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Inequality and Poverty in the United States: Public Policies for Inclusive Growth

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ABSTRACT/RESUME

**Inequality and poverty in the United States:
public policies for inclusive growth**

Income inequality and relative poverty in the United States are among the highest in the OECD and have substantially increased over the past decades. These developments have been associated with a number of other worrying statistics, including low intergenerational social mobility and weak real income growth for many households. A more inclusive pattern of growth would require less pronounced gaps in outcomes and opportunities across social groups and a broader sharing of the benefits of growth. The present paper analyses the causes of US income inequality and relative poverty in an OECD context, especially the role of the tax-and-transfer system, and suggests public policies to promote inclusive growth. To a significant degree, high income inequality is attributable to the large dispersion of earned income, which should be addressed by reforming education, so as to provide disadvantaged students with the skills needed to fully realise their potential. In addition, taxes and transfers contribute less to income redistribution than in other OECD countries. If well designed, reforms that promote inclusive growth could also help reduce the market distortions resulting from the current tax-and-transfer system. In particular, phasing out personal and corporate tax expenditures that disproportionately benefit high earners would lower income inequality and improve resource allocation. As well, social transfers could be more effective in alleviating poverty through better targeting of the truly needy while reducing administrative complexity.

JEL classification: D31, D63, H2, H5, H7, I3.

Keywords: United States; income inequality; poverty; inclusive growth; income redistribution; social welfare; education system; tax system; tax expenditures; capital taxation; transfer system; social insurance; means-tested transfers.

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**Inégalités et pauvreté aux États-Unis :
des politiques publiques en faveur d'une croissance inclusive**

Les inégalités de revenus et la pauvreté relative aux États-Unis sont parmi les plus élevées de l'OCDE et se sont considérablement accentuées au cours des dernières décennies. Ces phénomènes se doublent d'un certain nombre d'autres données préoccupantes, notamment la faiblesse de la mobilité sociale intergénérationnelle et l'évolution du revenu réel de nombreux ménages. Une structure de croissance plus inclusive impliquerait de combler les écarts dans la situation et les opportunités offertes aux différents groupes sociaux et un plus large partage des bénéfices de la croissance. La présente étude passe en revue les causes des inégalités de revenus et de la pauvreté relative aux États-Unis par rapport aux pays de l'OCDE, notamment le rôle du système de prélèvements et de prestations, et propose des mesures pour promouvoir une croissance mieux partagée. L'ampleur des inégalités de revenus s'explique dans une large mesure par la forte dispersion des revenus du travail, à laquelle il faudrait s'attaquer en réformant l'éducation pour que les étudiants issus de milieux défavorisés puissent acquérir les compétences dont ils ont besoin pour réaliser pleinement leur potentiel. En outre, le système de prélèvements et de prestations contribue moins à la redistribution du revenu que dans d'autres pays de l'OCDE. À condition d'être bien étudiées, des réformes favorisant une croissance inclusive pourraient également aider à réduire les distorsions de marché induites par le système actuel de prélèvements et de prestations. En particulier, la suppression progressive des dépenses fiscales en faveur des particuliers et des entreprises, qui favorisent les hauts revenus de manière disproportionnée, aurait pour effet d'atténuer les inégalités de revenus et d'améliorer l'allocation des ressources. De même, les transferts sociaux pourraient être employés plus efficacement à faire reculer la pauvreté si l'on ciblait mieux les bénéficiaires réellement nécessiteux tout en réduisant la complexité administrative des programmes.

Classification JEL : D31, D63, H2, H5, H7, I3.

Mots-clés : États-Unis ; inégalités de revenus ; pauvreté ; croissance inclusive ; redistribution du revenu ; bien-être social ; système éducatif ; système fiscal ; dépenses fiscales ; imposition du capital ; système de transferts ; assurance sociale ; transferts sous condition de ressource.

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

INEQUALITY AND POVERTY IN THE UNITED STATES: PUBLIC POLICIES FOR INCLUSIVE GROWTH

Oliver Denk, Robert Hagemann, Patrick Lenain and Valentin Somma[1]

1. Introduction

Income inequality and relative poverty in the United States are among the highest in the OECD and have significantly increased over the last four decades. These developments have been associated with a number of other worrying statistics, including low intergenerational social mobility and weak real income growth for many households. This paper investigates the causes of US income inequality and relative poverty in an OECD context, especially the role of the tax-and-transfer system, and suggests public policies to promote inclusive growth. The main findings and recommendations from the analysis are as follows.

Main findings:

- Income inequality in the United States has significantly increased since the late 1970s. This has been the result of a more unequal distribution of market income across households (*i.e.* of income before taxes and transfers). The rising contribution of the tax-and-transfer system to narrowing inequality has not been sufficient to cushion the greater dispersion of market income.
- Inequality of disposable income in the United States is the fourth largest among OECD countries (as measured by the Gini coefficient). This is explained by the higher inequality of market income, and by the lower inequality-reducing impact of the transfer system, whereas the inequality-reducing impact of the tax system is relatively high.
- Despite rising inequality and weak growth of market income, real disposable income increased significantly for the bottom quintile during 1979-2009, on the back of considerable fiscal support. The increase was similarly strong for the top quintile who primarily benefited from high market income growth, while the three middle quintiles gained substantially less.
- The Great Recession has lowered disposable incomes across the income distribution, but more so for high than low earners. The significant expansion of social transfers has provided some protection to low-income households, and market incomes have fallen particularly for the richest. The 2012 American Tax Relief Act raised capital income taxes, reinforcing the progressivity of the tax system, albeit with a potentially adverse impact on disposable incomes over time.

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1. Oliver Denk and Patrick Lenain: Economics Department, OECD. Robert Hagemann: Independent consultant. Valentin Somma: Columbia University. Corresponding author: Oliver Denk (email: Oliver.Denk@oecd.org). Sections 1-3 of this paper build on material in the 2012 OECD *Economic Survey* of the United States, which was published in June 2012 under the authority of the Economic and Development Review Committee (EDRC) of the OECD. Compared to the *Survey*, these sections, including the policy recommendations, have been expanded, modified and updated. We are grateful to David Carey, Steven Clark, Andrew Dean, Wendy Dunn, Robert Ford, Michael Förster, Isabelle Joumard, Pierre Leblanc, Jean-Baptiste Michau, Mauro Pisu, Linda Richardson and US government officials for useful comments and suggestions. Special thanks are due to Robert Moffitt and James Ziliak who graciously made their data available, and to Valery Dugain who provided outstanding statistical support. This paper contains the views of the authors, and not necessarily those of the OECD or its member countries.

- The progressivity of the US personal income tax system is reduced by various tax expenditures, including income exclusions and itemised deductions, some of which lack a clear economic rationale and distort market forces.
- The effective tax rates of the 400 taxpayers with the highest levels of income declined from an average of 26.4% in 1992 to 19.9% in 2009 (not accounting for the corporate income taxes paid by those taxpayers). The decline reflects the lowering of the top marginal tax rate, the predominance of dividends and long-term capital gains (both subject to the reduced federal tax rate of 15% in 2009) in their taxable income, and the use of legislated exclusions and deductions.
- Taxes on the intergenerational transfer of wealth have played a diminishing role in ensuring the progressivity of the tax system. This is largely attributable to the significant reduction of the statutory rates and base of the estate tax.
- Model simulations suggest that increasing the progressivity of capital income and wealth taxes risks reducing the disposable income of all income deciles. This underlines the importance of reform approaches to the tax-and-transfer system that raise both its efficiency and redistributive power to attain more inclusive growth.
- The US transfer system focuses on lowering poverty among specific groups of households: the elderly, disabled, low-paid workers, single parents and job-seekers.
- Other groups, non-eligible to existing programmes, can fall through the cracks in the social safety net, reflecting the absence of a universal means-tested cash transfer programme. There is, for instance, evidence of poverty among children, despite the provision of nutritional and health care in-kind transfers.

Recommendations for inclusive growth:

- Comprehensive education reform (including, for example, improvements to recruiting, developing, rewarding and retaining effective teachers and principals) should improve the access of disadvantaged students to high-quality education, which would help them raise their incomes and increase social mobility. To this extent, states relying heavily on local property taxes to fund public elementary and secondary schools should move to state-level funding, so as to distribute more evenly the funding of education across local areas.
- Changes to the corporate income tax, for instance through channels laid out in *The President's Framework for Business Tax Reform* (White House, 2012a), are necessary to lower existing tax incentives to move productions overseas and raise those to bring production back to the United States. They would help create domestic employment and raise domestic wages, with favourable impacts on the distribution of market incomes.
- A comprehensive reform to lowering tax expenditures that disproportionately benefit high earners is needed, for instance by limiting the marginal income tax rate at which deductions (such as for charitable donations) and exclusions (such as for retirement saving) may be permitted to 28%, as proposed in the Administration's FY 2014 budget.
- The unequal tax treatment of income from different asset classes increases inequality in some cases and distorts the allocation of capital. Equalizing effective tax rates on owner- and tenant-occupied housing would remove the current tax discrimination of tenant-occupied housing, which puts at a disadvantage tenants, even though they tend to have lower incomes than owner-occupiers. Equalizing effective tax rates on debt- and equity-financed corporate investment would improve the efficiency of investment and can reduce income inequality as such capital income is highly concentrated in higher-income households.

- To effectively pursue the objectives of intergenerational social mobility and equality of opportunity, capital gains on bequeathed assets should be taxed at the standard rate and the estate tax should be replaced with an inheritance tax.
- The transfer system lowers poverty among specific groups, but leaves others unreached. A stronger focus of eligibility criteria on income level is necessary. Simplifying the myriad of transfer programmes and their complex rules would lower administrative costs and increase take-up.

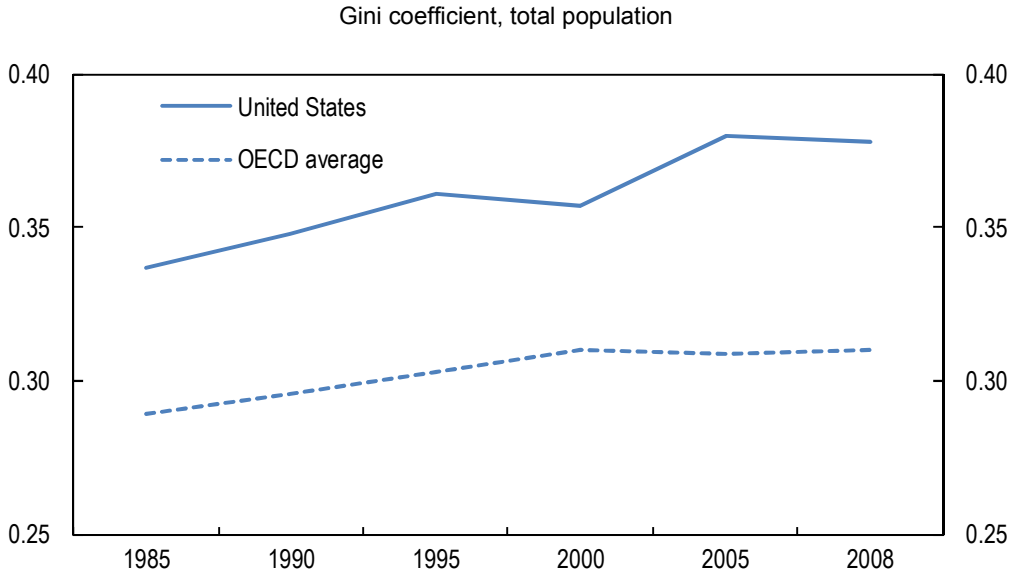
The remainder of the paper is organised as follows. The next section provides a brief overview of trends in income inequality and their causes in the United States, especially compared to other OECD countries. Section 3 suggests policy reforms, to education and the tax-and-transfer system, which could help attain more broad-based economic growth that would raise the incomes of wider parts of the population. The following section presents a detailed description of the effectiveness of the US tax system in reducing income inequality and combating poverty. Finally, section 5 turns to an in-depth analysis of the role of government transfers, including at the state and local levels where possible.

2. Overview of income inequality and poverty

2.1. Evolution of income inequality

Inequality of disposable income, *i.e.* of income after taxes and transfers, across households in the United States has significantly increased during the past several decades (OECD, 2008, 2011a), more than in the majority of OECD countries. Figure 1 captures these trends by the Gini coefficient, which expresses the overall degree of income inequality with a single number, but evidence based on alternative measures point in the same direction. The increase in inequality of disposable income has been due to a substantially more unequal distribution of *market income*, *i.e.* of income before taxes and transfers (Congressional Budget Office, henceforth CBO, 2012a). The contribution of the tax-and-transfer system to narrowing the income distribution was the same in 2007 as in the late 1970s, and it rose further during 2008-09 due to fiscal actions in the wake of the global financial crisis. Measures in the 2012 American Tax Relief Act, which increased taxes relatively more for high earners, have reinforced the lowering of income inequality through the tax system. The rise in the inequality-reducing impact of the tax-and-transfer system has therefore somewhat cushioned the increasing inequality of market income. While the precise estimates vary across sources of income data, they share similar trends. Annex A1 provides a detailed description of data sources and income definitions.

Figure 1. Inequality of disposable income over time



Note: The Gini coefficient is based on equivalised household income and after household taxes and cash transfers. The OECD average contains the following countries: Austria, Belgium, Canada, Denmark, Finland, Germany, Greece, Ireland, Israel, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Spain, Sweden, the United Kingdom and the United States. The years indicated are approximate.

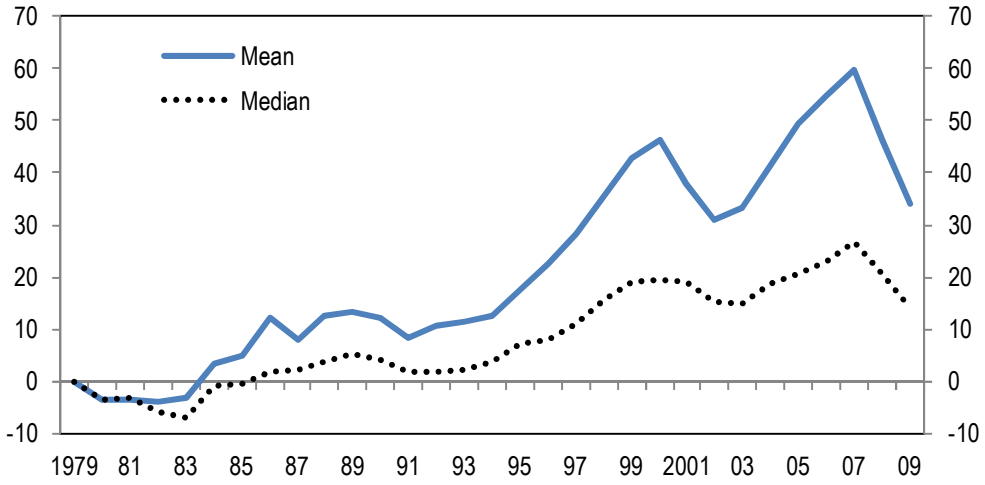
Source: OECD, Household Income Distribution and Poverty database, December 2012.

The distribution of market income in the United States has widened considerably since the late 1970s (CBO, 2012a). During 1979-2009, while real *average* household market income has risen cumulatively by 34%, real *median* household market income has grown cumulatively by only 14% (Figure 2). This reflects a concentration of income gains among top earners; the share in aggregate market income of the top quintile has increased by 10 percentage points to 58%, whereas the share of each of the lower four quintiles has declined. Moreover, most of those gains have accrued to persons in the top percentile, whose share has risen to 16%, up from 9% in 1979. A similar concentration of income gains has been experienced in many other OECD countries for which data are available, but it is in the United States that the gains of the top 1% have been among the greatest (OECD, 2008, 2011a). As a result, according to CBO (2012a) the US Gini coefficient for market income has increased from 0.476 in 1979 to 0.579 in 2009. The increase in income inequality had even been starker until 2007, while during 2007-09 wealthy households saw substantial income losses which subsequently partially reversed over the following two years according to tax return data (Saez, 2013). The CBO estimate for the change in the Gini coefficient is broadly comparable to the OECD estimate, although their levels differ somewhat, mainly because the sources of data differ (Box 1).

Several factors have contributed to the rise in inequality of market income. Greater openness to international trade has meant that low-income workers may have been affected disproportionately by import competition (Autor *et al.,* 2012), and the offshoring of activities in the tradable goods and services sectors has led to a fall in the demand for less-skilled labour (Feenstra, 2010). This may have been reinforced by skill-biased technical change, which induced a shift in labour demand towards higher skills (Acemoglu, 2002; Levy and Murnane, 1992). While the demand for skilled workers has increased, the supply of such individuals has not kept pace, as indicated by the slowing growth of tertiary attainment (Goldin and Katz, 2008). Also, the significant decline in union membership since the mid-1980s (Card *et al.*, 2004) and the reduction in the minimum wage (Lee, 1999) have arguably reduced the incomes of low earners.

Figure 2. Cumulative growth of mean and median market income

Percentage change since 1979, adjusted for inflation



Source: CBO (2012a).

Box 1. Key differences between OECD and CBO measures of income inequality

Both OECD (2008, 2011a) and CBO (2012a) provide estimates of the levels of income inequality in the United States over roughly the same time period (late 1970s to late 2000s). In general, estimated Gini coefficients can differ from one study to another for a number of reasons, the principal of which are: *i)* data sources; *ii)* the definition of income; *iii)* the equivalence scale applied to household incomes; and *iv)* the construction of Gini coefficients. The different estimates in the OECD and CBO studies arise mostly from *i)* and *ii)*.

With respect to *i),* the OECD and CBO studies both rely on data from the Current Population Survey Annual Social and Economic Supplement (CPS-ASEC). However, the CBO uses statistical matching to merge the CPS-ASEC data records (which are rich in socioeconomic detail and transfer income) with individual tax records from Internal Revenue Service data to capture better income and transfer data at both extremes of the income distribution (see also Annex A1). With respect to *ii)*, while the OECD and CBO studies define market income in a broadly similar way, realised capital gains are excluded in the OECD studies, but not the CBO studies. Capital gains tend to be concentrated among high-income households.

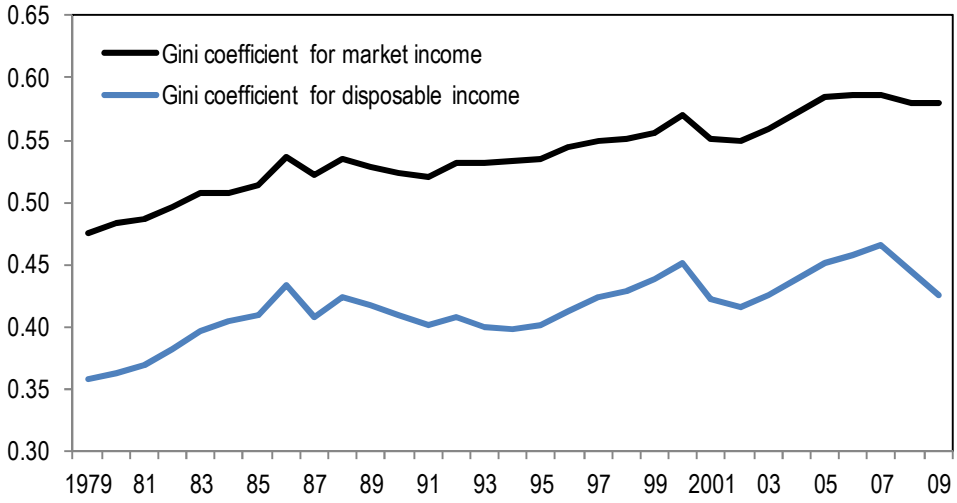
At the same time, the increase in inequality of market income has to some extent been countervailed by the rising contribution of the tax-and-transfer system to narrowing the distribution of disposable income. While the Gini coefficient for market income increased relatively continuously over the past three decades, the Gini coefficient for disposable income was at about the same level in 2009 as in the mid-1980s (CBO, 2012a; Figure 3, Panel A). In particular, the Gini coefficient for disposable income has risen from 0.358 to 0.426 during 1979-2009, a smaller increase than in the Gini coefficient for market income. The rising inequality-reducing impact of the tax-and-transfer system has been due to transfers (Figure 3, Panel B). Federal taxes reduced the Gini coefficient for market income by 4 percentage points in 2009, the same as in 1979. By contrast, transfers reduced the Gini coefficient by 8 percentage points in 1979, but by 11 percentage points in 2009.[2] These conclusions are to some extent affected by the economic environment

2. While these estimates, based on CBO (2012a), include the effects of transfers at all levels of government, those for taxes are limited to the federal level because of difficulties in calculating state and local taxes at the individual level over long periods of time. See section 4, however, for a discussion of the possible distributional impact of state and local taxes.

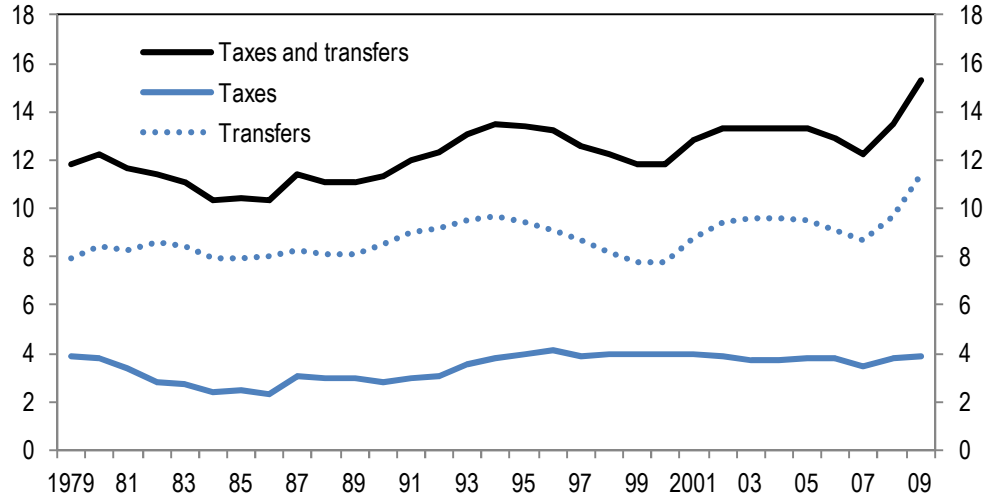
of the last two years in the sample: taxes and transfers, respectively, had reduced the Gini coefficient by the same percentage points in 2007 as in 1979, while over the following two years to 2009 the inequality-reducing impact of the transfer system increased by about 3 percentage points. Box 2 provides details about the effect of the Great Recession on households' income and income inequality.

Figure 3. Inequality-reducing impact of taxes and transfers over time

A. Gini coefficient for market income and disposable income



B. Percentage point reduction of the Gini coefficient for market income



Source: CBO (2012a) and authors' calculations.

Despite rising inequality, disposable income adjusted for inflation has increased significantly for the bottom quintile during 1979-2009 (Figure 4). It has also risen strongly (cumulatively by around 70%) for the top quintile. The rise has been, however, substantially less for the three middle quintiles. For all quintiles, disposable income growth has exceeded market income growth, *i.e.* in addition to higher market income they have benefited from higher transfers and/or lower taxes[3]. The magnitude of the contribution of

3. Growth rates in transfers and taxes are measured relative to market income growth.

the tax-and-transfer system to disposable income growth declines through the income distribution from the bottom to the top quintile. The lower quintiles, particularly the bottom one, have experienced a large increase of disposable income attributable to higher transfers. By contrast, lower taxation has added some similarly small income growth for all quintiles. Thus, increasing support through the transfer system has been the main source of disposable income growth for the bottom quintile, while for the top quintile it has been higher market income growth. Again, these numbers are influenced by the economic and fiscal developments in 2007-09, during which period especially for the lower quintiles transfers increased and taxes decreased, while the decline of market income was particularly pronounced for the top quintile.

