960s provided trade unions with increasing bargaining power. Wage hikes above produc-

[4] Since the wage share usually rises in 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 and in France.

tivity growth resulted. The trend revision in the mid 1970s has strong links to the end of era of full employment, on the contrary.[5]

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[6]) were never taken into account by the early writers who believed in the constancy of the wage share.

Summing up, it is argued here that no justified statement can be made according to which the wage share is stable over the course of time. 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 can not be meant. But which is the threshold up to which the wage share can be considered as 'relatively stable'? Since there is no objective basis for this, to a certain extend it is left to the individual judgment of a person, whether there is share constancy or not.[7]

II. Bowley's Law and the theory of the wage fund

The long-run constancy of the share of labour in national income belongs to the so-called stylized facts of economic development. This "economic law" is known as *Bowley's Law*.[8]

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5 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 with the two major recessions that emerged after the oil price shocks at that time.

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

7 No statistical or econometric test will eventually be able to help one out of this dilemma.

8 The term *Bowley's Law* was coined by Paul A. Samuelson in his textbook *Economics* honouring Arthur Lyon Bowley (1869-1957; cf. Samuelson 1964a, p. 736).

There are many prominent economists belonging to all different kinds of theoretical schools who refer to this law. 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) mention and use Bowley's Law. The alleged constancy of the wage share brought about astonishment[9], the naive belief that it is a law of nature[10], as well as an annoyance about the inability to refute it.[11] Bowley's Law is still one of the most important stylized facts of growth and distribution theories. In different strands of these theories, which include neoclassical, post-Keynesian and the Kaleckian approach to distribution theory, arguments are presented why income distribution does not change in the long run.

The constant wage share is also one item on a longer list of so-called economic constants that can be found in economic literature and that are sometimes called "great ratios of economics" (cf. Klein/Kosobud 1961, Simon 1990 und Darnell/Evans 1990, p. 44f.). Besides its peculiarity in itself Bowley's Law has a special relevance, because certain political conclusions can be derived from it. If it were true that the wage share does not change in the long run, every attempt of the workers and their unions to increase their share in the national product would be doomed to fail à la longue. As early as the first economic schools of thought came up, statements were put forward that there is no room for manoeuvre in the determination of wages, because they are strictly determined by the laws of economics. This idea can be found in the wage fund theory of classical political economics, it can also be found in the theory of the "iron law of wages" by Ferdinand Lassalle, and

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

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

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

it had its high-times in economic debates during the dispute between Tugan-Baranowsky (1913) and Böhm-Bawerk (1914) on *Macht oder ökonomisches Gesetz?* (power or economic law?) in income distribution.

With the development of the marginal productivity theory of distribution the notion that equilibrium wages determined in competitive markets are fair and any attempt to increase these wages will inevitably create unemployment found its neat theoretical and formal conception. However, while the old wage theories followed a static approach, the theory of the constant wage share relates to a growing economy. Therefore, the law of the constant wage share can be considered as the modern version of the theory of the wage fund. That is why Bowley's Law is frequently treated as an empirical proof for the fact that political power and class struggle can not influence income distribution in the long run. Bowley's Law is therefore often referred to when discussing the rules and principles of an adequate wage policy.

III. The wage share in classical economics

The notion of a stable long-run 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 in his *Principles* did not only declare the determination of the laws which regulate distribution as the principal problem in political economy, but emphasized that the income shares of the proprietors of land, of the capital owners, and of the labourers 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*; depending mainly on the actual fertility of the soil, on the accumulation of capital and population, and on the skill, ingenuity, and instruments employed in agriculture. To determine the laws which regulate this distribution,

> is the principal problem in Political Economy" (Ricardo 1951-59, vol. I, p. 5; emphasis added).

Ricardo came to the conclusion that the rent share in national income would tend to increase in the long-run.[12] He derived that result from the existence of diminishing returns in agriculture. However, as Pasinetti (1960) has demonstrated this is not a sufficient argument for assuming an increasing rent share. Diminishing returns in agriculture are also compatible with a decreasing rent share. In a similar way the development of the wage and the profit share is indetermined in Ricardo. Although Ricardo assumed that both income shares would tend to shrink in the long-run, later interpretations of Ricardo's works have shown that this must not be necessarily the case (cf. Preiser 1959; Kalmbach 1972, p. 17f.; Johnson 1973, p. 16).

Before Ricardo, Adam Smith treated the matter of income distribution also in depth. However, the variables he – like other classical writers – looked at most of the time were the rate of profit, the rate of rent, the wage rate and the absolute amounts of wages, profits, and rents, respectively. Smiths remarks on income shares on the other hand were relatively rare. He mentioned explicitly only the share of rent in national income which he saw increasing in the long-term (cf. Smith WN I.xi.p, Abs. 2). Later interpretations of Smith's remarks on the development of income distribution draw different conclusions like in the case of Ricardo. Sylos-Labini (1984) refers to a passage in Smith from which he derives the notion that Adam Smith expected wages to rise in accordance with national income in the long run. However, in this case a constant wage share would only result in the absence of productivity growth. As is well known, it has been Adam Smith who at so many occasions stressed the very importance of productivity advances for the wealth of nations. If

[12] It is not clear today whether Ricardo's reasoning supposes the three income shares (rent, profit, and wage share, respectively) to rise or to fall in the long run (cf. Kurz 2008).

one takes technological progress into account, the assumption of a constant wage share requires that real wages rise in proportion to productivity growth. Smith, on the other hand, did not expect that wages tend to rise in proportion to productivity increases:

> ”It is the natural effect of improvement [that] ... a much smaller quantity of labour becomes requisite for executing any particular piece of work; and though, in consequence of the flourishing circumstances of the society, the real price of labour should rise very considerably, yet the great diminution of the quantity will *generally much more than compensate* the greatest rise which can happen in the price” (Smith WN, I.xi.o, 1; emphasis added).

But if wages do not increase in step with productivity growth, as Smith obviously assumed, this would imply a long-run tendency of the wage share to decrease instead of staying stable.

In Marx, who is considered here as another important representative of classical economics, only very few quotations can be found that reveal his thoughts about the long-run development of functional income distribution (cf. Preiser 1959, p. 625). Nevertheless the development of the wage share in Marx, is not unimportant for the interpretation of Marx’s assumption of the increasing misery of the working class. Relative immiserization, as indicated by a decreasing wage share, can be viewed as falling behind the income progress of the other classes (cf. Mitra 1956, p. 11). Which direction the long-run wage share will take is a matter of controversy in the post-Marxian literature. A fall of the wage share is in principle only possible, if the rate of surplus value rises.[13] Concerning the development of the rate of exploitation Marx is quite ambiguous. Additionally, one can quote a remark from *Lohn, Preis und Profit* (Marx 1867) in which Marx considers the development of the rate of surplus value as a question of the relative strength of the classes.[14] And since the ques-

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[13] We are abstracting from the problem of value-price-transformation and the topic of productive and unproductive labour (cf. Moseley 1985).

[14] ”Die Frage löst sich auf in die Frage nach dem Kräfteverhältnis der Kämpfenden” (ibid., p. 149).

tion of the development of the rate of surplus is an open question also the question of the development of the wage share is left open in Marx.[15]

In summary it can be said, therefore, that the classical economists neither explicitly nor implicitly assumed a constant wage share. However, the writings of the classical authors show no clear statements which route the wage share would take in the long run according to their views.[16] One reason for this is the fact that the wage share played a relatively unimportant role in classical analysis. This magnitude was not seen as being relevant for the growth process – contrary to the rate of profit and its assumed tendency to fall. Therefore, in the classical framework the development of the functional income distribution is an open question. It can be determined only via the determination of the main parameters that influence income distribution, i.e. productivity and wage growth. From this it follows that any reasoning about the development of income shares cannot be carried out in isolation, but has to be developed in the context of accumulation and distribution – the major themes in classical economics.

With the fundamental shift between the economic paradigms at the end of the 19th century from classical to neoclassical analysis also the notion of the variable wage share disappeared. It was replaced by the conception of the long-run constancy of income distribution.[17] Since the beginning of the 20th century the basic questions of functional income distribution have no longer been what determines income shares and what are the causes of its

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15 In the post-Marxian literature on the theory of crisis some approaches exist that explain Marx's hypothesis of economic breakdown with a fall of the rate of profit, and vice versa a rise in the share of wages (cf. Glyn/Sutcliffe 1972; Weisskopf 1979). Other approaches hold just the opposite for true (cf. Baran/Sweezy 1966; Bleaney 1976). On a recent deviating interpretation concerning 'Okishio's Theorem' see Gehrke 2008 and von Weizsäcker 2009).

16 It should not be forgotten that the definitions of the classical writers concerning the types of income are not completely identical with today's income categories.

17 In the course of the disappearance of rent theory, land as a factor of production was considered to be a part of profit and the share of rent was subsumed under the share of profits, accordingly.

changes. Rather the question of what is responsible for the constancy of the wage share has got into the focus of interest.

IV. Bowley's Law and its history of origins

The inclusion of the wage share into the list of great economic magnitudes can be traced back to the works of Arthur L. Bowleys at the beginning of the 20th century in Great Britain. The term Bowley's Law is an attempt to honour the scientific work of one of the most important pioneers in applied economic statistics and one of the first scientists who collected and interpreted data on wage developments.[18] In what follows an attempt is made to describe how Bowley's Law came into existence and spread in income distribution theory. It has to be asked, furthermore, whether the statistical methods and concepts available at Bowley's time justify the classification of the constant wage share as one of the "great ratios of economics" (cf. Klein/Kosobud 1961, Simon 1990 und Darnell/Evans 1990, p. 44f.).

Following the thesis that the notion of the constant wage share is one of the corner stones of neoclassical as well as post-Keynesian theories of income distribution that were developed in the 1950s and 1960s another goal of this paper is to show how the notion was taken up by the still dominating theories of functional income distribution.

Three works are considered here as the major channels through which the notion of the constant wage share became so popular. It will be srutinized on which empirical studies they relied. Firstly, the rather microeconomic approach of Michael Kalecki from 1938 is considered. Secondly, it will be dealt with the major work for the neoclassical macroeco-

[18] Bowley (1869-1957) worked as a mathematician, statistician and economist in Great Britain. Besides his empirical and methodological work on wages and national income accounts his most important contributions to economics consist of research on mathematical economics, econometry and statistical methods, especially sample techniques (cf. Allen 1968; Darnell 1981; Stone 1987).

nomic marginal productivity theory of distribution, i.e. the contribution by Paul Douglas from 1934. And thirdly, Kaldor's paper from 1961 is identified as being responsible for the absorption of the constant wage share idea into the post-Keynesian growth and distribution theory – and beyond.[19]

1. The work of Kalecki and its sources

Michal Kalecki was among the first economic theoreticians who tried to develop a consistent theory about the remarkably stable share of wages in the value added of the business sector. Kalecki also was one of the first to speak of a law in this context:

> "As we see on the basis of statistical data the relative share of manual labour 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).

This phenomenon, however, received more attention through the work of another prominent author, namely Keynes. In the history of economic thought Keynes' article from 1939 Relative Movements of Real Wages and Output (Keynes, CW VII, p. 394-412), which is also important for our topic, is actually better known for some other reason. In this article Keynes dissociated himself from the general validity of the so-called 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 labour. Until then Keynes 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). Due to the empirical work of Dunlop (1938) and Tarshis (1939) Keynes modified his

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

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 on the assumption on a fixed stock of capital as well, as Keynes recognized.[20]

In addition to these considerations and to the empirical studies of Dunlop and Tarshis Keynes gave another piece of evidence underpinning his opinion that his original idea of an anti-cyclical movement of the real wage had to be given up, which he again called ”... one of the most surprising, yet best-established, facts in the whole range of economic statistics ... ” (Keynes, CW VII, p. 408f.):

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

Keynes’s view can, however, proven to be wrong, as we will see later.[21]

In order to prove the – as he called it – the ”undisputed facts” (ibid. p. 409) of constant wage shares in Great Britain and in the USA Keynes in his article reproduces two tables from a work of Kalecki (Kalecki 1939).

The data Kalecki used to build up data for the development of wage shares in Great Britain and in the USA were taken from quite different sources. (cf. Tab. 1, p. 14 und Tab. 2, p. 15).

