ISSN 2042-2695

CENTRE *for* ECONOMIC PERFORMANCE

CEP Discussion Paper No 1246

October 2013

Decoupling of Wage Growth and Productivity Growth? Myth and Reality

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E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Abstract
It is widely believed that in the US wage growth has fallen massively behind productivity growth. Recently, it has also been suggested that the UK is starting to follow the same path. Analysts point to the much faster growth of GDP per hour than median wages. We distinguish between "net decoupling" – the difference in growth of GDP per hour deflated by the GDP deflator and average compensation deflated by the same index - and "gross decoupling" – the difference in growth of GDP per hour deflated by the GDP deflator and median wages deflated by a measure of consumer price inflation. We would expect that over the long-run real compensation growth deflated by the producer price (the labour costs that employers face) should track real labour productivity growth (value added per hour), so net decoupling should only occur if labour's share falls as a proportion of gross GDP, something that rarely happens over sustained periods. We show that over the past 40 years that there is almost no net decoupling in the UK, although there is evidence of substantial gross decoupling in the US and, to a lesser extent, in the UK. This difference between gross and net decoupling can be accounted for essentially three factors (i) compensation inequality (which means the average compensation is growing faster than the median compensation), (ii) the wedge between compensation (which includes employer-provided benefits like pensions and health insurance) and wages which do not and (iii) differences in the GDP deflator and the consumer price deflator (i.e. producer wages and consumption wages). These three factors explain basically ALL of the gross decoupling leaving only a small amount of "net decoupling". The first two factors are important in both countries, whereas the difference in price deflators is only important in the US.

Keywords: Decoupling, Wages, Productivity, Compensation, Labour Income Share
JEL Classifications: E24, J20, J30

This paper was produced as part of the Centre's Productivity and Innovation Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

Acknowledgements
This work has been funded by the Resolution Foundation and the ESRC. Helpful comments on earlier drafts have come from Jared Bernstein, Gavin Kelly, Stephen Machin, James Plunkett and other participants at the LSE/Resolution Foundation seminar.

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Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

I. Introduction

It is widely believed that in the US wage growth has fallen massively behind productivity growth. Recently, it has also been suggested that the UK is starting to follow the same path. Analysts point to the much faster growth of GDP per hour than median wages. The purpose of this paper is to look at the decoupling between wages and productivity in the UK and compare this with other countries, in particular the US. We do this by defining what is meant by decoupling and then examining trends in these variables between 1972 and 2010.

We distinguish between "net decoupling" – the difference in growth of GDP per hour deflated by the GDP deflator and average compensation deflated by the same index - and "gross decoupling" – the difference in growth of GDP per hour deflated by the GDP deflator and median wages deflated by a measure of consumer price inflation (CPI-U-RS in the US and RPI in the UK). Basic economics would predict that real compensation growth deflated by the producer price (the labour costs that employers face) should follow real labour productivity growth (value added per hour), so net decoupling should only occur if labour's share falls as a proportion of gross GDP, something that rarely happens over sustained periods. So net decoupling would be a real surprise.

We show that over the past 40 years that there is almost no net decoupling, although there is evidence of substantial gross decoupling in the US and, to a lesser extent, the UK. This difference can be accounted for essentially by three factors (i) compensation inequality (which means the average compensation is growing faster than the median one), (ii) "benefits" - the wedge between compensation (which includes employer-provided benefits like pensions and health insurance) and wages which do not and (iii) differences in the GDP deflator and the CPI-U-RS/RPI deflator (i.e. producer wages and consumption wages). These three factors explain basically ALL of the gross decoupling leaving only a small amount of "net decoupling". The first two factors are important in both countries, whereas the difference in price deflators is only important in the US.

This is illustrated in the figure below for the UK. Looking at the 1972-2010 period as a whole productivity grew almost 42.5% faster than median wage – this is "gross decoupling". But there was almost zero net decoupling (the blue bar at -0.8%). The diagonally hatched bar and the dotted bar are inequality (a 16.6% contribution) and "benefits" (a 16% contribution) which explain just about all the divergence between gross and net decoupling. Benefits are

the difference between compensation (which includes health and pension benefits) and wages which do not.

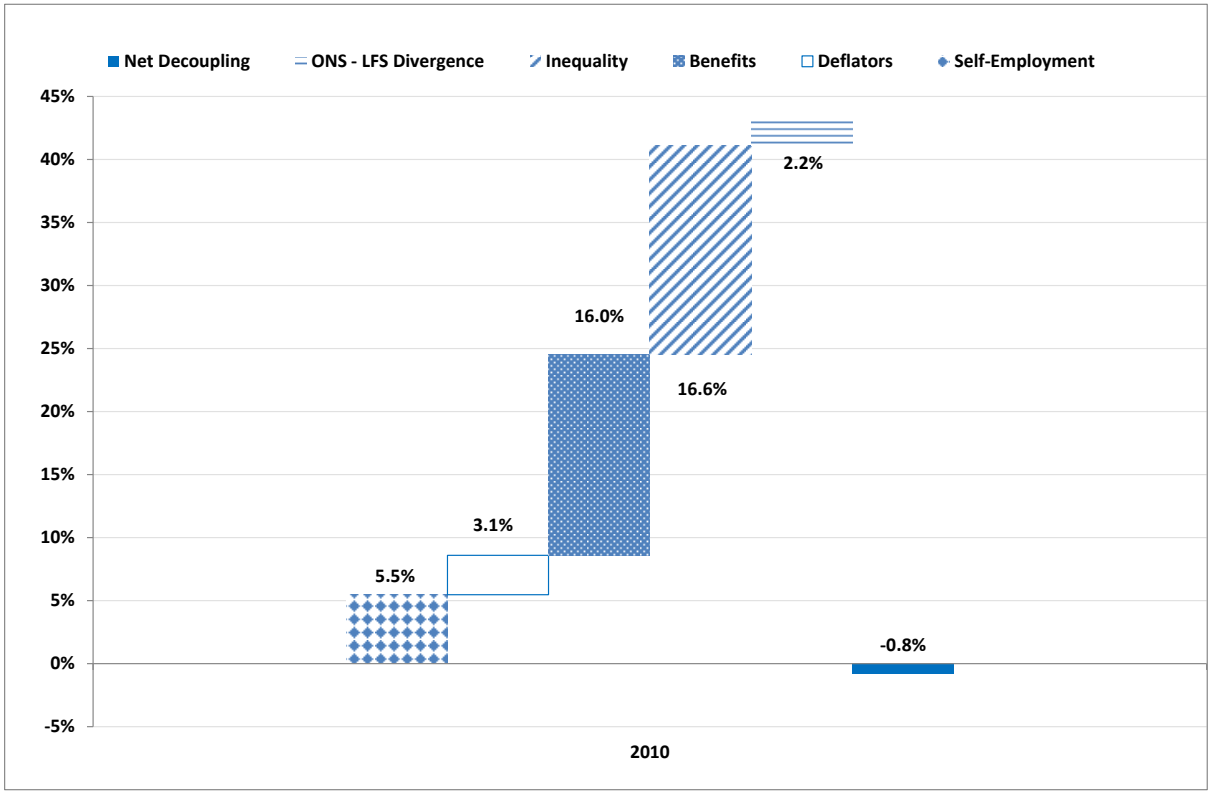

Figure 1: Decoupling Decomposition in the UK, 1972-2010

We also look at the share of labour in national income as a cross check. These trends are consistent with our analysis. Labour's share has fallen only slightly as a share of GDP in the US and UK. Interestingly, there is more of a fall in this "functional" share of income in Continental EU nations and Japan, so there might be evidence of capitalists doing a lot better than workers in these nations whereas the latter group have done a lot better in the US and UK.

Although we focus at the macro level we also analyse trends in productivity and wages at the industry level. Again, we find no evidence of net decoupling here except (paradoxically) in the "non-market" sectors of real estate, health, education and public administration. We suspect this is because of poor measurement of value added in these sectors. In other sectors ("the market economy) compensation growth has tended, if anything, to outstrip productivity growth.

In terms of policy, there has been a lack of clarity over what specifically is meant by decoupling. Our results suggest that net decoupling is essentially a myth and cannot be used to justify redressing the overall balance between wages and profits. Inequality within the group of employees however, is a major issue and the existing literature has been correct to focus on the causes of this and what could be done to improve matters. Improvements in the quantity and quality of skills and education for people in the bottom half of the distribution are the most important.

In terms of research questions, we need to understand a lot better why there is divergence between the wage series and compensation series. In the US this is driven by the rapid inflation in healthcare insurance costs, something that healthcare reform is seeking to tackle. This is not the case in the UK where pension costs seem to be more of the dominant force. Of course, the underlying reasons for the growth of wage inequality, especially the recent polarization of the labour market remain very important research topics.

The structure of this report is as follows. Section II examines the theory of decoupling, section III looks at decoupling in the UK and section IV looks at decoupling in the US. In section V we turn to examine labour's share of GDP across many countries so we can see the UK and US in comparison with other OECD nations. Finally we return to the UK to look at industry-level trends in wages and productivity in Section VI. Sections VII and VIII draws some conclusions for policy and for future research.

II. "Decoupling Theory"

Decoupling has had no precise definition, but loosely it refers to the difference between wages and productivity, or rather the idea that wage growth is substantially lagging behind productivity growth. Appendix A shows what we would expect from some basic economic relationships.

We define the notion of **Net Decoupling** (ND) as the difference between the growth of GDP per hour (labour productivity) deflated by the GDP deflator and average compensation deflated by the same index. We would normally expect labour productivity and compensation to grow at the same rate in long-run. Appendix A gives a model which shows the conditions under which we would expect this to happen. In particular, if the production function parameters and preferences are stable across time then we would expect a 10% growth in GDP per hour to lead to a 10% growth in real compensation.

Of course, net decoupling could certainly occur for a number of reasons. For example:

- In the short run there could be shocks that disturb the long-run equilibrium.
- Technological changes that are biased against labour as a whole.
- An increase in the profit mark-up (for example if product market competition weakens).
- A fall in the bargaining power of workers compared to firms[1].
- Changes in effective labour supply – for example the growth of globalisation, immigration, female participation.

It is worth noting that examining the net decoupling relationship is robust (in principle) to changes in the composition of the workforce. If the quality of the workforce increases because workers gain more human capital, this will increase their productivity and their wages by an equal amount, according to the marginal revenue productivity condition. Similarly, if there is an influx of low skilled immigrants then average productivity and wages will fall together.

By contrast, **Gross Decoupling** (GD) is the measure more frequently looked at in policy circles. It is not so easy to relate this to basic theory, but a common definition would be to use the same measure of productivity as net decoupling but instead of average real compensation use median wage deflated by a consumer price deflator such as the CPI. Thus, the difference in gross vs. net decoupling can be defined as:

$$GD - ND = Inequality + Wage\_wedge + \Pr ice\_wedge$$

The first term ("inequality") is the difference between the average compensation and the median one, the second term ("wage wedge") is the difference between compensation and wages and the third term ("price wedge") is the difference between the GDP deflator and the consumer price index. These can all change even if gross decoupling stays the same.

Gross decoupling is an important economic indicator since it measures how the productivity growth is accruing to the *middle* worker in the economy and it considers wages (*not* compensation), a variable that is more tightly related to workers' static material wellbeing. Moreover, the changes in the true cost of living faced by individuals seem to be

[1] This will only happen in some models. In basic models of bargaining over wages, a fall in worker power implies a lower nominal wage at a firm, but no change in the wage bill share of value added, because employers increase employment to exactly offset the wage bill (i.e. move up the labour demand curve. Even in efficient bargaining models the aggregate share of labor may not change - see Blanchard and Giavazzi (2003); Layard and Nickell (1998).

better represented by the consumer price index than by the GDP deflator, increasing the importance of this measure.

Economists would tend to be more surprised by systematic net decoupling, though. For one thing, net decoupling would imply that the share of labour in GDP should be falling, and the stability of labour's share is generally taken (rightly or wrongly) as one of the stylised facts of the US and UK economies. We will examine the trends in labour's share in this report explicitly and show that the results are consistent with what we find when looking at the productivity and compensation trends. In fact, the labour share of GDP for the UK and US look relatively stable, whereas the share has declined significantly in Japan and many Continental Europe and countries.

III. Macro Analysis of Decoupling in the UK

III.1 Data Sources

We use several sources of data to compute hourly compensation and productivity (see Data Appendix for more details). We measure labour productivity by examining GDP per hour based on national accounts from the ONS. The information on total number of hours worked in the economy is provided by the OECD. Hours is obviously a more appropriate measure of labour input than total workers because of part-time working. But may be subject to greater measurement error so in subsection III.5 below we also consider GDP per worker and annual compensation.

The basic measure of wage (w) is the basic payments, allowances, tips, and bonuses that workers receive pre-tax. This is recorded from representative samples of households in the General Household Survey (GHS) and the Labour Force Survey (LFS). The LFS is a quarterly sample of 60,000 households living at private addresses[2] and is the main source of UK micro-data on the labour market. It has been running since 1976 but comprehensive wage information was only asked in 1992 and subsequent quarters. The GHS has been running since 1972, and although the sample size has varied a lot between years it is much smaller than the LFS. In order to get the longest time series we splice the series together using the GHS prior to 1992 and the LFS after 1992. Machin, Moretti and Van Reenen (2011) run

[2] From 1992 onwards, all the UK is included, but before this year only Great Britain was included in the database.

extensive tests on the comparability of the samples and find that this procedure is robust. From now on we refer to this composition of surveys as LFS.

We also cross checked the wage results with the Annual Survey of Hours and Earnings (ASHE) - formerly known as the New Earnings Survey (NES) – which is an administrative dataset covering 1% of the working population. Employers are asked to provide detailed information on the hours and earnings of their employees to ASHE (note that it does not include self-employed workers).

A wider measure to appropriately look at decoupling is workers compensation (c). This includes non-pay benefits that are received by the worker such as pension contributions, employer's payroll tax (NI), health benefits, etc. Obviously these are costs to the employer and benefits to the employee, but they will not be captured by the standard surveys.

The advantage of compensation is that it is a theoretically more appropriate measure to examine decoupling. The disadvantage is that there is no dataset that can track the inequality of compensation over time in the UK (in the US this is possible – see Pierce (2001)). By contrast, with the more narrow measure of wages from LFS we can examine how wages have changed at different points of the distribution. In particular, we can look at how median wages have done compared to the mean. As inequality rises, the mean worker will be increasingly richer than the median worker.

The widest measure of employers' costs is labour costs. This is the same as compensation but also adds on other labour-related costs that may not be regarded as direct benefits to the worker such as payroll taxes and training costs. Trends in this look rather similar to compensation, so we will focus on compensation and use labour costs only as a cross check in Section V. Our approach follows the majority of the literature – see Krueger (1999) or Gollin (2002) for example.

Without further assumptions, it is not possible to compute the self-employed wage and compensation directly from the ONS national accounts data. A common practice is to assume that employees and self-employed earn the same on average. Although we explicitly assume this in Section V, in Sections III and IV this assumption would not change the analysis since we consider only growth rates in them. Note that computing wage and compensation per hour using data from the ONS also requires information on the total number of hours worked by all employees (excluding self-employed) in the economy, which is provided by the EU KLEMS.

Labour productivity is computed as:

Labour Productivity = volume measure of output / measure of labour input

The OECD uses gross domestic product (GDP) or gross value added (GVA) as a volume measure of output. The UN System of Accounts (SNA) defines GDP (measured at market prices) as the sum of the GVA estimates, plus taxes on products (for example, value added tax, alcohol duty), less subsidies on products. It is important to point out that GVA and GDP are highly correlated over time within a country, as reported by the OECD. More specifically, from 1972 to 2010, the correlation between the two measures is 0.99 in the UK. Although we use GVA as our measure of output in Sections VI (and in Appendix E) due to restrictions in the KLEMS database, we will focus on the more standard GDP measure.

III.2 Trends in Compensation and Wages

Figure 2 and Figure 3 plot the growth over time for compensation and some wage series mentioned above (all series consider the mean and are deflated by the GDP deflator). The legend in the graph describes the source, the definition of the series, and the deflator to convert the series to real terms. If the name of the series is related to "workers", then it includes both employees **and** self-employed. By contrast "employees" excludes the self-employed. The structure of most of the figures in this paper is that we normalize the level of the series to be 1 in the base year (usually 1972) so the number on the vertical axis can be read as a growth rate. For example, the fact that the ONS wage series (red squares) reached 1.7 in 2010 indicates that real hourly compensation was 70% higher in 2010 than in 1972. An arithmetic growth rate of 1.84% per annum (70/(2010-1972)).

Figure 2 shows that employees' real weekly earnings from ASHE and LFS follow each other quite closely and indeed are identical in growth rates over the 1972-2010 period as a whole. The LFS workers' wage has grown more slowly than the employees' earnings series because it includes the self-employed and measured earnings of the self-employed appears to have grown more slowly since 1993. We should be cautious about this as self-employed earnings are hard to define as some of the compensation may be taken directly in the form of dividends, profits or in other ways[3]. Wages computed by the ONS seem to be growing much less than the other series, but this is due to the fact that ONS wages are in annual terms, while other series are weekly. The growth of part-time and temporary work will be reflected in annual earnings more than it is in weekly earnings.

[3] Note also that workers' earnings growth after 1993 is based on the GHS survey (and not *only* on the LFS survey as the in the employees series), which becomes noisy after 2005. This is another reason why the workers series should be interpreted carefully.

Figure 3 considers the same five series by now in terms of hourly earnings[4]. Note first that, as in the weekly case, including self-employed earnings drops the growth rate of wages. The self-employed are facing slower earning growth than other groups and the difference is greater in hourly terms than in weekly ones (although the caveats about data must still be taken into account, especially over hours now). Second, in this figure the ONS wage presents a similar growth when compared to the LFS series as we are measuring things on a common basis. Third, ASHE seems to have faster growth in hourly wages than the other series, but this may be due to needing to make more imputations regarding hours. In what follows we will focus on the ONS and LFS series.

Note that in both figures the ONS compensation is growing faster than the ONS wage. Moreover, it is growing faster than all wage series in Figure 3 (except for the ASHE measure with its approximation). Note that the difference in growth starts to increase in the beginning of the last decade, increasing ever since. Obviously, some components included only in the compensation measure are growing much faster than wages. More on the reasons behind this growth difference in Subsection III.5 below.

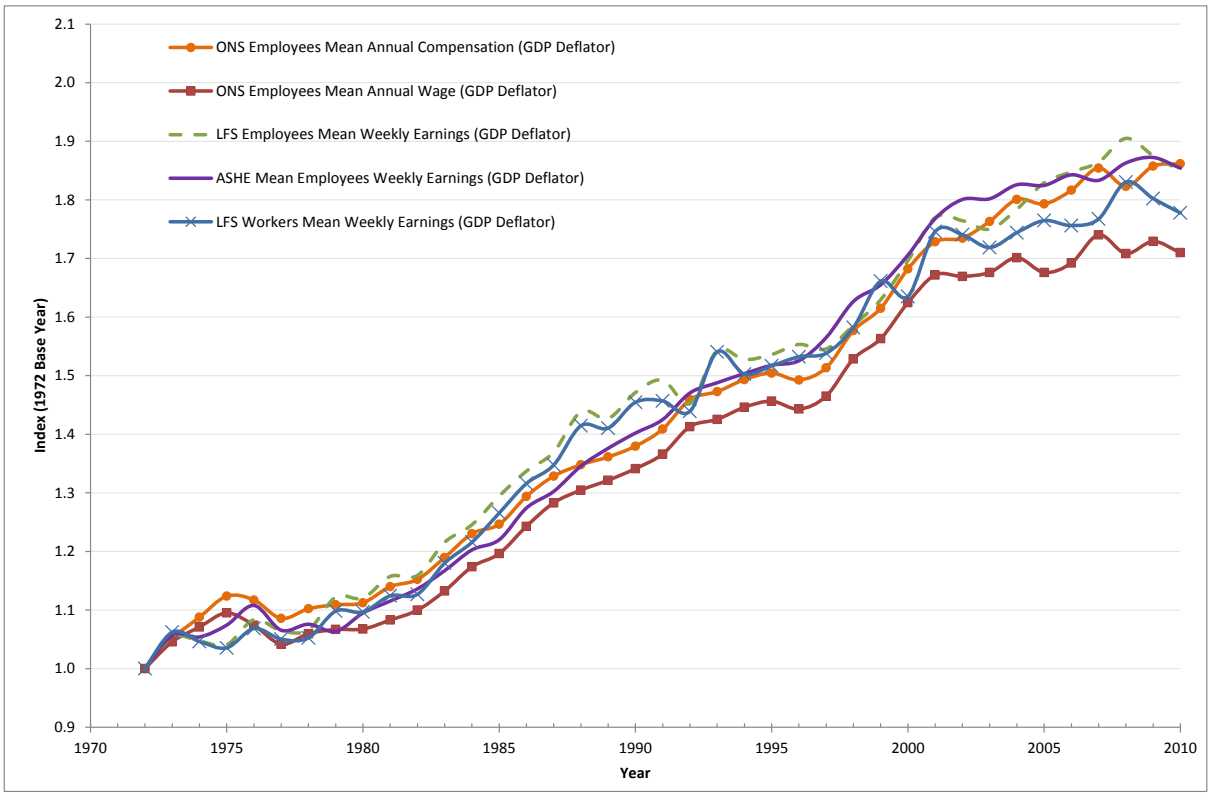

Figure 2: Real Mean Weekly Earnings in UK

Sources: ONS, GHS/LFS Survey, ASHE. "Workers" includes both Employees and Self-Employed.

[4] Although the ASHE hourly earnings are available only from 1982, we included it here considering that before this period its growth was the average between the LFS and the ONS wage growth.

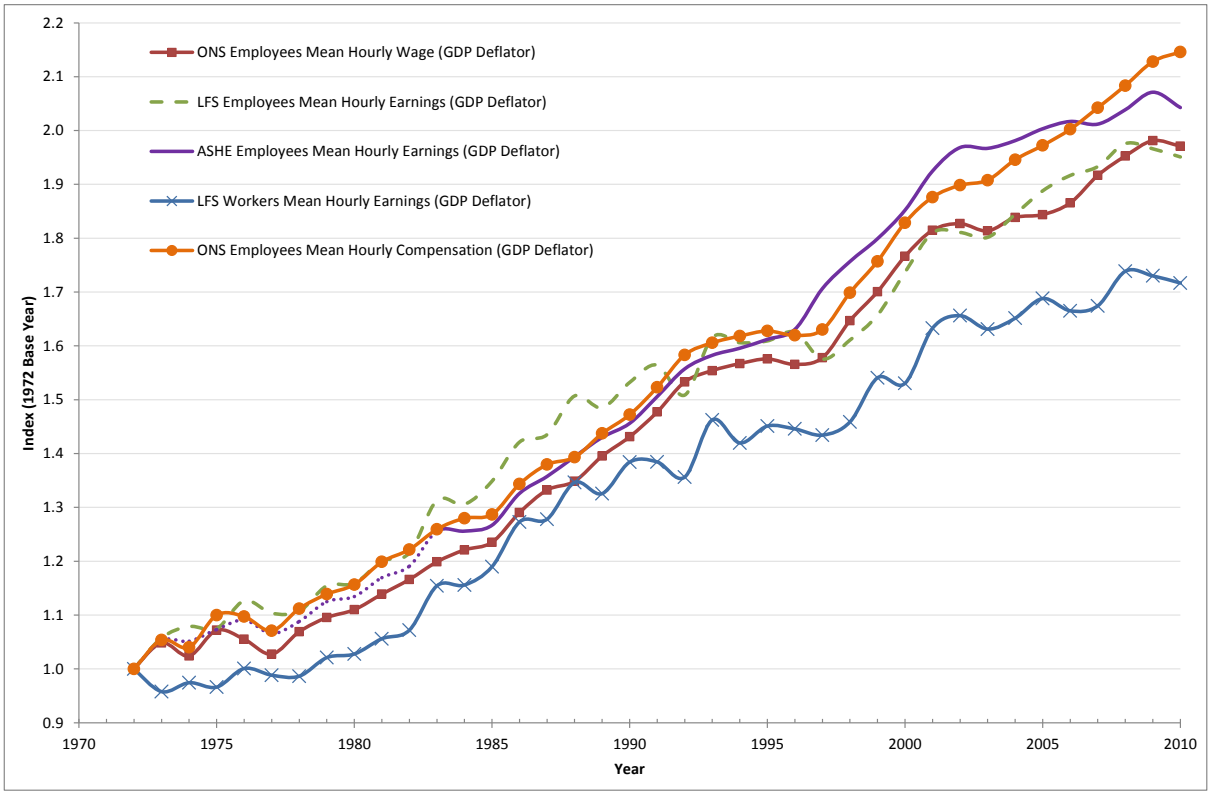

Figure 3: Real Mean Hourly Earnings in the UK/GB

Sources: ONS, GHS/LFS Survey, ASHE. "Workers" includes both Employees and Self-Employed.

III.3 Labour Productivity Trends

Figure 4 shows GDP (and GVA) per hour and per worker using the GDP deflator. GDP per hour has more than doubled between 1972 and 2010 (a factor of 2.14) whereas GVA per hour has about doubled. Note that this is faster than the growth of wages discussed above which is the first sign of decoupling. The per worker equivalents of these productivity measures have grown more slowly which reflects the increase in part-time work (fewer hours per worker).

Note that either in annual or hourly terms, computing labour productivity using the GVA instead of the GDP decreases the labour productivity growth in the period as a whole by approximately 8%. Hence, since we consider GDP per Hour in our analysis, keep in mind that the decoupling would be smaller (or inexistent) if we considered GVA per hour instead. We show in Appendix C results using gross value added which show even less decoupling on this measure – thus using GDP is actually more "conservative" and gives decoupling a better chance of working, as will become clear.

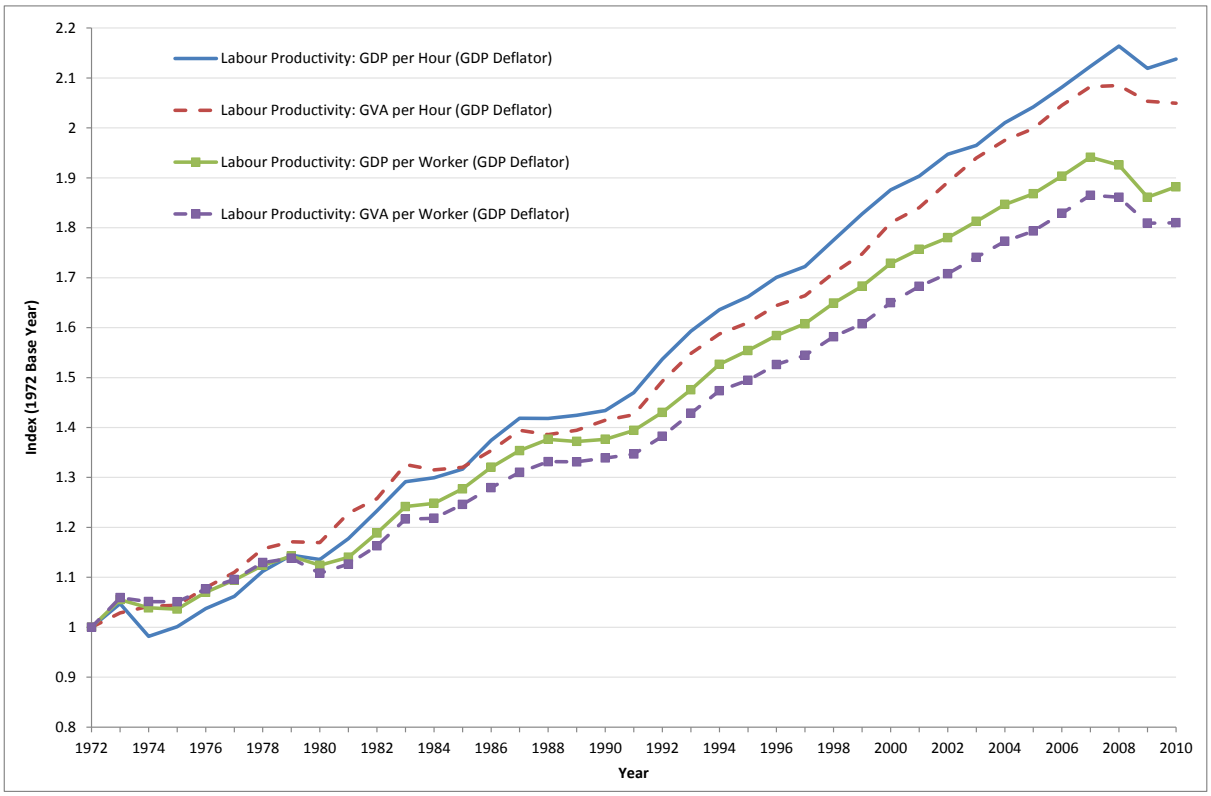

Figure 4: Labour Productivity in the UK

Sources: ONS, OECD.

III.4 Decoupling between Hourly Productivity and Compensation in the UK?

No Net Decoupling in the UK

We start our analysis considering hourly measures since they are more robust to some kinds of shifts in the labour market composition. Figure 5 describes the basic story behind the decoupling in the UK. Looking at the 1972-2010 period as whole both labour productivity and hourly compensation have doubled, so there is not much sign of net decoupling. Having said this, there are periods when the two series diverge. During the recession periods of the late 1970s and early 1990s wage growth outstripped productivity growth which is consistent with the idea of some labour hoarding – firms holding on to workers even when their productivity is low because demand is low (inverse decoupling if you will). There is even

some sign of this in the current recession where wage falls have been outstripped by productivity falls[5]. By contrast, during boom periods, especially the long upswing from 1994-2007 productivity growth was faster than compensation growth leading to some decoupling.

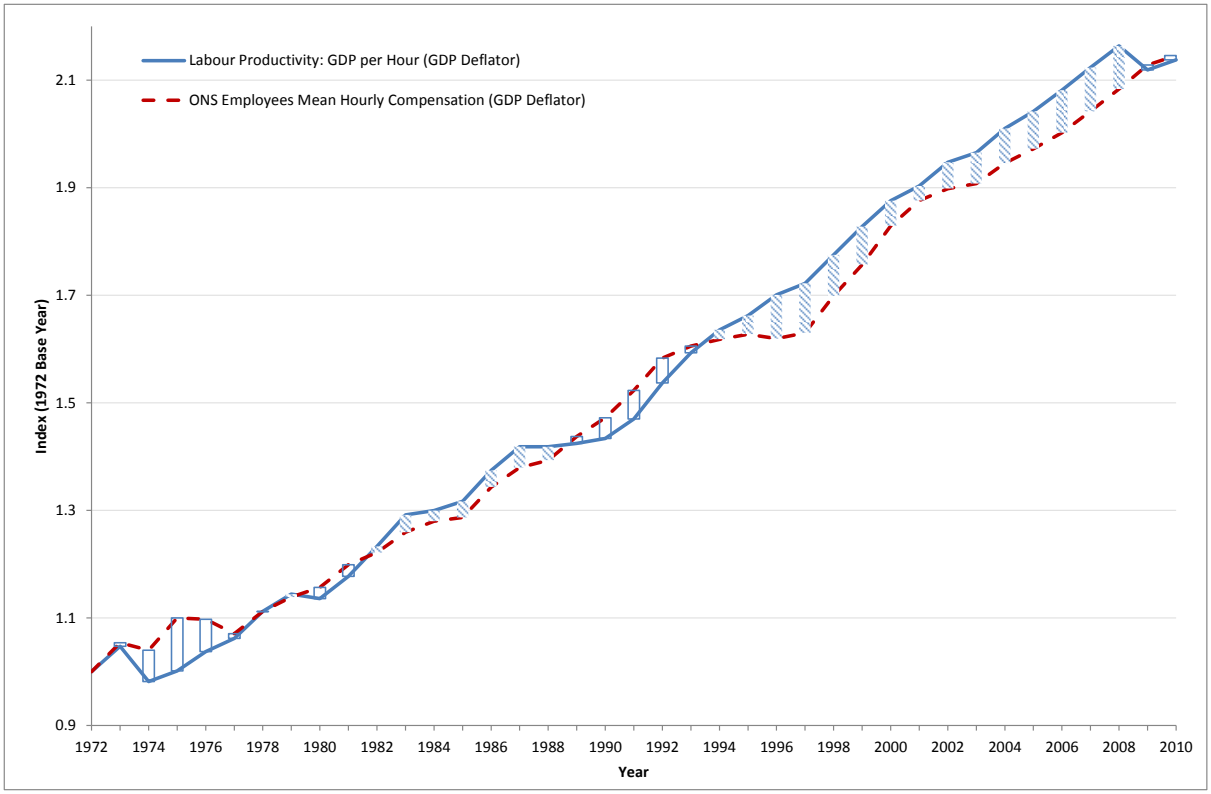

Figure 5: Hourly Net Decoupling in the UK.

Sources: ONS, OECD.

Explaining Gross and Net Decoupling

Given the absence of net decoupling one might legitimately ask "why so much debate around decoupling in the UK"? The reason is that some policy analysts have been focused on other important measures of median wages, in particular what we call gross decoupling. Rather than look at the real hourly average compensation series, the focus has been more on the median hourly wage series. We plot the productivity and compensation curves again in Figure 6, but now we add to them some alternative wage and compensation measures[6].

[5] It is worth mentioning that the 2008 crisis brought a lot of noise to the data and this data may be revised at some point by the ONS.

[6] Our LFS compensation measure is calculated assuming that the growth in benefits is proportional to the one observed in the ONS series, i.e., we multiply the LFS earnings series by a factor equals to the ratio of ONS compensation to ONS wages. This approach is similar to the one used in Mishel and Gee (2012).

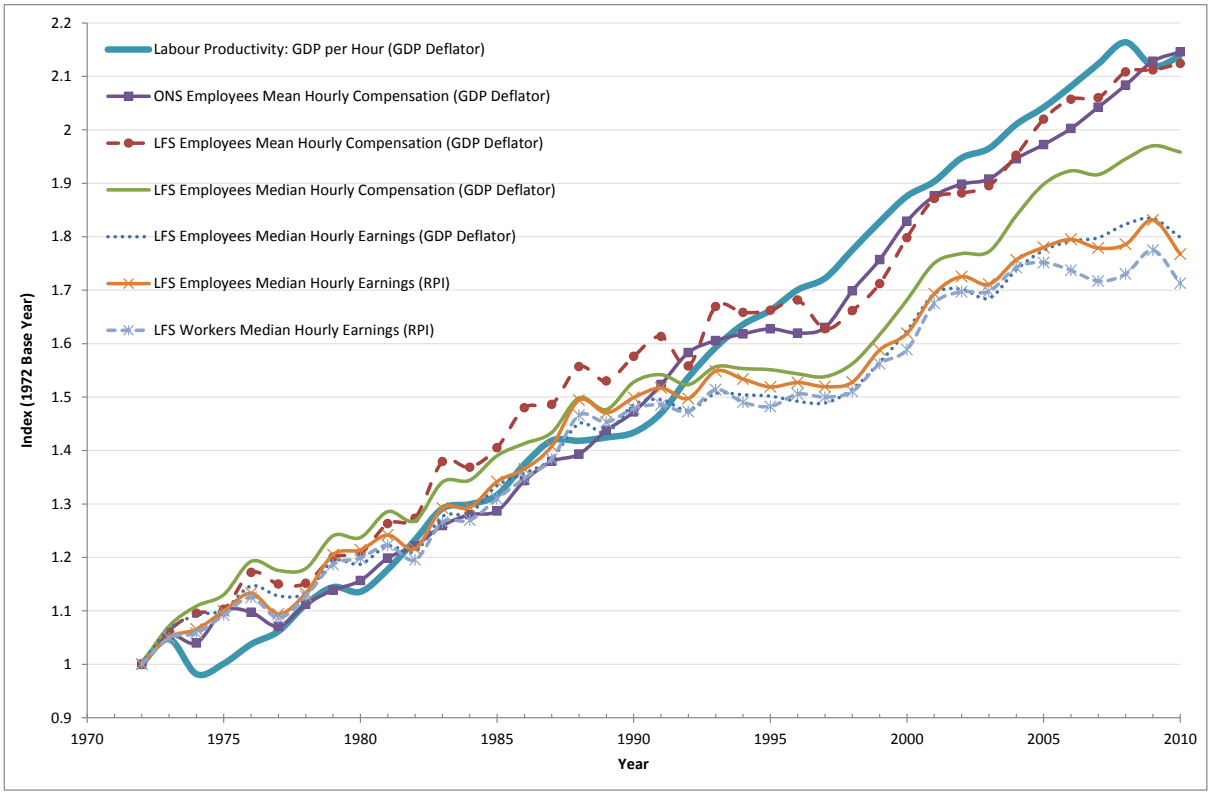

Figure 6: Hourly Decoupling in the UK.

Sources: GHS/LFS Survey, OECD, HM Treasury, and ONS. "Workers" includes both Employees and Self-Employed.

Looking at the median LFS worker wage (including self-employed and deflated by the Retail Price Index -RPI). This has only increased by a factor of 1.71 over our sample period, compared to a factor of 2.14 for productivity and compensation. So there is something like a 43% difference between productivity and median wage growth on this measure of gross decoupling which disappears when we consider net decoupling. Figure 6 shows us why this is the case. Looking at the curve for LFS mediann compensation we can see that the line is more than one third way between the mean compensation/productivity by the end of the period. This implies about one third of the gap is due to inequality. The other half is essentially due to the faster growth of compensation than wages.

This divergence between wages and compensation is surprising – it is showing us that the employer provided benefits such as pensions have been growing much faster than wages (the difference between the ONS average wage measure and LFS average wage measure is trivial). Even though the compensation growth level is greater than the wages one throughout the period, we can observe that the difference increases significantly in the 2000s. What would be behind this?

The ONS description of the national accounts system clearly shows us which are the components responsible for the fast growth of compensation compared to wages. The non-wage compensation is decomposed in Table 1 from 1999 to 2007. The accounts that are included in compensation (but not in wages) are employers' contributions to national insurance schemes and employers' contributions to pension schemes (funded and unfunded). The first component grew 67% (from £31bn to £52.3bn) in nominal terms between 1999 and 2007. The second grew considerably more: 98% (from £ 32.9 to £ 65.3 billions) in nominal terms in this same period (from which the relevant part corresponds to growth in funded pension schemes).

In the meantime, wages and salaries grew at a modest rate of 47% (not shown in the Table). Hence, contributions to pension schemes are the major component behind this disparity. This fact might reflect the various legal acts that affected pension schemes during the 1990s[7].

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007
National Insurance Contributions	31,286	34,028	35,706	35,735	39,890	43,586	46,741	49,552	52,300
Notionally Funded Pension Schemes	2,115	2,369	2,754	3,045	5,177	5,616	6,028	6,472	7,003
Funded Pension Schemes	19,128	20,891	21,836	26,025	32,054	38,473	42,963	47,527	45,995
Imputed Social Contributions*	11,670	12,536	12,920	13,977	11,692	11,031	11,931	11,739	12,328

Table 1: Non-Wage Compensation Decomposition (all numbers in millions of GB Pounds). *This last account includes employers' imputed contributions to unfunded government pension schemes.

Sources: ONS - United Kingdom National Accounts: The Blue Book 2008 edition.

In the Appendix C we show the decoupling in terms of GVA per hour (and not GDP). Even the net decoupling observed from 1993 almost disappears when we consider the GVA as our measure of output, showing an even closer correlation between compensation and productivity growth.

Figure 7 decomposes the difference between gross and net decoupling more formally. It compares the contribution of each of the components listed to the final difference between labour productivity (measured as GDP per hour) deflated by the GDP deflator and the LFS median hourly earnings (including self-employment) deflated by the RPI. The numbers behind each element are in Appendix D, Table 2.

Looking at the entire four decades of data, we see that gross decoupling reaches a maximum in 2010 of 42.5%. Yet, as we noted net decoupling is zero (actually it is slightly

[7] The Welfare Reform and Pensions Act 1999, the Pensions Act 1995 and the Pension Schemes Act 1993.

negative). As noted above, the two largest components of this are inequality (the bar) which accounts for 16.6 percentage points and non-wage benefits (the horizontal lines, the difference between compensation and wages) which accounts for 16 percentage points. So between them, inequality and benefits account for 32.5% of the 42.5 percentage points gross decoupling. Another components that make some minor contribution are the difference between the GDP deflator and the RPI (3.1%) arising from the faster growth of the RPI than the GDP deflator and the gap between employees and self-employed earnings in the UK (5.5%). Next, the ONS wage series growth was slightly faster than the LFS wage series (2 percentage points). Nevertheless, these last three components are minor – inequality and benefits are basically the story taking the last 4 decades together.

Figure 7 also performs the same decomposition for other years. As Figure 6 showed, there is some net decoupling in some periods, especially in the Labour years of 1997-2010, although it is still very small compared to the headline gross decoupling figures. Net decoupling takes its maximum value in 2007. In this year gross decoupling was 40.6% and net decoupling was 8.1%. Inequality contributed 14.4% and benefits 11.8% so they were still both more important.

Looking over the sample period, as noted above there are times when compensation has outstripped productivity growth. From 1990 inequality started to make an important contribution to gross decoupling and "benefits" became much more important from the mid-nineties, although they have always made a contribution throughout the last 40 years.

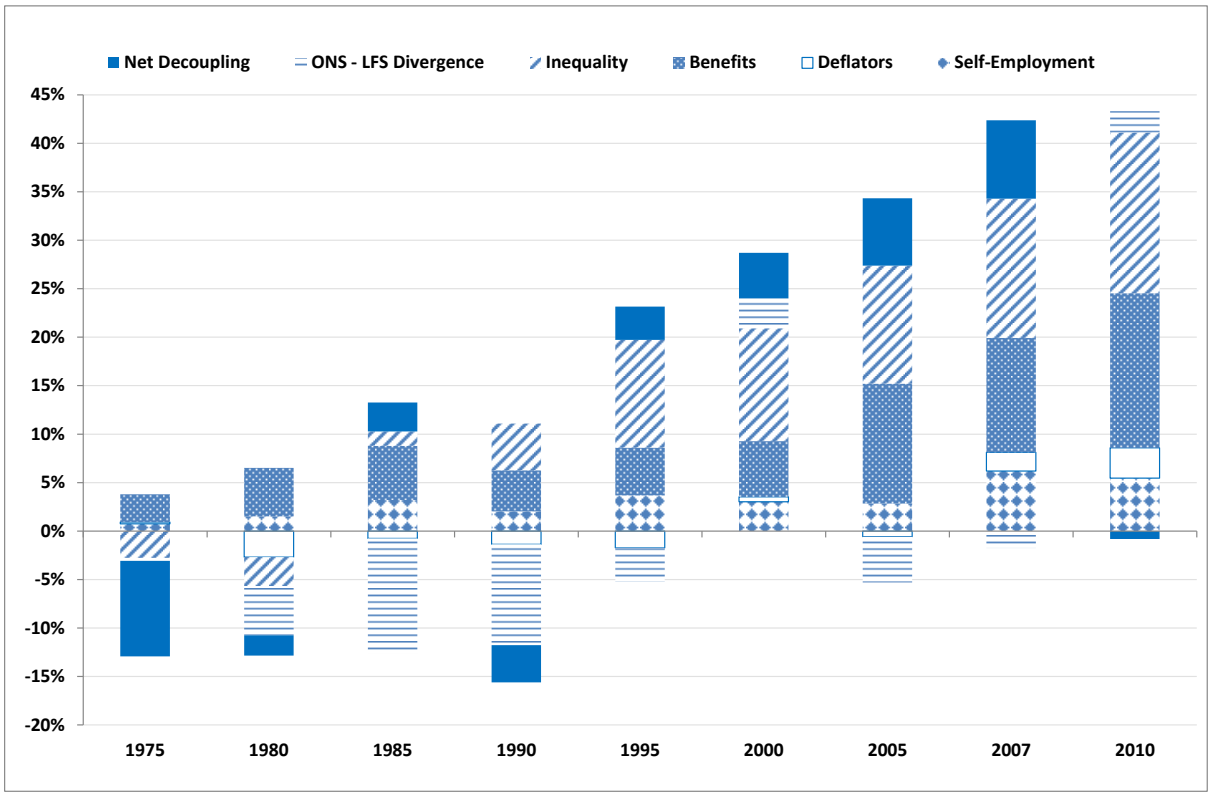

Figure 7: Decoupling Decomposition in the UK.

III.5 Weekly and Annual Measures of productivity and wages

Figure 8 below summarizes the decoupling analysis in the UK in terms of compensation and labour productivity per worker, and weekly earnings. As a measure of labour productivity we use GDP divided by the total number of employed individuals (including self-employed). Once more, the analysis here is robust to the hypothesis that employees and self-employed earn on average the same amount. Focusing on the net decoupling, i.e., the difference between labour compensation and labour productivity, Figure 8 is a lot like Figure 6, with the excepetion that LFS figures seem a bit overstaded when compared to the ONS ones.

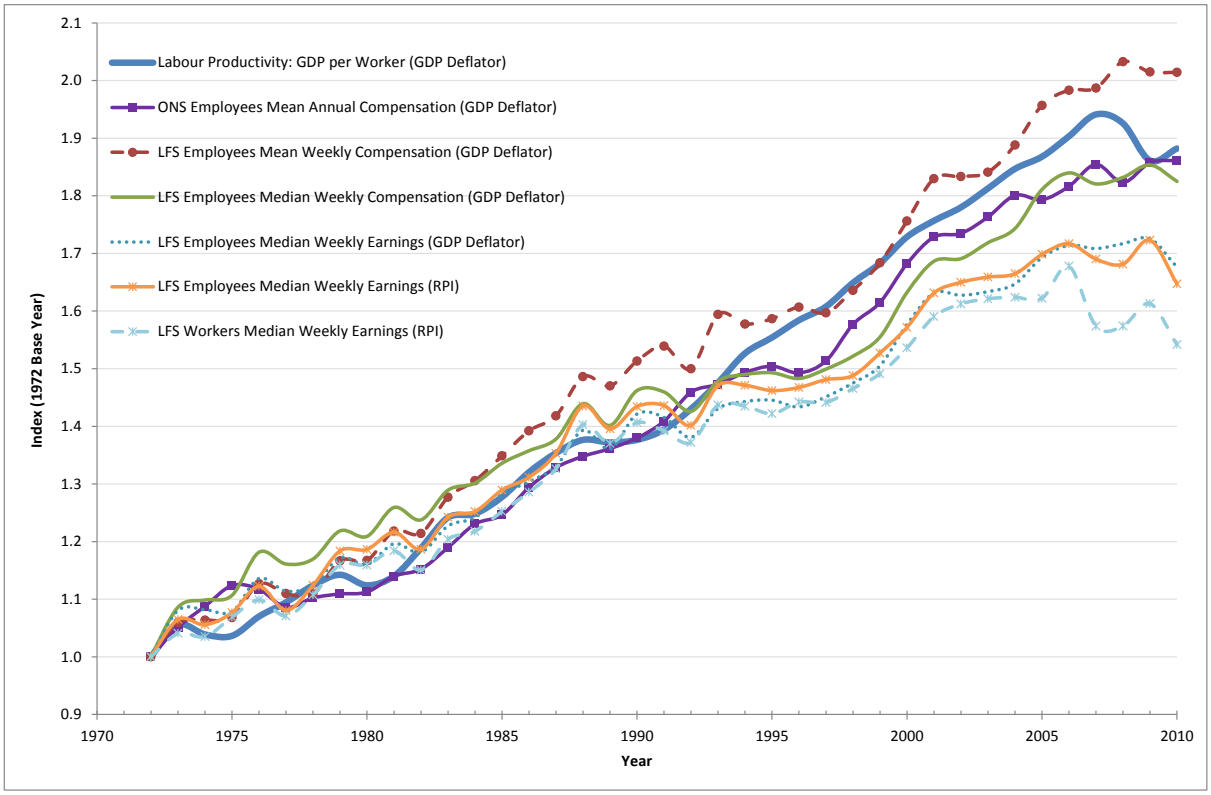

Figure 8: Weekly/Annual Decoupling in the UK

Sources: GHS/LFS, OECD, HM Treasury and ONS. "Workers" includes both Employees and Self-Employed.

III.6 Summary on UK Decoupling

The data tell a pretty straightforward story. Over the 1972 to 2010 period compensation and productivity grew as the same rate – a factor of 2.14 compared to 1972. There was no net decoupling as economists would generally think of it. Although the series diverge over some periods, the consistency is striking, no matter how these are measured (in hours compared to weeks; in value added or GDP).

On the other hand a large wedge did open up between the growth of median wages and productivity (gross decoupling). The main reason for this is (i) the growth of inequality which causes the mean compensation to grow faster than the median and (ii) the faster growth of compensation (which includes non-pay benefits like pensions and healthcare) compared to wages. The first reason is expected given the extensive empirical literature about the subject, the second is more surprising. Van Reenen (2011) shows how the inequality is evolving in the UK. Inequality is rising since the early eighties, but the "lower tail" inequality (comparing the 50th percentile gains with the 10th percentile ones) stabilised in the 2000s while the upper

tail inequality (comparing the 90th percentile gains with the 50th percentile ones) continued to grow during this period. These facts support the findings of this section, showing that the mean-median inequality has risen since the eighties with significant increases both in the nineties and in the last decade.

IV. Macro Analysis of Decoupling in the US

IV.1 Data Sources in the US

As in the UK case, we use more than one data source to compute workers' wages and compensation. The first database is from the Bureau of Economic Analysis (BEA) who has information on wages and compensation in order to compute the National Income and Products Account (NIPA) tables. This is the equivalent of our ONS measures.

The second database is the Current Population Survey (CPS) March supplement, which is the US equivalent of the LFS survey. It is a survey conducted by the Bureau of Labor Statistics (BLS) and the Census Bureau of about 50,000 households per annum representing the civilian non-institutional population. It includes individuals of 16 years and older. Even though the earning computed in this survey does not include some types of compensation included in the NIPA tables, it permits us to analyse self-employed earnings and the median earnings of workers and employees. We also collected information on employment and hours worked from the BLS and the OECD.

As with the UK we obtain measures of labour productivity from the NIPA and OECD and focus on GDP (although we also compare with GVA).

IV.2 Trends in Compensation and Wages in the US

Figure 9 plots the growth over time for some annual wage and compensation series and Figure 10 does the same for their hourly equivalents. Only the "CPS Workers" series include self-employment. We can observe that the NIPA annual wages are growing slower than the CPS annual employees earnings. In hourly terms, however, the two wage series seem to track each other fairly well.

In contrast with the UK, the self-employed earnings appear to be growing faster than employees in both in hourly and annual terms. We also observe a lot of noise in the CPS hourly earnings series that includes the self-employed. Note that, as in the UK, compensation is growing faster than the wage series in general.

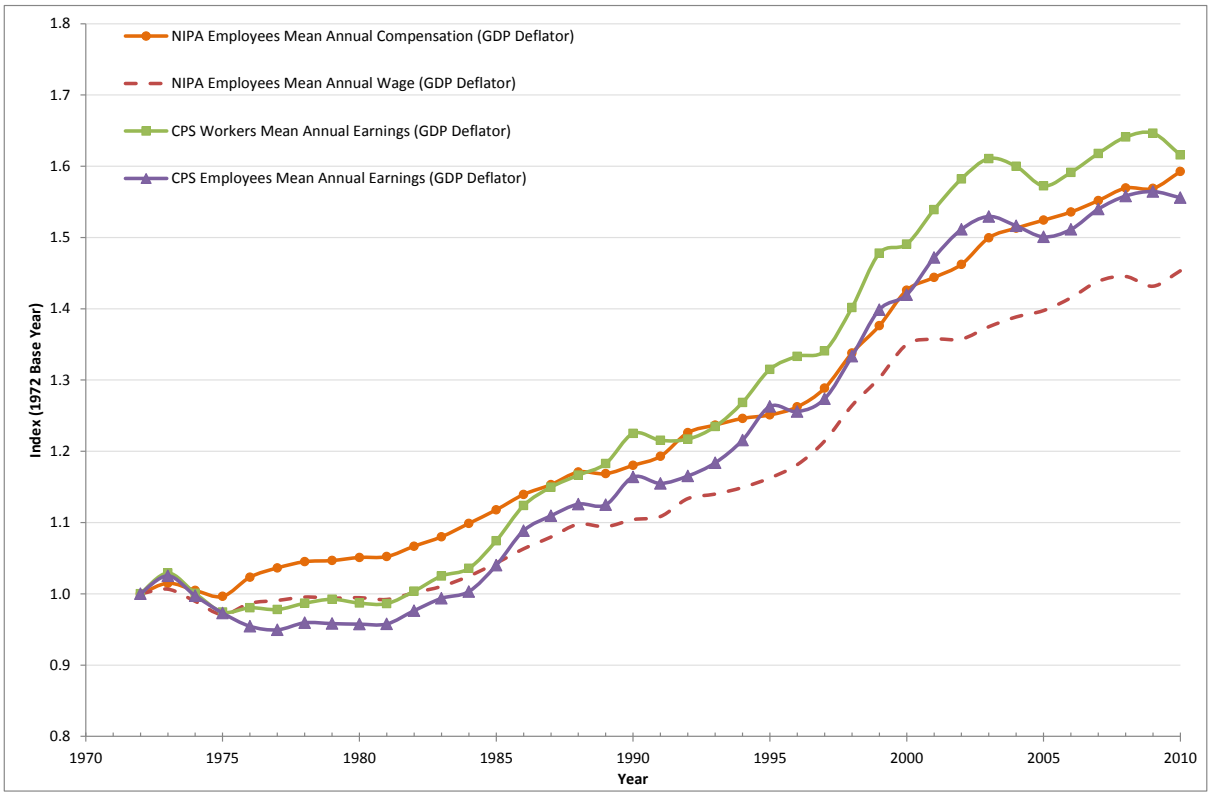

Figure 9: Real Mean Annual Earnings in the US.

Sources: BEA, OECD and CPS Survey. "Workers" includes both Employees and Self-Employed.

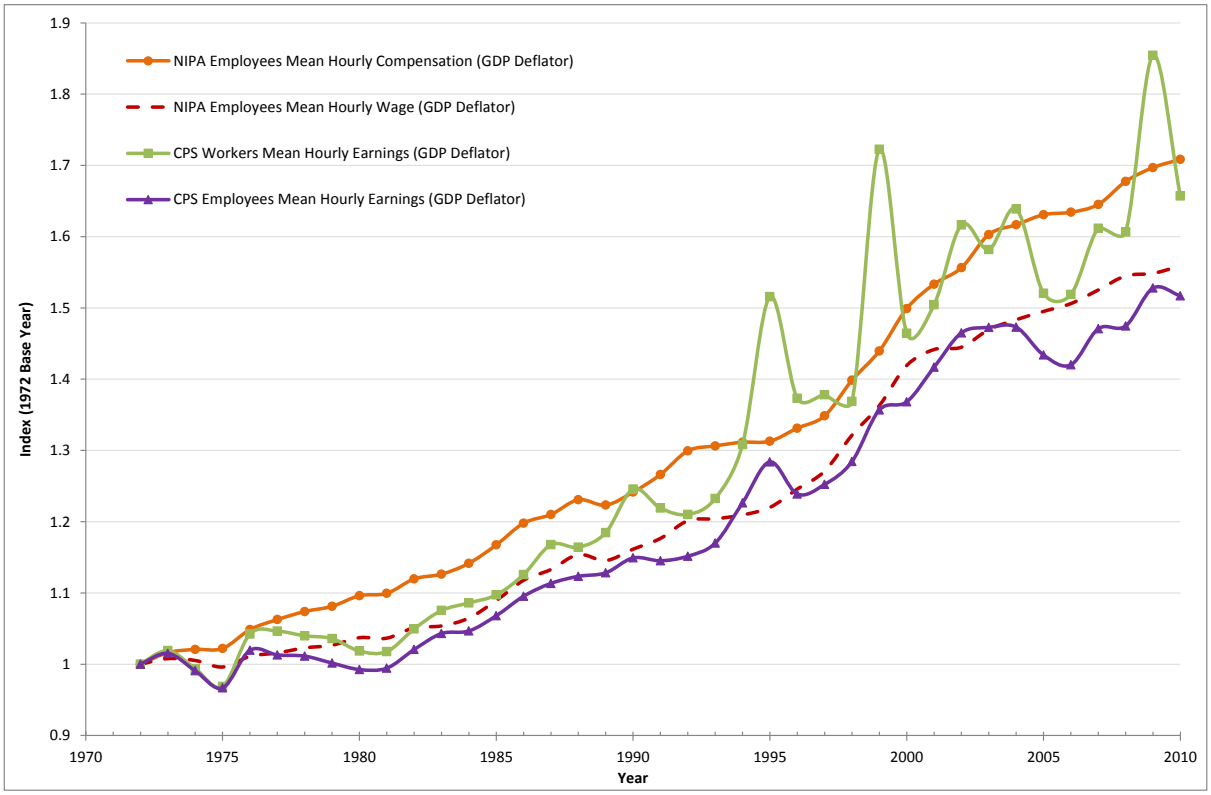

Figure 10: Real Mean Hourly Earnings in the US

Sources: BEA, OECD and CPS Survey. "Workers" includes both Employees and Self-Employed.

IV.3 Labour Productivity Trends in the US

Figure 11 plots out productivity measured in per hour terms and per worker terms. As with the UK the hourly-based measure has grown faster than the per worker measure, which again reflects falls in average hours worked (although this is less marked in the US than in the UK). GDP per hour has risen by a factor of 1.84 since 1972, less than the UK's productivity growth. This reflects some catch-up growth of the UK with the US (although UK productivity levels remain well below those of the US even by the end of the sample).

We can see in Figure 11 that GDP per Hour and GVA per hour have a similar growth, apart from some minor divergence that starts in the late eighties and ends in the late nineties. As in the UK case, the correlation between GVA and GDP is extremely high (approximately 0.99)

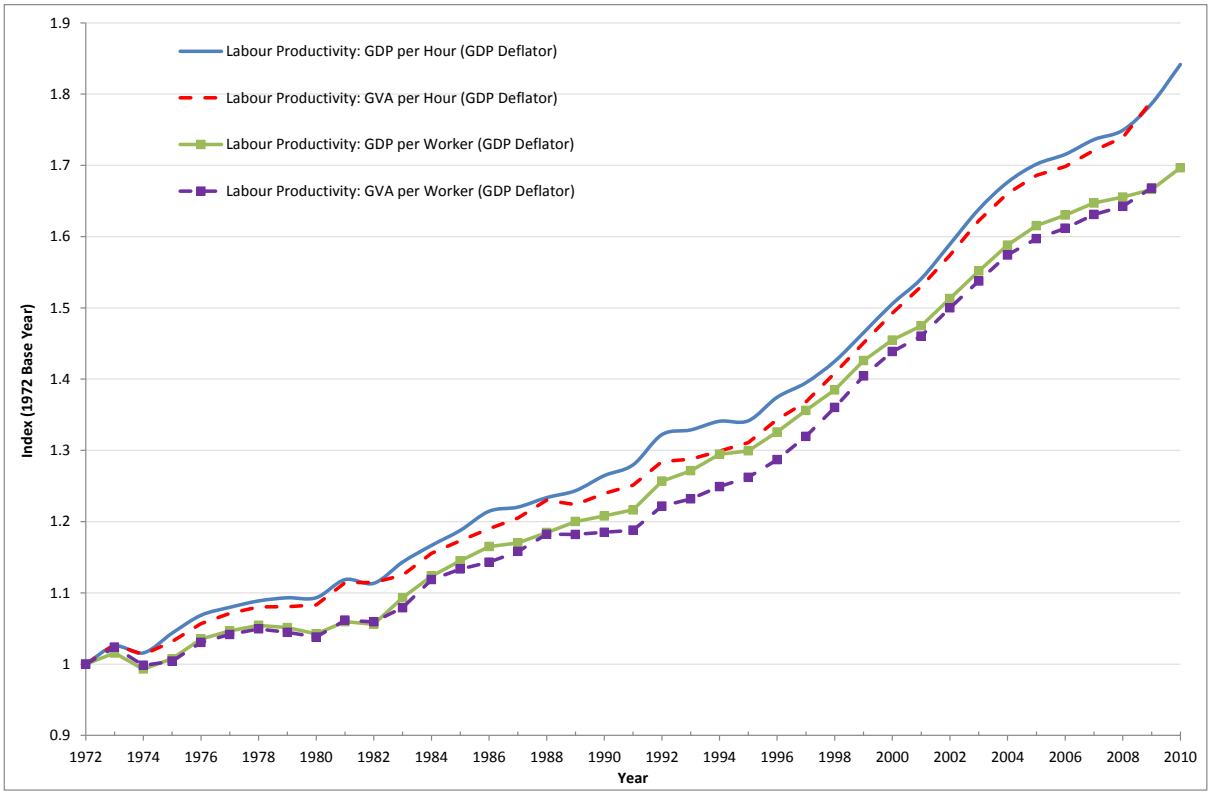

Figure 11: Labour Productivity in the US.

Sources: BEA and OECD.

IV.4 Decoupling between Hourly Productivity and Compensation in the US

The measures we use are analogous to the ones used in the previous section. In Figure 12 labour productivity is measured as GDP per hour and we use hourly compensation. Both are deflated by the GDP deflator. There is some evidence of net decoupling throughout the period especially during cyclical upswings (as in the UK). Unlike the UK, however, the faster growth of productivity during the 2000s has not been fully reversed by the Great Recession.

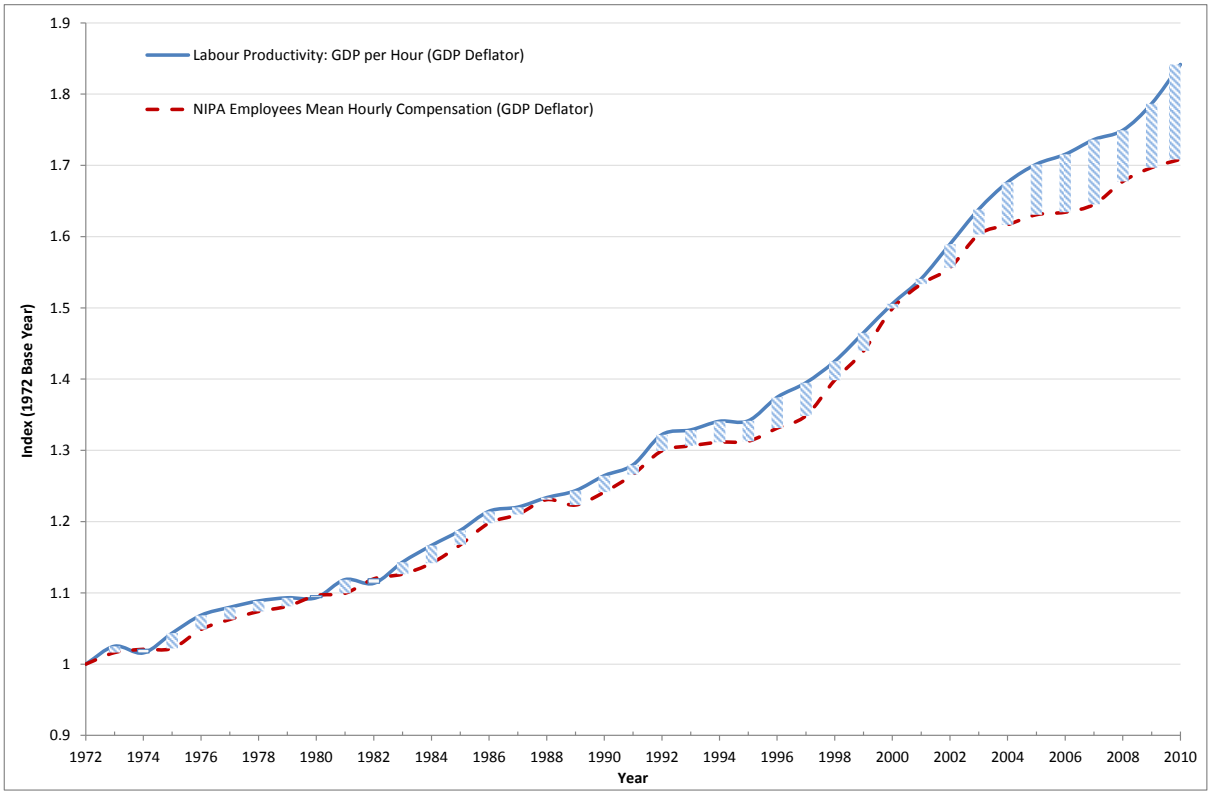

Figure 12: Hourly Net Decoupling in the US.

Sources: BEA and OECD

In Figure 13 we add five other wage series: NIPA mean wages, CPS mean employees' wages (deflated both by the GDP deflator and by the CPI-U-RS), CPS median wages (deflated by the CPI-U-RS) and CPS median workers' wages (deflated by the CPI-U-RS). It is clear that gross decoupling is much more dramatic in the US than in the UK. The gap between productivity and median wages is about 63% compared to only 42% in the UK over the 1972-2010 period as a whole[8].

Looking at the cumulative change as indicated by where the lines finish, it is clear that the net decoupling in Figure 13 is pretty small compared to the overall change: only 13.3 percentage points relative to the 63% change. Just as with the UK, "benefits" (the difference between compensation and wages) and "inequality" (the difference between mean and median wages) are large components of the difference. Unlike the UK, however, the

[8] Similar to the UK analysis, our CPS compensation measure is constructed assuming that the growth in benefits is proportional to the one observed in the NIPA series, i.e., we multiply the CPS earnings by a factor equals to the ratio of NIPA compensation to NIPA wages. This approach is similar to the one used in Mishel and Gee (2012).

difference between the CPI-U-RS and GDP deflator also accounts for a substantial chunk of the difference.

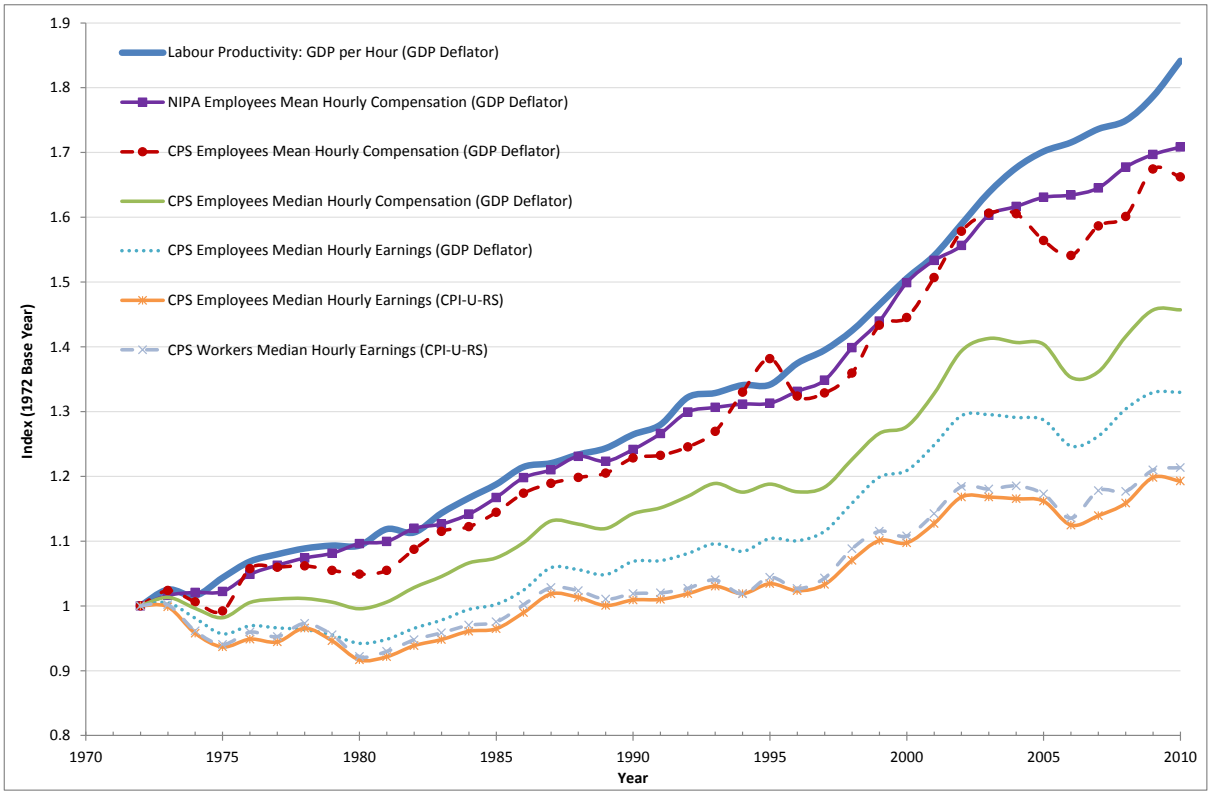

Figure 13: Hourly Decoupling in the US.

Sources: BEA, OECD, CPS Survey and BLS. "Workers" includes both Employees and Self-Employed.

Figure 14 decomposes the decoupling. It compares the contribution of each of the components listed to the difference between the labour productivity measure and CPS workers' median hourly earnings (deflated by the CPI-U-RS). Looking at 2010, the second largest component of gross decoupling is the divergence between the two measures of inflation (13.7%). Since this is puzzling and different from the UK we will discuss this explicitly in the next subsection. The first and the third components are inequality and benefits accounting for 20.5% and 12.7%, respectively. This is similar to the UK. The benefit which matters most in the US is health insurance which is generally provided by the employer. There has been substantial cost inflation for health insurance which is a major part of why compensation has risen faster than wages. Net decoupling is more important in the US

than in the UK as already mentioned. There is a larger discrepancy between NIPA wages and CPS wages than their equivalents in the UK, contributing to 4.6%. Finally, unlike the UK, the self-employed have had faster income growth which reduces the decoupling.

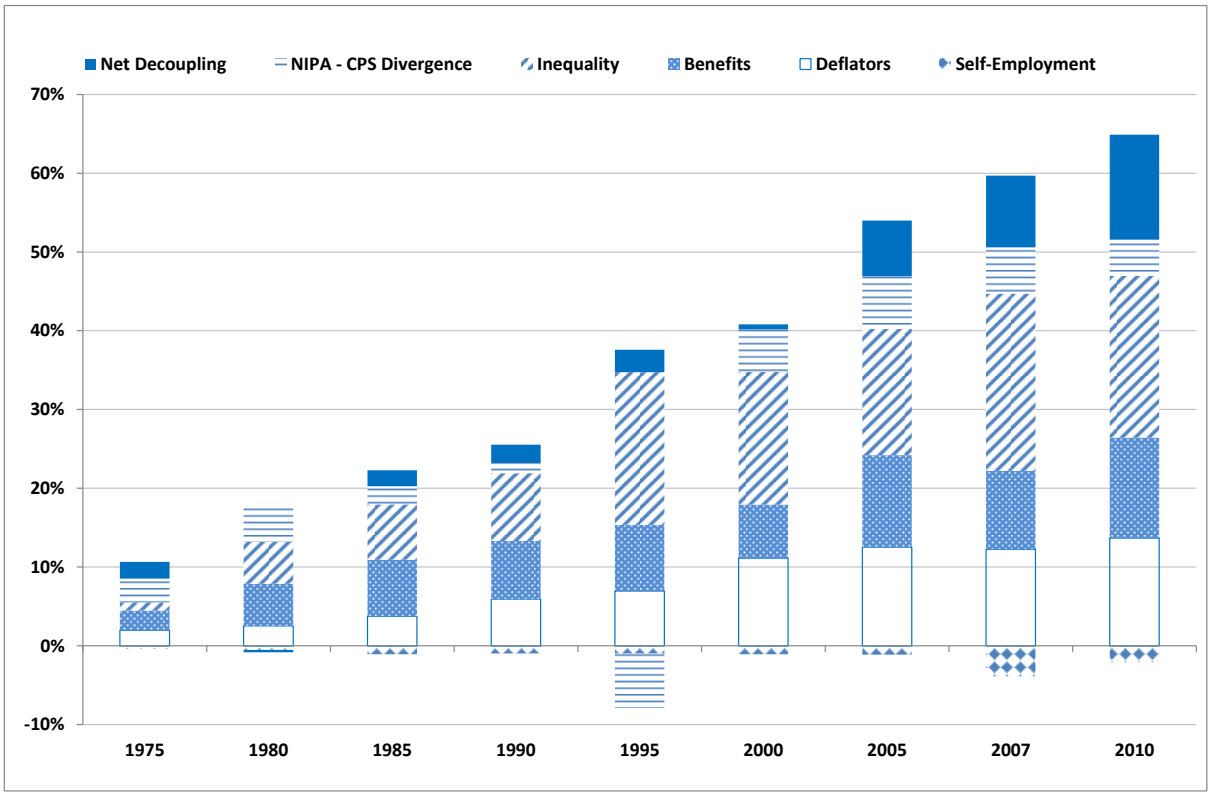

Figure 14: Decoupling Decomposition in the US.

IV.5 Deflator Discrepancies

In our main analysis in this section we consider the CPI for all urban consumers – research series (or CPI-U-RS). We prefer to use the CPI-U-RS because it incorporates most of the improvements made to the CPI over the last 33 years, i.e., the CPI-U-RS is measured consistently over the entire period while the CPI is not (the CPI historical series would not be adjusted for modifications made from today onwards, for example). Unfortunately, the CPI-U-RS is available only from 1977. So, in our main analysis we actually considered a composition of the CPI and the CPI-URS: we used the former series for the period 1972-1976 and the latter for the post 1976 years.

We also take into account different price deflators in our US analysis as it appears that, in contrast with the UK, different price deflators play an important role here. There are two alternatives to the CPI-U-RS - the non-consistent CPI for all urban consumers (or CPI) series and the Personal Consumption Expenditure (PCE) deflator series.

In Appendix E we show that using the non-consistent CPI and considering the 1977-2010 period, the gross decoupling is 14 percentage points higher when compared to the one obtained using the CPI-U-RS. In other words gross decoupling after 1977 was 57.2% using the CPI whereas it was only 43.2% using the CPI-U-RS. The difference is simply because the CPI-U-RS has not risen as fast as the CPI and is therefore closer to the GDP deflator (net decoupling was equal to 9.8% and is unchanged of course as this is in terms of the GDP deflator). In terms of a decomposition analogous to the one seen in Figure 14, looking at the 1977-2010 period the breakdown of gross decoupling using the CPI was 9.8% due to inequality, 27.5% due to difference in deflators, 7.3% due to the difference in mean compensation vs. mean wages, 3.7% due to the NIPA-CPS divergence and self-employment contributed with -1%

We also show in Appendix E that gross decoupling falls when we consider the PCE deflator during the 1977-2010 period (37.8%). In terms of gross decoupling decomposition, now only 6.5% of the gross decoupling is explained by differences in deflators. The part explained by inequality is 11.5% and the other components do not change relative to the values obtained using the CPI described in the previous paragraph.

It is not completely clear which deflator is best to use. Because we want to look over as long a period in the US as possible to compare with the UK (where we can do this for all years after 1972) we have used a mixed CPI/CPI-U-RS index in the main part of this section, since for the period after 1977 the CPI-U-RS does include many improvements relative to the CPI.

Explaining the differences between deflators

As we mentioned previously, the CPI and the CPI-U-RS differ because the latter series is measured consistently over time, incorporating modifications made to the CPI since the late seventies. An example of a methodological difference between the two series is the treatment given to homeowner cost. In 1983 the homeownership component of the CPI was changed from the cost of purchase of a home to a "rental equivalence" approach. The CPI-U-RS incorporates this modification for the pre 1983 years, while the CPI does not. Several

modifications like this[9] since 1978 led to significant divergence between the two series, with the CPI rising faster than the CPI-U-RS.

The difference between the CPI and the GDP deflator is more complex. Figure 15 below plots the GDP deflator, Personal Consumption Expenditure [10] (PCE) deflator and the Consumer Price Index for all urban consumers (CPI). We can observe that the CPI increases steeply after the late seventies, diverging significantly from the two other series after this same period. This faster growth of the CPI compared to the GDP deflator is also common to other countries – see Figure 36 in Appendix E.

There are several papers that try to explain the differences between the three deflators seen below[11]. Here we summarise the possible channels of divergence and indicate which of them might be responsible for such a gap. To understand the difference between the CPI and the GDP deflator we decompose our analysis in two steps. First we explain potential differences between the GDP deflator and the PCE deflator, and then mention the reasons behind the PCE deflator and the CPI differences.

[9] For a complete list of the improvements to the CPI between 1978 and 1998 see Stewart and Reed (1999).

[10] Personal consumption expenditures (PCE) measures the goods and services purchased by households and by non-profit institutions serving households who are resident in the United States. The implicit PCE deflator is calculated in a similar way to the implicit GDP deflator.

[11] See Triplett (1981); Fixler and Jaditz (2002); McCully, Moyer and Stewart (2007); Bosworth (2010).

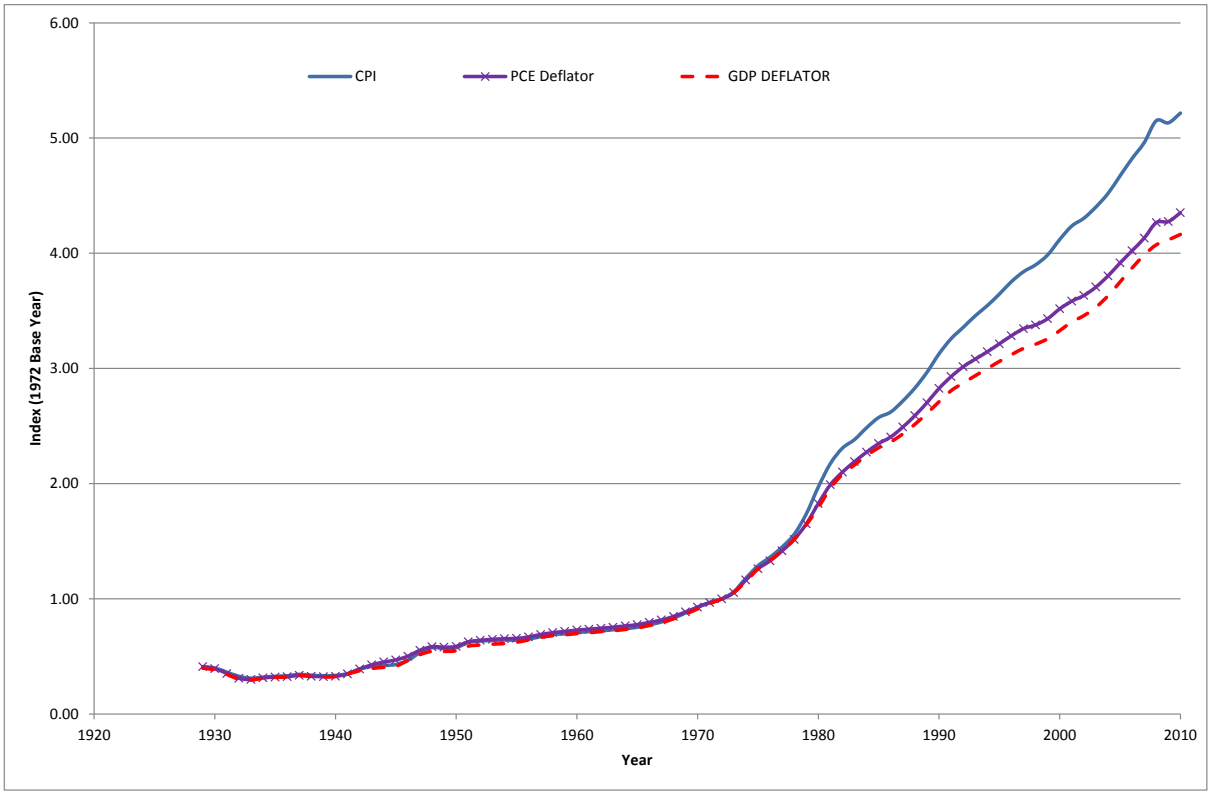

Figure 15: GDP Deflator, PCE Deflator and CPI over Time in the US.

Source: BEA and BLS

Consumer expenditure and GDP are obviously not exactly equal, but they are similar, with the former accounting for two thirds of the latter. The PCE and the GDP differ because of the composition of the aggregate purchases by consumers relative to the composition of the total GDP. An important source of potential differences between the two measures is that the PCE includes imported goods, while the GDP deflator includes only domestic production. Apparently, the greater weight given to energy in the PCE associated with increased costs of this product since the mid-seventies, account for a significant part of the divergence between the two deflators.

The difference between the CPI and the PCE deflator comes from four main potential sources[12]. First, they have different formulae. The CPI is based on a modified Laspeyres formula, while the PCE is based on a Fisher-Ideal formula (which is a geometric average of the Laspeyres and Paasche price relatives). The major practical difference between the two formulas is the substitution among items as the relative price of those items change.

[12] There are other sources not mentioned here – for example, seasonal adjustment.

Consumers *tend* to substitute away from products that are increasing in prices, and the Fisher price index better reflects this type of changes.

A second source of divergence is the relative weights assigned to comparable items in the two indexes. The weights are different because they are not based on the same data source. For example, Bosworth (2010) points out that the CPI final weight on housing is considerably higher than that of the PCE deflator. Additionally, he highlights that different weights to housing and energy, whose prices have risen faster than average, account for a significant part of the divergence observed in the last decade.

Third, there are differences in the scope of the two measures. A significant example regards medical care. The CPI includes only medical expenses actually paid by individuals. On the other hand, the PCE includes medical expenses paid by third parties (public and private insurers) on behalf of individuals.

A final potential source of divergence regards different methodologies for computing price changes, especially for owner-occupied housing. Triplett (1981) finds that different approaches for estimating owners' equivalent rent accounts for approximately 65% of the cumulative difference between the CPI and the PCE deflator from 1972 until 1980 (the weighting effect is also responsible for a significant 30% chunk).

In sum, the many potential sources of divergence (formula, weight, scope and price changes) between the CPI and the PCE deflator makes it difficult to elect a main responsible for the pattern observed in Figure 15. Fixler and Jaditz (2002) reach a similar conclusion in a more detailed analysis considering a five year period in the mid-nineties (1992-97). They attribute most part of the difference between the PCE deflator and the CPI to formula and price change effects, but highlight that "… there is no "smoking gun" that accounts for the entire discrepancy between the two indexes."

UK Deflators

For the sake of comparison we also put in the UK numbers since 1955. There is no CPI equivalent inflation measure available in the UK before 1988, but we show in Appendix E that the CPI grew at slower rate compared to the above two deflators in the period available for analysis. Hence, we plot the Retail Price Index (RPI) against the GDP deflator. Figure 16 shows that the two inflation measures are not exactly equal, but the divergence between them is trivial.

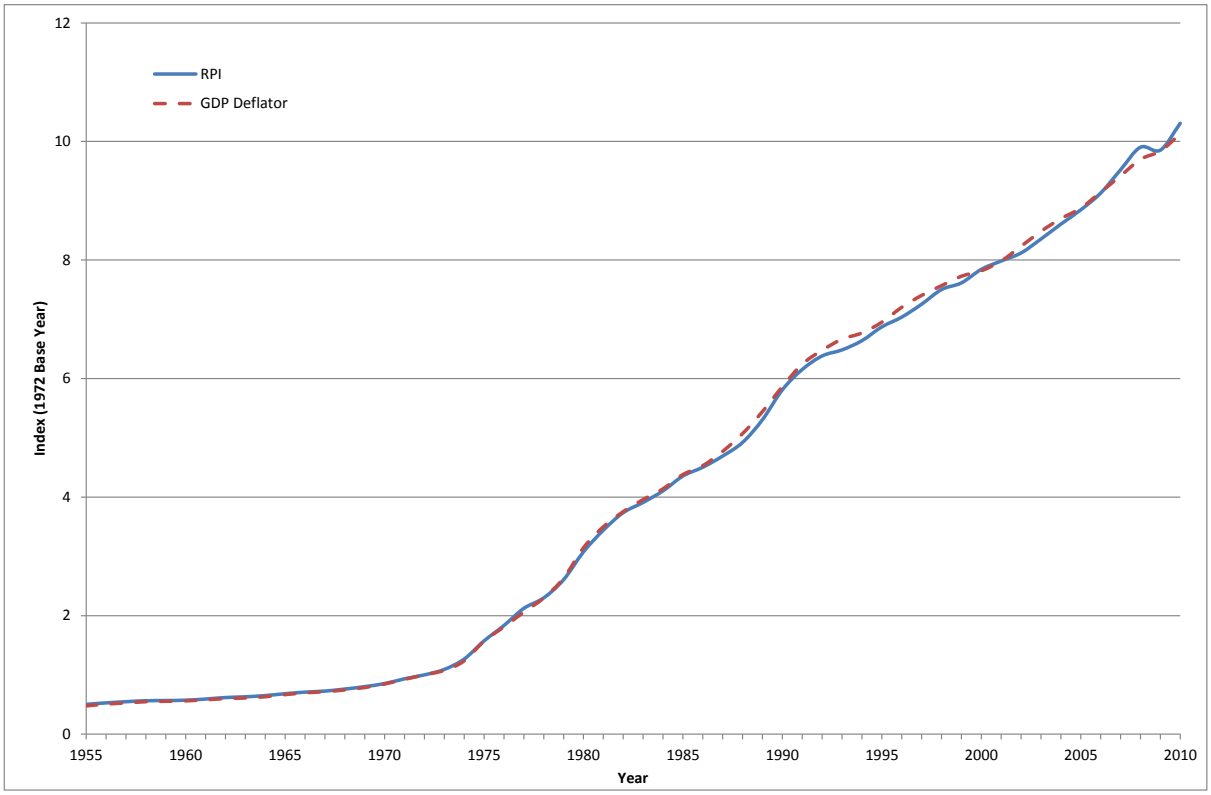

Figure 16: GDP Deflator and RPI over Time in the UK.

Sources: ONS and HM Treasury

IV.6 Annual Measures of Productivity and Wages in the US

In contrast to the UK case, with the US data it is possible to compute all measures in annual (or per worker) terms so we present these in Figure 17. Labour productivity is measured as GDP per worker. The decoupling characteristics are relatively similar to the ones presented earlier, but we can observe that the CPS measures are growing faster relatively to the NIPA ones.

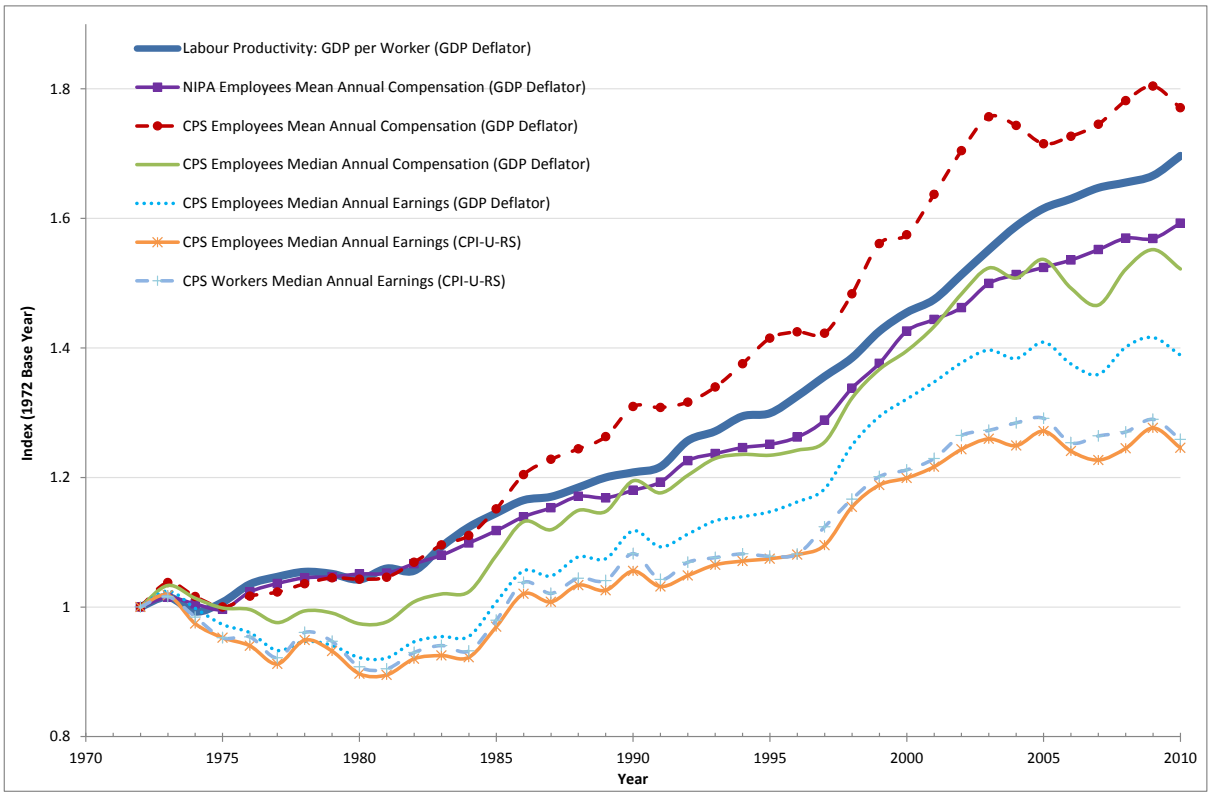

Figure 17: Annual Decoupling in the US.

Sources: BEA, OECD, CPS Survey and BLS. "Workers" includes both Employees and Self-Employed.

IV.7 Summary on US Decoupling

The policy debate on decoupling started in the US. However, like the UK the headline numbers that focus on gross decoupling: the difference between median workers' wages deflated by the CPI and productivity deflated by the GDP deflator. This gross decoupling appears to be 1.5 times the size of that in the UK (approximately 63% vs. 42%). However, only about 13% is due to net decoupling: the difference between compensation and labour productivity using common deflators. Much of gross decoupling in the US is driven by increases in inequality and the growing wedge between compensation (which includes employer provided health and pension benefits) and wages (which do not). These account for approximately 33% of the gross decoupling. Unlike the UK, however, the wedge between the CPI-U-RS and GDP price deflator accounts for a great part of gross decoupling, approximately 12.7%, a phenomenon that requires deeper investigation. Part of this seems to

be due to discrepancies in the measures of consumer price inflation used. If we use the PCE deflator then the contribution of deflator differences falls from 12.7% to 5.7%. On the other hand, If we use the non-consistent version of the CPI the contribution of deflator differences rises to 26.8%.So differences in deflators can account for between 5.7% to 26.8% of the difference between net and gross decoupling in the US – quite a large range[13]. Given the problems of comparability of the CPI over time we would tend to guess that the deflator difference is more towards the bottom of this range and therefore the US looks more like the UK.

V. Trends in the Labour Share of Income: Evidence from the UK, US and other OECD Countries

Theory predicts that labour productivity should follow average wages (or average compensation) in a given economy. If this is not happening, i.e., if labour productivity is actually decoupling from average compensation, than we should observe a fall in labour income share over time. In this section we investigate if there is any indication of decoupling in some of the major economies of the world by analysing labour income shares.

The OECD computes the labour income share as total labour costs divided by the GVA of the economy, where labour costs include wages, allowances, bonuses, payments in kind, benefits paid by the employer, costs associated with training of the workers, taxes regarded as labour costs, and other labour associated costs. So unlike compensation, payroll taxes (like employer NI in the UK) and training costs are also factored in.

Here we assume that employees and self-employed earn the same on average (in hourly terms). Hence, before computing the labour share we multiply compensation by a factor equals to the total hours worked in the economy divided by hours worked only by employees (excluding self-employed)[14]. The OECD measure considers a similar approximation.

[13] Baker (2007) also finds that inequality and inflation are important in explaining differences between wage growth and productivity growth. He claims that the slow growth in productivity after 1973 (when compared to the post war period growth) is one of the main *causes* behind the slow wage growth, i.e., he is implicitly assuming that net decoupling should be always zero (that compensation growth should always reflect productivity growth).

[14] In Appendix F we plot the labour shares for the UK and for the US dropping the self-employed (i.e. assuming they have a wage of zero). This is obviously the wrong thing to do because it is assuming that the self-employed have a zero wage and all their return should be counted as capital (since large numbers of the

We begin by using compensation. Figure 18 plots the UK share of compensation in GDP and Figure 19 does the same for the US. Unsurprisingly (since there is an identity between them) these figures show the same information as the compensation and productivity trends. The labour share in the UK in 2010 is essentially identical to that in 1972 at just under two thirds of GDP, although it did fall during the long-boom after 1993. The US share is also around 65% of GDP, although as noted above, the fall in the labour share in the 2000s was not reversed in the Great Recession.

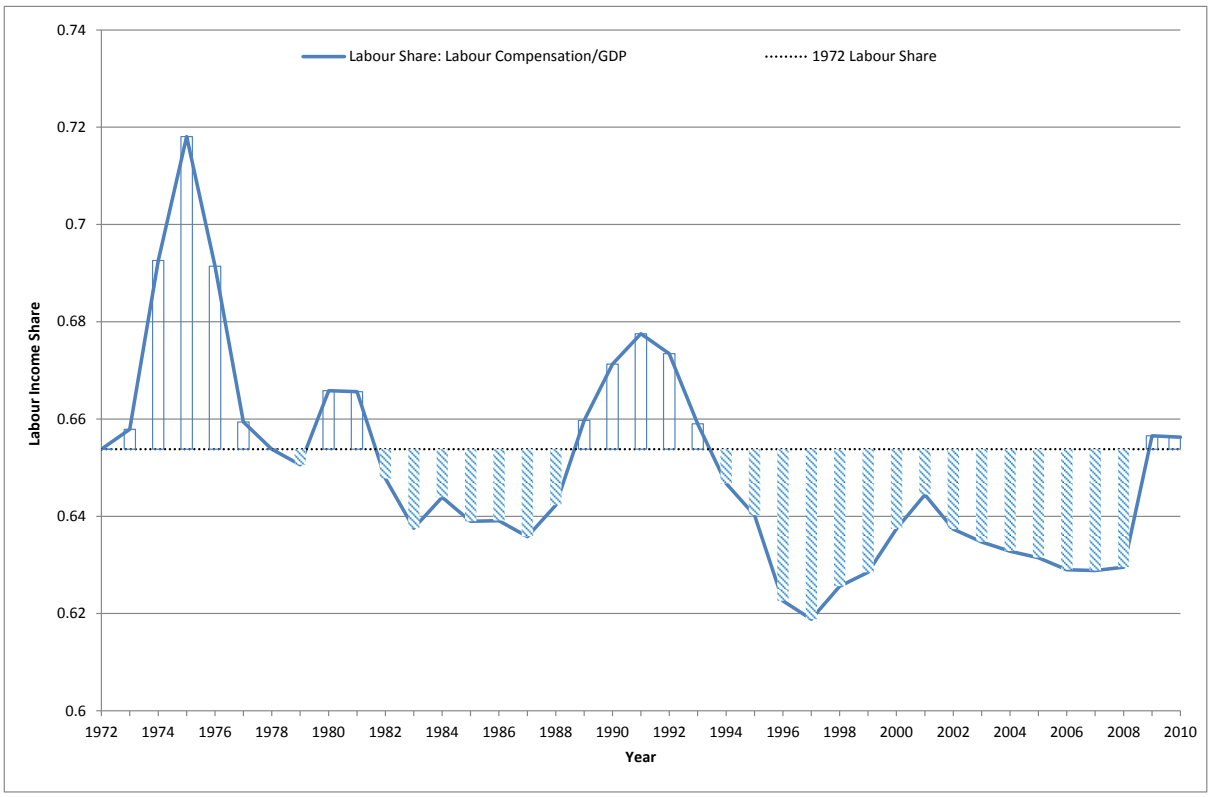

Figure 18: Labour Income Share in the UK.

Sources: ONS, OECD, and KLEMS. All Measures Adjusted for Self-Employment.

measured self-employed work as builder on construction sites this is obviously misleading). Since the proportion of self-employed is increasing, this artificially makes it appear as if labour's share is falling.

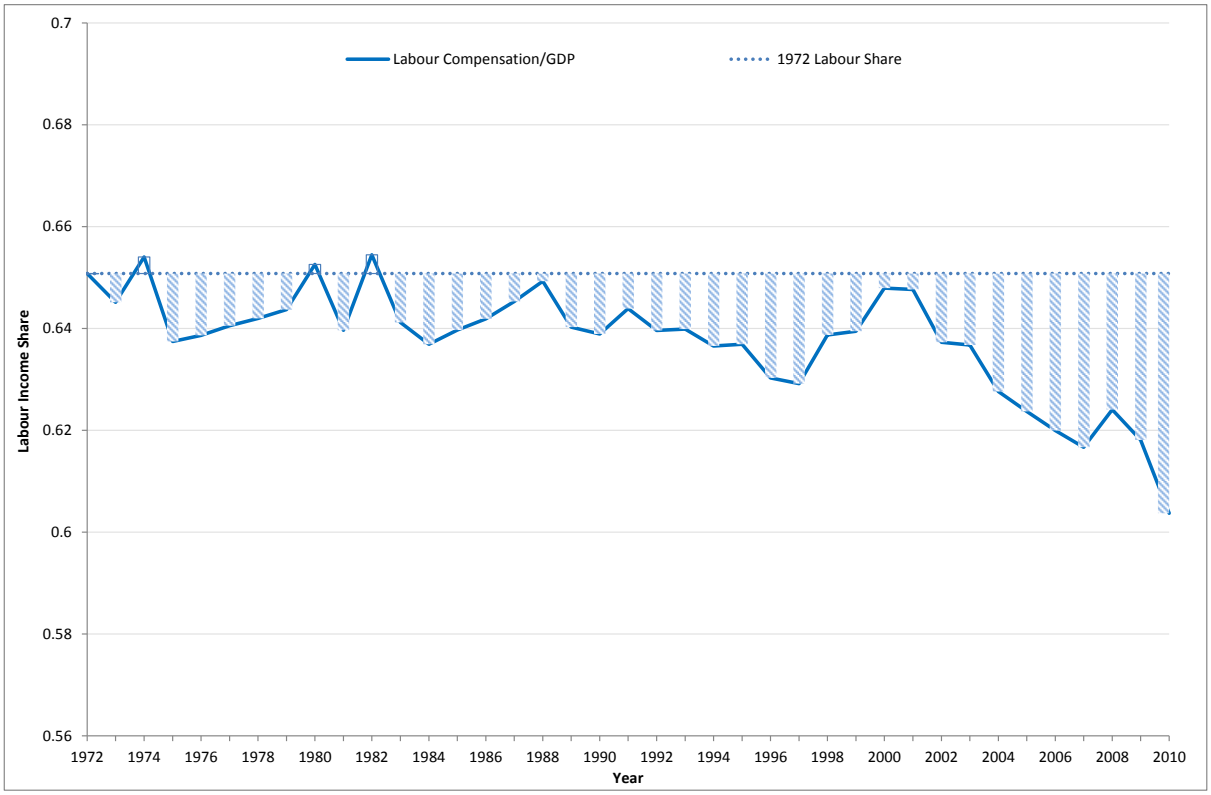

Figure 19: Labour Income Share in the US.

Sources: BEA and OECD. All Measures Adjusted for Self-Employment.

Figure 20 and Figure 21 show again the compensation share compared with the wider concept of the labour share in the UK and US. Obviously, since the labour cost share includes more items than compensation (like payroll taxes and training costs) it takes up a larger share of GVA (which is also smaller than the GDP), the difference is not great (e.g. about 70% of GDP rather than 65% for the UK) and the trends are near identical.

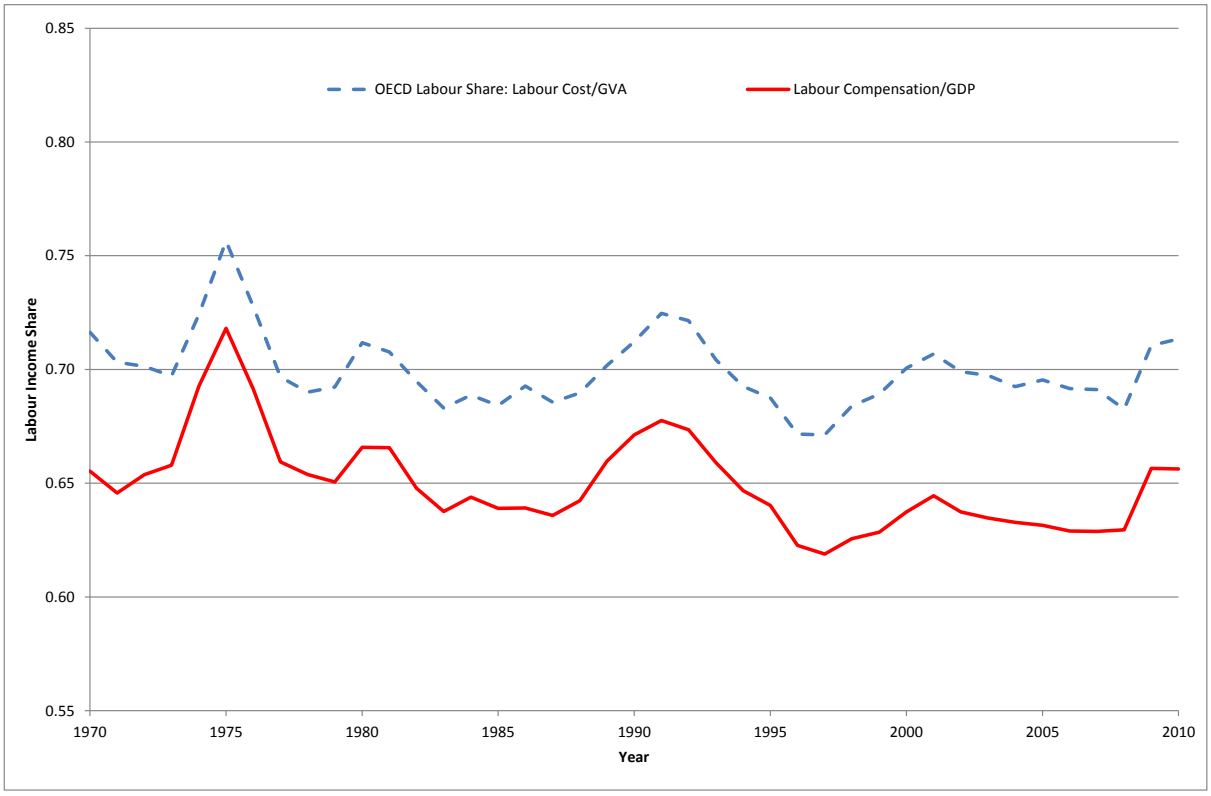

Figure 20: Labour Income Share over Time in the UK

Sources: OECD, ONS, and KLEMS. All Measures Adjusted for Self-Employment.

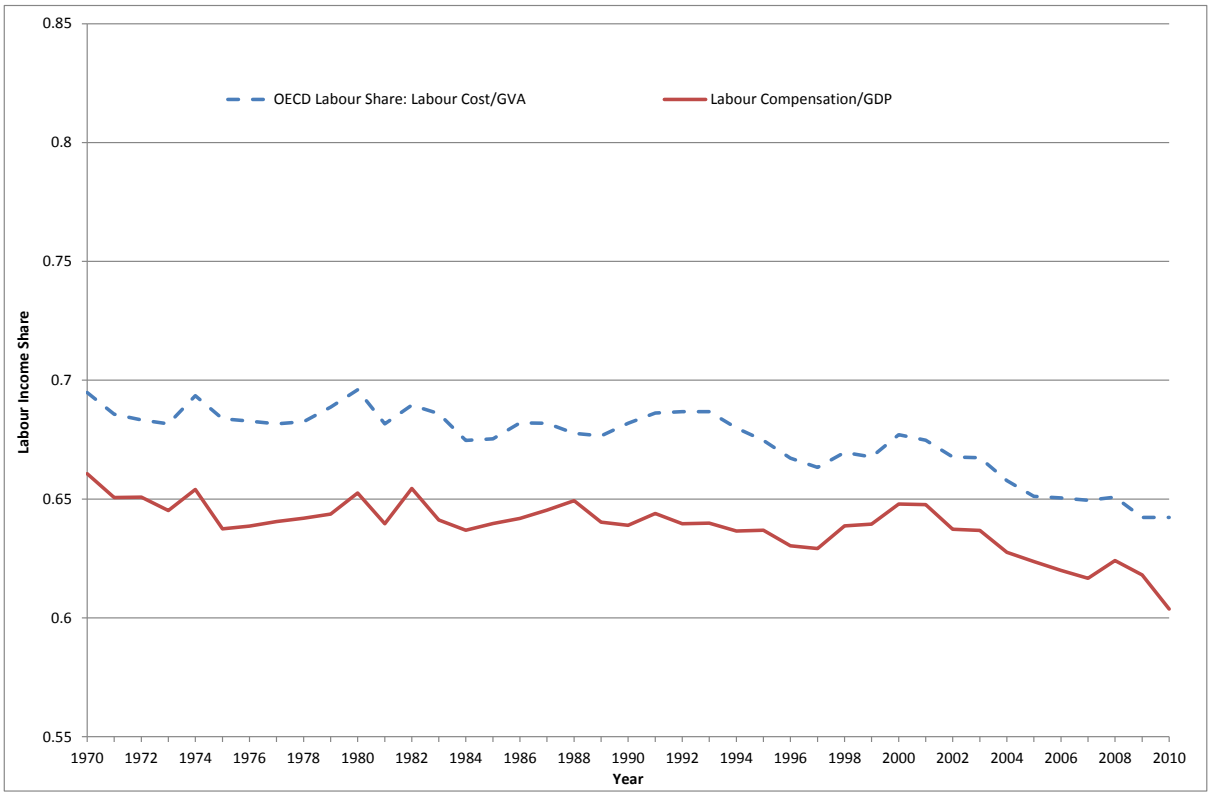

Figure 21: Labour Income Share over Time in the US.

Sources: OECD and BEA. All Measures Adjusted for Self-Employment.

Figure 22 and Figure 23 show the labour share for a number of other OECD countries. What is striking is that many of these countries *have* seen substantial falls in labour's share of income, so therefore substantial net decoupling. The German share fell from about 75% in 1975 to 65% in 2006, Japan from 73% in 1975 to 57% in 2006 and France from 80% in 1975 to 67% by the end of the period. Italy saw a fall in labour's share from 80% in 1970 to 67% by 2006. This net decoupling is vastly greater than the changes that have been seen in the US and UK and suggests workers have fared badly in the Continental EU countries and Japan which are usually regarded as being much more worker-friendly. This is not news, of course. The decline of the labour share especially in the Continental EU countries is the source of a considerable (and unsettled) literature (e.g. Azmat, Manning and Van Reenen, 2011; Blanchard and Givazzi, 2003). Globalisation, decline of worker bargaining power and privatization have all been seen as possible (multiple) culprits. What is less widely realised is that the UK and US have been relatively immune to these negative trends against the labouring classes as a whole.

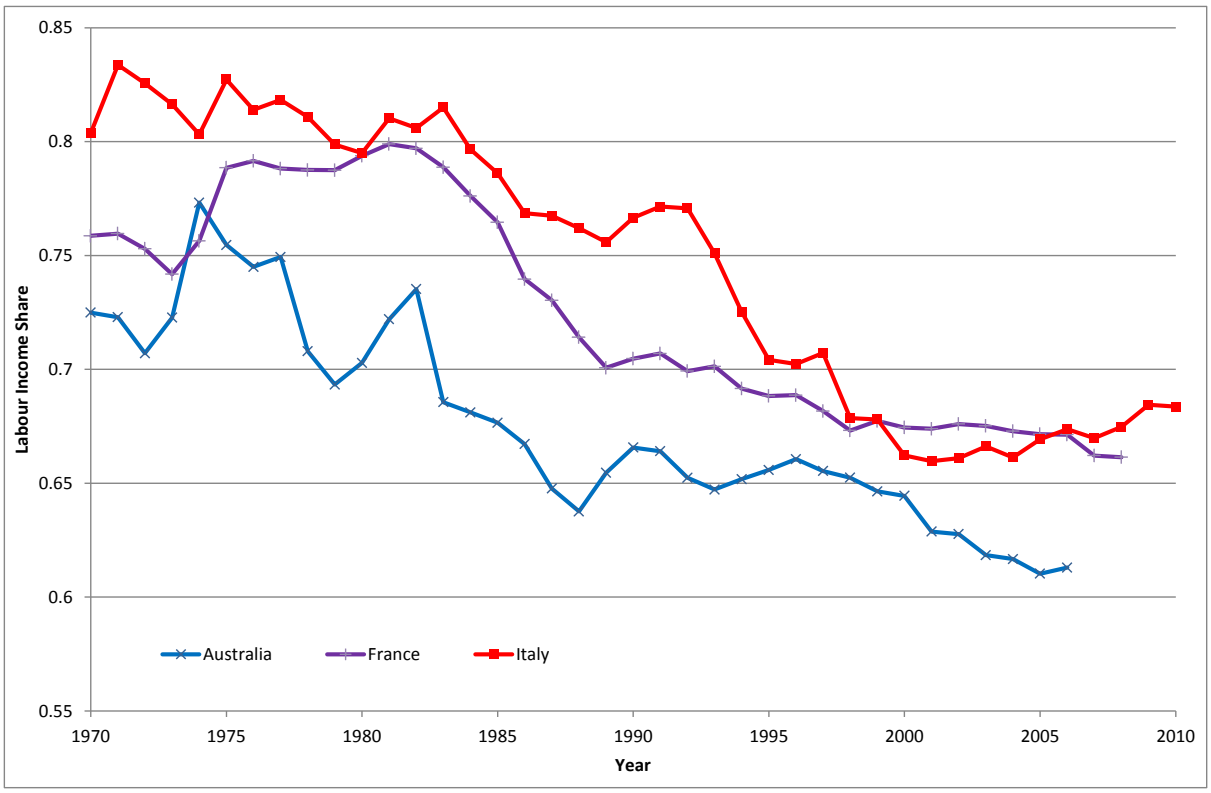

Figure 22: Labour Income Share over Time in Australia, France and Italy.

Source: OECD. All Measures Adjusted for Self-Employment.

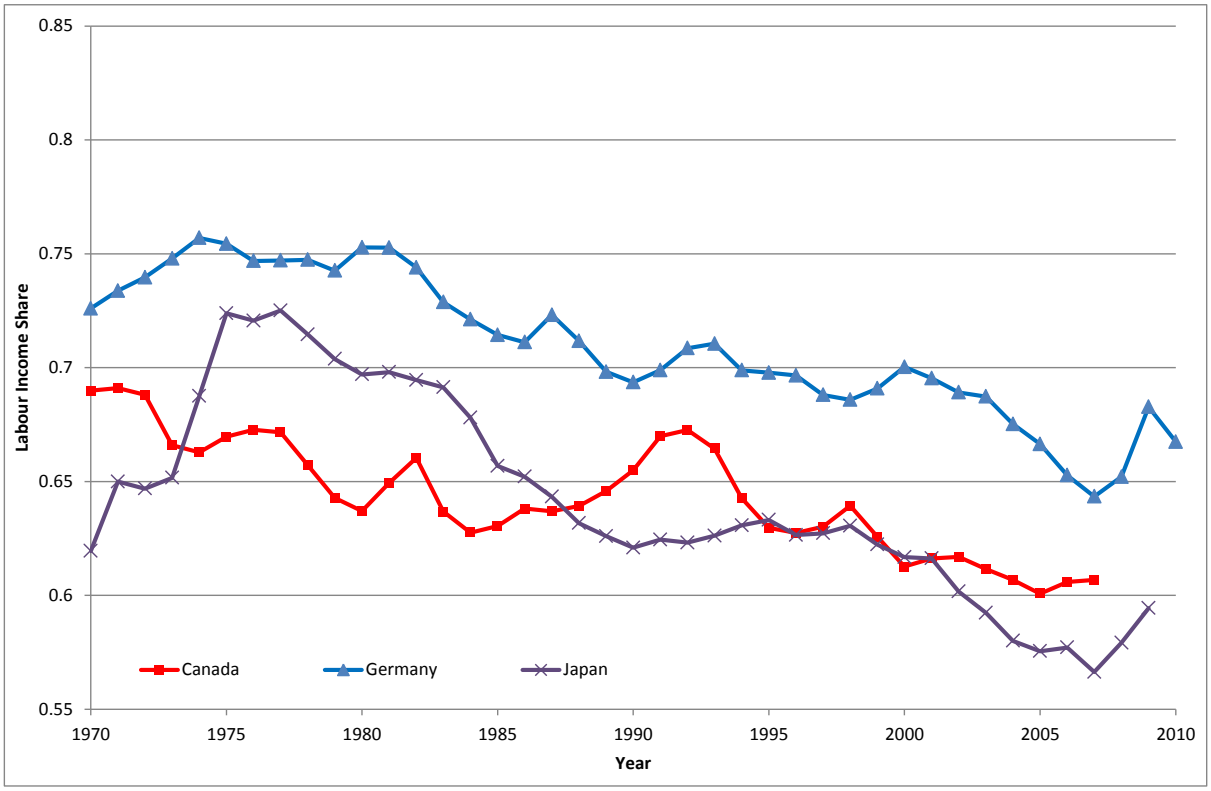

Figure 23: Labour Income Share over Time in Canada, Germany and Japan.

Source: OECD. All Measures Adjusted for Self-Employment.

VI. Industry- Level Analysis of Decoupling in the UK

VI.1 Introduction

We examined some disaggregation of the trends by industry. Of course, there is no reason to expect that compensation growth should match productivity growth at the industry (or firm) level. In the standard economic model workers' wages will depend on aggregate demand and supply, not the productivity of a specific firm or sector. Of course, when there is imperfect competition a positive shock to an industry's (or firm's) productivity might increase wages. But one might expect this to be only a short-run effect.

VI.2 Data

For the "micro" analysis we use the EU KLEMS database. This is the best available internationally comparable database on productivity measures at the industry level. In the UK, the data is available from 1970 to 2007, but we start our analysis from 1972 in order to keep some consistency with the analysis made previously.

VI.3 Overall Trends

We begin by taking another look at net decoupling using only KLEMS data in Figure 24. There is even less net decoupling here than in the ONS data with compensation growth slightly ahead of productivity growth through much of the period and almost exactly equal in 2007. The reason (as noted above) is that KLEMs used gross value added which has grown slightly more slowly than GDP.

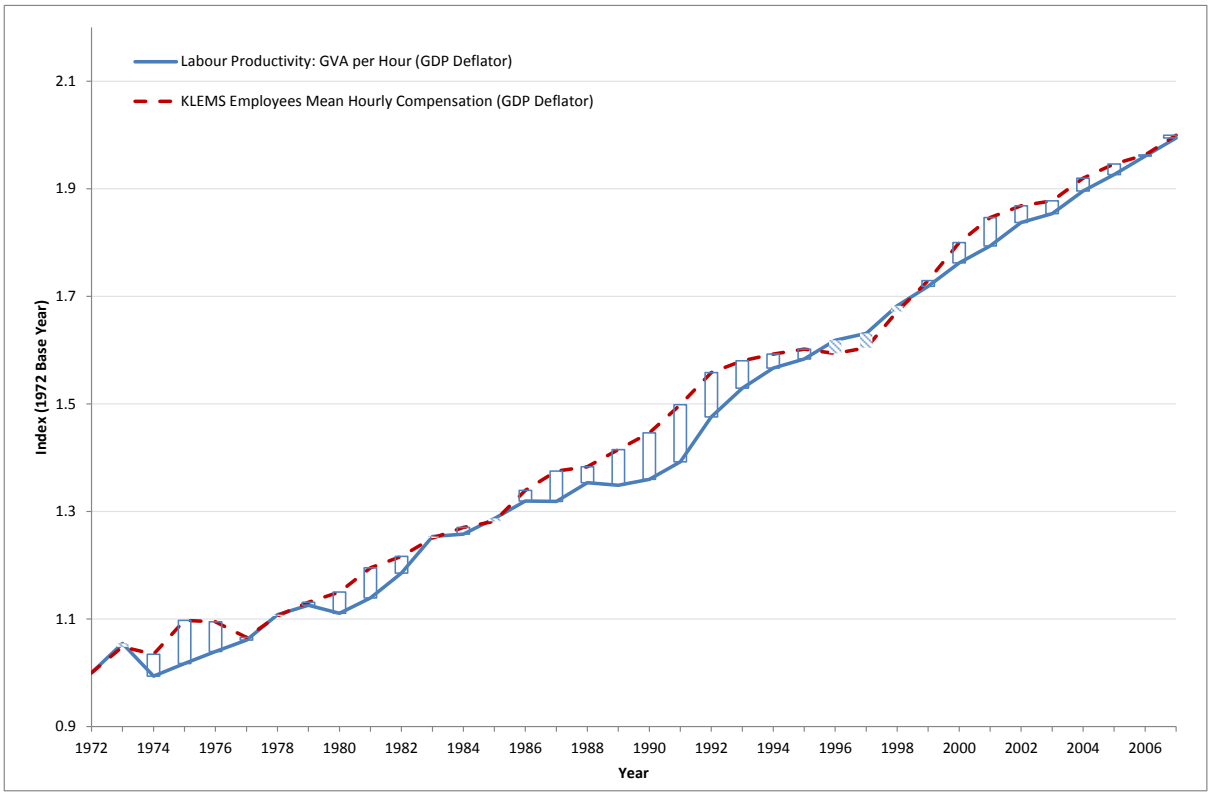

Figure 24: Hourly Net Decoupling in the UK considering the GVA.
Source: KLEMS

VI.4 Changes in the Shares of Sectors

The KLEMS data permits us to separate the economy into two different levels of disaggregation. In a first level, we separate the economy into a Market and a Non-Market Services sectors. The latter includes public services like administration, education, health, and defence; it also includes private education, health and social work, and real estate activities. These are sectors where value added is hard to measure and dominated by public sector services.

The Market sector comprises the rest of the private economy. We separate the Market sector into the following industries:

1) Electrical Machinery, Post and Communication Services – This classification includes electrical and optical equipment, and post and telecommunication services.
2) Goods Producing (excluding electrical machinery) – Includes manufacturing, agriculture, mining, construction, and supply of electricity, gas, and water.
3) Distribution Services - This is associated to retail and wholesale trade, transport, and storage.
4) Financial and Business Services (except real estate) – comprises financial intermediation, renting of mergers and acquisitions, and other business activities.
5) Personal Services – Composed by services like hotels and restaurants, private households with employed persons, and other community, social, and personal services.

Figure 25 splits GVA into market and non-market and shows that the non-market sector has increased from 18.3, to 26.4%, much of this is driven by increases in health and real estate.

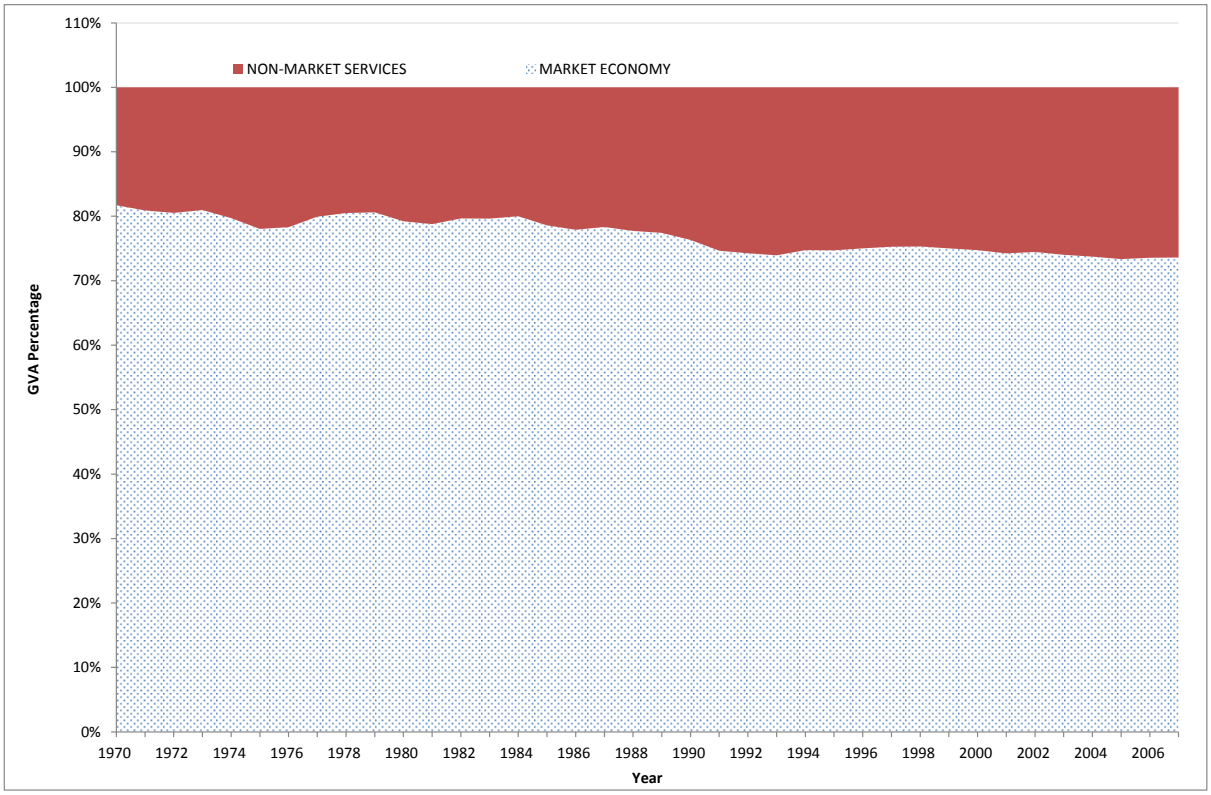

Figure 25: GVA Decomposition between Market and Non-Market Economies in the UK.
Source: KLEMS

Looking within the market economy we see that the Financial and Business Services grew considerably along time, going from approximately 11% of the Market economy GVA, to 31% in 2007. In contrast, the Goods Producing sector fell from 55% to 31% during the same period. The Personal Services also increased significantly, changing from 6% to 11% with stability in the other two sectors.

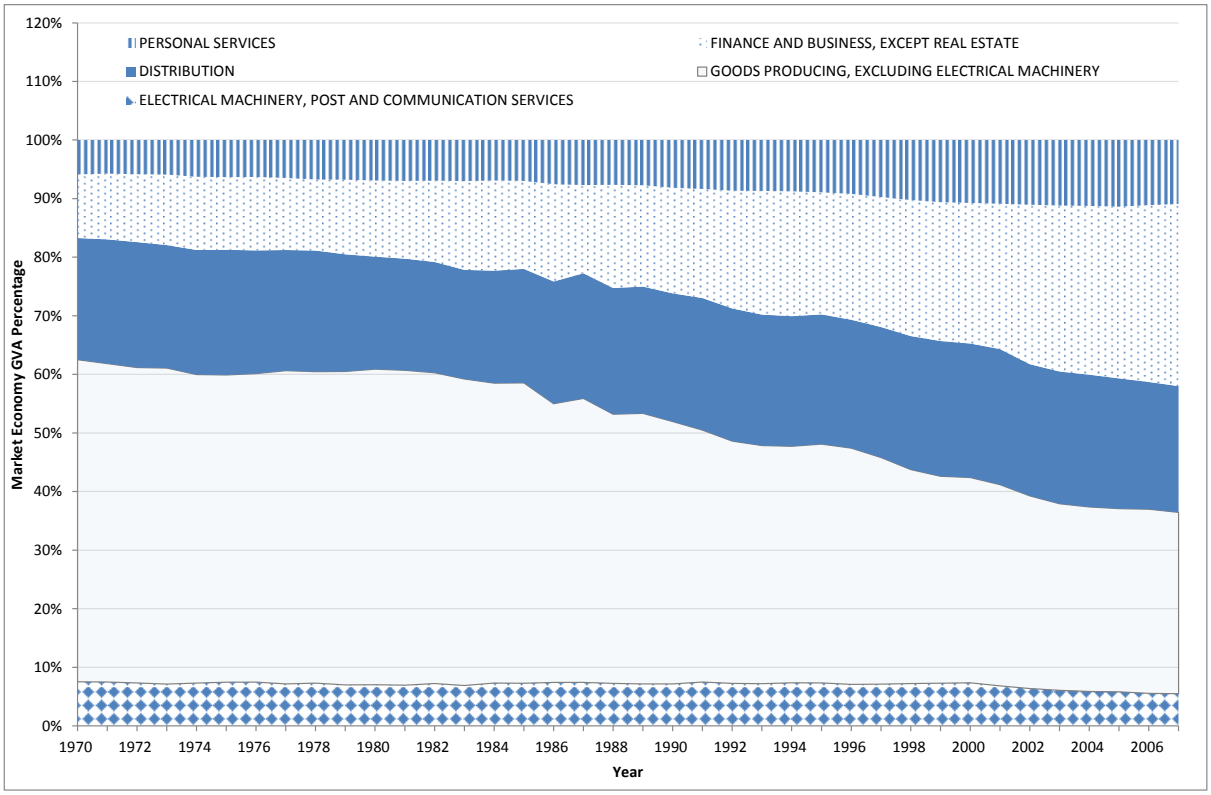

Figure 26: Market Economy GVA Decomposition between main Sectors in the UK.
Source: KLEMS

VI.5 Changes within Sectors

Figure 27 shows that compensation grew more slowly than productivity in the non-Market services whereas the reverse was true in the market economy. We may doubt the accuracy of value added measures in the non-market sector, but what is remarkable is that in the better-measured market economy there is no sign of decoupling at all – workers compensation appears to outstrip productivity growth

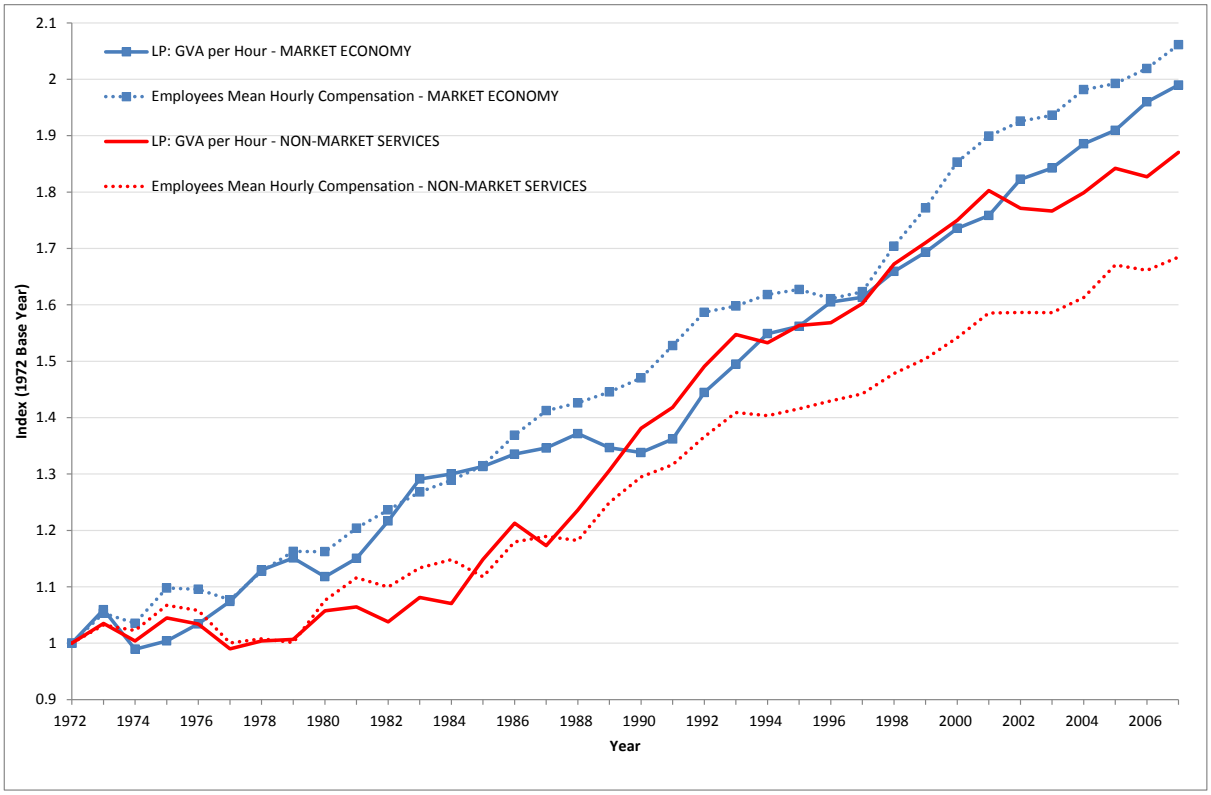

Figure 27: Hourly Net Decoupling in the UK considering the GVA for Market and Non-Market Economies. Source: KLEMS. All Measures Adjusted for Self-Employment.

Disaggregating the Market economy, Figure 28 below shows that labour productivity tracks labour compensation reasonably well in the Goods Producing and in the Electrical Machinery sectors. The same is true for Distribution. In Finance, however, there is some "negative decoupling" in the sense that compensation appears to grow faster than productivity. Personal services (Figure 30) are the most extreme example where compensation appears to have grown much faster than productivity. Again, this may be due to measurement issues, although it is worth remembering that this is an important component of total GVA by the end of the sample.

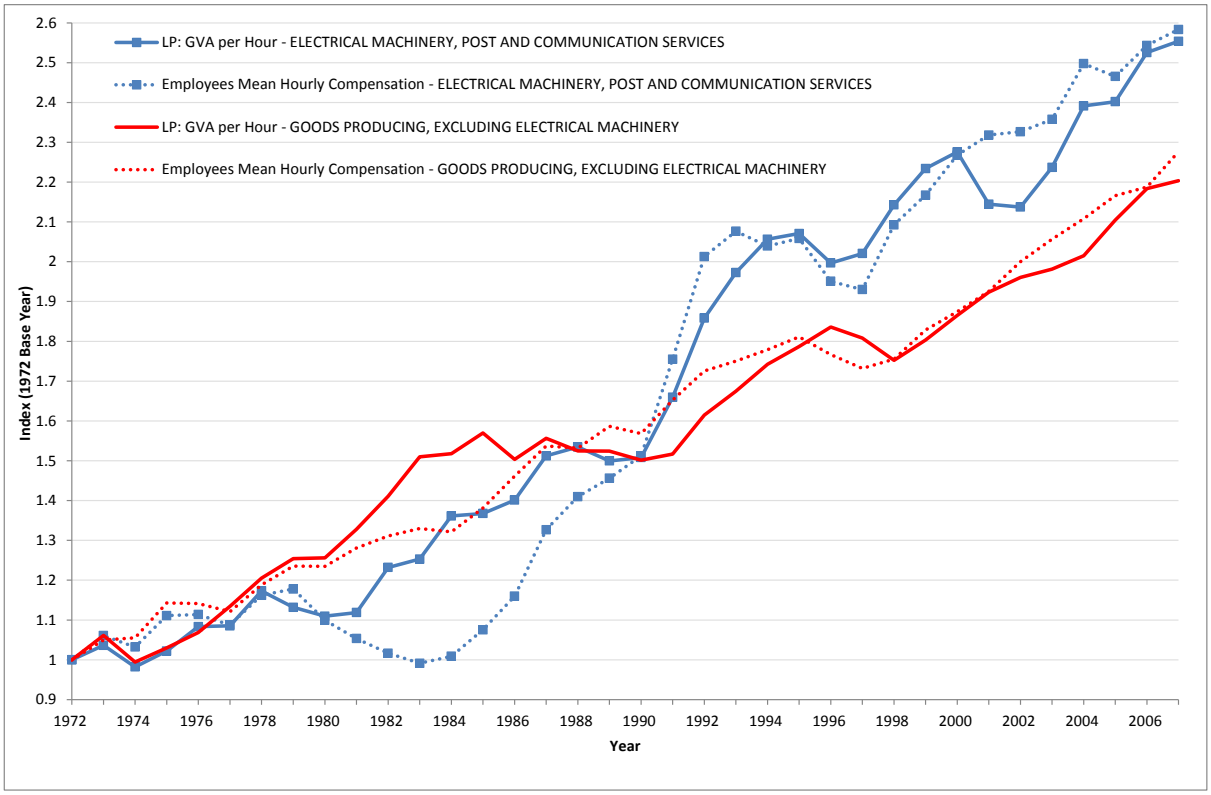

Figure 28: Hourly Net Decoupling per Sector in the UK considering the GVA; Production and Services.
Source: KLEMS.

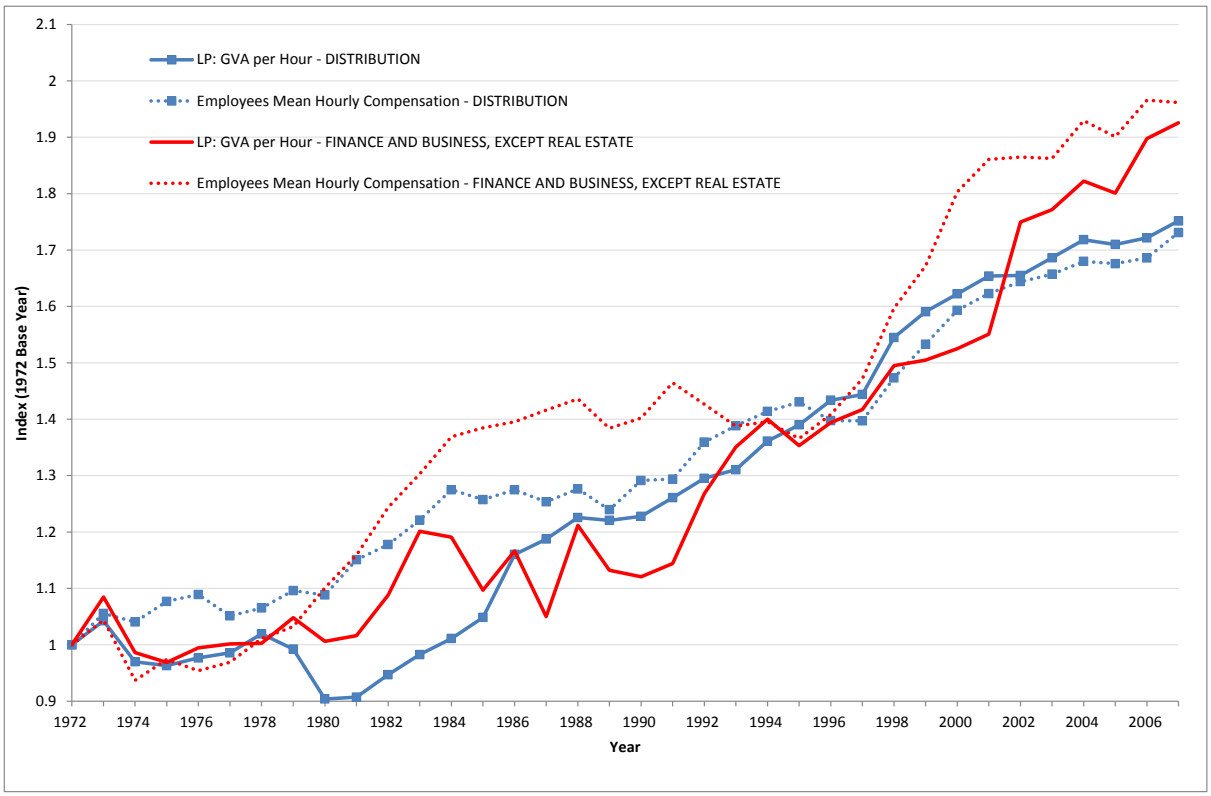

Figure 29: Hourly Net Decoupling per Sector in the UK considering the GVA; Services.
Source: KLEMS

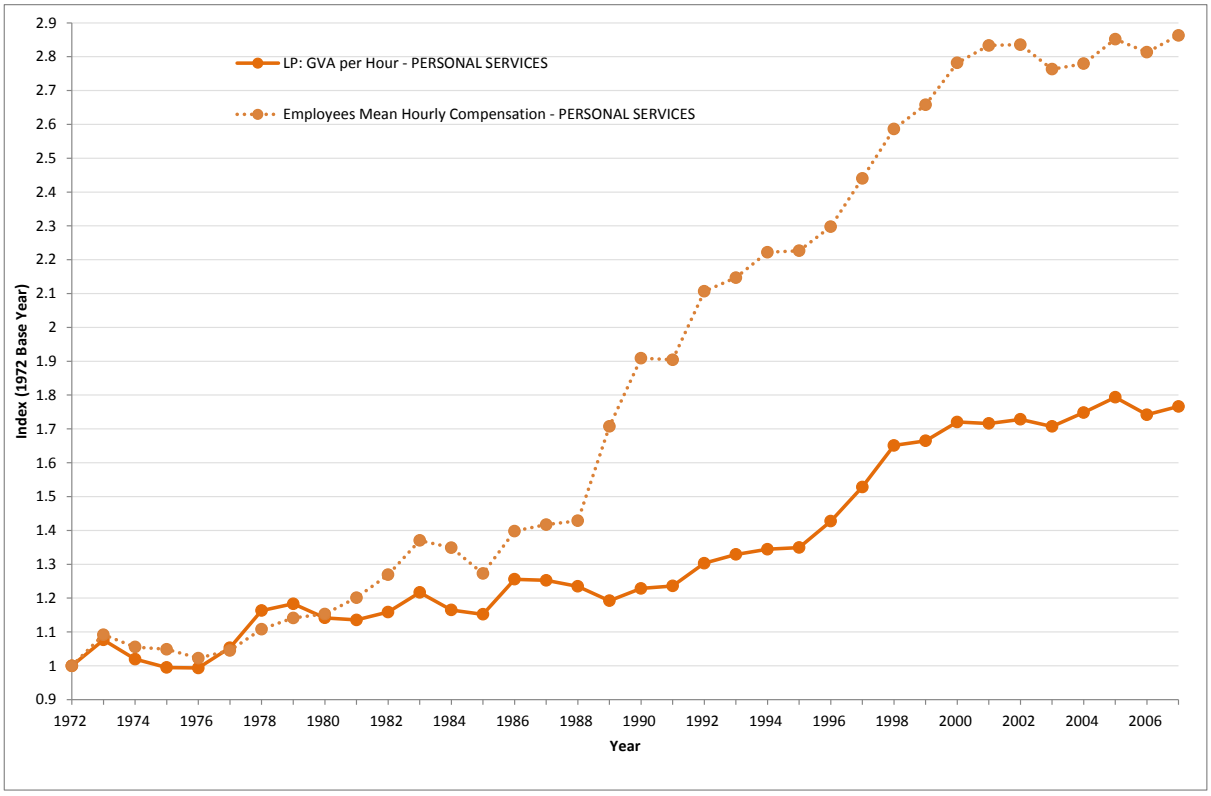

Figure 30: Hourly Net Decoupling per Sector in the UK considering the GVA; Personal Services.
Source: KLEMS

VI.6 Summary on industry-specific analysis

Using industry data to obtain a more disaggregated view of decoupling does not give a very clear picture. Overall, using value added per hour as our productivity measure there is no aggregate net decoupling in the UK over the 1972-2007 period, so in one sense there is not much "to explain" when we disaggregate by sector. The only major decoupling we find is in the non-market economy which is dominated by the public sector. In the market economy, compensation appears to have generally growth faster than productivity, especially in personal services and (to a lesser extent) in finance.

It is perhaps unsurprising that there should be less of a clear picture at the industry level than at the national level as noted in the introduction to this section. There is certainly no sign of net decoupling.

VII. Research and Policy Implications

VII.I Research Implications

The decoupling literature has been more popular in policy circles than in academic research. Perhaps this is because some economists are blinkered and find it hard to understand how net decoupling could be a long-term phenomenon when labour's share of GDP has not changed so much (at least in the US and UK). In fact, we have found that there is not much evidence for net decoupling in the UK or US, so an investigation of the functional distribution of income is unlikely to excite much analysis.

There have been some interesting new puzzles thrown up by our analysis:

1. Why has compensation grown so much faster than wages in the UK and the US?
2. Why in the US have the CPI and GDP deflators diverged so much, whereas they (RPI and CPI) have not in the UK?
3. Why has there been net decoupling in Continental European countries and Japan (but not the UK and US)?
4. ....And the same old question of what has caused the massive increase in inequality between workers?

VII.2 Policy Implications

If (net) decoupling were a major fact in the UK (or US) it would lead to a concern that the shares of economic growth are not going to workers. This may not matter if shares were evenly distributed, but that is not the case. Assets are distributed even more unequally than wages. However, we have seen that there is not much, if any, net decoupling in the UK.

The fact that we see gross decoupling raises some issues, but of a different sort:

1. The fact that compensation has followed productivity growth over the long run highlights the importance of a growth policy to boost productivity. Reforms supporting productivity will lead to higher compensation which is good for workers (see Corry, Valero and Van Reenen, 2011).
2. What can be done about the increase in inequality between workers as indicated by the growing divergence between the mean and the median wage? This is the classic policy issue that has been discussed by economists for the last three decades when the

rise in wage inequality first started to be properly documented, showing that inequality is rising since the eighties in the UK with significant increases along the past two decades (although the "lower tail" inequality seems to have stabilised in the 2000s – see Van Reenen, 2011). Dealing with wage (or compensation) inequality is fundamentally about dealing with inequality in the acquisition of human capital. There is a major need in the US and UK to improve education and skills for those in the lower half of the distribution and in the long-term this has to be done through public school (and early years) reform and the school to work transition (e.g. apprenticeships).

3. Is the increasing divergence between wages and compensation a problem? Since this is driven by pensions in the UK, this is an issue of whether the wedge is sufficiently *large* (See the Turner Report). There is evidence that people are not saving enough for retirement and that the current pension regime is unsustainable without significant changes to the generosity of pensions (such as the raising of the retirement age).
4. In the US, a major issue is the cost of healthcare which is outstripping wage inflation by a considerable degree. The issue here is whether the new healthcare act will be sufficient to tackle this problem. At the moment, the Act does not look like it has sufficient cost control elements in it even though it extends entitlements.

VIII. Conclusions

This paper seeks to shed some light on a confused debate around decoupling. We have focused on the following question: has the growth of workers' compensation and wages fallen behind the growth of labour productivity in the UK? We start with the growth of GDP per hour (deflated by the GDP deflator) and compare this to (i) the growth of median wages per hour deflated by the CPI (net decoupling) and (ii) the growth of mean compensation per hour (deflated by the GDP deflator).

We find no evidence of net decoupling in the UK over the 1972-2010 period as a whole. There is some evidence of net decoupling in the US of the order of 13% (i.e. productivity grew by 13% more than compensation since 1972), but it is small compared to gross decoupling (about 63%) . This means that workers' compensation and productivity growth have tracked each other fairly well since the seventies in both countries. This is consistent with generally used, simple economic models.

The reason for the confusion in some policy circles is that there certainly has been some "gross decoupling", i.e. median workers' wages (deflated by consumer prices) have been growing more slowly that GDP per hour (deflated by the GDP deflator). In the UK this gross decoupling is 42% and in the US this was 63% (although this falls or rises if different consumer deflators are used such as the PCE deflator or the non-consistent CPI). In the UK the difference between gross and net decoupling is because of increased inequality (mean wages have grown much faster than median wage) and because compensation (which includes non-wage benefits like employer pension contribution) has grown faster than wages. In the US these two factors are also important (health premiums are another big driver of the wedge between wages and compensation) but so is a third: an increased divergence between the consumer and producer price index (this deflator difference can account for between 6 and 27 percentage points of gross decoupling). We introduce a decomposition method to clarify where these differences between gross and net decoupling comes from.

Our conclusion is that the debate around net decoupling in the UK and US is rather a distraction (it is actually more important in Continental Europe and Japan). Obtaining faster productivity growth is a highly desirable policy goal in the current climate of near recession as it will ultimately lead to faster wage growth and consumption. On the other hand, the clear presence of gross decoupling shows that the real issues are inequality within the class of workers, not between workers and firm profits and the challenge of health and retirement benefits.

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Appendix A: Decoupling Theory

Consider a firm who maximises profits

$$\Pi = PQ - cL - rK$$

Where P is producer prices, Q is output, c is worker compensation (wages plus employer costs), L is labour, r is the cost of capital and K is capital. Assume also that the firm faces a Cobb-Douglas production function (this can be relaxed).

$$Q = AL^{\alpha}K^{1-\alpha}$$

Where A is an efficiency parameter. We can allow for imperfect competition in the product market so the firm can have market power by letting the demand curve facing the firm be downward sloping with elasticity η. This implies that the firm will potentially enjoy a mark-up, μ, which will be falling in the elasticity of demand (perfect competition is when the demand elasticity facing the firm is infinite).

The firm will choose a level of employment by maximising profits given the technological constrains and factor prices it faces. This leads to a first order condition for the demand for labour that can be written as:

$$c / P = \alpha\mu Q / L$$

Or in logarithmic differences (i.e. a growth rate approximation):

$$\Delta\ln(c / P) = \Delta\ln(Q / L) + \Delta\ln\alpha + \Delta\ln\mu$$

This equation shows the basic forces at work. If the factor bias of technology and consumer preferences does not change (i.e. $\Delta\ln\alpha = \Delta\ln\mu = 0$), then the growth of compensation deflated by product prices ($\Delta\ln(c / P)$) should equal the growth of real productivity $\Delta\ln(Q / L)$.

We define **Net Decoupling** as:

$$ND \equiv \Delta\ln(Q / L) - \Delta\ln(c / P)$$

Of course, technology and preferences may change in a way that is unfavourable to workers. For example, if firm mark-ups increase because (for example) consumers become less sensitive to price increases then $\Delta\ln\mu > 0$ and there will be some net decoupling. Behind much of the analysis is the view that firms are enjoying more market power and this is allowing them to gain "excess profits".

Gross decoupling is what is usually analysed in the policy literature. It can be defined as

$$GD \equiv \Delta\ln(Q / L) - \Delta\ln(Medw / CPI)$$

Where Medw is the MEDIAN wage rather than the AVERAGE compensation. CPI is the consumer (rather than producer) price index. There is no theoretical reason to expect the two measures to be the same. In particular there is no reason why we would think GD should be constant over time. A simple way to see the difference is to write:

$$GD - ND = (\Delta \ln c - \Delta \ln Medc) + (\Delta \ln Medc - \Delta \ln Medw) + (\Delta \ln CPI - \Delta \ln P)$$

or

$$GD - ND = Inequality + Wage\_wedge + Price\_wedge$$

The first term (inequality) is the difference between the average compensation and the median one, the second term ("wage wedge") is the difference between compensation and wages and the third term is the difference between the consumer price index and the GDP deflator.

Appendix B: Data Sources

Source	Name	Description	Country	Modified?	Self-Employed?	Notes	Website
ONS	Wages	Basic wages, cost-of-living allowances, and other guaranteed and regularly paid allowances. It also includes: i) enhaced rates of pay for overtime, night work, hazardous circumstances. ii) bonuses and gratuities regularly paid iii) remuneration for time not worked iv) bonuses and gratuities paid (productivity, Christmas, holydays, transport, etc) v) payments in kind (meals, vehicles, provision of workplace creches, etc)	UK	No	No	Definition of this wage measure and the others (ASHE, GHS/LFS and CPS) are similar. Differences between them must be due to sample bias, differences in the way surveys are conducted, Scott's modifications in the surveys, and adjustments made in the ONS/NIPA measures that are not explicit.	http://www.ons.gov.uk/ons/datasets-and-tables/index.html
	Compensation	It is equal to Wages plus social contributions (incurred by employers in order to ensure their employees are entitled to social benefits). This latter account includes: vi) employer contribution to statutory social security schemes or to private funded social insurance schemes vii) unfunded employee social benefits paid by employers in the form of: (a) children's, spouse's, family, education or other allowances in respect of dependants; (b) payments made to workers because of illness, accidental injury, maternity leave, etc.; (c) severance payments	UK	No	No	-	
	GDP (nominal)	Nominal gross domestic product	UK	No	Yes	-	
NIPA	Wages	See ONS description above	US	No	No	Minor differences between ONS and BEA descriptions; not relevant.	http://www.bea.gov/national/nipaweb/SelectTable.asp?Selected=N
	Compensation	See ONS description above	US	No	No	Minor differences between ONS and BEA descriptions; not relevant.	
	GDP (nominal)	See ONS description above	US	No	Yes	-	
OECD	Labour Cost	It is equal to Labour Compensation plus (see NIPA and ONS definitions above): viii) cost of vocational training ix) cost of welfare training (i.e. cost of canteens) x) labour cost not elsewhere classified (i.e. costs of transport of workers, cost of work clothes, cost of recruitment) xi) taxes regarded as labour costs (i.e. taxes on employment or payrolls)	All	No	No	-	http://stats.oecd.org/Index.aspx
	GVA (nominal)	GVA is equal to GDP, minus taxes on products (for example, value added tax, alcohol duty), plus subsidies on products. Also excludes FISIM (financial intermediation services indirectly measured).	All	No	Yes	The examples of taxes deducted from the GDP were taken from the ONS website, since the OECD does not clarify tthis point. See: http://www.ons.gov.uk/ons/guide-method/user-guidance/index-of-services-methodology/conceptual-basis/index.html	
KLEMS	Compensation	See ONS/NIPA descriptions above	All	No	No	-	http://www.euklems.net/
	GVA (nominal)	See OECD description above	All	No	No	-	
ASHE	Earnings	-Defined as "...gross pay before tax, national insurance or other deductions and exclude earnings in kind". -Similar to ONS wages, although it does not include benefits in kind.	UK	No	No	Includes only GB; Different from GHS/LFS and CPS, it is derived from employers' records (not from survey over workers).	Provided by ONS staff
GHS/LFS	Earnings	-Similar to ASHE. Also does not include benefits in kind.	UK	Yes	Yes; We separate it when convenient	Part of the time series include all the UK, while part includes only GB.	Available upon request
CPS	Earnings	-Similar to GHS/LFS and ASHE. Also does not include benfits in kind. -Defined as: "Money wage or salary income is the total income people receive for work performed as an employee during the income year. This category includes wages, salary, armed forces pay, commissions, tips, piece-rate payments, and cash bonuses earned, before deductions are made for items such as taxes, bonds, pensions, and union dues."	US	Yes	Yes; We separate it when convenient	-	Available upon request

Appendix C: Net Decoupling in Terms of Gross Value Added (GVA)

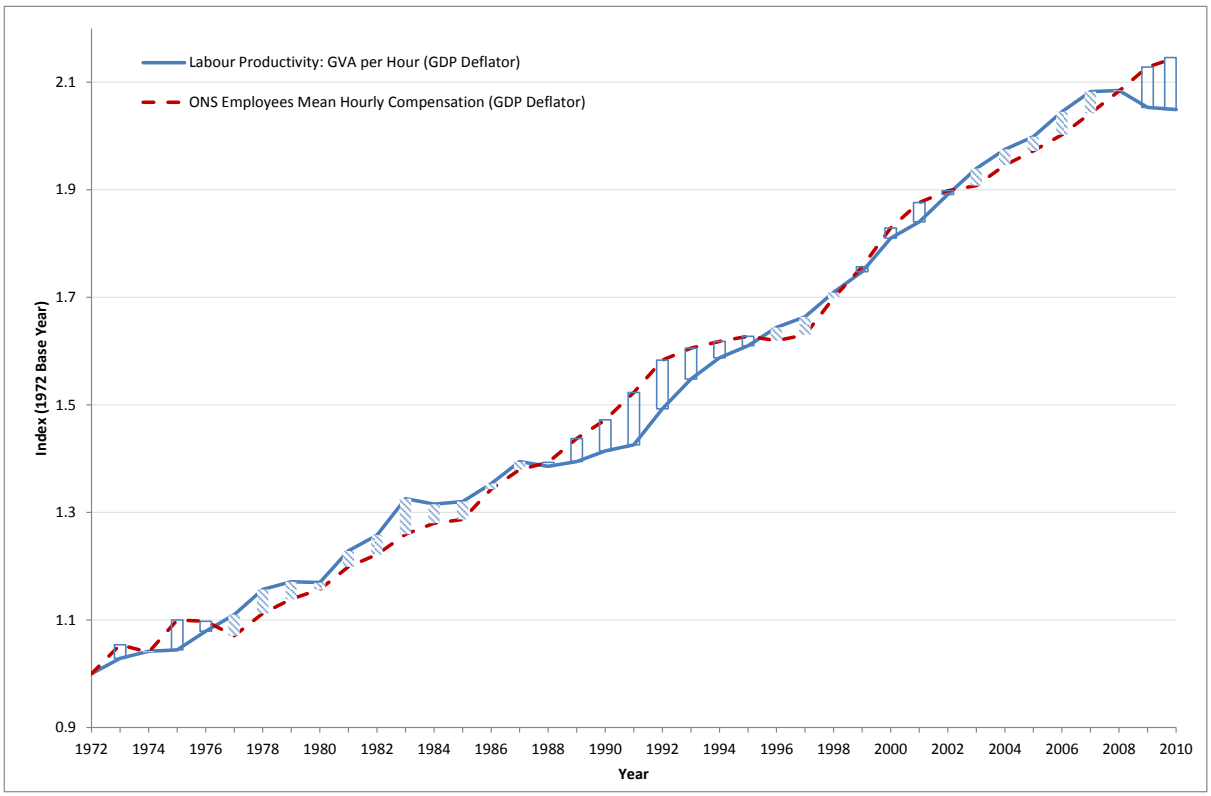

Figure 31: Labour Productivity and Labour Compensation per Hour Growth over Time in the UK.
Sources: ONS and OECD and KLEMS

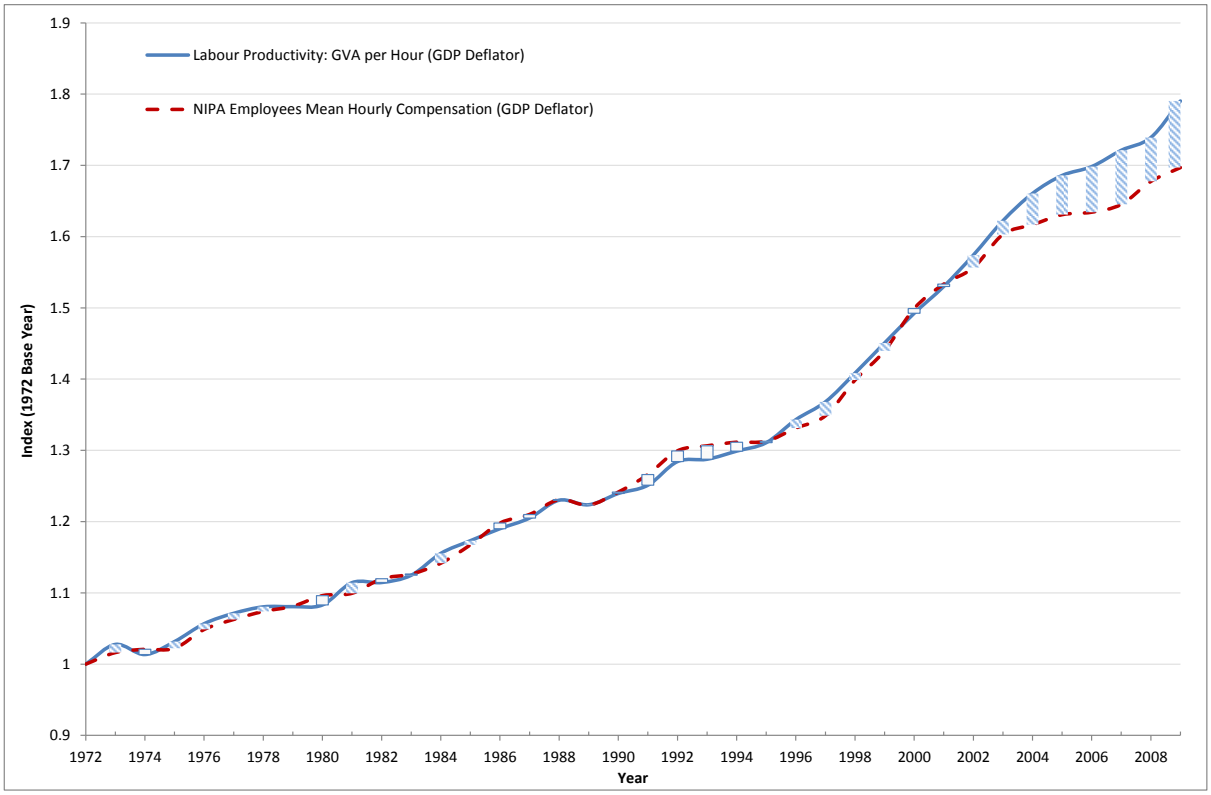

Figure 32: Labour Productivity and Labour Compensation per Hour Growth over Time in the US.

Sources: BEA and OECD

Appendix D: Decoupling Decomposition Tables

Year	Net Decoupling	ONS - LFS Divergence	Inequality	Benefits	Deflators	Self-Employment	Gross Decoupling
1975	-9.85%	-0.30%	-2.76%	2.88%	0.17%	0.76%	-9.10%
1980	-2.09%	-5.08%	-2.97%	4.99%	-2.68%	1.52%	-6.31%
1985	2.98%	-11.83%	1.49%	5.59%	-0.75%	3.21%	0.69%
1990	-3.84%	-10.39%	4.82%	4.25%	-1.36%	2.04%	-4.49%
1995	3.44%	-3.45%	11.11%	4.94%	-1.73%	3.67%	17.98%
2000	4.70%	3.07%	11.65%	5.74%	0.51%	3.03%	28.71%
2005	6.96%	-4.73%	12.16%	12.38%	-0.57%	2.85%	29.04%
2007	8.10%	-1.75%	14.37%	11.79%	1.94%	6.19%	40.64%
2010	-0.81%	2.20%	16.57%	15.95%	3.12%	5.47%	42.51%

Table 2: Decoupling Decomposition in the UK

Year	Net Decoupling	NIPA - CPS Divergence	Inequality	Benefits	Deflators	Self-Employment	Gross Decoupling
1975	2.14%	3.01%	1.02%	2.50%	2.00%	-0.37%	10.30%
1980	-0.30%	4.73%	5.33%	5.35%	2.55%	-0.51%	17.14%
1985	2.03%	2.29%	7.03%	7.18%	3.77%	-1.05%	21.24%
1990	2.31%	1.31%	8.61%	7.37%	5.95%	-0.97%	24.57%
1995	2.87%	-6.88%	19.37%	8.40%	6.97%	-0.99%	29.73%
2000	0.67%	5.38%	16.83%	6.81%	11.15%	-1.05%	39.78%
2005	7.08%	6.68%	16.01%	11.68%	12.54%	-1.11%	52.88%
2007	9.10%	5.87%	22.51%	9.93%	12.28%	-3.85%	55.84%
2010	13.32%	4.61%	20.52%	12.74%	13.71%	-2.08%	62.82%

Table 3: Decoupling Decomposition in the US

Appendix E: Inflation

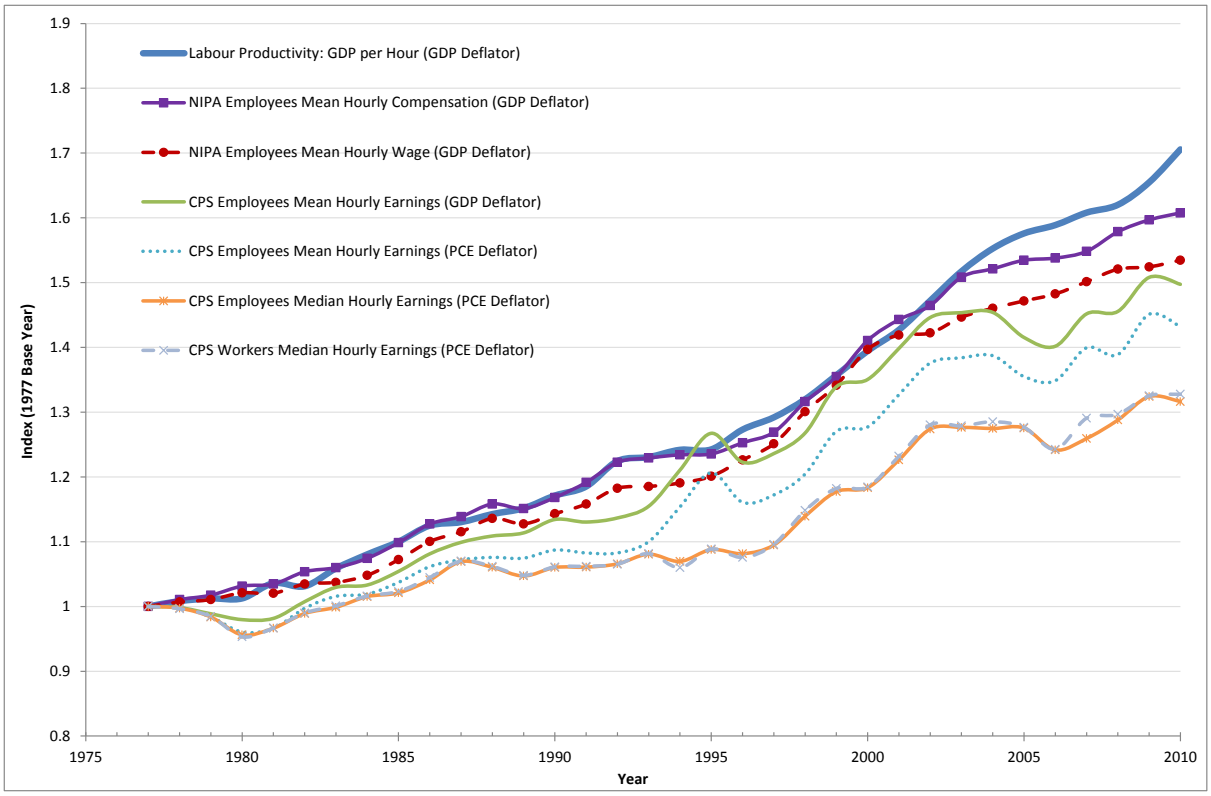

Figure 33: Hourly Decoupling in the US after 1977 considering the PCE Deflator.

Sources: BEA, OECD, CPS Survey and BLS. "Workers" includes both Employees and Self-Employed.

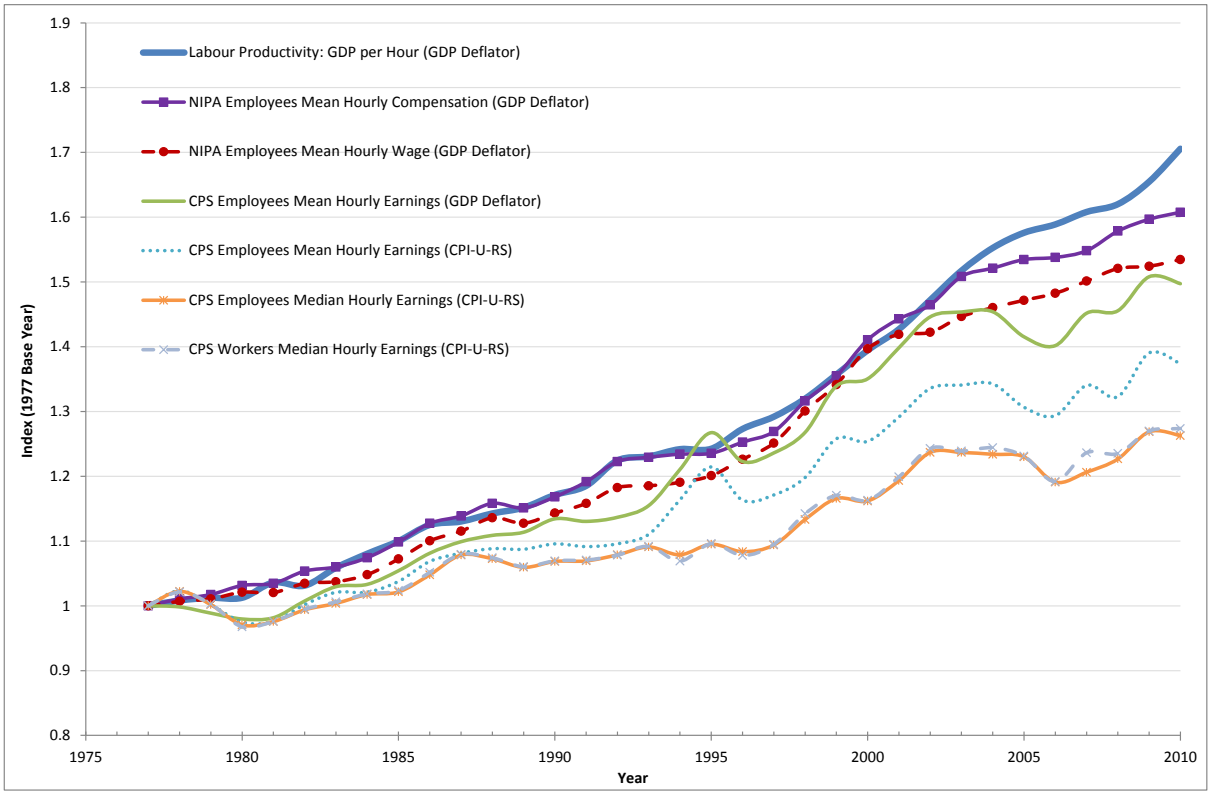

Figure 34: Hourly Decoupling in the US after 1977 considering the CPI-U-RS.

Sources: BEA, OECD, CPS Survey and BLS. "Workers" includes both Employees and Self-Employed.

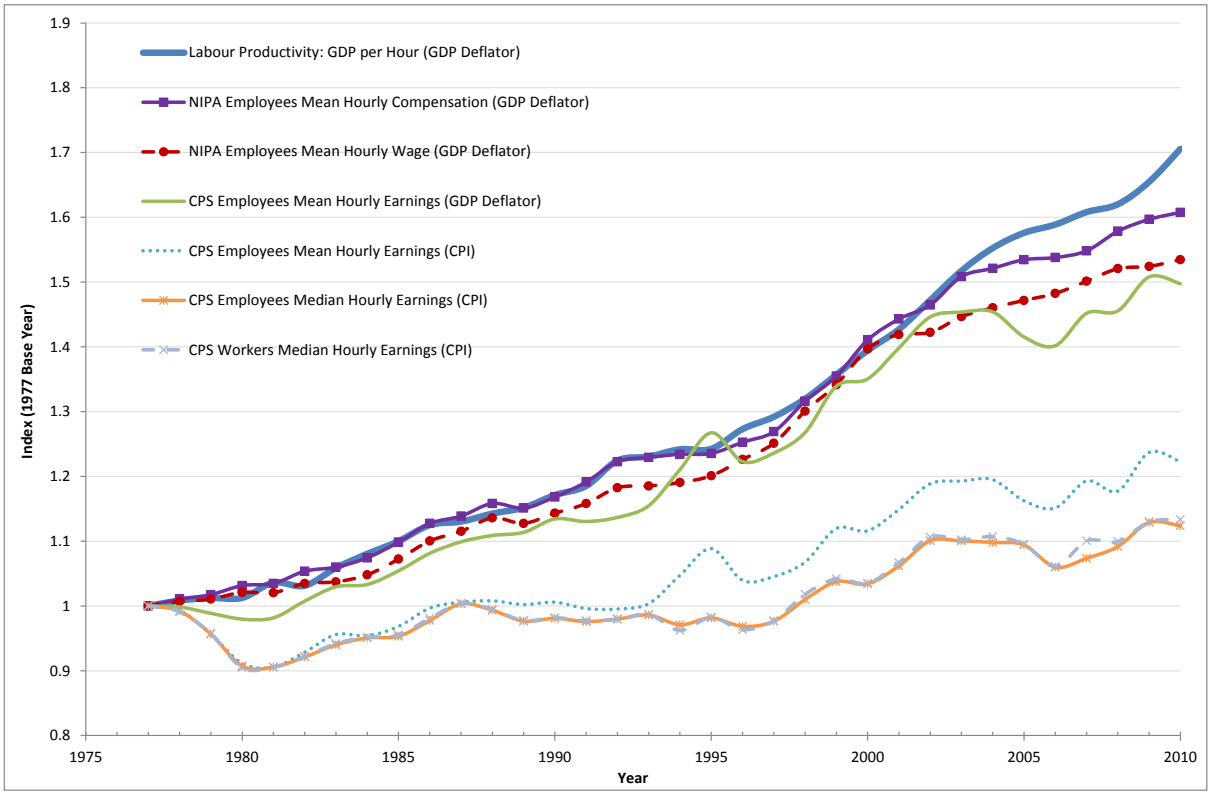

Figure 35: Hourly Decoupling in the US after 1977 considering the CPI.

Sources: BEA, OECD, CPS Survey and BLS. "Workers" includes both Employees and Self-Employed.

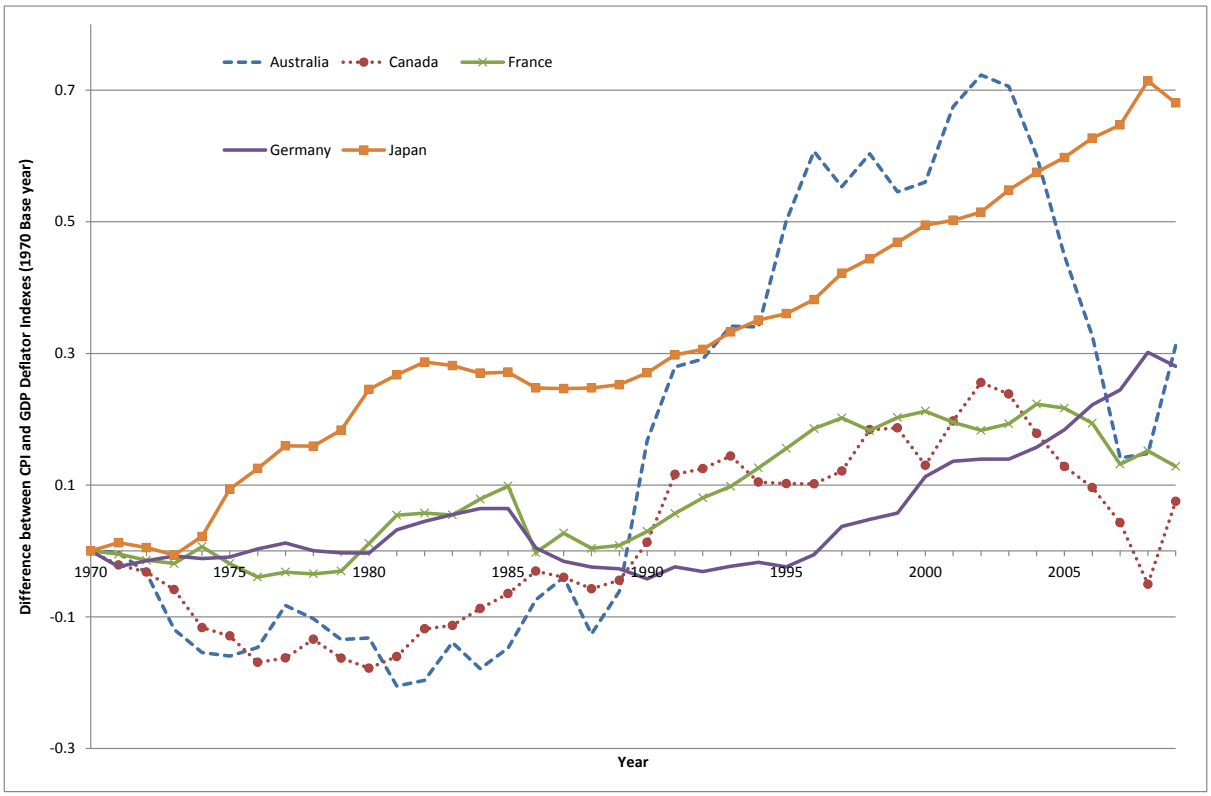

Figure 36: Difference between the CPI growth and the GDP Deflator growth for some OECD countries.

Sources: OECD

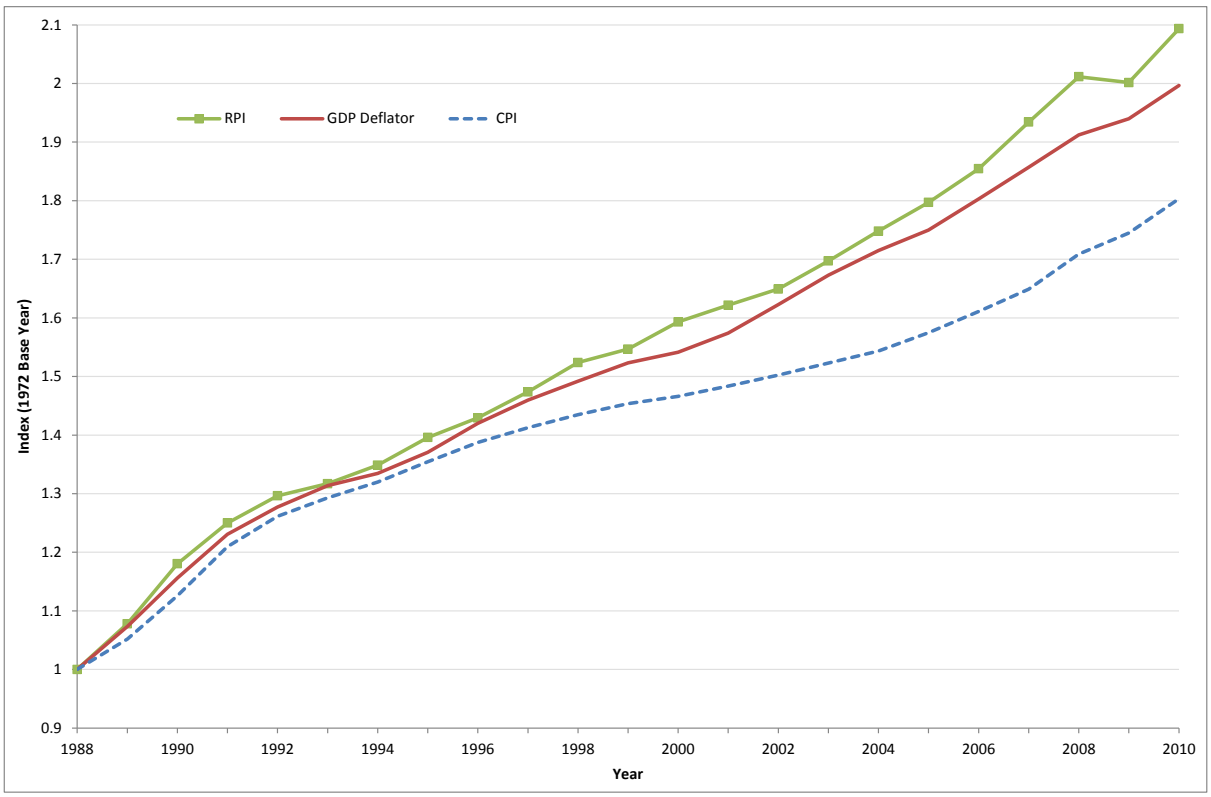

Figure 37: CPI, GDP Deflator and RPI over Time in the UK.

Sources: ONS and HM Treasury

Appendix F: Labour Income Shares

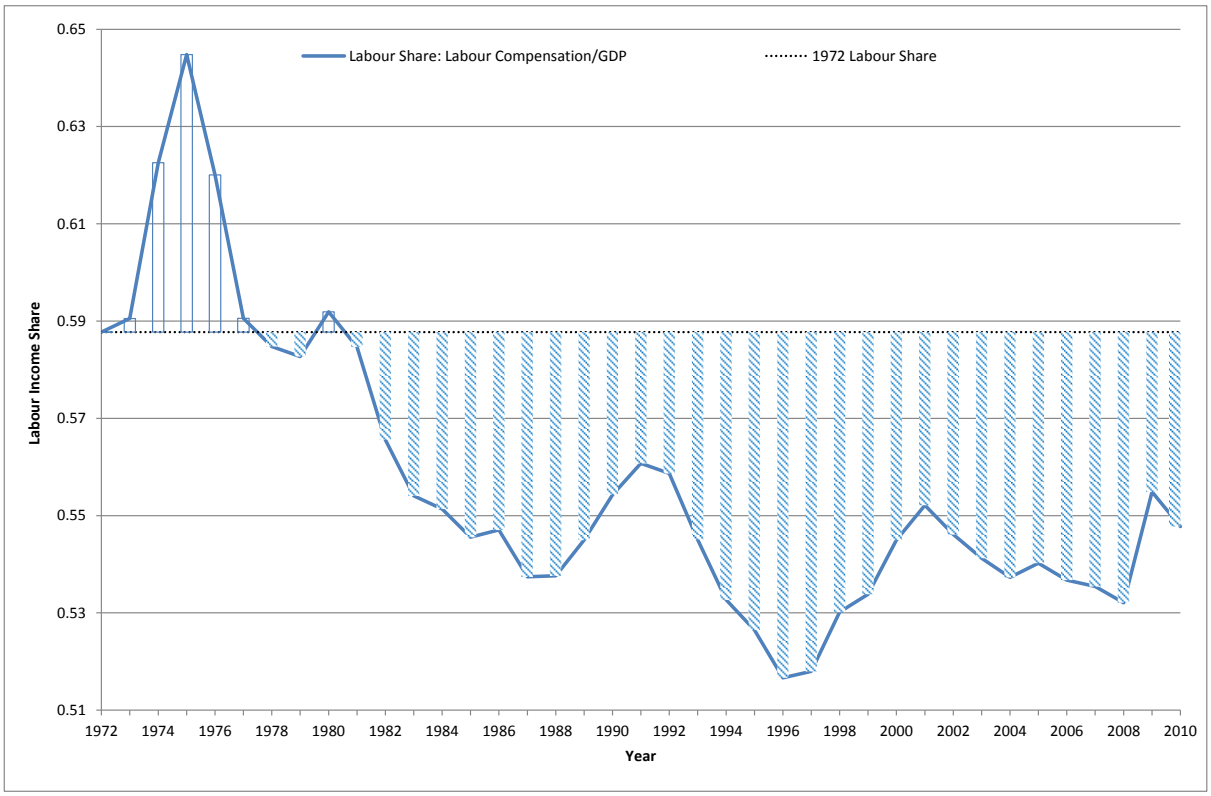

Figure 38: Labour Income Share in the UK.

Sources: ONS, OECD, and KLEMS. *No* adjustment for Self-Employment.

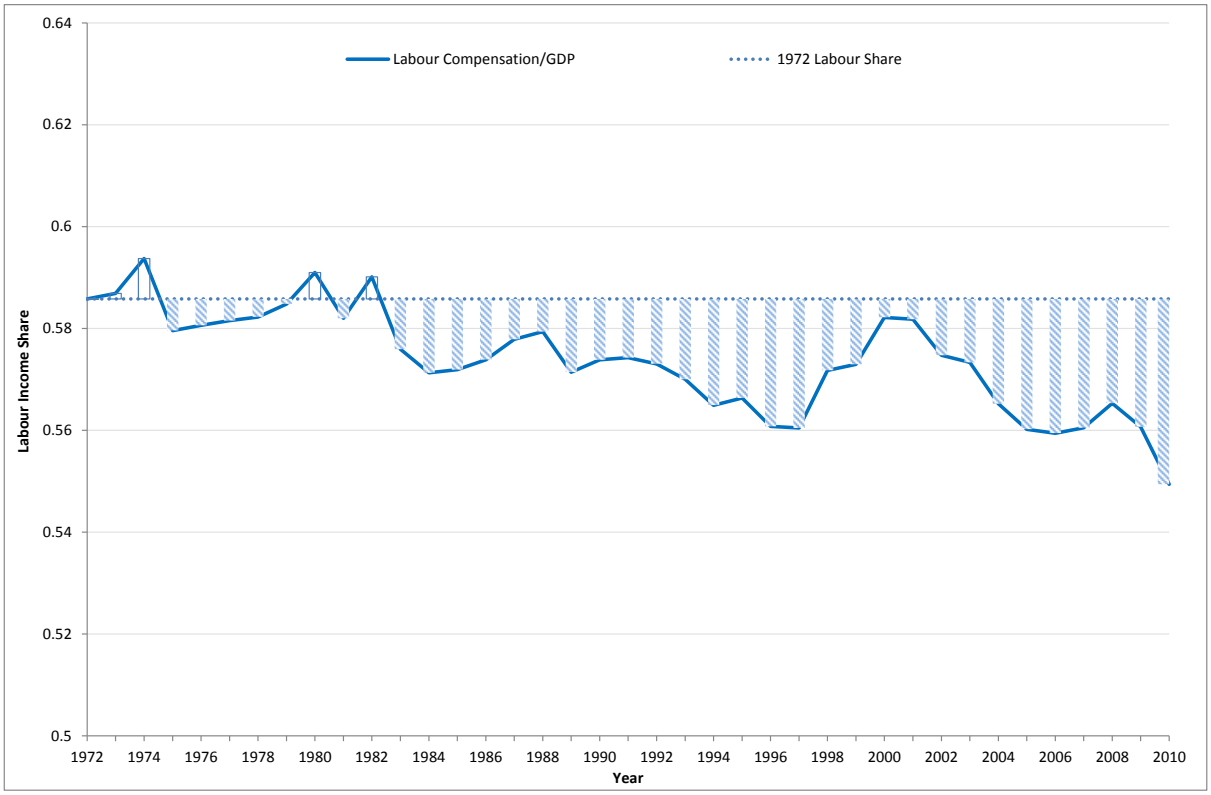

Figure 39: Labour Income Share in the US.

Sources: BEA and OECD. *No* adjustment for Self-Employment.

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