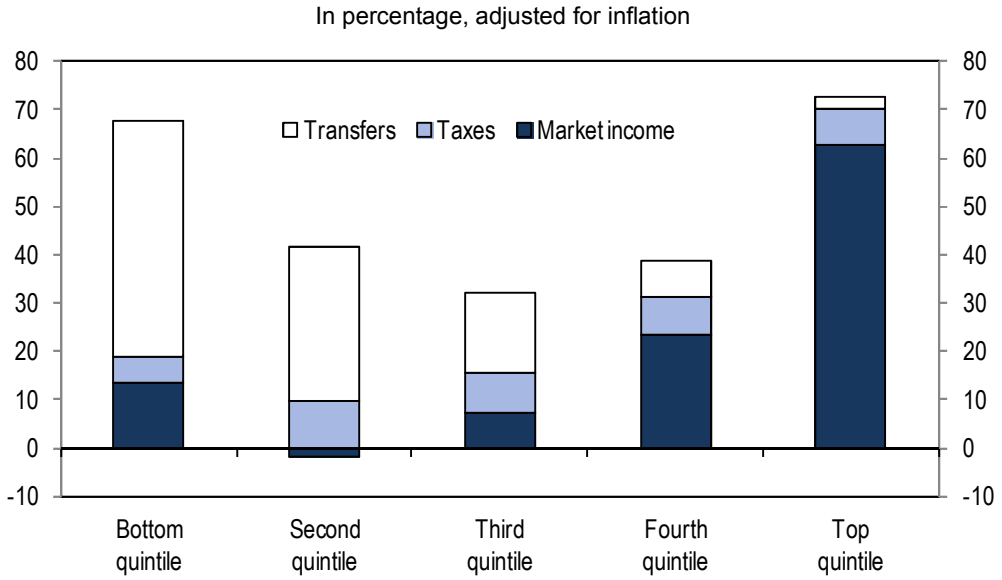
The growth of disposable income of the lower three quintiles was largely due to increases in transfers and cuts in taxes. Put differently, without fiscal support, their real incomes would have risen rather little. One concern therefore is that this fiscal support has become unsustainable – persistent increases in social benefits and cuts in taxes have resulted in a strong accumulation of public debt – and that the growth of real disposable income for the lower quintiles will decline going forward.

Box 2. The impact of the Great Recession on income inequality

Data in CBO (2012a) are available until 2009. They show that the Gini coefficient for disposable income fell by 4 percentage points during 2007-09. The decline was mainly driven by two forces. First, high earners experienced a marked reduction in their market income. Over these two years, market income in real terms decreased by 19% for the top 20% and by 36% for the top 1%. This was primarily due to a substantial drop in income from capital gains, which for both groups in 2009 was a quarter of its value in 2007. Second, the Administration succeeded in cushioning the harmful effects of the recession on poverty through a substantial expansion of transfer expenditure, reflected in the bottom three quintiles seeing a significant increase in their transfer income. Oh and Reis (2012) argue that more than 50% of the rise in aggregate spending from 2007 to 2009 was accounted for by higher social transfers, especially on medical care, retirement and disability. According to the study, about half of this is explained by discretionary fiscal stimulus, in particular the 2009 American Recovery and Reinvestment Act.

In contrast to CBO (2012a), which makes use of both household survey and tax return data, Saez (2013) relies exclusively on tax return data. These have the advantage of being available until 2011, hence of including two years of economic recovery. He documents that all of the gains in market income during 2009-11 have gone to the top 1%. Yet, because of the relatively large decline of their income during 2007-09, the market income of the top 1% was still 29% lower in 2011 than in 2007, while that of the bottom 99% was 12% lower. Going forward, the American Taxpayer Relief Act of 2012, which raised the top marginal tax rates for ordinary income, long-term capital gains and dividends, should exert some positive effects for income inequality reduction via the tax system. With the recovery continuing, transfer spending is set to be rolled back, although this would likely be countervailed by a strengthening of the market incomes of workers at the lower end of the income distribution.

Figure 4. Decomposing the growth of disposable income for different quintiles, 1979-2009



Source: Authors' calculations using CBO (2012a).

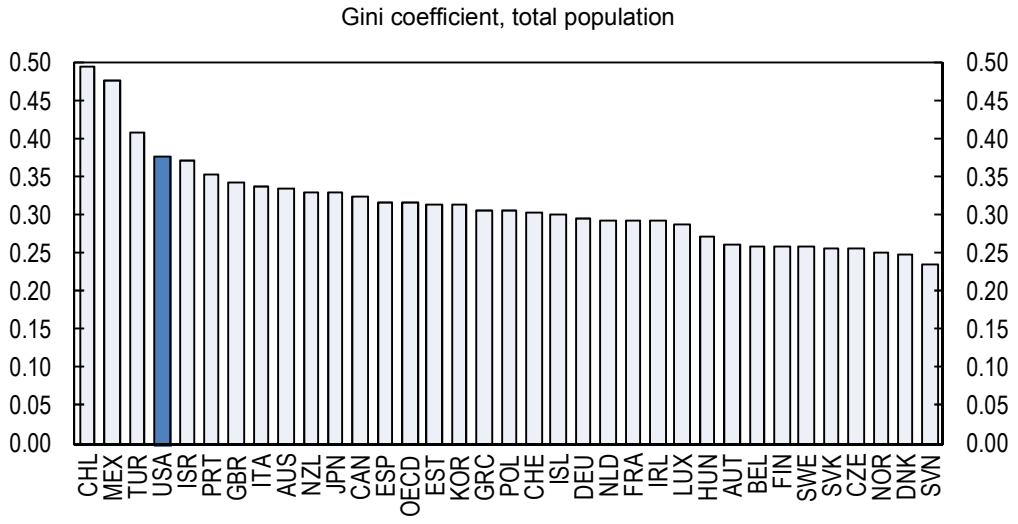
The tax system has changed in many ways, but its overall role for income inequality reduction has remained very similar. Some channels have reduced progressivity. In this paper, taxes (or transfers) are considered progressive if they take a larger (in the case of transfers: smaller) share in the market income of high- than low-income households. For one, Social Security payroll taxes have become relatively more important over the past several decades in overall tax revenue (CBO, 2012a), reflecting an increase in their statutory rate of about 3 percentage points. Abstracting from the contributory nature of the Social Security payroll tax (*i.e.* the counterpart to the tax is the future pension benefit that is obtained), the bulk of the tax tends to be regressive because it applies a proportional rate to earnings below a ceiling, so that the average tax rate declines at higher levels of income. In addition, decreased marginal tax rates at the upper end of the federal income tax schedule have lowered income taxes of high earners. At the same time, however, the lower-income groups have benefited from cuts in statutory personal income tax rates, expansions of the Earned Income Tax Credit and increases in child tax credits, which have all raised progressivity.

The higher impact of transfers on reducing inequality of disposable income reflects mostly substantial increases of in-kind spending through Medicare and Medicaid. While Medicaid is generally well-targeted to those with the lowest market incomes, Medicare is provided to all persons aged 65 and over irrespective of their income, although a significant fraction of them are in the lower quintiles. Transfers made up a much larger share of the disposable income of the bottom quintile in 2009 than 1979, but the share of all transfers going to the lowest quintile has declined. This is due to a change in the composition of transfer spending toward less progressive programmes (CBO, 2011a). The proportion of transfers that are not conditioned on income levels *per se* (*i.e.* not means-tested) has increased, notably expenditures on Social Security (old age, survivors' and disability insurance) and Medicare, which are less progressive than means-tested cash and in-kind transfers. In addition, spending on anti-poverty programmes has tilted in favour of persons in the upper segment of the poor population. Thus, the progressivity of transfers at the lowest end of the income distribution has fallen.

2.2. International comparison of income inequality and poverty

The Gini coefficient for disposable income in the United States is the fourth highest in the OECD (Figure 5). Although the US tax-and-transfer system redistributes large amounts of income[4], the overall redistributive effect of household taxes and cash transfers in the United States is one of the lowest in the OECD (as measured by the percentage point reduction of the Gini coefficient; Figure 6, Panel A). While household taxes have an above-average impact on reducing inequality (Figure 6, Panel B), the US system of cash transfers is among the least inequality-reducing in the OECD (Figure 6, Panel C). This largely reflects the smaller amount of spending on cash transfers relative to GDP in the United States (Joumard *et al.*, 2012).

Figure 5. Inequality of disposable income, late 2000s



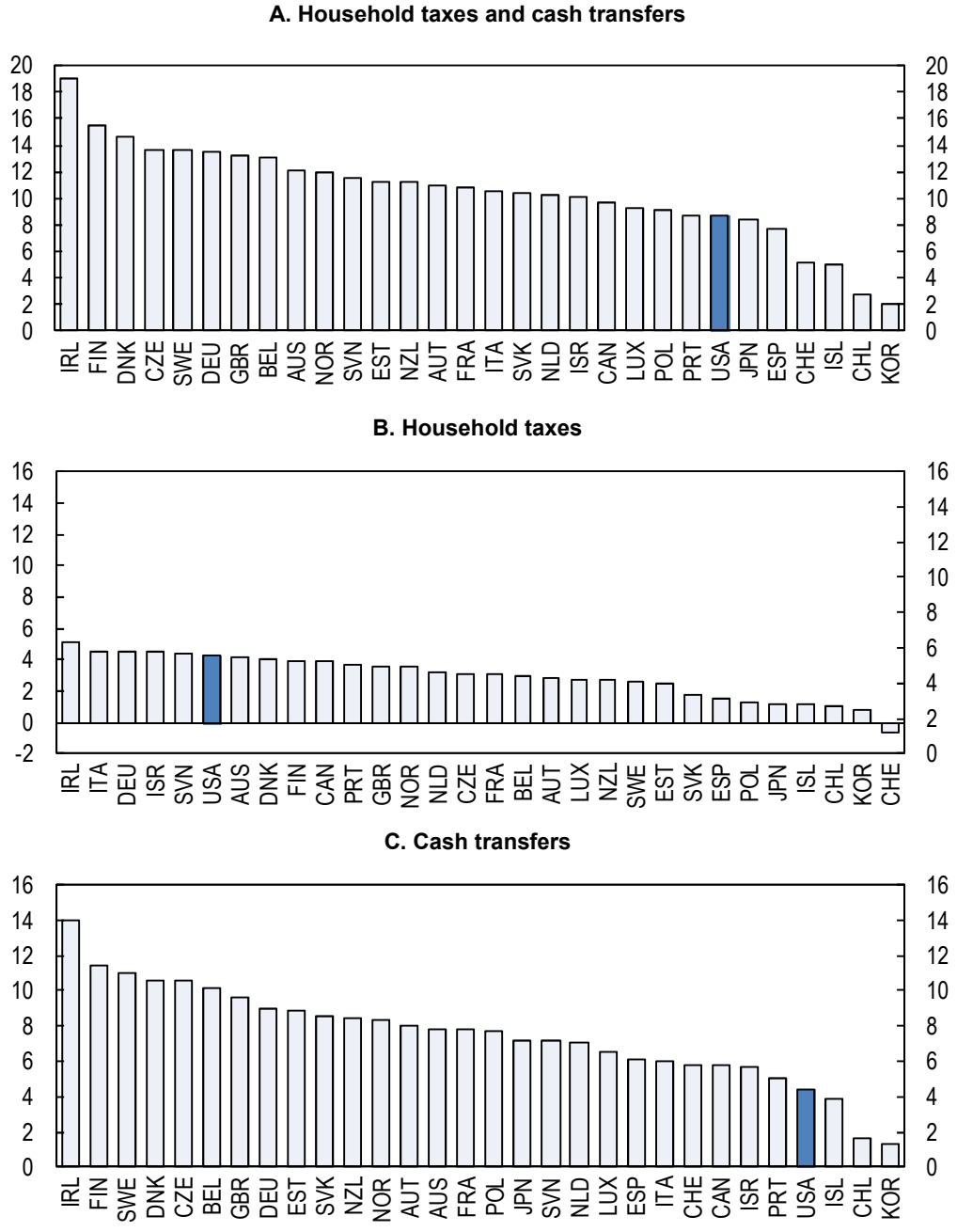
Note: The Gini coefficient is based on equivalised household income and after household taxes and cash transfers.

Source: OECD, Household Income Distribution and Poverty database, December 2012.

4. Chamberlain and Prante (2007) offer one of the most detailed quantitative assessments of the distributional impacts of all taxes and spending at all levels of government. The authors estimate that in 2004 the level of government spending per USD 1 paid in taxes reached USD 8.21 for households in the bottom quintile of the income distribution, versus USD 0.41 for those in the top quintile.

Figure 6. The inequality-reducing impact of taxes and transfers in cross-country comparison, late 2000s

Percentage point reduction of the Gini coefficient for market income, total population



Note: The Gini coefficient is based on equivalised household income. The Earned Income Tax Credit in the United States enters cash transfers. In-kind transfers are not included.

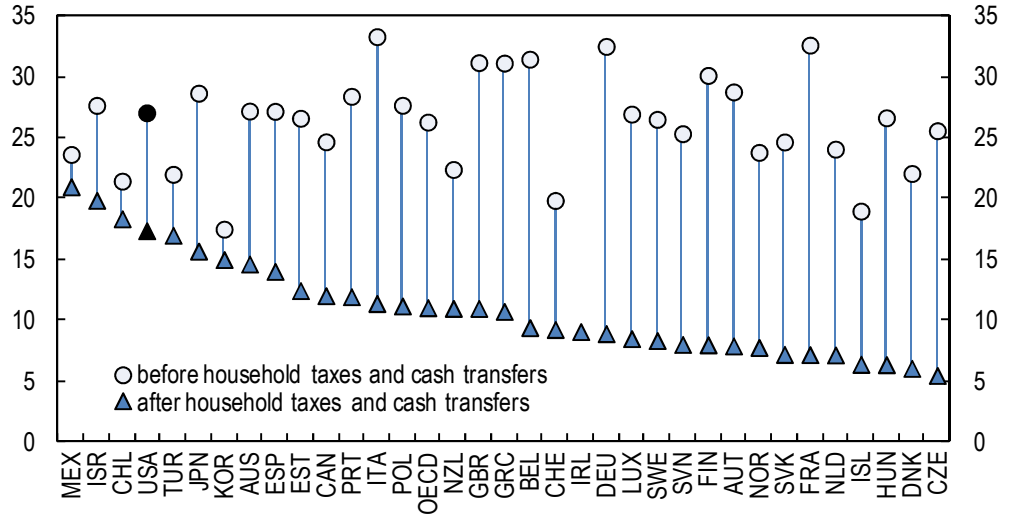
Source: OECD Secretariat calculations using OECD, Household Income Distribution and Poverty database, December 2012.

The United States has a long-established strategy of poverty reduction, comprising a variety of programmes that reduce the relative poverty rate from 27% to 17% (Figure 7), although the relative poverty rate both before and after household taxes and cash transfers has increased since the mid-1970s. Annex A2 provides some details on issues in measuring poverty. This reduction is, however, smaller than

that observed in other OECD countries (Pisu, 2012). While the US relative poverty rate before household taxes and cash transfers does not differ substantially from the OECD average, its value after household taxes and cash transfers is among the highest in the OECD, apart from Mexico, Israel and Chile. It is important to bear in mind that, while cash transfers in Figure 7 include the refundable tax credits in the United States, the impact of in-kind transfers (*e.g.* Medicaid), which are important to poverty reduction there, is not taken into account.

Figure 7. Relative poverty rate, late 2000s

In percentage



Note: The relative poverty rate is defined as the share of individuals with equivalised disposable income of less than 50% of the median income of the total population.

Source: OECD, Household Income Distribution and Poverty database, December 2012.

High income inequality in the United States is associated with low intergenerational social mobility (ISM). ISM pertains to the movement of children (as adults) up and down the income distribution relative to their parents. Research (Bengali and Daly, 2013) shows that when the population is divided in fifths, the middle three quintiles are fairly mobile. For this middle group, where one is born in the distribution does not determine where one will end up. However, for those born in the bottom or top quintile, mobility is more constricted. This result holds to a large degree by construction as individuals in the bottom quintile cannot move down and in the top quintile cannot move up, yet it is suggestive that birth circumstances play more of a role in lifetime outcomes for people at both ends of the income distribution. Compared to other OECD countries, the United States is characterised by both higher income inequality and lower ISM (Corak, 2006; Krueger, 2012), despite Americans' perception (inferred from public opinion surveys) that they have been living in a relatively mobile society (Alesina *et al.*, 2004). Long and Ferrie (2013) present evidence that ISM in the United States has experienced a long-term decline from its 19th century levels.

Besides (in a cross-country context) being associated with low intergenerational social mobility, the high degree of US income inequality implies a number of other potentially undesirable consequences. Some have identified income inequality as one of the factors contributing to the financial crisis since it may have encouraged subprime borrowing by households who tried to make up for their lack of income (*e.g.* Rajan, 2010; for empirical evidence, see Bertrand and Morse, 2012). Inequality has been argued to be bad for health, education and innovation (Wilkinson and Pickett, 2009) and economic well-being (OECD, 2008). The rise in income inequality has been reflected in rising consumption inequality between 1980 and

2010 (Attanasio *et al.*, 2012). Impoverishment of some parts of the population may also result in support for anti-market and protectionist measures, while excessive concentration of wealth on a small group could lead to their having disproportionate political influence. In addition, there is no consensus that reducing inequality is harmful to economic growth (OECD, 2012).

The next section outlines recommendations that could lower income inequality without having a harmful impact on economic growth. One specific measure that the Administration has recently proposed with the objective to pursue more inclusive growth is to raise the federal minimum wage from the current USD 7.25 to USD 9 (White House, 2013), which exceeds the minimum wage applying in most US states. Such an increase in the minimum wage would tend to narrow inequality of market income among households earning market income, but this positive impact may be offset by lower employment (Koske *et al.*, 2012), especially in the currently weak employment environment.

3. Public policies for inclusive growth

3.1. Reforms to the education system

The US education system is less effective than those of other countries in helping children realise their potential, as illustrated by a much greater impact of the socioeconomic background on education achievement (OECD, 2009). To reduce this impact, more resources need to be directed towards disadvantaged students. Currently, the United States is one of only three OECD countries that on average spend less on students from disadvantaged backgrounds than on other students (OECD, 2011b). Moreover, the most able teachers rarely work in disadvantaged schools in the United States, the opposite of what occurs in countries with high-performing education systems (OECD, 2011b). These resource allocations reinforce the disadvantages of social segregation, which results in children in poorer schools having lower educational expectations and outcomes.

The key to redirecting resources towards students in most need is to replace the local-property tax system of financing schools by state-level financing where this is not already so. Canada had similar arrangements but reformed them by moving school funding to the provincial level. This contributed to Canada now having one of the smallest influences of socioeconomic background on achievement and a high average level of achievement. While desirable, such a reform would likely be difficult for many states to implement owing to fierce opposition from residents of affluent localities.

Some of the measures in the Administration's Race to the Top (RTT) programme, launched in 2010, would also help reduce the impact of socioeconomic background on outcomes. In particular, RTT encourages states to implement reforms to turn around the lowest-performing schools and improve their programmes of early learning and care (White House, 2012b). Other aspects of the programme aim to improve education achievement in general, which would likely benefit disadvantaged students disproportionately. They include: *i)* adopting internationally-benchmarked state-developed standards and assessments that prepare students for success in college and the workplace; *ii)* recruiting, developing, rewarding, and retaining effective teachers and principals; and *iii)* building data systems that measure student success and inform teachers and principals how they can improve their practices (White House, 2012b; Office of Management and Budget, 2012).

Particular benefits would arise from upgrading the teaching profession, both by raising its low pay relative to that for other professions with similar qualification levels to attract more able candidates – for example, a US high school teacher with 15 years of experience can expect to receive only 65% of the earnings of a tertiary-educated individual working in another profession, a proportion substantially below the 85% observed, on average, in other OECD countries (OECD, 2011c) – and by developing teachers' skills to identify students with learning difficulties and propose pedagogical solutions for them. Persuasive research (*e.g.* Chetty *et al.*, 2011) has shown that good teachers significantly raise adult earnings,

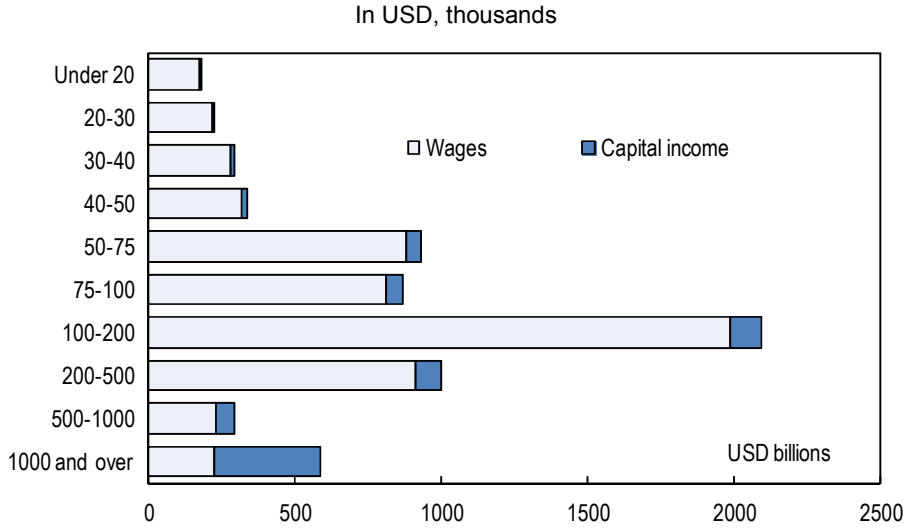
suggesting that they have a large impact on students' skills, including of those from disadvantaged backgrounds.

3.2. Reforms to the tax system

While income redistribution has also a role to play, as Figure 6 has shown the tax-and-transfer system reduces income inequality by less in the United States than other OECD countries. Federal taxes on personal incomes reduce inequality significantly, reflecting average tax rates rising with household income (CBO, 2012a). In 2013, the progressivity of the tax system has been further reinforced by the American Taxpayer Relief Act (ATRA), which increased the top marginal income tax rate from 35% to 39.6%. The ATRA also raised the top marginal tax rates on long-term capital gains and dividends from 15% to 20%, although capital income continues to be taxed at a lower rate than labour income, a feature of the tax system that especially benefits the more wealthy for whom capital income constitutes a significant source of earnings.

There are good reasons for personal income tax rates on capital income to be lower than on labour income, including the attenuation of the effects of double taxation of corporate income. Nevertheless, while taxation of capital income often implies a trade-off between income redistribution and economic growth, there are avenues to reform that are compatible with both objectives. Empirical research (*e.g.* Feldstein, 1995; Gruber and Saez, 2002) shows that wealthy households respond significantly to high marginal tax rates by reorganising their affairs to optimize the use of benefits existing in the tax system. Broadening the tax base by closing loopholes in the current tax code therefore has the potential to raise both efficiency and equity. This is particularly the case for the taxation of capital income, which is highly concentrated among wealthy households and represents a significant fraction of their total income (Figure 8).

Figure 8. Composition of personal income by pre-tax income category[1,2,3], 2011



1. Capital income consists of capital gains, dividend income and interest income.
2. The income concept used to place tax returns into income categories is adjusted gross income plus: [1] tax-exempt interest, [2] employer contributions for health plans and life insurance, [3] employer share of FICA tax, [4] workers' compensation, [5] non-taxable Social Security benefits, [6] insurance value of Medicare benefits, [7] alternative minimum tax preference items, and [8] excluded income of US citizens living abroad. Categories are measured at 2011 levels.
3. Includes non-filers, excludes dependent filers and returns with negative income.

Source: Joint Committee on Taxation (2011).

The unequal tax treatment of income from different asset classes (Table 1) undermines revenue collection, and therefore the effectiveness of the capital income tax as a redistribution instrument; at the same time it distorts the allocation of capital. Aligning effective tax rates on both debt- and equity-financed corporate investment and owner- and tenant-occupied housing investment would hence reduce avoidance opportunities for the wealthy and improve the efficiency of investment. Several options could be considered to achieve this, in the case of corporate investment ideally by making the opportunity cost to equity investments deductible (equivalent to interest deductibility for debt investments), while raising the corporate income and/or capital income taxes at the personal level. An alternative – though less desirable option – is to phase out interest deductibility and treat interest income as equivalent to dividend income and capital gains. A bipartisan initiative in this direction was promoted by members of the House of Representatives Ways and Means Committee in spring 2013. The returns to owner-occupied housing (imputed rents and capital gains) should ideally be subject to the same tax rates as income from corporate investment, while maintaining mortgage interest deductibility. Given the political and practical difficulties of taxing imputed rents experienced in many OECD countries, a more realistic reform approach would aim to phase out or reduce the cap on mortgage interest deductibility for owner-occupied housing. Such action would reduce the current tax discrimination of tenant-occupied housing, which puts at a disadvantage tenants, even though they tend to have lower incomes than owner-occupiers.

Table 1. Effective tax rates on the real income from different asset classes, 2012

Corporate investment:	
Debt-financed	-6.4%
Equity-financed	36.1%
Housing investment:	
Owner-occupied	-5.1%
Tenant-occupied	18.2%

Note: The effective tax rates account for federal but not state and local taxes and are hence somewhat lower than the actual effective tax rates. They are not updated to reflect the measures in the 2012 American Taxpayer Relief Act.

Source: CBO (2005a).

Raising the taxation of capital income would be conducive to equity, but it is likely to reduce efficiency. For example, the 2012 proposal by the Administration to raise the tax rate on dividend income from 15% to 45% (39.6% combined with other provisions) would significantly increase the effective tax rate on equity income. As equity income is highly concentrated among the rich, this measure would lower inequality, but it would also amplify the existing disadvantageous tax treatment of equity-financed corporate investment compared to other investments. It would thus likely give rise to an increase in the distortions to the allocation of capital, while not reducing income inequality very much as it would encourage further shifting of income toward less-taxed asset classes. Overall, CBO (2012b) finds that the various tax proposals contained in the Administration's FY 2013 budget would increase the marginal tax rate on capital income, with a likely negative impact on the capital stock. According to Piketty and Saez (2012), the level of capital taxation in the United States exceeded its optimal level already prior to the tax increases as part of the ATRA.

Numerical simulations (see Annex A3) based on a standard dynamic (life-cycle) general equilibrium model calibrated to the US economy show that an increase in the progressivity of the taxation of capital

income and wealth reduces the incomes of US households across the income distribution. Such a reform can thus, while lowering income inequality, make the majority of the population less well off. The intuition for the result arises from the empirical observations that capital is very unequally distributed (*e.g.* CBO, 2012a) and that rates of return tend to be larger for high than low earners (*e.g.* Campanale, 2007). Thus, increasing the progressivity of capital taxes adds to the overall inefficiency of the tax system. The general equilibrium nature of the model means that the lower capital stock that results from the higher inefficiency reduces the productivity of workers, including those at the low end of the income distribution. According to the model, a stylised reform that aligns the progressivity of the capital income tax with the progressivity of the taxation of labour income would permanently lower households' income by about 1%.

A more growth-friendly approach to reduce income inequality would be to focus reform efforts on other provisions in the personal income tax system that favour households at the upper end of the income distribution. Some tax expenditures are justifiable on economic grounds, but several are not. For example, tax breaks to encourage the accumulation of individual private pensions could in principle be desirable, but in practice they frequently lead to a re-allocation of existing savings to retirement accounts and primarily benefit high earners (Toder *et al.*, 2009). Such tax expenditures should therefore either be phased out or progressively more tightly capped, for instance by adopting a limit of 28% on the marginal income tax rate at which deductions (such as for owner-occupiers' mortgage interest payments) and exclusions (such as for employer-provided health insurance cover) may be permitted, as proposed by the Administration, which would be good for both efficiency and equity, as well as reducing the deficit. So-called carried interest in private investment funds is now taxed at the low capital income tax rate, but arguably should be taxed at the higher rate on labour income, although such a change would raise very little revenue (CBO, 2011b; Viard, 2008). On the administrative side, policies to improve tax compliance are likely to bear particularly on those with the highest incomes.

US revenues from the taxation of wealth transfers, *i.e.* gifts, estates and inheritances, have over the past decade continuously fallen and are now below the OECD average. The United States taxes estates (levied on the donor) rather than inheritances (levied on the recipient). The estate tax is highly progressive relative to income; the top 10% of income earners pay virtually all of the tax and over half is paid by the richest 0.1% (Tax Policy Center, 2008). Its design nonetheless provides for avoidance opportunities by the wealthy. For example, capital gains on bequeathed assets are tax-exempt. They should be taxed to avoid undermining the effectiveness of the gift and estate tax and providing undue incentives for old individuals to hold their capital until they die. Citizens also make use of trusts to avoid the estate tax, although wealth transfers to trusts incur gift duties beyond a certain level.

Most OECD countries, in contrast to the United States, tax inheritances rather than estates, and the past several decades have seen a shift away from estate taxes, as for example in Ireland. From the perspective of intergenerational social mobility and equality of opportunity, taxing inheritances is preferable to taxing estates since what matters is how much a person receives from others, not how much a person leaves to others, and taxing inheritances would reduce income inequality if implemented in a revenue-neutral way (Batchelder, 2008).

The design of the tax-and-transfer system can influence income inequality not only directly through taxes and transfers but also indirectly through its impact on the distribution of market incomes. For instance, the corporate income tax in principle subjects foreign subsidiaries of US-based multinationals to taxes on their overseas income. But many corporations reinvest, rather than repatriate, a significant portion of their income overseas, as often they do not need to pay taxes in the United States on that income until it is repatriated. Reducing the tax discrimination of domestic investment, for example through channels laid out in *The President's Framework for Business Tax Reform* (White House, 2012a), would lower incentives to move productions overseas and raise those to bring production back to the United States. By making domestic capital accumulation more attractive, such a reform has the potential of creating employment as

well as raising productivity and hence wages of workers in the United States, in turn impacting the income distribution.

3.3. Reforms to the transfer system

The government runs a multitude of transfer programmes with the objective of reducing income inequality and poverty. These can be grouped into *social insurance* (old-age and survivors' insurance, Medicare, unemployment insurance, disability insurance, workers' compensation), *means-tested cash transfers* (Earned Income Tax Credit, Supplemental Security Income, Temporary Assistance for Needy Families) and *means-tested in-kind transfers* (Medicaid, Supplemental Nutrition Assistance Program, housing assistance, Head Start Program, Supplemental Nutrition Program for Women, Infants and Children, school food programmes). While the cash transfer programmes significantly reduce poverty (*e.g.* White House, 2012b; Ziliak, 2011), they do so less than in other OECD countries. Accounting for in-kind transfers further reduces poverty, and potentially more so than in other countries given the targeting of Medicaid to low-income individuals.

To combat poverty, the government should restore the inequality-reducing power of the transfer system that has been lost over time (CBO, 2011a). Ben-Shalom *et al.* (2012) find that the safety net has increasingly tilted towards the disabled and elderly and away from the "deep-poor". An increased focus on those with low income levels, rather than on specific demographic groups, would help ensure that the truly needy are reached. As well, simplifying the myriad of means-tested programmes, of which there are currently 82 distinct major ones at the federal level alone (Haskins, 2011), would lower administrative costs and increase take-up, which is often low, reflecting the difficulty of understanding eligibility requirements (Currie, 2006). It would also reduce the scope for fraud and, if implemented smartly, improve work incentives. The United Kingdom, for instance, is in the process of introducing a thoroughgoing welfare reform; it involves combining the UK equivalent of housing assistance, Earned Income Tax Credit, Child Tax Credit, unemployment insurance and other welfare programmes into a universal credit (UK Department for Work and Pensions, 2010), with the reform broadly judged as likely to be positive (OECD, 2013; Institute for Fiscal Studies, 2011).

The United States is unique among OECD countries in relying on in-kind transfers for food and nutrition rather than simple cash transfers. While on the one hand some of these programmes have been shown to reduce poverty (*e.g.* Tiehen *et al.*, 2012), on the other they can restrict the recipient's choice in using the funds for other purposes and are an administratively expensive way of providing benefits.

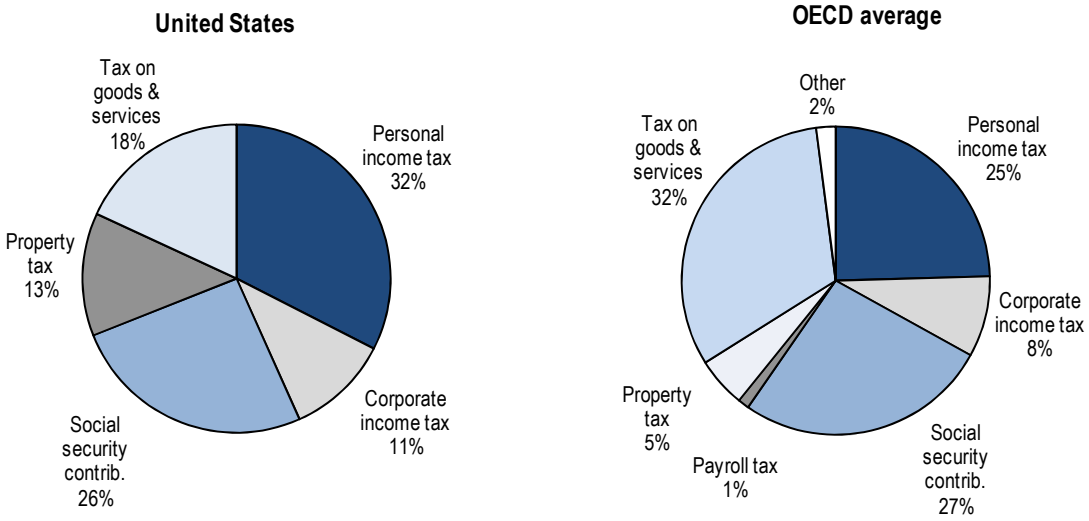
4. In-depth focus: the contribution of the tax system to reducing income inequality and poverty

The structure of the US tax system is distinct from that in the average OECD country in two ways. First, the mix of taxes in overall revenue differs (Figure 9, Panel A). The United States depends relatively more on income taxes, notably on personal income, and on property taxes, while taxes on goods and services account for a substantially smaller share of overall revenue. Although state and local governments rely heavily on retail sales taxes, the United States is the only OECD country without a general indirect tax on goods and services at the central government level. A second distinction is the higher proportion of general government revenue that accrues to state and local governments than elsewhere, reflecting the federal structure of government in the United States (Figure 9, Panel B).

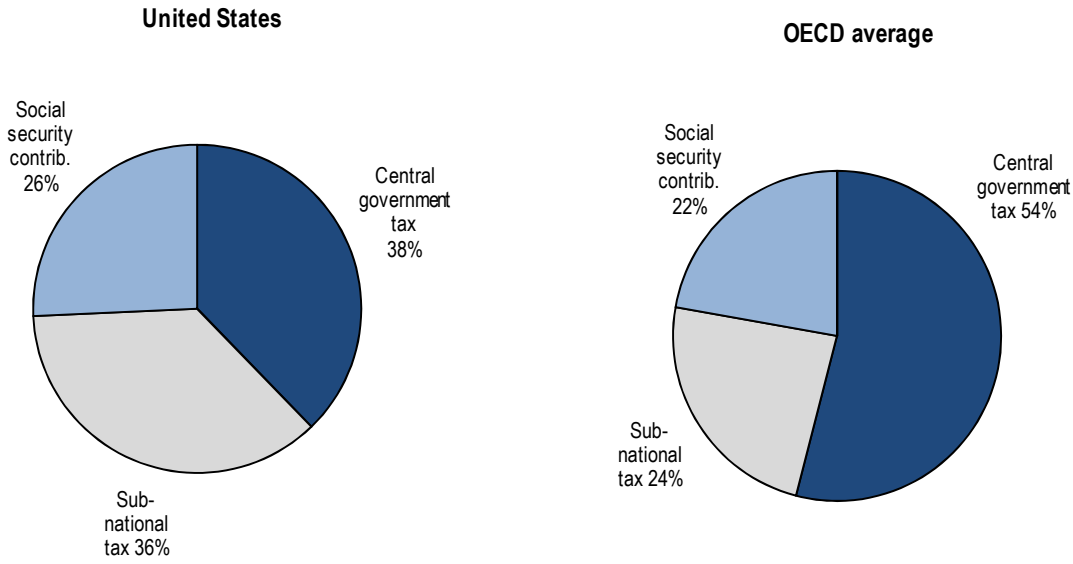
Figure 9. Tax structure: United States and OECD average, 2010

In percentage of total revenue

A. Composition according to tax category



B. Composition according to government level



Source: OECD, Revenue Statistics database.

4.1. Progressivity of the tax system

Taxation in the United States is quite progressive. Most of the tax progressivity is obtained through federal and, to a lesser extent, state-level personal income taxes, complemented by estate taxes. At the federal level, the average effective tax rate (comprising individual income taxes, social insurance, or payroll, taxes, corporate income taxes and excise taxes) on market income rises continuously across the distribution, from 1% for the lowest quintile to 29% for the top 1% (Figure 10, Panel A). The rising effective tax rate reflects the statutory progressivity of the federal income tax (including the effects of allowable tax expenditures), with marginal tax rates ranging from 10% to 35% (as of 2009) on most sources of income. Given the high concentration of income among taxpayers at the upper end of the income distribution, the top quintile paid just under 70% of total federal taxes in 2009, and 22% were paid by taxpayers in the top 1% (Figure 10, Panel B).

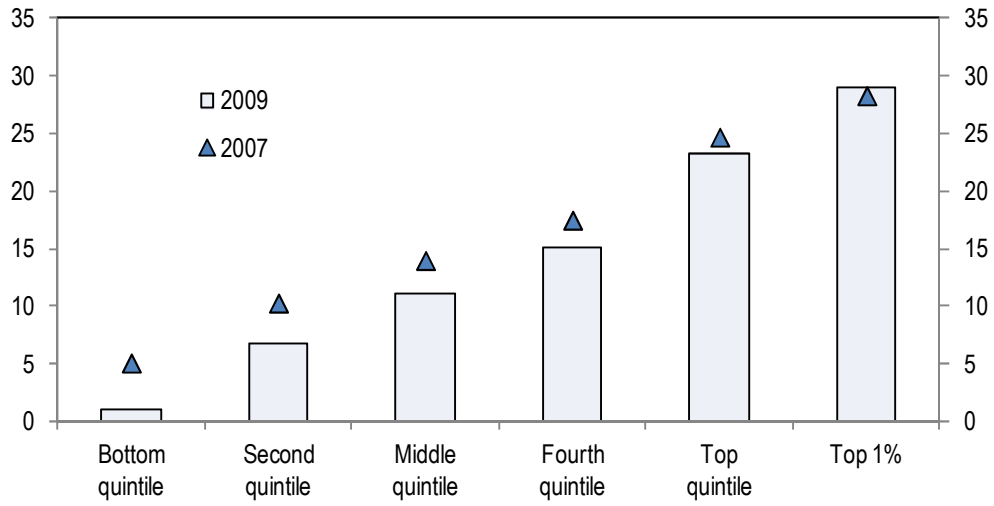
Measures adopted in the context of the 2010 health care reform (the Patient Protection and Affordable Care Act, henceforth ACA) contributed to increasing the progressivity of taxation. The ACA extended the Medicare tax to income from capital for taxpayers with taxable income above USD 250 000 (USD 200 000 for single taxpayers), and imposed a 0.9 percentage point surtax on the same taxpayers, bringing the total Medicare tax rate to 3.8% for high-income taxpayers.[5] The 2009 American Recovery and Reinvestment Act (ARRA) temporarily raised the progressivity also at the lower end of the income distribution through increasing the threshold above which the phase-out of the EITC starts, and through expanding refundable tax credits for families with children (in particular the Child Tax Credit and an education tax credit, the American Opportunity Tax Credit). The 2012 ATRA extended these provisions through 2017. In addition, the ATRA further reinforced the progressivity of the tax system by increasing the top marginal income tax rate from 35% to 39.6%, and also by raising the top marginal tax rates on long-term capital gains and dividends from 15% to 20%.

5. The extent to which the Medicare tax is progressive depends importantly on the stream of benefits eventually "purchased" by contributions during working years. Given that medical care needs do not rise in step with increases in lifetime income, the Medicare tax is likely to be very progressive.

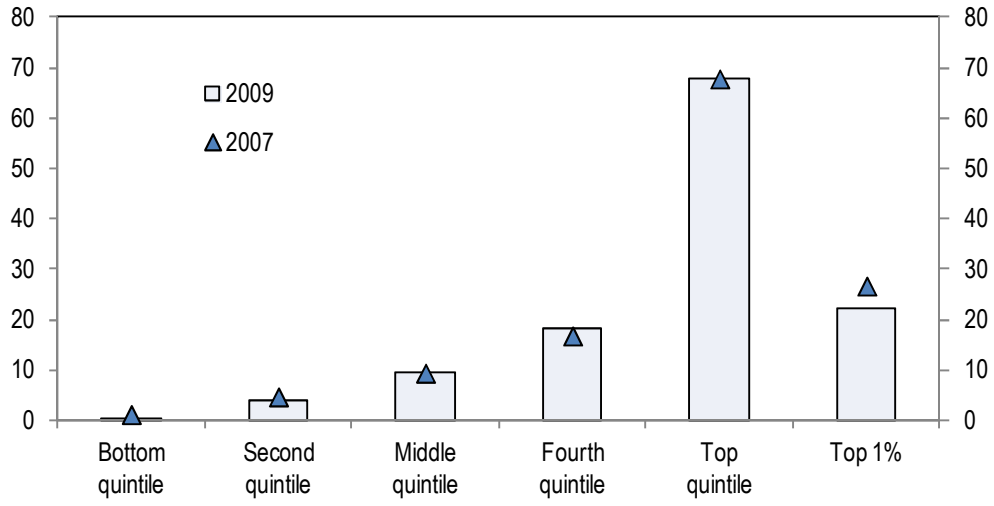
Figure 10. Progressivity of federal taxes

In percentage

A. Average effective federal tax rate



B. Average share in all federal taxes



Note: Effective tax rates are calculated by dividing federal taxes paid by comprehensive household income. Federal taxes comprise individual income taxes, social insurance, or payroll, taxes, corporate income taxes and excise taxes. Comprehensive household income equals pre-tax cash income plus income from other sources. Pre-tax cash income is the sum of wages, salaries, self-employment income, rents, taxable and non-taxable interest, dividends, realised capital gains, cash transfer payments, retirement benefits plus taxes paid by businesses (corporate income taxes and the employer's share of Social Security, Medicare and federal unemployment insurance payroll taxes) and the employee's contributions to 401(k) retirement plans. Other sources of income include all in-kind benefits (Medicare and Medicaid benefits, employer-paid health insurance premiums, food stamps, school lunches and breakfasts, housing assistance and energy assistance).

Source: CBO (2012a).

Sub-federal taxes have an impact on the progressivity of overall taxation. With about a third of general government revenue accruing to state and local governments, the level and structure of sub-federal revenues determine whether these augment or offset some of the progressivity at the federal level. The ability of state and local governments to impose tax progressivity is limited by the need for revenue to finance local services and infrastructure (*viz.* "benefit" taxes), and by the greater elasticity of both labour and capital in view of taxpayers' potential mobility. Given the high mobility of US residents, raising progressivity at the state and local levels is limited to the extent to which residents are supportive of redistribution. At the local level, property taxation tends to be regressive insofar as equity in one's home is generally a smaller share of overall assets at higher levels of wealth, and as some forms of wealth are normally not subject to property taxation. At both local and state levels, retail sales taxes and excise taxes tend to be regressive since they make up a higher percentage of pre-tax income among lower-income households[6], although this is less the case when viewing income inequality from a lifetime perspective where people across the income distribution consume most of what they earn. Thus, progressivity at the sub-federal level is mainly achieved through income taxes, which exist in 41 (of the 50) states and the District of Columbia.

The empirical evidence on the effective degree of progressivity of state and local taxes offers a mixed picture. Chamberlain and Prante (2007) find a moderate degree of progressivity across the first four quintiles of the income distribution, with mild regressivity setting in at the top end. By contrast, Davis *et al.* (2009) conclude that there is a considerable degree of regressivity in practice. Rather than estimate effective tax rates, Cooper *et al*. (2012) assess the extent to which federal and state taxes reduce inequality between wages at the 10th and 90th percentiles of the distribution. Regarding state taxes, they focus on the three principal ones that also exhibit the greatest inter-state variation (taxes on personal income, general sales taxes, taxes on motor fuels) and find that state-levied taxes on average mitigate wage inequality (*i.e.* reduce the estimated Gini coefficient), albeit much less than at the federal level on average. The reduction in inequality achieved by some states (Wisconsin, Oregon, Maine, Hawaii), however, is large, reaching as high as one third of the federal compression. By contrast, some states' tax systems (Wyoming, Texas, Tennessee, South Dakota, Illinois) actually widen the dispersion of wages, notably due to excise taxes on gasoline and either the absence, or non-progressivity, of income taxes.

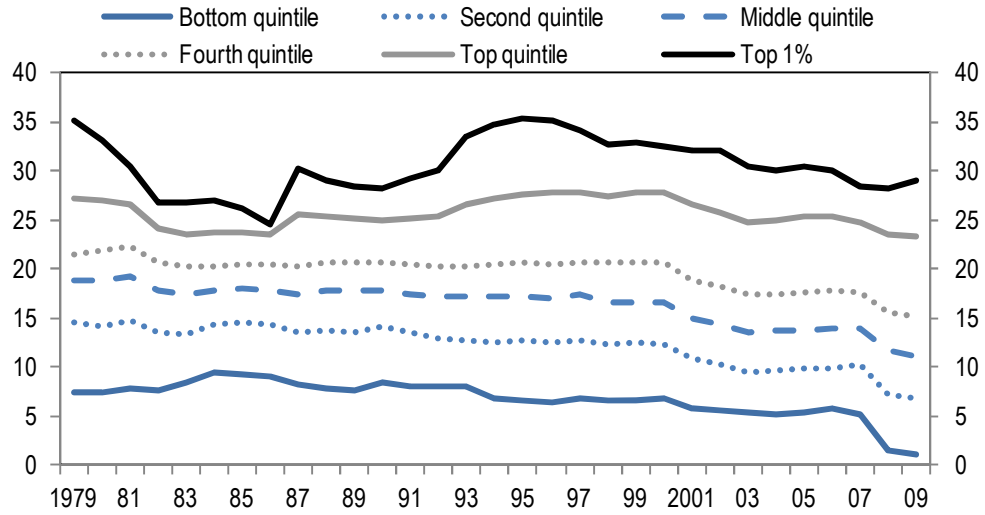
At the federal level, total effective tax rates (comprising individual income taxes, social insurance, or payroll taxes, corporate income taxes, excise taxes) have fallen during the past 30 years at all income levels (Figure 11, Panel A). The lower portions of the income distribution have experienced a considerable decline in effective federal individual income taxes (Figure 11, Panel B), as refundable tax credits expanded and became more generous. While total effective tax rates at the upper end of the income distribution fell during the 1980s with reductions in top marginal tax rates, they rose strongly during the first half of the 1990s, when the top statutory personal income tax rate increased from 28% to 39.6% and the cap on the earnings subject to the then-prevailing 2.9% Medicare tax was removed. Tax policy initiatives in 2001 and 2003 contributed to a fall in the effective federal individual income tax rate (and thus the total effective federal tax rate) at all levels of income; upper-income taxpayers benefited, for example, as the top marginal tax rate was lowered to 35% and the tax rates on long-term capital gains and dividends were reduced to 15%.

