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Can Pro-growth Policies Lift all Boats? An Analysis Based on Household Disposable Income

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ABSTRACT / RÉSUMÉ

Can pro-growth policies lift all boats? An analysis based on household disposable income

In a majority of OECD countries, GDP growth over the past three decades has been associated with growing income disparities. To shed some lights on the potential sources of trade-offs between growth and equity, this paper investigates the long-run impact of structural reforms on GDP per capita and household income distribution. Pro-growth reforms can be distinguished according to whether they are found to generate an increase or a reduction in household disposable income inequality. Those that contribute to reduce inequality include the reduction in regulatory barriers to competition, trade and FDI, as well as the stepping-up in job search assistance and training programmes. Conversely, a tightening of unemployment benefits for the long-term unemployed is found to lift mean household income but to lower income among poorer households, thus raising inequality. Several other reforms have no significant impact on income distribution.

JEL codes: O47; D37; E61
Keywords: Growth, inequality, pro-growth policies

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Les politiques de croissance peuvent-elles réduire les inégalités? Une analyse basée sur le revenu disponible des ménages

Dans la majorité des pays de l'OCDE, la croissance du PIB au cours des trois dernières décennies a été associée à des disparités croissantes de revenus. Afin d'éclairer les sources potentielles d'arbitrage entre croissance et équité, cette étude examine l'impact à long terme des réformes structurelles sur le PIB par habitant et sur la distribution du revenu des ménages. Les réformes favorables à la croissance peuvent être distinguées selon qu'elles augmentent ou réduisent la dispersion du revenu disponible. Les politiques qui contribuent à réduire les inégalités comprennent la réduction des obstacles réglementaires à la concurrence, au commerce et à l'IDE, ainsi que l'intensification des programmes d'assistance et de formation à l'emploi. Inversement, un resserrement des prestations de chômage pour les chômeurs de longue durée augmente le revenu moyen des ménages mais baisse celui des plus pauvres, augmentant ainsi les inégalités. Plusieurs autres réformes n'ont pas d'impact significatif sur la répartition des revenus.

Codes JEL : O47; D37; E61

Mots clé : croissance, inégalité, politique pour la croissance

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CAN PRO-GROWTH POLICIES LIFT ALL BOATS? AN ANALYSIS BASED ON HOUSEHOLD DISPOSABLE INCOMES

Orsetta Causa, Alain de Serres and Nicolas Ruiz[1]

1. Introduction

1. Pro-growth structural reforms are regularly assessed on the basis of their effectiveness in boosting material living standards through their ability to lift employment and productivity. GDP per capita has been the variable traditionally used to measure of living standards (OECD, 2013a). Yet, the limitations of GDP per capita in measuring people's wellbeing -- even from a narrow material living standard perspective – are well-known (Stiglitz et al, 2009, OECD, 2011a, OECD, 2010, Boarini et al., 2006). For instance, median household income – an income measure which better reflects the actual material living standards of a "typical" household – has evolved quite differently from GDP per capita in a number of countries.

2. The purpose of this paper is to provide new empirical evidence on the effects of structural policies on households' incomes across the distribution, with the aim of identifying policy tradeoffs and complementarities between efficiency and equity.[2,3] It is a follow-up on an earlier paper that provided a new assessment of how households' income fared compared with GDP and of the evolution of inequality and poverty across OECD countries over the last fifteen years (Causa et al., 2014).[4]

3. The previous paper confirmed that focusing on output alone provides an inaccurate picture of people's actual material living standards as it showed for instance that growth in GDP per capita outpaced growth in mean household income in most OECD countries during the last two decades. It also emphasised the need to go beyond single measures of inequality and argued in favor of looking at the structure and

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2. Throughout the paper, more equity is to be interpreted as less inequality in income distribution and does not imply any judgement about the intrinsic value of a more equal distribution.

3. In this paper, inequality is examined from a static perspective. While ultimately a comprehensive assessment would need covering inequality in life-cycle perspective as well as dynamic inequality, hence intra-generational mobility as well as inter-generational mobility, such analysis is beyond the scope of this study, not least reflecting major data limitations. For a relatively recent analysis of intergenerational social mobility in OECD countries, see Causa and Johansson (2009).

4. It also builds on earlier studies on the topic OECD (2008, 2010, 2011b, and 2012).

location of inequalities, such as within each half of the income distribution. Putting more focus on the lower-half of the distribution, it documented a relatively widespread tendency for bottom incomes to lose ground relative to median incomes, and, as a result, an increase in relative poverty in the majority of OECD countries.

4. The current paper builds on these findings and complements previous OECD analysis in the area of structural policies and inequality, in particular OECD (2012)[5] and OECD (2011b). It goes beyond earlier studies in two main respects:

- The paper relies on a recently-developed analytical framework that encompasses average income and the income distribution within a simple unified measure – the income standards. The latter summarises the level of income by placing progressively more weight on different portions of the distribution. Taking average income as the benchmark point, the analysis focuses on the lower-half of the income distribution, i.e. moving progressively from median to bottom incomes. This is consistent with a Rawlsian approach to social welfare, which puts relatively stronger weight on the lower end of the distribution.

- The paper analyses the joint effects of structural policies on GDP per capita and household incomes, on average and across the distribution. It investigates the extent to which structural policies have differential long-run impacts on GDP per capita and household incomes at different points of the distribution. This is aimed at identifying potential policy trade-offs and synergies between economic efficiency, household material living standards and inequality. Relying on this assessment, different countries may implement different policy reforms, depending on various factors such as societal preferences and aversion to inequality, but also short-term budgetary and or political constraints.

5. The paper is structured as follows. Section 2 defines and illustrates incomes standards as encompassing measures covering household incomes on average and across the distribution. Section 3 lays-out the starting point of the analysis: it assesses the extent to which GDP per capita trickles down to household incomes on average and across the distribution; it attempts identifying the potential drivers of the widespread growing shortfall of household incomes vis-à-vis GDP. Section 4 starts by briefly discussing the potential channels of transmission from GDP per capita-enhancing policies to average incomes and their distribution. It then presents the empirical approach pursued in the paper to address this issue. On the basis of this framework, Section 5 delivers new empirical evidence on the joint impact of structural reforms on GDP per capita and household disposable incomes, on average and across the distribution. As a result, the paper delivers evidence on the impact of structural policies on inequality in disposable incomes.

6. The analysis covers a large span of institutional settings that have been found to boost GDP per capita, either directly or through various channels (i.e. labour utilisation and labour productivity). It focuses on the area of tax policies, labour market product market policies. Non-policy factors such as up skilling, globalisation and technological change are also covered, albeit more succinctly.[6] Section six wraps-up the empirical findings by classifying policy reforms on the basis of their joint effects on GDP per capita and household disposable incomes across the distribution.

5. See Chapter 5, "Reducing income inequality while boosting economic growth: Can it be done?''

6. This topic has been at the core of numerous inequality studies, such as e.g. Braconier and Ruiz-Valenzuela, (2014), Johansson and Olaberria, (2014), Ostry *et al.* (2014) and Chapter 2 of OECD (2011b).

2. A unified framework for assessing households' material living standards on average and across the distribution

2.1 Basic concepts and data limitations

7. The central income concept used throughout the analysis is that of household disposable income, as this is the best proxy of households' economic resources defined by internationally agreed standards and computable across the income distribution.[7] Household disposable income broadly builds on the following pillars:

- *Income concept*: disposable income encompasses all income sources, hence it includes net transfers from government (cash transfers net of direct taxes paid by households) in addition to market income, which covers both labour income (wages, salaries and self-employment income) and income derived from capital.

- *Unit of observation:* income is measured at the household as opposed to individual level and takes into account economies of scale in consumption within households.[8]

- *Scope of the reference population:* income is measured for total population (as covered in survey-based data) as opposed to sub-groups such as in particular the working or working-age population.

In the rest of this paper, *income* will refer to *disposable* income unless otherwise specified.

8. The empirical analysis relies on the OECD Income Distribution database, where an attempt is made to achieve the best possible comparability across countries and over time (Box 1). For each country and each year, the database covers mean disposable income by deciles (i.e. the population is sliced in ten equally sized groups ranked by income), allowing direct computation of income standards (see Box 2). Despite the high quality of the data, especially from a cross-country comparative perspective, some caveats need being borne in mind, which qualify the boundaries of the analysis:

- The data do not build on a longitudinal panel structure, which makes it impossible to measure inequality in a dynamic perspective and therefore to study intra and inter-generational income mobility. As a consequence, this paper focuses on inequality from a static perspective.

- As most household surveys, the data used here measure income on a cash basis and therefore do not include several non-cash components such as in-kind public transfers and income for owner-

7. Ideally one would need to rely on the most comprehensive household adjusted disposable income, taking into account in-kind transfers such as education and health care but this measure is not available on a time-series basis and is difficult to use for international comparisons (see below on data limitations). See OECD (2011b) for an analysis on the redistributive impact of in-kind transfers.

8. As standard in inequality analysis, income measures are defined on an "equivalised" (or ''per consumption unit'') basis. The notion of "equivalisation" implies that the income attributed to each person in a household reflects income sharing within the household and adjusts for household needs. It is assumed that these needs increase with household size, but less than proportionally. A number of "scales" exist for such adjustment. In this analysis, total household income is divided by the square root of household size.

occupied housing.[9] Capital income does not include capital gains. These income components are generally not evenly distributed across the income distribution. For example, in-kind public services represent a higher share of disposable incomes at the bottom of the distribution.[10,11] The absence of in-kind public services implies that the current paper may overestimate the level of inequality in countries where such transfers represent a relatively important income component at the low end of the distribution — hence a major redistribution tool. Income from capital gains represents a higher share of disposable income at the top of the distribution and more generally in its upper-half. One associated risk is thus that of underestimating the level of inequality in countries where capital gains represent a relatively important income component for households in the upper-end of the distribution.

- As most household surveys, the data used here underestimate top incomes, reflecting a number of well-known factors such as non-response rates increasing with income levels or confidentiality issues. Assessing top incomes would need to rely on tax return data, as has been done in OECD (2011b and 2014) for 17 OECD countries – based on pioneering work by Piketty and co-authors.[12] While top incomes are not the focus of this study, an associated risk is to underestimate levels and, even more, increases in inequality. Available evidence would suggest that in practice this risk could have tangible (though not measurable) consequences in the case of the United States.

- Real incomes are derived from the implicit assumption that all consumers across the income distribution face the same price for their consumption basket because price indices differentiated by population groups are not available for most countries.[13] This is a potential caveat, as different people buy different bundles of goods (e.g. poor people spend more on food and less on leisure) and they may buy their goods and services in different types of stores (which sell "similar" products at very different prices). Again it is not clear though if and to what extent this risk would impact cross-country comparisons.

- Indirect taxes are not included in the measure of taxes paid by households. Their impact may tentatively be reflected in cross-country-time series differences in consumption prices faced by households. Still, as implied by the above-discussed limitation, such inference would only be valid for the average household. As a result, the data do not allow for addressing the distributional implications of e.g. consumption taxes.

9. While almost two-third of OECD countries provide some estimates of non-cash income components such as imputed rents, the high heterogeneity in the methodology applied for deriving such figures makes them unsuited to cross-country comparisons. These items are therefore excluded from the OECD database.

10. See Table 8.1 in OECD, (2011b).

11. The distributive patterns of imputed rents are likely to vary across countries, reflecting different estimation methods and institutional settings. See Törmälehto, and H. Sauli (2010).

12. OECD (2011b, 2014) is based mostly on pre-tax income data compiled by Atkinson et al. (2011). There is evidence of the rise in top income shares in the three decades before the crisis for certain OECD countries, especially in the United States and also, though substantially less, in Canada and the United Kingdom. See more recent work by Piketty (2013).

13. See Causa et al. (2014) for a discussion of implications and country-specific efforts to address this issue.

Box 1. The OECD income distribution database

In order to benchmark and monitor countries' performance in the field of income inequality and poverty, the OECD has developed over the last 20 years a statistical database of a number of standardised indicators. These indicators are based on the central concept of "equivalised household disposable income", i.e. the total income received by the household less the current taxes and transfers they pay, adjusted for household size with an equivalence scale.

The method of data collection used for the OECD Income Distribution Database aims to maximise international comparability as well as inter-temporal consistency of data. This is achieved by a common set of protocols and statistical conventions (e.g. on income concepts and components) to derive estimates. The information obtained by the OECD through a network of national data providers is more up-to-date relative to that available through many other statistical sources, but reflects the long time-lags that characterise data collection in this field in most OECD countries. Country estimates are provided to the OECD in the form of semi-aggregated tabulations, and are based on national sources that are deemed to be most representative for each country. One disadvantage of this approach is that it does not allow accessing the original micro-data, which constrains the subsequent analysis that can be performed.

The data collection is undertaken via a standardized questionnaire. Selected data from this questionnaire are available at http://www.oecd.org/els/soc/inequality-database.htm.

The data cover OECD countries and span the period from mid-80s until end 2000s. Currently, the data are not available on a yearly basis and time coverage varies widely across countries, ranging from e.g. 5 points for Australia to 17 points for Canada. Due to the increasing importance of income inequality and poverty issues in policy discussion, the database is in the process of being annually updated. The OECD aims to extend its database to Brazil, China, India, Indonesia, Russia and South Africa.

2.2 Household incomes across the distribution: the average and distribution-sensitive income standards

9. Headline household-based income standards indicators are constructed based on the general mean approach developed by Foster and Szekely (2008) following Atkinson's framework for measuring inequality (Box 2). Income standards are known as functions that summarise the income distribution by a single "representative" level of income, which can then be used in comparison of material living standards across countries and over time. Widely-used income standards reflect the general affluence of the distribution – the case of the average – or the affluence of some parts of the distribution – the case *e.g.* of the average income in the lowest quintile. Compared with those, the family of income standards defined in this paper based on the general mean approach do not restrict attention to income below an arbitrary cut-off point while ignoring incomes across the line. On the contrary, they allow placing progressively less weight on incomes higher up or down the distribution, such as from top to average incomes, from average to median incomes, from median to bottom incomes (Box 2).

