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## **The impact of household capital income on income inequality – A factor decomposition analysis for the UK, Germany and the USA**

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**Keywords:** capital income, CNEF, factor decomposition, inequality

### **Abstract**

This paper analyses the contribution of capital income to income inequality in a cross-national comparison. Using micro-data from the Cross-National Equivalent File (CNEF) for three prominent panel studies, namely the BHPS for the UK, the SOEP for West Germany, and the PSID for the USA, we use the factor decomposition method described by Shorrocks (1982). The factor decomposition of disposable income into single income components shows that capital income is exceedingly volatile and that its share in disposable income has risen in recent years. Moreover, capital income makes a disproportionately high contribution to overall inequality in relation to its share in disposable income. This applies to Germany and the USA in particular. Thus capital income accounts for a large part of disparity in all three countries.

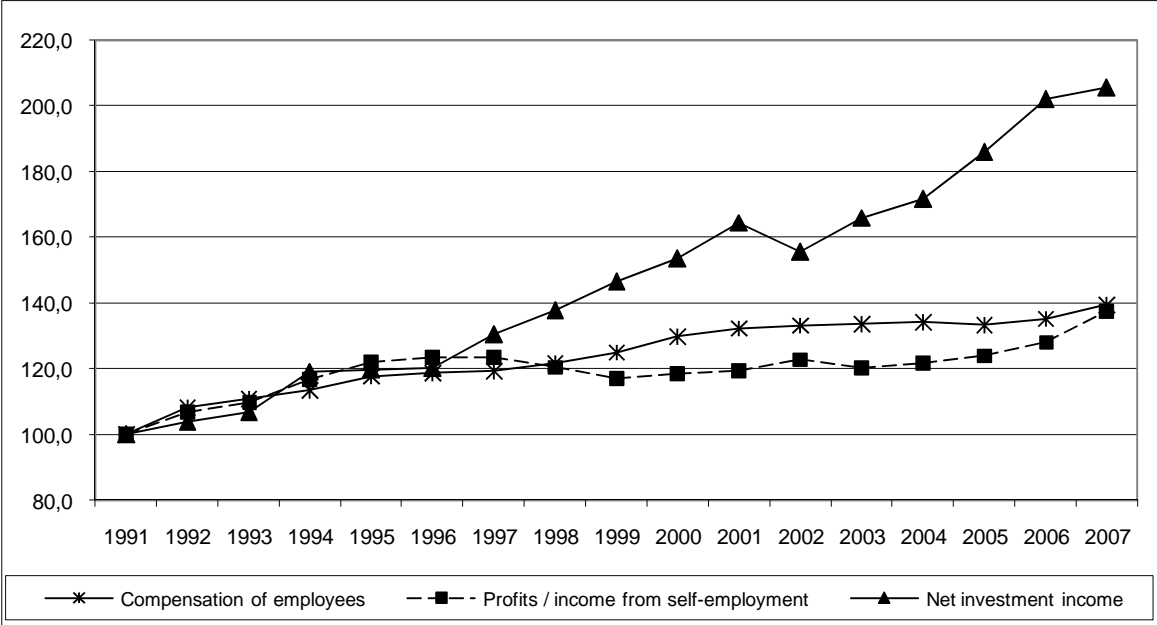
## **1 Introduction**

There is ample evidence in the literature showing a significant increase in income inequality since the mid-1970s in a wide range of OECD countries (e.g., Atkinson et al. 1995, Burkhauser et al. 2007, OECD 2008). While scholars agree on the existence of inequality, the question of its underlying causes still remains largely unanswered. Not only is the income distribution affected by demographic, political-structural, and labour market changes; it is also affected by individual components of household income that mirror these societal changes as well. The quantitatively most important sources of received income are wages and salaries, which have a distinct impact on inequalities in disposable income. One often-cited explanation for increasing wage inequality is that of “skill-biased technical change” leading to a wider spread in labour income (Bound and Johnson 1992; Juhn et al. 1993, Autor et al 1999).

Up to now, some evidence has been produced to show how other income components influence the personal distribution of income (see for instance Jäntti 1997, Jenkins 2000, Lerman and Yitzhaki 1985, O’Higgins et al. 1990, Schwarze and Frick 2000, Shorrocks 1983, Wolff and Zacharias 2009). Capital income is seen as playing an important role in this process. Compared to labour’s share in domestic income, capital income has gained in importance in nearly all OECD countries over the past 20 years (OECD 2008). While, for example, in Germany, compensation of employees increased by only about 40% between 1991 and 2007, net investment income more than doubled in the same period (see Figure 1). At the same time, we also see a levelling effect due to the strong link between capital returns and economic development and hence to current interest rates. Since the early 1980s there has been a trend toward

decreasing interest rates in most of the OECD countries, which might have limited the impact of capital income on overall inequality.

**Figure 1:** The development of income aggregates in the German System of National Accounts (SNA) (1991=100)



Source: own calculations based on SVR 2007/08.

There is also cross-country variation in the incidence and relevance of capital income (see Hedstrom and Ringen 1990). This is partly the result of different investment strategies. The Anglo-Saxon countries traditionally invest (more) money in the stock market, yielding a higher probability of increased capital gains and income from dividends than in corporatist countries like Germany. One might explain this general finding by different risk preferences (see, e.g., Hsee and Weber 1999), but differences between old-age insurance systems play an even more important role. Liberal systems like those in the USA and UK clearly facilitate the possibility to invest in private instruments. By contrast, in corporatist welfare regimes like Germany, the statutory pension insurance still is the main pillar of old-age provision for the majority of the population. Hence there is no clear-cut need for supplemental private coverage. Certainly the relatively comprehensive protection against income losses in old age is enabled by relatively high contribution rates, thus constraining the opportunity for private in-

vestments. Besides cross-country variation in the need for private investments, there are distinct within-country differences. In countries like Germany, civil servants are exempt from paying contributions to the statutory pension system.<sup>1</sup> However, when entering retirement, they obtain a pension financed by public funds, which typically exceeds the entitlement in the statutory pension insurance. This allows greater opportunities for private investments.<sup>2</sup> To cite another example, in contrast to the USA most of the self-employed in Germany are also exempt from statutory pension insurance. Thus self-employed people typically invest in the capital market as a means of old-age provision yielding more returns than dependent employees.<sup>3</sup>

Against the background of these institutional differences within and across countries, one might also expect different levels of returns from private investments and deviating effects on overall inequality. However, due to the significant reduction in benefits from the statutory pension insurance in nearly all corporatist countries, employees increasingly need to invest in alternative means of old-age provision. As a consequence of this reorientation of the public

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<sup>1</sup> Civil servants in the US and the UK are partly exempt from paying contributions to the pension system, here employers take over the financial responsibility.

<sup>2</sup> Frick and Grabka (2009) give also evidence that civil servants in Germany tend to have significantly more net worth than their counterparts contributing to the statutory pension insurance system.

<sup>3</sup> For a cross-national comparison of capital income, one should also think about differences in tax-favoured treatment of various assets and their returns. A prominent example are tax allowances on savings. While, e.g., in Germany this exemption amounted in 2001 to 3,000 DM for a single tax filer, the comparable value in the UK in 2001 was about £7,500. Tax exemptions for capital gains are also treated differently from one country to the next. In the UK, a tax exemption of £5500 for capital gains was set in 1992 and was raised over the years to £8800 by 2006, whereas in Germany this exemption was only 1000 DM in 2001. However, if the time-lag between purchase and disposition is more than 12 months capital gains are fully exempt from taxation. Capital losses can be charged against profits in the UK, Germany, as well as in the USA. If losses are in excess of capital gains in the US, up to \$3,000 per year can be deducted from taxes and the amount potentially exceeding this value can be transferred to the next year. Until 2003, a 20% tax was levied on long-term capital gains. Since then it has amounted to 15% and only 5% for the lowest tax brackets. A further example of cross-country differences is the promotion of private pensions. In Germany a so-called "Riester-Rente" was introduced in 2002, where all contributions to this pension plan can be fully deducted from taxable income, thus yielding an increasing portion of future income of the elderly in Germany. However, returns are subject to future income tax and contributions must not exceed 4% of a person's earnings. Finally one should also think about the property tax burden, which may affect an investor's decision. The share of property taxes and inheritance taxes in GDP varied in 1999 between 3.9% in the UK, 3.1% in the USA to only 0.9% in Germany (OECD 2000). Above and beyond the differences in tax-favoured treatment of assets and their returns in a particular year, one might also consider variations in taxation over time.

old-age insurance system, people generally receive greater benefits from investment income, although these will most likely be distributed in a rather unequal manner (see Antolin 2008).

