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The deterioration of the public spending mix during the global financial crisis: Insights from new indicators

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By Debra Bloch and Jean-Marc Fournier

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ABSTRACT/RÉSUMÉ

The deterioration of the public spending mix during the global financial crisis: Insights from new indicators

New indicators measuring the effects of public spending on inclusive growth have been constructed using recent empirical work by Fournier and Johansson (2016) and a recent public finance dataset (Bloch et al., 2016). A first set of indicators combines information on the mix of public spending. Each spending item share is multiplied with an estimated coefficient from growth and inequality equations to build both a growth and an income distribution component, which is then summed up to an aggregate inclusive growth indicator. The spending mix analysis cannot, however, measure the effectiveness of public spending within individual spending items, which is difficult to observe in a comparable manner across countries. A second set of indicators attempts to at least partly overcome this limitation by including information on the size and perceived effectiveness of governments. The average of the spending mix indicator and the size and effectiveness indicator provides an indicative overall indicator on the effects of public spending on inclusive growth. The analysis suggests that countries with a counter-cyclical fiscal stance typically have a public spending structure that is more supportive of inclusive growth. There is also a striking link between the growth component of the public spending mix indicator and the output gap: the capacity of the public finances to support inclusive growth deteriorated markedly in the countries hardest hit during the recent crisis.

JEL Classification: H5; H11; H50; E62; D31

Keywords: public spending, inclusive growth, government size, fiscal policy

* * * * *

La dégradation de la structure des dépenses publiques pendant la crise financière mondiale : éclairage apporté par de nouveaux indicateurs

De nouveaux indicateurs mesurant les effets des dépenses publiques sur la croissance inclusive ont été élaborés à partir de récents travaux empiriques réalisés par Fournier et Johansson (2016) et d'un récent ensemble de données sur les finances publiques (Bloch *et al.*, 2016). Un premier ensemble d'indicateurs repose sur diverses informations concernant la structure des dépenses publiques. On multiplie le poids relatif de chaque poste de dépenses par un coefficient estimé à partir d'équations relatives à la croissance et aux inégalités, de manière à construire à la fois une composante relative à la croissance et une composante relative à la distribution des revenus, que l'on ajoute ensuite pour obtenir un indicateur global de croissance inclusive. L'analyse de la structure des dépenses ne permet cependant pas de mesurer l'efficacité des dépenses publiques pour chaque poste de dépenses, étant donné la difficulté de procéder à une comparaison de ces éléments entre pays. Nous avons élaboré un deuxième ensemble d'indicateurs en vue de remédier au moins en partie à cette lacune, en utilisant des informations sur la taille et l'efficacité perçue des administrations publiques. La moyenne de l'indicateur relatif à la structure des dépenses publiques et de l'indicateur relatif à la taille et à l'efficacité perçue des administrations publiques fournit un indicateur global des effets des dépenses publiques sur la croissance inclusive. D'après les résultats de nos analyses, les pays dont la politique budgétaire a une orientation anticyclique se caractérisent généralement par une structure des dépenses publiques plus propice à une croissance inclusive. Il existe par ailleurs un lien frappant entre la composante relative à la croissance de l'indicateur relatif à la structure des dépenses publiques et l'écart de production : la capacité des finances publiques d'étayer une croissance inclusive s'est nettement dégradée dans les pays les plus durement touchés par la récente crise.

Classification JEL : H5 ; H11 ; H50 ; E62 ; D31

Mots clés : dépenses publiques, croissance inclusive, taille des administrations publiques, politique budgétaire

TABLE OF CONTENTS

1. Introduction....6
2. Building Public Spending Indicators: Underlying data and methodology....8
2.1. Designing the indicators....8
2.2. The OECD Public Finance Dataset....9
2.3. The structure and methodology of the indicators....12
3. Public Spending Indicators: Main results....17
3.1. Indicator breakdown: Overall, public spending mix and government size and effectiveness....17
3.2. Indicator breakdown: Inclusive growth indicators versus growth indicator....25
4. Public spending and demand shocks....26
4.1. Counter-cyclical fiscal stance and public spending....26
4.2. The spending mix worsened when large negative demand shocks hit....27
4.3. The link between the economic cycle and the size and effectiveness of governments varies across countries....30
5. Robustness checks: Comparison with other indicators....31
6. Conclusion and next steps....32

ANNEX A. ROBUSTNESS CHECKS ON THE SPENDING MIX AND INCLUSIVE GROWTH INDICATORS....34

BIBLIOGRAPHY....40

Tables

1. Expenditure item list....9
2. Mapping of expenditure data into fiscal items....10
3. Growth and inequality effects of the spending mix....14
4. The size and dispersion of spending items....15
5. Breakdown of cyclically adjusted primary spending by item for selected OECD countries....23
6. Comparison of inclusive growth effects on the spending mix....31
A1.1. The robustness to the source of coefficients....35
A1.2. Robustness to spending mix breakdown choices....36
A1.3. The robustness to method choices....37
A1.4. The robustness of coefficient choices....38
A1.5. Time sensitivity....39

Figures

1. Data decision process for expenditure items 11
2. The Overall Public Spending Indicator schema 15
3. Worldwide Governance Indicators: Government effectiveness indicator 16
4. Public spending overall inclusive growth indicator over time 18
5. Government spending mix inclusive growth indicator 19
6. Government size and effectiveness inclusive growth indicator 21
7. Components of public spending mix indicator 22
8. Components of the public spending mix inclusive growth indicators for selected OECD countries 24
9. Components of the overall inclusive growth indicators for selected OECD countries 24
10. Public spending overall indicator: Inclusive growth effects and growth effects 25
11. Public spending mix indicator: Inclusive growth effects and growth effects 26
12. Counter-cyclical fiscal stance and public spending 27
13. Spending mix changes tend to amplify demand shocks 28
14. The spending mix quality declines following the global financial crisis in Greece, Ireland, Portugal and Spain 29
15. The output gap and the size and effectiveness component 30
16. Comparison of country rankings based on the inclusive growth spending mix indicators under the baseline and alternative weighting methods 32

Boxes

Box 1. Main findings of the effect of the size and the mix of public spending on growth and inequality 12
Box 2. Contributions to the spending mix and overall indicators 22

THE DETERIORATION OF THE PUBLIC SPENDING MIX DURING THE GLOBAL FINANCIAL CRISIS: INSIGHTS FROM NEW INDICATORS

By Debra Bloch and Jean-Marc Fournier[1]

1. Introduction

1. Fiscal policy is a central focus in policy debates as governments strive to boost growth and make it more inclusive. Many of these debates focus on well-reported flagship quantitative measures such as the government balance. The public spending mix, or public spending effectiveness, while quite significant in the fiscal policy debate, has received less attention. Indeed, during the crisis, the public spending mix may have been less geared toward growth and equity as decisions were taken to reduce fiscal deficits. This paper provides indicators aimed to help decision makers consider the growth and inclusive growth consequences of spending structure choices. These indicators can encourage policymakers to devote more attention to spending mix and government effectiveness in fiscal policy choices.

2. The indicators provided in this paper describe to what extent the government spending mix, size and effectiveness favour inclusive growth. The recent literature highlights how the type and effectiveness of public spending affect growth and equity. Public investment in infrastructure and innovative activities raises the productive capacity of the economy, while social and welfare spending can reduce inequality. Likewise, the size and effectiveness of governments can have an important bearing on inclusive growth. The ability of government policy to promote long-run growth and address societal inequalities can be investigated through an analysis of the breakdown of government spending and key government features.

3. The literature highlights the importance of distinguishing between productive and unproductive spending when assessing the effects of public spending on growth (Johansson, 2016). A second important takeaway from the literature is that the size of government (as measured by general government spending) can have an adverse effect on growth. A recent OECD study found a negative relationship between the size of government and GDP growth in a sample of OECD countries (Fall and Fournier, 2015). Nonetheless, complementarities may exist between the size of government and other policies and institutions, affecting this relationship. For instance, Freeman (1995) showed that in Sweden the mix of growth-friendly structural policies with a high level of trust in public institutions

1. The authors are members of the OECD Economics Department. They would like to thank Boris Cournède, Balázs Egert, Mikkel Hermansen, Peter Hoeller, Vincent Koen, Lukasz Rawdanowicz and Douglas Sutherland (Economics Department), Silvia d'Andrea (Italian Ministry of Finance), Kamran Kazemzadeh (Austrian Delegation to the OECD), Arent Skjæveland (Norwegian Ministry of Finance and Chairman of WP1 of the Economic Policy Committee), Gabriele Velpi (Italian Delegation to the OECD) and Paulo Leiria (Portuguese Delegation to the OECD) for helpful comments and suggestions, and Sebastian Barnes (Economics Department) who first encouraged this project. Special thanks go to Celia Rutkoski (also from the Economics Department) for assistance in preparing this document.

may have off-set the adverse growth effect of a large government sector. In line with this, Fournier and Johansson (2016) find that there is an adverse growth effect of government size where government effectiveness is low, while countries with high government effectiveness show no negative growth effects of large governments.

4. As public policy puts greater emphasis on balancing growth and equity to promote inclusive growth, it has become increasingly important to analyse and assess public finances in both of these terms. In this paper, growth and income equality are thus the two public policy objectives, and hence the indicators developed reflect to what extent public spending is geared toward these goals.

5. Fournier and Johansson (2016) provide a comprehensive set of estimates used here to gauge the effect of the public spending mix, government size and effectiveness on growth and equity. The estimated coefficients reflect, for instance, that higher shares of public investment and family benefits are conducive to stronger long-term inclusive growth. On the other hand, shifting spending towards public subsidies or pensions may reduce growth. This paper also shows that large and effective governments reduce inequality with no adverse growth effect. The indicators presented here combine the features of public spending with the estimated coefficients from Fournier and Johansson (2016). The aim is to capture to what extent these features favour inclusive growth. Thus a country with a higher share of public investment in total spending will show a better public spending mix as the coefficient on investment is positive. The indicators are positively correlated with the corresponding outcomes. For instance, the correlation between the growth component of the indicator and growth outcomes is about 0.5. This illustrates that the public spending mix is an important determinant of inclusive growth.

6. The concept of the quality of public spending is generally defined as the capacity to achieve public policy objectives effectively. While quality is a notion which is difficult to observe, and as such quality indicators need to be read with caution, this paper uses the term “quality of public spending” specifically to indicate to what extent the public spending mix, along with the size and effectiveness of government, can boost growth and make it more inclusive. Other factors affecting quality, such as national policy preferences and various measures of public programme efficiency are not included in these indicators.

7. These new indicators provide evidence that in most countries, the quality of the public spending mix deteriorates after large demand shocks. This complements the literature on the long-term consequences of deep economic crises on potential output. Investigating events before the global financial crisis, Cerra and Saxena (2008) showed that political and financial shocks have a permanent effect on potential output. In the same vein, Reinhart and Rogoff (2009) and Furceri and Mourougane (2012) show that financial crises have long-term negative effects on potential output. The global financial crisis confirms this pattern (Reinhart and Rogoff, 2014; Ball, 2014). The channels typically considered are those of higher risk premia and stricter lending standards which can depress private investment and raise long-term unemployment, which in turn reduces the human capital stock. This paper provides a look at such shock persistence through a new lens. It shows that the global financial crisis, through the pressure placed on public finances, has triggered a deterioration of the public spending mix: governments have, for instance, cut investment more than less productive spending categories.

8. Governments have many objectives, and country preferences certainly influence how governments spend and structure their limited resources. Ensuring solid economic growth and income equality are important objectives for all OECD countries, but they are not the only goals. It is important to bear in mind that the indicators capture performance with respect to inclusive growth policies, but do not attempt to capture progress towards other policy goals which individual countries

may pursue. Furthermore, taking a bird's eye view of the public spending mix with regard to the broad goals of growth and equity may not suffice to analyse in a more granular way specific public expenditure and policy issues. For instance, as highlighted in European Commission (2012), health outcomes must be analysed not simply by focusing on the quantity of public expenditure, but also on how that money is spent. The indicators presented here can thus be complemented with outcome indicators for policies related to other goals. As an example, Programme for International Student Assessment (PISA) scores provide complementary information on education outcomes, and Dutu and Sicari (2016) map such outcomes with education spending.

9. The indicators presented summarise information available with cross-country comparable data sources; policy makers can refine the assessment with country-specific information to adjust the assessment to each country's specificities. For instance, the provision of in-kind benefits can favour inclusiveness. This cannot be easily captured in a comparable manner as cross-country inequality data focus on disposable income or market income inequality. Furthermore, in a few countries, a large share of infrastructure investment is provided by private firms in Public-Private Partnership, which may impact the view on the optimal share of public investment. In some countries, a part of social spending is covered by private entities (e.g. private pension schemes). That said, OECD Social Expenditure data suggest this does not dramatically change the big picture. The correlation across OECD countries between gross public social expenditure and net publicly mandated social expenditure is 0.95, and the correlation between gross public social expenditure and net total social expenditure is 0.86 (0.92 for the latter without the United States).

10. This paper describes the construction of this set of indicators, based on recent empirical work by Fournier and Johansson (2016) and on a recent public finance dataset (Bloch et al., 2016). The dataset is briefly explored, followed by a discussion of the empirical work which underlies the construction of the indicators. The overall indicator is then presented, along with a specific look at sub-indicators of the spending mix and government features. Comparisons over time highlight important changes in country rankings, and the exploration of sub-indicators allows for an understanding of the relative importance of growth-enhancing versus equity-promoting spending across countries. A descriptive analysis suggests a striking link between the quality of public spending and the output gap, especially in countries which experienced large shocks. The indicators are then compared with alternative indicators, with a view to check their robustness. Finally, the scope to improve the accuracy of these indicators is discussed, but this would require additional research. Greater emphasis on the quality of public spending may help to stimulate such research and hence improve the indicators.

2. Building Public Spending Indicators: Underlying data and methodology

2.1. Designing the indicators

11. The goal of the indicators is to facilitate the observation of trends, the setting of policy priorities and the comparison of country performance (see for instance, OECD/EU/JRC, 2008). Their construction is based on recent empirical work studying the effects of the size and composition of public spending on growth and inequality (Fournier and Johansson, 2016). Both the empirical work and the resulting indicators were made possible through the construction of the OECD Public Finance dataset, which combines a number of complementary sources to create a detailed breakdown of fiscal data over time (Bloch et al., 2016).

12. The public spending mix indicators measure the extent to which structural fiscal policy settings support inclusive growth. This is quite similar to existing definitions of quality of public spending in the literature. For instance, Barrios and Schaechter (2008) define quality of public

spending as "all fiscal policy arrangements and operations that support achieving macroeconomic goals of fiscal policy, in particular long-term economic growth". The construction of the indicators therefore focuses on how well the composition of public spending and the size and effectiveness of government underpin the goals of long-term growth and inclusiveness.

13. The choice of data is essential to the construction of composite indicators (OECD/EU/JRC, 2008). The indicators are built upon the mix of public spending, the size of government and perceived government effectiveness. The public spending mix is broken down into key spending areas relevant to the policy objectives of growth and income distribution. The size of government is measured as total primary spending, and is combined with a measure of perceived government effectiveness. There is indeed evidence that higher public spending can reduce long-term growth, but this adverse growth effect can be offset if countries have effective governments (Fournier and Johansson, 2016).

2.2. The OECD Public Finance Dataset

14. The Public Spending Indicators are built from the OECD Public Finance dataset, a recent effort to bring together a detailed breakdown of fiscal data designed specifically for the analysis of the effect of public finance on growth and equity (Bloch et al., 2016). Starting from earlier work on fiscal consolidation for which a single-year data file was constructed (Cournède et al., 2013), detailed expenditure and revenue items were grouped to arrive at a comprehensive breakdown. Taking this idea to the next step, this recent database takes into account not only a breakdown of fiscal items by policy area, but also includes time variation, cycle variation and structural factors which affect the quality of public finance. The construction of public spending and revenue items is described extensively in Bloch et al. (2016). The Public Spending Indicators focus on two main areas of this dataset: the breakdown of government expenditure and the size and effectiveness of government. The breakdown of spending instruments is shown in Table 1, while an overview of the mapping of this breakdown with the available data is shown in Table 2.

Table 1. Expenditure item list

	Expenditure Item
Item 1	Education
Item 2	Health
Item 3	Other wages and intermediate consumption
Item 4	Old-age and survivor pensions
Item 5	Sickness and disability
Item 6	Unemployment benefits
Item 7	Family and children
Item 8	Subsidies
Item 9	Investment
Item 10	Other primary expenditure
Item 11	Property income paid (including interest payments)

Source: Bloch, D., J.M. Fournier, D. Gonçalves and Á. Pina (2016), "Trends in Public Finance: Insights from a New Detailed Dataset", *OECD Economics Department Working Papers*, No. 1345, OECD Publishing, Paris.

Table 2. Mapping of expenditure data into fiscal items

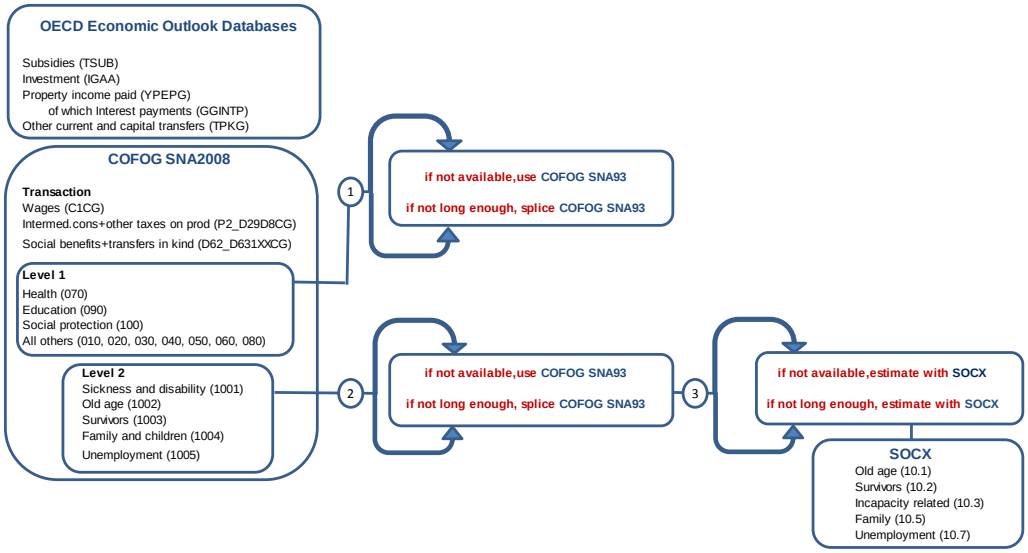
Function \ *Transaction*		Social benefits and transfers in kind (D62_D631XX)	Wages (D1)	Intermediate consumption (P2)	Subsidies (TSUB)	Investment (IGAA)	Interest payments (YPEPG)	Inventory changes	Capital transfers	Other primary expen-ditures
Education (090)		1	1	1	8	9	11	10	10	10
Health (070)		2	2	2	8	9	11	10	10	10
Social protection (100)	**Sickness and disability (1001)**	5	5	5	8	9	11	10	10	10
	Family and children (1004)	7	7	7	8	9	11	10	10	10
	Old age and survivors (1002 + 1003)	4	3	3	8	9	11	10	10	10
	Unemployment (1005)	6	3	3	8	9	11	10	10	10
	Other social protection (1006-09)	10	3	3	8	9	11	10	10	10
General public services (010)		10	3	3	8	9	11	10	10	10
Defence (020)		10	3	3	8	9	11	10	10	10
Public order and safety (030)		10	3	3	8	9	11	10	10	10
Economic affairs (040)		10	3	3	8	9	11	10	10	10
Environment protection (050)		10	3	3	8	9	11	10	10	10
Housing and community amenities (060)		10	3	3	8	9	11	10	10	10
Recreation, culture and religion (080)		10	3	3	8	9	11	10	10	10

Note: The numbers shown in the main body of the table refer to the expenditure items listed in Table 1. The columns in the table refer to national accounts transactions (codes in parentheses refer to SNA COFOG codes or Economic Outlook database variable codes), while rows show the breakdown by function in the COFOG classification (the codes in parentheses refer to COFOG function codes). The areas coloured in pink refer to data extracted from Annual National Accounts Table 11 (COFOG), the areas in blue refer to data taken from the Economic Outlook database, and the areas without shading are calculated as a difference between total expenditure (YPGT) from the Economic Outlook database and the other aforementioned items.

Source: Bloch, D., J.M. Fournier, D. Gonçalves and Á. Pina (2016), "Trends in Public Finance: Insights from a New Detailed Dataset", *OECD Economics Department Working Papers*, No. 1345, OECD Publishing, Paris.

15. The OECD Public Finance dataset relies on several data sources (Table 2). Specifically, subsidies, public investment, interest payments and total public expenditure are directly from the OECD Economic Outlook Database based on the National Accounts. Spending on education, health, pensions, sickness and disability, unemployment benefits, family and child benefits and other wages and intermediate consumption expenditure are from the National Accounts' Classification of the Functions of Government (COFOG). When data on certain social spending items are missing, data are imputed using the data of the OECD Social Expenditure Database (SOCX). The correlation, in cases of overlap, between the two data sources is high, suggesting that SOCX data are a good proxy for COFOG data. A schema of this construction is shown in Figure 1, and detailed information on the construction of the database is provided in Annex 1 of Bloch et al. (2016).

Figure 1. Data decision process for expenditure items



Note: The abbreviations in brackets refer to the variable code in the Economic Outlook, COFOG and SOCX databases.

Source: Bloch, D., J.M. Fournier, D. Gonçalves and Á. Pina (2016), "Trends in Public Finance: Insights from a New Detailed Dataset", *OECD Economics Department Working Papers*, No. 1345, OECD Publishing, Paris.

16. Certain public expenditure items are sensitive to the business cycle. To obtain a measure of structural expenditure, unemployment benefits, other income related transfers and capital transfers are cyclically-adjusted following the methodology of Price et al. (2015). The other spending items are not cyclically-adjusted as their sensitivity to the cycle is limited (e.g. public investment is not cyclically-adjusted as its variation reflects discretionary choices, rather than the automatic stabilisers). In order to focus on long-term structural effects, the spending items are expressed as ratios to potential GDP. The Public Spending Indicators are constructed with these data, and are the same as those used for the estimation of the effects of spending on inclusive growth in Fournier and Johansson (2016). Robustness checks with non-adjusted data reveal that indicators are nearly identical (Table A1.3).

2.3. The structure and methodology of the indicators

Structure of the overall indicator

17. Fournier and Johansson (2016) show that the size and mix of public spending affect growth and inequality. Spending components, such as government investment, family benefits or subsidies, matter for growth and inequality. Furthermore, too large governments tend to reduce growth, unless governments function in a highly effective way. On the other hand, large governments tend to redistribute more, thereby reducing inequality. Simulations combining both growth and distributional effects illustrate that public spending reforms can deliver considerable inclusive growth gains. The main findings are summarised in Box 1. The results of this study form the basis for the Public Spending Indicators.

Box 1. Main findings of the effect of the size and the mix of public spending on growth and inequality

Fournier and Johansson (2016) employed an estimated baseline convergence model inspired by Barro (2015) to capture the long-term effect of the public spending mix, size and effectiveness on potential output for a panel of OECD countries.[1] The inequality effect estimates follow the approach by Hermansen et al. (2016). The inequality estimates control for GDP in order to isolate the inequality effect. These two effects are then combined to provide an overall effect on the income distribution. The main findings that emerge from these estimates are the following:

On the public spending mix

- Increasing the share of public investment in spending yields large growth gains. A spending shift towards public investment, away from other spending, would also speed up the convergence of income towards the most advanced economies. Overall, such a spending shift would lift “all boats” as it raises average income without any substantial adverse equity effect.
- The growth gains from increasing public investment may decline at a high level of the public capital stock due to decreasing returns. Still, the estimations suggest that all OECD countries, except Japan, have room for additional public investment.
- Reducing the share of pension spending in primary spending yields sizeable growth gains with no significant adverse effect on disposable income inequality. This reduction could be achieved by an increase in the effective retirement age or by cutting the replacement rate. However, cutting pensions entails a trade-off between the old and the young.
- Cutting public subsidies boosts growth, as public subsidies that do not correct market failures can distort the allocation of resources and undermine competition. But empirical evidence suggests that the gains from cutting subsidies would mainly benefit the rich, rather than the poor.
- A shift in spending towards family benefits and child care, away from other spending, reduces disposable income inequality as these benefits tend to be worth comparatively more for lower-income families. They may also facilitate the participation of second earners in the labour market.

1. With a convergence equation, the estimated long-term effect of a public finance reform is an effect on the GDP level. Since it can take decades to reach the new long-run GDP level after a reform, the temporary growth effect lasts for a long time.

Box 1. Main findings of the effect of the size and the mix of public spending on growth and inequality *(cont.)*

On the size and effectiveness of government

- Larger governments are associated with lower long-term growth. Larger governments also slow down the catch-up to the productivity frontier.
- The adverse growth effect of large governments can be offset, if countries have well-functioning governments (e.g. the Nordic countries). A high degree of spending decentralisation also mitigates the adverse growth effect of large governments.
- In the countries with the most effective governments, the large size of the government promotes equity with no adverse effect on growth. This likely reflects that larger governments tend to redistribute more, and that better functioning governments tend to better target transfer programmes to disadvantaged groups.

In countries with less effective governments, improving government effectiveness can both increase growth and reduce inequality. In these countries, reducing the size of government increases the income of all. Nonetheless, it benefits less those with lower income as smaller governments tend to redistribute less.

Fournier and Johansson (2016) provide overall effects of public spending, combining an average growth effect and a distributional effect with income indicators that focus more on low incomes. These overall effects are absolute effects. For instance, a pro-growth policy that has relatively small redistributive effects such as public investment would give a positive outcome as it increases income for all. Should one consider an inequality reducing policy, its effect is magnified in the case of a high sensitivity to low-incomes. This sensitivity is captured by a parameter noted α, as described in Foster and Székely (2008). In a first step, income distribution effects are estimated in a regression in which average GDP is in the list of the controls with a coefficient close to one. This provides a relative effect, setting aside any average growth effect. Growth effects estimated in another set of regressions and income distribution effects thus need to be averaged to calculate an inclusive growth coefficient. This combination reflects an accounting identity. In line with Fournier and Johansson (2016) and Hermansen et al. (2016), indirect growth effects of reforms are assumed to trickle down to households uniformly across the distribution of income.

This paper reports results with three different relative aversion levels, so that the importance given to inequality reduction is chosen by policy makers rather than by the authors of this paper (Figures 4, 5 and 6). Policy makers who are more concerned by inequality reduction can thus consider results with $\alpha = -4$, those less concerned by inequality reduction can opt for $\alpha = 0$. In between, intermediate results $\alpha = -2$ are reported in the remainder of the paper, unless otherwise specified.

The public spending indicators are based on all the estimated effects, including those that are not statistically significant, so that all items are handled in a comparable manner (Table A1.4 illustrates that this choice does not matter much in practice). Table 3 highlights these effects of the spending mix on growth and inequality. The largest positive growth effect is provided by public investment. The main other productive spending item, education, is associated with a rather small coefficient. As discussed in Fournier and Johansson (2016) and in line with other research (see Hanushek and Woessmann, 2011 for a literature review), this most likely reflects that in advanced economies, education outcomes are driven by education policies, rather than education spending. The coefficient associated with the largest negative effect is public subsidies because the negative growth effect is particularly large and dominates the inequality reducing effect.

Box 1. Main findings of the effect of the size and the mix of public spending on growth and inequality *(cont.)*

Table 3. Growth and inequality effects of the spending mix

Spending item	A. Growth effect	B. Inequality reduction effect	C. Inclusive growth effect (A+B)
Education	0.2	0.0	0.2
Health	0.2	0.0	0.2
Other wages and intermediate consumption	0.6	-1.1	-0.6
Old-age and survivor pensions	-0.9*	-0.1	-1.0
Sickness and disability	0.8	0.9	1.7
Unemployment benefits	0.2	1.0	1.2
Family and children	1.7	1.6*	3.3
Subsidies	-3.0*	1.2*	-1.9
Investment	2.8*	-0.3	2.5

Note: The growth effect is the change in GDP after 45 years, in per cent, following an increase of the share by 1% of total spending that is phased-in over 10 years, as simulated in Fournier and Johansson (2016). The inequality reduction effect is the effect on the general mean with a medium aversion for inequality, holding GDP constant (α = -2). A positive effect in column B indicates that an increase in the spending share reduces inequality. Each effect is estimated holding the total spending to GDP ratio constant. For instance, a higher share of the item "other wages and intermediate consumption" may be negative for equity because it is associated with lower transfers that directly go to households. The estimated effects of education and health spending in Fournier and Johansson (2016) which are negative and not significant are not regarded as relevant as this does not take into account the inequality reducing effect of in-kind services (see Fesseau and Mattonetti, 2013, for measures of disparities in household income and consumption including social transfers in kind). These two coefficients are thus set to zero. (Table A1.4 illustrates that this choice does not matter much in practice). * signals that the results of Fournier and Johansson (2016) are statistically significant. Some of the other results are borderline significant.

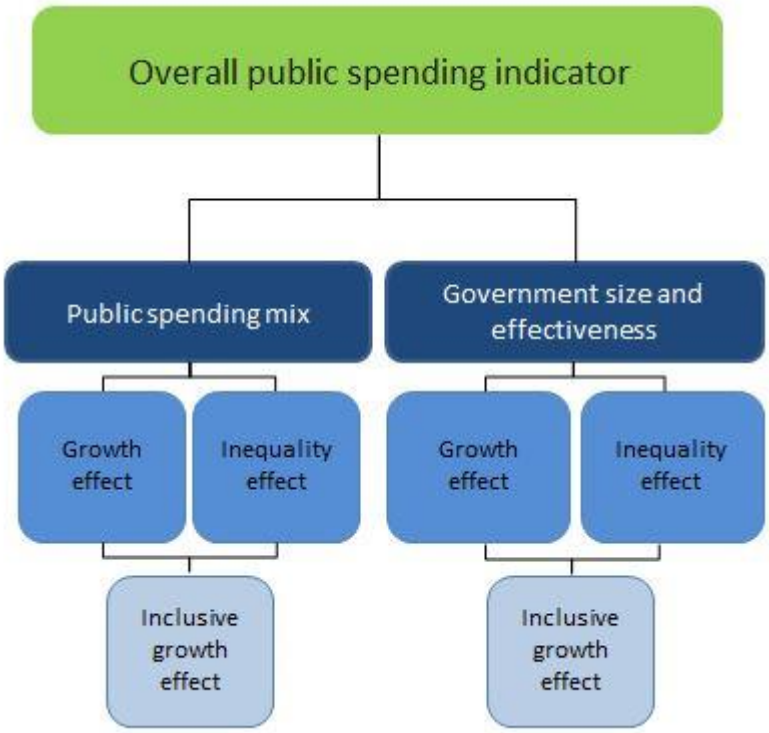
Source: Calculations based on Fournier and Johansson (2016).

The coefficients estimated are average effects. Specific reform designs that cannot be easily measured in cross-country comparisons may be associated with specific growth or inequality outcomes. For instance, the study reports no visible effect of pension spending on inequality. Pension schemes are typically effective in reducing old-age poverty. By contrast, Auerbach et al. (2017) find that life expectancy gains are accruing mostly to those at the top of the income distribution, so that pension schemes may not be an effective redistribution instrument.

18. Figure 2 illustrates the structure of the Public Spending Indicators. The overall inclusive growth indicator is composed of two main components of equal weights: the public spending mix and the size and effectiveness of government. Spending items are added together by their growth and inequality effects, and government size and effectiveness are also converted into an inclusive growth effect. The inclusive growth effect is the sum of the growth and inequality effects. Details of the equations and illustrations for overall effects are given in Fournier and Johansson (2016), and its main findings are summarized in Box 1.

19. Yearly data, 3-year averages and 5-year averages have been calculated. The resulting overall growth and inclusive growth totals are normalised around the average over the country-time sample. This allows the indicators to both situate each country in comparison to its peers and to allow for longitudinal comparisons within and across countries.

Figure 2. The Overall Public Spending Indicator schema



Public spending mix component

20. The relative importance of each spending item in the public spending mix component reflects not only the magnitude of the estimated coefficients, but also the dispersion of spending shares across countries and years (Table 4). Over time, public investment is more volatile than other components, and hence plays a relatively larger role in explaining variations of the spending mix indicator over time. Overall, if one combines estimated magnitudes of effects and dispersion of spending shares, the components that contribute most to the public spending mix inclusive growth indicator are public investment, family and child benefits and pension spending.

Table 4. The size and dispersion of spending items

In percentage

Spending item	Average size (per cent of spending)	Average dispersion across countries and years	Average dispersion in 2012	Share of between country variance in total variance
Education	11.2	2.5	2.4	92
Health	13.2	3.7	4.2	83
Other wages and intermediate consumption	20.8	3.0	2.5	84
Old-age and survivor pensions	18.3	7.0	7.5	92
Sickness and disability	6.9	3.5	3.4	87
Unemployment benefits	2.8	2.2	1.6	85
Family and children	4.4	2.5	2.2	92
Subsidies	3.5	2.3	1.9	81
Investment	9.4	3.6	2.7	77

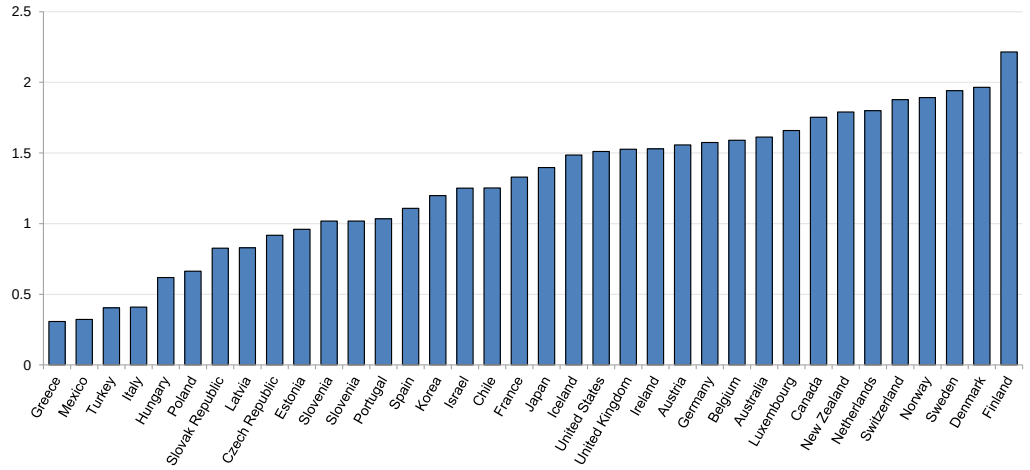
Size and effectiveness component

21. The size of government is represented by total underlying primary spending, while government effectiveness is measured by the Worldwide Governance Indicators (WGI) data disseminated by the World Bank (Figure 3). The government effectiveness indicator captures "perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies"[2] (Kaufmann et al., 2011). While this indicator is inherently imperfect, being based on perceptions rather than hard facts, it provides a proxy for effectiveness, with good cross-country coverage, broad data availability and detailed documentation. As a proxy, this indicator should be used with care, but it is worth noting that the government effectiveness measure correlates well with results obtained with other indicators (Fournier and Johansson, 2016).

22. Coefficients estimated by Fournier and Johansson (2016) are used to convert this information into inclusive growth effects. The interaction between spending size and government effectiveness in the growth regression gives two possible cases that are good for growth: either a large and effective government, or a small government. An improvement in government effectiveness also matters more in countries with a large government. There is no effect on the inclusive growth indicator in countries where primary spending is below 36% of GDP.[3] On top of the growth effect, government size and effectiveness both contribute to decrease disposable income inequality. In sum, countries that rank best are characterised by the largest and most effective governments. Countries with small governments are also well ranked. The countries which rank lowest are either particularly ineffective, or moderately effective, but with very high public spending.

Figure 3. Worldwide Governance Indicators: Government effectiveness indicator

2012



Source: The Worldwide Governance Indicators, www.govindicators.org.

2. See http://info.worldbank.org/governance/wgi/pdf/ge.pdf for details of the government effectiveness measure.

3. There are too few observations with a small government size to identify a positive inclusive growth effect of government effectiveness in those countries.

3. Public Spending Indicators: Main results

3.1. Indicator breakdown: Overall, public spending mix and government size and effectiveness

23. The indicators analyse the mix of public spending along with government size and effectiveness to gauge the capacity of public spending to raise inclusive growth. The indicators can give an overall view with regard to the policy aims of inclusive growth or for growth and inequality separately. The spending mix and the size and effectiveness of government taken separately can give further information on areas to target whether the policy goal is inequality reduction, long-term growth or both.

24. The overall indicator, which combines the spending mix and the size and effectiveness of government, highlights the inclusive growth features of public spending policy now and in the past. Figure 4 gives an overview of country rankings in the late 1990s, as well as both prior to and after the 2007 financial crisis. For 2012, the indicator based on a medium sensitivity to lower incomes suggests that the structure, size and effectiveness of government spending was most conducive to higher growth and better income equality in Australia, Denmark and Finland.

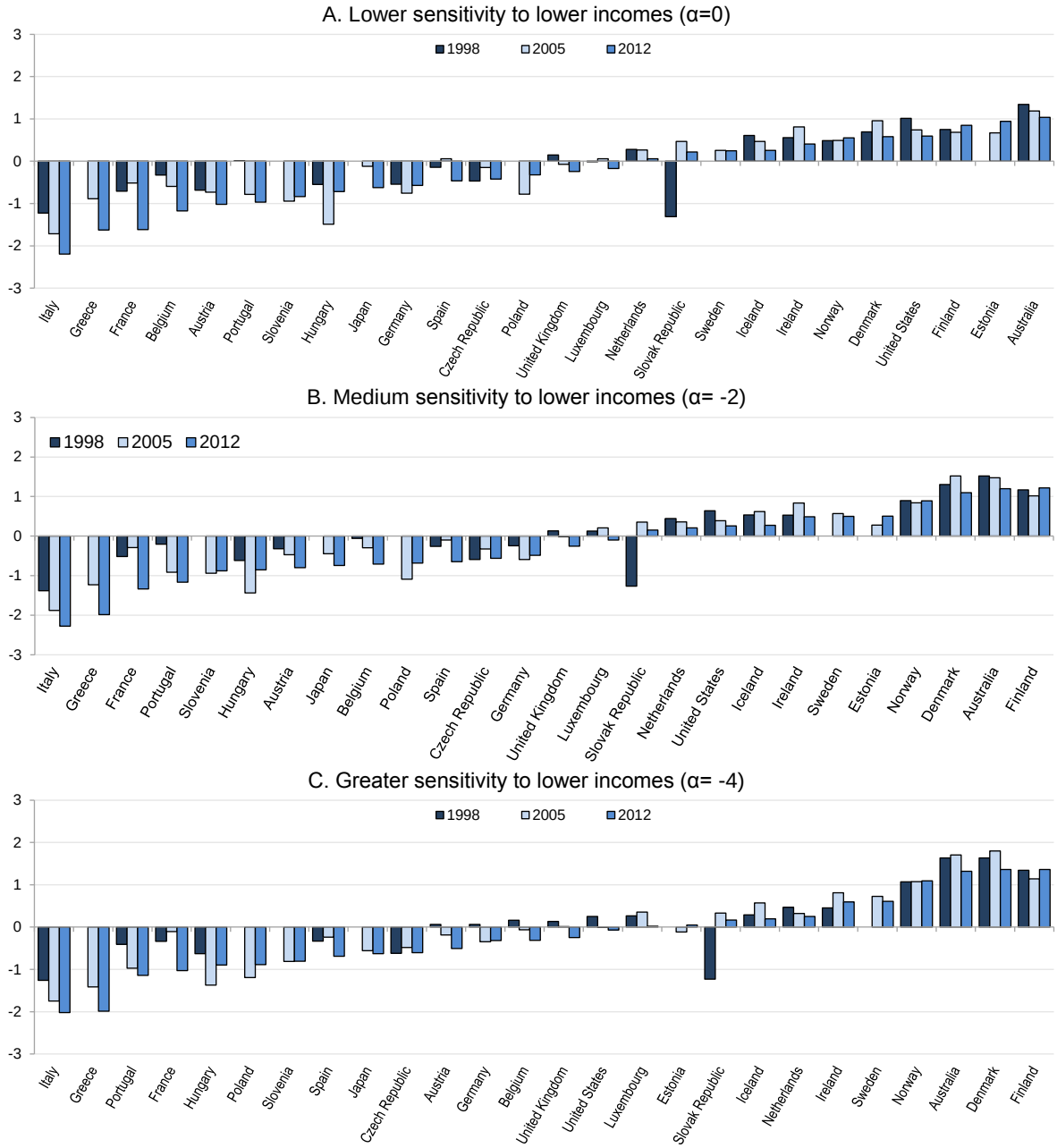
25. The relative emphasis on growth or inequality objectives is a political choice. This paper thus reports results for different degrees of inequality aversion: each user can chose the option she or he prefers. In Figures 4, 5 and 6, each panel reflects a different sensitivity to lower incomes: lower sensitivity for Panel A, medium sensitivity for Panel B and higher sensitivity for Panel C. For simplicity's sake, the medium sensitivity option (α= -2) is shown in other tables and figures.

26. Looking at the extent to which sensitivity moves the overall inclusive growth indicator, Denmark stands out with better inclusive growth performance the higher the sensitivity to lower incomes (comparing α= -4 to α= 0), owing largely to the importance of the inequality aspect of their spending mix and to its large and effective government. On the opposite end of the spectrum, the United States and Estonia fare worse with higher sensitivity to lower incomes, as the main drivers moving the indicators for these countries (investment for Estonia, investment along with low spending on subsidies for the United States) are more geared towards growth than addressing inequality.

27. The composite overall indicators point to a decline in the quality of public spending between 2005 and 2012 virtually everywhere (Figure 4). Exceptions are Estonia, Finland, Germany, Hungary and Poland and to a lesser extent Norway and Slovenia. The deterioration was particularly large in France, Greece and Spain over this period. Some important shifts between country rankings are also evident, with large improvements in rankings seen for Estonia, Germany and Poland which each gained six spots, while France slipped quite a bit, dropping nine places in these overall rankings between 2005 and 2012 (with α= -2). Looking at the full period, over three quarters of the countries show a decline in the quality of public spending, although the three-period patterns are varied. Notable when comparing the 1998 situation with 2012 is the impressive improvement by the Slovak Republic, going from near the lowest ranking to above the OECD average over the period due to a shift in the spending mix towards education and away from other government wages and intermediate consumption.

Figure 4. Public spending overall inclusive growth indicator over time

Outcomes given different sensitivities to lower incomes



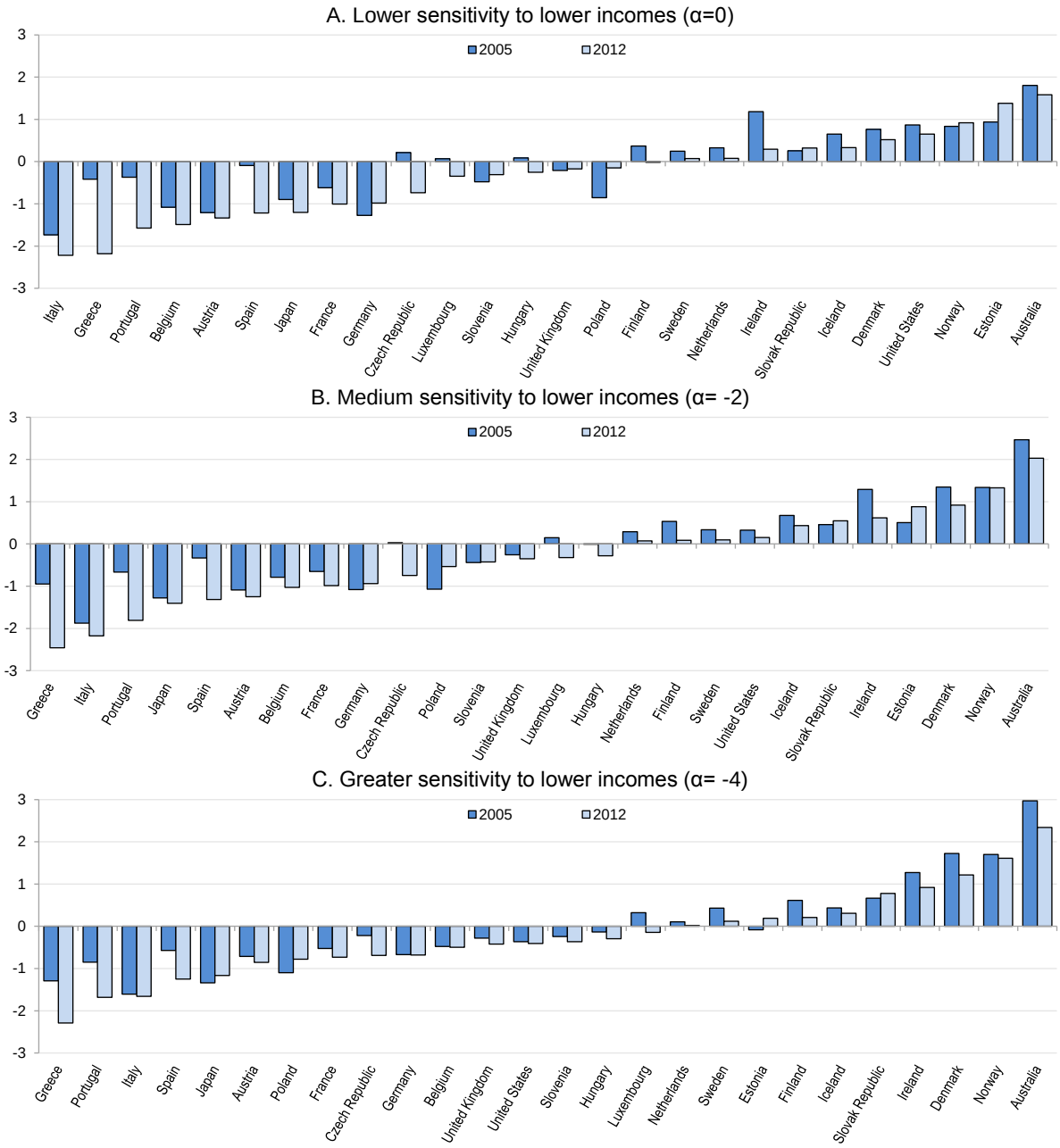
Note: The overall indicator combines information on the effect of the size and effectiveness of government and the public spending mix on growth and inequality. The sub-components have been centred around the average over all countries and the whole sample (from the mid-1990s to 2014 in most countries). An indicator value of 1 indicates that a country is one standard deviation above the sample average.1998 data are unavailable for Estonia, Greece, Japan, Poland, Slovenia and Sweden.

28. Looking more specifically at the public spending mix (Figure 5, panel B) a similar group of high performing countries (Australia, Denmark and Norway) emerges. Big negative shifts took place, however, over the crisis years, particularly for Greece, Portugal and Spain, while Germany and Poland showed significant improvement in terms of ranking for an inclusive growth-friendly spending mix, gaining respectively five and six ranks.

29. As with the overall indicators shown above in Figure 4, those countries where the indicators are growth-driven, notably the United States and Estonia, show better rankings under the lower sensitivity to lower incomes (Figure 5, panel A versus panel C). Belgium notably improves under the highest sensitivity to lower incomes variant, with unemployment benefits and higher subsidies driving the shift.

Figure 5. Government spending mix inclusive growth indicator

Outcomes given different sensitivities to lower incomes



Note: The indicator has been centred around the average over all countries and the whole sample (from the mid-1990s to 20 14 in most countries). An indicator value of 1 indicates that a country is one standard deviation above the sample average.

30. Figure 6 shows the government size and effectiveness inclusive growth indicator, shown here as three-year averages. Greece and Italy are penalised on this measure by their relatively low scores on the Worldwide Governance Indicator of perceived government effectiveness, compared to other OECD countries. It should, nonetheless, be noted that all OECD countries perform quite high on the government effectiveness indicator, compared to the full set of World Bank countries, and that the differences within the OECD group are small.[4] Under the medium sensitivity to lower incomes scenario (panel B), Denmark, Finland and Sweden are the top-ranked countries in terms of the effects of size and effectiveness on inclusive growth. Even with a relatively large government size, as measured by total underlying primary spending, these countries boast very high government effectiveness scores which permit the larger government size to positively affect growth and equality. France saw the biggest decline in this indicator over the period, with Austria and Belgium also shifting significantly lower in the rankings (losing 15 and 16 places respectively). Over 80% of the countries performed worse in the period 2010-12 than in the pre-crisis period of 2002-04, with only six countries displaying small improvements in the government size and effectiveness inclusive growth indicator over the two periods (Czech Republic, Finland, Germany, Hungary, Israel and Switzerland). In terms of ranking, Israel and New Zealand both improved their standings by six spots.

31. The impact of greater sensitivity to lower incomes (Figure 6, panel C versus panel A) favours the economies which are also rated as being effective, notably Finland and Denmark, where social spending is a motor for inclusive growth. Conversely, Latvia and Greece fare worse if more sensitivity is given to lower incomes, as their lower government effectiveness impedes their ability to effectively reduce inequality.

32. There is a positive correlation (about 0.5) between the public spending mix component and the size and effectiveness component of the inclusive growth overall indicators. The public spending mix indicator is also positively correlated with the underlying government effectiveness indicator. This can be because those countries that are better in delivering productive spending are perceived as more effective. In addition, government effectiveness and the quality of the public spending mix can be driven by the same policies, such as sound budgetary procedures. One advantage of considering the overall average indicators is that they mitigate measurement issues of each of these components.

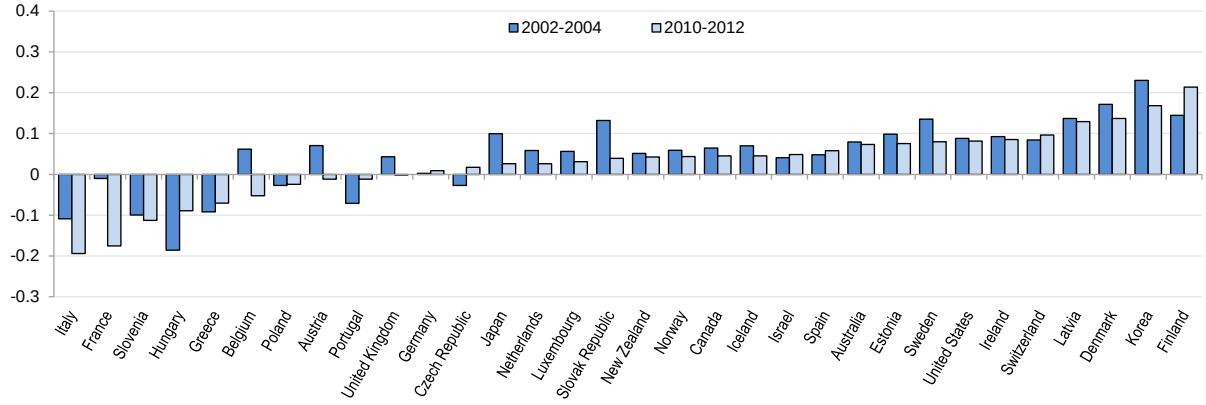
33. Box 2 illustrates the decomposition of the public spending mix indicators, identifying the contribution of each spending item and revealing that the largest drivers of results are pensions, investment and family benefits. Focussing on a subset of countries, the analysis goes further, looking at the decomposition of the spending mix and the contribution of size and effectiveness to better understand the drivers of the overall indicator.

4. All OECD countries score above the world average, which is set to zero.

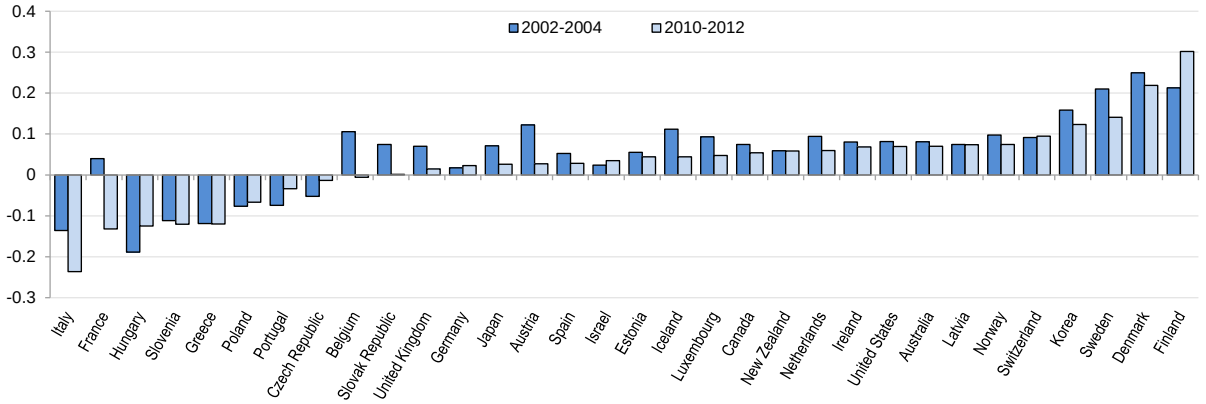
Figure 6. Government size and effectiveness inclusive growth indicator

Outcomes given different sensitivities to lower incomes

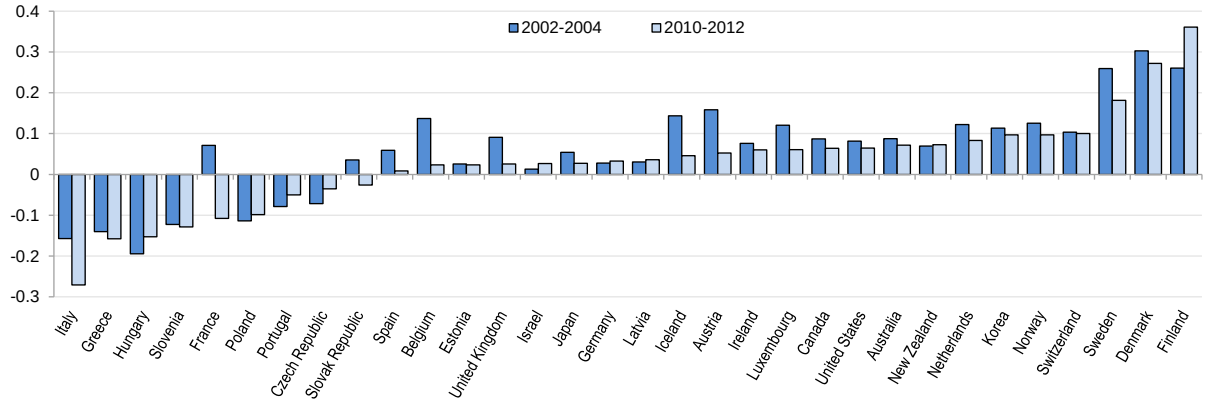
A. Lower sensitivity to lower incomes (α=0)



B. Medium sensitivity to lower incomes (α= -2)



C. Greater sensitivity to lower incomes (α= -4)



Note: The indicator has not been centred in this figure. An indicator value of 0.01 indicates that general mean disposable income is expected to be 1% higher than the one that would be observed in a country with average size and effectiveness, everything else equal.

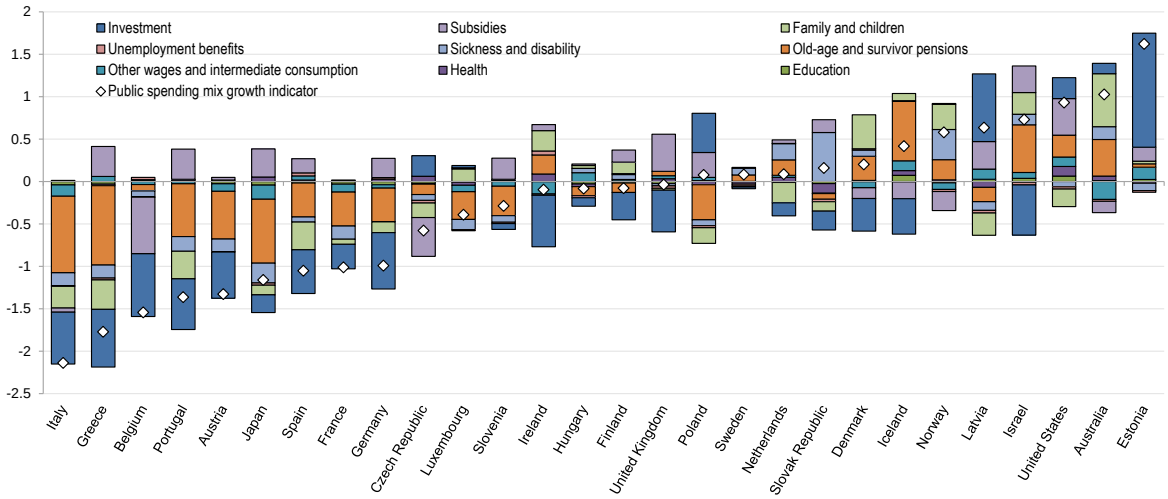
Box 2. Contributions to the spending mix and overall indicators

The spending mix indicator is the sum of the contributions of each spending item, for which the share is multiplied with the estimated effects on growth and equity. This requires two adjustments as indicators are centered and standardised: the difference between spending shares and the cross-country average is used, and the standardisation factor of the indicator is applied to each contribution so that they add up to the indicator.

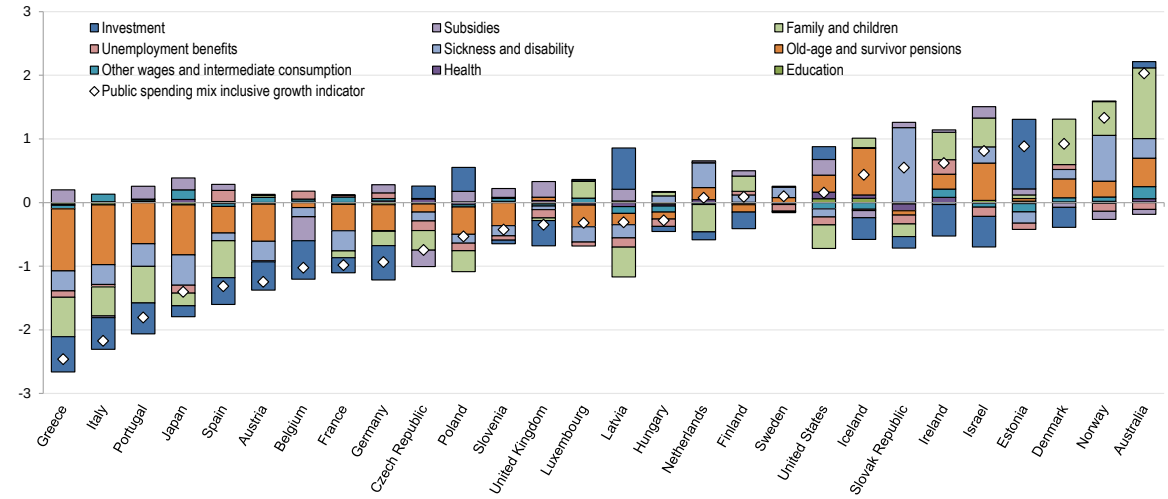
Investment and pensions are the largest contributors to the public spending mix growth indicator (Figure 7, Panel A). On top of these two, family benefits also contribute importantly to the public spending mix inclusive growth indicator (Figure 7, Panel B). As regards the growth indicator, Estonia ranks first because of its large share of public investment. Australia ranks first for the inclusive growth indicator mainly thanks to its large share of family and child benefits. In other cases the results are more broad-based, with, for example in Greece, several items contributing to its lower ranking. And in some cases, indicators close to zero hide offsetting contributions. For instance, Latvia enjoys a positive contribution of high public investment to spending ratio, but that is offset by a negative contribution of social transfers, especially family and child benefits, so that the inclusive growth indicator is slightly negative.

Figure 7. Components of the public spending mix indicator

Panel A. Growth indicator



Panel B. Inclusive growth indicator, medium sensitivity to lower incomes (α= -2)



Box 2. Contributions to the spending mix and overall indicators *(cont.)*

Focusing on a small group of selected countries to illustrate how the indicators are produced, Table 5 gives the public spending breakdown for Austria, Denmark, Japan and the United States in 2012, along with the coefficient of each spending item in the inclusive growth calculation (see Box 1, Table 3 for more information). Building on these data, Figure 8 shows a close-up view for these four countries of the data presented above in Figure 7, Panel B. The data are normalised, so that the relative importance of each item is not only in relation to the coefficient, but also to the OECD average. This means that even where an item has a positive coefficient, it can have a negative contribution to the indicator in a country where spending on that item is below the OECD average. Likewise, an item with a negative coefficient will give a positive contribution to the indicator if spending is below the OECD average for that item.

The drag on inclusive growth due to old age and survivors pensions is quite visible in Figure 8 for Austria and Japan, with spending of 29% and 32% of primary spending, respectively (Table 5). Conversely, Denmark and the United States have small positive contributions from this category, as spending on pensions in these countries is below average (approximately 13% of primary spending each). The boost to inclusive growth from 8.3% of primary spending on family and child benefits by Denmark is also evident, while for the United States, at only 2.6% of primary spending, this category gives a negative contribution to the indicator. Finally, the contribution of investment, with an important positive coefficient, bolsters the United States with over 10% of total primary spending, while Austria and Denmark, and to a lesser extent Japan, are penalised for lower than average public investment.

Table 5. Breakdown of cyclically adjusted primary spending by item for selected OECD countries

Per cent of total cyclically-adjusted primary expenditure, 2012

Expenditure Item	Austria	Denmark	Japan	United States	OECD average	*Coefficient in inclusive growth calculation*
Education	8.9	10.7	7.6	16.1	10.6	*0.2*
Health	13.5	14.4	17.8	22.6	14.4	*0.2*
Other wages and intermediate consumption	18.4	18.9	16.2	23.9	20.4	*-0.6*
Old-age and survivor pensions	28.8	12.9	32.4	13.5	20.2	*-1.0*
Sickness and disability	3.9	8.4	2.1	5.6	6.8	*1.7*
Unemployment benefits	2.3	3.7	0.8	0.8	2.0	*1.2*
Family and children	4.7	8.3	3.5	2.6	4.5	*3.3*
Subsidies	3.1	3.9	1.5	1.0	2.8	*-1.9*
Investment	6.0	6.9	7.9	10.5	8.2	*2.5*
Other primary expenditure	10.4	11.8	10.1	3.4	10.1	--
Memorandum items:						
Total cyclically-ajdusted primary expenditure, % of potential GDP	47.7	54.2	39.5	34.8	41.9	
Government effectiveness indicator	1.6	2.0	1.4	1.5	1.3	

Figure 8 completes the picture with the components of the overall inclusive growth indicators, averaging the spending mix component described in Figure 8 with the size and effectiveness component. Table 5 reports the government effectiveness indicator and the size of government (total underlying primary expenditure), used to calculate the size and effectiveness component. In the presence of an interaction term between size and effectiveness, these two inputs cannot be disentangled further. The size and effectiveness indicator gives an important boost to Denmark, where government size is deemed a positive input due to high government effectiveness, and to the United States which has a relatively small government size. For Austria, the government size-effectiveness nexus contributes negatively to the overall indicator, as the score of government effectiveness relative to other OECD countries, although above average, is not enough to compensate its large size of government.

Box 2. Contributions to the spending mix and overall indicators *(cont.)*

Figure 8. **Components of the public spending mix inclusive growth indicators for selected OECD countries**

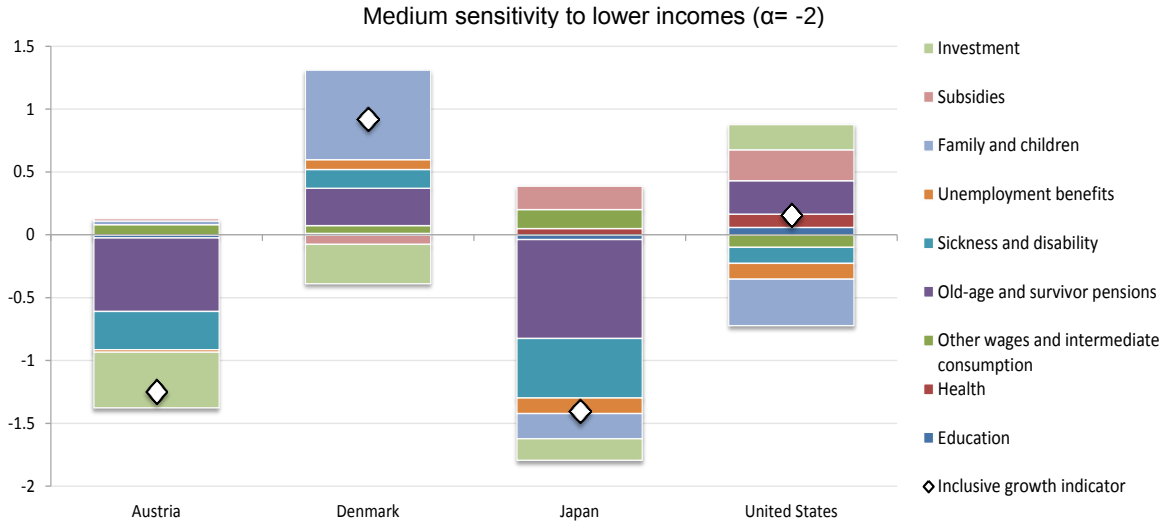
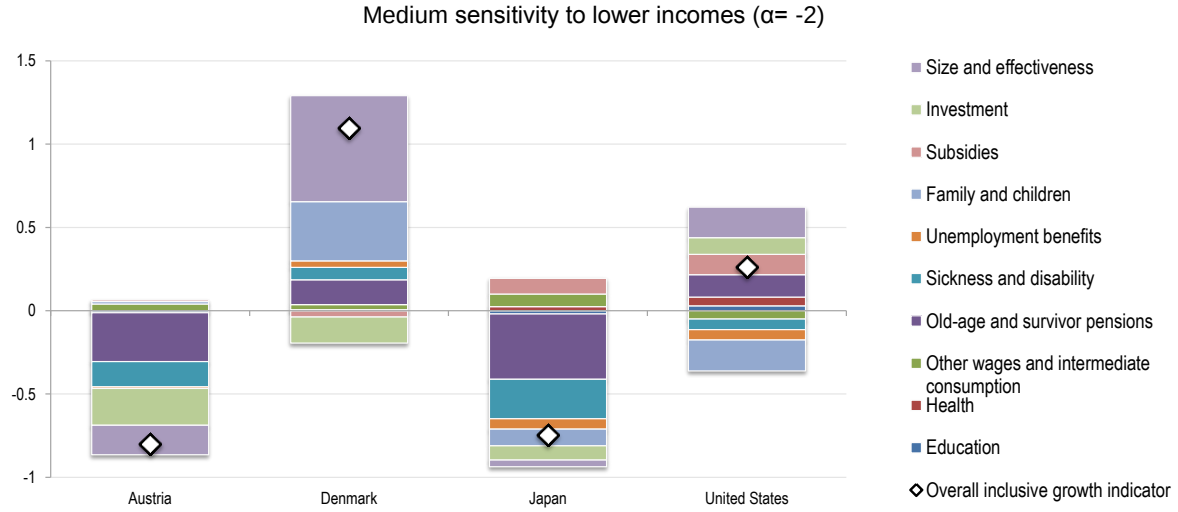


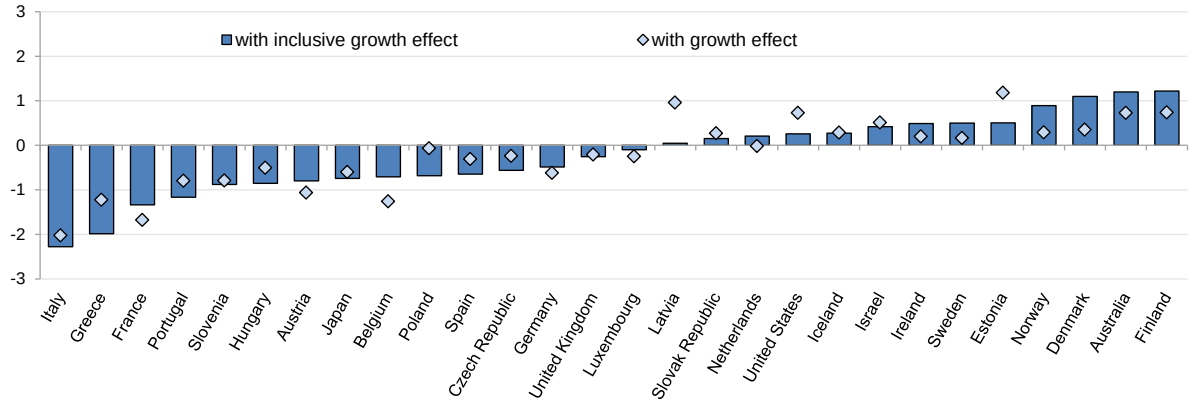
Figure 9. Components of the overall inclusive growth indicators for selected OECD countries



3.2. Indicator breakdown: Inclusive growth indicators versus growth indicator

34. The public spending overall indicators gauge the effects of public spending policies and institutional settings on the policy goals of growth and equity. Figure 10 shows the ranking of countries for the overall indicators (spending mix and size and effectiveness of government combined) in terms of inclusive growth effects (with alpha equal to -2) and growth effects alone (i.e. without accounting for any effects on equity). While the two follow closely for most countries and do not lead to many differences in rankings, for Estonia, