OECD Economics Department Working Papers No. 1373

Decoupling of wages from productivity: Macro-level facts

Cyrille Schwellnus,
Andreas Kappeler,
Pierre-Alain Pionnier

https://dx.doi.org/10.1787/d4764493-en

OECD

Unclassified **ECO/WKP(2017)5**

Organisation de Coopération et de Développement Économiques
Organisation for Economic Co-operation and Development **24-Jan-2017**

English - Or. English

ECONOMICS DEPARTMENT

ECO/WKP(2017)5
Unclassified

DECOUPLING OF WAGES FROM PRODUCTIVITY: MACRO-LEVEL FACTS

ECONOMICS DEPARTMENT WORKING PAPERS No. 1373

By Cyrille Schwellnus, Andreas Kappeler and Pierre-Alain Pionnier

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author(s).

Authorised for publication by Christian Kastrop, Director, Policy Studies Branch, Economics Department.

All Economics Department Working Papers are available at www.oecd.org/eco/workingpapers.

JT03408096

Complete document available on OLIS in its original format
This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

English - Or. English

OECD Working Papers should not be reported as representing the official views of the OECD or of its member countries. The opinions expressed and arguments employed are those of the author(s).

Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works.

Comments on Working Papers are welcomed, and may be sent to OECD Economics Department, 2 rue André Pascal, 75775 Paris Cedex 16, France, or by e-mail to eco.contact@oecd.org.

All Economics Department Working Papers are available at www.oecd.org/eco/workingpapers.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

Latvia was not an OECD Member at the time of preparation of this publication. Accordingly, Latvia does not appear in the list of OECD Members and is not included in the zone aggregates.

© OECD (2017)

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgment of OECD as source and copyright owner is given. All requests for commercial use and translation rights should be submitted to **rights@oecd.org**

Abstract/Résumé

Decoupling of wages from productivity: Macro-level facts

Over the past two decades, aggregate labour productivity growth in most OECD countries has decoupled from real median compensation growth, implying that raising productivity is no longer sufficient to raise real wages for the typical worker. This paper provides a quantitative description of decoupling in OECD countries over the past two decades, with the results suggesting that it is explained by declines in both labour shares and the ratio of median to average wages (a partial measure of wage inequality). Labour shares have declined in about two thirds of the OECD countries covered by the analysis. However, the contribution of labour shares to decoupling is smaller if sectors are excluded for which labour shares are driven by changes in commodity and asset prices or for which labour shares are driven by imputation choices (primary, housing and non-market sectors). The ratio of median to average wages has declined in all but two of the OECD countries covered by the analysis and appears to reflect disproportionate wage growth at the very top of the wage distribution rather than stagnating median wages. The causes for these developments will be analysed in follow-up research.

JEL classification codes: D3, E24, E25.
Keywords: productivity, labour share, wage inequality.

*****

Découplage des salaires et de la productivité : Les faits au niveau macroéconomique

Au cours des deux dernières décennies, la productivité du travail au niveau agrégé et la rémunération réelle médiane du travail ont divergé dans la plupart des pays de l'OCDE, ce qui signifie que les gains de productivité n'ont pas permis d'accroître la rémunération réelle du salarié médian. Cet article décrit quantitativement ce phénomène de découplage au cours des vingt dernières années et suggère qu'il s'explique à la fois par une baisse de la part de la rémunération dans la valeur ajoutée et du ratio entre le salaire médian et le salaire moyen (une mesure partielle de l'inégalité salariale). La part de la rémunération dans la valeur ajoutée a baissé dans les deux tiers des pays de l'OCDE pris en compte dans cette étude. Néanmoins, sa contribution au phénomène de découplage est moindre si on exclut les secteurs pour lesquels les évolutions de la part des rémunérations sont liées à des évolutions de prix d'actifs ou de matières premières ou à des imputations (secteur primaire, secteur immobilier et secteurs non marchands). Le ratio entre le salaire médian et le salaire moyen a baissé dans tous les pays de l'OCDE pris en compte dans cette étude, sauf deux. Cette évolution est liée à une évolution hors normes des salaires tout en haut de la distribution plutôt qu'à la stagnation du salaire médian. Des articles à venir analyseront plus en détail l'origine de ces phénomènes.

Codes JEL : D3, E24, E25.
Mots-clés : productivité, partage de la valeur ajoutée, inégalité salariale.

TABLE OF CONTENTS

1. Introduction 5
2. Macro-level decoupling: Framework and definitions 6
2.1. Framework 6
2.2. Definitions 8
3. The contribution of declining labour shares to decoupling 9
3.1. Gross or net labour shares? 9
3.2. Total-economy labour shares or labour shares excluding the primary, housing and non-market sectors? 11
3.3. Pre- or post-crisis developments? 15
3.4. Manufacturing or services? 16
4. The contribution of increasing wage inequality to decoupling 17
5. Conclusion 19

REFERENCES 20

ANNEX: SUPPLEMENTARY TECHNICAL MATERIAL 22

1. Evolution of deflators 22
2. Imputation of compensation of the self-employed 24
3. Gross versus net labour shares 24
4. Share of housing in total value added 26

Tables

Table 1. Changes in labour shares 15
Table A1.1. Real median compensation growth based on value added and consumption deflators 23

Figures

Figure 1. Macro-level decoupling reflects declines in labour shares and increases in wage inequality .7
Figure 2. Changes in gross and net labour shares 10
Figure 3. The depreciation share has increased more in countries with large cyclical downturns 11
Figure 4. Changes in the labour share with and without the primary, housing and non-market sectors..... 13
Figure 5. Cumulated change in labour share excl. primary, housing and non-market sectors.....16
Figure 6. The contribution of manufacturing and services to labour share developments 17
Figure 7. The ratio of median to average wages has declined in a wide range of OECD countries 18
Figure 8. Wages of the top 1% of income earners have diverged from the average and the median ...19
Figure A1.1. Real median compensation based on value added and consumption deflators (OECD average) 22
Figure A2.1. Effect of the imputation method for compensation of the self-employed on labour shares ..24
Figure A3.1. Association between the depreciation rate in volumes and share of ICT capital in volumes 25
Figure A3.2. Value added share of depreciation and share of ICT capital in total capital 25
Figure A3.3. ICT capital to total capital ratio 26
Figure A4.1. Change of ratio of housing to total gross value added.....27

Boxes

Box 1. Have increased housing rents contributed to declines in labour shares? 12

DECOUPLING OF WAGES FROM PRODUCTIVITY GROWTH: MACRO-LEVEL FACTS

By Cyrille Schwellnus, Andreas Kappeler and Pierre-Alain Pionnier[1]

1. Introduction

1. In the long run, raising productivity is the only way to raise living standards, with real wages being the most direct mechanism through which the benefits of productivity growth are transferred to workers. Over the past two decades, however, aggregate labour productivity growth in most OECD countries has decoupled from real median compensation growth.[2] Raising productivity no longer appears to be sufficient to raise real wages for the typical worker, suggesting that there is a role for public policies to support a broader sharing of the benefits of productivity gains in the economy.

2. Public policies can impact the sharing of productivity gains in the economy by influencing the distribution of income between capital and labour, and by affecting the distribution of labour income across workers. This paper is the first stage of a research project analysing the extent and the causes of decoupling of wages from productivity growth in OECD countries over the past two decades. It analyses whether developments at the macro level mainly reflect changes in labour shares or changes in wage inequality and assesses whether labour share and wage inequality developments are mainly related to changes in public policies or to longer-term structural changes.

3. The main results are as follows:

- For the analysed OECD countries as a whole, total-economy decoupling over the period 1995-2014 is explained by declines in total-economy labour shares and also by declines in the ratio of median to average wages (a partial measure of wage inequality).

- For the analysed OECD countries as a whole, labour share declines over the period 1995-2014 are fully accounted for by pre-2005 developments.

- Excluding sectors for which labour shares are driven by changes in commodity and asset prices or for which labour shares are driven by imputation choices (primary, housing and non-market sectors) lessens the contribution of labour shares to decoupling.

- In a number of countries, declines in total-economy labour shares reflect increases in housing rents, which are related to increases in house prices. For commodity-producing countries, declines in total-economy labour shares largely reflect increases in commodity rents. These are, in turn, related to price increases on global markets on which national policies have limited leverage.

---

1 . Cyrille Schwellnus and Andreas Kappeler are members of the Economics Department of the OECD. Pierre-Alain Pionnier is member of the Statistics Directorate of the OECD. The authors would like to thank Andrea Bassanini and Alexander Hijzen (from the Directorate for Employment, Labour and Social Affairs), Orsetta Causa, Antoine Goujard, Mikkel Hermansen, Yosuke Jin, Christine Lewis, Catherine L. Mann, Giuseppe Nicoletti, Rory O'Farrell, Nicolas Ruiz, Jean-Luc Schneider (from the Economics Department) and Paul Schreyer and Peter van de Ven (from the Statistics Directorate) for helpful discussions and suggestions. The support of Sarah Michelson (also from the Economics Department) in putting together the document is gratefully acknowledged.

2. Real compensation growth is based on the value added deflator.

- While labour shares have declined significantly in about two thirds of the analysed OECD countries, all but two countries have experienced significant declines in the ratio of median to average wages over the past two decades.

- The increase in wage inequality as measured by the decoupling of median from average wage growth appears to reflect disproportionate wage growth at the very top of the wage distribution. While wage growth at the top 10 percentile of the wage distribution has been similar to growth at the median, average wage growth for the top 1% has exceeded growth at the median by a multiple.

4. The remainder of the paper is organised as follows. Section 2 describes the conceptual framework for decomposing macro-level decoupling into labour share and wage inequality developments, and provides descriptive evidence for the analysed OECD countries as a whole. Section 3 investigates the role of the primary, housing, and non-market sectors as well as capital stock depreciation in total-economy labour share developments. Section 4 analyses the role of disproportionate wage growth of top earners for wage inequality developments and Section 5 concludes.

2. Macro-level decoupling: Framework and definitions

2.1. Framework

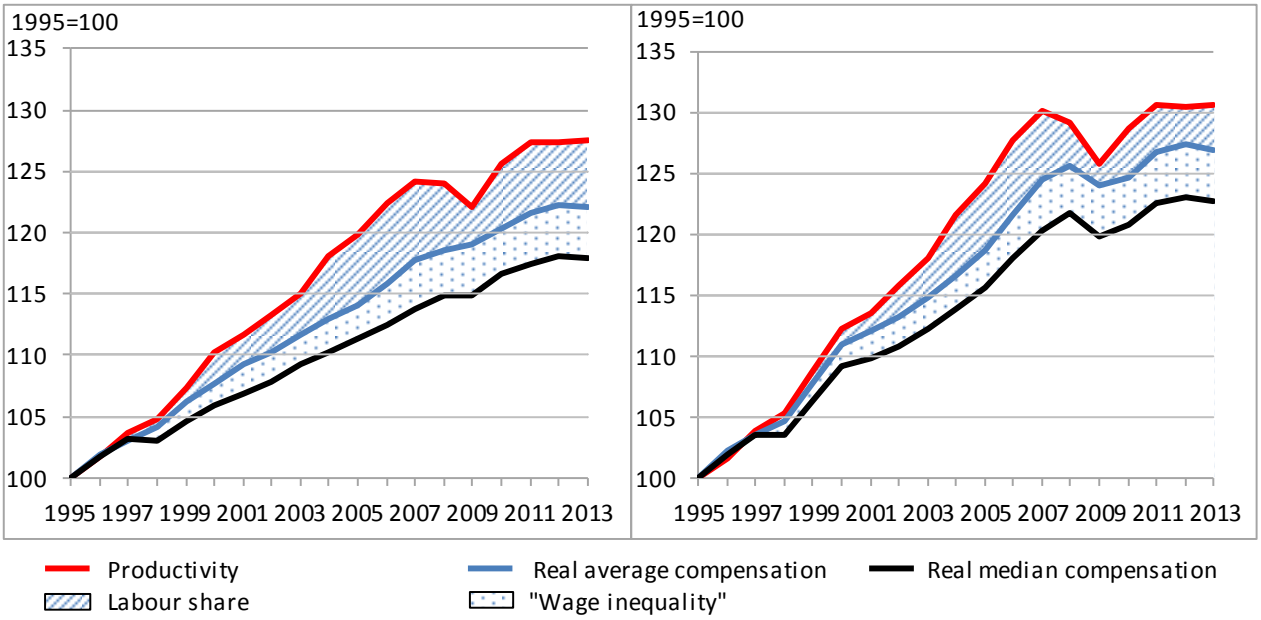
5. Conceptually, macro-level decoupling between compensation growth of the typical worker and labour productivity growth can be decomposed into the growth differential between average compensation and labour productivity and the growth differential between median and average compensation (Figure 1). Decoupling between real median and average compensation growth typically reflects higher compensation growth at the top than at the middle of the compensation distribution, which can be interpreted as a partial measure of rising wage inequality.[3]

3. Note that the focus of this paper is on workers in the middle of the wage distribution rather than at the bottom, and on labour income rather than disposable income, which additionally includes capital income and government transfers net of taxes.

Figure 1. Macro-level decoupling reflects declines in labour shares and increases in wage inequality

A. Total Economy

B. Excl. primary, housing and non-market sectors[1]



Note: Unweigthed average of 24 OECD countries. 1995-2013 for Austria, Belgium, Germany, Finland, Hungary, Japan, Korea, United Kingdom; 1995-2012 for Australia, Spain, France, Italy, Poland, Sweden; 1996-2013 for Czech Republic, Denmark; 1997-2012 for Canada, New Zealand; 1997-2013 for Norway, United States; 1998-2013 for Ireland; 1995-2010 for Netherlands; 2001-2011 for Israel; 2002-2013 for Slovak Republic. In Panel A, all series are deflated by the total economy value added price index. In Panel B, all series are deflated by the value added price index excluding the primary, housing and non-market sectors. The sectors excluded in panel B are the following (ISIC rev. 4 classification): (1) Agriculture, Forestry and Fishing (A), (2) Mining and quarrying (B), (3) Real estate activities (L), (4) Public administration and defence, compulsory social security (O), (5) Education (P), (6) Human health and social work activities (Q), (7) Activities of households as employers (T), and (8) Activities of extraterritorial organisations and bodies (U).

1. "Wage inequality" refers to total economy due to data limitations.

Source: OECD National Accounts Database, OECD Earnings Database.

6. Compensation and value added are deflated by the same value added price index so that decoupling between real average compensation and labour productivity reflects declines in labour shares.[4] Deflating compensation by a consumption deflator and value added by the value added deflator would drive an additional wedge between median wage growth and productivity growth. This wedge is largely driven by countries' external terms of trade since the consumption deflator includes imported goods whereas the value added deflator includes only domestic production.[5] For the countries covered by the analysis as a whole, the growth differential between real wages based on a consumption deflator and the value added deflator has been limited and depends on whether the households' Final Consumption Expenditure (FCE) deflator from the national accounts or the Consumer Price Index (CPI) is used in the analysis (Annex Figure A1.1)[6]. However, for a number of commodity-importing countries, real wages

4. Feldstein (2008) argues that wages and value added be deflated by the same output price index, as the basic economic relation is between nominal wages and the marginal revenue product of labour.

5. Despite the exclusion of this wedge, the analysis here does cover the effects on the labour share and wage inequality of changes in the terms of trade. Only the wedge between the consumption and value added deflator per se is excluded from the analysis.

6 Differences between the FCE deflator and the CPI mainly reflect the treatment of imputed rents of home owner-occupiers. While both actual and imputed rents are included in households' final consumption

based on a consumption deflator would have grown less than real wages based on the producer price index irrespectively of the precise measure of the consumption deflator used in the analysis (Annex Table A1.1).

7. The growth differential between real average compensation and labour productivity can directly be computed from national accounts data, whereas the growth differential between average and median compensation needs to be approximated using data from the OECD Earnings Database. Average compensation is computed as the ratio of total compensation to the total number of workers in the economy while labour productivity is computed as the ratio of gross value added at factor cost to the number of workers. In this paper, the growth differential between average and median compensation is approximated by the growth differential between gross average and median wages from the OECD Earnings Database, which exclude employers' social contributions.[7]

8. Decoupling is significantly more pronounced when it is based on productivity and compensation in the total economy rather than in the non-primary (*i.e.* excluding agriculture and mining), non-housing market sector. In line with previous studies on decoupling, this paper uses as a starting point compensation and value added in the total economy (Figure 1, Panel A).[8] However, the total economy includes sectors for which labour shares are largely determined by fluctuations in commodity and asset prices, such as the primary and housing sectors, or for which labour shares are driven by imputation choices, such as the non-market sector. Labour share fluctuations in these sectors may have different distributional implications from those in the production sector. Once the primary, housing and the non-market sectors are excluded from the analysis, the decoupling between productivity and average compensation appears more limited (Figure 1, Panel B).

2.2. Definitions

9. Labour productivity is defined as the ratio of real value added at factor cost to total employment and real average compensation is defined as the ratio of total real compensation to total employment. Real value added at factor cost is obtained by deflating nominal value added at factor cost by the corresponding value added deflator. Total compensation is computed as the sum of the compensation of employees and the compensation of the self-employed, which is imputed by assuming that hourly compensation of the self-employed and of dependent employees is the same at the level of individual industries (see Annex 2). The compensation of employees encompasses remuneration in cash and in kind and includes employees' and employers' social contributions. Real compensation is obtained by deflating nominal compensation by the same value added price index used to deflate value added at factor cost. Value added at factor cost, compensation of employees, employment and deflators are sourced from the OECD Annual National Accounts database.

10. Median and average wages are based on the distribution of gross wages, while median compensation is not directly observed and is approximated by multiplying average compensation by the ratio of gross median to average wages. Median and average wages are sourced from the OECD Earnings Database that compiles data on gross wages of full-time workers from a variety of sources, including household, labour force and enterprise surveys. Gross wages encompass remuneration in cash and in kind, including regular payments, irregular supplements and employees' social contributions. They exclude

expenditure for all countries, imputed rents are not included in the basket of goods and services underlying the CPI for a number of countries. The FCE deflator is therefore more comparable across countries than the CPI.

7. The approximation is imprecise if developments in employers' social contributions differ for the median and average workers, but more precise data are unavailable since national accounts do not report distributional statistics.

8. See Bivens and Mishel (2015) and Uguccioni (2016) for recent studies on decoupling.

stock options, severance payments, cash government transfers, transport subsidies and employers' social contributions. Definitions are not fully consistent across countries, with data referring to weekly or monthly wages for most countries but to hourly or annual wages for some others.

11. The labour share is defined as the ratio of total nominal labour compensation to value added at factor cost. Given that nominal value added is expressed at factor cost, *i.e.* net of taxes less subsidies on production, the labour share can be fully decomposed into total labour compensation, including an imputed labour compensation to self-employed workers, and total gross operating surplus (GOS), including the part of the mixed income of self-employed workers considered as GOS. Aggregate wage inequality is approximated by the ratio of median to average wages while top income inequality is approximated by the ratio of median wages of full-time employees to the average wage of the top 1% of income earners from the World Wealth and Income Database (Alvaredo et al., 2016).

3. The contribution of declining labour shares to decoupling

12. Several recent studies have emphasised that distributional and policy implications of labour share changes depend on the inclusion of capital depreciation and housing rents in value added (Rognlie, 2015; Bridgman, 2014).