The contribution of capital income to personal income inequality and the question of its role in increasing inequality have scarcely been examined up to now. It is to be expected that the share as well as the volatility of capital income has risen in the recent past and will rise in the future as well. If capital income is more volatile than other income components, the altering share of capital income could also provide an explanation for observable fluctuations in measured income inequality.

Given that capital income is more concentrated at the top of the income distribution, one may argue that a further increase in capital income also leads to an increase in inequality. On the other hand, wealth and derived capital income are more prevalent among the elderly, who are often found in the lower and middle quantiles of the income distribution. Due to demographic changes that are resulting in obsolescence and the increased importance of private retirement funds, this is having a levelling effect on the overall income distribution.

Past studies have dealt at least peripherally with the contribution of capital income to income inequality. According to Atkinson (2000), rising capital income, which he identifies in the shift from earned income to other income components and increased rates of return, can potentially influence the income distribution. Gottschalk and Smeeding (1997) explain the higher income shares at the top of the income distribution by increased capital income among other factors. O'Higgins et al. (1990) find that the average shares of property income in gross income are 5.8% in the USA, 2.7% in the UK, and 1.1% in West Germany. Furthermore, they examine the shares of the single income components in total income within the first to the

fifth quintiles, and find no significant difference between quintiles for property income in Germany or the UK, in contrast to the USA. Indeed the highest values appear in the highest quintiles of all three countries (see O'Higgins et al. 1990). Atkinson (1997) explains the four percentage point increase in the contribution of capital income to income inequality between 1973 and 1993 (from 7% to 11%) primarily on the basis of increasing private pension benefits, whose share he calculates to have doubled from 3% to 6%. He also believes this development resulted from rising interest rates at the beginning of the 1980s, their continued rise in the 1990s, and increasing dividend and share prices (Atkinson 1997). Jenkins (2000) addresses the issue of rising income from investment and savings in the UK and its increasing influence on inequality in the 1980s as well, arguing that the impact has not risen since the 1990s (see Jenkins 2000). The contribution of property income to inequality is also discussed by Jäntti (1997): he points out that although only 3% of income in the UK was property income in 1986, it was responsible for 10% of inequality. According to Jäntti, the 6% share of the income component even accounts for 18% of income disparity in the USA. Becker (2000) looks at the influence of single income components on inequality in Germany, comparing the years 1988 and 1993. She draws similar conclusions for Germany to those of Jäntti (1997) for the UK and the USA: although only around 5% of income was property income in 1988 and 7% in 1993, it accounted for approximately 14% and 18% of total inequality in these two years, respectively (see Becker 2000). Gottschalk and Smeeding (1997) emphasise that as a result of the rising correlation between high earned and high capital income, the inequality in market income increased in the UK in the eighties (see Gottschalk and Smeeding 1997). Franz (1997) also alludes to the fact that capital income contributes noticeably to total income and should hence be included in the inequality analysis.

The aim of this paper is to investigate the impact of capital income on the overall distribution of income in a cross-national comparison over a period of more than 20 years using three prominent panel surveys. In our examination of how inequality of capital income has developed in the USA, the UK, and Germany, we decompose disposable income into single income sources. We analyze, among other things, the relative and absolute contribution of capital income as well as the share of this income component in disposable income.

In Section 2 of the following, we define capital income. Section 3 describes the analytical framework for the empirical study, and outlines the method of inequality decomposition. In Chapter 4, we give an overview of our empirical analysis of the contribution of capital income to income inequality in the UK, Germany, and the USA. In Chapter 5, we summarise and discuss the findings.

## **2 The definition of capital income**

The analysis of the impact of capital income on overall income inequality is confronted with the problematic lack of a universal definition for this income concept. There are distinct differences in the definition of investment income—as the superordinate concept of capital income—in national accounts and income surveys.

In the system of national accounts (SNA), capital income is used as synonym for property income, and covers income derived from a resident entity's ownership of domestic and foreign assets. The most common types of investment income are income on equity (dividends, distributed income of corporations, branch profits, reinvested earnings, etc.) and income on debt (interest), as well as royalties and rent from land (less expenses). Renting houses or equip-



ment is regarded as a production activity, however, and the respective income received is treated as part of mixed income (as recommended in the 1968 SNA). Investment income includes the components direct investment income, portfolio investment, and other investment income (OECD 2007), and also covers income imputed to households from net equity in life insurance reserves and in pension funds.

Although income surveys typically try to pursue income concepts suggested by the SNA, there are some variations. One important difference is that income surveys typically do not distinguish between rent from land and income from rental housing or equipment, thus measuring income from all rental activities. An investment in real estate rather than in the capital market yields the same level of return for the investor, thus—if one intends to measure the economic situation of the individual household—a separation does not seem to be necessary from an income survey point of view.<sup>4</sup>

Another deviation in the definition of capital income is the consideration of imputed income from investments, e.g., in cash-value life insurance policies. While capital income attributed to insurance policyholders—i.e., the investment income receivable by insurance enterprises on insurance technical reserves—is shown in the SNA as being paid by the insurance enterprises to the insurance policyholders because the technical reserves are assets of the policyholders, this component is typically not collected and counted in income statistics. The annual return on this source is usually reinvested and thus, no actual payment of income occurs in the accounting period until the beneficiary becomes eligible or the contract period has expired.

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<sup>4</sup> This general problem also applies to the fictitious imputed rental value for owner-occupied housing. Again, in the SNA, imputed rents are counted as a production activity. If the same household had invested in the capital market rather than in real estate, a direct income flow of capital income would have been observed as part of the household's investment income. We refrain from considering imputed rent in a general measure of capital income in this paper, firstly to concentrate on monetary incomes only thus neglecting the methodological problems when deriving a fictitious return from imputed rent (see Frick and Grabka 2003) and secondly due to lacking information about imputed rent in at least one of the three surveys at hand.

Hence respondents are typically not aware or able to provide information about the periodic return on that investment. This is one reason why population surveys typically underestimate investment income compared to the SNA (see Atkinson 1996).

According to Smeeding and Weinberg (2001), it is advisable to extend the concept of capital income to private retirement pensions—as is done in the SNA—given that this income component represents an alternative investment in insurance instead of the capital market. Private pensions in the three surveys at hand include income from previous employers—such as defined benefit or defined contribution pension plans—annuities, and other private pensions.<sup>5</sup> While pensions from previous employers can be interpreted as deferred labour compensation, income from other private pensions such as annuities (cash-value life insurance policies) or voluntary pension schemes form an alternative investment in the capital market. The latter two are very common forms of old-age provision among the self-employed, e.g., in Germany. Some occupational pension schemes—at least in Germany—do also allow one to fill a pension account with voluntary contributions by an employee. It is difficult to extract the portion that can be attributed to capital income only. We therefore refrain from considering private retirement income in the concept of capital income, although this income component has also gained in importance in recent years. However, when applying the factor decomposition, we are able to give evidence about the impact of private retirement income on overall income inequality.

Capital gains or losses can clearly improve or impair a household's economic position and thus affect its economic behaviour. However, we refrain from considering capital gains in the measure of capital income in this paper, which is in line with the recommendations made by

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<sup>5</sup> In case of the PSID, this does also include income from Veterans' pensions.

the Canberra Group (2001: 28) and with the SNA. While earnings on capital (such as dividends) are counted as income from a SNA perspective, capital gains and losses are not. Capital gains are not regarded as the result of a productive activity that affects GNP or total household income, but as a change in the value of an asset, and thus are counted as increased net worth. Furthermore, households almost certainly consider capital gains as a form of implicit saving (Peek 1986 or Summers, Carroll and Blinder 1987).<sup>6</sup> However capital gains have an independent effect when looking at returns from property investments on overall inequality. According to Cannari et al. (2008) unrealised capital gains contribute about 40% to wealth variation in Italy. Wolff and Zacharias (2009) show that including capital gains in their extended income measure increases the importance of income from wealth and its share in inequality in the USA. Furthermore, income from wealth and its share in inequality decrease from 1982 to 2000 if capital gains are omitted whereas this result is reverse accounting for capital gains.<sup>7</sup>

The study by Piketty and Saez (2003) examines the inequality of top income shares in the USA. They show that including realised capital gains has increased the income share of the top percentile only slightly in the last decades (see Piketty and Saez 2001 for more detailed results). If this is true for the top income shares one can assume that the change would be marginal regarding the whole distribution. Summing up and taking into account that the three surveys under consideration lack any appropriate information about capital gains we prescind from including this aspect in our analysis.