Box 2. General means as income standards

General means are grounded in Atkinson's (1970) framework for inequality and welfare analysis and belong to the family of "equally distributed equivalent income" functions. The equally distributed equivalent level of income is the level of income per head, which if equally distributed, would give the same level of social welfare as the present distribution. Formally, general means are defined as follows:

$\mu_\alpha = \left[(x_1^{\ \alpha} + ... + x_n^{\ \alpha})/n\right]^{\frac{1}{\alpha}}$ for all α≠0 and $\mu_\alpha = \left[(x_1 ... x_n)\right]^{\frac{1}{n}}$ for all α= 0,

where the vector $x=(x_{1,...}x_n)$ describes the income distribution, $x_i>0$ is the income of the i-th person and n is the population size. Clearly, the general mean reduces to the standard mean or equivalently the average when α= 1. The case where α= 0 is called the geometric mean whereas α= -1 is known as the harmonic mean.

For a fixed distribution x, the value of the general mean μ α(x) is increasing in the parameter α, with the value approaching the maximum income of x as α rises to ∞ and tending to the minimum income as α falls to −∞. The income standard μα(x) places greater weight on higher incomes and less weight on lower incomes as the parameter rises. Hence α can be interpreted as (an inverse) measure of the level of inequality aversion. The parameter value α =1 (corresponding to the average) provides a natural dividing line between the "bottom sensitive" income standards (with α < 1) that emphasise lower incomes and take values below the average, and "top sensitive" income standards (with α >1) that emphasise higher incomes and take values above the average. The geometric mean (α = 0) is generally empirically close to the median.

Inspection of income standard as defined by general means allows for a broad assessment of inequality across countries and over time. Because these functions can be linked to the Lorenz criterion underlying inequality measurement, this assessment will be consistent with that implied by most widely used summary inequality measures such as the Gini coefficient[1] – and can be intuitively explained as follows: *i*) comparing income distributions across two countries (A and B) at a given point in time, if country A and country B feature the same level of average income but all bottom sensitive income standards are lower and all top sensitive income standards are higher in country A, then this implies higher inequality in A compared with B, consistent with Gini-based inequality ranking; *ii*) comparing income distributions in a single country over a given period: weaker growth in all bottom sensitive income standards and stronger growth in all top sensitive income standards compared with the average implies an increase in inequality over this period, consistent with Gini-based inequality assessment.

Income standards as defined by general means feature a number of analytical properties making them an attractive alternative to widely-used income standards such as median incomes or mean incomes in the bottom of the distribution. General means are the only income standards that satisfy simultaneously linear normalisation (requiring that when all incomes are identical, the income standard is simply the common income level), replication invariance (requiring that the income standard is measured on a per capita basis), homogeneity (requiring that if all incomes are doubled, the income standard must double as well) , continuity (requiring that the income standard does not abruptly change as incomes are altered) and subgroup consistency (requiring that if the income of two distributions in two populations subgroups change in such a way that the income standard rises in one and is unchanged in the other, then the overall standard must rise). It has to be noted for instance that the mean income of the bottom fifth, the income standard employed in many studies including Dollar and Kraay (2001), does not satisfy sub-group consistency. As a result of these properties, this approach has been recently fully extended as a general tool being now systematically used by the World Bank for tracking inequality and poverty (Foster et al., 2013).

While the baseline specification is estimated for the full-range of bottom to top-sensitive income standards, as governed by the parameter α, the range of income standards considered is narrowed for policy analysis. Reflecting the initial focus of this paper – on bottom income households and the poor, the policy analysis is performed for average income and a selected range of bottom-sensitive income standards. From a welfare and policy perspective, these reflect increasing levels of inequality aversion, from no inequality aversion (α = 1) to strong inequality aversion – while the first case is consistent with utilitarian welfare principles, the last case comes close to Rawlsian welfare principles (α=-8):

1. Null emphasis on the income distribution: the standard mean (α =1, average income) provides the benchmark point.

2. Weak emphasis on the bottom of the distribution: the geometric mean (α=0, median income) is empirically generally close to the median.

3. Moderate emphasis on the bottom of the distribution: this case (α =-3, income of the lower-middle class) is covered mainly to ensure continuity between the median and the low-end of the distribution. This intermediate case can be interpreted as covering incomes in the "lower-middle class'', defined as households with incomes above the poverty threshold but below the median income.

4. Strong emphasis on the bottom of the distribution: this case (α =-8, income of the poor) is empirically generally close to the mean income of the poor, where the latter are defined in relative terms with a threshold set between 50 and 60%of median income.

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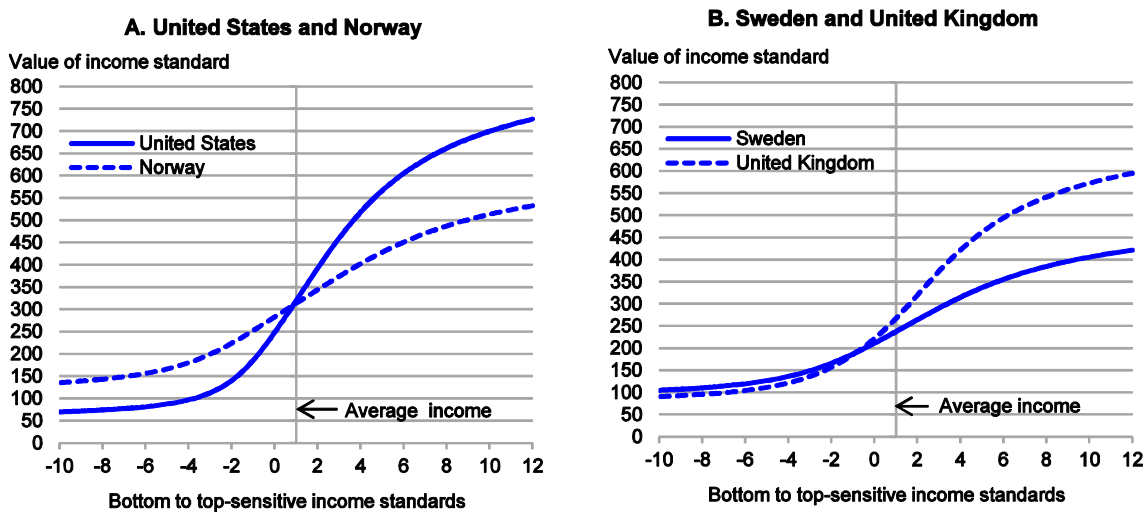
1. The Gini coefficient is defined as the area between the Lorenz curve (which plots cumulative shares of the population, from the poorest to the richest, against the cumulative share of income that they receive) and the 45° line, taken as a ratio of the whole triangle.

10. Income standards as defined above can be used to evaluate and compare income distributions across countries and over time. First, inspection of income standard curves delivers a broad assessment of inequality rankings across countries, which will be consistent with that implied by most widely used summary inequality measures such as the Gini coefficient. This evaluation is illustrated in Figure 1 for selected pairs of OECD countries, in each case exhibiting similar levels of average household incomes in 2010 (i.e. the income standard curves cross at μ_1). Panel A compares the United States to Norway: for a common level of average income, all bottom-sensitive income standards ($\alpha<1$) are lower for the United States than for Norway, whereas all top-sensitive income standards ($\alpha>1$) are higher, clearly indicating the lower level of income inequalities in the latter country compared with the former.

11. In addition, inspection of income standard curves allows assessing in a snapshot the "location" and profile of inequality within countries at any given point in time. For example, contrasting with the previous case showing strong distributional differences for top and bottom-sensitive income standards, a comparison between Sweden and the United Kingdom points to strong distributional differences for top-sensitive income standards only (Figure1, Panel B). This indicates that the higher level of income inequalities in the United Kingdom compared with Sweden is mostly driven by higher inequality within the upper half of the distribution.

Figure 1. Household incomes across the distribution: selected OECD countries



Note: As explained in the text, household incomes across the distribution are measured by the full range of income standards, i.e. from top to bottom-sensitive income standards. Income data refer to 2010 and are divided by a factor of 100 and expressed in USD, constant prices and constant PPPs (OECD base year 2005) with Purchasing Power Parities for private consumption of households.

The figures read as follows. Panel A compares the United States to Norway: for a common level of average income, all bottom-sensitive income standards ($\alpha<1$) are lower for the United States than for Norway, whereas all top-sensitive income standards ($\alpha>1$) are higher, indicating the lower level of income inequalities in the latter country compared with the former.

See text for details.

Source: OECD Income Distribution Database.

12. The comparison between growth in bottom to top-sensitive income standards and growth in mean incomes provides a broad assessment of inequality developments. In addition, as is the case with level-based analysis, this assessment will be consistent with that implied by most widely used summary inequality measures such as the Gini coefficient. This evaluation is illustrated in Figure 2 (Panels A to C) for selected pairs of OECD countries, in each case exhibiting similar growth of average household income over the period going from the mid-90s to end-2000s (i.e. the income standard curves cross at μ_1). Panel A compares Sweden to Turkey: in Turkey all bottom-sensitive income standards grew much faster than the

average, whereas top-sensitive income standards grew more slowly, implying a marked decline in inequality. In Sweden, the opposite occurred, implying a sharp increase in inequality. A similar picture emerges from the comparison between Germany, where inequality increased, and Italy, where it decreased (Figure 2, Panel B). But the flatness of these countries' income standard curves relative to that of Sweden and Turkey indicates smaller changes in income dispersion.

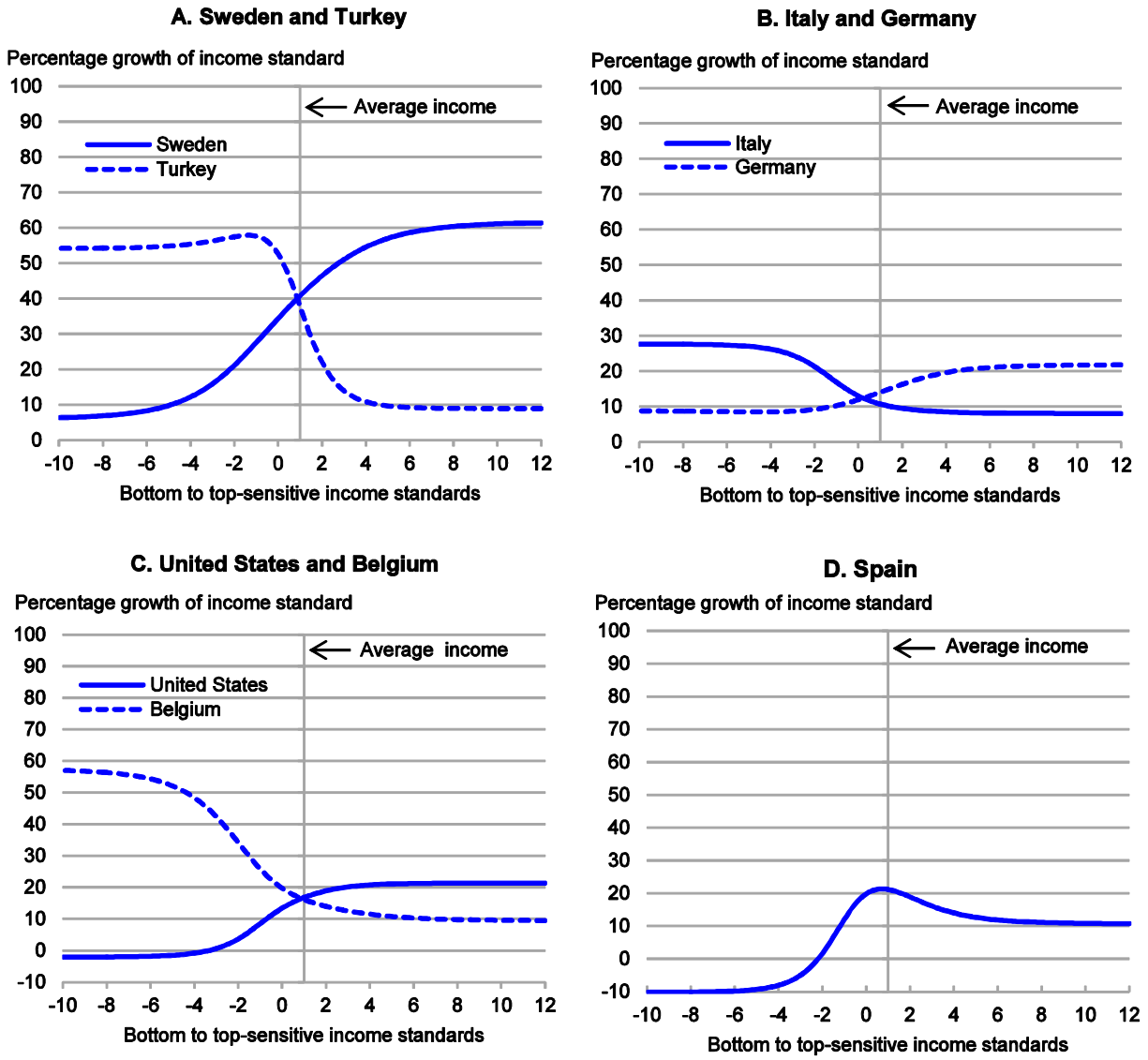
13. Growth in income standards allows not only for assessing the broad evolution of inequality but also associated profiles, i.e. the sources and patterns of changing inequality within each country. For example, the contrasting developments in inequality between Sweden and Turkey and between Italy and Germany were driven by growth differences in both the upper and lower halves of the income distribution, that is, for both top and bottom sensitive income standards compared with the average. In the case of Belgium and the United States (Figure 2, Panel C), the broad divergence in inequality – a decline in the former country and a rise in the latter – was mainly driven by differential developments within the lower-half of the income distribution. The data would suggest for instance that the rise in inequality in the United States between the mid-90s and end-2000s resulted from a marked growth shortfall of bottom compared to middle incomes amid similar growth dynamics within the upper-half of the income distribution – however this should be qualified due to the risk that the data used here may underestimate the increase in upper-income inequalities in the United States.[14]

14. Finally, Spain provides a good illustration of contrasting inequality developments in the two halves of the distribution (Figure 2, Panel D): it experienced lower growth in top-sensitive income standards compared with the middle of the distribution, implying contracting inequalities in the upper-half of the income distribution, but at the same time slower (in fact negative) growth in bottom-sensitive income standards compared with the middle of the distribution, implying increasing inequalities in the middle and lower-half of the income distribution.[15] According to the Gini coefficient, income inequality declined over that period in Spain, suggesting that summary inequality measures on their own provide a partial view of inequality developments.

14. As stated above, this results from the low coverage of top incomes in household surveys along with the large increases in their income shares over the last three decades compared with the rest of the OECD for which data are available.

15. This confirms findings from the earlier paper (Causa et al. 2014) in which a similar conclusion was drawn from a different, range-dependent, methodology (that is, the comparison between the evolution of the Gini coefficient to that of the ratios of bottom-to-middle and top-to-middle incomes).

Figure 2. Growth in household incomes across the distribution between the mid-90s and late 2000s: selected OECD countries



Note: As explained in the text, household incomes across the distribution are measured by the full range of income standards, i.e. from top to bottom-sensitive income standards. The data show cumulative growth rates and refer to the period 1995-2009. Income data are expressed in USD, constant prices and constant PPPs (OECD base year 2005) with Purchasing Power Parities for private consumption of households.

The figures read as follows. Panel A compares Sweden to Turkey: for a common growth in average income, in Turkey all bottom-sensitive income standards grew much faster than the average, whereas top-sensitive income standards grew more slowly, implying a decline in inequality. In Sweden, the opposite occurred, implying an increase in inequality. Panel D illustrates contrasting inequality developments in the two halves of the distribution: Spain experienced lower growth in top-sensitive income standards compared with the middle of the distribution, implying contracting inequalities in the upper-half of the income distribution, but at the same time slower growth in bottom-sensitive income standards compared with the middle of the distribution, implying increasing inequalities in the middle and lower-half of the income distribution.

See text for details.

Source: OECD Income Distribution Database.

15. To summarise, income standards deliver, within a single curve, a comprehensive assessment of countries' income distribution and provide a powerful complement to standard inequality analysis derived from single measures such as the Gini coefficient or income shares. For instance, designing appropriate policies to reduce the level or curb the rise in inequality can be helped by previous identification of the profile of inequality at one point in time or with reference to the past. Whether inequality increases occurred across the whole distribution of income (such as in Sweden) or within a narrower part of the distribution (such as in the United States and even more so in Spain) would bear differential policy implications such as e.g. increasing top marginal tax rates *versus* introducing tax credits for low incomes.

3. From GDP per capita to household disposable incomes across the distribution

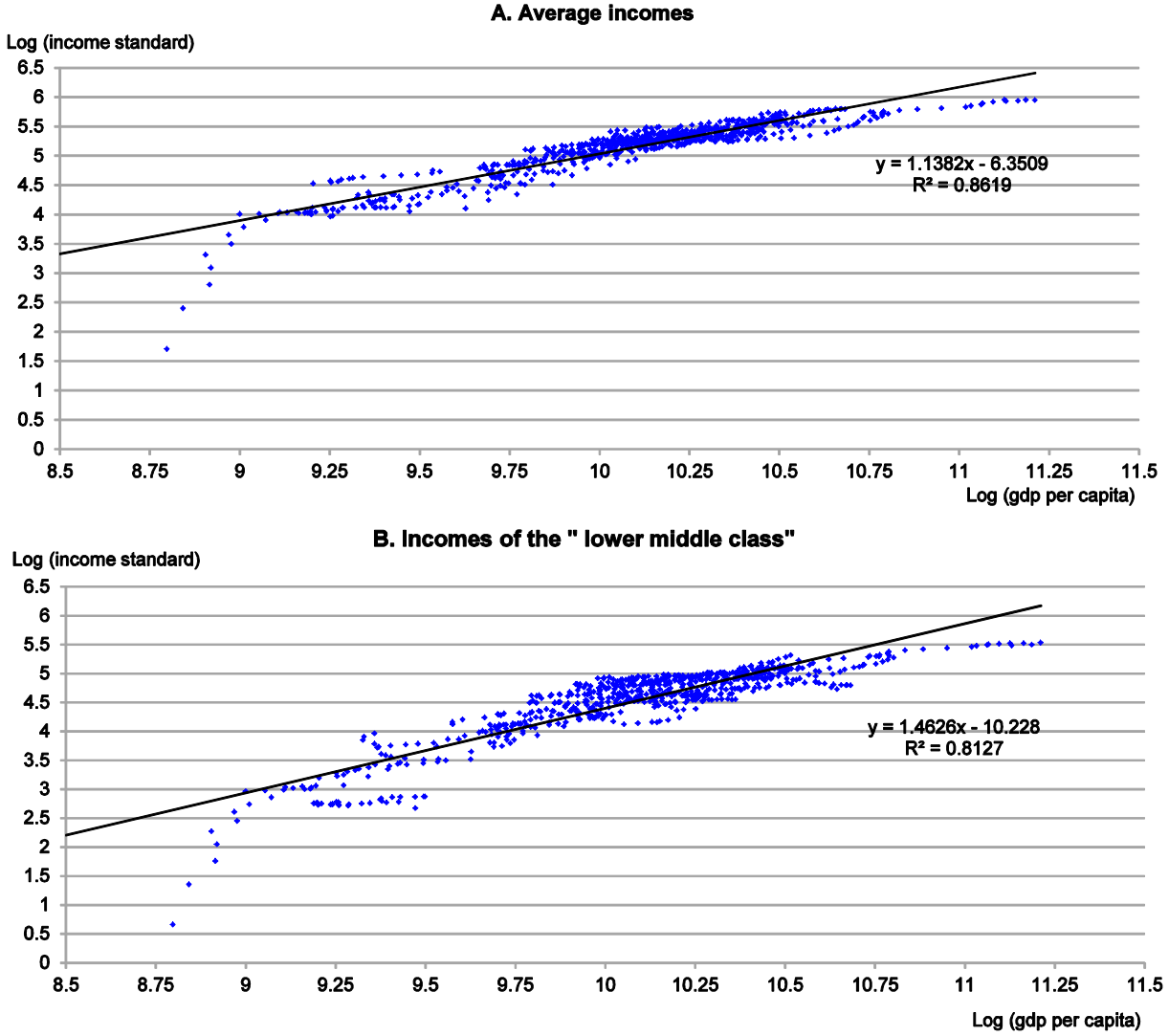
3.1. A first look at the data

16. Looking beyond GDP per capita to household incomes requires establishing the link between these two measures. In principle, domestic production should for the most part "trickle down" to domestic households, which implies that, absent measurement and methodological considerations and controlling for shifts in terms of trade, the elasticity of average household disposable income to GDP per capita should be close to one in the long run. Associated distributional patterns depend on the differential effects of GDP per capita growth across income groups. The question is then whether economic growth "lifts all boats", including incomes at the lower end of the distribution. It has been mainly studied in the field of poverty, such as e.g. by Dollar and Kraay (2001, 2013), Timmer (1997) and Ravallion and Chen (1997). If the benefits of growth are shared across the economic strata, this increases the attractiveness of purely growth-oriented policies. On the other hand, if economic growth typically leaves the poorer groups behind, there may be trade-offs between growth and inequality and pro-growth policies may have to be tempered by distributional considerations.

17. A preliminary look at the data would suggest that across OECD countries between the mid-80s and the late 2000s, GDP per capita fully trickled down to domestic households (Figure 3)[16] Panel A shows a positive linear relationship between GDP per capita and average household income, with a slope close to unity, which indicates that on average household incomes have risen in similar proportions to GDP per capita. In addition, the data would suggest that the benefits of growth over the last fifteen years have been shared equitably since low incomes – represented here by incomes of the "lower-middle class" (see definition in Box 3) – have risen by somewhat more than GDP per capita (Panel B). At the same time, the relationship between these measures seems to exhibit dispersion and nonlinearities – especially at low GDP per capita levels. This calls for a multivariate analysis of the association between GDP per capita and household incomes across the distribution, as done in the next section.

16. In Figure 3, each dot represents the income standard and GDP per capita levels of a given OECD country in a given year.

Figure 3. GDP per capita and household incomes across OECD countries



Note: Each dot represents the income standard and GDP per capita levels of a given OECD country in a given year between 1985 and late-2000s. As explained in the text, household incomes across the distribution are measured by selected income standards. Panel B illustrates the income standard for a moderate emphasis on the bottom of the distribution (α=-3). See text for details. Income data are expressed in USD, constant prices and constant PPPs (OECD base year 2005) with Purchasing Power Parities for private consumption of households. GDP is expressed in USD, constant prices and constant PPPs (OECD base year 2005) with Purchasing Power Parities for GDP deflator.

Source: OECD *Income Distribution Database*.

3.2. GDP per capita elasticities of household disposable incomes: baseline results

18. The baseline model builds on the joint estimation of GDP per capita and household income equations (Box 3). The GDP per capita specification is based on the augmented-Solow model (Mankiw, Romer and Weil, 1992), where in addition to population growth, the set of long-run determinants of GDP include proxies for investment in human and physical capital, as well as labour-augmenting efficiency. The household income specification is based on the assumption that in the long run the level of income is mainly driven by the level of GDP per capita. In addition to the level of GDP per capita, the baseline household disposable income specification includes a proxy for terms-of-trade fluctuations and country-

fixed effects. Empirical evidence suggests that the contribution of terms-of-trade fluctuations to the gap between real GDP per capita and average household disposable income can be large, especially in commodity-exporting countries.[17] The baseline estimation is produced across the full range of top to bottom-sensitive household incomes standards and covers average income as the benchmark case.

Box 3. The baseline model: structural econometric modelling of GDP and household incomes across the distribution

The baseline specification takes the following form:

$$\Delta \ln(GDPt) = \beta_0 - \beta_1 \ln(GDP_{t-1}) + \beta_2 \ln(s_t) + \beta_3 \ln(h_t) - \beta_4 n_t + \beta_5 t + \delta_1 \Delta \ln(s_t) + \delta_2 \Delta \ln(h_t) + \delta_3 \Delta \ln(n_t) + \varepsilon$$

$$\Delta \ln(\mu_\alpha (x_t)) = = \eta_{0,\alpha} + \eta_{1,\alpha} \ln(TT_t) + \eta_{2,\alpha} \Delta \ln(GDP_t) + \eta_{3,\alpha} \ln(GDP_t) - \eta_{4,\alpha} \mu_\alpha (x_{t-1}) + \upsilon$$

with $cov(\varepsilon, \upsilon) \neq 0$ and where:

-$\Delta \ln(GDPt)$ is the variation in GDP per capita between year t and year t-1

-$\Delta \mu\alpha$ (xt) is the variation in income standards between year t and year t-1 for a given value of α, i.e. the parameter driving the emphasis on different parts of the income distribution. The baseline specification covers the entire income distribution as measured by top to bottom-sensitive income standards. Household income equations are therefore estimated for a continuous range of αs.

-s is the investment rate defined as the share of investment in productive capital over GDP

-h is the stock of human capital, measured as mean years of schooling

-n is the growth rate of the working age population

-TT measures terms of trade effects (i.e. changes in export relative to import prices). Terms of trade effects are accounted for in in consumer price deflators but not in GDP deflators. This variable is included as a control for one of the known and measurable sources of discrepancies between developments in GDP per capita and in household disposable incomes. See Causa et al. (2014) for recent evidence.

- ε et υ are error terms, assumed to be correlated across the two equations

These equations are estimated jointly by SURE procedures. The GDP per capita and household income equations include country fixed-effects. The GDP per capita equation systematically includes a time trend and country specific time-trends. The baseline analysis is presented under two variants defined by a differential treatment of time in the household income equations: *i*) the household incomes equations are first estimated without and then *ii*) with time trends and country specific time-trends.

In the baseline setting, the parameters of interest are $\eta_{3,\alpha}/\eta_{4,\alpha}$ and measure the household disposable incomes elasticity to GDP per capita for: *i*) average household income (α=1) and *ii*) household incomes at different points of the distribution, as measured by top to bottom-sensitive income standards (α≠1). The comparison of GDP per capita elasticities across α allows for assessing the distributional effects of GDP per capita growth.