3.1. Gross or net labour shares?

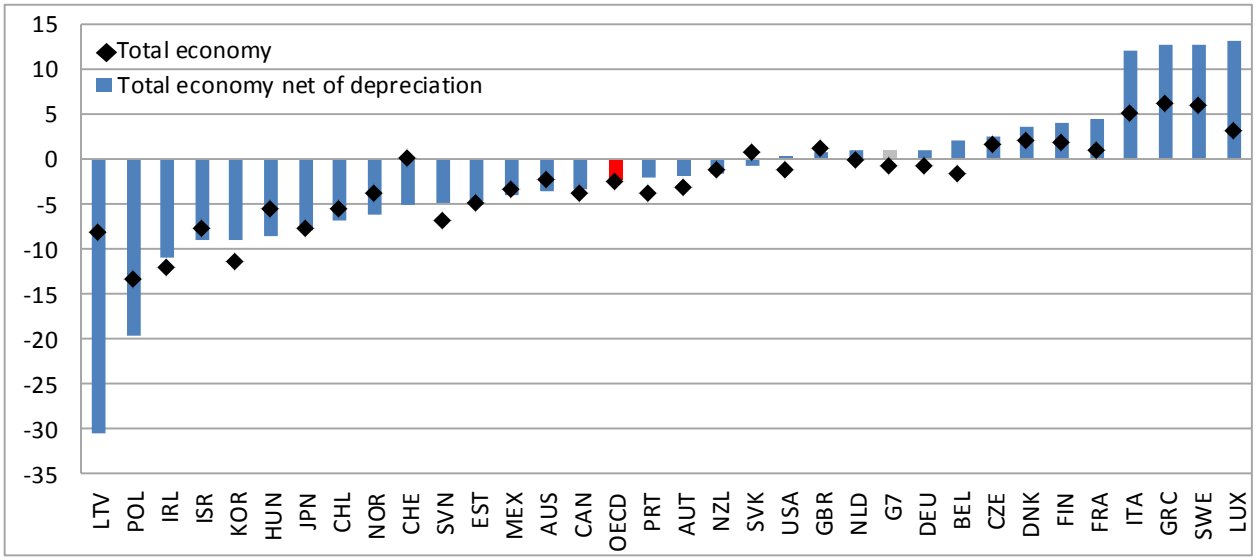
13. Even though most analyses of labour shares are based on gross value added, only value added net of capital consumption is available for compensation of workers and capital owners once productive capital has been restored to its pre-production level.[9] From an income distribution perspective, it may therefore be more appropriate to base labour shares on net rather than gross value added (Bridgman, 2014; Rognlie, 2015; Cho et al., 2016).

14. For the analysed OECD countries and the G7 countries as a whole, developments in gross and net labour shares over the period 1995-2014 have been similar (Figure 2). This is consistent with Rognlie (2015, Figures 1 and 2) who shows that average net and gross labour shares of G7 diverged before 1975 but evolved similarly thereafter. However, for some countries there have been large differences between net and gross labour share developments.

9 . Analyses based on gross labour shares include (Karabarbounis and Neiman, 2014; Pionnier and Guidetti, 2015; OECD, 2012).

Figure 2. Changes in gross and net labour shares

Percentage points, 1995-2014



Note: Three-year averages starting and ending in indicated years. OECD and G7 refer to unweighted averages for the relevant countries included in the figure. 1995-2013 for Australia, Canada, France, Korea, Latvia, Mexico, Portugal; 1996-2014 for Chile; 1997-2014 for United Kingdom; 1996-2012 for New Zealand.

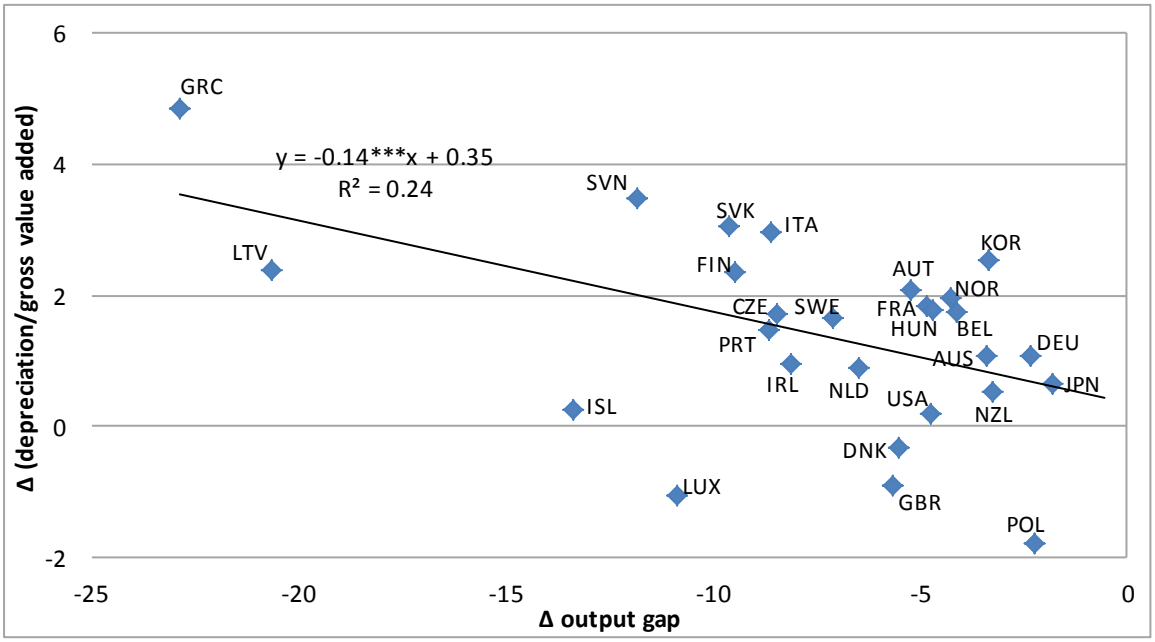
Source: OECD National Accounts Database.

15. There is little empirical evidence in the national accounts that differences between the evolution of gross and net labour shares are related to longer-term technological developments. The increase of around 2 percentage points in the average value added share of capital depreciation for the analysed OECD countries over the past two decades is commonly attributed to the substitution of rapidly depreciating ICT capital for more slowly depreciating traditional equipment (see Annex 3). However, the increase in the share of ICT capital in the total capital stock in volume terms (Annex Figure A3.1) has been offset by the decline in relative prices so that the substitution of ICT equipment for other types of equipment is unrelated to the increase in the share of depreciation in value added at current prices (Annex Figure A3.2). In fact, the share of ICT capital in the total capital stock at current prices has remained broadly constant or has even declined for the analysed OECD countries (Annex Figure A3.3).

16. There is more support in the data for the hypothesis that the share of depreciation in gross value added is highly counter-cyclical, which implies that net labour share developments are largely driven by the business cycle rather than structural developments. The relationship between changes in the share of depreciation in value added and changes in output gaps appears to be negative (Figure 3). Greece, for instance, experienced the largest widening of the output gap over 2007 and 2014 and is the country in the sample for which the share of depreciation in value added increased most. The increase in the value added share of depreciation appears to mainly reflect cyclical developments rather than a long-term structural change driven by the long-term decrease in ICT prices.

Figure 3. The depreciation share has increased more in countries with large cyclical downturns

Percentage point changes, 2007-2014



Note: The ratio of depreciation to gross value added is expressed in current prices. 2007-2013 for Korea, Portugal, Sweden and United Kingdom; 2007-2012 for New Zealand.

Source: OECD National Accounts Database, OECD Economic Outlook Database.

17. In sum, capital consumption is highly counter-cyclical. This makes it difficult to separate structural changes – which are the main focus of this paper – from cyclical changes in the net labour share. Consequently, the remainder of the paper focuses on gross labour shares.

3.2. Total-economy labour shares or labour shares excluding the primary, housing and non-market sectors?[10]

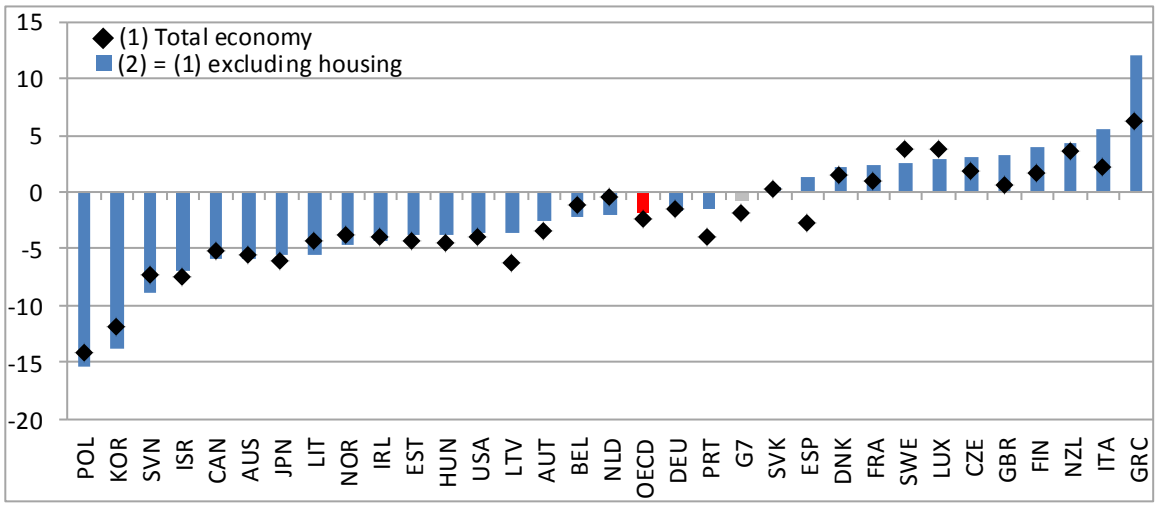
18. The decline in the total-economy labour share observed in the analysed OECD countries may partly be driven by developments in specific industries for which there are significant conceptual and measurement issues. For instance, total-economy labour shares are partly driven by developments in housing rents. Although the typical worker may actually benefit more from increases in housing rents than from other forms of capital income, the overwhelming part of housing rents ends up in gross operating surplus (*i.e.* capital income) in the national accounts. Given that the labour share in the housing sector is well below the labour share of the total economy, an increase in the share of housing to total value added puts downward pressure on the total economy labour share (Box 1).

10. This paper uses industry accounts and imputes labour compensation of the self-employed at the industry level rather than using the non-financial corporations' institutional account without correction for the self-employed as Rognlie (2015) and Karabarbounis-Neiman (2014). Pionnier and Guidetti (2015) show that in the national accounts of some countries self-employed workers are allocated to the non-financial corporations' institutional sector, thereby affecting levels and trends of non-financial corporations' labour shares.

Box 2. Have increased housing rents contributed to declines in labour shares?

For a number of countries increases in housing rents contributed to declines in total-economy labour shares (Box Figure 1). Between 1995 and 2014, the share of the housing sector in total value added increased by more than 4 percentage points in Greece, Italy, Latvia, Portugal and Spain, and by more the 2 percentage points in the Czech Republic, Finland, Israel and United Kingdom (Annex Figure A4.1). Housing value added consists of rents paid by tenants to landlords and imputed rents of homeowners. Since the share of this value added distributed as labour compensation is low or non-existent, the overwhelming part of housing value added ends up in gross operating surplus (i.e. capital income) in the national accounts. Given that rents and house prices are highly correlated, a house price boom typically raises the total-economy capital share.

Box Figure 1. Change in total-economy and non-housing labour shares
Percentage points, 1995-2014



Note: Three-year averages starting and ending in indicated years. OECD and G7 refer to unweighted averages for the relevant countries included in the figure. 1995-2013 for Australia, France, Korea and Portugal; 1995-2012 for New Zealand; 1997-2012 for Canada; 1997-2014 for United Kingdom; 1998-2014 for Ireland and United States.

Source: OECD National Accounts Database.

The distributional consequences of increases in housing rents may be different from increases in capital income in the production sector of the economy. Housing wealth is more equally distributed in the population than productive capital so that increases in housing rents can be seen as an indirect channel through which income is transmitted to the typical worker (Murtin and Mira d'Ercole, 2015; Sierminska and Medgyesi, 2013).

Increases in housing rents and their distribution across workers raise a set of public policy issues unrelated to product and labour markets that are the main focus of this paper. Increases in housing rents could, for instance, be addressed by public policies directly targeting the housing market, in particular by loosening overly restrictive land-use regulations. This would have the double benefit of raising workers' access to homeownership and limiting rent increases for tenants. The remainder of this paper will not further analyse these housing policy issues and will instead focus on labour productivity and wages excluding the housing sector.

19. A further issue with total-economy labour shares is that labour share developments are partly driven by commodity price developments and by imputation choices in the non-market sector (Table 1). For countries with large agricultural or mining (*i.e.* primary) sectors, developments in total-economy labour shares are largely driven by developments in commodity prices; when commodity prices increase,

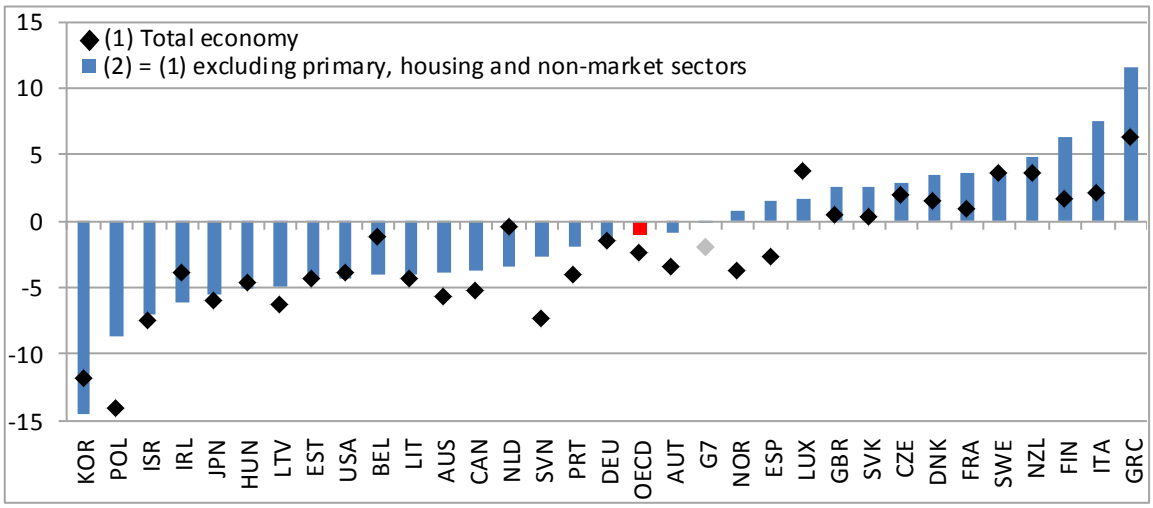
aggregate profits rise without commensurate increases in aggregate wages.[11] In Norway, for instance, where the mining sector is large, the non-housing labour share declined by around 5 percentage points over the period 1995-2014, but it increased by around 1 percentage point when the agriculture, mining and non-market sectors are excluded (Table 1).[12] Moreover, national accounting conventions in the non-market sector may bias developments in labour shares. Value added in the non-market sector is equal to the sum of wage compensation and capital consumption, which artificially implies limited variation over time.[13]

20. Changes in labour shares have typically been more positive than for the total economy when housing, the primary sector (agriculture and mining) and the non-market sector are excluded from the analysis (Figure 4). The primary, housing and non-market sectors represent about one third of total value added on average across OECD countries.

21. Moreover, changes in the labour share of both the total economy and this narrower aggregate have not been uniformly negative. For about two thirds of the analysed OECD countries, labour shares declined between 1995 and 2014 while they increased for the remaining third. This finding is consistent with Cho et al. (2016) who also conclude that there has been a small decline in the average gross labour share of 23 OECD countries over the last 20 years, but with substantial heterogeneity across countries. In their sample, gross labour shares decline in 14 countries, whereas they increase in the remaining 9 countries.

Figure 4. Changes in the labour share with and without the primary, housing and non-market sectors

Percentage points, 1995-2014



Note: Three-year averages starting and ending in indicated years. OECD and G7 refer to un-weighted averages for the relevant countries included in the Figure. 1995-2013 for Australia, France, Korea and Portugal; 1995-2012 for New Zealand; 1997-2012 for Canada; 1997-2014 for United Kingdom; 1998-2014 for Ireland and United States.

Source: OECD National Accounts Database.

11. The decline in the aggregate labour share partly reflects a change in industry composition: as commodity prices increase, the share of the mining sector – for which the labour share is low – in total value added increases.

12. Since profits of the Norwegian mining sector partly flow into a sovereign wealth fund benefiting future generations of workers, the decline in the total-economy labour share overstates the extent to which value added is appropriated by capital.

13. The finance sector is included in the analysis. Excluding the finance sector would only have a marginal effect on labour share developments for most countries, the exception being Luxembourg for which the exclusion of the finance sector would increase the labour share by 2 percentage points over the period.

22. For a number of countries, the change in the labour share is significantly more positive when the housing sector is excluded from the analysis (Table 1, Column 2). For most of these countries, including Greece, Italy, Spain and the United Kingdom, this reflects house price booms in the run-up to the global crisis of 2008-09 that were followed by a slow downward adjustment of rents in the subsequent bust so that the share of rents in value added increased over the period 1995-2014. For countries with large primary sectors, such as Australia, Canada and Norway, labour share developments are significantly more positive when the primary sector is excluded from the analysis, which reflects the trend increase in commodity prices over the period 1995-2014 (Table 1, Column 3). On the whole, for the OECD countries covered by the analysis the commodity price effect appears to be larger than the house price effect. Given that the labour share in the non-market sector is broadly stable over the period analysed here, excluding the non-market sector typically amplifies changes in labour shares stemming from the remaining sectors (Table 1, Column 4).

Table 1. Changes in labour shares

Percentage points, 1995-2014

	(1) = Total economy	(2) = (1) excl. housing	(3) = (2) excl. primary sector	(4) = (3) excl. public sector
Australia	-5.7	-5.9	-2.5	**-3.9**
Austria	-3.5	-2.6	-0.7	**-0.9**
Belgium	-1.3	-2.2	-2.3	**-4.0**
Canada	-5.3	-5.9	-3.4	**-3.7**
Czech Republic	1.8	3.0	3.2	**2.8**
Denmark	1.5	2.1	3.4	**3.5**
Estonia	-4.3	-3.8	-2.0	**-4.4**
Finland	1.6	3.9	4.9	**6.4**
France	0.9	2.3	2.7	**3.6**
Germany	-1.6	-1.7	-1.3	**-1.5**
Greece	6.2	12.0	10.5	**11.6**
Hungary	-4.6	-3.8	-3.6	**-5.1**
Ireland	-4.0	-4.2	-4.0	**-6.1**
Israel	-7.5	-6.9	-6.8	**-7.0**
Italy	2.1	5.5	5.9	**7.6**
Japan	-6.1	-5.6	-5.2	**-5.5**
Korea	-11.9	-13.8	-12.7	**-14.5**
Latvia	-6.4	-3.7	-1.4	**-5.0**
Lithuania	-4.4	-5.5	-4.0	**-4.0**
Luxembourg	3.7	2.9	2.5	**1.7**
Netherlands	-0.5	-2.1	-2.0	**-3.4**
New Zealand	3.5	4.4	5.1	**4.8**
Norway	-3.8	-4.7	1.4	**0.7**
Poland	-14.2	-15.4	-8.0	**-8.6**
Portugal	-4.1	-1.5	-2.0	**-1.9**
Slovak Republic	0.2	0.3	1.9	**2.6**
Slovenia	-7.4	-8.9	-2.0	**-2.7**
Spain	-2.8	1.2	0.9	**1.5**
Sweden	3.6	2.5	2.7	**3.6**
United Kingdom	0.4	3.3	3.0	**2.6**
United States	-4.0	-3.7	-2.5	**-4.3**
OECD	-2.5	-1.9	-0.6	**-1.1**
G7	-1.9	-0.8	-0.1	**-0.2**

Note: Three-year averages starting and ending in indicated years. OECD and G7 refer to unweighted averages for the relevant countries included in the Table. 1995-2013 for Australia, France, Korea and Portugal; 1995-2012 for New Zealand; 1997-2012 for Canada; 1996-2014 for Chile; 1997-2014 for United Kingdom; 1998-2014 for Ireland and United States.

