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De-Composition of the Labour Share of Income

The Development of Functional Income Distribution
in Selected Advanced Economies

The relative stability of the aggregate share of national income that goes to labor has acquired the condition of a "stylized fact" (Kaldor) of economic growth[1]. Indeed, recent empirical research has shown that labor income shares are subject to substantial changes over time.[2] In the G-7 economies the labor share of income has been declining on average over the past two and a half decades (see figure 1).
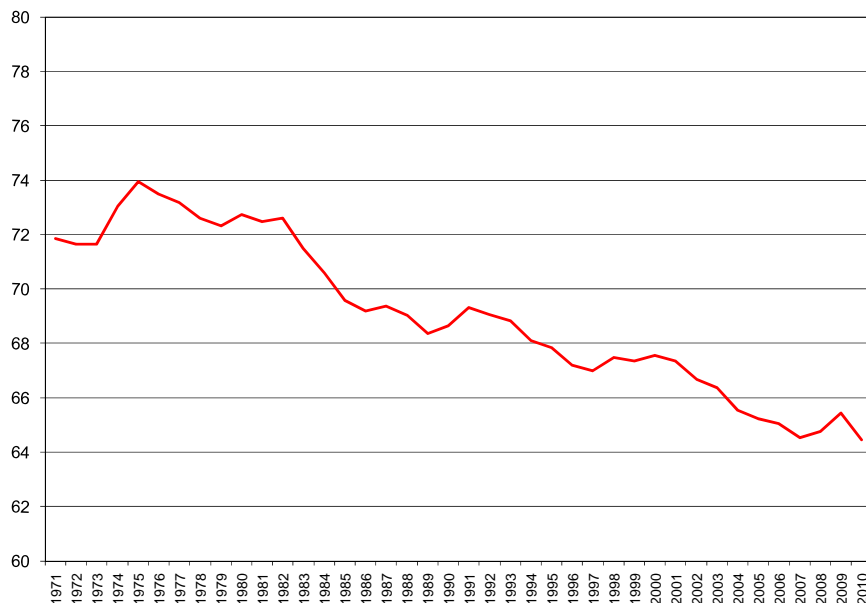

Figure 1: Development of labor share of income in G7-economies (weighted), 1970-2010

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[1] See for the history of economic theory about the assumption of shares constancy Krämer (2011a).

[2] 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 literature acknowledges the long-term decline of the labor income share. See for instance Bentolila, Saint Paul (2003), Bernanke (2007), Blanchard (2006), Orellana et al. (2005), de Serres et al. (2001) und Young (2006) as well as major economic institutions like BIS (2006), IMF (2007), EU-Commission (2007).

This paper summarizes and highlights some of the main results of a recently published study (Krämer 2011b). As can be seen in this study, not only in the G7-counties in general but in continental Europe as well as in the US the general picture shows a clear downward trend of the labour income share within the last 20-30 years. However, there are some cross-country differences in the behaviour of the labour share of income. In Germany and France the labour share peaks in the early 1980s, while in other countries like Austria and the Netherlands it does so in the mid-1970s. In some countries the decline is relative mild or even absent in the last decade (eg in France), while in others it shows a steady and rather strong decrease (eg in Austria). (cf. figures 2 and 3).
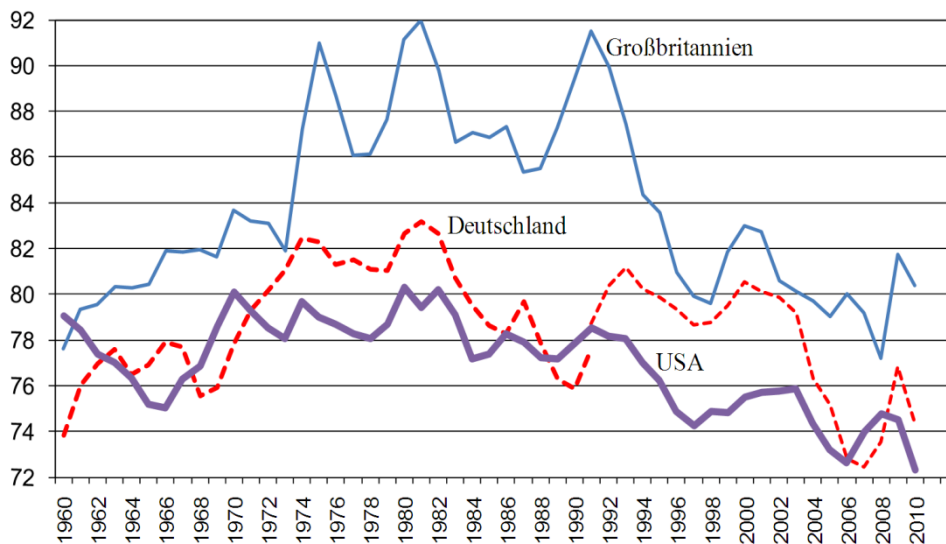

Figure 2: Labor share of income in selected economies I (UK, Germany, USA), 1960-2010

The study pictures recent developments of factor shares in selected advanced economies (Germany, France, UK, USA, Austria and the Netherlands) and presents a simple empirical approach to shed some light on the question why the labor share declined in the majority of countries looked at. Since in last ten years or so the decline in most countries has been rather strong, the paper focused on that period. Rather than giving a theoretical explanation for the declining shares the main objective is to identify what happened empirically in the first decade of the new century behind the scene.
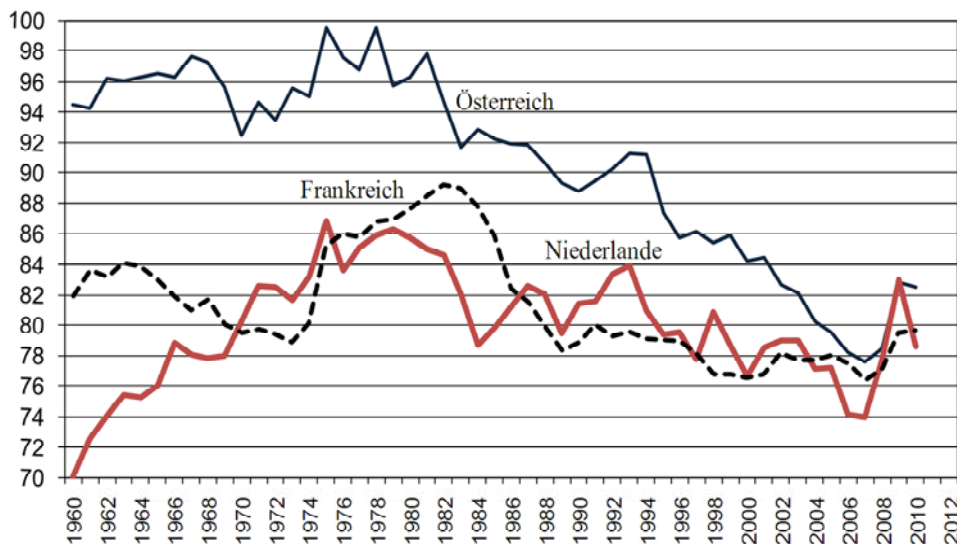

Figure 2: Labor share of income in selected economies II (Austria, France, the Netherlands), 1960-2010

In the first of the study part recent developments of factor shares in selected advanced economies are presented. However, instead of focusing on the wage share, ie the share of national income that goes to employees, a broader measure is used to overcome the problem of structural changes in the labour force and at the same time to account for all labor income. This broader measure helps to overcome two problems that occur when analyzing functional income distribution by using the "wage share". First, comparing the development of the wage share with the labor share of income reveals that in many countries there has been a stronger decline in the labor share of income than in the wage share, reflecting a reduction in the share

of other categories of workers in the total workforce (self-employed and family workers). Second, 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, a procedures suggested by Kravis (1959) (cf. Hein/Krämer (1997), Krueger (1999)). Labor compensation is hence the product of the compensation of employees (W) and the ratio of total employment (E) and employees (L). The labor share of income (λ^*) is then obtained by dividing labor compensation by valued added of the total economy (Y):

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

In empirical studies different statistical measures for the magnitude "value added" can be found. Usually this measure is defined as the sum of labour and capital income However, when defining the so-called "Adjusted wage share" the EU-commission in its Ameco database uses either GDP at market prices or GDP at current factor cost to define value added. Total labour including is therefore related to a measure of value added that besides labour and capital income (ie "Compensation of employees" and "Gross operating surplus") includes other magnitudes like depreciation, net taxes on production and imports and the like. Additionally, in both cases the domestic concept instead of the national concept is applied. As can be suspected, this alternative definition has an impact on the results: not only the absolute value but also the measured changes in income distribution differ when using other definitions of the labour share of income as the example of Germany illustrates (cf. figure 4).
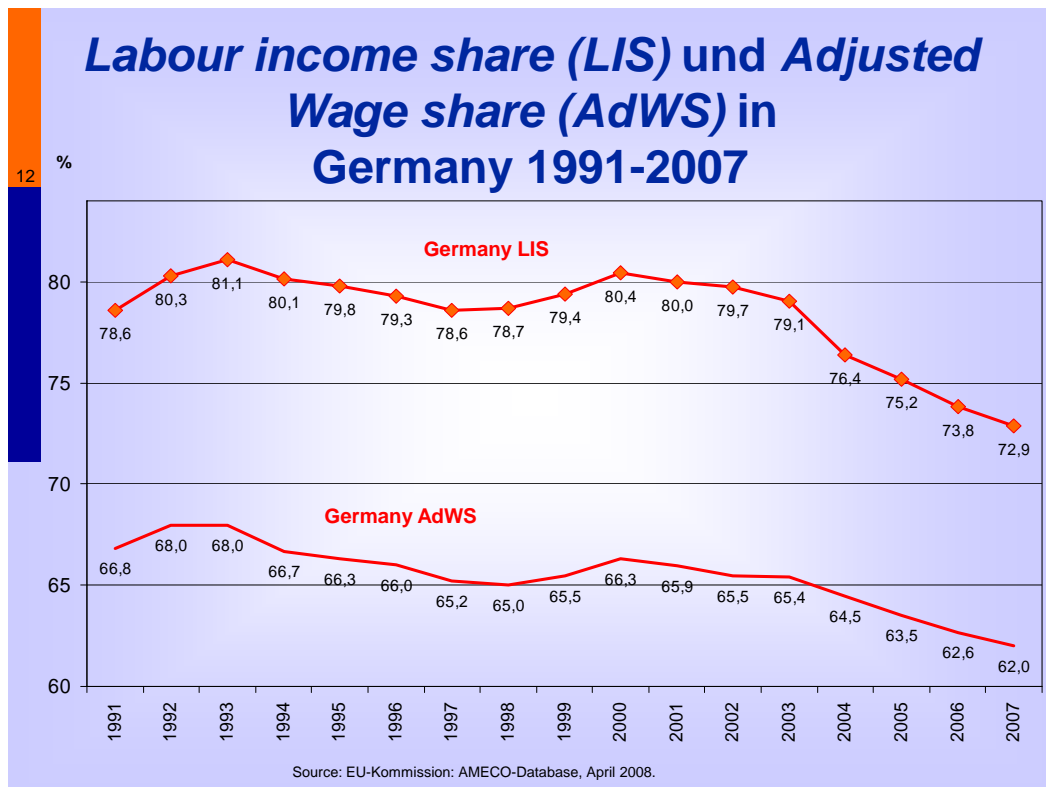
Figure 4: Labour income share (LIS) und Adjusted Wage share (AdWS) in Germany 1991-2007

Table 1 provides an overview over changes of functional income distribution in selected advanced economies using Ameco's "Adjusted wage share" in selected OECD-Countries in 1990-2008. With the exception of Portugal in all countries this measure declined within the 18 year period, in some cases quite substantially. There is no clear picture in which subperiod, 1990-99 or 1999-2008, the decline occurred. For instance, in Germany the decline was bigger in the second subperiod than in the first, whereas in Italy in was just the opposite. In what follows in the remaining part of the first section changes in functional income distribution are decribed and analyzed by using another definition of the labour share of income. Instead of relating labour income to GDP it is related to the sum of labour and capital income. The advantage is that changes in depreciation and net taxes on production and so on do not influence this measure of income distribution.

Table 1: AMECO's Adjusted wage share in selected OECD-Countries,1990-2008						
		Year			Change in %	
Country	1990	1999	2008	1990/ 1999	1999/ 2008	**1990/ 2008**
EU-15*	69.4	66.6	64.9	-2.8	-1.7	**-4.5**
Portugal	61.6	66.4	66.6	4.8	0.2	**5.0**
Switzerland*	72.1	73.1	71.6	1.0	-1.6	**-0.5**
USA	67.8	66.8	65.1	-1.0	-1.7	**-2.7**
France	67.9	66.7	65.2	-1.3	-1.5	**-2.7**
Netherlands	67.4	66.8	64.5	-0.6	-2.4	**-3.0**
Germany*	66.8	65.5	62.5	-1.3	-2.9	**-4.3**
Great Britain	74.3	70.7	69.7	-3.7	-1.0	**-4.6**
Italy	67.6	62.6	62.9	-5.0	0.3	**-4.7**
Sweden	72.5	67.2	67.6	-5.3	0.4	**-5.0**
Canada	68.8	65.9	63.1	-3.0	-2.7	**-5.7**
Ireland	66.6	56.7	60.6	-9.9	3.9	**-6.0**
Japan	70.2	70.5	64.2	0.3	-6.3	**-6.0**
Spain	68.3	65.7	62.0	-2.6	-3.6	**-6.3**
Finland	72.4	62.6	63.0	-9.7	0.3	**-9.4**
Norway	60.3	60.4	50.6	0.1	-9.8	**-9.7**
Austria	73.7	69.0	63.7	-4.7	-5.4	**-10.0**

*1991 instead of 1990.

Quelle: EU-Commission (2011). Ameco database, own calculations,
see Krämer (2011).

Based on this measure the six industrialized countries looked at can be gouped according to the extend of the decline of the labour share of income in the first decade of the new century (cf. table 2).

Table 2: Grouping of countries according to their labour income share developments in 1999-2010

Group	Change of labour income share in 1999-2010	Country
1	Strong decline	Germany, Austria
2	Mild decline	Great Britain, USA
3	No decline	Netherlands, France

In the second part of the study a simple empirical approach is be used to shed some light on the question why the labor share declined in the countries looked at. The main objective is to identify in some detail what happened empirically behind the scene, rather than giving a theoretical explanation for the declining share. The approach is as follows: Since the

labor share can be calculated by dividing aggregate labor income by labor productivity, changes in the labor share of income roughly result from changes in labor income per employee minus the rate of growth of labor productivity. If the rate of growth of labor productivity exceeds the rate of growth of the labor income per employee it follows that the labor share declines. In other words: the potential created by productivity growth has not been exploited fully for corresponding labor compensation growth; and vice versa.

In order to carry through a more detailed analysis the numerator and the denominator of the labor share of income will at first be expanded with the help of some tautologies. One reaches the following term:

$$\lambda^* = \frac{\dfrac{GWAS + SSC}{L} \cdot \dfrac{1}{P^{DD}}}{\dfrac{GNP^r}{E} \cdot \dfrac{P^{GNP}}{P^{DD}} \cdot \dfrac{GNP - D - (TPI - SUB)}{GNP}}$$

D: Depreciation (nom.), SSC: Actual plus Imputed Employer's Social Security Contributions; GWAS: Gross Wages and Salaries, GNP: Gross National Income (current prices), GNP^r: Gross National Income (constant prices), P^{GNP}: GNP-Deflator, P^{DD}: Price Deflator of Domestic Demand, TPI-*SUB:* Taxes on production and imports minus subsidies.

From this, several factors can be derived that determine the development of the labor income share over time:

The reference point for the analysis is a constant labor share of income. In that sense the first group of the defined factors determine the (neutral) scope of distribution, the second group of factors might then use that scope of distribution. If the factors that use up the scope of distribution exactly absorb what was created by the factors of the first group, then the labor share of income will not change. If the factors of the second group use up more (less) than was placed at the disposal by the factors of the second group, then the labor share of income (Λ) will increase (decrease):

$$\hat{\lambda} \approx \left(\hat{E}_6 + \hat{E}_7 + \hat{E}_8 - \hat{E}_9\right) - \left(\hat{E}_1 + \hat{E}_2 - \hat{E}_3 - \hat{E}_4 - \hat{E}_5\right)$$

Factors *using* the scope of distribution	Factors *determining* the scope of distribution
F_6 : Wage settlement factor F_7 : Working time factor F_8 : Wage drift factor F_9 : Deflator factor	F_1 : Productivity factor F_2 : Terms-of-Trade factor F_3 : Social contributions factor F_4 : Depreciation factor F_5 : "Tax" factor

Amongst the variables that determine the scope of distribution in a domestic economy are labor productivity (broadly defined), terms-of-trade, and so-called "cost-factors" (social contributions, depreciation, taxes and subsidies); the last factor having a negative impact on the scope of distribution. The distributional scope that was created by the factors of the first group can be used up in different ways: either it can increase settled wages agreed upon between trade unions an employer's federations or it can be used to reduce agreed working hours. Besides official pay hikes arranged in wage negotiations, compensation might also rise due to additional ("voluntary") pay by firms, if these firms want to pay more than the agreed minimum increase. If the pay rise is higher than the agreed pay increase, there is a positive wage drift. However, if this extra pay is reduced in later period a negative wage drift can also

occur. And finally, the increase of the price level will be considered as utilizing the distributional scope as well.
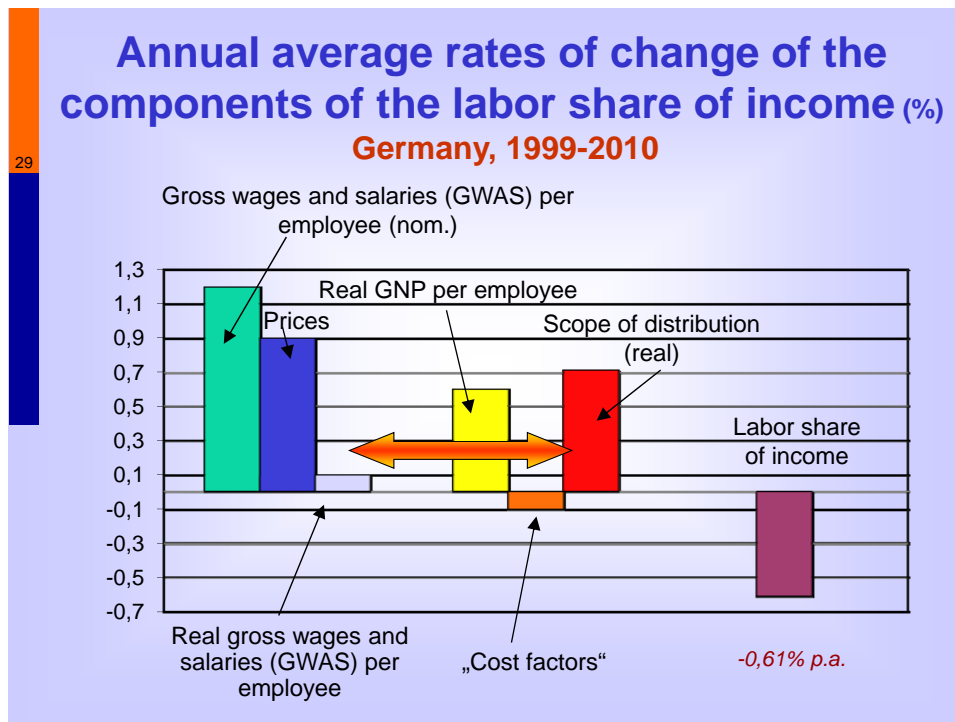

Figure 5: Annual average rates of change of the components of the labor share of incom, Germany, 1999-2010

In this way the developments of the labor share can by analyzed in detail by decomposing changes of the constituent factors that built the numerator and the denominator of the labour income share. The empirical development in Germany and the other five countries is scrutinized in greater detail in the periods 1999-2010, when this share in some of these countries decreased substantially. In the case of Germany, for instance, it could be shown that, although the scope of distribution shrank strongly between the two periods under consideration (the productivity slowdown since the mid 1970s being the most important reason for this decline), the usage of this already relatively restricted scope of distribution decreased even stronger: this period is characterized by a sluggish development of agreed compensation per employee plus by a negative wage drift (cf. figure 5).

In the final part of the study some considerations are made concerning the reasons behind these developments. Usually factors like biased technical change and globalization (see IMF 2007) or shocks from the demand or supply side (see Blanchard 1998) are made responsible for the declining labor share in income. Some authors address the influence of structural change on the statistically measured income shares (see eg de Serres et al. (2001), Krämer (2008)). Most studies in this field have focused on explaining the decline in the labor share of income of unskilled workers in the United States due to biased technical progress and globalization (see Freeman (1995) and Feenstra, (2004) for a survey). Studies that attempt to explain the evolution of the overall labor share are scarcer. Some of theses studies conclude that skill-biased technological change is a more important cause of wage inequality than trade (e.g., Harrigan, (1998), Harrigan and Balaban (1999)). Feenstra (2004, 2007) finds that the role of trade and technological progress are equally important in explaining rising wage inequality. In a recent contribution, Guscina (2006) finds that labor shares across countries are equally affected by technological progress and openness to trade (see IMF 2007).

However, the picture will not be complete if one does not take the declining influence and decreasing bargaining power of trade unions into account. Mainstream economic theory typically does not directly consider the change in the balance of power between trade unions and employer's federations, since it considers distributional issues as being determined by technological factors (production technology, elasticities of substitution of production factors etc). However, mass unemployment in most of the advanced economies and the effects of globalization clearly influence the conflict over the distribution of the product. Thus, a socio-economic approach is necessary to explain the marked changes that emerged in functional income distribution in most of the advanced economies over the past two decades.

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