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[20] 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 (pp. 200).

[21] The curiosity should be noted that Keynes in his Economic-Journal article from 1939 dissociated himself from an idea that had lost empirical ground. However, he justified his changing view with another fact that was empirically wrong as well.

Tab. 1: Relative Share of Manual Labour* 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).

Kalecki had already published an article in 1938 in *Econometrica* (Kalecki 1938) about the determinants of income distribution, in which he identified the degree of monopoly as the major determining factor of influence. This article is of special interest in our context since for the first time Kalecki put together statistical figures about wage shares in Great Britain and the USA in the period from 1880 to 1935. Keynes referred to a revised version of this article that appeared one year later as the first chapter named *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).[22] The sources Kalecki used were studies and calculations made by Arthur L. Bowley (1920 and 1937)[23] and Colin Clark (1937) for Great Britain. For the USA he took Wilford L. King (1930) and Simon Kuznets (1937).[24]

If one investigates the validity of the contemporary sources, many substantial differences can be found in the way that wage shares are defined and calculated today. Also the reli-

[22] Overall total three similar versions of Kalecki's article exist. The third version appeared 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.

[23] In his first version from 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.

[24] 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.

Tab. 2: Relative Share of Manual Labour* 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).

ability of the data have to be questioned (cf. Krämer 1996). This is why the alleged stability of the wage share even in the times of Keynes and Kalecki is not free of doubts.

1.1. Data for the wage bill and for the national income

To calculate wage shares, apart from data for the national wage bill one needs data for national income as well. Therefore, the history of calculating wage shares is closely linked to the history of national income accounting. The evolution of national income accounting took place in particular in Great Britain, since this country is the place of origin not only of the first theories of income formation but also of the first empirical calculations and assessments of national income.[25] As early as in the 17th century first steps were taken by William Petty and Gregory King (cf. Studenski 1958). At the end of the 19th century an intensive discussion process set in about the correct categories of national income accounting. These debates lasted until the 1930s and 1940s, when the terms and concepts of national accounting that are so well known and common to us today got their final shapes. Until then many definitions of national income accounting were changed quite often. This explains in part why so many difficulties existed to calculate wage shares and to compare them over time and between different countries. It was to the advantage of calculating wage shares when at the end of the 18th century the method of calculation for the national income changed in Great Britain. The reintroduction of the income tax in 1842 provided more reliable data than those which were taken so far from trade and production statistics. This is why in Great Britain those methods gained in importance that used the factor-

[25] Also early in Germany national income was calculated for official statistics (cf. Tooze 1999 and 2001).

earnings approach instead of the expenditure approach (cf. Studenski 1958, pp. 111). This method was also used by Arthur L. Bowley, whose studies and publications were widely noticed and rather influential (cf. Darnell 1981, pp. 151). Since Bowley, besides his interest in national income accounting, had a special interest in the income development of workers. This is why he put much effort in the collection of wage data. This assured that sufficient data on the wage bill in Great Britain existed.

1.2. Methods of calculating the numerator of the wage share

Today the numerator of the wage share consists of the gross income from employed persons, i.e. gross wages and salaries before taxes plus social contributions of the employer. The numerator of the wage share as constructed by Kalecki and his contemporaries differed from this way mainly in two respects. Firstly, in most of the cases the social contributions of the employer were not taken into account (cf. Bowley 1937, p. 72). And secondly, which is more important, the numerator did not include salaries.

Thanks to Bowley's works, data for the national wage bill in Great Britain are available for a much longer period, starting as early as 1860. However, although the calculation of the national wage bill is not confronted with so many difficulties as the total national income is the pioneers of income accounting still faced several serious problems as Bowley 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 sufficient uncertainty after that date" (Bowley 1937, p. 99).

Data revision in the 1950s concerning the wage bill in Great Britain resulted in significant higher values in the period from 1920 to 1938 compared to the calculations made by Bowley and Clark (cf. Chapman 1953). According to the revisions in 1924 the wage bill was

11.7% higher than Clark thought. In 1926 it was 1.1% below Bowley's calculations, in 1935 it was 4.9% higher than Clark's estimations. And finally, Bowley's data for 1938 were 9.7% below the revised figures. When following the development of wage shares it is not a constant mistake that matters but fluctuating deviations from the actual measure. Therefore, it is relevant to notice that Chapman expected the margin of error in his own estimations to be around 5% to 10% (ibid., pp. 41).