Source: OECD National Accounts Database.

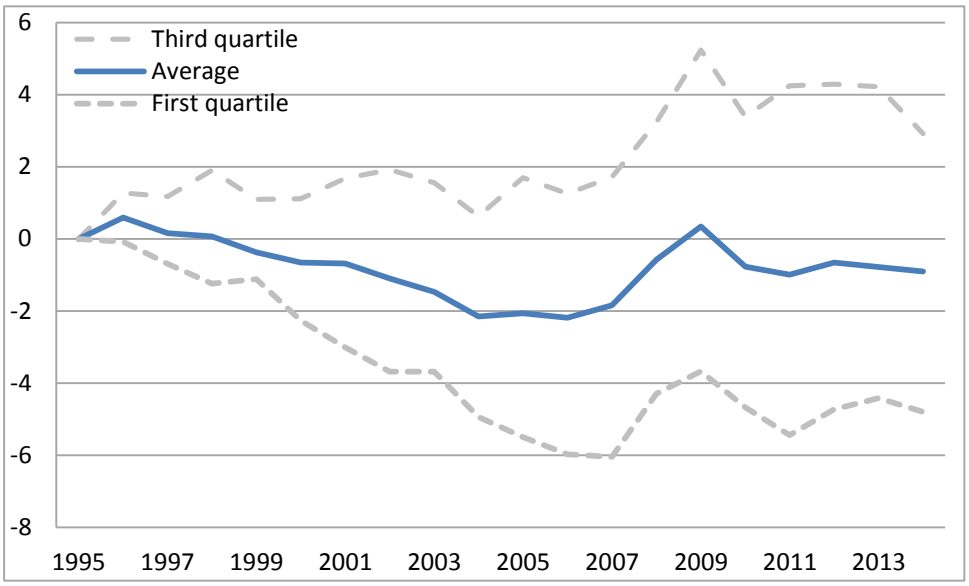
3.3. Pre- or post-crisis developments?

23. Most of the decline in the business labour share excluding the housing and primary sectors took place before the global crisis of 2008-09 (Figure 5). However, labour share developments have been very heterogeneous across countries, with no pre-crisis decline for the country at the third quartile of the distribution of cumulated labour share changes and a large decline for the country at the bottom quartile. Given that this narrowly defined labour share is not affected by house and commodity price developments,

the timing of the decline and rebound suggests that the structural factors that drove down the labour share before 2005 weakened thereafter.

Figure 5. Cumulated change in labour share excl. primary, housing and non-market sectors

Unweighted average of 31 OECD countries, in percentage points



Note: 1995-2014 for Austria, Belgium, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Hungary, Israel, Italy, Japan, Lithuania, Latvia, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia and Sweden; 1995-2012 for New Zealand;1995-2013 for Australia and Korea; 1997-2012 for Canada; 1998-2014 for Ireland and United States.

Source: OECD National Accounts Database.

24. The timing of the decline and the rebound of the labour share is consistent with evidence suggesting that the pace of expansion of global value chains associated with China's integration into the world trading system slowed in the wake of the global crisis of 2008-09 (Ferrantino and Taglioni, 2014). Alternative explanations could be the slowing pace of IT-related technological change or the reduced scope of regulatory reforms, especially in network industries, which appear to be two major drivers of labour share declines (Karabarbounis and Neiman, 2014; Azmat et al., 2012). The post-2005 rebound in the labour share may partly also reflect business cycle conditions, with limited downward adjustment of wages and employment during and in the wake of the global economic crisis.

3.4. Manufacturing or services?

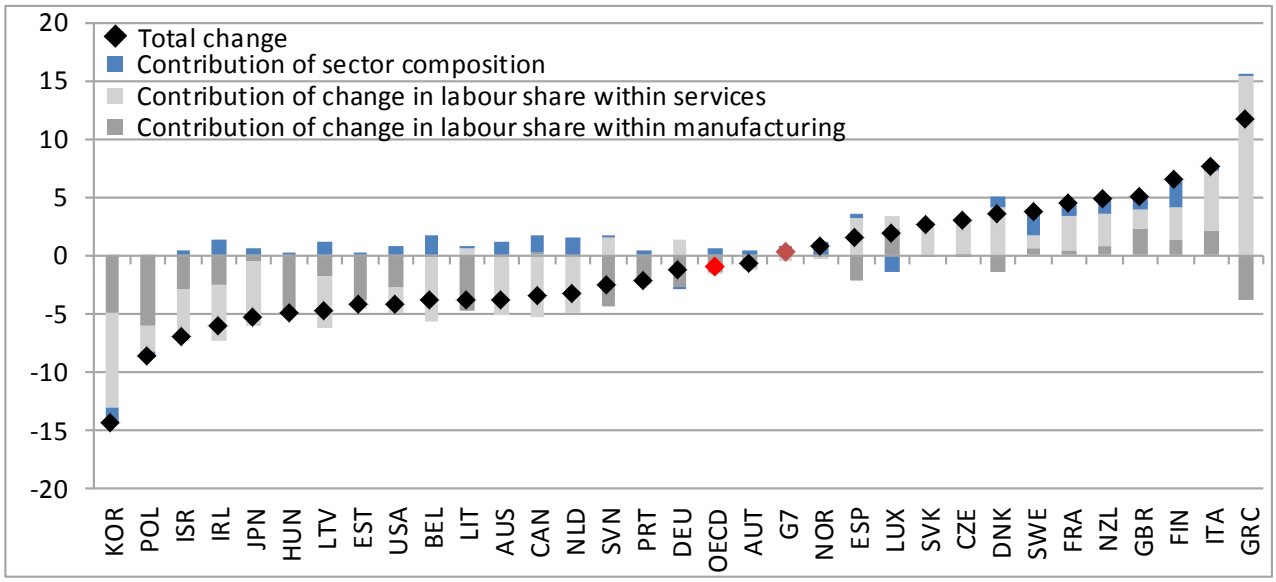
25. In most of the countries examined here, changes in labour shares when primary, housing and non-market sectors are excluded reflect similar rather than diverging developments in manufacturing and services and a limited role of changes in industry composition (Figure 6).[14] If labour share developments were entirely driven by declines in labour shares within manufacturing – which is more exposed to increased trade integration than services – or by a shift in industry composition from manufacturing to services, this would suggest globalisation as the most plausible explanation of aggregate labour share developments. However, the similarity of developments in services and manufacturing does not imply that technological change is the ultimate source of aggregate labour share developments as globalisation may

14. This is consistent with previous studies suggesting that labour share developments are overwhelmingly driven by developments within industries (OECD, 2012; De Serres et al., 2001).

induce technological change or displace manufacturing workers that are then re-employed in services at lower wages.

Figure 6. The contribution of manufacturing and services to labour share developments

Excluding primary, housing and non-market sectors, percentage points, 1995-2014



Note: Three-year averages starting and ending in indicated years. OECD and G7 refer to unweighted averages for the relevant countries included in the Figure. 1995-2013 for Australia, Korea; 1995-2012 for New Zealand; 1997-2012 for Canada; 1998-2014 for Ireland and United States.

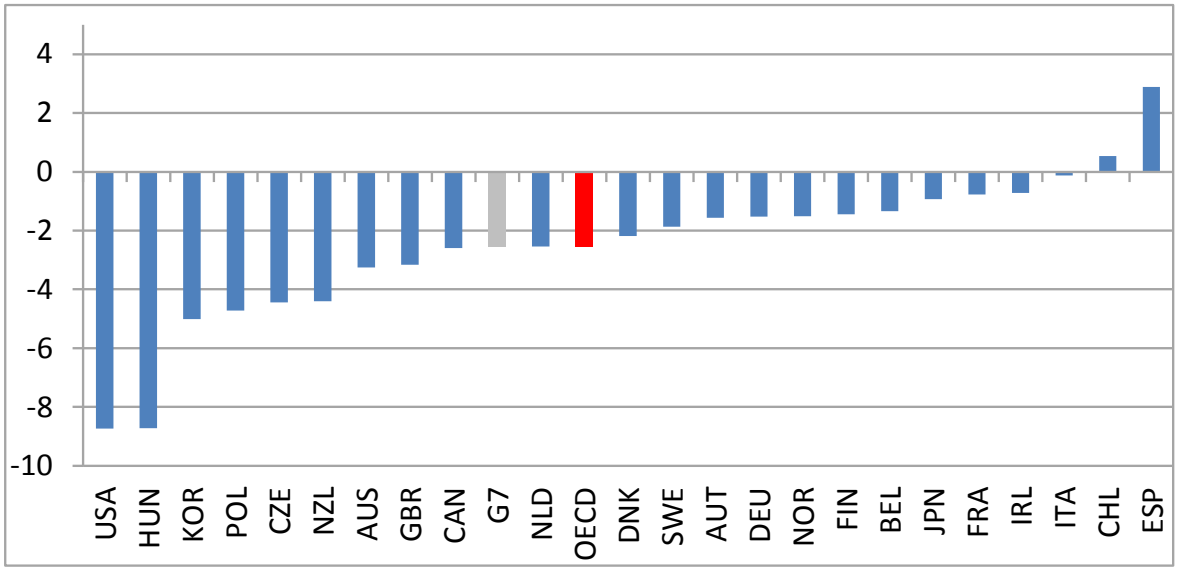
Source: OECD National Accounts Database.

4. The contribution of increasing wage inequality to decoupling

26. Increases in wage inequality have contributed to aggregate decoupling by reducing the ratio of median to average wages in a wide range of OECD countries. The average decline in the ratio of median to average wages based on OECD Earnings Database was around 2 percentage points over the period 1995-2014, but for a number of countries, including the Czech Republic, Hungary, Korea, New Zealand, Poland and the United States, declines in the ratio were significantly more pronounced (Figure 7). Of the analysed OECD countries only Chile, Italy and Spain bucked the trend of increasing wage inequality.

Figure 7. The ratio of median to average wages has declined in a wide range of OECD countries

Percentage points, 1995-2013



Note: Three-year averages starting and ending in indicated years. OECD and G7 refer to unweighted averages for the relevant countries included in the Figure. 1996-2013 for Chile, Czech Republic, Denmark; 1995-2012 for Australia, Spain, France, Italy, Poland, Sweden; 1997-2013 for Norway, New Zealand; 1998-2013 for Canada; 1995-2010 for Netherlands.

Source: OECD Earnings Database.

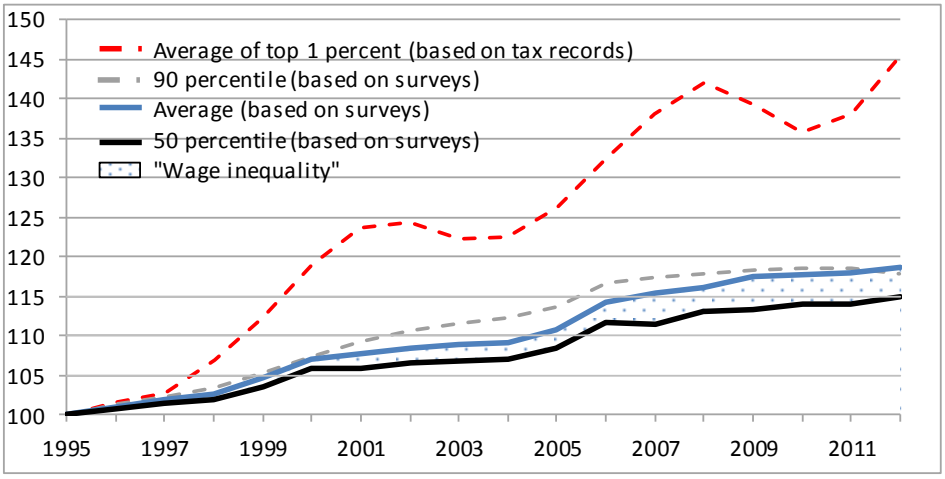
27. The decline in the ratio of median to average wages appears to be overwhelmingly driven by high wage growth of top earners. Information on wages of workers at the top of the wage distribution from surveys is unreliable – which reflects top-coding, sampling issues and under-reporting – so that it is preferable to base wage growth of top earners on tax records.[15] Alvaredo et al. (2016) provide average wage income of the top 1% of income earners, which likely overlaps with the top 1% of wage earners. According to these data, which are available only for a limited number of countries, the most striking development over the past two decades has been the divergence of wages of the top 1% of income earners from both the 90th percentile and the median of wage earners (Figure 8).[16]

15. Atkinson et al. (2011), Burkhauser et al. (2012), Deaton (2005) and Ruiz and Woloszko (2016) discuss issues with the coverage of top earners in surveys.

16. To the extent that surveys only incompletely capture wage growth at the top of the wage distribution and therefore underestimate average wage growth, the actual decoupling of median from average wages may be larger than suggested by surveys.

Figure 8. Wages of the top 1% of income earners have diverged from the average and the median

Index, 1995=100



Note: Indices based on unweighted average for nine OECD countries: Australia (1995-2010), Canada (1997-2000), Spain (1995-2012), France (1995-2006), Italy (1995-2009), Japan (1995-2010), Korea (1997-2012), Netherlands (1995-1999) and United States (1995-2012), for which data on wages of the top 1% of income earners are available. All series are deflated by the same total economy value added price index.

Source: OECD Earnings Database; World Wealth and Income Database.

28. Common explanations for increased wage inequality such as skill-biased technological change and globalisation cannot plausibly account for the disproportionate wage growth at the very top of the wage distribution. Skill-biased technological change and globalisation may both raise the relative demand for high-skilled workers, but this should be reflected in broadly rising relative wages of high-skilled workers rather than narrowly rising relative wages of top-earners. Brynjolfsson and McAfee (2014) argue that digitalisation leads to "winner-takes-most" dynamics, with innovators reaping outsize rewards as digital innovations are replicable at very low cost and have a global scale. Recent studies provide evidence consistent with "winner-take-most" dynamics, in the sense that productivity of firms at the technology frontier has diverged from the remaining firms and that market shares of frontier firms have increased (Andrews et al., 2016). This type of technological change may allow firms at the technology frontier to raise the wages of its key employees to "superstar" levels.

5. Conclusion

29. This paper is limited to a quantitative description of movements in labour shares and wage inequality in OECD countries. The cross-country heterogeneity in these movements suggests that longer-term global trends such as technological change and globalisation alone cannot fully account for decoupling of wages from productivity. Country-specific factors, including public policy settings, may play a significant role in shaping the effects of global trends on labour shares and wage inequality.

30. Future work will investigate the structural causes of the decoupling of wages from productivity and the relation with economic policies. A first research axis will use country- and sector-level data to analyse the extent to which movements in labour shares and wage inequality are related to measures of technological change, trade integration and public policies. A special focus will be on whether digitalisation and trade integration with lower-income countries have particularly large effects on labour shares and wage inequality and the role public policies can play in mitigating these effects. A second research axis will analyse the transmission of productivity gains to wages at the firm level. This research will analyse the extent to which cross-firm divergence of wages reflects cross-firm divergence of productivity or decoupling of wages from productivity within specific groups of firms, with a particular focus on the role of public policies in these developments.

REFERENCES

Alvaredo F., A. B. Atkinson and S. Morelli (2016), "The challenge of measuring UK wealth inequality in the 2000s", *Fiscal Studies*, Vol. 37, No. 1, pp. 13-33.

Andrews D., C. Criscuolo and P. Gal (2016), "The Global Productivity Slowdown, Technology Divergence and Public Policy: A Firm Level Perspective", *OECD Economics Department Working Paper for WP1*, ECO/CPE/WP1(2016)26.

Atkinson A., T. Piketty, and E. Saez (2011), "Top Incomes in the Long Run of History", *Journal of Economic Literature*, 2011, No. 49:1, pp. 3–71.

Azmat G., A. Manning and J. Van Reenen (2012), "Privatization and the Decline of Labour's Share: International Evidence from Network Industries", *Economica*, No. 79/315, pp. 470–92.

Bivens J. and L. Mishels (2015), "Understanding the Historic Divergence Between Productivity and a Typical Worker's Pay", *EPI Briefing Papers*, No. 406, Economic Policy Institute, Washington.

Bridgman B. (2014), *Is Labor's Loss Capital's Gain? Gross versus Net Labor Shares*, Bureau of Economic Analysis, mimeo, October 2014.

Brynjolfsson E. and A. McAfee (2014), *The Second Machine Age - Work, Progress, and Prosperity in a Time of Brilliant Technologies*, WW Norton & Company.

Burkhauser R., S. Feng, S. Jenkins, and J. Larrimore (2012), "Recent Trends in Top Incomes Shares in the United States: Reconciling Estimates from March CPS and IRS Tax Return Data", *The Review of Economics and Statistics*, vol. XCIV, pp. 371-388.

Cho T., S. Hwang and P. Schreyer (2016), "Has the Labour Share Declined? It Depends", *OECD Statistics Working Papers*, forthcoming, OECD Publishing, Paris

Deaton A. (2005), "Measuring Poverty in a Growing World (or Measuring Growth in a Poor World)", *The Review of Economics and Statistics*, vol. LXXXVII, pp. 1-19.

De Serres A., S. Scarpetta and C. de la Maisonneuve (2001), "Falling Wage Shares in Europe and the United States: How Important is Aggregation Bias?", *Empirica*, Vol. 28, pp. 375–400.

Elsby M., B. Hobijn and A. Sahin (2013), "The Decline of the U.S. Labor Share", *Brookings Papers on Economic Activity*, No. 2013-27, September 2013.

Feldstein M. S. (2008), "Did Wages Reflect the Growth in Productivity?", *NBER Working Paper*, No. 13953, The National Bureau of Economic Research.

Ferrantino M. and D. Taglioni (2014), "Global Value Chains in the Current Trade Slowdown", *World Bank Economic Premise* No. 137.

International Labour Organisation (2015a), *The Labour Share in G20 Economies*, ILO, IMF, OECD, WB, Report prepared for the G20 Employment Working Group Antalya, Turkey, 26-27 February 2015 .

International Labour Organisation (2015a), *Income inequality and labour income share in G20 countries: Trends, Impacts and Causes*, ILO, IMF, OECD, WB, Report prepared for the G20 Employment Ministers Meeting and Joint Meeting with the G20 Finance Ministers, Ankara, Turkey, 3-4 September 2015.

Karabarbounis L. and B. Neiman (2014), "The Global Decline of the Labour Share", *Quarterly Journal of Economics*, Vol. 129, No. 1, pp. 61–103.

Murtin F. and M. Mira d'Ercole (2015), "Household wealth inequality across OECD countries: new OECD evidence", *OECD Statistics Brief*, No. 21, OECD Publishing, Paris.

OECD (2012), *OECD Employment Outlook 2012*, Chapter 3. Labour Losing to Capital: What Explains the Declining Labour Share?, OECD Publishing, Paris.

Pionnier P-A. and E. Guidetti (2015), "Comparing Profit Shares in Value-Added in Four OECD Countries: Towards more Harmonized National Accounts", *Statistics Directorate Working Papers*, No. 61, OECD Publishing, Paris.

Rognlie M. (2015), "Deciphering the fall and rise in the net capital share", *Brookings Papers on Economic Activity*, March 19, 2015.

Ruiz N. and N. Woloszko (2016), "What do household surveys suggest about the top 1% incomes and inequality in OECD countries?", *OECD Economics Department Working Papers* , No. 1265, OECD Publishing, Paris.

Sierminska E. and M. Medgyesi (2013), "The distribution of wealth between households*", Research note*, No. 11/2013, European Commission.

Uguccioni J. (2016), "Decomposing the Productivity-Wage Nexus in Selected OECD Countries, 1986-2013", *CSLS Research Report*, forthcoming, Centre for the Study of Living Standards.

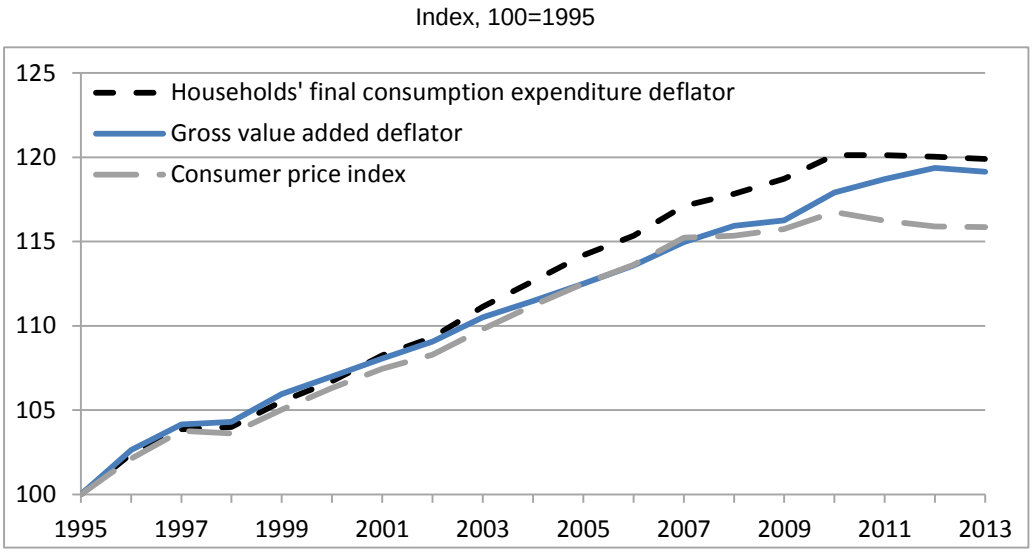
United Nations et al. (2009), *System of National Accounts 2008*, New York.

ANNEX: SUPPLEMENTARY TECHNICAL MATERIAL

1. Evolution of deflators

1. For the countries covered by the analysis as a whole, the growth differential between the consumption deflator and the value added deflator has been small and depends on the precise measure of the consumption deflator. The consumer price index has grown more than the gross value added deflator over the sample period, especially from 2010 onwards, so that the growth rate of real median compensation based on the consumer price index has been below the rate based on the value added deflator (Annex Figure A1.1). By contrast, the growth rate of real median compensation based on the households' final consumption expenditure deflator from the national accounts has been above the rate based on the value added deflator.

Figure A1.1. Real median compensation based on value added and consumption deflators (OECD average)



Note: 1995-2013 for Australia, Austria, Belgium, Germany, Finland, Hungary, Japan, Korea and United Kingdom; 1996-2013 for Czech Republic, Denmark; 1997-2013 for Canada; 1998-2013 for Ireland, Norway and United States; 1995-2012 for Spain, France, Italy, Poland and Sweden; 1997-2012 for New Zealand; 1995-2010 for Netherlands; 2001-2011 for Israel; 2003-2013 for Slovak Republic.

Source: OECD National Accounts Database, OECD Earnings Database.

2. The wedge between the value added deflator and consumption deflators is largely driven by countries' external terms of trade since the consumption deflators include imported goods whereas the value added deflator includes only domestic production. Indeed, for a number of commodity-importing countries, real compensation based on a consumption deflator has grown less than real compensation based on the producer price index irrespectively of the precise measure of the consumption deflator used in the analysis (Annex Table A1.1).

Table A1.1. Real median compensation growth based on value added and consumption deflators

Annualised growth rates, 1995-2013

	Gross value added deflator	Consumer price index	Households' final consumption expenditure deflator
Australia	0.4	0.7	0.9
Austria	0.7	0.2	0.4
Belgium	0.8	0.4	0.6
Canada	0.2	0.4	0.8
Czech Republic	2.2	1.4	2.0
Denmark	0.8	0.9	1.1
Finland	1.1	1.1	0.9
France	1.0	0.8	1.1
Germany	0.5	-0.3	0.0
Hungary	0.9	0.3	0.5
Ireland	1.0	0.8	1.4
Israel	0.4	-0.2	-0.2
Italy	-0.1	-0.2	-0.2
Japan	0.3	-0.6	0.0
Korea	2.0	1.0	0.9
Netherlands	0.6	0.6	0.7
New Zealand	0.8	0.8	1.3
Norway	-0.7	2.6	2.6
Poland	2.0	1.6	1.8
Slovak Republic	3.3	1.8	2.0
Spain	0.6	0.4	0.4
Sweden	2.0	2.3	2.1
United Kingdom	1.1	1.3	1.6
United States	0.2	0.0	0.4
OECD	**0.9**	**0.8**	**1.0**
G7	**0.4**	**0.2**	**0.5**

Note: OECD and G7 refer to un-weighted averages for the relevant countries included in the Table. 1996-2013 for Czech Republic, Denmark; 1997-2013 for Canada; 1998-2013 for Ireland, Norway and United States; 1995-2012 for Spain, France, Italy, Poland and Sweden; 1997-2012 for New Zealand; 1995-2010 for Netherlands; 2001-2011 for Israel; 2003-2013 for Slovak Republic.

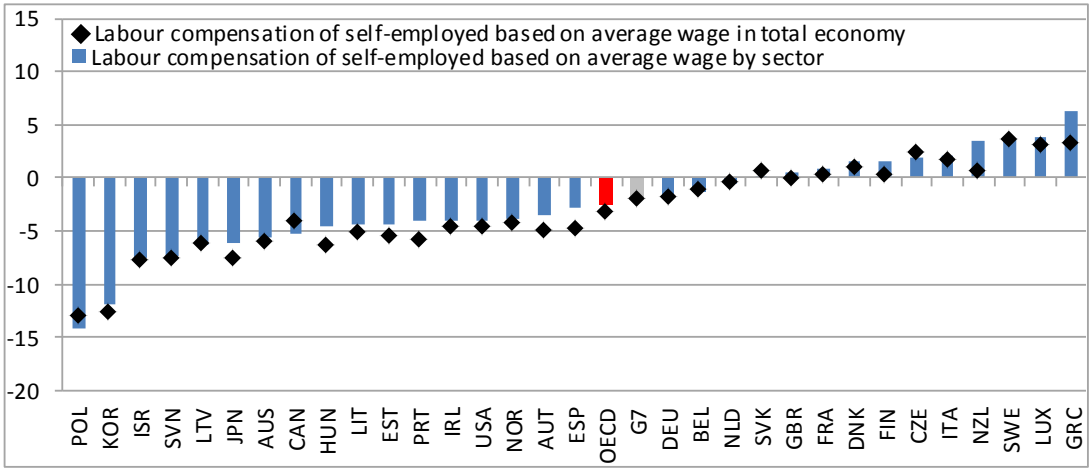
Source: OECD National Accounts Database, OECD Earnings Database.

2. Imputation of compensation of the self-employed

3. Wages of the self-employed are commonly imputed using the average hourly wage of dependent employees in the total economy (International Labour Organisation et al., 2015a; International Labour Organisation et al., 2015b). This approach fails to account for inter-industry wage differentials, which can be large. For instance, a self-employed in the financial industry is unlikely to earn a similar wage as a self-employed in the agricultural sector. Consequently this paper is based on labour compensation of the self-employed imputed at the sector level. Developments in total-economy labour shares in a number of individual countries are sensitive to the imputation method of wages of the self-employed, but the OECD average is roughly unchanged (Annex Figure A2.1). Alternative wage imputation methods for self-employed workers are discussed in Cho et al. (2016). As they argue, from a theoretical point of view, the best procedure is to make this imputation based on micro-level information on the socio-economic status of self-employed workers. In the absence of such data, the second-best solution is to make this imputation based on industry-level national accounts data as in the present paper.

Figure A2.1. Effect of the imputation method for compensation of the self-employed on labour shares

Total economy, Percentage points, 1995-2014



Note: Three-year averages starting and ending in indicated years. 1995-2013 for Australia, France, Korea and Portugal; 1995-2012 for New Zealand; 1997-2012 for Canada; 1997-2014 for United Kingdom; 1998-2014 for Ireland and United States.

Source: OECD National Accounts Database.

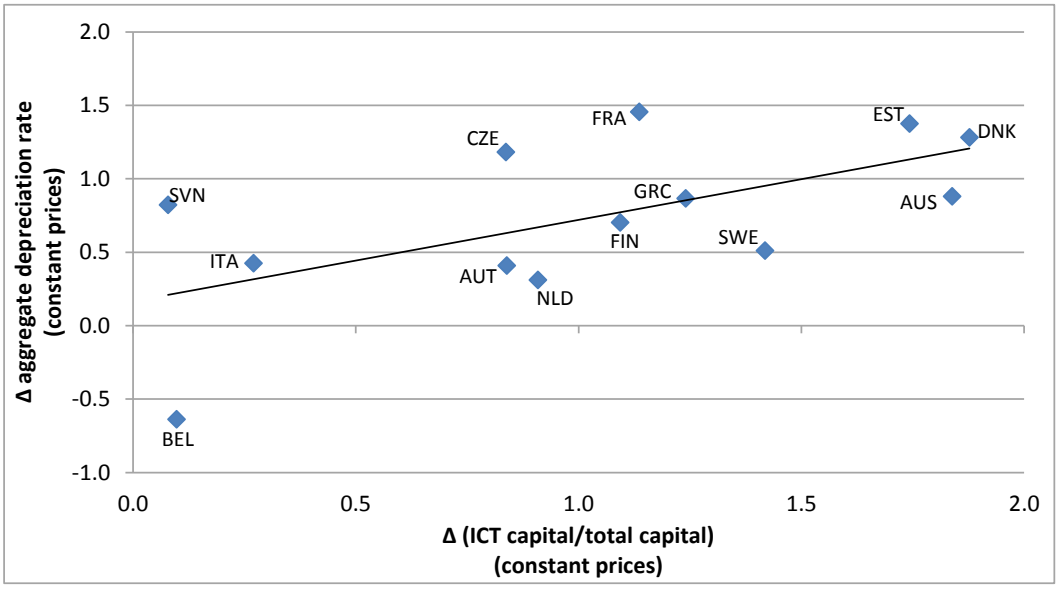
3. Gross versus net labour shares

4. The increase in the share of capital depreciation in value added is commonly viewed as reflecting the increased share of rapidly depreciating ICT capital in the total capital stock. If the elasticity of substitution between ICT equipment, non-ICT equipment and labour in the production function is sufficiently large, a fall in the price of ICT capital induces an increase in the share of depreciation in value added and thus a larger decrease in the gross labour share than the net labour share (Bridgman, 2014). By contrast, if the elasticity of substitution is below some critical threshold, the increase in the relative volume of the ICT capital stock is offset by a fall in its relative price so that this substitution effect does not lead to any increase in the share of capital depreciation in value added at current prices.

5. In volume terms, ICT capital has substituted other types of capital in most countries. Given that ICT capital depreciates more rapidly than non-ICT capital, this substitution has been associated with a proportionate increase of the aggregate depreciation rate in volume terms, that is, the ratio of aggregate depreciation to the aggregate capital stock at constant prices has increased (Annex Figure A3.1).

Figure A3.1. Association between the depreciation rate in volumes and share of ICT capital in volumes

Percentage point changes, 1995-2013



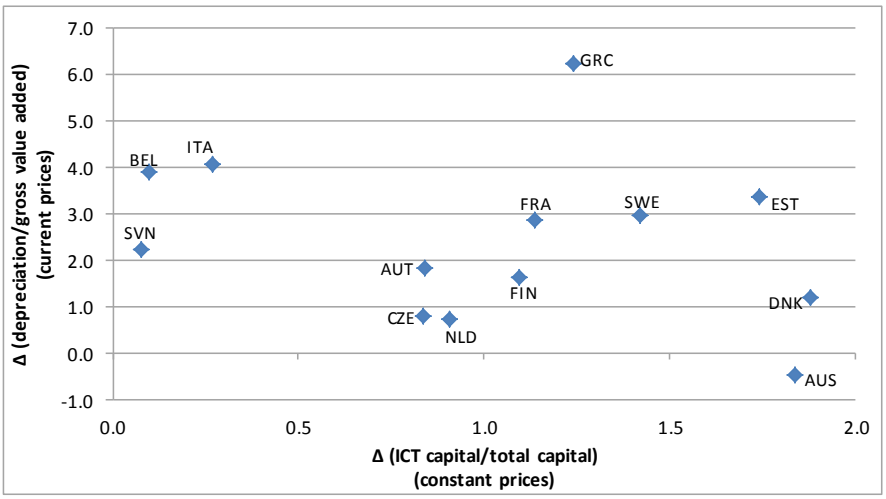
Note: Three-year averages starting and ending in indicated years. Belgium (1996-2013); Estonia, Netherland and Slovenia (2000-2013). Depreciation rate refers to the ratio of depreciation to total capital stock.

Source: OECD National Accounts Database.

6. However, for OECD countries, the substitution of rapidly-depreciating ICT capital for other types of equipment does not appear to be a major driver of the increase in the share of capital depreciation in value added at current prices. Actually, the substitution of ICT equipment for other types of equipment appears to be unrelated to the increase in the share of depreciation in value added at current prices (Annex Figure A3.2).

Figure A3.2. Value added share of depreciation and share of ICT capital in total capital

Percentage point changes, 1995-2013



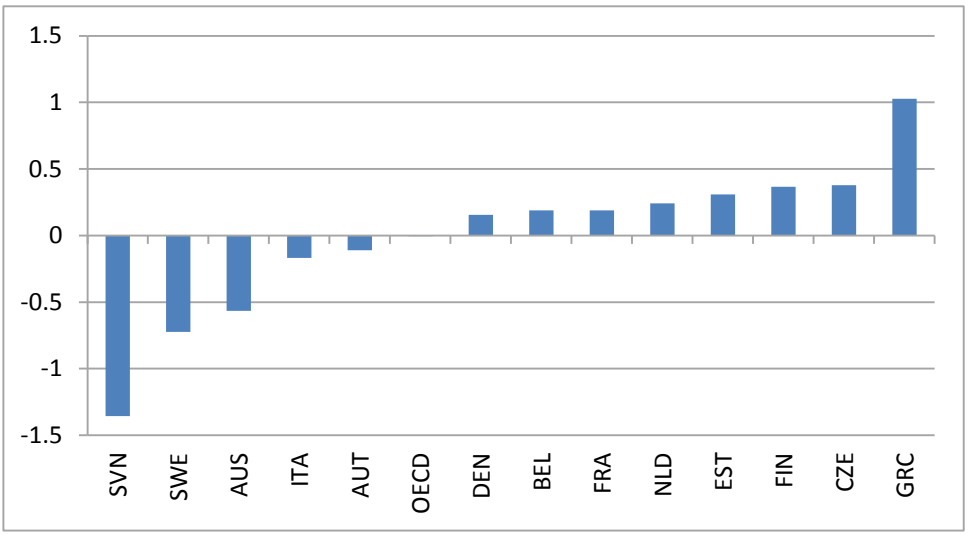
Note: Three-year averages starting and ending in indicated years. Belgium (1996-2013); Estonia, Netherland and Slovenia (2000-2013).

Source: OECD National Accounts Database.

7. The increase in the share of ICT capital in the total capital stock in volume terms appears to have been offset by the decline in its relative price so that the share of ICT capital in the total capital stock at current prices (*i.e.* in nominal terms) has remained broadly constant or even declined for the analysed OECD countries (Annex Figure A3.3). Overall, substitution of rapidly-depreciating ICT capital for other types of equipment does not appear to be a major driver of the increase in the share of capital depreciation in value added at current prices.

Figure A3.3. ICT capital to total capital ratio

Current prices, percentage point changes,1995-2013



Note: Three-year averages starting and ending in indicated years. OECD refers to unweighted average of the countries included in the Figure. Belgium (1996-2013); Estonia, Netherland and Slovenia (2000-2013)

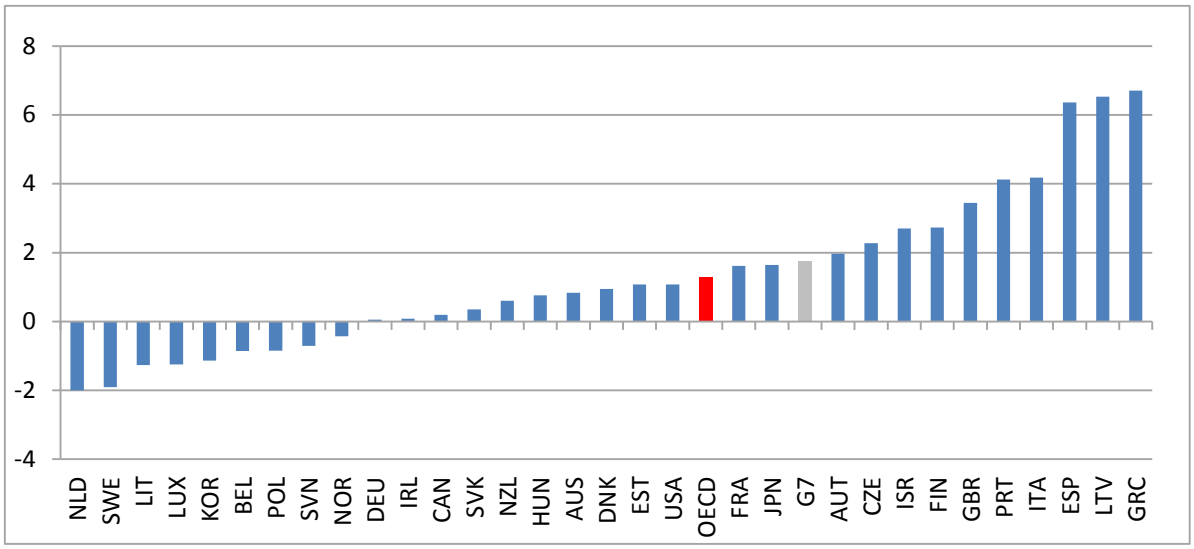
Source: OECD National Accounts Database.

4. Share of housing in total value added

8. In the national accounts, rents paid by tenants to landlords and imputed rents of home owner-occupiers are recorded as output of the housing sector and the overwhelming part of it ends up in gross operating surplus, so that the labour share in the housing sector is well below the labour share of the total economy. Consequently, an increase in the share of housing to total value added puts downward pressure on the total economy labour share. Between 1995 and 2014, the share of the housing sector in total value added increased by more than 4 percentage points for Greece, Italy, Latvia, Portugal and Spain, and by more the 2 percentage points for Czech Republic, Finland, Israel and United Kingdom (Annex Figure A4.1).

Figure A4.1. Change of ratio of housing to total gross value added

Change in percentage points, 1995-2013



Note: Three-year averages starting and ending in indicated years. OECD and G7 refer to un-weighted averages over the relevant countries included in the figure. 1995-2013 for Austria, Australia, Belgium, Czech Republic, Denmark, Germany, Finland, United Kingdom, Hungary, Japan, Korea, Netherlands, New Zealand, Norway, Poland, Slovak Republic, Sweden; 1998-2013 for Ireland, United States; 1995-2012 for New Zealand; 1997-2012 for Canada.

Source: OECD National Accounts Database.