6. Exclusions for some goods (*e.g.* food and clothing) and differentiated tax rates aimed at reducing the regressivity of such taxes are generally counterproductive. They create distortions, unintentionally benefit higher-income taxpayers, and complicate tax administration and collection.

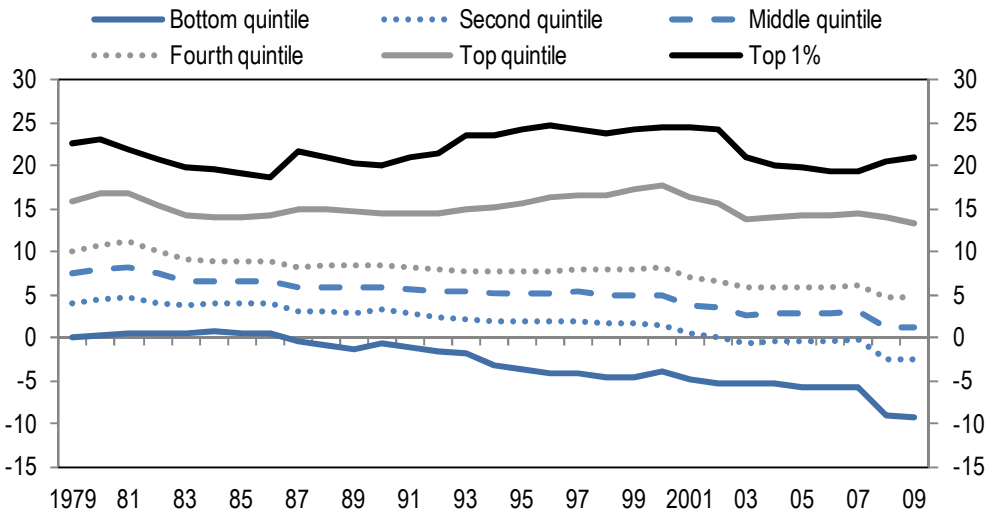
Figure 11. Average federal tax rates for different quintiles

In percentage of households' market income

A. Total average effective federal tax rate



B. Average effective individual income tax rate



Note: Effective tax rates are calculated by dividing federal taxes paid by comprehensive household income. Federal taxes comprise individual income taxes, social insurance, or payroll, taxes, corporate income taxes and excise taxes. Comprehensive household income equals pre-tax cash income plus income from other sources. Pre-tax cash income is the sum of wages, salaries, self-employment income, rents, taxable and non-taxable interest, dividends, realised capital gains, cash transfer payments, retirement benefits plus taxes paid by businesses (corporate income taxes and the employer's share of Social Security, Medicare and federal unemployment insurance payroll taxes) and the employee's contributions to 401(k) retirement plans. Other sources of income include all in-kind benefits (Medicare and Medicaid benefits, employer-paid health insurance premiums, food stamps, school lunches and breakfasts, housing assistance and energy assistance).

Source: CBO (2012a).

Effective tax rates reflect the interplay of statutory tax parameters and changes in the economic circumstances of taxpayers, making it difficult to isolate the extent to which tax policies *per se* may have impacted progressivity. During the past several decades, numerous changes have been made to elements of the federal tax code, including the marginal personal income tax rates and rate bracket thresholds, levels of exemptions and allowable deductions, differential treatment of some sources of income (such as long-term capital gains and dividends) and Social Security tax rates. Moreover, the distribution and composition of income has changed over time, especially among high-income persons, for whom labour and business income (excluding capital gains) has risen as a share of market income (CBO, 2011a).

One way of isolating the extent to which statutory tax policy changes have impacted effective tax rates at different income levels is to simulate tax liabilities holding the distribution of income constant but applying the tax parameters in place in each year over time. Council of Economic Advisors (henceforth CEA, 2012) studies for the period 1960-2010 how different taxpayers would have fared had historical tax rates applied to the current distribution of income. The exercise demonstrates that the taxpayers with the highest real incomes today (the top 1% and 0.1% of the income distribution) have seen their effective tax rates decline substantially, in contrast to broadly unchanged effective rates for taxpayers in the middle of the income distribution. Bargain *et al.* (2011) find that during the period 1978-2009 tax reforms implemented under Democrat administrations had an equalizing effect for the lower half of the distribution, but because of the disequalizing effects of Republican reforms (in the form of tax cuts for high-income families) overall policy effects almost cancel out.

The US Internal Revenue Service regularly publishes information on the sources of income and tax liabilities of the top 400 taxpayers. Reflecting *i)* the lowering of the top marginal tax rate, *ii)* the predominance of dividends and long-term capital gains (both subject to the reduced top federal tax rate of 15% in 2009) in taxable income, and *iii)* the use of a host of legislated deductions and exclusions, the average effective tax rate at the very highest levels of income declined from 26.4% in 1992 to 19.9% in 2009 (Table 2; Internal Revenue Service, 2012). It is important to note that to the extent that corporate level taxes will have already been paid by taxpayers heavily dependent on income from capital, the values shown in Table 2 understate the actual effective tax rates.

Table 2. Distribution of the top 400 adjusted gross incomes by average tax rate

Tax year	Number of top 400 taxpayers by average effective tax rate bracket							Average effective tax rate
	0-9%	10-14%	15-19%	20-24%	25-29%	30-34%	35+%	
1992	6	10	17	62	234	71	-	26.4%
1993	9	5	15	50	147	77	97	29.4%
1994	9	4	16	55	156	64	96	28.6%
1995	7	5	13	32	148	85	110	29.9%
1996	3	7	24	61	180	57	68	27.8%
1997	7	10	70	141	67	42	63	24.2%
1998	7	31	109	146	28	27	52	22.0%
1999	7	31	104	133	27	34	64	22.2%
2000	11	29	96	141	36	35	52	22.3%
2001	19	30	108	94	22	44	83	22.9%
2002	10	34	86	110	38	60	62	22.9%
2003	24	75	116	53	52	80	-	19.5%
2004	27	112	103	34	51	73	-	18.2%
2005	23	121	111	39	47	59	-	18.2%
2006	31	113	125	34	50	47	-	17.2%
2007	25	127	137	40	38	33	-	16.6%
2008	30	101	112	52	46	59	-	18.1%
2009	27	89	86	39	77	82	-	19.9%

Note: The effective tax rates do not account for the corporate income taxes paid by the taxpayers.

Source: Internal Revenue Service (2012).

Taxes on the intergenerational transfer of wealth have also played a role – albeit decreasing – in ensuring the progressivity of federal taxes. The federal government's principal wealth transfer tax is the estate tax, but it is complemented by gift taxes and generation-skipping transfer taxes to limit the transfer of wealth before death to avoid taxation. The United States is exceptional in that most advanced OECD countries rely on inheritance rather than estate taxes (Box 3). One key feature of the estate tax that weakens its progressivity is the step-up in the basis of assets upon transfer, so that the capital gains of the decedent remain untaxed.[7] In addition, taxpayers can use trusts to limit or avoid estate taxation, although wealth transfers to trusts are subject to gift taxation beyond a certain threshold.

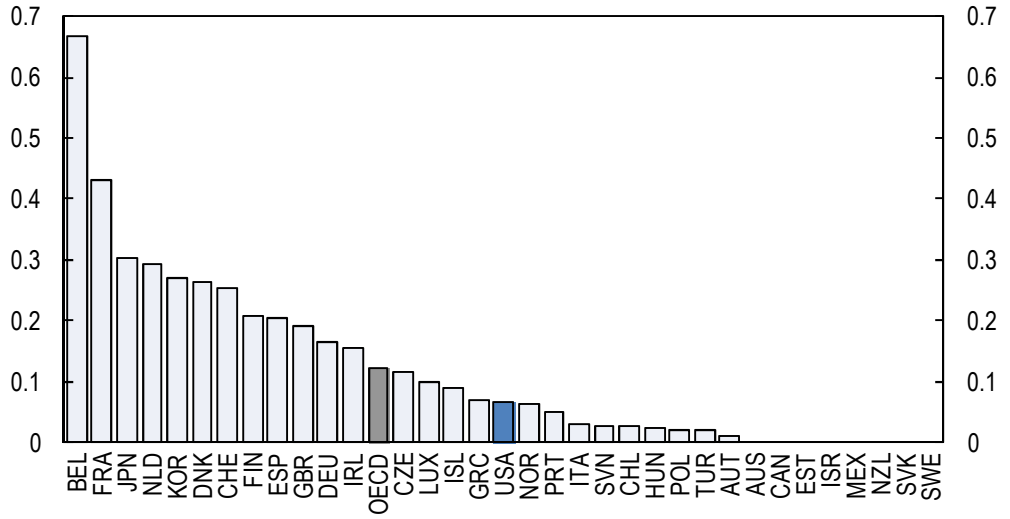
7. Under the estate tax, capital gains on the appreciated value of assets in the estate are not subject to income taxation when the owner dies. Under the stepped-up basis on inherited assets, the "cost" basis of the assets to heirs is the market value at the time of the bequest, not the original price paid by the decedent. Capital gains tax will only be due upon sale of the asset by the heir, and only on the increased value over the value at the time of inheritance.

Box 3. Cross-country differences in the taxation of wealth transfers

Wealth transfer taxation includes the taxation of gifts (or *inter vivos* transfers), estates and inheritances. Inheritance taxation differs from estate taxation in that the tax rate depends on the amount the recipient inherits rather than the donor bequeaths. Eight OECD countries (Australia, Canada, Estonia, Israel, Mexico, New Zealand, the Slovak Republic, Sweden) do not tax wealth transfers of any kind. In countries that tax wealth transfers, the revenues are rather low; the OECD average is 0.12% of GDP and the maximum 0.67% in Belgium (Figure 12). While revenues from wealth transfer taxation have stayed fairly stable over the past three decades in the OECD as a whole, they have trended downward in the United States and in 2011 have been below the OECD average.

Figure 12. Tax revenue from gifts, estates and inheritances in cross-country comparison, 2011

In percentage of GDP



Note: Data for Australia, Greece, Mexico, the Netherlands and Portugal refer to 2010.

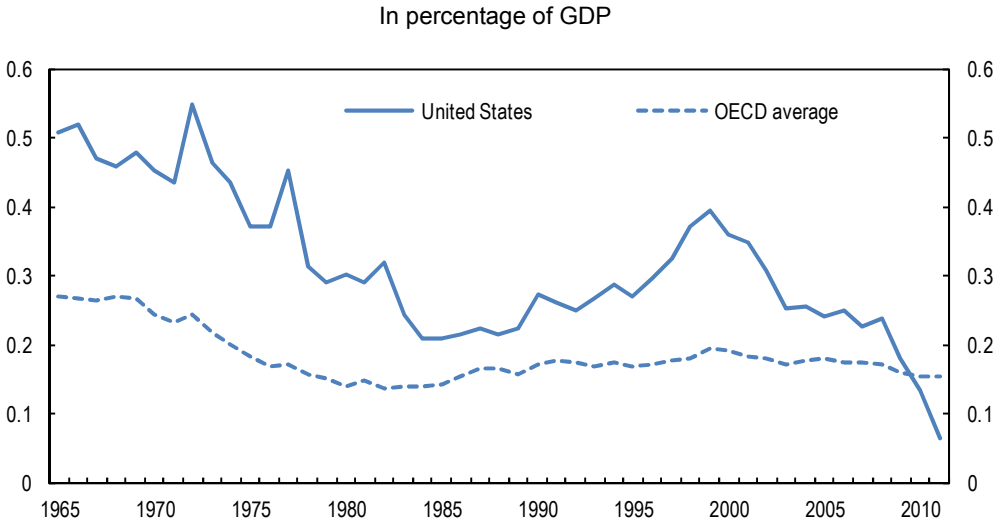
Source: OECD, Revenue Statistics database.

Inheritance taxes take three principal forms (Tax Policy Center, 2008). Accession taxes apply to the amount an individual receives in bequests or gifts over her lifetime. Annual inheritance taxes apply to the gifts and bequests a person receives in a given year. Inclusion taxes count gifts and bequests as income and tax them under the income tax; thus, the tax rate depends on both the size of the gift or bequest and the recipient's other income.

Most advanced countries use inheritance rather than estate taxes. Of 34 industrialised (mostly OECD) countries surveyed in Batchelder (2008), more than half have an annual inheritance tax; a few use accession and inclusion taxes. Only four of the countries have estate taxes, among them the United States. The past several decades have seen a shift away from estate taxes: Australia, Canada and New Zealand repealed their estate tax, and Ireland replaced its estate tax with an inheritance tax.

The estate tax is highly progressive relative to income; the top 10% of income earners pay virtually all of the tax; over half is paid by the richest 0.1% (Tax Policy Center, 2008). At the same time, the combined revenue from wealth transfer taxes accounts for a relatively small share of federal revenue, historically ranging between 1-2%, but it has been significantly less in more recent years. The past half-century has seen a trend decline in revenue (as a percent of GDP) from wealth transfer taxes in the United States, a trend that has been more pronounced than generally elsewhere in the OECD (Figure 13). Piketty and Saez (2007) find that declines in the federal estate tax (and in the corporate income tax) played a greater role in lowering overall progressivity than changes in the individual income tax. US revenue from wealth transfer taxes is now lower than in many countries of the European Union, for example.

Figure 13. Tax revenue from gifts, estates and inheritances over time



Note: OECD average excludes Chile, the Czech Republic, Estonia, Hungary, Iceland, Israel, Korea, Mexico, Poland, the Slovak Republic and Slovenia. 2011 data are from 2010 for Australia, Greece, the Netherlands and Portugal.

Source: OECD, Revenue Statistics database.

The falling revenue from wealth transfer taxes during the past 15 years is largely attributable to significant changes to estate taxes. The Taxpayer Relief Act (TRA) of 1997 initiated reductions in wealth transfer taxes, including through increases in the exempt amount from USD 600 000 to USD 1 million and in the exempt amounts for gifts and generational-skipping taxes. The Economic Growth and Tax Relief Reconciliation Act (EGTRRA) of 2001 accelerated the phase-in of the TRA's provisions, raising the exempt amount from USD 1 million to USD 3.5 million, with a top marginal tax rate of 45%. The estate tax was suspended in 2010 before being reinstated in 2011, with an exempt amount of USD 5 million and a top marginal rate of 35%. The ATRA from 2012, which applies as of 2013, retained the exempt amount of USD 5 million, while increasing the top marginal rate to 40%.

4.2. Tax expenditures

Despite the overall progressivity of the US federal tax system, a number of features undermine both its equity and efficiency. The federal income tax code is particularly replete with tax expenditures that modulate taxpayers' economic choices, but that also result in lower effective tax rates than implied by statutory rates and brackets. In few OECD countries is the scope of tax expenditures as great as in the United States. Congressional Research Service (2008) estimates that there were 247 tax expenditures affecting personal and corporate taxes in 2008, with a value of USD 1.2 trillion, 90% of which pertained to personal income taxation. Many favour higher-income taxpayers the most by virtue of their design (*i.e.* deductions) and the statutory progressivity of the tax rate schedule. A steeply graduated income tax schedule, whose aim is to impart progressivity of taxation, increases the value of deductions and hence may boost both the use of existing tax expenditures and the demand for new ones.

Not all items commonly classified as tax expenditures in the United States are undesirable, as some improve efficiency and equity. Several, however, are poorly designed, contribute to a lack of transparency and are not well-targeted, including when they disproportionately benefit upper-income taxpayers. While determining the distributional impact of classified tax expenditures is not without its complications, recent estimates indicate that they primarily benefit high earners. Elimination of a tax expenditure will, in the first instance, reduce the after-tax income of the affected taxpayer. However, behavioural responses by the taxpayer can avoid some or all of the effect, or the increased burden can be shifted to others. The distributional impact depends, in addition, on the uses to which the revenue gains from the elimination of the tax preference are put.

Abstracting from the offsets that would follow from the behavioural responses and the uses to which the revenue gain would be put, the elimination of all classified tax expenditures would have reduced after-tax incomes on average by 12.3% in 2011 (Table 3; Toder and Baneman, 2012). Reflecting the substantially larger benefit to high- than low-income taxpayers, the hypothetical drop in after-tax incomes generally increases across the distribution of taxpayers, but for a drop between the second and third quintiles. The latter is due to the fact that taxpayers in the second quintile receive a large share of their income in the Child Tax Credit and the Earned Income Tax Credit. Given the higher share of capital gains and dividends in the incomes of taxpayers in the top 1%, these taxpayers benefit the most, in absolute and relative terms, from the reduced rates on long-term capital gains and dividends in the individual income tax. Elimination of all classified tax expenditures, without giving the money back to taxpayers, would thus raise progressivity. Similarly, a policy returning the revenue gains as a constant proportion of income would increase the progressivity of the tax system, since taxpayers in the top income groups would receive a larger share of tax increase from eliminating tax expenditures than their shares of pre-tax income. On the other hand, a reform returning the revenue gains via an equal proportional cut in marginal tax rates would reduce progressivity (Toder and Baneman, 2012).

Table 3. Distributional impacts of all classified tax expenditures

Percentage reduction in after-tax income from elimination

Cash income percentile	Total	Exclusions	Capital gains & dividends	Itemised deductions	Above-the-line deductions	Non-refundable tax credits	Refundable tax credits	Other
Bottom quintile	7.5	0.9	0.0	0.0	0.0	0.0	6.0	0.1
Second quintile	9.8	4.2	0.0	0.1	0.1	0.2	5.5	0.3
Middle quintile	8.1	4.7	0.1	0.4	0.1	0.2	2.0	0.4
Fourth quintile	8.4	4.4	0.1	1.2	0.1	0.1	1.0	0.5
80-90th percentiles	12.2	7.0	0.2	2.2	0.1	0.1	0.6	0.7
90-95th percentiles	15.0	8.9	0.4	2.8	0.1	0.1	0.2	0.8
95-99th percentiles	15.9	9.4	0.9	2.6	0.1	0.0	0.0	1.1
Top 1%	19.8	6.4	4.5	3.0	0.1	0.1	0.0	1.6
Total	12.3	6.0	0.9	1.7	0.1	0.1	1.4	0.8

Source: Toder and Baneman (2012).

Higher-income taxpayers benefit particularly from several specific tax expenditures (Toder *et al.*, 2009). Given that marginal statutory tax rates increase with taxable income, tax savings from deductions and exclusions increase disposable incomes disproportionately at the upper levels of income. Taxpayers in the top quintile are the largest beneficiaries of the tax advantages to owner-occupied housing and retirement saving, while health-related tax expenditures are of value to taxpayers across the income distribution (Table 4). Moreover, the preferential tax treatment of long-term capital gains and dividends at the individual level is of benefit mainly to taxpayers in the top 1% of the income distribution. Again, the extent to which progressivity would be altered depends on the behavioural responses and distributional pattern of the uses to which revenue gains would be put. Toder *et al.* (2009) provide illustrative scenarios of different policy options.

Table 4. Distributional impacts of the largest classified tax expenditures

Percentage reduction in after-tax income from elimination

Cash income percentile	Owner-occupied housing[1]	Health-related[2]	Retirement saving[3]
Bottom quintile	0.0	-0.7	0.0
Second quintile	-0.2	-2.1	-0.4
Middle Quintile	-0.6	-2.3	-0.8
Fourth quintile	-1.2	-2.3	-1.4
Top quintile	-1.7	-1.5	-3.2
80-90th percentiles	-2.0	-2.6	-3.2
90-95th percentiles	-2.3	-1.9	-4.2
95-99th percentiles	-2.2	-1.4	-4.1
Top 1%	-0.8	-0.3	-2.0
Top 0.1%	-0.3	-0.1	-1.4

1. Eliminates the mortgage interest and property tax deduction.
2. Eliminates the exclusion of employer-provided health insurance, the self-employed health insurance deduction and the itemised deduction for medical expenses.
3. Eliminates tax expenditures for retirement saving.

Source: Toder *et al.* (2009).

4.3. Capital taxation

Capital income is relatively more important to high- than low-income taxpayers. The taxation of income from capital, however, poses particular challenges for policymakers. First, measuring real income from the gain on the sale of assets can be difficult, such as when inflation is high and variable. Second, wealthy households respond significantly to taxes by reorganising their affairs to avoid taxes (*e.g.* Feldstein, 1995; Gruber and Saez, 2002). Third, high marginal tax rates create inefficiencies by distorting both the labour-leisure choice (*i.e.* by discouraging labour supply) and the choice between consuming now or in the future (*i.e.* by discouraging saving), with harmful effects to economic growth (Arnold *et al.,* 2011).

The United States taxes capital income differently depending on the circumstances of both investor and saver. Corporate producers are taxed at a central government statutory rate of 35% (or at an average of 39.1% including state-level corporate income tax) on gross business receipts less deductions for costs of

raw materials, employee compensation and depreciation of fixed assets. When capital acquisitions are financed through the issuance of debt, interest paid on the debt is deductible at the corporate level and taxed at the individual lender level at the taxpayer's marginal tax rate. By contrast, corporations that finance capital acquisitions through share issuance or reinvested profits may not deduct dividend payments or adjust their net income to reflect the increased value of their share. These differences result in a higher tax rate on equity-financed than debt-financed investments. As in most OECD countries, partial relief for the higher cost of equity-financed investment is provided, although differently from many countries (Box 4). In the United States, relief has been provided since 2003 via reduced tax rates of 15% (raised to 20% as of 2013) on qualified dividends and long-term capital gains at the individual level.

Other producers face different tax treatments. The net income of sole proprietors, partnerships and so-called S-corporations is taxed at the individual level at personal income tax rates. Producers of housing services face yet different treatment. Rental property is generally taxed in a similar manner to other market activities, whereby gross rent is taxed after deductions for costs (including costs of finance and depreciation). Owner-occupied housing receives a different treatment, whereby the implicit rental income of owner-occupiers is excluded, along with other costs except interest and property taxes to the extent the taxpayer itemises deduction. These different treatments result in effective tax rates that vary across many dimensions, including business organisation, method of financing and asset class. Debt-financed corporate investment and owner-occupied housing investment receive, respectively, a large tax-based subsidy (see Table 1).

Box 4. Cross-country differences in the taxation of equity-financed corporate investment

Most OECD countries, including the United States, subject the returns to equity-financed corporate investment (*i.e.* dividend income and capital gains) to taxation at two levels: first at the company level via the corporate income tax, and second at the shareholder level via the personal income tax. Belgium and Italy use an allowance for corporate equity (ACE) system, a variant of the corporate income tax that provides for a tax deduction based on the amount of corporate equity and the risk-free rate of return. Estonia and the Slovak Republic do not tax dividend income, and the Netherlands taxes a presumptive return on the shareholder's equity.

In contrast to the traditional comprehensive income tax system (which treats dividend income and capital gains in the same way as labour income), tax systems in few OECD countries disregard the cumulative taxation of equity income through corporate and personal income taxes. Most seek to reduce the tax due on the personal level, either by levying lower rates on equity income than other types of income (*e.g.* the United States) or, in the case of dividend income, by imputing at the shareholder level the amount of corporate income tax paid at the company level.