### **3 Data and Methods**

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<sup>6</sup> According to Juster et al. (2005) the personal saving rate in the USA declined in a large part by reason of capital gains (cf. Smith 2001).

<sup>7</sup> However, information about capital gains which are used by Wolff and Zacharias (2009) are provided as experimental measures by the United States Bureau of the Census only.

The analyses in this paper are based on data from the Cross-National Equivalent File (CNEF, Frick et al. 2007), which is constructed by Cornell University in collaboration with DIW Berlin, ISER Essex, and StatsCan Ottawa. The CNEF currently contains data from six major panel surveys. Here we make use of three of them, namely the German Socio-Economic Panel Study (SOEP started in 1984, see Wagner et al. 2007),<sup>8</sup> the US Panel Study of Income Dynamics (PSID started in 1968, see Hill 1992),<sup>9</sup> and the British Household Panel Study (BHPS started in 1991, see Bardasi et al. 1999).<sup>10</sup>

The CNEF is designed to allow researchers to analyse the dynamics of income in an international context. Thus it contains information about household income and income components, socio-demographic variables and other labour market data (see Frick et al. 2007). Furthermore it provides some imputed variables that are not available in the original datasets—for instance, post-government income, tax estimations, and variables regarding the composition of households. To allow for comparison between countries, the variables are defined in as closely equivalent terms as possible. The income variables are measured on an annual basis, thus also including one-time payments such as 13<sup>th</sup>-month salary, Christmas bonuses, and income from interest and dividends. The CNEF is updated each year to include new surveyed data of all panels. This paper uses CNEF data from 1984 to 2005.<sup>11</sup>

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<sup>8</sup> For the following analysis, we focus on West Germany only, to assure long-term comparability as income information about East Germany is only available since 1992. Capital income still has significantly minor relevance in East Germany (Frick and Grabka 2009).

<sup>9</sup> All panel studies included in the CNEF survey information annually. However, interviews in the PSID have been carried out at two-year intervals since 1997.

<sup>10</sup> The other three panel studies are: the Canadian Survey of Labor and Income Dynamics (SLID started in 1992), data from the Household, Income and Labour Dynamics in Australia Survey (HILDA started in 2001) and the Swiss Household Panel (SHP started in 1999). Because of specific data access rules for the SLID data, we refrain from considering this survey in our investigation. In case of HILDA and SHP however, only few observation years are provided, thus not affording a long enough time series to analyze the impact of capital income. For more information about the CNEF see Frick et al. (2007).

<sup>11</sup> For the numbers of observations by country and analysis period, see Appendix.

Capital income in the three panel studies employed consists of gross income from interest, dividends, trust funds, and other assets.<sup>12</sup> It also includes income from rental activities (less expenses).<sup>13</sup> If respondents do not know the exact amount of capital income received, all surveys additionally ask for a rough assessment in several income classes.<sup>14</sup> Irregular income inflows like one-time transfers, winnings, inheritances, and gifts of money or items are not considered in the measure of capital income. As described above, imputed income from investments, e.g., in cash-value life insurance policies and income from private pensions are not considered in the measure of capital income in any of the three surveys. Information about capital income in all three surveys is collected at the household level for all household members. Thus it can be assumed that the information about capital income might be underestimated. This is especially true for multi-person households, where a reference person is most likely not able to rate all returns from all household members.<sup>15</sup>

Conventional definitions of income (e.g., those from the Canberra Group 2001 or from Smeeding and Weinberg 2001) are based on the so-called “full-income concept”, which includes monetary and non-monetary income, i.e., in-kind transfers and services are factored

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<sup>12</sup> Other property incomes such as royalties are not covered by the SOEP questionnaire. This income is also of very minor relevance in Germany.

<sup>13</sup> The yield on capital only includes positive capital yields. Interest expenses and capital losses, etc., are defined as consumption and are thus not included in the final outcome measure. Due to the specific way in which information about rental activities is collected in SOEP, there is a lower limit of zero; thus, possible losses from renting and leasing are not considered.

<sup>14</sup> The income classes used in the SOEP are defined as follows: lower than €250, €250 to 1000, €1,000 to 2,500, €2,500 to 5,000, €5,000 and higher; since 2003 the supplemental classes €5,000 to 10,000 and €10,000 and higher exist. These grouped data are converted into metric information by the CNEF data producers employing uniformly distributed random numbers within the classes. In case of item non-response, this information is imputed; for the German SOEP, see, e.g., Frick and Grabka (2005).

<sup>15</sup> Atkinson and Bourguignon (2000) discuss further problems and several factors that also hinder the collection of capital income data. They argue that in contrast to earnings, capital income is paid at irregular intervals, yielding more volatile information and thus impeding the ability to give valid answers. Moreover, according to Atkinson and Bourguignon, this income is often more virtual than real. Smeeding and Weinberg (2001) point out the problem of undervaluation of capital income, whereby inequality tends to decrease due to the decreasing incomes of households at the top of the distribution, which obtain relatively high capital incomes. Gottschalk and Smeeding (1997) argue similarly that the survey of capital income in annual income statistics is limited. All of these arguments also apply to the underlying data. However we refrain from a correction of capital income for the following analysis, since these systematic problems apply to all countries and for every point in time. Additionally there is no potential correction factor, given that investment income in the national accounts is partly derived as a residual.

into measuring welfare. The transfers in-kind considered in the CNEF are income advantages from owner-occupied housing (imputed rents).<sup>16</sup> However in the following, only monetary income is taken into consideration. The household disposable income or post-government income results from the sum of the following components<sup>17</sup>:

$$(1) \quad Y = E + C + R_{PR} + T_{PR} + \underbrace{T_{SO} + T_{PU}}_{\substack{\text{public} \\ \text{transferincome}}} - T .$$

The disposable income  $Y$  contains gross earnings from dependent employment and self-employment (E)<sup>18</sup>, capital income (C), private retirement pensions (R<sub>PR</sub>), private transfers (T<sub>PR</sub>), social security pensions (T<sub>SO</sub>), public transfer payments (T<sub>PU</sub>) and taxes and social contributions (T).<sup>19</sup>

For the decomposition analysis the half the squared coefficient of variation (HSCV), a member of the class of the generalised entropy measures, is used:

$$(2) \quad HSCV = \frac{C(y)^2}{2} = \left( \frac{1}{2n\bar{y}^2} \right) \sum_{i=1}^n (y_i - \bar{y})^2$$

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<sup>16</sup> According to Frick and Grabka (2003) imputed rent makes a considerable contribution to inequality. As this income component is no longer computed for the UK, it has to be left aside in this analysis although this source is embraced by the term of property income in some studies (see Becker and Hauser 2003).

Although imputed rent and capital income both show the same relevance as measured as the share of disposable income in Germany, the impact on overall income inequality is oppositional. While fictitious income from imputed rent slightly reduces inequality, capital income clearly increases overall income inequality. However, as shown by Frick and Grabka (2003) the method of deriving imputed rent can affect the relevance as well as the impact on overall inequality. However it can be shown that trends and on the whole even the level of capital income inequality does not change essentially, no matter whether imputed rent is taken into consideration or not.

<sup>17</sup> On the definition of income components, see Frick et al. (2007) or CNEF Codebooks. For the BHPS see Bardasi et al. (1999), for the SOEP see Grabka (2007).

<sup>18</sup> For reasons of measurement quality, income from self-employment is not embraced by the term capital income here.

<sup>19</sup> Our measure of disposable income is equalized using the square root of the household size to adjust for differences in household composition. Additionally, income is adjusted by price indices and purchasing power parities.

According to Shorrocks (1982) the relative contribution of an income component  $k$  to income inequality  $s_k$  results from the absolute contribution of that component to inequality  $S_k$  divided by total inequality  $I(y)$ :

$$(3) \quad s_k = \frac{S_k}{I(y)}.$$

Each function satisfying  $\sum_{k=1}^K s_k = 1$  can be characterised as a decomposition rule (see Shorrocks 1982). Under some assumptions an unambiguous decomposition rule can be derived, where the choice of the inequality measure has no effect on the relevance of the particular income sources (cp. Shorrocks 1982). This unambiguous decomposition rule is the “natural decomposition rule” of the *HSCV*, hence:

$$(4) \quad s_k = \rho_k \left( \frac{\overline{y_k}}{\overline{y}} \right) \sqrt{\frac{HSCV(\overline{y_k})}{HSCV(\overline{y})}}.$$

Therefore the relative contribution of the different income components to total inequality  $s_k$  depends on the correlation of the income source with total income  $\rho_k$ , the share of the income component in total income  $\overline{y_k}/\overline{y}$ , and the ratio of inequality of the income source to total inequality  $HSCV(\overline{y_k})/HSCV(\overline{y})$ .

#### 4 Empirical Findings

The Gini coefficients in Figure 2 regarding the disparity of capital income show that over time, capital income has been distributed more unequally in West Germany and the USA compared to the UK. In addition, it becomes apparent how much more unequally capital income is distributed than disposable income. The Gini coefficients for capital income take an

average value of 0.75 for the UK, 0.78 for the USA, and even 0.81 for West Germany.<sup>20</sup> The Gini coefficients on capital income for the USA exhibit a moderate ascent in the middle of the 1990s; those for the UK rise constantly and converge the other curves. The values measured for Germany vary less. Furthermore, the similar gradients of the country-specific curves suggest a high correlation between the particular inequalities of capital income and disposable income.<sup>21</sup>

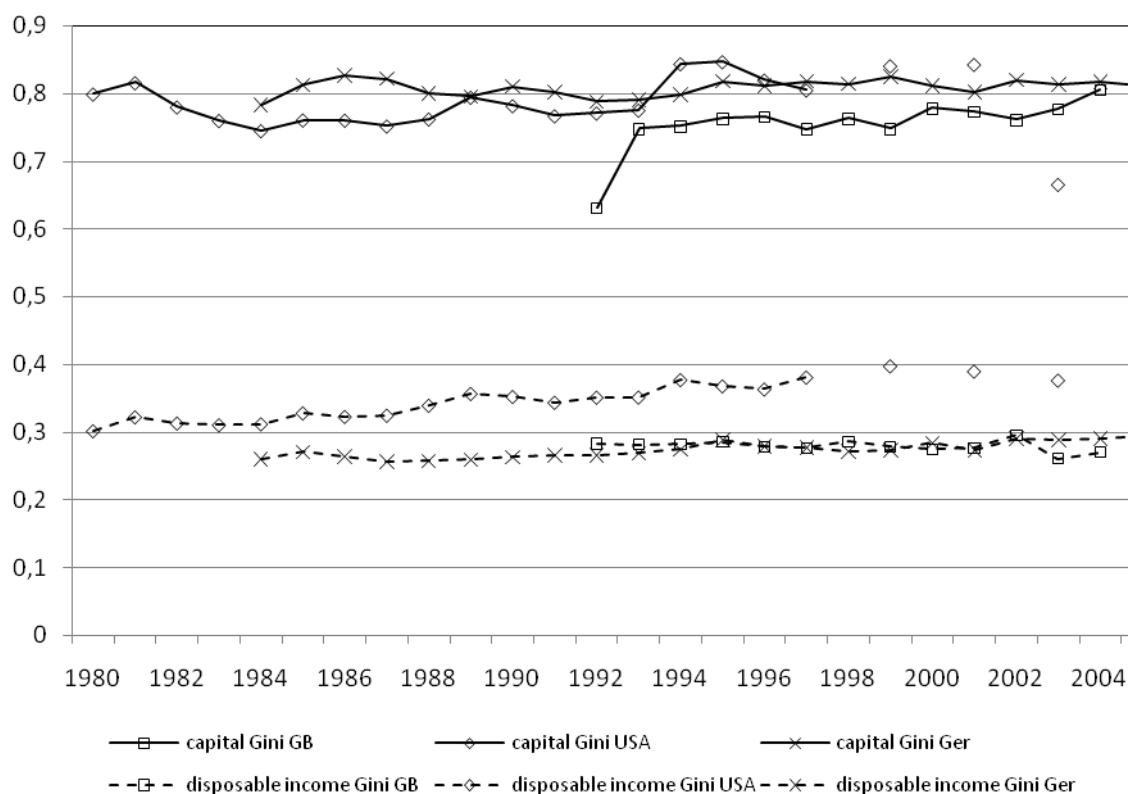
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<sup>20</sup> It must be noted that business cycles of the three countries contemplated here do not perfectly coincide. According to Burkhauser et al. (1997) it is advisable to compare trough to trough and boom to boom periods analysing inequality. This could impair the cross-country comparability of measures for single years. However, returns from capital investments do follow the developments in the stock market to a greater extent than the country specific business cycles in all three countries. This becomes clear when looking at the shrinkage of capital income as a share of disposable income after the Asian financial crisis or the burst of the new economy bubble after the year 2000.

<sup>21</sup> How intensive this interdependence actually is can be read off the coefficients of correlation. Their averages are relatively high for all three countries: 0.54 for the USA, and 0.43 and 0.46 for the UK and Germany, respectively. Indeed, the highest correlation becomes continuously apparent between gross income from employment and disposable income.



**Figure 2:** The development of inequality of disposable income and capital income measured by the Gini coefficient<sup>22</sup>



Source: CNEF, authors' calculations.

To assess in which part of a distribution inequalities occur, absolute and relative quantiles can be examined. Table 1 gives information about the composition of disposable income in the three countries in particular years in the bottom, middle, and top quintiles.

<sup>22</sup> It must be noted that for this analysis we do not apply a top coding or trimming of the underlying data, thus, outliers can in principle affect the results. However, unusual values are much more prominent in capital income than in other income types. Even a top 1% trimming does not affect the general picture of the results presented here.

**Table 1:** The share of the income components in disposable income in %

	UK 1992/2003				USA 1991/2001				Ger 1993/2003			
	<i>bottom quintile</i>	<i>middle quintile</i>	<i>top quintile</i>	<i>all</i>	<i>bottom quintile</i>	<i>middle quintile</i>	<i>top quintile</i>	<i>all</i>	<i>bottom quintile</i>	<i>middle quintile</i>	<i>top quintile</i>	<i>all</i>
<i>employment income*</i>	47.8 56.2	78.9 74.9	108.5 99.4	87.9 83.6	61.6 74.2	99.5 103.4	116.4 116.2	104.7 108.1	54.0 45.6	106.3 97.9	124.7 119.0	108.6 102.5
<i>capital income</i>	3.6 1.7	4.2 2.4	5.4 6.2	4.6 3.8	3.1 0.8	5.4 3.5	15.2 16.7	9.5 9.4	3.5 2.6	3.4 2.9	7.8 10.2	4.9 5.9
<i>private pensions</i>	3.0 4.0	5.9 7.1	6.9 9.2	6.1 7.8	3.5 3.5	6.5 5.3	4.9 3.8	5.4 4.3	1.5 1.7	1.4 2.1	2.1 2.1	1.4 2.0
<i>private transfers</i>	2.5 1.9	1.1 0.6	2.0 0.6	1.5 0.8	3.4 5.4	1.3 3.1	0.9 3.0	1.2 3.2	4.0 3.0	0.4 0.6	0.1 0.2	0.6 0.6
<i>public transfers &amp; social security pensions</i>	49.9 45.9	27.1 31.3	7.1 11.1	21.2 23.8	34.4 21.2	9.4 8.6	2.8 4.2	8.5 7.3	51.5 59.9	20.9 30.0	9.1 14.7	19.7 26.5
<i>Taxes and social contributions</i>	-6.8 -9.7	-17.1 -16.4	-29.8 -26.4	-21.3 -19.7	-6.1 -5.1	-22.1 -23.8	-40.2 -43.9	-29.3 -32.3	-14.4 -12.8	-32.4 -33.5	-43.8 -46.2	-35.2 -37.6
<i>total</i>	100	100	100	100	100	100	100	100	100	100	100	100

Source: CNEF, authors' calculations. Note: The values are rounded so that they do not sum up to 100 % in all cases. \* Includes income from self-employment.

It is noticeable that the composition of household income varies widely in the particular quintiles of the income distribution. The share of capital income in disposable income differs substantially within the countries and within quintiles. First of all, the share of capital income in disposable income is clearly the highest in the US, at roughly 10%, compared to about 5-6% in Germany and only about 4% in the UK. As expected, the highest values are found without exception in the top quintiles. Thereby capital income in the top quintile in all three countries gained in importance between the early 1990s and the first few years after 2000. The increases amount to approximately 10% in the USA, 15% in the UK and to more than 30% in Germany.<sup>23</sup> In the middle and the lower quintiles, however, capital income became less im-

<sup>23</sup> From other studies (e.g., Burkhauser et al. 2009) it is well known that the top one percentile in the US further increased their income share (of total capital income in particular). However, this could not be shown for the US with the PSID data, because it does not include a specific high-income sample. Although the top one percent of income earners might have a distinct impact on overall inequality not only in the US, we refrain from considering any high income sub-samples in this paper—like the sample provided by the SOEP—in order not to harm the cross-country comparability of our results.

portant. Furthermore, the shares of this income source decreased even more in the lower than in the middle quintiles. This is especially true in the US, where the share of capital income in the bottom quintile decreased from 3.1% to just 0.8%.

On the basis of Table 1, it can be stated that private pensions are of particular importance in the UK and that they gained in importance in all quintiles. The share of this income source decreased in the top and middle quintiles in the USA and increased in the lower and middle quintiles in West Germany. Against the background of the still-strong relevance of the statutory pension scheme in Germany, the lowest values for private pensions can be found here. However when comparing the relevance of private pensions in the two liberal countries, one can observe the by far much stronger relevance of capital income in the US. While in the USA in 2001 individuals received more than two times more returns from capital income than from private pensions—one alternative investment strategy for old-age provision—this ratio is reversed with again more than two times more returns on private pensions in the UK.

Hence, also regarding capital income in conjunction with private pensions, one can assume that the inequality of capital income has increased within all three countries. This result is consistent with the assumption of Piketty and Saez (2003) that capital income is of particular importance for the higher percentiles. Table 1 also reveals a shift from earnings to capital income as supposed by Atkinson (2000) for the middle and top income quintile in Germany and the top quintile in the UK. The same cannot be stated for the USA or the remaining British quintiles.

Table 2 exhibits relative quantiles relating to capital income measuring the p90/p10 ratio and the p80/p20 ratio, respectively. The p90/p10 ratio takes the highest values in the USA. In the

UK and West Germany, the quotient exhibits lower values with comparatively little variation. In the nineties, an increase in the ratio is found for all three countries. In the UK and West Germany, the p90/p10 ratio increased slightly for the most recent years, whereas in the USA a decrease in inequality for capital income was observed. The p80/p20 ratio is much more constant over the time than p90/p10 in all of the three countries. This suggests that the inequality of the capital income distribution is particularly affected by the extrema of the distribution. However this kind of inequality measurement disregards all other points of the distribution. Regarding the inequality of capital income, one can generally state that it has increased in Germany and the UK in reference to the extrema in recent years, but that the level in the USA is still higher.

Having gained insight into the distribution of capital income in the three countries, we now turn to the contribution of this income source to total inequality, which we will analyse in more detail. Figures 3 to 5 show the influence of single income components on overall disparity employing the decomposition of HSCV. Some components contribute negatively to the inequality of disposable income. Thus, the absolute contributions  $S_k$  of this kind of income take negative values. It becomes apparent that gross income from employment is the income component contributing most to the disparity of disposable income in all three countries. The absolute contribution of capital income to total inequality  $S_{capital}$  remains comparatively stable in the UK over time and averages out at 0.018. An unambiguous trend of the absolute contribution of capital income to disparity does not become apparent in the long run. Instead it shows episodic fluctuations that raise the level of the contribution only marginally. However, a short-run examination reveals that the absolute contributions of capital income to income inequality in the UK have increased in recent years. The German values average out at 0.03

and exhibit a rising tendency. The value of  $S_{capital}$  varies far more widely in the USA and is considerably higher there than in the other countries.<sup>24</sup>

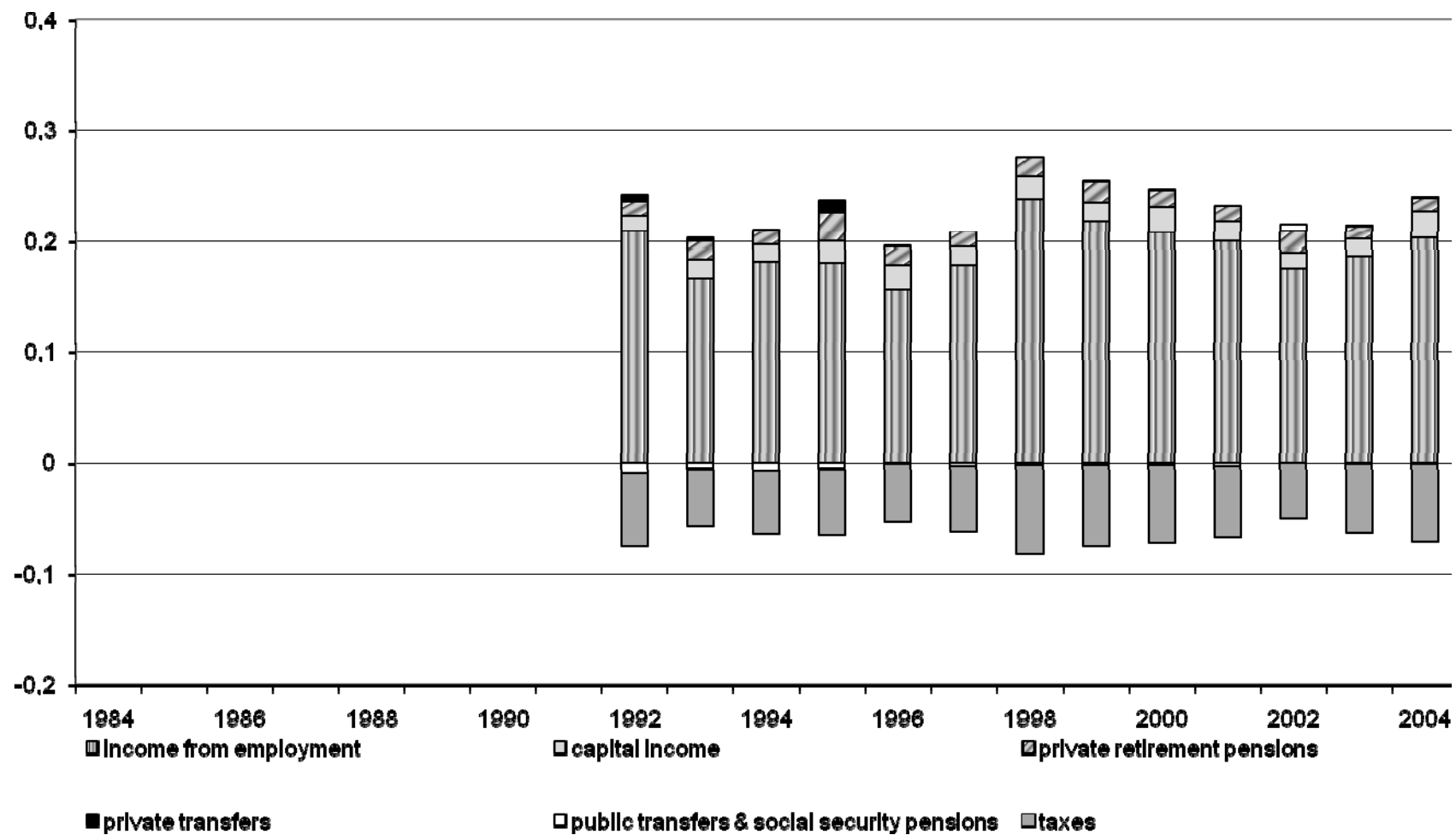
**Table 2:** Percentile Ratios of capital income for the UK, USA, and West Germany

	UK		USA		Ger	
	<i>p90/p10</i>	<i>p80/p20</i>	<i>p90/p10</i>	<i>p80/p20</i>	<i>p90/p10</i>	<i>p80/p20</i>
1985			5.24	3.99	4.16	3.39
1986			8.05	4.71	4.83	4.44
1987			9.14	2.63	2.98	2.98
1988			6.00	3.09	4.06	2.09
1989			5.15	2.73	3.81	3.32
1990			10.10	2.45	4.35	2.23
1991			6.51	3.14	2.29	1.49
1992	5.42	3.13	7.07	4.56	4.31	2.23
1993	6.74	3.30	7.30	2.54	4.72	2.72
1994	3.91	2.45	5.72	2.92	3.33	3.33
1995	3.73	2.50	7.15	3.60	3.36	2.51
1996	4.00	2.69	9.85	2.28	5.49	2.86
1997	4.56	3.26	8.33	2.95	4.96	2.17
1998	3.46	2.87			4.32	2.61
1999	4.24	2.42	8.42	5.40	2.19	2.19
2000	3.68	2.26			4.61	2.17
2001	2.90	1.93	7.52	3.64	3.20	2.09
2002	4.17	4.00			4.51	2.32
2003	4.62	3.39	5.85	2.60	4.83	3.44
2004	4.59	2.11			4.60	2.65

Source: CNEF, authors' calculations.

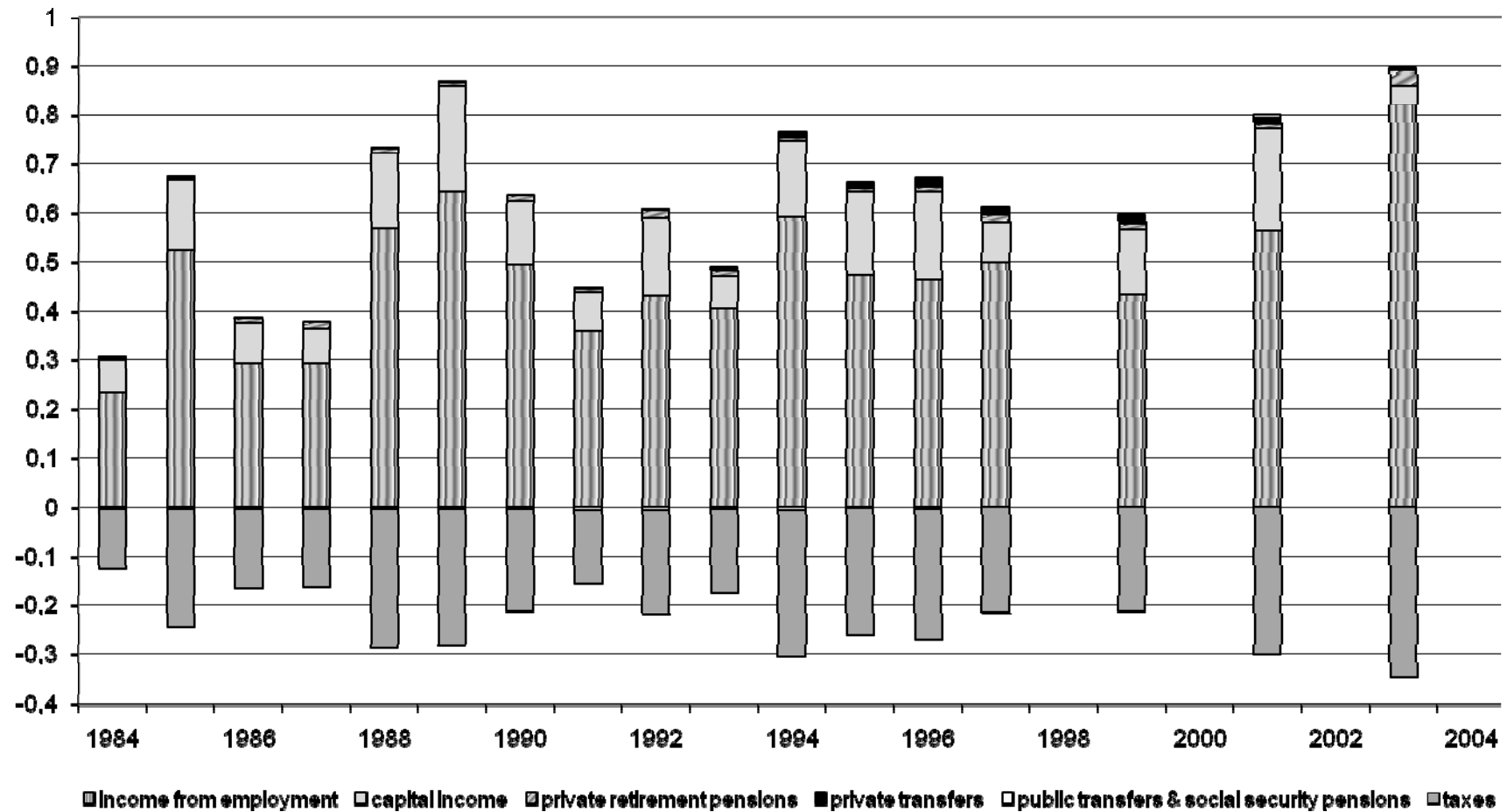
<sup>24</sup> A simple explanation for the higher fluctuation in the measures resulting from decomposition could be that capital income is of major relevance in the USA compared to the two other countries. It can be assumed that stocks make a bigger share of capital investments in the USA thus yielding more volatile returns.

**Figure 3:** The absolute contribution  $S_k$  of the particular income sources to inequality of disposable income in the UK 1992 to 2004



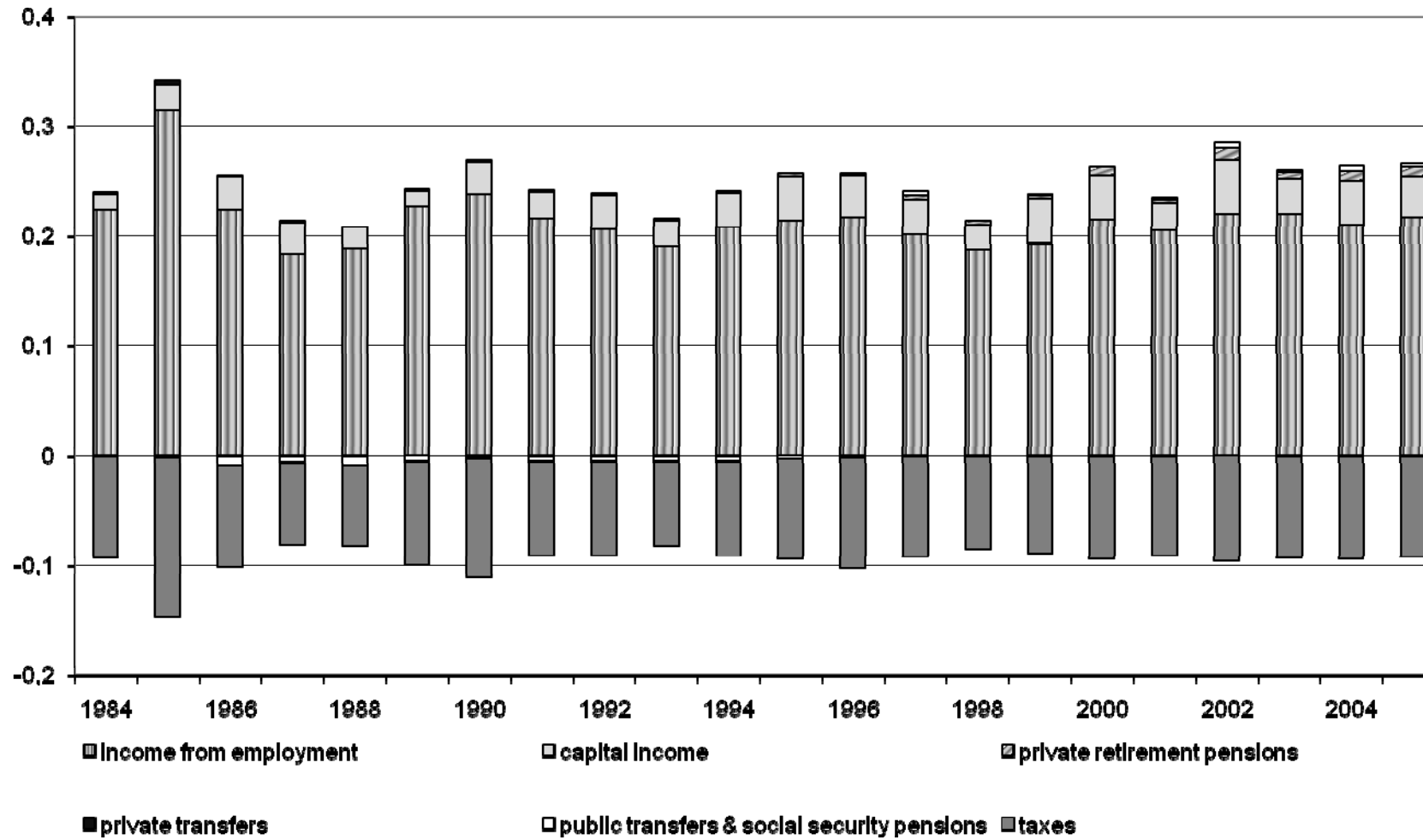
Source: CNEF, authors' calculations.