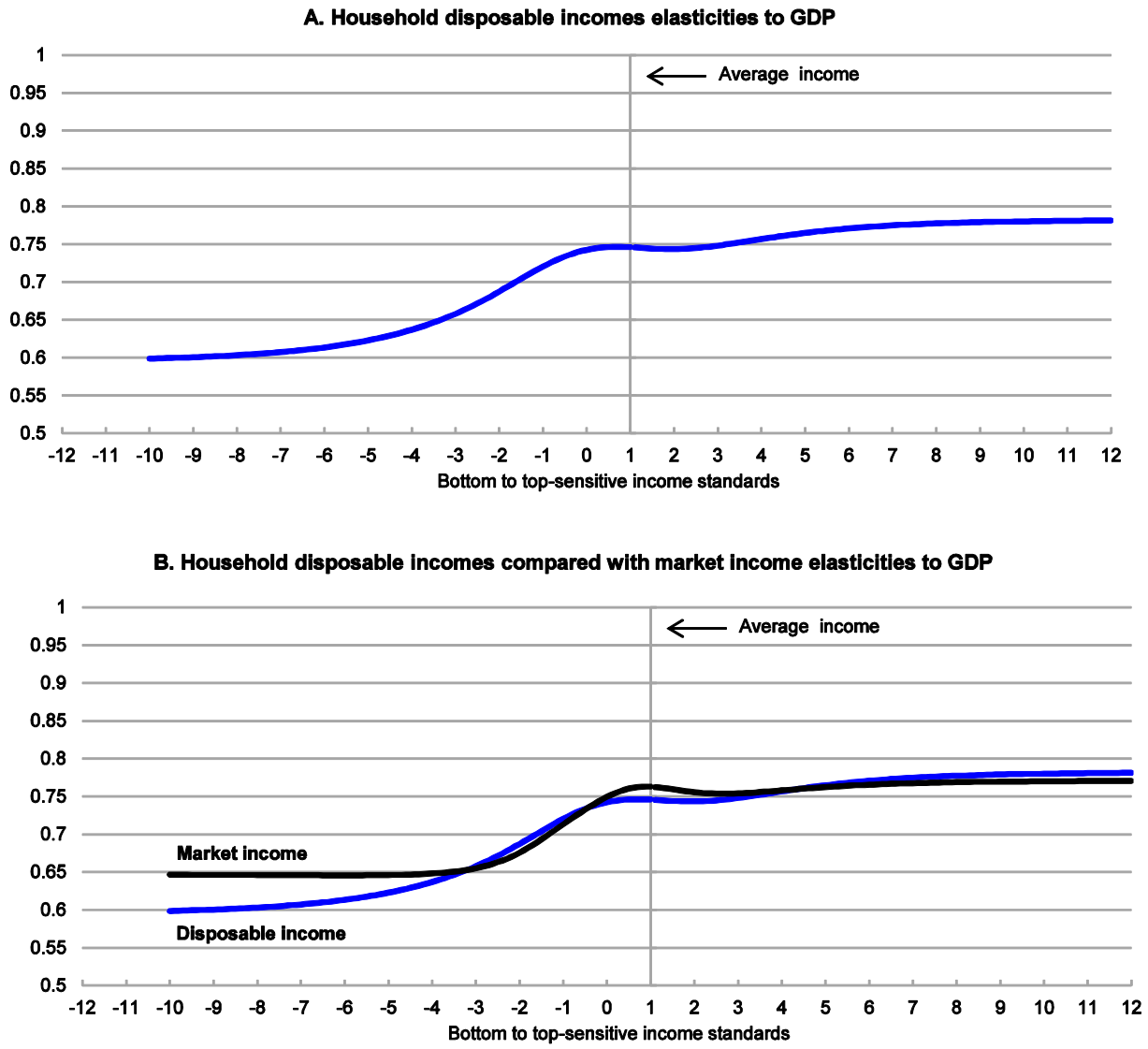
The baseline estimations cover all OECD countries over the period from mid-80 s to late 2000s.

19. The baseline elasticities presented in Figure 4 indicate that on average across OECD countries and over the period examined (mid-1980s to the late 2000s), gains in real household disposable income

17. (Causa *et al*., 2014).

have not matched gains in GDP per capita. And growth has been unequal, as the gap between GDP per capita and household incomes has been wider at the lower end of the income distribution. This is indicated by the profile of the elasticity across the income distribution, which falls from 0.8 for high income to 0.75 around the average and 0.6 for low-income households. This finding is in line with the broad conclusions from previous empirical studies on inequality and in particular OECD (2011b), which documents widespread increases in inequality in OECD countries between the mid-80s and the late 2000s.

Figure 4. From GDP per capita to household disposable incomes across the distribution, baseline elasticities



Note: Elasticities estimated from the joint estimation of GDP and household incomes equations, without time trend (but with country fixed effects). It is assumed that GDP per capita drives long-run levels of household incomes across the distribution. Market income refers to disposable income before taxes and transfers for the working-age population. See text for details.

20. While one would expect GDP per capita and average household disposable income to move in parallel – at least over a sufficiently long period – a number of factors could explain the relatively low elasticity obtained over the sample examined. First, some of the aforementioned measurement limitations associated with household income survey data of the kind used for this study can potentially account for part of the discrepancy:

- *The underestimation of top incomes*. Severe under-representation of top-income household in surveys could account in part the low elasticity even at the level of average household, if this group has benefited from a growing share of total income, as has been documented in several countries (Atkinson et al, 2011; OECD, 2011b). In fact, it is now consensually established that household surveys tend to be representative of the 99% of the income distribution but fail to capture the top 1%. In addition, such underreporting pattern has been growing over time (Burkhauser et al. (2012).

- *Non-compliance across the distribution*. The issue of top incomes underestimation is in fact more general and can pervade to the whole distribution. Not everyone who is asked to participate in a survey agrees to do so, and failure to respond is known to be different for households with different characteristics (Groves & Cooper (1998). In developed countries, the probability of response is negatively related to almost all measures of socioeconomic status. This implies that income from household surveys tends to grow less rapidly than income measured from National Accounts, leading to a downward bias on the elasticity. As this relationship has strengthened over time, it implies a growing divergence between National Accounts and households' surveys figures (Deaton, 2005).

- *The exclusion of capital gains as a source of income*. Again, insofar as the share of profits distributed in the form of capital gains has been rising during the period examined, this would result in measured household income growing less rapidly than GDP per capita.

21. Second, aside from measurement problems, the low elasticity reported above may also reflect incomes transfers across the main economic sectors, which may have persisted long enough to have created a wedge between GDP per capita and household disposable incomes over a period of 25 years. More specifically, this gap would suggest a rise in income transfers from households to the public sector and the corporate sector.[18] A growing share of GDP going to the public sector could explain the lower elasticity at the bottom of the distribution if it has been associated with a partial reversal of redistribution policies, that is, lower (cash) public transfers and more broadly a decline in the progressivity of tax and benefits systems.[19]

- A growing share of GDP going to the corporate sector could be another potential driver of the rising gap between GDP per capita and household disposable incomes. This outcome could be related to the trend decline in the labour share of income and the concomitant rise in corporate saving. Such developments have been documented for a large number of countries over the last decades and attributed to various factors: in particular the steady decline in the relative price of investment, which has lowered the cost of capital relative to labour (Karabarbounis and Neiman, 2012).[20] The decline in the labour share of income implies that the share of corporate profits –

18. Part of income may have gone also to the rest of the world, but since the sample includes nearly all OECD countries, it is likely that net income flows would largely balance overall. In addition the estimates control for those real income transfers, which are channelled via changes in terms-of-trade.

19. The finding of reduced tax and transfers progressivity is consistent with the analysis of OECD (2011b). However, this needs being qualified. The income data used here do not cover public transfers in kind (e.g. education, health); the decline cash transfers could in some cases have been compensated by an increase in-kind transfers and the latter generally represent a higher income share at the lower-end of the distribution.

20. Using a model with a CES production function and capital market imperfections, the authors show that the decline in the relative price of capital goods can largely explain the observed decline in the labour share assuming an elasticity of substitution between capital and labour significantly larger than one. In the

measured residually in the national accounts – has been rising over time. In principle, corporate income should be ultimately fully redistributed to households through interest, dividends, or re-invested profits (and hence capital gains). However, the substantial trend rise in corporate saving implies that a growing share of corporate profits is neither distributed in the form of dividends nor necessarily quickly re-invested to expand productive capacity. Together these phenomena may have contributed to the gap between household disposable income and GDP per capita through different mechanisms: Even under the assumption that all profits ultimately trickle down to households *via* shareholdings, the time required for profits to translate into higher measured household income may have lengthened considerably since the mid-1980s as a result of these developments.

- An increase in the portion of profits that is distributed through capital gains (re-invested profits, share buy-backs, etc.) means that a growing share of household income is under-reported for the reason mentioned above.

- The trend rise in the profit share of GDP per capita would imply that associated income transfers from the corporate to the household sector has increased for shareholders–generally households in the upper-end of the income distribution. This would help explain the lower elasticity of household income to GDP per capita at the bottom compared with the top of the distribution.

22. Assessing the relative contribution of these factors to the growing gap between GDP and household incomes is beyond the scope of this paper. However, to tentatively disentangle measurement-based explanations from cross-transfer-based explanations, an empirical strategy is to replace household average income as reported in surveys by household average income as reported in the National Accounts (NA). If transfers across sectors are the main reason for the failure of household income to match GDP gains on average, then using the N.A. measure of income should yield a similar picture, hence a similarly low elasticity. This is not the case: the elasticity of NA-based household average income to GDP turns out to be much closer to one (0.89), even though it remains statistically different from one. This suggests that the low elasticity of average household income to GDP that is obtained with survey-based data would rather reflect measurement gaps related to under-reporting. Explanations based on the growing share of corporate and public sector incomes at the expense of the household sector would have only played a limited role, at least on average across the sample of OECD countries. Some of these factors – *e.g.* the weaker redistributive role of the public sector and the trend rise in the profit share – may still account for the much lower elasticity at the bottom end of the distribution relative to the upper end.

- Against these findings and in order to assess whether such measurement issues would have grown over time, as suggested above, two sets of controls are alternatively introduced in the baseline: (country-specific) time trends and time dummies. Estimating the baseline elasticities with these controls included in the household income equations yields a different assessment on the long-run association between GDP per capita and household incomes across the distribution (Figure 5)[21]. In the case of (country-specific time trends), the elasticity of average household disposable incomes to GDP per capita is estimated to be close to one. It is thus very close to the elasticity obtained with the N.A.-based measure of household income without time treatment. This finding would confirm that survey-based income measurement issues and underestimation has been growing over

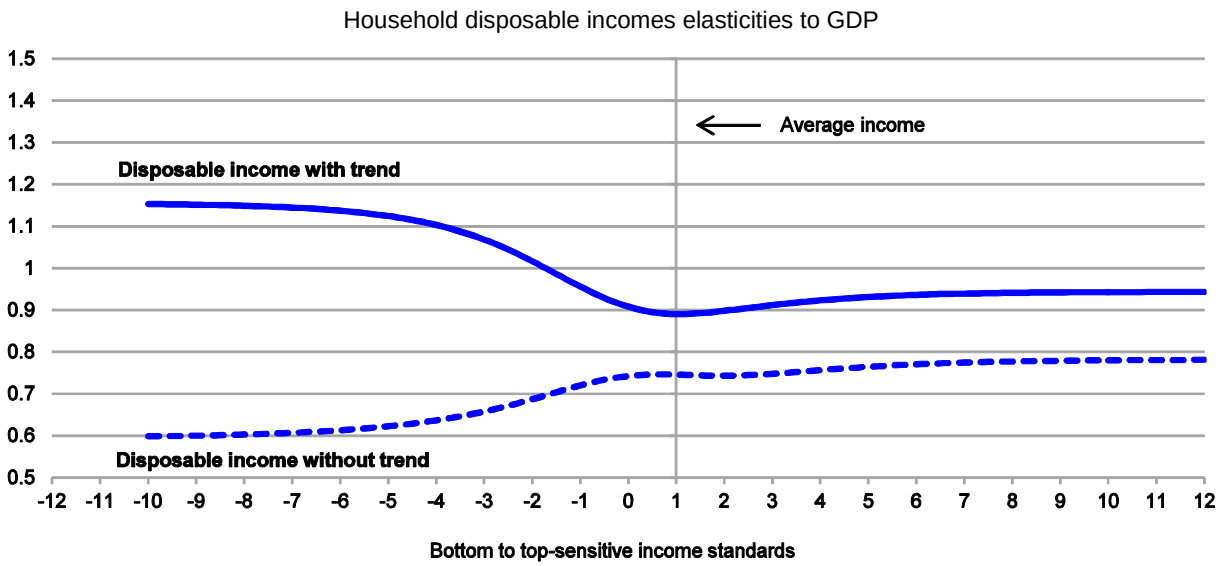
model, the strength of capital market imperfections determine the extent to which firms rely on their own saving to fund investment, leading to "excess" corporate savings.

21. The conclusions from the comparison between the two specifications are qualitatively unchanged whether the trends are assumed to be common or country-specific.

time. The elasticity estimated with time trends is significantly higher at the lower-end of the distribution than at the average and upper-end of the distribution, suggesting that GDP growth would have been associated with lower rather than higher inequalities.

- The introduction of (country-specific) time dummies generates an intermediate outcome. As in the case of time trends, the estimated elasticity around the average is also closer to one and controls to the one obtained with the N.A.-based measure of household income without time treatment – again confirming the growing role of measurement issues in survey data. However, the results with time dummies indicate less variation in estimated elasticities across the distribution. In this case, GDP growth would have been more neutral with respect to inequalities.

Figure 5. From GDP per capita to household disposable incomes across the distribution, baseline elasticities with and without a trend



Note: Elasticities estimated from the joint estimation of GDP and household incomes equations. It is assumed that GDP per capita drives long-run levels of household incomes across the distribution. See text for details.

23. The sensitivity of the estimated elasticities to the introduction of time controls, in association with the comparison with (NA-based) household average income elasticities, suggest that time controls can capture the growing measurement gap between macro and micro household income data. The policy analysis in this paper therefore systematically relies on (country-specific) time trends in both the GDP and household income equations. The risk, however, is that such controls also capture economic factors – including policy changes -- which have been a source of growing inequalities. This is particularly the case for policies associated with skill-biased technological change (SBTC): empirically, SBTC has been usually proxied by time trends and found to be a significant driver of higher wage dispersion (Braconier and Ruiz-Valenzuela, 2014; OECD, 2011b, Katz and Murphy, 1994; Acemoglu and Autor, 2012). This implies that the empirical results in this paper could fail to identify some policy effects on household incomes, i.e. those that are channelled via SBTC.

4. From GDP-enhancing policies to household disposable incomes across the distribution

4.1. Previous studies and interpretational guidance

The growth perspective

24. Empirical evidence on the impact of structural policies on GDP per capita is rich and covers potentially multiple channels. The majority of growth-oriented empirical studies on structural reforms have focused on the two main proximate determinants of GDP per capita – labour productivity and employment – or on a number of intermediate drivers, which include investment in physical capital, trade, R&D and multifactor productivity. This approach allows for a better modelling and understanding of the channels through which policies and institutions affect growth. This is also facilitated by the possibility to use disaggregated data, at the individual, firm, or industry level.[22]

25. A more limited set of studies have directly estimated the growth effects of policies by augmenting traditional (Solow-type) growth equations with policy variables.[23] These studies have generally relied on a so-called conditional convergence framework, under which investment in various forms of capital as well as policies and institutions are assumed to have a permanent impact on cross-country differences in GDP per capita levels, but policies generally do not have permanent effects on growth. The evidence on the effects of policies on GDP per capita via this type of specification is rather limited, at least in comparison with that on the effects of policies through intermediate drivers. In fact, studies based on the augmented Solow growth equation have typically focused on a narrow set of policies, in most cases product market regulation and the tax structure.

The inequality perspective

26. Empirical evidence of the growth effects of structural reforms does not provide direct interpretational guidance on the likely effects of reforms on household incomes across the distribution and hence on income inequality. Among growth-oriented studies, however, those that have focused on labour market outcomes allow for more direct inference of potential household income effects as well as on income inequality.[24] By lifting employment levels, structural policies can boost incomes and *via* this channel reduce inequality among the working-age population.

27. As an additional benchmark point, a large and growing empirical literature directly investigates the effects of structural policies on inequality. Most studies focus on labour earnings inequality, i.e. inequality among the population in employment, or, most often due to data limitations, on a subcomponent of it, i.e. wage inequality among full-time employees. [25] This highlights a second channel by which

22. A far from exhaustive list of relevant OECD studies would include Bassanini and Duval (2006), de Serres and Murtin (2013), Bourles et al. (2010), Nicoletti and Scarpetta (2003, 2005), Jaumotte (2004), Bassanini et al. (2009), Bassanini and Garnero (2013), Arnold et al. (2011) and Causa (2009).

23. OECD studies include Bassanini et al. (2001), OECD, (2003), Arnold, (2008), Boulhol et al. (2008) and Bouis et al. (2012).

24. A high number of growth-oriented studies estimate the impact of structural policies on various dimensions of labour market performance such as e.g. employment, unemployment and participation in Bassanini and Duval (2006), de Serres and Murtin (2013) and Bouis et al. (2012), hours worked in Causa (2009) job flows in Bassanini and Marianna (2009) and Bassanini and Garnero (2013).

25. Most papers focus on wages among full-time employees, i.e. they exclude part-time workers and the self-employed, in general reflecting data limitations. See Chapter 2 of OECD (2011b) and also Koske et al. (2012).

structural policies can impact income inequality, i.e. by affecting the dispersion of labour earnings among those employed.

28. Depending on the policy under consideration, the employment and wage dispersion channels may have either reinforcing or offsetting effects on inequality – and the latter case is quite frequent. Reflecting this concern, recent inequality studies have attempted to assess these *overall* labour income inequality of structural policies by combining analyses of both the earnings inequality and employment effect.[26,27] Even so, the scope of these studies remains narrow insofar as it pertains to *one* source of income, labour income, and one population group, the working-age population.

29. Finally, some structural policies influence household disposable income and inequality in disposable income mechanically. This is by definition the case of tax and transfer policies that directly act on the level of household incomes and differentially so across the distribution. Tax and transfer policies also induce behavioural and macroeconomic reactions and, via this channel, in turn affect both growth and the distribution of market income. As a result, associated reforms often raise a trade-off between equity and efficiency, as discussed in e.g. Joumard et al. (2012), Koske et al. (2012) and OECD (2012). Micro-simulation models usually assess the impact of redistribution-oriented policy reforms on household disposable incomes across the income distribution – and thus provide an additional complementary benchmark from the perspective of this paper.[28]

30. Compared with growth-oriented studies, there tends to be lower consensus among inequality-oriented studies regarding the effects of structural reforms. To a large extent, this reflects methodological and measurement differences, which reduce comparability across studies. In this context, the following differences are worth emphasising between the current and recent studies, such as OECD (2011b) and Koske et al. (2012):

- The use of income standards as encompassing measures of the income distribution as opposed to standard inequality measures such as income shares or the Gini coefficient

- The joint estimation of the growth and inequality effects from structural reforms as opposed to *e.g.* reduced-form equations of the inequality effects from reforms

- The focus is on a broad income concept, i.e. disposable income, covering total population as opposed to e.g. income for the working population, wages for full-time employees, or earnings for the working-age population. This means that estimated policy effects should be interpreted as "overall'' or net, that is, ideally encompassing various channels, and in particular the labour market and redistribution channels as well as aggregating over various population groups.

26. OECD, (2011b) Koske et al (2012).

27. Fournier and Koske (2012) focus on the effects of structural policies on earnings dispersion by means of quantile regressions based on wages. Koske et al. (2012) rely on associated estimates and on separate studies on the employment effect of structural policies to deliver a qualitative assessment of the ''total'' effects of policy reforms on labour income inequality. Chapter 2 of OECD (2011b) also focuses on the effects of structural policies on earnings dispersion by looking at various earnings deciles ratios (d9/d1, d5/d1 and d9/d5). Chapter 3 of OECD (2011) relies on associated estimates and on a separate analysis of the employment effect of structural policies to deliver a qualitative assessment of the ''total'' effects of policy reforms on labour income inequality.

28. See *inter alia*, Bourguignon and Spadaro (2005), Immervol et al. (2007, 2009), Figari et al. (2012), and Jara (2013).

4.2. Methodology and modelling assumptions

31. The baseline model is augmented with structural policies as common determining factors of GDP per capita and household incomes across the distribution (Box 4). The analysis focuses on long-run equilibrium effects, in line with the growth literature on structural reforms. Because it is assumed that household disposable incomes are ultimately driven by GDP per capita, the total effects of structural policies on household incomes decompose as follows: *i*) reform effects on GDP per capita which trickle down to household incomes, referred to as *indirect* effects and *ii*) reform effects on household incomes over and above those channelled via GDP, referred to as direct (or *additional*) effects. By construction, indirect household income effects follow reform effects on GDP per capita while direct household income effects can contrast reform effects on GDP per capita. As a result, these two components can either reinforce or offset each other. In the latter case, and depending on their respective strength, total household-income reform effects can run contrary to GDP per capita effects[29] – the implication would be that associated reforms introduce a wedge between GDP and household incomes. Against this background, the summary tables presented in this section systematically report: *i*) the effects of structural policies on GDP per capita; *ii*) the *total* (or *net*) effects of structural policies on household incomes, combining direct and indirect effects; *iii*) the *direct* (or *additional*) effects of structural policies on household incomes.

Box 4. The impact of structural policies on GDP per capita and household incomes across the distribution: econometric approach

This baseline specification presented in Box 4 is augmented with (lagged) structural policy variables as common determining factors of GDP per capita and household incomes across the distribution:

$$\Delta \ln(GDP_t) = \beta_0 - \beta_1 GDP_{t-1} + \beta_2 \ln(s_t) + \beta_3 \ln(h_t) - \beta_4 n_t + \beta_5 t + \delta_1 \Delta \ln(s_t) + \delta_2 \Delta \ln(h_t) + \delta_3 \Delta \ln(n_t) + \gamma \ln(Z_{t-1}) + \varepsilon$$

$$\Delta \mu_\alpha (x_t) = \eta_{0,\alpha} + \eta_{1,\alpha} \ln(TT_t) + \eta_{2,\alpha} \Delta \ln(GDP_t) + \eta_{3,\alpha} \ln(GDP_t) - \eta_{4,\alpha} \mu_\alpha (x_{t-1}) + \varphi_\alpha \ln(Z_{t-1}) + \upsilon$$

Where Z_{t-1} is the policy variable (or the set of policy variables), introduced in lagged form

The GDP per capita and household income equations include country fixed-effects, time trends and country-specific time trends.[1]

In the policy setting, the parameters of interest measure the joint estimated effects of structural policies on long-term levels of GDP per capita, household incomes across the distribution and -- as a result-- income inequality: *i*) the parameter γ / β_1 captures the impact of policy Z on the long-term level of GDP per capita; *ii*) for any given α, the parameter $(\eta_{3,\alpha}/\eta_{4,\alpha})*(\gamma/\beta_1)$ captures the *indirect* impact of policy Z on the long-term level of household income at a given point of the distribution, as channeled via that of policy Z on GDP per capita; *iii*) for any given α, the parameter $\varphi_\alpha/\eta_{4,\alpha}$ captures the *direct* (or additional) impact of policy Z on the long-term level of household income at a given point of the distribution, beyond its impact via that of policy Z on GDP per capita; iv) for any given α, the parameters $(\eta_{3,\alpha}/\eta_{4,\alpha})*(\gamma/\beta_1) + \varphi_\alpha/\eta_{4,\alpha}$ can be used to derive the *total (or net)* effect of structural policies on household income at given point of the distribution i.e. the above-defined *indirect* and *direct* (or *additional*) effects; iv) finally, the comparison of *total* policy effects across α allows assessing the impact of structural policies on income inequality (see text) – in cases where the policy has a statistically significant differentiated impact across the distribution.

29. It is possible to find that a given policy reform boosts GDP per capita but reduces household disposable incomes. This would be the case when there is household income-level evidence of negative direct reform effects (above and beyond the positive indirect effects via GDP per capita) of larger estimated magnitude compared with indirect effects, implying negative total effects. For example, reducing unemployment benefits could, in a purely static and accounting perspective – all else equal and absent behavioural effects – reduce household disposable incomes via reduced transfers but raise GDP per capita via reduced public spending.

As developed before, while the baseline specification is estimated for the full-range of bottom to top-sensitive income standards, as governed by the parameter α, the range of income standards is narrowed for policy analysis. The policy analysis is performed for average income and a selected range of bottom-sensitive income standards. In practice and with reference to the definition of income standards in Box 2, the analysis is produced for parameter values α = 1, α = 0, α =−3, and α =−8.

The policy estimates generally cover OECD countries over the period from mid-80s to late 2000s. The sample is in some cases reduced due to data availability. In particular, ICT investment data are not available for Turkey, Portugal, Poland, Norway and Mexico.

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1. The identification of significant policy effects is only marginally impacted by the inclusion of trends. Estimation results with time dummies or without any time treatment are available upon request.

32. The pair-wise comparison of total policy effects between average income and different bottom-sensitive income standards such as the median, the lower middle class and the poor provides indication of reform effects on income inequality. For example, if a given policy reform has a positive income effect which is stronger for poor households compared with the average, this implies that this policy reform is associated with a reduction in income inequality. The focus on bottom-sensitive income standards implies that this paper emphasizes the impact of structural reforms on household incomes in the lower-half of the distribution.

5. The impact of structural policies on GDP per capita and household incomes across the distribution: empirical results

33. The impact of structural reforms on long-term levels of household disposable incomes across the income distribution and, as a result, on income inequality, is established jointly with a broad reassessment of the impact of structural reforms on long-term GDP per capita. The analysis focuses on policies and institutions that in the past have been found to boost output growth either directly, or, for most of them, indirectly, that is via, labour productivity (e.g. multi-factor productivity, both at the aggregate level and at the industry-level) and labour utilisation (e.g. participation and unemployment, both at the aggregate level and for population sub-groups). It covers the broad areas of tax policies, labour market and welfare policies and product market regulation (Box 5). It then examines the influence of up-skilling. The role of non-policy factors such as technical change along with globalisation is only covered succinctly in the last part.

34. The quantitative implications associated with the policy estimates are tentatively illustrated with simulations based on past reform experiences, where the size of the simulated reform in one area is based on the changes in the related policy indicators, measured on average across OECD countries and over the period 1995-2005. For this purpose, only changes in the policy variables that have gone in the direction consistent with growth-enhancing reforms have been considered in the calculation of the average size. In all cases (except the cyclically-adjusted measure of spending on ALMPs) a “reform” corresponds to a decline in the policy variable.

Box 5. Policy variables

The analysis covers the following policy areas and associated indicators:

- The tax structure: the share of various taxes (such as e.g. personal income taxes, corporate income taxes, taxes on goods and services and taxes on property) in total tax revenues.
- Labour taxation: statutory average and marginal tax wedges (comprising income taxes plus employee and employer social security contributions less children-related cash benefits)
- Unemployment benefits systems: various measures of gross benefit replacement rates, corresponding to different durations of unemployment spells, different family situations and different pre-unemployment earnings levels.
- Job protection: the summary OECD index of employment protection legislation
- Minimum wages: the ratio of the statutory minimum wage relative to the median wage
- Active labour market policies (ALMPs): spending per unemployed over GDP per capita adjusted for the economic cycle[1], considering the following categories: *i*) public employment services (PES) and administration and, *ii*) training and employment incentives.
- Product market regulation: the OECD's summary index of product market regulation in seven non-manufacturing industries.
- Education: mean years of schooling; attainment rate of the population (15-64 years old) by level of education (below upper secondary, upper secondary and post-secondary non-tertiary and tertiary).

Based on the preferred specifications presented in Chapter 2 in OECD (2012),[2] this paper considers the following set of globalisation indicators:

- Trade integration: import penetration and export intensity
- Financial integration: Inward and Outward FDI stock as a share of GDP;
- Technology: investment in ICT as a share of overall investment

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1. This variable is sourced in Bouis et al. (2012) and defined by the authors as follows: the amount of spending (by category) per unemployed over GDP per capita is adjusted for the economic cycle by considering the residuals of a country-specific regression of the variable on the unemployment gap (defined as the difference between the NAIRU and current unemployment).

2. Namely Table 2.1, column 4 and Table 2.5, column 3, the only difference being that in the present paper trade integration is not measured by overall trade exposure but disaggregated in its two subcomponents.

5.1 Labour market and welfare policies

35. Labour market policy reforms are often designed to boost aggregate employment through behavioural effects such as labour supply incentives, and *via* this channel, output growth. At the same time, these policies also affect income inequality through their impact on the earnings distribution. For some reforms, these two impacts on inequality may be offsetting each other.[30] For example, recent evidence suggests that reducing unemployment benefits and lowering statutory minimum relative to median wages are associated with both higher wage dispersion and higher employment rates (among low-skilled workers), which may result in a very small net change on inequality among the working-age population, while the impact on overall inequality is uncertain.[31] For other reforms, however, wage and employment effects may reinforce each other, resulting in both stronger growth and less inequality. This could be the case of policy reforms aimed at easing the strictness of job protection on regular contracts as a way to

30. OECD (2013a), Chapter 2.

31. See OECD (2011b) and Koske et al. (2012).

tackle labour market duality (i.e. the existence of separate segments where comparable workers enjoy differential wage conditions and job protection).[32] Preliminary findings are reported in Table 1.

Table 1. The effects of labour market and welfare policies on GDP per capita and household disposable incomes across the distribution

	Employment protection legislation			Unemployment benefit replacement rate, summary measure of generosity			Unemployment benefit replacement rate, long-term unemployment		
	GDP per capita	Household incomes: Total effect	Household incomes: *Direct effect*	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*
Average income	ns			- *	- *	- *	- **	- *	
Bottom-sensitive income standards									
Median income					(- <) **	*(- <)* **		(- =) *	
Income of the lower middle class					(- <) **	*(- <)* **		(+ >) *	+ *
Income of the poor					(- <) **	*(- <)* **		(+ >) *	*(+ >)* **

	Minimum relative to median wage			Active labour market policies, spending on public employment services and administration			Active labour market policies, spending on training and employment incentives		
	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*
Average income	ns	+ ***	+ ***		+ **	+ ***	ns	ns	*ns*
Bottom-sensitive income standards									
Median income		(+ =) *	*(+ =)* *		(+ =) **	*(+ =)* ***		ns	*ns*
Income of the lower middle class		ns	*ns*		(+ =) *	*(+ =)* **		ns	*ns*
Income of the poor		ns	*ns*		(+ >) *	*(+ >)* *		ns	*ns*

Note: The entries of this table come from the estimation of the simultaneous effects of policies on long-term levels of GDP and household incomes across the distribution. Since GDP per capita is a determinant of household incomes across the distribution, the total effects of policies on the latter decompose as follows: *i*) indirect effects, i.e. channelled via reform-driven GDP effects and *ii*) direct (or additional) effects, i.e. over and above GDP effects. The tables systematically report: *i*) the effects of structural policies on GDP per capita, which, by construction imply equivalent indirect effects on household incomes; *ii*) the total (or net) effects of structural policies on household incomes, combining direct and indirect effects; *iii*) the direct (or additional) effects of structural policies on household incomes. The policy indicators are entered in lagged levels in both the GDP and the household income equations. See text for details on the definition of policy variables, specification and econometric technique.

The entries can be read as follows. + denotes a positive policy impact while - denotes a negative one. The table also provides (statistical) comparison of estimated policy effects on household income standards at different points of the distribution, respectively the median, the lower-middle class and the poor, with policy effects on average household income. Hence, the cases >, < and = denote, respectively, a positive impact of the reform which is, for a given income group, statistically higher, lower, or equal than that on average income. For example, in the case of unemployment benefit replacement rate (summary measure of generosity), household income effects are negative for all income groups and they are higher in absolute value for median income, incomes of the lower middle class and incomes of the poor, in each case compared with average income. The symbols (*, **, ***) denote respectively statistical significance at 10, 5 and 1% level.

Job protection

36. The effect of job protection on GDP per capita is found to be negative but the estimate falls just short of statistical significance at standard confidence levels.[33] Earlier studies based on disaggregated data have provided fairly strong evidence that easing job protection legislation raises multifactor productivity

32. See Koske et al. (2012).

33. The estimated parameter is very close to being significant though, at 12% confidence level.

by enhancing workers' reallocation across firms and industries, even though the associated effects may take time to materialise.[34]

37. The empirical estimates also fail to identify any effects of job protection on average household income. By contrast, the findings reported in Table 1 point to a negative impact on household incomes of the lower middle class and, even more, the poor, pointing to disequalising effects of strict protection. This finding is consistent with "insider-outsider'' mechanisms and institutional settings associated with labour market duality.[35] Under such regimes, insiders, generally prime-aged medium-skilled males, enjoy employment security and bargaining power while outsiders, generally youth or the low-skilled, are more likely to be priced out of the labour market and overrepresented under atypical contracts with low pay and low security.

38. Although the results are too fragile to support strong conclusions, they indicate potential policy synergies as they imply that reforms aimed at easing hiring and firing procedures could serve both efficiency and equity objectives. As mentioned above, the potential gains from easing job protection are tentatively illustrated by simulating the impact of a change in policy parameters corresponding to the reduction observed between 1995 and 2005, on average across OECD reforming countries. This illustrative scenario is based on a modest change (in practice the magnitude of the decline corresponds to the current difference in stringency of regulation between Australia and Denmark).[36] Still, taken at face value, the estimates would imply that such reform could raise long-term level of household disposable incomes of the lower middle class by 0.7 and the poor by 1%.

Unemployment benefits

39. The results reported in Table 1 provide evidence of a negative link between unemployment benefit levels and GDP per capita, suggesting that reductions in benefit generosity have tended to boost output. This finding holds at the level of average household income. But, distributional effects are found to depend on whether the reform affects all unemployed workers or is targeted to the long-term unemployed:

- Untargeted reductions in replacement rates are found to raise household incomes by more than GDP per capita, with an impact that is not much different across the distribution. The decomposition of total household income effects suggests that indirect reform effects via GDP per capita are reinforced by additional effects, over and above those via GDP per capita. These results would tend to suggest that in the long-run, employment gains[37] more than offset the income losses from reduced transfers to unemployed workers, with little impact on inequality.

- Reductions in replacement rates targeted to the long-term unemployed (i.e. benefits for jobseekers in the fourth and fifth year of unemployment, which include additional social assistance transfers when those are available) are found to increase disposable incomes for the median household but

34. See Andrews and Cingano, (2013); Bassanini et al. (2009), Bassanini and Garnero, (2013). In contrast, the reform effects on aggregate employment are rather ambiguous, as lower job protection tends to raise both unemployment inflows and outflows.

35. This result is in line with empirical evidence in Koske et al. (2012) based on decile ratios for full-time employees.

36. This is not a novel finding and reflects political economy considerations – typically fierce political opposition (Boeri, 2010; Bouis et al., 2012).

37. For evidence on employment effects see e.g. Nunziata, (2002), Bassanini and Duval (2006), de Serres and Murtin (2013) Nickel et al. (2005), OECD, (2011b).

to reduce disposable incomes for the lower-middle class and, even more, poor households – unambiguously pointing to higher inequality.

40. The differential distributional implications associated with the two measures of benefit generosity could tentatively reflect that targeting unemployment benefit reforms to the long-term unemployed may deliver relatively less employment gains because the long-term unemployed have usually lower chances to find a job relative to the recently unemployed, reflecting compositional effects as well as skills erosion.

41. Average findings across the OECD may not hold at all levels of benefit generosity –reducing unemployment benefits would neither be equitable nor efficient in countries where those benefits are relatively low. Bearing this caveat in mind, reform effects are tentatively illustrated by simulating the GDP per capita and household income effects associated with two illustrative reform scenarios defined on the basis of past reform experiences across the OECD. Those reform scenarios correspond to untargeted (i.e. across the board) benefit cuts of 5 percentage points and to targeted (*i.e*. to the long-term unemployed) benefit cuts of 8 percentage points. In the first case, the estimates imply that the reform could raise long-run GDP per capita by 1.6 per cent and incomes in the lower half of the distribution by between 2 and 2.4 per cent. In the second case, however, while median income could rise by around 1.7 per cent, incomes of the poor could on the contrary decline by 4.8 per cent. These are quite strong effects, even taking into consideration the magnitude of the simulated change, which is based on the large historical reductions to long-term benefits, as observed on average across OECD countries between 1995 and 2005. The strong effect points to a possible over-estimation of the size of the elasticity in the regression analysis.

Active labour market policies

42. Reforms of unemployment benefit systems are often formulated in combination with recommendations to strengthen active labour market policies (ALMPs) so as to enhance the efficiency of job-search support, activation and training programmes for the unemployed. However the macro effects of ALMPs are difficult to identify empirically,[38] because available expenditure-based measures fail to properly capture policy design or effectiveness and are very sensitive to the economic cycle. For the empirical analysis, the latter problem is partly addressed by removing the cyclical component from the policy indicator (Box 6). Even so, the estimates fail to identify a significant effect on GDP per capita. On the other hand, there is evidence of significant positive effects on average household incomes. This finding holds for household incomes down the distribution and associated income gains are found to be larger for the poor, pointing to equalising effects. This tentatively indicates that stepping-up job-search support and programmes for the unemployed can increase jobseekers' employment chances and wages once in employment and, via this channel, reduce income inequality.

43. These results indicate potential policy synergies between the efficiency and equity objectives. The estimates imply that increases on spending on public employment services and administration equivalent to those measured on average across OECD countries over the period 1995-2005 – broadly corresponding to the current spending gap of Portugal relative to Sweden – would raise long-run levels of median income by 0.5 per cent and income of the poor by 0.6 per cent.

38. See Kluve (2010) for a survey on the effectiveness of ALMPs to improve labour market performance. Vanhoult (1997) provides some evidence on inequality-reducing effects from higher spending on ALMPs.

Minimum Wages

44. The empirical analysis also fails to find significant evidence of an impact of the ratio of minimum-to-median wages on GDP per capita. [39] However, the results indicate that reductions in minimum wages tend to lower household mean and median disposable incomes, though not necessarily the poor. This finding is *a priori* surprising insofar as minimum wages are designed to support incomes of the most vulnerable workers. However, it may reflect a higher proportion of jobless households at the bottom end of the distribution, which are not directly affected by cuts in minimum wages. In fact, lower minimum wages may raise the job prospects of low-skill individuals, improving at the margin the income of these households. In contrast, cuts in minimum wages may have more detrimental income effects on workers whose earnings are closer to the median wage. Minimum wage reductions could also generate broader wage moderation effects spreading up the income distribution.[40] This would be consistent with the finding of positive and statistically significant effect of minimum wages on mean and median incomes.

45. Taken at face value, the estimates would imply that minimum wages reductions in the same order of magnitude of those that took place on average across OECD countries over the period 1995-2005 (i.e. in practice a decline of around 5 percentage points in the ratio of minimum to median wages) could lower long-run median disposable incomes by 0.6 per cent. This indicates relatively weak transmission from policy reform to household incomes.

5.2 Tax policy

46. Many tax policies raise well-known trade-offs with respect to growth and equity objectives.[41] Economic theory and empirical evidence suggests that the tax structure influences macroeconomic efficiency and in particular that direct taxes have relatively more distortionary effects by reducing incentives to work and invest. One of the highest ranked growth-friendly tax reforms,[42] shifting the tax burden away from income taxes to consumption and property taxes, may in principle have adverse effects on inequality through various channels. For instance, reform-driven positive employment effects can be counterbalanced by increased income dispersion resulting from lower tax progressivity. Also, empirical evidence derived from the joint analysis of micro-level consumption and income data suggests that consumption taxes can be regressive, at least in the short-run.[43] There is ambiguity with respect to the

39. Only countries with statutory and universal minimum wages are included in this specification. Other countries also effectively set minimum wages through collective agreements in a number of other countries but these minima can vary substantially across sectors and according to a worker' age, experience and qualifications.

40. The positive effect of declines in minimum wages on wage dispersion is confirmed by a large number of empirical studies (di Nardo et al. 1996; Lee, 1999, Lemieux, 2006 for the US; Koeniger et al. 20007 and Checchi and Garcia-Penalosa, 2010, Koske et al. 2012, for panels of OECD countries). The literature is less conclusive regarding employment: while some studies such as Koske et al. (2012) cannot detect a link between minimum wages and overall employment, others find negative employment effects, at least for some workers such as the very low-skilled (see Neumark and Wascher, 2007 for a review). The few studies that looked at the combined effect (as measured by the Gini index for labour income inequality, see e.g. Checchi and Garcia-Penalosa, 2008) conclude that an increase in minimum wages from their current level would generally raise inequality. This issue however is far from being settled in the literature.

41. Koske et al. (2012), Cournede et al. (2013).

42. See Arnold et al. (2011) and Arnold (2008) for a ranking of tax instruments with respect to their relationship with economic growth.

43. See inter alia, Ruiz and Trannoy (2008), for a microsimulation study on the short-term (that is immediate) distributional effects of consumption taxes in France. The paper runs against the prior that consumption

distributional effects of property taxes. On the one hand, depending on how they are designed, recurrent taxes on immovable property can be regressive with respect to disposable incomes; on the other, inheritance and capital gains tax clearly reduce wealth inequality.[44]

47. The empirical framework used in this paper, based on a long-run relationship between household incomes and GDP per capita allows for capturing these longer-term effects of changes in tax policies on the two income measures. However, the analysis deserves a cautious interpretation considering that both the level and structure of taxation are also likely to have also a direct and more mechanical influence linked to measurement on the wedge between GDP per capita and household disposable incomes:

48. Disposable income is by definition measured net of taxes and transfers. Hence, from a purely static and accounting perspective, changes in taxation that lead to a temporary transfer of income from households to the government (or vice versa) will likely have an impact on measured household disposable income at a given point in time.

49. Many forms of taxation are not taken into account in the measurement of real household disposable incomes. This is the case in particular of taxes paid on the consumption of goods and services. In principle, their effects on real disposable income may be captured through changes in consumer prices but this is valid only for the average income and even in this case changes in prices can reflect factors other than taxes.[45] As a result, changes in the structure of taxation are likely to have a first-round, accounting effect on household disposable income even if the reform keeps the overall level of taxation unchanged.

50. Bearing these caveats in mind, there is no evidence that shifting the tax burden away from income taxes to consumption and property taxes raises trade-offs between the objectives of achieving higher efficiency, household material living standards and equity (Table 2):

- In line with previous studies, raising tax revenues by relying relatively more on direct (i.e. personal and corporate income) taxes is found to depress GDP per capita. It is also found to have a negative effect on average household income as well as on lower incomes, without any significant differences on the magnitude of the impact across the distribution. However, the negative effect of direct taxes is estimated to be of a lower magnitude in the case of household incomes compared with GDP per capita. The decomposition of direct taxes between the personal and corporate tax components indicates that their combined negative impact is driven by the personal income tax component.

- Consistent with the former result and previous studies, raising tax revenues by relying relatively more on consumption and property taxes is found to boost GDP per capita. However, no significant effect on average household income is found. The estimated neutral real household income effects from consumption and property taxes holds for median income and income of the lower-middle class, but there is some evidence of positive effects on income of the poor, possibly reflecting lower tax wedges and unemployment.

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taxes are strongly regressive. Indeed, the main conclusion of the micro-based analysis is that that the design of indirect taxes can only marginally address the redistribution objective, reflecting the relatively homogeneity of consumption profiles across incomes deciles.

44. See Koske et al. (2012).

45. The unavailability of price indices by income groups deny the possibility to identify distributional effects.

51. The potential adverse impact of labour taxation on income can also be assessed by looking at the effect of marginal labour tax wedges faced by a representative average wage worker, for each OECD country and each year.[46] Holding average labour tax wedges and tax revenues constant, higher marginal tax wedges are found to be associated with lower GDP per capita and average household disposable income. The similar magnitude of the estimated effect across the different income levels precludes drawing any inequality implications.[47] The findings of a negative effect from high marginal taxes on income are in line with theory and empirical evidence, which point to a relatively high responsiveness of labour force participation or hours worked to net labour income among specific workforce groups such as the low-skilled and women but also top wage-earners.[48] Since the policy indicators used in the analysis include employers' social security contributions, the estimates could also reflect labour demand effects

5.3 Product market regulation

52. Previous analysis has found that relaxing anti-competitive product market regulation can bring productivity and employment gains in the long run, therefore spurring economic growth (Bourlès et al., 2010; Conway et al., 2006). However, the impact on income inequality is uncertain and empirical evidence generally inconclusive (OECD, 2013a; Guadalupe, 2007; Koske *et al.*, 2012). This is because employment gains[49] may be at least partly offset by higher wage dispersion, as more intense product market competition tends to reduce the bargaining power of workers. The analysis relies on the OECD's summary index of product market regulation in seven non-manufacturing industries, covering energy, telecom and transport sectors.[50]

53. As shown on Table 3, no statistically significant impact of product market regulation on long-run GDP per capita could be identified. This runs against priors and previous evidence and aside from data limitations, could reflect the difficulty to identify the effects of regulation at the aggregate level – as opposed to e.g. the disaggregated industry-level. By contrast, there is evidence of negative

46. The analysis relies on statutory rates derived from OECD Taxing wages models. Average tax wedges are defined as the difference between total labour compensation paid by the employer and the net take-home pay of employees, as a ratio of total labour compensation. The marginal tax wedge is defined as the difference between the change in total labour compensation paid by employers and the change in the net take-home pay of employees, as a result of an extra unit of national currency of labour income. The difference is expressed as a percentage of the change in total labour compensation. The data refer to a single individual without children at 100% of average earnings.

47. The median income estimate is lower than, but close to, statistical significance (at 13% confidence level).

48. Empirical evidence on the detrimental effects of labour taxes on labour utilisation is abundant. See Causa (2009) for a short survey.

49. Bassanini and Duval (2006); Griffith et al. (2007); Nicoletti and Scarpetta, (2005); Fiori et al. (2007); Nicoletti et al. (2001).

50. This is the only policy index available on a time-series basis but is clearly quite narrow and as result not the best proxy for measuring the overall effects of anti-competitive product market regulation on either GDP per capita or household income. This implies that associated results are not always comparable with previous work, for instance those that used other indices of product market regulation and/or alternative identification strategies.

Table 2. The effects of tax policy on GDP per capita and household disposable incomes across the distribution[1]

	Share of direct taxes			Share of personal income tax			Share of corporate income tax			Share of consumption and property taxes		
	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*
Average income	- ***	- **	+ ***	- ***	- ***		ns	+ **	+ **	+ ***		- ***
Bottom-sensitive income standards												
Median income		(- <) **	*(+ <)* ***		(- =) ***			(+ >) *	*(+ >)* **			*(- <)* ***
Income of the lower middle class		(- =) ***			(- =) ***							*(- <)* ***
Income of the poor		(- =) ***			(- =) ***						+ *	

	Share of consumption tax			Share of property tax			Labour tax wedge, marginal (2)		
	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*	GDP per capita	Total effect	*Direct effect*
Average income	+ ***	+ *	- ***	+ **	+ **		- **	- **	
Bottom-sensitive income standards									
Median income		(+ =) *	*(- >)* **		(+ =) **				
Income of the lower middle class		(+ =) **			(+ =) **			(- =) **	
Income of the poor		(+ =) **			(+ =) **			(- =) **	

The entries can be read as follows. + denotes a positive policy impact while - denotes a negative one. The table also provides (statistical) comparison of estimated policy effects on household income standards at different points of the distribution, respectively the median, the lower-middle class and the poor, with policy effects on average household income. Hence, the cases >, < and = denote, respectively, a positive impact of the reform which is, for a given income group, statistically higher, lower, or equal than that on average income. For example, in the case of direct taxes, household income effects are negative for all income groups and they are higher in absolute value for median income, while they are statistically equivalent for incomes of the lower middle class and incomes of the poor, in each case compared with average income. The symbols (*, **, ***) denote respectively statistical significance at 10, 5 and 1% level.

The entries can be read as follows. + denotes a positive policy impact while - denotes a negative one. The table also provides (statistical) comparison of estimated policy effects on household income standards at different points of the distribution, respectively the median, the lower-middle class and the poor, with policy effects on average household income. Hence, the cases >, < and = denote, respectively, a positive impact of the reform which is, for a given income group, statistically higher, lower, or equal than that on average income. For example, in the case of direct taxes, household income effects are negative for all income groups and they are higher in absolute value for median income, while they are statistically equivalent for incomes of the lower middle class and incomes of the poor, in each case compared with average income. The symbols (*, **, ***) denote respectively statistical significance at 10, 5 and 1% level.

1. All the regressions control for tax revenue as a share of GDP.

2. This regression controls for the average tax wedge. See text for definitions of average and marginal tax wedges.

effects from stringent product market regulation on average household disposable income. Such negative effects hold across the income distribution – and increasingly so for households at its low-end, pointing to dis-equalising effects. This suggests that reducing overall regulatory barriers to product market competition would tend to boost household incomes and reduce income inequality. The finding of strong direct effects for household incomes could reflect that positive employment effects can more than compensate potential increases in wage dispersion.

54. These results indicate potential policy synergies as they imply that product market reforms could serve both efficiency and equity objectives. Simulating the household incomes gains from an illustrative reform scenario defined as the average decline in regulation observed between 1995 and 2005 across OECD countries delivers strong household income gains, reflecting both high estimated coefficients but also large and widespread reforms in the area of energy and networks sectors over the period (i.e. a decline of around 2 standard deviations of the current cross-country index, broadly equivalent to the stringency of regulation prevailing currently in Ireland compared with Austria). Taken at face value, this scenario would raise long-run levels of average income by 3%, median income by 4% and income of the poor by 8%, implying a catch-up of the latter vis-à-vis the former income groups and as a result lower inequality.

Table 3. The effects of product market regulation on GDP per capita and household disposable incomes across the distribution

	Product market regulation				
	GDP	**Total effect**		***Direct effect***	
Average income	ns	-	*	-	*
Bottom-sensitive income standards					
Median income		(- <)	***	(- <)	***
Income of the lower middle class		(- <)	***	(- <)	***
Income of the poor		(- <)	***	(- <)	***

5.4 Up-skilling, technological progress and globalisation

55. The effects of the trend rise in skills are examined, as education is one of the main drivers of long-term material living standards and inequality. Reflecting the lack of data on educational policies though, policy conclusions can only be drawn on the basis of educational outcome variables. The analysis then provides some limited extension on the joint effects of up-skilling, globalisation, and technological change on material living standards and inequality, based on the findings of previous OECD work (Chapter 2 of OECD, 2011b). Because this paper emphasises the role of structural policies on growth and inequality and associated trade-offs and complementarities, non-policy factors such as broad globalisation forces and technology-driven trends are not given prominence. While globalisation is likely to interact with structural policies as joint determining factors of material living standards and inequality, analysing these interaction effects is beyond the scope of the present paper. [51]

Up-skilling

56. While the positive link between human capital, employment and GDP per capita is well established, the relationship between education and income inequality is notoriously ambiguous. Upgrading of the educational composition of the workforce can have two separate effects (Knight and

51. See Braconier and Ruiz-Valenzuela (2014) and Johansson and Olaberria (2014) for recent evidence on the effects of globalisation and education on growth and inequality.

Sabot, 1983): *i*) a composition effect, whereby a rise in the share of highly-educated (high-wage) workers raises earnings inequality up to a certain point, but will then lower it as fewer low-education (low-wage) workers remain; and *ii*) a rate-of-return effect, whereby a rise in the share of highly-educated workers reduces the returns to education; as a result of these contrasting forces, the combined effect on inequality is unclear a priori. In addition, the effects of human capital on household disposable incomes could differ from those on market incomes, reflecting the interplay between employment and wage effects, but also the potential interaction between raising levels of education and the demand for redistribution.

57. The household income equation is simply augmented with education, where the latter is measured by mean years of schooling (Table 4). As expected, up-skilling is found to boost long-term levels of GDP per capita and average household income. Total household incomes effects are also positive across the distribution, and with the same order of estimated magnitude – which suggests the absence of distributional implications. The decomposition of total household income effects indicates that beyond positive effects channelled via GDP, there are no additional benefits from education at the household level. These findings can tentatively be qualified by replacing means years of schooling with attainment rates by education levels, leading to the following broad conclusions:

- Attainment in upper-secondary non-tertiary education boosts long-term GDP per capita. Total household incomes effects are also positive, both on average and across the distribution and, as for mean years of schooling, associated estimates do not allow for inferring distributional effects.

- The effect of attainment in tertiary education on long-term GDP per capita and household incomes do not reach statistical significance.

58. These findings imply that rising education did not boost household incomes as much as GDP per capita. They could reflect decreasing returns to education at the OECD-wide level, due to the relatively high development stage of the average OECD country – available schooling indicators probably no longer adequately measure population skills and the quality of education. Even though the analysis could not rely on policy indicators but only on performance indicators, these results would still indirectly suggest that reforms aimed at encouraging educational up skilling while promoting equity in access to education can serve both growth and equity objectives.

Table 4. The effects of up-skilling on GDP per capita and household disposable incomes across the distribution

	Mean years of schooling			Attainment in below upper secondary education			Attainment in upper secondary non tertiary education			Attainment in tertiary education		
	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*
Average income	+ ***	+ ***		ns			+ ***	+ **		ns		
Bottom-sensitive income standards												
Median income		(+ =) ***						(+ =) **			- **	
Income of the lower middle class		(+ =) ***						(+ =) *	- ***		*(- <)* *	
Income of the poor		(+ =) ***						(+ =) *	*(- <)* ***		*(- <)* *	

Note: The entries of this table come from the estimation of the simultaneous effects of policies on long-term levels of GDP and household incomes across the distribution. Since GDP per capita is a determinant of household incomes across the distribution, the total effects of policies on the latter decompose as follows: i) indirect effects, i.e. channelled via reform-driven GDP effects and ii) direct (or additional) effects, i.e. over and above GDP effects. The tables systematically report: i) the effects of structural policies on GDP per capita, which, by construction imply equivalent indirect effects on household incomes; ii) the total (or net) effects of structural policies on household incomes, combining direct and indirect effects; iii) the direct (or additional) effects of structural policies on household incomes. The policy indicators are entered in lagged levels in both the GDP and the household income equations. See text for details on the definition of policy variables, specification and econometric technique.

The entries can be read as follows. + denotes a positive policy impact while - denotes a negative one. The table also provides (statistical) comparison of estimated policy effects on household income standards at different points of the distribution, respectively the median, the lower-middle class and the poor, with policy effects on average household income. Hence, the cases >, < and = denote, respectively, a positive impact of the reform which is, for a given income group, statistically higher, lower, or equal than that on average income. For example, in the case of mean years of schooling, total household income effects are positive for all income groups and they are of equal size for median income, incomes of the lower middle class and incomes of the poor, in each case compared with average income. The symbols (*, **, ***) denote respectively statistical significance at 10, 5 and 1% level.

Table 5. The effects of up-skilling, technological progress and globalisation on GDP per capita and household disposable incomes across the distribution[1]

	Export intensity			Import penetration			FDI inflow			FDI outflow			ICT investment share			Mean years of schooling		
	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*	GDP	Total effect	*Direct effect*
Average income	+ **	+ ***		- *			+ ***	+ ***		ns			+ ***	+ ***		+ ***	+ ***	
Bottom-sensitive income standards																		
Median income		(+ =) ***						(+ =) ***			- **			(+ =) ***			(+ =) ***	
Income of the lower middle class		(+ =) *	+ **					(+ >) ***	+ *		- *	*(- <)* **		(+ =) ***			(+ =) ***	
Income of the poor		(+ >) **	*(+ >)* **					(+ >) ***	*(+ =)* *		(- =) *	*(- <)* ***		(+ =) ***			(+ =) ***	

Note: The entries of this table come from the estimation of the simultaneous effects of policies on long-term levels of GDP and household incomes across the distribution. Since GDP per capita is a determinant of household incomes across the distribution, the total effects of policies on the latter decompose as follows: *i*) indirect effects, i.e. channelled via reform-driven GDP effects and *ii*) direct (or additional) effects, i.e. over and above GDP effects. The tables systematically report: *i*) the effects of structural policies on GDP per capita, which, by construction imply equivalent indirect effects on household incomes; *ii*) the total (or net) effects of structural policies on household incomes, combining direct and indirect effects; *iii*) the direct (or additional) effects of structural policies on household incomes. The policy indicators are entered in lagged levels in both the GDP and the household income equations. See text for details on the definition of policy variables, specification and econometric technique.

The entries can be read as follows. + denotes a positive policy impact while - denotes a negative one. The table also provides (statistical) comparison of estimated policy effects on household income standards at different points of the distribution, respectively the median, the lower-middle class and the poor, with policy effects on average household income. Hence, the cases >, < and = denote, respectively, a positive impact of the reform which is, for a given income group, statistically higher, lower, or equal than that on average income. For example, in the case of export intensity, total household income effects are positive for all income groups and they are of equal size for median income and incomes of the lower middle class compared with average income while they are higher for incomes of the poor compared with average income. The symbols (*, **, ***) denote respectively statistical significance at 10, 5 and 1% level.