Approaches to the tax treatment of equity income vary widely across OECD countries and even within a country dividend income and capital gains are often taxed differently. Some general characteristics can, however, be identified.

Tax treatment of dividend income:

- *Classical system:* In place in the United States, as well as Denmark, Iceland, Ireland, Israel, Japan, Slovenia, Spain, Sweden, Switzerland. Dividend income is taxed at the shareholder level with no integration of corporate and personal income taxes. It may be taxed at reduced rates, as *e.g.* in the United States, or simply like labour income, as in the traditional comprehensive income tax system. Applying reduced rates on dividend income is equivalent to the partial inclusion system – in place in Finland, France, Luxembourg, Norway, Turkey – which includes only a proportion of post-tax corporate income as taxable income at the shareholder level.

- *Withholding system:* In place in Austria, the Czech Republic, Germany, Greece, Hungary, Poland, Portugal. As in the classical system, the tax base at the shareholder level is company profits after corporate income taxes. In the withholding system, in contrast to the classical system, tax is withheld by the distributing company and no further tax is payable at the shareholder level.

- *Imputation system:* In place in Australia, Canada, Chile, Korea, Mexico, New Zealand, the United Kingdom.

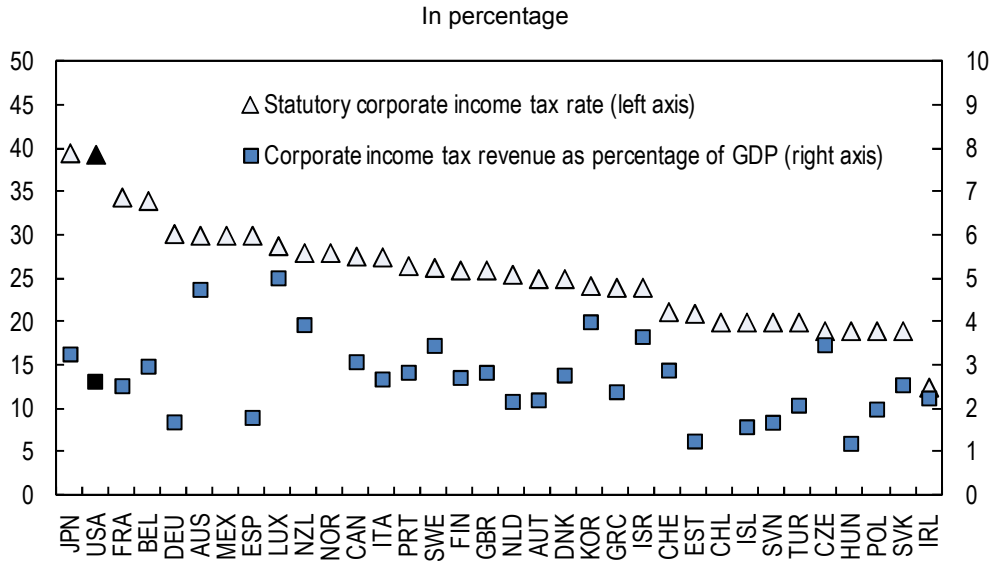
Taxable income at the shareholder level is grossed up to approximate pre-tax corporate income, and a tax credit is granted at the shareholder level which offsets either all (full imputation system) or part (partial imputation system) of the corporate income tax paid.

Tax treatment of capital gains:

- *No taxation:* Five OECD countries (Belgium, Korea, the Netherlands, New Zealand, Switzerland) do not tax capital gains on equity-financed corporate investment, independent of the holding period.
- *Calculation of the tax base:* OECD countries that tax capital gains do so upon realisation (commonly triggered by the sale of the asset) rather than accrual. Most subject the nominal amount of capital gains to taxation; only Chile, Israel and Mexico provide for an adjustment of the acquisition price to inflation. Some OECD countries, including the United States, include all capital gains in the tax base, others only part of it.
- *Tax rates:* In countries where capital gains are included with other taxable income, they are taxed at the marginal tax rate of that taxpayer. Several OECD countries, including the United States, tax capital gains separately from income from other sources. Some countries tax capital gains differently depending on the length of time for which the asset generating the capital gain was held prior to sale. For example, the United States taxes capital gains on shares held less than a year at a top rate of 39.6%, while otherwise a top rate of 20% applies.

In most OECD countries, not least the United States, the base of the corporate income tax is reduced by many tax preferences, so that companies pay less than the statutory rate. Cross-country comparisons of the relative position in the statutory corporate income tax rate and the size of the corporate income tax revenue (as a percent of GDP) can be used to gauge a country's broadness of the base of the corporate income tax. The underlying presumption is that, in the absence of tax loopholes and tax expenditures in the base of the corporate income tax, corporate income tax revenue rises with increases in the statutory corporate income tax rate. Figure 14 illustrates that there is little correlation between the statutory corporate income tax rate and the corporate income tax revenue across OECD countries. One explanation would be that OECD countries with high statutory corporate income tax rates tend to have more tax loopholes and tax expenditures in the base of their corporate income tax. A caveat to this interpretation is the endogeneity of the international location of businesses: companies may choose to locate in countries with low corporate income tax rates, which would increase revenue in low-tax countries (for evidence, see the overviews Hines, 1999; Devereux and Griffith, 2002).

Figure 14. Statutory corporate income tax rate and corporate income tax revenue, 2011



Note: The statutory corporate income tax rate is the basic combined central and sub-central (statutory) corporate income tax rate given by the adjusted central government rate plus the sub-central rate. Data for Australia, Greece, the Netherlands, Poland and Portugal refer to 2010.

Source: OECD, Revenue Statistics database.

Compared to the other OECD countries, corporate income tax revenue in the United States is below average, while the statutory rate is the second highest. This suggests that the base of the US corporate income tax is relatively narrow, in line with the assessment in White House (2012a). The alternative conclusion, namely that the statutory corporate income tax rate of nearly 40% is so high that few companies invest in the United States, is unlikely the primary explanation, although business investment (as a percent of GDP) is less than in the OECD as a whole.

The US method of relief for corporate level taxation of equity finance has implications for the progressivity of income taxes. While many OECD countries have chosen to reduce corporate income tax rates while increasing corporate-sourced income at personal levels, the United States has left the corporate rate unchanged but lowered effective taxation at the personal level through the reduced rates on long-term capital gains and dividends. The extent to which the progressivity of the tax system was reduced or not by this approach hinges on the ultimate incidence of the corporate income tax. The greater the degree to which owners of capital bear the corporate income tax (rather than workers via either higher prices or lower wages), the less regressive is the provision of relief through reduced rates on capital gains and dividends at the individual level. Altshuler *et al.* (2010) argue that if the burden of the corporate income tax is borne by both wage earners and owners of capital, substituting higher capital gains and dividend rates at the individual level for a lower corporate income tax rate would increase the progressivity of the overall income tax system.

4.4. The special case of carried interest

In the United States, the tax treatment of carried interest has long been the source of disagreement among tax experts, but has also been a source of concern about equity. While some analysts argue that carried interest should be taxed as ordinary income, others contend that this form of compensation is no different than other forms of long-term capital gains, and should therefore be taxed similarly to other long-term gains. Treated as long-term capital gains, carried interest is taxed at the top rate of 20% rather than

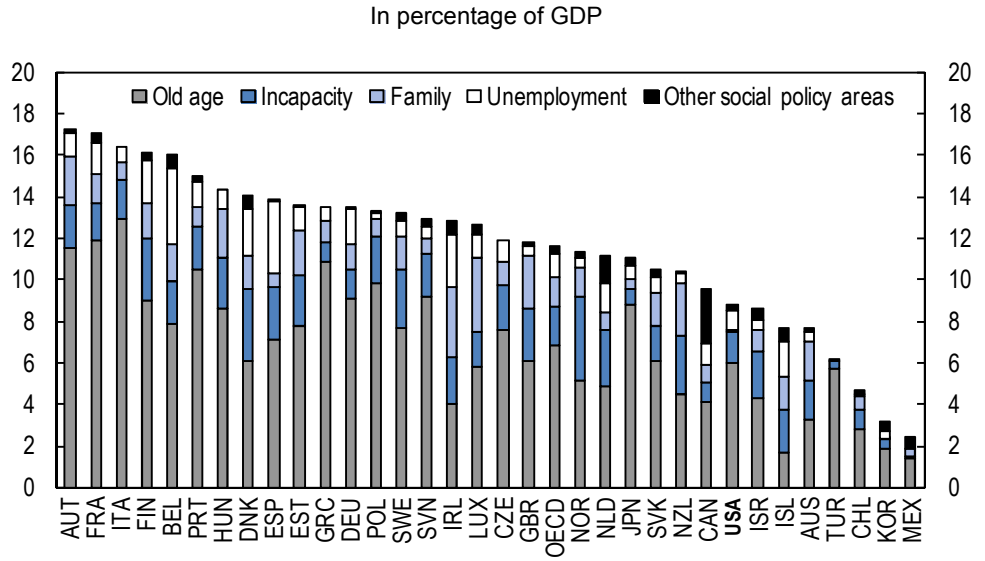
39.6%, as it would be if considered ordinary income. Since it is a form of compensation prevalent among private equity and hedge fund managers, whose compensation levels are at the very upper ends of the income distribution, the reduced tax rate is perceived by some to decrease the progressivity of the federal income tax.[8]

The basic question underpinning concerns about the taxation of carried interest relates to the portion that represents compensation for labour services as opposed to return on investment. To the extent that a portion of a general partner's income is a return on a capital that is not "at risk" (that is, capital that the general partner did not have to provide), that return could be treated as ordinary income, or a payment for labour services. However, with the exception of tax-exempt investors, a change in the general partner's income from capital gain to ordinary income would have potentially little impact on progressivity, since the payment of labour services as ordinary income would be tax-deductible (Viard, 2008). According to CBO (2011b), taxing carried interest as ordinary income would raise USD 9.7 billion in government revenue from 2012 to 2016, or annually only approximately 0.01% of GDP.

5. In-depth focus: the contribution of the transfer system to reducing income inequality and poverty

The US social safety net comprises a multitude of social insurance and means-tested transfer schemes, many of which originate at the federal level and are administered by or run in cooperation with states. State and local governments complement federal programmes independently in many areas. Haskins (2011) lists 82 means-tested programmes at the federal level alone, while stressing there being even more.[9] Altogether, US spending on cash transfers represents about 9% of GDP, less than on average in the OECD (Figure 15). Contrary to many other OECD countries, the United States has no single comprehensive cash assistance programme that applies to all persons or families below an income threshold.

Figure 15. Size and composition of cash transfers, 2009



Source: OECD, Social Expenditure database.

8. Orszag (2007) reported an estimate that the top 25 hedge fund managers collectively earned USD 14 billion in 2006, among whom one earned more than USD 1.5 billion.

9. The 82 programmes are in the areas: health (11), cash (5), food and nutrition (10), housing and development (17), education (17), social services (14), energy assistance (2), and employment and training (6).

5.1. Main social transfers

Among the various programmes, some are very large in terms of caseloads and spending, while others are much smaller. In declining order of government spending, the principal programmes are: Social Security old age and survivors' insurance; Medicare; Medicaid and the Children's Health Insurance Program; unemployment insurance; Social Security disability insurance; Supplemental Nutrition Assistance Program (also known as food stamps); Earned Income Tax Credit; Supplemental Security Income; public and assisted housing; Temporary Assistance for Needy Families; and Workers' Compensation. A variety of other food supplement and housing assistance programmes are also available. The following paragraphs provide a brief description of the different programmes.

Social Security benefits are part of the social insurance programmes financed by enrolees' contributions and provide universal benefits to contributors having met certain minimum requirements. Social Security covers around 94% of workers. Old age and survivors' insurance (OASI) benefits are paid to retired workers and to surviving spouses and children under age 18. Full retirement benefits are paid after contributing a minimum of 40 quarters and reaching age 65 (rising to 67 by 2027), with a penalty/bonus for early/late retirement. Benefits are a proportion of the average of the highest 35 years of wage-indexed earnings, but the proportion decreases as the pension base rises, making the gross replacement rate progressive. Benefits are taxable when the recipient's total income exceeds a threshold, adding to progressivity. Aggregate benefits are financed on a pay-as-you-go basis by a 6.2% payroll tax collected each from both employees and employers. (The full 12.4% payroll tax is collected from self-employed persons.) The contribution earnings base is capped, implying that the average tax rate declines as covered earnings rise.

Medicare provides health care to persons 65 years of age and older or receiving Social Security disability insurance benefits (see below). Covered reimbursed expenses include hospital care, prescription drugs and physician's services (the latter are optional and entail a monthly premium). Benefits are financed by a separate payroll tax on all earnings, the cap having been removed in the early 1990s. The 2010 health care reform (ACA) legislated both a 0.9 percentage point surtax on higher-income taxpayers, raising their overall rate to 3.8%, and an extension of the tax to high-income taxpayers' capital income.

Medicaid provides medical assistance to low-income and low-liquid asset individuals and families (including elderly unable to afford physician's services under Medicare). It is a co-operative programme between the federal government and states, with many programme parameters set at the state level. Low-income single mothers and children tend to be the largest recipient group. The beneficiary population is expected to grow in coming years, both because of the ageing of the population and provisions in the recent health care reform legislation: the ACA extends Medicaid to families with incomes under 138% of the poverty line. As well, the ACA provides subsidies to families with incomes up to four times the poverty line (equal to USD 92 200 in 2012 for a family of four) for the purchase of health insurance through insurance exchanges.

Unemployment insurance (UI) is a federally mandated programme administered largely by states. States set eligibility rules and benefit levels. A beneficiary must have worked in covered employment for the first four of the previous five calendar quarters and must have been involuntarily separated. Benefits are paid for up to 26 weeks and are contingent on active job search by the beneficiary. Additional weeks can be paid in periods of exceptionally high unemployment, as in recent years when benefits were extended to up to 99 weeks.

Disability insurance (DI) is part of the Social Security programme and provides cash assistance to disabled persons under age 65 whose disability is considered to prevent gainful employment for 12 months or longer. Eligibility requires a minimum contributory period of 5 of the previous 10 years. The same

progressive formula applies as for regular retirement benefits, except that the benefit base is an average of indexed earnings in all years when the contribution history is less than 35 years.

The *Supplemental Nutrition Assistance Program* (SNAP) provides food assistance to low-income individuals and families. The programme is federally funded, with eligibility requirements and the benefit formula set by the federal government. SNAP benefits are available to all low-income individuals and families regardless of marital status or the presence of dependent children. Moreover, eligibility extends to families with incomes up to 130% of the official poverty line, and eligibility requirements were relaxed in 2008 when states were given the option of removing asset tests. In addition, the American Recovery and Reinvestment Act of 2009 (ARRA) provided for sizeable temporary increases in SNAP benefits (by just under 14%).

Besides SNAP, the most significant in terms of spending, there exist numerous other means-tested food and nutrition support programmes. The *National School Lunch Program* offers low-cost nutritionally balanced meals in public and non-profit private schools. The *Head Start Program* assists preschool poor children with comprehensive education, health, nutrition and parental involvement. Also available is the targeted *Special Supplemental Nutrition Program for Women, Infants and Children* (WIC). The WIC provides financial assistance for the purchase of nutritious foods, nutrition education and health services to pregnant/breastfeeding women as well as families with children under 5 years old. Eligibility requires not only an income test, but also a "nutritional risk" condition.

The *Earned Income Tax Credit* (EITC) is a wage subsidy in the form of a refundable tax credit provided to low-income workers. The credit is proportional to earnings up to a threshold above which it declines gradually to zero. The credit increases with the number of children in the family, up to three. The ARRA increased the subsidy rate implicit in the tax credit for the years 2009 and 2010, subsequently extended through 2012 by the Tax Relief and Job Creation Act of 2010, and then through 2017 by the ATRA of 2012. A number of states supplement the federal EITC with their own work-dependent tax credit. A second tax credit targets families with dependent children. The credit is progressive insofar as it is phased out above a threshold income level, and is refundable only for low-income families with 3 or more children.

The *Supplemental Security Income* (SSI) provides cash assistance to aged, blind and disabled persons with low income and low liquid assets. A large majority of beneficiaries are disabled, constituting around 80% of recipients. Benefit levels and eligibility requirements are established by the federal government. Beneficiaries normally automatically qualify for Medicaid.

The *Temporary Assistance for Needy Families* (TANF) programme was established in 1996 by the Personal Responsibility and Work Opportunity Act (PRWOA), legislation that reformed the previous Aid to Families with Dependent Children (AFDC) programme. The goal was to eliminate the unlimited entitlement to transfers and introduce reforms aimed at improving incentives to work. The programme is administered by states, financed by block grants from the federal government. Unless financed by a state's own additional resources, benefits cannot be paid for more than 5 years over a recipient's lifetime. In practice, most transfers go to single parents with dependent children, and benefits are paid conditional on a minimum number of hours of work per week, job search effort or participation in a training programme.

Workers' Compensation (WC) is an employer-provided insurance mandated by the federal government, but administered by the states. It provides temporary cash and needed medical benefits to workers injured in an employment-related accident. Survivors' benefits are also provided in the event of a work-related death of an insured employee.

The US safety net also includes *housing and energy assistance*. Housing assistance is unique in that it is entirely administered at the local level. Falling investment in public housing during recent decades has reduced considerably the supply of public housing, and assistance is therefore mostly provided via housing vouchers for subsidised housing. Housing assistance is often rationed, while average benefits received tend to be relatively large (Ben-Shalom *et al.*, 2012). The *Low-Income Home Energy Assistance Program* provides poor households with financial support to defray a portion of home heating costs.

Table 5 presents recent aggregate spending levels and caseloads in the major programmes. Judged on the basis of the levels and distribution of expenditures across the different categories of the overall social safety net, a number of features stand out. First, overall spending is dominated by the four social insurance programmes (Social Security old-age and disability pensions, Medicare and UI), which account for 72% of total safety net outlays. Second, in-kind transfers (Medicare as social insurance and Medicaid, SNAP, etc. as means-tested transfers) make up close to half of overall safety net spending, and over three-fourths of means-tested transfers. Third, the tax system plays a significant "transfer" role via the EITC. Fourth, direct cash means-tested transfers (*i.e.* excluding the EITC and other refundable tax credits) are dominated by outlays for poor elderly and non-elderly disabled or blind persons, with spending on SSI exceeding 2½ times that on TANF.

Table 5. Annual federal expenditures and caseloads, 2010

Programme	Type of programme	Number of participants (million)	Federal expenditures (in USD billion)	Average monthly expenditure per participant (USD)
Social insurance:				
Medicare	In-kind	47.5	522.8	917
Old age and survivors' insurance	Cash	43.8	584.9	1113
Unemployment insurance	Cash	10.4	158.3	1268
Social Security disability insurance	Cash	10.2	127.7	1043
Means-tested transfers and credits:				
Medicaid/Children's Health Insurance Program	In-kind	58.3	281.9	403
Supplemental Nutrition Assistance Program	In-kind	40.3	68.3	141
Earned Income Tax Credit	Cash	26.8	59.5	185
Supplemental Security Income	Cash	7.9	47.8	504
Public and assisted housing	In-kind	4.7	37.9	672
Temporary Assistance for Needy Families	Cash	4.4	18.1	343
National School Lunch Program	In-kind	32.0	9.9	26
School breakfast programme	In-kind	12.0	2.9	20
Other supplemental food programmes	In-kind	-	9.2	-

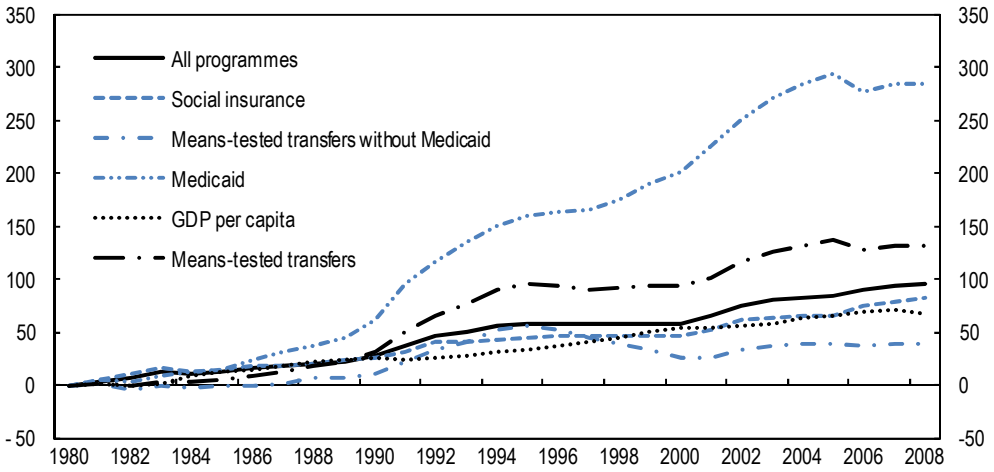
Source: CEA (2012) and Ben-Shalom *et al*. (2012).

The past several decades have witnessed continued growth of spending on both social insurance and means-tested transfers (Figure 16, Panel A). The growth of transfers has been particularly strong since 1990, mostly due to Medicaid. Indeed, the excess of the growth of means-tested transfers over GDP is entirely attributable to Medicaid; non-Medicaid means-tested transfer spending has fallen relative to GDP. The sustained growth of Medicaid reflects the rising cost of medical care, extensions of programme eligibility and other reforms that have led to caseload growth (Gruber, 2003).

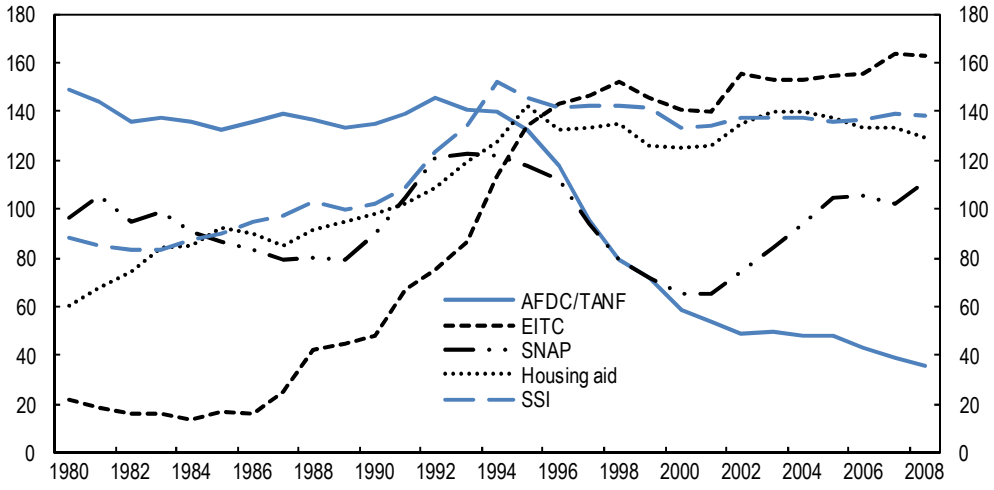
Real per capita levels of means-tested programmes have developed differently over time, however (Figure 16, Panel B). While most programmes saw substantial growth from the mid-1980s before growth tapered off beginning in the mid-1990s, AFDC/TANF and SNAP transfer spending declined substantially from the mid-1990s, a decline that was strongly reversed beginning in 2000 in the case of SNAP. By contrast, real per capita AFDC/TANF transfers have fallen continuously, particularly following the major welfare reforms in 1996. Evidence (Moffitt, 2003; Blank, 2002) suggests that the reforms introduced with PRWOA were quite successful in raising the labour force participation and incomes of single mothers during 1994-2000, including the incomes of those who remained on welfare. The sustained decline in real per capita transfers in recent years, however, is largely thought to be due to falling take-up rates rather than falling eligibility (Bitler and Hoynes, 2010). Given the lifetime ceiling on receipt of transfers, eligible persons have incentives to "bank" their remaining transfer entitlements if dependent children are still present. Weak job growth during the 2000s has also contributed to falling caseloads.

Figure 16. Real per capita government expenditure

A. Cumulative growth (in percentage) since 1980



B. Level (in USD) of non-Medicaid means-tested transfer programmes



Note: Panel B is expressed in constant 2007 USD.

Source: Ben-Shalom *et al.* (2012).

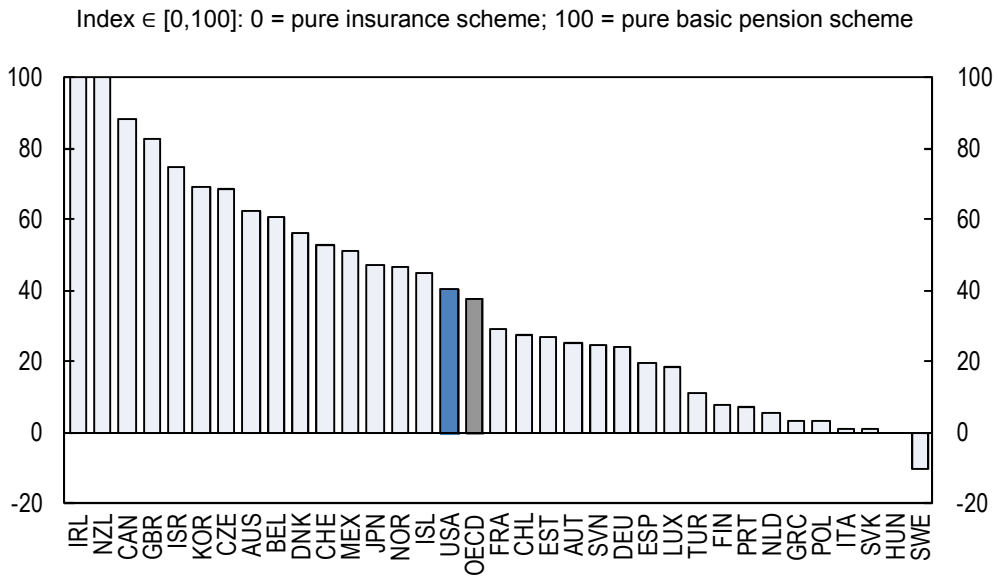
5.2. The impact of the different transfer programmes on income inequality and poverty

Pensions

Social Security benefits are tied to contributions, ensuring a link between contributions and benefits, with an aim to maintain the insurance dimension of the programme. At the same time, OASI has a moderate degree of built-in progressivity. Although the payroll tax is regressive insofar as taxed earnings are capped, the rate of return is greater for low- than high-income contributors and OASI benefits become taxable when a beneficiary's overall income exceeds a threshold.[10]

One way of judging the progressivity of old-age pension benefits is to compare benefits that would be paid under a pure "basic" pension and a pure "insurance" one. The former would pay the same benefit regardless of earnings history, and would therefore be highly progressive since low-income recipients would receive a pension which is a larger proportion of their pre-retirement earnings than higher earners. A pure insurance benefit would pay the same replacement rate to all workers when they retire. The OECD's pension progressivity index (OECD, 2011d) is designed to summarise in a single number the relationship between retirement pension and previous labour earnings. The index is constructed so that a pure insurance scheme scores 0, and a pure basic pension scheme 100. On the basis of this construct, and bearing in mind that the calculations are for new entrants into the workforce, the OASI scheme in the United States is marginally more progressive than the average in the OECD (Figure 17).

Figure 17. Progressivity of pension systems, 2008



Source: OECD (2011d).

While the basic source of intra-cohort redistribution is the Social Security benefit formula itself, many features of the programme impact the actual degree of redistribution. Indeed, there are numerous sources of redistribution that arise from the interplay of earnings patterns within families toward persons with short spells of covered work, and from two-contributor families to single contributing retired couples. One source of offset of some of the intended progressivity and redistribution from high- to low-income earners

10. Strictly speaking, actuarially fair Social Security taxes that are uniformly proportional to future pension benefits are not taxes *per se*, and should not necessarily be seen as regressive.

is differential life expectancy. If low-income contributors have lower life expectancy than their higher-earning counterparts, their relative total lifetime benefits may be reduced, offsetting a portion or all of the intended redistribution. However, Duggan *et al.* (1995) analyse mortality patterns among actual Social Security contributors and conclude that there is little reduction in the progressivity of benefits arising from different life expectancies across income groups. Liebman (2002) reaches a broadly similar conclusion.

Yet another redistributive channel is the nexus of statutory spousal benefits and relative spousal earnings histories. The progressivity of the Social Security formula pertains to the individual. However, the Social Security scheme provides both survivor and spousal benefits, the former equal to 100% of the principal beneficiary's benefit, and the latter to 50% while the principal beneficiary is alive and the spouse does not have her own accumulated pension rights. If high-earning principal beneficiaries are married to spouses with considerably lower lifetime earnings, survivor and spousal benefits will be more important to high-income families. This suggests that redistribution is less among households than individuals (Steuerle and Bakija, 1994). Indeed, Gustman and Steinmeier (2001) find that when the redistributive potency of Social Security is assessed on the basis of the family rather than the individual, almost half of the redistribution embedded in the Social Security benefit formula is eliminated.

Overall, OASI plays a significant role in providing income support in a progressive manner. One indicator of this is the considerable importance of old-age Social Security support in preventing poverty among the elderly. Ben-Shalom *et al.* (2012) find that the different cash and in-kind transfer programmes taken together reduced the incidence of poverty among the elderly from 55.1% to 9.3% in 2004. The impact was even greater for elderly households with incomes below 50% of the poverty line, whose poverty incidence was reduced from 42.3% to 1.5% in 2004. The relative importance of OASI in reducing overall poverty is shown in Table 6; the overall poverty rate would be 8.0 percentage points higher in the absence of OASI.

Unemployment insurance

Assessing the impact of UI benefits on income inequality and poverty is challenging since programme parameters vary across US states. A large share of benefits flows to middle-income workers. Among single-worker households with no children who received benefits in 2010, UI benefits as a share of income ranged from 15% to 36% (CEA, 2012). Moreover, in the absence of unemployment benefits, about 3.2 million more persons in the United States would have been below the poverty line in 2010.

Disability insurance

DI also plays a significant role in the safety net. Since the benefit formula is the same as for OASI (except for the calculation of the pension base), the same degree of progressivity is sought. Ben-Shalom *et al.* (2012) estimate that the overall poverty rate would have been 1.8 percentage points higher in the absence of DI in 2004. They also estimate that DI, together with other available benefits (*e.g.* SSI), reduced the incidence of poverty among the disabled from 72% to 19% in 2004. For disabled persons with incomes below 50% of the poverty line, the role of the transfer system (including DI) was even greater, reducing the incidence of poverty from 62.3% to 1.8%.

Medicare

Medicare is of considerable importance for preventing hardship among the elderly. Indeed, Ben-Shalom *et al.* (2012) estimate that Medicare is the single most important programme in preventing poverty, reflecting the higher prevalence of poverty among the elderly (in the absence of social insurance) and the higher usage of health care services among persons in retirement.

Other programmes and total impacts

The overwhelming importance of elderly-related and health-related transfers to poverty reduction is evident from a comparison of the differential impacts of separate programmes. All programmes combined cut the poverty rate by more than half, reducing the number of persons under the poverty line from 29% of the population to 13½ per cent in 2004. However, OASI, Medicare and Medicaid have by far the largest impacts, followed by DI, UI and the EITC. According to Ziliak (2011), during the recent crisis, enhancements and funding under the ARRA raised the number of persons lifted out of poverty due to the EITC from a rough average of 4 million to 5 million in 2009.

Table 6. Estimated impact of individual transfer programmes on the poverty rate, 2004

	Per cent poor (below the poverty line)	Per cent of families under 50% of the poverty line	Per cent of families under 150% of the poverty line
Pre-transfer poverty rate	29.0	21.3	39.6
Post-transfer poverty rate	13.5	6.6	25.3
Means-tested transfers:			
Medicaid	-3.8	-6.6	-4.3
SSI	-0.4	-1.8	-0.3
TANF	-0.1	-0.3	0.0
EITC	-0.9	-0.4	-1.0
Child Tax Credit	-0.1	0.0	-0.7
General Assistance	0.0	0.0	0.0
Other welfare	0.0	0.0	0.0
Foster child payments	0.0	0.0	0.0
Food stamps	-0.4	-0.5	-0.2
Housing Assistance	-0.6	-1.6	-0.3
WIC	-0.1	0.0	-0.1
Social insurance:			
Social Security (OASI)	-8.0	-7.5	-7.3
Disability insurance	-1.8	-2.8	-1.2
Medicare	-9.1	-9.3	-6.9
Unemployment insurance	-0.9	-1.1	-0.6
Workers' Compensation	-0.3	-0.2	-0.3
Veterans Benefits	-0.4	-0.4	-0.3

Note: Poverty rates are based on an absolute threshold. The estimates are not additive.

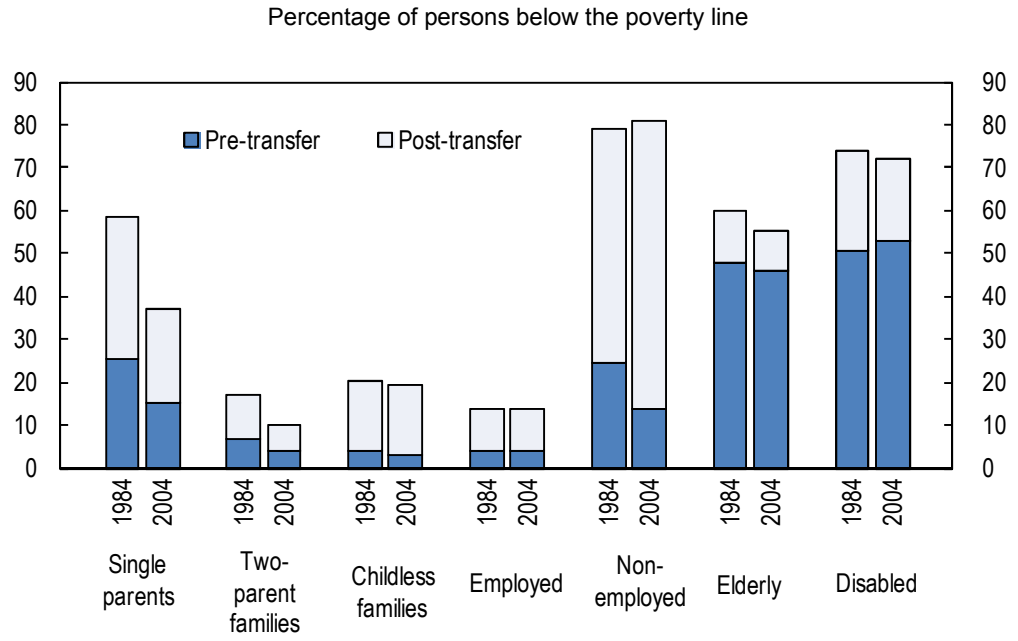
Source: Scholz *et al.* (2009) and Ben-Shalom *et al.* (2012).

Reflecting the categorical nature of many anti-poverty transfers in the United States, the impact of the overall system of transfers varies across categories of households. The system has the largest impact on the disabled and elderly (through OASI, DI and SSI). The post-transfer poverty rates among the elderly and disabled are dramatically lower than their pre-transfer rates, reflecting the size and scope of Social Security old-age benefits and disability insurance payments. Ben-Shalom *et al.* (2012) estimate that pre-tax-and-transfer poverty rates among the elderly and disabled were reduced by 83% and 73%, respectively. There

are also large reductions in poverty rates among single parent families, mostly due to TANF, SNAP, housing assistance and the EITC. Two-parent as well as childless families are generally not targeted, but have lower poverty rates to begin with. In contrast, the safety net is relatively less effective in reducing poverty among children. Ziliak (2011) finds that the safety net lifts half as many children out of poverty as adults. Sherman (2009) estimates that, had the safety net been as effective in 2005 in preventing deep poverty as in 1995, there would have been 1.1 million children in deep poverty rather than 2.4 million.

The effectiveness of anti-poverty programmes has changed over time for the different groups of the population (Figure 18). Between 1984 and 2004, the percentage point reduction in the incidence of poverty fell for single parents, two-parent families and particularly the non-employed, while it increased for disabled persons. Worth noting is the significant reduction in poverty among single parents pre-transfer in 2004 compared to 1984, reflecting the decline in AFDC/TANF benefits which raised the labour force participation of this group, as discussed above.

Figure 18. Differential and changing impacts of anti-poverty programmes



Source: Ben-Shalom *et al.* (2012).

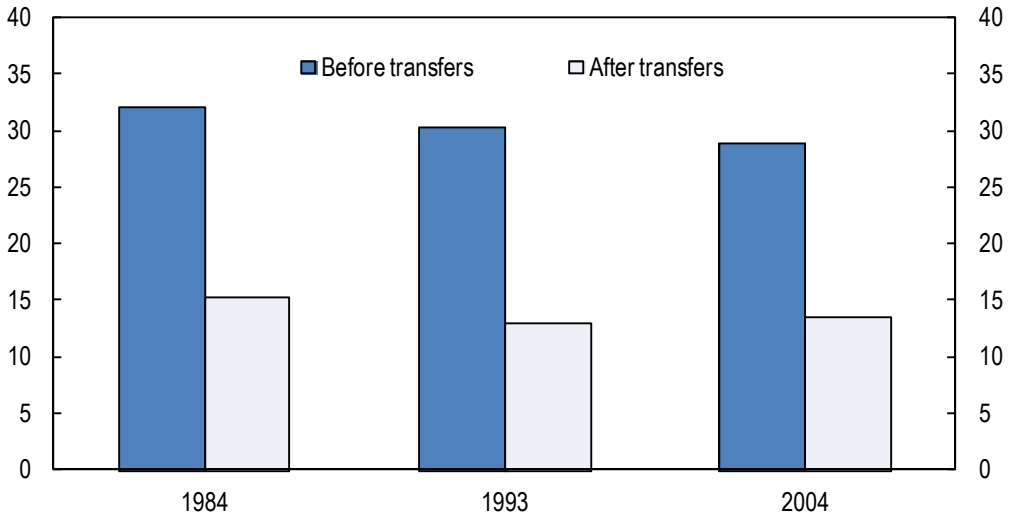
Transfers have also tilted in favour of eligible households above the poverty line and away from persons in deep poverty.[11] In aggregate, the effectiveness of transfer programmes in lowering poverty incidence fell from 1984 to 2004 (Figure 19, Panel A; Ben-Shalom *et al.*, 2012). However, while the reductions in the percentages of persons with incomes below 100% and 50% of the poverty line declined between 1993 and 2004, transfer programmes continued to be equally effective in lifting the near poor above 150% of the poverty threshold (Figure 19, Panel B). This reflects in part the increased access to SNAP, for which eligibility reaches up to 130% of the poverty line, as well as the increased relative importance of social insurance programmes (notably OASI and DI) which are not as progressive as other transfers. The importance of SNAP is corroborated by Tiehen *et al.* (2012), who find that SNAP benefits

11. The depth of poverty differs from the incidence of poverty. The latter refers to the proportion of the population with incomes below the poverty line. By contrast, the depth of poverty refers to the mean distance below the poverty line, where households above the poverty line have a zero gap.

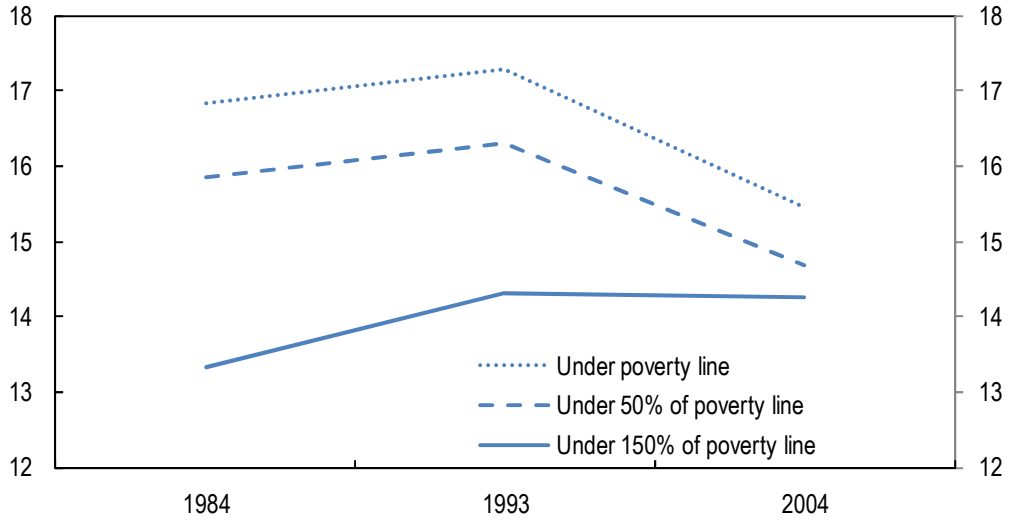
on average reduced the incidence of poverty by 44% during 2000-09. Their role is also large with respect to children, reducing the depth of child poverty by 15½ per cent on average during 2000-09.

Figure 19. Impacts of anti-poverty programmes over time

A. Percentage of families below the poverty line



B. Percentage point reduction in the poverty rate



Source: Ben-Shalom *et al.* (2012).

Ziliak (2011) examines both the incidence and the depth of poverty during 1999-2009. Over this period, he finds that the social insurance and means-tested programmes together reduced the pre-tax-and-transfer poverty rate by half on average. However, despite substantial increases in spending, the effectiveness of the programmes remained steady, increasing only in 2009 thanks to additional funding under the ARRA. He finds that children in particular are not well served by the system of low-income transfers, although it is estimated to be moderately more effective among children than in earlier years. For instance, whereas transfers and taxes reduced the number of children in poverty by 37% in 1999, they reduced it by 41% in 2009. Nutritional assistance (principally SNAP) and the EITC played enhanced roles in reducing poverty in the latter part of the period studied. Notwithstanding, he finds that the aggregate

poverty gap – the total level of spending needed to lift all persons in poverty above the poverty line – increased by 50% during 1999-2009, suggesting a fall in the redistributive effectiveness of the combined programmes.

Several conclusions can be drawn from the empirical evidence presented here. First, the US transfer system (including that part that is dependent on the tax system) is effective in reducing hardship overall. Second, it is much more effective in reducing such hardship among some households, notably the elderly and disabled, and among low-earning persons in employment or engaged in active job search. For the non-elderly and non-disabled, cash assistance other than through the EITC is limited to single parents with children, and is limited in time to prevent sustained dependency. Third, a finding common to most studies is that the least well served are the non-elderly, non-disabled persons without continuous employment, who can easily fall through the cracks in the safety net.

ANNEX A1. DATA SOURCES AND MEASURES OF INCOME

Differences in estimates of both measures of inequality and impacts of taxes and transfers can easily arise from differences in underlying income data and in definitions of income. A variety of data sources are available in the United States for empirical income distributional analysis. Each data source has advantages and disadvantages depending on the specific focus of analysis, and each will yield different estimates of concentrations of income. These data sources include: *i)* the Census Bureau's Current Population Survey Annual Social and Economic Supplement (CPS-ASEC); *ii)* the Census Bureau's Survey of Income and Program Participation (SIPP); and *iii)* the Internal Revenue Service's Statistics on Income (SOI). Each of these sources is discussed briefly here. Both agencies produce their own tables and statistics based on the surveys, and provide public-use files.

A1.1. Data sources

CPS-ASEC

The CPS is the primary source of data for estimating the unemployment rate and various other household employment statistics. The survey sample size is approximately 76 000 households. The annual February and March supplement (ASEC) asks detailed questions on the amount of money income received during the preceding calendar year. The income sources include earnings, dividends, cash and non-cash transfers from all government programmes, employer-provided fringe benefits, and the value of tax credits such as the Earned Income Tax Credit and other refundable tax credits. The survey also provides detailed socioeconomic and demographic information on the household. The Census Bureau relies on money income obtained in the CPS-ASEC to produce official estimates of the number of persons falling below the poverty line. The public data file provides detailed information on income by source, but is subject to misreporting at both extremes of the income distribution. Moreover, households reporting very high incomes are top-coded in the public use data file. Given the detailed income and demographic information, the CPS-ASEC enables analysts to construct different measures of income, and the demographic data permit them to use their own equivalence methods in adjusting family size. However, the CPS-ASEC lacks detailed information on very high-income households, does not report capital gains, underreports other income from capital, and lacks information on deductions and adjustments needed to compute taxes.

SIPP

The Census Bureau's SIPP is a household survey specifically designed to fill data gaps on employment, labour force participation, income dynamics, and participation in federal, state and local anti-poverty programmes. The SIPP is unique among surveys in that it not only provides detailed information on incomes by source for a representative sample (over 40 000) of US households, but it also tracks changes in programme eligibility and participation for the members of those households as their incomes and other circumstances change. Panels are interviewed with greater frequency (every 3-4 months) than the CPS, reducing recall errors, notably regarding income and participation in about 70 cash and in-kind government programmes. The survey also collects information on household assets and major expenditures (housing costs, medical out-of-pocket, etc.).

SOI

The SOI is a nationally representative sample of individual income tax returns collected by the Internal Revenue Service. The sample size has grown from roughly 90 000 in earlier years to close to 300 000 recently. The income data from the Internal Revenue Service are generally more accurate and complete than those from household surveys. At the same time, the data perforce do not include

information on persons that do not file an income tax return. Moreover, the SOI dataset lacks information on government-provided in-kind benefits and non-taxable employer-provided fringe benefits. Finally, the reporting unit in SOI data is the taxpayer and not the household or a family member *per se*.

A1.2. Matching records

Statistical matching allows an analyst to combine the more detailed socioeconomic and demographic information of the CPS-ASEC with the more precise and complete income and tax data from the SOI to produce a synthetic representative sample. CBO (2011a, 2012a) use a statistical matching technique to overcome the respective limitations of each data source. For each matched record, the CBO relies on income reported in the SOI, complemented by those sources that are available only in the CPS-ASEC. Since not all households need to file a tax return, there are more households in the CPS. CPS-reported income is used for households that did not file a tax return, and the CBO estimates federal tax liability from household survey information.

A1.3. Measures of income

The CBO study

With the aim of assessing the impact of the tax-and-transfer system on the distribution of disposable income, the CBO defines three income concepts:

- Market income: This income is before taxes are deducted and before transfers are received. It includes all cash income, including realised capital gains and other income from capital, business income, taxes paid by businesses, and in-kind compensation such as employer-provided insurance premiums. Corporate taxes are imputed to the household as part of capital income, and employer-paid payroll taxes are imputed to households as labour income. In both cases, it is assumed that households' incomes would be higher in the absence of the taxes, but would bear taxes on capital and labour.

- Market income after transfers and before taxes: This income equals market income augmented by cash transfers and the estimated value of in-kind transfers (*e.g.* Medicare and Medicaid), including all state and local transfers. In assigning a value to in-kind government transfers, the CBO uses the so-called fungible value. Some transfers are valued at market prices, that is, the household's cost if it were to purchase the goods itself. Some transfers, such as Medicare and Medicaid, equal the amount of a household's income that is freed up for other uses by virtue of receipt of the government-provided health services, but only up to the average cost.

- Market income after transfers and taxes: This income subtracts federal individual and corporate taxes, payroll taxes and excise taxes to arrive at disposable income. State and local taxes are not incorporated because of difficulties in determining incidence.

The OECD distributional analysis

OECD (2008, 2011a) rely on household survey data collected by national authorities. In the case of the United States, the data are based on the CPS. Market income is broadly defined similarly to the CBO's, but excludes realised capital gains. However, despite having access to internal CPS data that are top-coded at a much higher level of income than public-use files, the measured income at the top end of the income distribution is higher in the CBO matched data file.

ANNEX A2. THE SUPPLEMENTAL POVERTY MEASURES IN THE UNITED STATES

An individual's or family's poverty status in the United States is determined on an *absolute* scale. The vast majority of OECD countries use a *relative* measure of poverty, whereby a state of impoverishment is assumed to exist when a family's cash resources fall below a percentage of median income, such as 50%. One notable advantage of a relative threshold is that the real level of the threshold tracks the population's living standards. The absolute threshold used in the United States was developed during the 1960s, when the income needed to achieve a minimum prescribed living standard (reflecting economies of scale in household consumption) was set at the national level. The minimum consumption basket includes food, clothing, shelter and utilities. The Consumer Price Index (CPI) is used to adjust annually the standardised (for family size) thresholds to take inflation into account. When the family's money income falls short of the threshold, the family is deemed to be in poverty. Families with money income equal to or less than 50% or 150% of the threshold are considered, respectively, to be in deep poverty or to be "near poor".

Leaving aside the comparative merits of an absolute versus a relative threshold, the methodology for assessing poverty status in the United States has been found wanting for some time. In the mid-1990s, the National Academy of Sciences (NAS) undertook a thorough review of the conceptual and statistical underpinnings of the official poverty measure (Citro and Michael, 1995). The NAS offered a number of recommendations it thought would improve the quality of the measure. Key weaknesses identified by the NAS include:

- The definition of income used in a family's poverty status is too narrow. The official measure considers only cash income that is provided directly to individuals. Thus, transfers (such as the EITC and refundable child tax credits) available only below threshold levels and means-tested in-kind transfers are excluded from income. A more comprehensive measure of income should be used.

- The determination of a family's poverty status under the official measure does not reflect certain expenditures deemed to be unavoidable, such as taxes, out-of-pocket medical expenses, and some expenditures likely required to engage in employment, such as child care services. These could be either added to the threshold or deducted from income.

- Geographic differences in the cost of living are not taken into account in the absolute thresholds.

- The CPI that is used to adjust the thresholds annually is upwardly biased due to several sources of bias, including outlet and quality bias, and changes in expenditure patterns over time (*viz.* the principal difference between the Laspeyres and Paasche price indices).

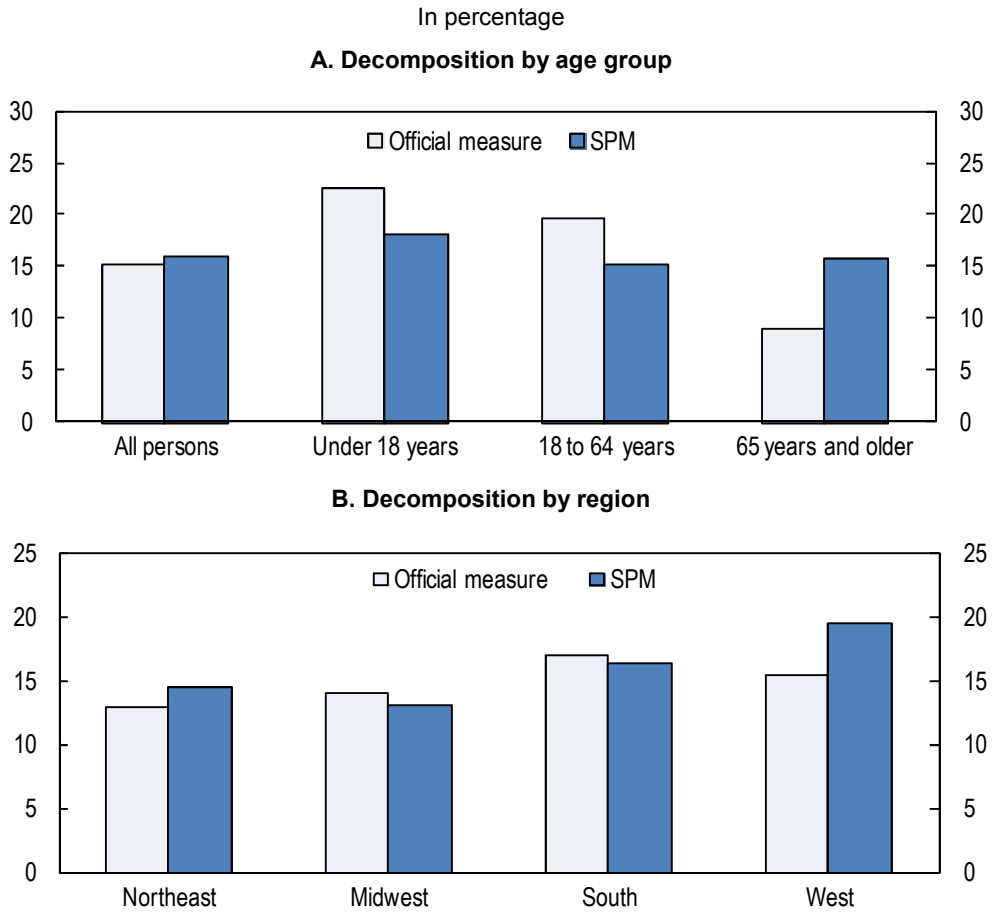
Taking a number of the NAS recommendations into consideration, Census Bureau (2011) has recently begun to publish several so-called "Supplemental Poverty Measures" (SPM) to help guide policymakers in assessing poverty in the US. The SPMs use a broader definition of income that includes income in-kind and tax-based cash transfers. They also subtract payroll taxes and out-of-pocket medical expenses and work-related outlays such as child care, and adjust the thresholds to take into account variations in housing costs.

To illustrate the impacts of the new measures, one can compare poverty rates by age group and region based on the official measure and the SPM. The new measure yields a moderately higher overall poverty rate (Figure A2.1, Panel A). Decomposing by age group, the higher overall poverty rate using the SPM is due to the much higher rate among elderly, which arises because the SPM produces a lower threshold for

the elderly than the official measure. Geographic differences in living costs also impact the incidence of poverty (Figure A2.1, Panel B). The higher costs in the Northeast and West raise the thresholds relative to the official level, placing more individuals below the poverty line.

Figure A2.1. People in poverty (official measure and Supplemental Poverty Measure), 2010

In percentage



Source: Census Bureau (2011).

One obvious advantage of the SPM is its capacity to better reflect the contribution of government programmes to reducing poverty. Table A2.1 shows static estimates of the increases in the SPM that would result from withdrawal of selective transfers.

Table A2.1. Increase in the Supplemental Poverty Measure from the exclusion of selected programmes

Programme	All persons	Under 18 years	18-64 years	65+ years
SPM	16.0	18.2	15.2	15.9
Change in poverty rate from exclusion of:				
EITC	2.0	4.2	1.5	0.2
SNAP	1.7	3.0	1.3	0.9
Housing subsidies	0.9	1.3	0.7	1.2
School lunch programmes	0.4	0.8	0.2	0.1

Source: Census Bureau (2011).

Some analysts suggest that the new measure may be less effective than the official measure in gauging deprivation. Meyer and Sullivan (2010) suggest that income, even if more comprehensively measured as in the SPM, may not properly reflect economic well-being. Reasons for which income could distort the measurement of well-being include the fact that transitory changes in income may not result in changes in consumption, which could be maintained by the household's income from or use of assets (not captured in either the official measure or the SPM). Meyer and Sullivan (2010) also highlight the ways in which the SPM's adjustments for family size and circumstance can result in measured poverty rates that are at odds with reality. A case in point is the higher incidence of poverty among elderly under the SPM, which is *a priori* counterintuitive in light of ample evidence that the poverty rate among the elderly is below that of other groups.

A number of analysts have noted other problematic aspects of the new measure. The proposed deductions, for instance, may pose problems. The deduction for medical outlays implicitly assumes that all health-related spending is made out of necessity rather than choice. Ziliak (2006) offers the example of two individuals with equal incomes and a similar vision problem. One opts for corrective lenses for USD 200, the other for corrective surgery at a cost of USD 2 000. The latter could be judged to be in poverty solely because of a discretionary choice.[12] Child care is another problematic deduction, as also noted by Ziliak (2006).

12. This is similar to a hypothetical but not unrealistic situation posited by Cogan (1995).

ANNEX A3. IMPACTS OF RAISING THE PROGRESSIVITY OF CAPITAL TAXATION

This annex investigates the impact of raising the progressivity of capital taxation on output, inequality and social welfare. To this end, it sets out a standard dynamic (life-cycle) general equilibrium model. The model is characterised by two distinct features. First, agents are heterogeneous in their productivities and hence market incomes. This is necessary to study the effect of tax policies on the income distribution. Second, the interest rate earned on capital income is assumed to be an increasing function of the stock of savings. This is motivated by the empirical observation that richer households tend to obtain a higher rate of return on their wealth than poorer households, and allows to reproduce the concentration of wealth at the top of the distribution in the data.

The model is calibrated to the US economy, based on microeconomic data. Numerical simulations are then used to study the impacts of raising the progressivity of capital taxation. They show that, while higher progressivity lowers income inequality, it reduces not only aggregate output but the disposable income of every household. Such a policy thus reduces social welfare, independent of the precise aggregation of individual utilities. Taxing the capital income of rich households at a particularly high rate is inefficient as their contribution to aggregate capital accumulation in the economy is so large. This is both because capital is very unequally distributed and rich households manage on average to obtain a higher rate of return on their savings. Higher progressivity of capital taxation lowers therefore the overall efficiency in the economy. Due to the general equilibrium nature of the model, this reduces the productivities and disposable incomes of all workers, despite the increased redistribution through the tax-and-transfer system.

The annex is structured as follows. The next section describes the model. Section A3.2 is devoted to the calibration, and the final section to the numerical simulation.

A3.1. The model

The framework is a standard general equilibrium life-cycle model in discrete time, where individuals are heterogeneous in their productivities. One individual, or household, of each productivity and each age is alive at every moment. Population size is therefore constant. Preferences are homogeneous, with the utility function given by $u(\cdot), u'(\cdot) > 0, u''(\cdot) < 0, \lim_{c\to 0} u'(c) = \infty, \lim_{c\to\infty} u'(c) = 0$ and the per-period discount factor by β. There is no uncertainty: life span and labour endowments are known in advance. As the focus will be on steady-states, time indices are dropped; the variable $t \in [1, t_f]$ denotes the age.

Household's decision problem

Each household i chooses his optimal consumption (and hence saving) path to solve:

$$\max_{(c_t^i)_{t=1}^{t_f}} \sum_{t=1}^{t_f} \beta^{t-1} u(c_t^i);$$

subject to:

$$\forall\, t \in [1, t_f], c_t^i + s_{t+1}^i = \left[1 + \tilde{r}(s_t^i)\right] s_t^i - \tau_K\left[\tilde{r}(s_t^i) s_t^i\right] + \left[y_t^i - \tau_L(y_t^i)\right] + p_t^i;$$

$$y_t^i = h_t^i w;$$

$$s_t^i \geq 0;$$

$$s_1^i, s_{t_f+1}^i = 0.$$

The retirement age t_{ret} is exogenous. c_t^i, y_t^i, p_t^i, respectively, represent the consumption, the labour income and the retirement pension of household i at age t: $p_t^i = 0$ for $1 \leq t < t_{ret}$ and $y_t^i = 0$ for $t_{ret} \leq t \leq t_f$.

Every household is assumed to inelastically supply one unit of labour in each period before retirement.[13] Labour income is given by y_t^i where h_t^i represents the productivity of household i at age t. w is therefore the wage per unit of effective labour. The labour income tax $\tau_L(\cdot)$ is a, potentially non-linear, function of labour income y_t^i.

s_t^i is the stock of savings at the beginning of the period, before incomes from labour and capital are received. There is no bequest in the model, thus $s_1^i = s_{t_f+1}^i = 0$. Households cannot borrow, so that $s_t^i \geq 0$ for all i and t. The interest rate $\tilde{r}(\cdot)$ is assumed to be a function of the savings of household i at age t. The capital income tax τ_K depends, potentially in a non-linear way, on the amount of interest earned, $\tilde{r}(s_t^i)s_t^i$.

Finally, denoting by V_t^i the value function of the decision problem faced by household i at age t, his general maximisation problem can be written recursively:

$$\forall\, t \in [1, t_f], V_t^i = \max_{s'}\left[u(c) + \beta V_{t+1}^i(s')\right]; \tag{1}$$

subject to:

$$c = [1 + \tilde{r}(s)]s - \tau_K[\tilde{r}(s)s] + \left[y_t^i - \tau_L\left(y_t^i\right)\right] + p_t^i - s' \geq 0; \tag{2}$$

$$s' \geq 0; \tag{3}$$

$$V_{t_f+1}^i = 0;$$

$$s_1^i = 0.$$

From (1)-(3), the first-order condition is:[14]

$$u'(c) = \beta \frac{dV_{t+1}^i(s')}{ds'} \text{ or } s' = 0.$$

Meanwhile, the Envelope theorem gives:

$$\frac{dV_t^i(s)}{ds} = \langle 1 + \{1 - \tau_K'[\tilde{r}(s)s]\}\frac{d}{ds}[\tilde{r}(s)s]\rangle\, u'(c).$$

This yields the Euler equation:

13. This assumption could, in principle, restrict the analysis of variations to the tax schedule on capital income. Households in the model are forward-looking, thus adjust their labour supply by considering how it will affect their consumption during the rest of their life (especially during retirement). Hence, any tax on capital income is also implicitly a tax on labour income as at the margin an additional dollar earned today is at least partly meant to be transmitted to a later period. However, theoretically households may increase or decrease their labour supply, and according to Meghir and Phillips (2010) empirical evidence suggests that labour supply is effectively inelastic for most of the working population. Therefore, the effects of changing tax rates on labour supply should be small (although those on welfare could nonetheless be significant via the substitution effect).

14. Condition (2) cannot be binding as $u(\cdot)$ follows the Inada conditions.

$$u'(c) = \beta \langle 1 + \{1 - \tau'_K[\tilde{r}(s')s']\} \frac{d}{ds'}[\tilde{r}(s')s'] \rangle u'(c') \text{ or } s' = 0.$$

Since $u'(\cdot)$ is decreasing and $\lim_{c\to 0} u'(c) = \infty$, and since $s_1^i = 0$, the borrowing constraint will be binding, and the household will act as hand-to-mouth consumer so long as:

$$u'\left[y_t^i - \tau_L(y_t^i) + p_t^i\right] > \beta \left\{1 + [1 - \tau'_K(0)] \frac{d[\tilde{r}(s')s']}{ds'}|_{s'=0}\right\} u'\left[y_{t+1}^i - \tau_L(y_{t+1}^i) + p_{t+1}^i\right],$$

that is to say, so long as the marginal utility of consuming all the income earned today is higher than the marginal utility of consuming tomorrow the whole labour income of that period plus an infinitely small amount saved. As soon as the inequality is binding, the household will start saving in anticipation of the lower income during his retirement.

The firm

There is one representative firm in the economy with a classical Cobb-Douglas production function:

$$Y = K^{\alpha} L^{1-\alpha},$$

with K being the aggregate stock of capital and L the aggregate demand for (effective) labour.

Let r be the average cost of using one unit of capital, and denote by δ the natural rate of depreciation of capital. Then, the firm seeks to maximise:

$$Y - (r + \delta)K - wL.$$

Since in equilibrium profits are equal to zero:

$$r = \alpha \frac{1}{\left(\frac{K}{L}\right)^{1-\alpha}} - \delta; \tag{4}$$

$$w = (1 - \alpha)\left(\frac{K}{L}\right)^{\alpha}. \tag{5}$$

The firm does not remunerate capital investment at this average rate r but instead provides a higher rate of return to households with a higher investment. This way the model incorporates the empirically observed positive correlation between a household's level of savings and his rate of return. Campanale (2007), for example, shows that the richest households may experience an average interest rate of 6%, while the average household one of roughly 4% and the poorest only 1-2%.

The interest rate experienced by household i is therefore a function of his savings:

$$\tilde{r}(s) = rZ(s),$$

with $Z(\cdot) > 0$ strictly increasing and bounded. In the next section, this function will be calibrated so that the saving rates in the model fit those in the data. Nevertheless, $Z(\cdot)$ needs to be consistent with the definition of r. The interest rate $\tilde{r}(\cdot)$ will determine the amount that the household finally receives, which can possibly be less than the one the firm chooses to reward him with. In aggregate, households receive from the firm:

$$\sum_{i,t}\left[rZ\left(s_t^i\right)\right]s_t^i = r\tilde{K}, \text{ with } \tilde{K} = \sum_{i,t} Z\left(s_t^i\right) s_t^i.$$

Hence, imposing $\widetilde{K} \leq K$ ensures that the firm never loses money from renting capital. $\Delta = r\left(K - \widetilde{K}\right)$ can be interpreted as a supplementary depreciation of capital (in addition to the natural depreciation δK). As $rZ(\cdot)$ represents the experienced interest rate (and not the one initially chosen by the firm), Δ can be seen as the cost of managing the portfolios (for instance margins taken by financial intermediates) or some sub-efficient management of portfolios on the part of households.[15]

The government

The government is raising funds by taxing labour income and capital income. τ_L could be negative, as the government may want to subsidise the lowest labour-income earners (*i.e.* $\tau_L < 0$ denotes transfers during work life). The total amount of taxes raised is thus:

$$T = \sum_{i,t}\left\{\tau_L\left(y_t^i\right) + \tau_K\left[\tilde{r}\left(s_t^i\right)s_t^i\right]\right\}.$$

The government uses this to finance retirement pensions and non-productive expenditure G_{np}. The amounts of the different retirement pensions are exogenous and fixed:

$$G = G_{np} + \sum_{i,t} p_t^i.$$

General equilibrium

In this economy, a general equilibrium is characterised by:

1. a family of value functions $\left[V_t^i : s \to V_t^i(s)\right]_{t=1,i=1}^{t_f+1,N}$ solving the household's problem given the equilibrium prices;

2. the corresponding families of household's decision rules for saving and consumption: $\left[\tilde{d}s_t^i : s \to \tilde{d}s_t^i(s)\right]_{t=1,i=1}^{t_f,N}$ and $\left[\tilde{c}_t^i : s \to \tilde{c}_t^i(s)\right]_{t=1,i=1}^{t_f,N}$;

3. factor prices (r, w) determined competitively according to (4) and (5);

4. a government policy G_{np}, so that the government budget constraint is satisfied: $T = G$.

5. macroeconomic aggregates (K, L), so that all markets clear:

$$K = \sum_{i,t} s_t^i;$$

$$L = \sum_{i,t} h_t^i;$$

$$\sum_{i,t} c_t^i + \sum_{i,t} s_{t+1}^i + G = Y + (1 - \delta)K - \Delta;$$

i.e. the total amount of capital invested in the firm is equal to the aggregate amount of savings of households; the total demand for effective labour equals the aggregate offer; and the goods market clears.

15. One could ideally prefer to impose $\widetilde{K} = K$. This would, however, imply that for this condition to still hold with different tax rates the function $Z(\cdot)$ has to change.

As common in models with heterogeneous agents, there is no closed-form solution. By discretising the state spaces, one can solve for an approximated equilibrium.

A3.2. Calibration

The sample

The objective is to calibrate stylised profiles for each lifetime labour-income decile. To this end, data from the Panel Study of Income Dynamics (PSID) is used from the year 2009. Only households whose head is aged between 20 and 64 are considered. This gives an initial sample of 7 529 households. Labour income ranges between USD 0-5 304 000, and per year a household earns on average USD 53 468.[16] Meanwhile, savings net of debt value are as low as -USD 1 974 000 and as high as USD 100 470 000 when including home equity, with an average of USD 244 954. In parallel, data from the Health and Retirement Study (HRS) are used to compute the levels of retirement pensions, since the PSID does not provide a sample big enough to compute satisfactory results.

Labour incomes

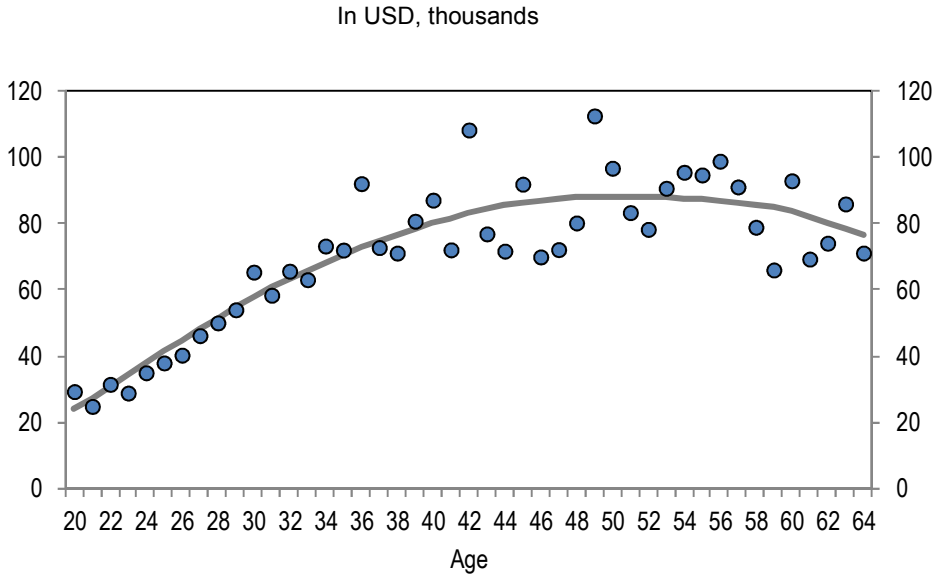
Between ages 20-64, all households are dropped for which total labour income received (from all sources and for every family member) is less than USD 1 000 and those whose head is already retired. This is to ensure consistency with the life-cycle model, where everybody is assumed to work, and leaves 6 680 households. Then, for each age, the households are split in 10 labour-income deciles and, again for each age, the average labour income is computed for every decile. This gives 10 points for each age that can be linked to obtain 10 "labour income by age" curves. These profiles of labour income by age in the year 2009 are assumed to have the same structure as the lifetime evolution of each decile of lifetime labour income. This implies that there is no mobility within labour-income deciles with age: someone in the first decile in terms of lifetime labour income will be in the first decile for labour income at each age.

For each age, the average overall labour income is calculated and then the LOWESS[17] curve of this average profile computed. The smoothed average thus obtained (Figure A3.1) is very similar to lifetime productivity profiles used by other papers in the literature (*e.g.* Cocco *et al.*, 2005). Then, for each decile, the average (over the lifetime) ratio between the decile's labour income and the smoothed overall average labour income is calculated. As in Dynan *et al.* (2004), in so doing only households whose head is aged between 30 and 59 are used to remove transitional effects. Table A3.1 shows the coefficients obtained. Finally, the labour income of a decile at age t is deduced by multiplying the smoothed average of overall labour income with the corresponding coefficient.

16. Each time an average is calculated, the household weights as given in the PSID data are used.

17. LOWESS stands for locally weighted scatterplot smoothing, a non-parametric regression modelling method, which allows to find a trend in the data without assuming that it belongs to any parametric family of functions.

Figure A3.1. Overall average annual labour income by age



Source: Authors' calculations using PSID.