1.3. Methods of calculating the denominator of the wage share

Even bigger was the margin of error in national income which was calculated estimating its single components. Kuznets (1941) mentions a margin of error in the inter-war period (1919-1938) of up to 20%.[26] The further one goes back in history the more relevant is the problem of a correct data base. However, besides the potentially incorrect data, the major problem consists in the different definitions of the national product in the respective studies. This is due to the fact that no common standard in national accounting had yet been established. It was not until the Keynesian Revolution and in face of the military mobilization in Great Britain on the eve of the second world war that a "statistical Revolution" (cf. Arndt 1979, p. 121) occurred. Only then a precise definition of terms like 'national income' or 'gross national product' was put forward. The latter term, for example, that is so common for us today has not been introduced before 1940 by Colin Clark (Cairncross 1988, p. 14f.). Even in Clark's 1937 book *National Income and Outlay* which was used by Kalecki in his 1939 article this term did not appear.[27] It was in the year 1952 when eventually the OECD

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

[27] Only in 1941 the first official calculation of the national product of Great Britain (for the period 1938-1940) was 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 statistic 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.).

urged its member nations to introduce a uniform and internationally comparable classification of the systems of national accounts (cf. UNO 1952).

Particularly in Bowley's works – whose figures were used by Kalecki only for the years 1880 and 1913 – many methods for calculating a ‚national income' are doubtful from today's perspective. The three categories which Bowley used to construct his national income are ‚wages', ‚income assessed to income tax' and ‚intermediate income'. Additionally he subdivided ‚income assessed to income tax' further into ‚taxable income' and income and ‚tax evasion'. It is obvious, however, that especially the latter can only be very broadly estimated. The third category, ‚intermediate income', is the residual and consists mainly of non-wage income below the tax-exempted amount (cf. Bowley 1937, pp. 79). The magnitude of the second category is based mainly on estimations made by tax authorities. These figures are subject to errors because many changes in the tax system took place in the period under consideration. The data can therefore not be regarded as being very reliable and were not referred to in later studies, unlike the numbers Bowley created for his first category. 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. For us the following statement of Bowley is of high importance, since with these remarks he directly pointed to his finding of a constant wage share and laid the foundations to what later should 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).

However, this quotation is not Bowley's first hint to the alleged constant long-run income distribution. Already in his important study on the development of income distribution in Great Britain that appeared in 1920, Bowley speculated about share constancy (cf. Bowley 1920, pp. 25). But only in *Wages and Income in the United Kingdom since 1860* (Bowley 1937) he was able to examine his guess in detail by using long-run data series. With this work Arthur L. Bowley became the first economist to explicitly formulate the thesis of the constant wage share. It is highly justified, therefore, that Samuelson chose Bowley as the one who gave this "law" his name. It should not be forgotten, however, that Bowley's empirical foundations for the constant wage share are of rather doubtful value.

Similar conclusions can be made for the studies carried through by Clark (1937), King (1930) and Kuznets (1937), especially concerning the way they calculated the national product (cf. Krämer 1996, pp. 79 and Krämer 2006, pp.154). Out of these four sources with all their different definitions and conceptions Kalecki assembled two tables about the development of the relative share 'of manual labour in national income' in Great Britain and in the USA. Furthermore, Kalecki modified the data in some important respects (cf. ibid). Because of the many difficulties he faced when constructing the national wage bill for both countries, he got in his own words not more than a "hypothetical wage bill" (cf. Kalecki 1939, p. 200). In doing this, Kalecki reached the result that the maximum value of the wage share in Great Britain was 43.7% (in 1931), whereas the minimum value was 40.7% (in 1911) (cf. table 1, p. 14).[28] For the USA, the maximum value of the wage share was

[28] Keynes was concerned about the compatibility of the data series of Bowley and Clark. In a letter to Kalecki, in which Keynes commented the blue prints of Kalecki's *Essays in the Theory of Economic Fluctuations*, Keynes asked whether he could use Bowley's value of the wage share for 1880 (41%) without modifications for a reprint of his *Economic Journal* article. In the editorial notes of Kalecki's writings editor Osiatynski (referring to Don Patinkin's notes) assumed that either Kalecki never answered Keynes' letter or such a letter was received by Keynes too late (cf. Kalecki CW I, p. 512). This assumption, however, is contradicted by the existence of the following footnote in Keynes' 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% ...