1. The specification controls for sectoral (agriculture, industry and services) and female shares of employment.

Technological progress and globalisation

59. Economic globalisation involves increased exposure to international trade and financial movements, increased mobility of production factors (i.e. workers and capital) and increased fragmentation of the production process. There is some consensus, in both developed and – though less so – developing countries, that globalisation is a growth-enhancing force, but there is no consensus, and mixed empirical evidence, about its distributional implications. The effects of globalisation on overall income inequality have mainly focused on the earnings dispersion channel as opposed to the employment channel. Available evidence would seem to suggest that globalisation-induced inequality effects are mainly driven by the wage dispersion channel, in particular arising from changes in the skill and industry composition of labour demand.[52]

60. From a developed country perspective, concerns that globalisation would increase inequality reflect a variety of channels such as: *i*) increased wage dispersion resulting from import competition from low-wage developing countries, *ii*) growing outward investment reflecting the rapid development of international production-sharing (from home companies to their foreign affiliates) distorting the wage distribution of home countries by shifting relative demand within industries – the so called ''outsourcing hypothesis'',[53] and *iii*) an interplay between globalisation and technological change – whereby increased trade and international capital flows would boost scientific activities hence increase wage differentials via mechanisms such as skill-biased technological change.[54] To the extent that skill-biased technological change shifts demand of labour towards higher skills and especially when this increase in demand is not matched by a sufficient increase in the supply of skilled workers, technical progress may increase wage inequality. The implications of this hypothesis for inequality have found empirical support for many OECD countries.[55] Going further, recent evidence strongly suggests that skill-biased trade specialisation is associated with higher wage inequality, even accounting for technological change.[56]

61. However, increased international exposure can also reduce inequality through various channels such as *i*) price reductions in goods that are disproportionately consumed by low-income households; *ii*) lower wage differentials resulting from increased demand for unskilled labour due to inward foreign investment in low-skill sectors in particular services (i.e. hotels and retail distribution) and; *iii*) employment creation resulting from e.g. greenfield investment or innovation- induced increase in consumption.

62. To shed light on these effects, the analysis is selectively extended to cover some broad areas which have been found to influence inequality in previous OECD work (Chapter 2 of OECD, 2011b) – and accordingly this is done by controlling for concomitant structural shifts affecting the composition of OECD economies, e.g. in terms of the sectoral (agriculture, industry and services) and female shares of employment. Main results are presented in Table 5.

52. See OECD (2011b) for references.

53. Feenstra and Hanson (2003); Hijzen (2007)

54. Thoenig and Verdier (2003), Stojanovska and Cuyvers (2010), Bloom et al. (2008).

55. Autor et al. (2006), Goos et al. (2009) and OECD (2011b).

56. Johansson and Olaberria (2014).

63. Stronger export intensity is found to boost long-run GDP per capita and average household disposable income. Such effects hold across the distribution of household income, with stronger estimated gains for the poor – implying reduced inequality. The decomposition of total household income effects suggests that indirect GDP per capita-driven gains are compounded by additional and reinforcing direct gains accruing to the lower-middle class and, even more so, the poor. The income-equalising effects of export intensity are broadly consistent with previous empirical literature (*e.g.* Jaumotte et al., 2008 and Koske et al., 2012).[57] Higher import penetration is found to depress long-run GDP per capita – but with estimates being only weakly significant – while no statistically significant effects could be uncovered on household disposable incomes. Overall, these findings signal synergies across policy objectives, i.e. that reforms aimed at encouraging exports among domestic firms could boost efficiency and equity.

64. The analysis delivers mixed findings on the impact of international financial integration:[58]

- The influence of inward FDI is qualitatively close to that of export intensity – a likely reflection of the interplay between trade and FDI and the resulting difficulty to properly identify their isolated effects: there is evidence of positive effects on GDP per capita and positive equalising (both indirect and direct) effects on household disposable incomes. This finding could reflect FDI-induced demand for unskilled labour and associated employment creation; and it would suggest that policy reforms aimed at easing barriers to entry for foreign firms could serve both the efficiency and equity objectives.

- The impact of outward FDI is significant on neither GDP per capita nor average household income. By contrast, there is some evidence of negative effects on household incomes of the lower-middle class and the poor. These effects are consistent with the outsourcing hypothesis but could more broadly signal that jobs created and wages distributed by multinational companies do not mostly accrue to domestic but to foreign households.

65. Technological progress, as measured by the share of investment in communication technology (ICT) in overall investment, is found to boost long-run GDP per capita and average household disposable incomes. Household income gains are channelled via GDP per capita only – there is no evidence of additional household income effects. Average household income gains hold across the distribution, and are of the same estimated order of magnitude. As a result, there is no evidence of inequality effects, contrary to priors. This could reflect methodological differences compared with empirical studies that highlighted a significant technology-driven dis-equalising impact because:[59] *i*) generally such effect has been estimated on the basis of wage dispersion among employed individuals, and *ii*) generally such effect has been estimated on the basis of technological

57. In the latter case the paper measures overall trade as a share of GDP and does not disentangle imports and exports effects.

58. Financial integration is measured by de facto indicators, based on the following arguments: i) de jure legal restrictions on FDI transactions may not adequately reflect actual exposure of countries to international capital markets, and in particular does not distinguish between inward and outward financial transactions; ii) the OECD indicator of legal barriers to FDI is available for a few years only, making it impossible to use it in a time-series context. One important shortcoming associated with de facto measures is the higher risk of endogeneity bias compared with de jure measures, implying the need to interpret associated results with caution.

59. Braconier and Ruiz-Valenzuela (2014), Johansson and Olaberria (2014), OECD (2011b), Koske et al. (2012).

progress proxied by linear time trends; the failure to identify a specific dis-equalising effect from ICT could in this context be due to the inclusion of time trends in the household equations.

6. Which growth-enhancing policies appear to "lift all boats"? A wrap-up

66. The previous section has shed new light on the joint effects of structural policies on GDP per capita and on household disposable incomes, on average and across the distribution. A number of structural policies have been shown to boost long-term levels of GDP per capita and, via this channel, household disposable incomes. There is only scarce evidence that growth-enhancing structural policies raise inequality of disposable incomes in the long-term – in fact a limited number of them are found to potentially reduce it, tentatively pointing to synergies between the growth and equity objectives.

67. In order to illustrate and quantify policy findings, empirical results can be used with a view to tentatively compare reforms in terms of their respective effects on different objectives such as efficiency and equity (Table 6). This illustration is produced by taking the estimates at face value and as a result clearly implies a cautious interpretation. The exercise proceeds as follows:

- GDP per capita estimates are used to standardise policy reforms so that they all deliver a 1% long-term increase in GDP per capita. Table 6 presents the required change in associated policy parameters.

- Household income estimates are used to simulate the effects of such standardised policy reforms on household disposable incomes; first on average and second across the distribution.

- When GDP per capita estimates deliver insignificant policy results, reforms are standardised so that they deliver a 1% long-term increase in average household income. Household income estimates are used to simulate the effects of such standardised policy reforms on incomes across the distribution.

68. This exercise delivers the following main insights:

- Long-term reform-driven average household income gains are generally very close to GDP per capita gains. This reflects the fact that GDP per capita is a key driver of average household disposable income and in the long term reform effects at the GDP per capita level trickle down at the household level.

- Many structural reforms have a stronger traction on household incomes – especially those at the low-end of the distribution – than on GDP per capita. This reflects the fact that reform effects channelled via GDP per capita and its subsequent effect on household incomes are often compounded by additional effects beyond and above those via GDP:

  - Reducing barriers to competition, job protection, unemployment benefits for all categories of jobseekers and labour taxation are found to lift incomes of the lower-middle class more than GDP per capita.

  - Shifting from income to property and consumption taxes, boosting ICT investment and tightening unemployment benefits for the long-term unemployed, are found to lift incomes of the lower-middle class by less than GDP per capita – the latter reform is even found to reduce disposable incomes of the lower-middle class.

  - There is relatively rich evidence of long-term policy synergies between growth and equity objectives. Many structural reforms are found to deliver stronger income gains for households at the low end of the distribution compared with the average household and can thus be viewed as helping to narrow inequality in disposable incomes. Such is the case of reforming job protection to tackle labour market duality; reducing regulatory barriers to domestic competition as well as to trade and FDI; and stepping-up job-search support and activation programmes.

- Conversely, clear cases of long-term policy trade-offs between the growth and equity objectives are not easy to identify empirically. One notable exception is tightening unemployment benefits for the long-term unemployed as it is found to lift GDP per capita and average household incomes but to reduce disposable incomes at the lower-end of the distribution, an indication that it may raise inequality. Nevertheless, this result should be taken with care: as stressed earlier, the magnitude of the effect obtained from the regression analysis may well overestimate the true value of the underlying elasticity.

- Reducing minimum relative to median wages could also raise concerns as it is found to depress disposable incomes on average and for the median household, though not for households at the low-end of the distribution.

- The size of the illustrative reform scenarios to lift GDP per capita and household incomes by around 1% do not seem out of reach. In a number of cases, such as in the area of taxation, unemployment benefits and product markets, the policy changes are of lower magnitude compared with past experiences, as observed on average across OECD reforming countries between 1995 and 2005. [60]

60. Such tentative scenarios are derived mechanically but not inconsistent with country-specific reform experiences identified in Bouis et al. (2012) by means of a formal definition of "reform shocks".

Table 6. Wrapping-up: policy reforms to lift GDP per capita and household incomes, on average and across the distribution

Example of specific structural policy reform	Change in policy parameters to deliver a 1% long-term increase in GDP per capita	Effects on long-term GDP per capita (%)	Effects on long-term average household income (%)	Effects on long-term household incomes across the distribution (%)		
				The median	The lower-middle class	The poor
Relax hiring and firing procedures / Reduce labour market duality	Reduction in the employment protection legislation index approximately equivalent to the stringency of regulation prevailing currently in Finland compared with Estonia (*)	*1.0 (*)*			1.4	1.9
Reduce the level or duration of unemployment benefits	Untargeted reductions in benefit replacement rates by 3 percentage points	*1.0*	1.3	1.5	1.5	1.5
Reduce the level of unemployment benefits for the long-term unemployed	Reductions in benefit replacement rates targeted to the long-term unemployed by 4 percentage points	*1.0*	0.8	0.8	-1.5	-2.4
Reform the tax structure by reducing the share of direct (corporate and income) taxes and increasing the share of property or indirect taxes	Reductions in the share of personal income taxes in tax revenue by 1.3 percentage points	*1.0*	0.5	0.5	0.5	0.5
Reduce marginal tax rates on labour	Reductions in average statutory marginal tax wedges on labour by 3.5 percentage points	*1.0*	1.3	1.3 (*)	1.3	1.3
Encourage educational upskilling and equity in access to education	General increases in average years of schooling by 0.25 years	*1.0*	0.9	0.9	0.9	0.9
Reduce barriers to entry for foreign firms -- FDI inflows	Increases in the stock of inward FDI as a share of GDP by 4 percentage points	*1.0*	1.0	1.0	1.3	1.3
Reduce barriers to exports / Encourage exports among domestic firms	Increases in export intensity by 3 percentage points	*1.0*	1.1	1.1	1.1	1.2
Encourage innovation and raise the effectiveness of R&D support	Increases in the share of ICT in overall investment by 4 percentage points	*1.0*	0.7	0.7	0.7	0.7

Example of specific structural policy reform	Change in policy parameters to deliver a 1% long-term increase in average household disposable income	Effects on long-term GDP per capita	Effects on long-term average household income	Effects on long-term household incomes across the distribution		
				The median	The lower-middle class	The poor
Step-up job-search support and activation programs for the unemployed	Increases in spending on administration and PES per unemployed on GDP per capita approximately equivalent to the current spending gap of Ireland relative to the Netherlands		*1.0*	1.0	1.0	1.3
Increase the minimum cost of labour	Increases in the ratio of minimum relative to median wage by 8.3 percentage points		*1.0*	1.0		
Relax product market regulation (by easing entry restrictions in non-manufacturing sectors, reducing barriers to firm entry)	Reduction in the summary index of product market regulation in energy and network industries approximately equivalent to the stringency of regulation prevailing currently in Spain compared with the United States		*1.0*	1.4	1.8	2.9

Note: The table only reports results for which estimated effects are statistically significant. Empty cells refer to estimates which are not statistically significant. See text for details.

(*) These simulations are produced because the corresponding coefficients are below but very close to statistical significance (at a level of confidence of 12% for the GDP per capita effect of employment protection and 13% for the median income effect of marginal tax wedges)

7. Conclusions

69. This paper has provided new empirical evidence on the effects of structural policies on households' disposable incomes across the distribution. More specifically, using a sample of OECD countries over the period 1985-2010, it has investigated the extent to which structural policies have differential long-run impacts on GDP per capita and household incomes at different points of the distribution. One purpose was to identify potential policy trade-offs and synergies between economic efficiency, household material living standards and inequality. The main findings can be summarised as follows:

- On average across OECD countries and between the mid-1980s and the late 2000s, growth in GDP per capita has not fully trickled down to household incomes. In addition, growth has been unequal, as the gap between the growth rates of GDP per capita and household disposable incomes has been wider at the lower end of the income distribution. To a large extent, this trend shortfall reflects a number of statistical issues, in particular the under-reporting of top incomes and non-compliance to filling the household survey questionnaire across the distribution.

- Pro-growth reforms can be distinguished according to whether they are found to generate potential synergies with equity objectives or raise trade-offs.

  - Many structural reforms are found to deliver stronger income gains for households at the low end of the distribution compared with the average household and can thus be viewed as helping to narrow inequality in disposable incomes. Such is the case of reducing regulatory barriers to domestic competition, trade and FDI, stepping-up job-search support and activation programmes and tightening unemployment benefits for all categories of jobseekers.

  - Conversely, a tightening of unemployment benefits for the long-term unemployed is found to lift GDP per capita and average household incomes but also to reduce disposable incomes at the lower-end of the distribution, an indication that it may raise inequality.

  - Reducing minimum relative to median wages could also raise concerns as it is found to depress disposable incomes on average and for the median household, though not for households at the low-end of the distribution.

- Many reforms are found to raise median household income by more than GDP per capita: this is the case of reducing barriers to competition, easing job protection, tightening unemployment benefits for all categories of jobseekers and lowering labour taxation; conversely, shifting from income to property and consumption taxes, boosting ICT and tightening unemployment benefits for the long-term unemployed raise median household income by less than GDP per capita.

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