Table A3.1. Average ratio of a decile's labour income to overall average labour income

Lifetime labour-income decile	Average ratio to the mean
1st	0.12
2nd	0.28
3rd	0.42
4th	0.54
5th	0.68
6th	0.84
7th	1.03
8th	1.26
9th	1.62
10th	3.29

Source: Authors' calculations using PSID.

Saving behaviour

For each lifetime labour-income decile, a measure of the saving rate during the period of potential wealth accumulation is required, *i.e.* when people are actually working. To this end, only households whose head is aged between 20 and 64 are considered. The variable used is *Imputed wealth with home equity*. *Imputed wealth* refers to the sum of all types of savings except the owner-occupied home (banking accounts, equities, Individual Retirement Accounts, other real estates, imputed value of vehicles, etc.), net of debt value. *Home equity* is the value of the home minus mortgage. To ensure consistency between model and real data, observations of households, for whom the ratio of their observed savings to the calculated lifetime labour income is greater than 2, are dropped. This reduces the sample by 15 households.

Similarly to labour income above, for each age average savings by lifetime labour-income decile are computed, and the LOWESS smoother is used to fit a curve through the overall-average savings at the different ages. For each labour-income decile, this is then multiplied by the average (over the lifetime) ratio between its average savings and overall-average savings (using the smoothed curve). The focus is again on households whose head is aged between 30 and 59.

As the PSID does not provide information on consumption, it is not possible to rely on the natural definition of the saving rate: (net labour income - consumption) / net labour income. However, the objective of this calibration is to measure and then introduce in the model heterogeneity in saving behaviour in a tractable way. For that purpose, any equivalent proxy can be used as long as it is strongly correlated with the saving rate. The proxy chosen here is the change of wealth between two periods, divided by the gross labour income received in the first of the two periods. Absent consumption data, the change of wealth serves as an approximation to the numerator. For every lifetime labour-income decile, this variable is calculated at each age along the wealth accumulation period (ages 20-64). Table A3.2 lists its average (over the lifetime).

Table A3.2. Average saving rate by lifetime labour-income decile

Lifetime labour-income decile	Average saving rate
1st	12.80
2nd	9.57
3rd	10.52
4th	8.92
5th	8.76
6th	13.55
7th	10.57
8th	14.33
9th	18.23
10th	22.79

Source: Authors' calculations using PSID.

The result is a U-shaped pattern. The minimum of a bit less than 10% is reached around the 4th and 5th deciles. It then increases slowly (and unevenly) to 14% for the 8th decile, and finally rises more sharply to 18% and 23% for the two top deciles. Hence, the propensity to save seems indeed to increase with wealth on that part of the sample. The interpretation of the decreasing part is more subtle. The definition of the saving rate used was the change in wealth divided by labour income. Yet, the poorest receive significant net transfers from the state which are not captured by labour income. This results in distorting the proxy for the saving rates, since even with low savings the poor receive significantly more than their labour income.

Retirement pensions

As mentioned above, to determine the level of retirement pensions, data are used from the HRS for the year 2009. From the 10 754 households in the sample, the 7 868 are kept for which the head is retired. The Social Security retirement pensions received by the head and his wife are added up. Annuities from Individual Retirement Accounts and other forms of pensions are not taken into account since they are more closely considered incomes from capital. The whole remaining sample is split in ten retirement pension deciles, and the average of it is computed for each decile. These amounts can be read off Table A3.3, and

they are assumed to be constant during retirement. To reflect that the retirement pension of a household is a function of his labour income, he will always belong to the same labour income and retirement pension deciles.

Table A3.3. Annual retirement pension

Lifetime labour-income decile	Pension (in USD)
1st	3 807
2nd	8 181
3rd	10 518
4th	12 357
5th	14 050
6th	16 162
7th	18 799
8th	22 158
9th	26 568
10th	36 471

Source: Authors' calculations using HRS.

The benchmark economy

There are $N = 10$ types of households, living for $t_f = 12$ periods.[18] The retirement age is $t_{ret} = 10$. There are therefore $Nt_f = 120$ households alive at every moment. The elasticity of output to capital is set at $\alpha = 0.36$, consistent with estimates in Cooley (1995), and the natural depreciation rate of capital at $\delta = 0.08$, as in Aiyagari and McGrattan (1998). Households' utility is logarithmic: $u(c) = \ln c$. The time preference rate is 3%, corresponding to a discount factor of $\beta = 0.9709$, a value well within the common range.

Labour endowments are determined in the following way. The productivity is set to $h_t^i = A \cdot inc_t^i$, where $\left(inc_t^i\right)_{i,t}$ represents the income paths deduced from the data treatment above. A is a scaling factor which ensures that the labour income in the model corresponds to the one computed in the data, *i.e.* $y_t^i = inc_t^i$.[19] Each lifetime productivity decile corresponds then to the same lifetime labour-income decile. p_t^i is calibrated based on the retirement pensions data as previously explained.

Taxation of labour income is progressive and follows the effective marginal tax rates (CBO, 2005b) that a head of household with two children faces in the US economy. In the benchmark economy, capital income is taxed at a flat rate: $\tau_K[\tilde{r}(s)s] = \tau_K\tilde{r}(s)s$. With the diversity of assets in households' portfolios already contained in $Z(\cdot)$, τ_K is to be taken as the overall tax rate on capital income. In the current system, because of tax preferences the overall tax rate on capital income depends much more on its origin than level. A flat tax rate is therefore a good proxy to reflect overall capital income taxation. Absent an estimate

18. Five-year periods are used, but all the values reported are annual ones.

19. In practice, the equilibrium of the model is computed with $A = 1$; then $A = 1/w$ is taken and this operation repeated until it "converges", *i.e.* $y_t^i = inc_t^i$ for all i and t.

for the overall *average* effective tax rate, it is set equal to the overall *marginal* effective tax rate in CBO (2005a): $\tau_K = 0.138$.

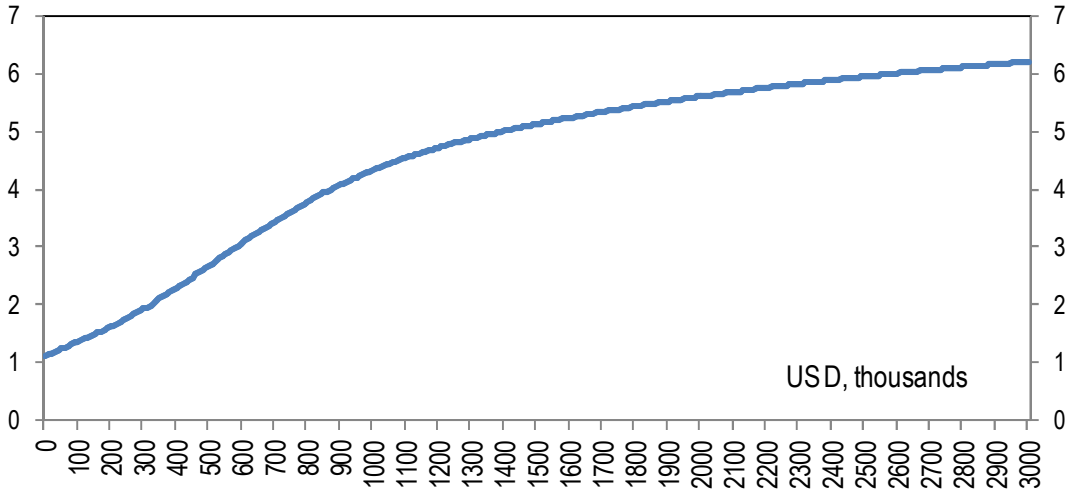
To calibrate the saving rate of each lifetime labour-income decile requires specification of the function $Z(\cdot)$ which enters the experienced interest rate. With 10 empirical values for the saving rate, there is no unique functional relationship between savings and saving rate. To this end, data from Campanale (2007) are employed to build an initial guess of the profile of the experienced interest rate as a function of savings. This is then used to characterise $Z(\cdot)$ with the aim to manually fit the saving rates of the different deciles. The final function $Z(\cdot)$ chosen is:

$$Z(s) = 0.2 + (1 - 0.2)\left(1 - e^{-0.6\frac{s}{10^6}}\right) + (1.25 - 1)\left[1 - e^{-\left(1.7\frac{\max\{0;s-1.5\cdot 10^5\}}{10^6}\right)^2}\right].$$

Figure A3.2 shows how the experienced interest rate $\tilde{r}(\cdot)$ depends on the savings of the household. It increases at a constant rate for a certain period (USD 0-150 000), and then more sharply up to USD 1 million. Finally, it slowly increases to reach about 6% for savings near USD 3 million.

Figure A3.2. Experienced interest rate as a function of savings

In percentage



Source: Authors' calculations using PSID and HRS.

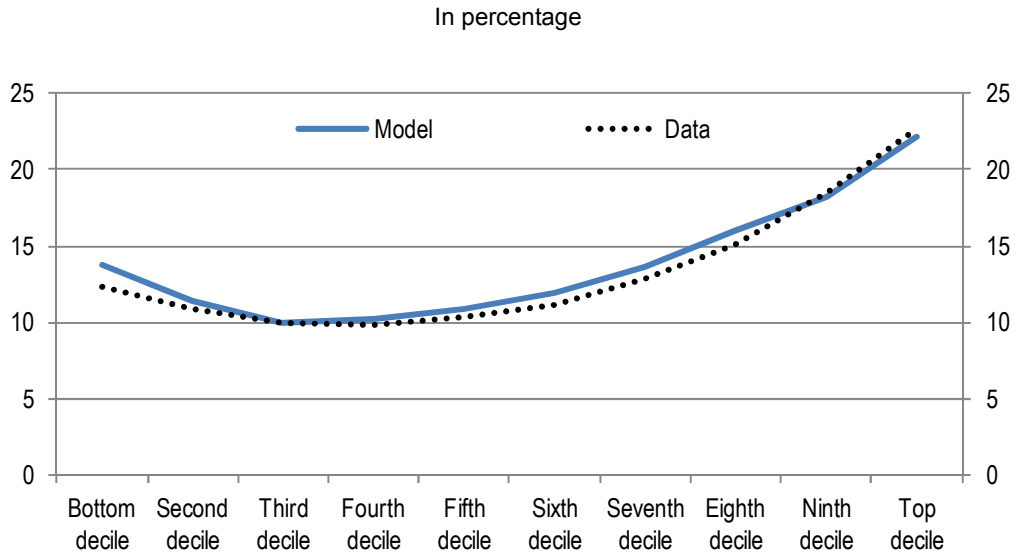
A3.3. Numerical simulation

Equilibrium in the benchmark economy

The equilibrium interest rate is $r = 5.55\%$. This is the real cost of using capital for the firm, which is then employed to determine the experienced interest rate for each household. The capital-to-output ratio is 2.66, which lies in the range of 2.6-3 that is typically found in the literature. The Gini coefficient for household income (*i.e.* for the sum of labour income and capital income) is 0.573 before taxes and transfers. This declines to 0.476 after taxes and transfers. The reduction by 10 percentage points is approximately consistent with the 11 percentage point reduction in the United States estimated by the OECD. The Gini coefficient for savings, or wealth, is obtained to be 0.794, very close to the actual value of 0.816 found by Díaz-Giménez *et al.* (2011). The ratio of the income of the 9th to that of the 1st decile is 73.9 before taxes and transfers, falling to 10.8 after taxes and transfers.

By model design, households are heterogeneous in their saving behaviour. Figure A3.3 compares the average saving rates in the benchmark equilibrium with those from a trend through the PSID data. The match of the model with the data is very good. As in the data, the model resembles a U-shaped function within a similar range of values.

Figure A3.3. Average saving rate by lifetime labour-income decile: model versus data



Source: Authors' calculations using PSID and HRS.

Impacts of a reform increasing the progressivity of capital taxation

The benchmark economy is a stylised representation of the US economy. The model can then be used to study the impact of various tax reforms on output and production, income inequality and social welfare. In what follows, the focus will be on the economic effects of increasing the progressivity of capital taxation. This has been a recurrent theme over the recent past. One of the main measures contained in the 2012 American Taxpayer Relief Act (ATRA) was to raise the top tax rate on long-term capital gains and dividends. Previously, the Administration made some more radical proposals in this direction. For example, the FY2013 budget advocates implementation of the *Buffet rule*, which states that "no household making over USD 1 million annually should pay a smaller share of their income in taxes than middle class

families pay" (Office of Management and Budget, 2012). The Administration therefore suggests that "no millionaire pays less than 30 percent of his income in taxes". As capital income is on average the first source of revenues of the very wealthiest (while representing less than 3% of total income of 80% of the population), such a measure would effectively mean an increase in the progressivity of capital taxation. In the same document, the Administration requests to raise the corporate dividend tax rate from 15% to 45% for upper-income taxpayers, rather than only to the 20% as in the ATRA. Since those investing in this type of assets are mainly the richest, this increase in the level of capital taxation would have effectively implied an additional increase in its progressivity.

To investigate the economic effects of increasing the progressivity of capital taxation, a progressive tax schedule needs to be introduced on capital income in a stylised way. The starting point are the effective marginal tax rates on labour income given by CBO (2005b).[20] Every tax rate on capital income is then lowered by the same percentage points, without modifying the tax rates on labour income, to ensure that the amount of taxes raised is the same as in the benchmark equilibrium.[21] Implementing the reform in a revenue-neutral way allows to isolate its distortionary effect. Before turning to the evaluation of the reform, an appropriate measure of welfare needs to be defined.

Measure of welfare

For each household, lifetime utility is taken as a natural measure of welfare given a fiscal policy ω:

$$W_i(\omega) = \sum_{t=1}^{t_f} \beta^{t-1} u\left[c_t^i(\omega)\right].$$

To compare two fiscal designs ω_0 (the benchmark economy) and ω, the percentage change (constant in every period) of consumption in the benchmark economy is computed that is required to make a household indifferent between the two policy arrangements. Denoting by θ_i household of type i:

$$W_i(\omega) = \widetilde{W}_i(\omega_0, \theta_i) = \sum_{t=1}^{t_f} \beta^{t-1} u\left[(1+\theta_i) c_t^i(\omega_0)\right].$$

Impact of higher progressivity of capital taxation on output and production

The new equilibrium is reached for a 0.94 percentage point reduction in the initial set of marginal tax rates. The new interest rate is $r = 5.80\%$, and the capital stock drops by 2.9%. Output and wages are lower by 1%. As the most productive now face a higher marginal tax rate on capital income, their marginal cost of consuming tomorrow becomes higher relative to the marginal cost of consuming today. They are therefore more reluctant to save, and as a result the average saving rate of the top lifetime productivity decile falls from 22.2% to 19.7% (Figure A3.4). Yet, the saving rate remains nearly unchanged for the 9th decile and increases a bit for the rest of the population, even though this is nonetheless not enough to compensate for the capital reduction of the rich.[22] This can be explained by most households facing a lower marginal tax rate than in the benchmark economy. The first six lifetime labour-income deciles are now experiencing an average and marginal tax rate of 9.1% on capital income, and the average tax rate on capital income is still only 12.9% for the 9th decile. The average rate of capital taxation goes up from 13.8% in the benchmark economy (flat tax rate) to 15.9% in the new one (for the highest lifetime labour-income decile it is even 19.0%). Thus, the increase in the aggregate level of capital taxation is

20. These go from 10% for annual incomes lower than USD 11 000 to 35% for incomes higher than USD 429 000.

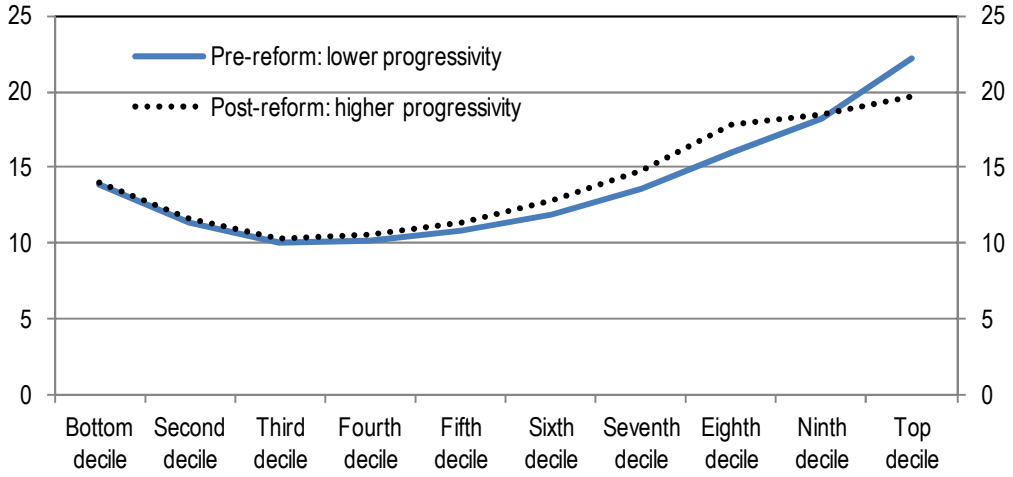
21. An alternative reform which effectively increases the progressivity of capital taxation by applying a comprehensive income tax on the sum of labour and capital income was found to have similar effects.

22. In the benchmark economy, the top lifetime labour-income decile has 48% of the whole wealth, and the 9th one only 18% of it. Hence, the top decile decides alone what occurs to one half of the total capital stock.

compensated for by a fall in the labour-income tax revenue (since wages went down), and this burden is almost exclusively borne by the top lifetime labour-income decile.

Figure A3.4. Average saving rate by lifetime labour-income decile: low versus high progressivity

In percentage



Source: Authors' calculations using PSID and HRS.

Impact of higher progressivity of capital taxation on income inequality

Reductions in the level of static income inequality are significant. The Gini coefficient after taxes and transfers for current income, *i.e.* not lifetime income, is reduced by 1 percentage point, and the Gini coefficient for wealth by 1.8 percentage points. This signifies large distributional effects. The tax system currently reduces the Gini coefficient for market income by about 4 percentage points (see Figure 6). Accordingly, the simulation suggests that the reform would increase income inequality reduction via the tax system by 25%. However, these results bear little implication for the effect on lifetime income inequality, arguably the concept more relevant for welfare analysis.

Impact of higher progressivity of capital taxation on social welfare

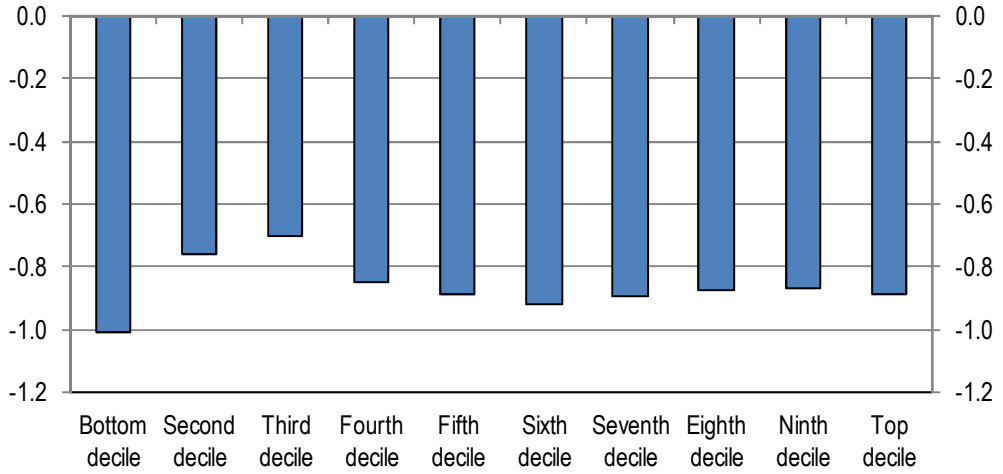
Because of the lower output, the reform of raising the progressivity of capital taxation could lower the welfare of every household. However, with the observed increase in redistribution it is, in principle, also possible that the most productive households are worse off, while the less productive benefit from the reform. Yet, the most striking feature from the computation of the changes to labour income after taxes and transfers is that every household has fewer resources post- than pre-reform. The average per-year decline is 1% for the bottom decile and varies between 0.7% and 1% for the other deciles (Figure A3.5, Panel A). Thus, from a social welfare perspective, everybody is worse off in the new equilibrium. On average, the welfare loss from the tax reform proposal corresponds to a drop of 0.64% of consumption in each period (Figure A3.5, Panel B). The worst hit are the bottom and top lifetime labour-income deciles, although for different reasons. Everyone's wage decreases, implying lower earned labour income. The transfers that the government provides decline too (as they are calculated through negative marginal tax rates on labour income). The lower eight deciles all compensate by slightly increasing their saving rate to benefit from the falling average tax rate on capital income for them. However, the top lifetime productivity decile is the only one confronted with a significant increase in the effective capital income tax rate, and thus saves less.

For it, higher capital taxation reinforces the negative impacts of the reform from lower earned labour income, which explains its relatively large welfare loss.

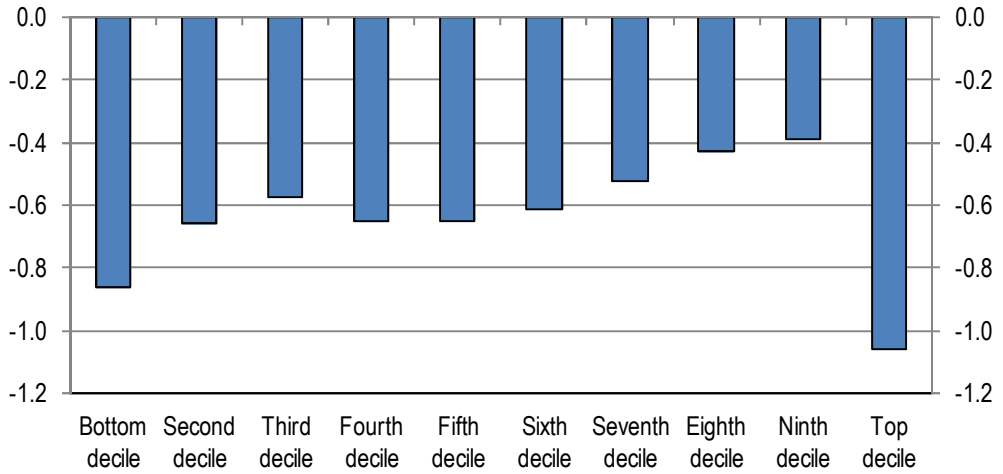
Figure A3.5. Impacts from more progressive capital taxation by lifetime labour-income decile

In percentage

A. Average impact on labour income after taxes and transfers



B. Impact on welfare



Source: Authors' calculations using PSID and HRS.

In summary, while higher progressivity increases redistribution through the tax-and-transfer system and thus lowers income inequality, it reduces not only aggregate output but the disposable income of every household. The policy of raising the progressivity of capital taxation thus reduces social welfare, independent of the precise aggregation of individual utilities. Intuitively, taxing the capital income of rich households at a particularly high rate is inefficient as their contribution to aggregate capital accumulation in the economy is so large. This is both because capital is very unequally distributed and rich households manage on average to obtain a higher rate of return on their savings. Higher progressivity of capital taxation lowers therefore the overall efficiency in the economy.

The insights are obtained using a standard dynamic (life-cycle) general equilibrium model calibrated to the US economy. As with any macroeconomic model, the quantitative results are conditional on the assumptions made. However, the negative impacts on disposable income and social welfare are so large across the income distribution, that they are arguably robust in a qualitative sense to plausible variations around the benchmark assumptions. More generally, the reform studied provides an example illustrating the importance of economic advice going beyond the simple trade-off between equity and efficiency that is so central to policymakers. It shows that, even when lowering income inequality, a policy can reduce the welfare of households across the income distribution.

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