40.2% (in 1925; King's measurement including shop assistants; not in the table), whereas the minimum value was 39.3% (in 1923; Kuznets' measurement without shop assistants; cf. table 2, p. 15). Kalecki concludes his writing about the empirical part of his work in stating that the share of manual labour in national income is constant in the short-run and in the long-run and could therefore be called a kind of law, which has to be explained (cf. ibid.).

If one takes into account the many difficulties that existed in collecting reliable income data and the fact that many magnitudes were estimated with the help of some crude assumptions, it is highly questionable to follow Kalecki's reasoning. It was finally Keynes who facing Kalecki's studies 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, pp. 409).[29] As a matter of fact, many more studies on this matter were carried out later on. Therefore, only twenty years later a study of similar importance like Kalecki's work was published, namely Kaldor's influential paper. Before dealing with Kaldor's work we will look for chronological reasons at the dissemination of Bowley's Law in neoclassical analysis, since it took place at almost the same time as Kalecki's first work was published.

2. The constant wage share and neoclassical theory

" (cf. Keynes 1939, p. 409, fn 4). This stresses the fact that Kalecki although being aware of the problems tried to put together data from many different sources.

[29] 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 Kalecki from then on focussed on the analysis of the movements of the wage share in the business cycle.

In the textbook version of neoclassical growth theory, the use of a Cobb-Douglas production function together with the assumption of constant economies of scale, profit maximization and perfect competition implies a complete distribution of the product. Additionally, it follows from these assumptions that all income shares remain the same, whether it is on or beside the equilibrium growth path. Similarly, in the basic version of neoclassical theory of income distribution income shares do not vary when this production function is applied. Distribution cannot be changed due to endogenous factors. On the contrary, income distribution is determined exogenously and is equal to the production elasticities of capital and labour. Using a Cobb-Douglas production function it is equal to the exponents in this function and is therefore determined "technically".[30]

a) Paul Douglas

The "inventor" of the Cobb-Douglas production function, Paul Douglas, contributed mainly to the introduction of a constant wage share into the dominant version of neoclassical growth and distribution theory. Douglas' original intention was to create a production function that was capable of mirroring data series in the USA for the development of labour, capital and output. The application of the Cobb-Douglas production function on matters of income distribution was originally not in the focus of Douglas' research interests. According to Bronfenbrenner, it has been a subsequent idea concerning other fields of application of this type of production function (cf. Bronfenbrenner 1968, p. 478). It was not until his 1934 book *Theory of Wages* when Douglas mentioned functional income distribution more or less in passing. He estimated the production elasticity of labour between 60% and 70% and found a high correspondence with the existing wage share. It was the mathe-

[30] When using a CES production function with an elasticity of substitution not equal to one, the capital-labour-ratio will assert an influence on income shares. Income distribution is then determined by endogenous factors as well. However, it still holds that income shares are constant along the steady-state-growth path.

matician Charles Cobb who alerted Douglas to Euler's theorem and made clear to him that, with an elasticity of substitution of one, income shares would not be subject to changes. With this Douglas developed *en passant* and unintentionally a theoretical explanation for the constant wage share. This drew a lot of attention in the scientific community where Bowley's Law was widely accepted in the meantime. Douglas himself later described the genesis of the Cobb-Douglas production function (cf. Douglas 1967). This interesting report makes quite clear that there are some striking similarities between neoclassical theory and Newton's physical conception of the world, which also induced Douglas to search 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).

b) John Hicks

The elasticity of substitution played also a major role in a book which was published already in 1932 and had an almost identical title like Douglas' one: *The Theory of Wages* by John Hicks (1932). Hicks developed for the first time in a systematic fashion the mutual dependence between the elasticity of substitution, income shares and the bias of technical progress (cf. Rothschild 1994, pp. 66-68). This work laid the basic foundations for neoclassical share theory. Occasionally, Hicks has been accused of having had the explicit intention to build his theory in 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).

However, if one looks into the first edition of Hicks' book, one finds, contrary to the quotation given above, Hicks referring to Bowley's work from 1920.[31] In the latter 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 a way Bowley did himself in his later studies: Hicks subtracted the property received abroad and got therefore as his new values 34% for 1880 and 31% for 1913. This means that the profit share had shown a slight decrease in that period. Having his theoretical background and knowing that the capital-labour ratio had shown a historically increasing tendency, Hicks concluded that the elasticity of substitution in the real economy must be smaller than one and must also fluctuate in the course of time (cf. Hicks 1963, pp. 130). Therefore, when Hicks looked back later he asserted that the model developed by Douglas showed many similarities with his own, but

> "..[it] was in one respect a special model. He assumed that the elasticity of substitution between capital and labour 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 modelled.

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[31] 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).

c) Paul Samuelson

A major influence in the dissemination of Bowley's Law can be conferred to one of the most successful and influential textbook, Paul A. Samuelson's *Economics*. Last but not least it is important to know, because Samuelson coined the term *Bowley's Law* for the constancy of the wage share. [32] Samuelson wrote in his first edition of *Economics* from the year 1948 about the development of income shares:

> "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)[33].

Samuelson, however, showed already in the first edition of his highly influential textbook some scepticism concerning the principal validity of the law. [34] He stressed his reservations even more strongly in the fourth edition of his Economics:

> "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)[35].

d) Robert Solow

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:

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[32] The term *Bowley's Law* appears the first time in the 6th American edition of 1964 on page 736 (cf. Samuelson 1964a). In his first five editions Samuelson did not use this term, although he already referred to Bowley and his findings. About the same time as Samuelson did, Robert Solow used the term *Bowley's Law* in a talk he made at a conference on income distribution, which was organized in September 1964 by the *International Economic Association* in Palermo (cf. Solow 1968, p. 449).

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

[34] "... 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).

[35] In one of the later editions of *Economics* it reads as follows: "The share of wages and salaries in national income has edged up very slightly over the long run" (Samuelson/Nordhaus 1992, p. 555).

> "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).

Solow (1956) in his seminal paper on growth theory discussed in several passages the influence of different production functions on share distribution. He stressed several times that it is the very characteristics 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 researcher in his field. But 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 the single industries, rather than the constancy of the wage share in the long-run (cf. Solow 1958).

In concluding one finds that signs of mistrust as those discussed by Solow were very rare. In general, the vast amount of literature on neoclassical growth and distribution theory that appeared subsequently based implicitly or explicitly on the assumption of a constant income distribution. From the middle of the 1960s – that is ten years after Solow's (1956) and Swan's (1956) pioneering work and five years after Kaldor formulated his stilized facts – the notion of the constant wage share represented the general scientific standard in economic theory.[36] 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).

[36] "Distributive shares have been remarkably constant in most western economies ... the modern economist has almost ceased to wonder at Bowley's Law" (Drandakis/Phelps 1966, p. 823)

The last of the three important routes through which Bowley's Law came into distribution theory is therefore Kaldor's influential article. It has now to be discussed how Kaldor reached his conclusion of share constancy and on which empirical sources he relied.

3. The "Kaldor line"

Already at the beginning of his article *A Model of Economic Growth*, Kaldor (1957) listed some empirical findings that he regarded as essential for any convincing model of economic growth:

(i) Constant wage and profit shares in the long-run,
(ii) Capital-labour ratio and labour 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 (cf. Kaldor 1957, p. 260).

As mentioned earlier, this collection of empirical facts appeared again in a slightly elaborated version in Kaldor (1961) where it was named stylized facts. The concept, the content, and the methodological idea behind it found almost general acceptance in economics. This is why Kaldor's 1961 article is regarded here as one of the three major works in the history of economic thought that disseminated the notion of share constancy in economics. Kaldor presented this paper already in 1958 at the famous Corfu conference on capital theory. Since he did not carry out any empirical studies on his own, one has to scrutinize the empirical works Kaldor referred to in order to examine how reliable Kaldor's sources were. The main source Kaldor relied on in assembling his list of stylized facts for both his papers was work done by Phelps Brown and Weber published in 1952 in the *Economic Journal* (cf. Kaldor 1961, p. 2 and Kaldor 1957, p. 260). In what follows we will briefly scrutinize this study and the one it referred to.

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. For it was the very purpose of Phelps Brown and Weber to build up 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 as a measure for income shares ”earnings as a proportion of home-produced national income” (ibid., p. 266). According to their findings this variable was 55% between 1870 and 1914, rose to 66% until 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 means 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 rest as well. As is shown in detail in Krämer 1996 (pp. 89) the Bowley and Prest studies faced similar difficulties in constructing income categories, especially the national product.[37] The definitions vary in the course of time and a lot of guess work was necessary to reach final results. First of all, a major difference consists in the addition of salaries to the national

[37] As Prest admitted once (1948, p. 31): ”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 ... ”.

wage bill by Phelps Brown/Hart. Namely, salaries were not included by Bowley and by Kalecki. However, sometimes the income of shop-assistents was included by Bowley and Kalecki, and sometimes even the labour income part of self-employed, like e.g. shop-keepers, was not taken into account. Whereas Kalecki added depreciation to national income, Bowley and Prest did not. Therefore 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 a wage shares differed so substantially, that any comparison between is hardly possible.

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

Some of the difficulties the empirical studies faced in these times are of general nature with regard to income accounting. Other are of more specific nature and have to do with the calculation of wage shares. The general problems were found to be threefold[38]: 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, in many cases this was possible only after some far reaching assumptions and modifications. The special problems that existed

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

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 occurs unsystematically, when definitions of the numerator and the denominator of the wage share were changed. Additionally, definitions differ not only from author to author, but also the same researcher 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 labour 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 foundation 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 labourers. Amazingly enough, except one in no other of the historical empirical studies this factor of influence was taken into account and no attempt was made to modify the wage share in this respect.[39] Tables 3 and 4 provide an overview on how wage shares and relative (or: modified) wage shares (i.e. the wage share divided by the labour share at a given point in time) developed in the extended century from 1870 to 1985, as far as data are available. Despite all possible caveats, in the author's opinion it is quite unambiguously to realize that income shares vary also in the very long run.

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[39] It was only in Phelps/Brown and Hart (1952) that this factor was mentioned. The authors presented values for the change in the relative amount of workers in the total labour force in three big countries. However, although being aware of this influencing factor they did not calculate a modified wage share.

VI. Conclusions

Taking into account the important role the alleged constancy of income shares plays in the three most important strands of distribution theory one has to assert that Bowley's Law is based on rather shaky empirical foundations. Therefore, the validity Klein and Kosobud requested for any economic measure to be used by economic model builders as an empirical starting point is not given:

> "If ratios are in the nature of fundamental parameters, simplifications of the theory may result ... For theory construction, however, *our standards must be high* ... " (Klein/Kosobud 1961, p. 173; emphasis added).

The goal of this paper has been to demonstrate that the justified strong request of high standards in those empirical investigation which legitimated theorists to assume constancy of income shares in the long-run did not exist. Today we have to state that the validity of the historical studies on income distribution was too low to formulate a general law of income distribution, like Bowley's law. Together with the fact that in the last decades reality has proven that income shares fluctuate quite substantially also in the long-run, neoclassical, post-Keynesian and, with some notable exceptions, also Kalecki's distribution theory are unsuitably designed. It should be stressed that although at the starting point Kalecki followed Bowley's law, his theory of income distribution is open to variable income shares, since distribution is determined by exogenous factors like the degree of monopoly or the economic power of the socio-economic classes.[40]

Since major theories of macroeconomic income distribution still rest on the assumption of share constancy, it should be a challenge for today's distribution theory to develop a modern approach that no longer rests on an invalid assumption like Bowley's law.

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40 Cf. Sylos-Labini 1984; Krämer 1996, pp. 251, Hein and Krämer 1997, Hein 2008.

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