**Figure 4:** The absolute contribution  $S_k$  of the particular income sources to inequality of disposable income in the USA 1984 to 2003



Source: CNEF, authors' calculations.

**Figure 5:** The absolute contribution  $S_k$  of the particular income sources to inequality of disposable income in Germany 1986 to 2005

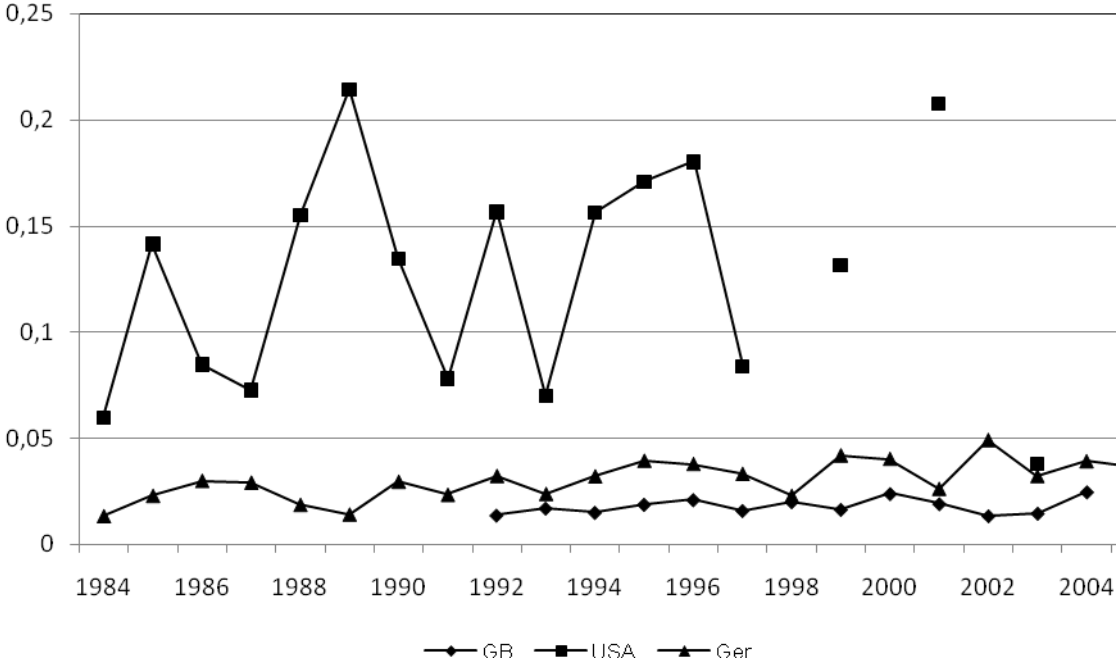


Source: CNEF, authors' calculations.



This becomes apparent in Figure 6 as well. The contribution of capital income to income inequality increased in the middle of the 1980s in Germany and the USA followed by a decrease in both. A similar pattern is seen at the beginning and middle of the 1990s. The values for the UK remain rather stable.<sup>25</sup>

**Figure 6:** The absolute contribution  $S_k$  of capital income to inequality of disposable income decomposing *HSCV*



Source: CNEF, authors' calculations.

On the basis of Table 3 it can be shown that the relative contribution of capital income to disparity is disproportionately high compared to its share in disposable income in all of the three countries, with the highest level and also the highest volatility for the USA. While the share of capital income in disposable income is only about 10% in the USA, the relative contribution to overall inequality on average more than tripled. The major difference between the values

<sup>25</sup> The country-specific curves resemble one another, independent of the choice of measure to be decomposed. In comparison to decomposing the Gini coefficient, the far higher fluctuations emerging from the decomposition of *HSCV* can be explained by its sensitivity to changes at the top of the distribution. Furthermore it can be assumed that the inequality of capital income is affected more strongly by the middle of the distribution in the UK than in Germany because when decomposing the Gini coefficient, a higher disparity of British capital income becomes apparent, whereas the decomposition of *HSCV* results in a similar level of disparity for both countries.

for 2001 and 2003 can be explained when looking deeper in the distribution of capital income for those years. While the change in the upper percentiles in the USA is rather slight, the values in the lowest percentiles decline considerably and almost ten times as many people as in 2001 suffer losses in 2003. Furthermore, the amount of capital income drops at the very top at the distribution.

**Table 3:** The relative contribution of capital income to inequality  $s_k$  and the share of capital income in disposable income in %

	UK		USA		Ger	
	<i>relative contribution of capital income to inequality <math>s_k</math></i>	<i>share of capital income in disposable income in %</i>	<i>relative contribution of capital income to inequality <math>s_k</math></i>	<i>share of capital income in disposable income in %</i>	<i>relative contribution of capital income to inequality <math>s_k</math></i>	<i>share of capital income in disposable income in %</i>
1984			32.6	11.1	9.1	2.5
1985			32.7	11.9	11.7	4.1
1986			37.7	10.7	19.3	4.4
1987			33.1	10.8	21.5	4.2
1988			34.6	9.9	14.5	4.0
1989			36.4	10.6	9.9	3.9
1990			31.4	10.1	18.3	4.4
1991			26.3	9.5	15.2	4.5
1992	8.0	4.6	40.1	9.2	21.4	4.9
1993	11.4	5.2	21.9	9.0	17.5	4.9
1994	10.1	4.7	33.8	9.7	21.0	5.4
1995	10.7	5.1	41.9	10.1	23.8	5.7
1996	14.4	5.6	44.1	9.5	24.2	5.7
1997	10.6	5.2	21.1	8.2	22.1	5.9
1998	10.2	5.4			17.4	5.2
1999	9.0	4.9	34.1	9.1	27.5	6.3
2000	13.4	5.5			23.7	6.1
2001	11.3	4.7	41.5	9.4	17.9	5.6
2002	8.0	4.1			25.7	6.4
2003	9.4	3.8	6.9	5.8	19.1	5.9
2004	14.3	4.5			22.7	6.2

Source: CNEF, authors' calculations.

The shares rise over time in all three countries, but show the strongest increase for Germany, with the USA in the middle and only a moderately small increase for the UK. The British values of  $s_k$  are relatively low compared to the share of capital income in inequality. Hence it

appears that particularly in Germany and the USA, the importance of capital income is disproportionately high compared to its share in disposable income, thus explaining the disparity.

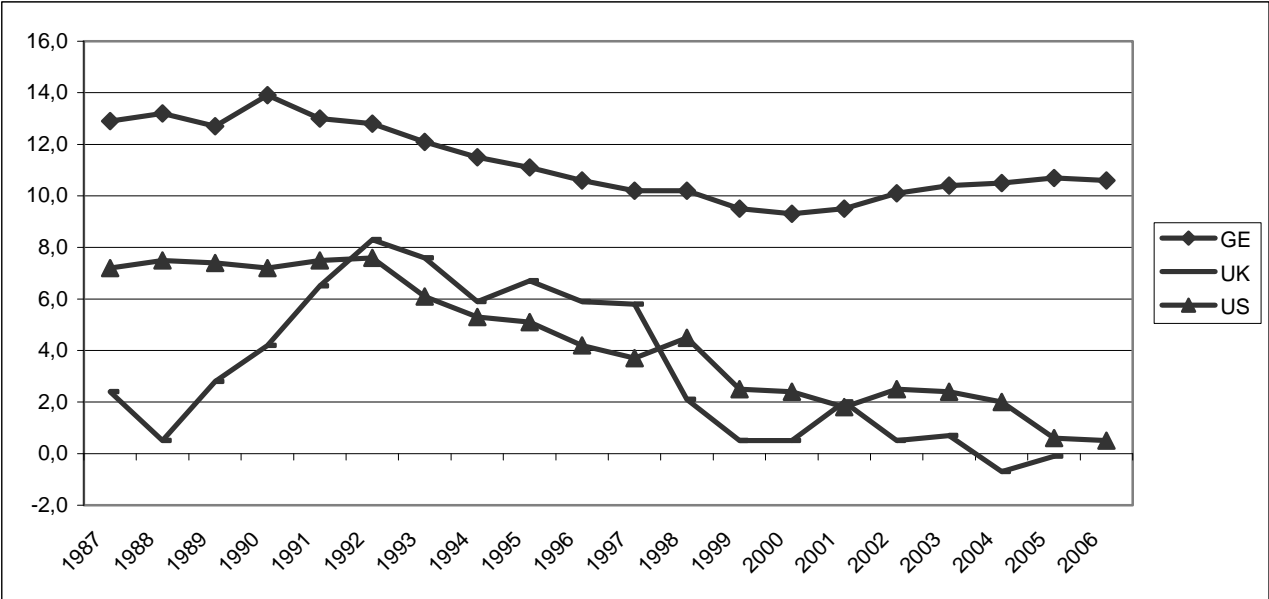
The findings for the UK and Germany are remarkable given that one would expect a much higher relevance of capital income to overall inequality in a liberal country than in a corporatist country such as Germany. On the one hand, there is the tradition in liberal countries of investing more in the stock market, and on the other, there is also a need to accumulate more assets given that the public pension system is typically not as generous as in conservative or social democratic countries. However, institutional differences may account for the fact that the returns from private investments are more unequally distributed in Germany than in the UK: in Germany specific subgroups—such as self-employed persons or civil servants—have better opportunities for wealth accumulation, thus yielding much more returns than standard dependent employees (Frick and Grabka 2009).

## **5 Discussion**

Although capital income is influenced *inter alia* by interest rates specifically or by the economic situation more generally, the trends in capital income and its role in the development of disposable income inequality can only partly explained by these factors. Only for the USA is there a somewhat clearer link between economic development and capital income. The recession of 1990/91, the Asian financial crisis of 1997, and the burst of the new economy bubble in 2001 in particular had a levelling effect on overall inequality as measured by the Gini coefficient and HSCV. This development can also be reproduced using the absolute and relative contribution as well as the share of the particular income component in disposable income. It can be stated that the relative and the absolute contribution of capital income to income ine-

quality caused a rise in prosperity and a decline in depression. The same is true for the share of this income component in disposable income. However this explanation seems not to bear out for the UK, and particularly not for Germany. Although the general economic development dragged behind the USA and the UK and interest rates on average declined in Germany over the last decade, capital income has clearly gained in importance, and also the relative contribution to inequality clearly exceeds that of the UK. Thus it can be assumed that other factors led to this development in Germany. One potential explanation might be higher saving rates. Germany's ratio has nearly always been above 10% over the last two decades while those in the USA and in the UK fell almost continuously since the early 1990s from about 8% to less than 1% in 2005 (see Figure 7).<sup>26</sup>

**Figure 7:** Household net saving rate – as a percentage of household disposable income



Source: OECD Factbook 2008: Economic, Environmental and Societal Statistics.

Having said that, high-income earners tend to have better opportunities to save and accumulate wealth, thus getting more returns than low or middle-income earners. This might be one

<sup>26</sup> Intergenerational models of saving include the possibility of bequests and gifts (Davies and Atkinson 2000). Thus the relation between capital income and intergenerational income mobility seems likely.

factor explaining why the share of capital income in disposable income as well as the relative contribution to overall inequality increased most strongly in Germany. It can be assumed that capital income will become even more important in Germany when more and more employees are forced to invest in private pension plans (such as the recently introduced “Riester” pension) due to the reductions in the benefits provided under the statutory pension insurance, or to invest directly in the capital market.

However it has also been shown that the volatility of capital income has increased as well, particularly in the US. Since capital income is more volatile than other income components and its inequality exhibits a quite similar course to the inequality of disposable income, it can be held liable for a large part of the disparity. The fact that a higher share of capital income is usually accompanied by higher inequality suggests the same.

Regarding the contribution of capital income to income inequality in the USA, Germany, and the UK the following can be summarized: in all three countries, this income component makes a disproportionately high contribution to inequality in relation to its share in disposable income. This applies to Germany and the USA in particular. The absolute as well as the relative contributions of capital income take the highest values for the USA, as expected, where they vary the most widely. It is remarkable that the relative contribution of the income component is considerably higher in Germany than in the UK although the British absolute contributions are only slightly lower than the German ones and the shares of capital income in disposable income in Germany are only slightly in excess of those in the UK. In comparison to the USA, capital income contributes relatively little to inequality in the UK as well. This result is remarkable insofar as it was assumed, due to the comparable incentive structures in liberal welfare regimes such as the UK and the USA, that capital income plays a more impor-

tant role in inequality in those countries than in Germany. Less surprising is the rather dominant role of capital income in income inequality in the USA.

Thus the contribution of capital income to income inequality can be considered as substantial. However the results of this analysis cannot be seen as complete. To be better able to judge the extent to which capital income influences disparity, macro-economic conditions and their impact on capital income must be examined in detail. Furthermore, the concept of monetary capital income should be extended to imputed income components such as fictitious returns from owner-occupied housing, given that if the same household had invested in the capital market rather than in real estate, a direct income flow of capital income would have been observed as part of the household's investment income.<sup>27</sup> Additionally it might be worthwhile to extend the measure of capital income used in this study to income from private pensions. However, up to now, the three panel studies do not facilitate the analysis of this component given that income from occupational pensions (as a type of deferred labour compensation) and income from private pension plans are subsumed only. The consideration of private pensions in the measure of capital income would also support cross-country comparability given that different welfare regimes promote different investment strategies that are not fully reflected by the measure of capital income provided by the three surveys.

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<sup>27</sup> Frick and Grabka (2003) have shown that imputed rents had a levelling effect on inequality, given that elderly people profit the most from debt-free owner-occupied housing. Although both income concepts show nearly the same share in disposable income, the overall inequality-increasing effect is clearly dominated by monetary capital income.

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## Appendix:

**Table A1: Number of observations by country and analysis period**

	<b>UK</b>	<b>USA</b>	<b>Ger</b>
<b>1984</b>		7927	15158
<b>1985</b>		7972	13607
<b>1986</b>		7876	12938
<b>1987</b>		7911	12719
<b>1988</b>		7913	12067
<b>1989</b>		7846	11667
<b>1990</b>		7929	11443
<b>1991</b>		7935	11397
<b>1992</b>	9459	8002	11326
<b>1993</b>	9029	7942	11212
<b>1994</b>	9057	7923	11019
<b>1995</b>	8816	8201	11756
<b>1996</b>	9109	7948	11461
<b>1997</b>	9087	9735	11228
<b>1998</b>	8892		12554
<b>1999</b>	8753	9819	11998
<b>2000</b>	8622		22122
<b>2001</b>	8513	9645	19975
<b>2002</b>	7954		18791
<b>2003</b>	8161	9762	18045
<b>2004</b>	7967		17428
<b>2005</b>			16621

Source: CNEF, authors' calculations.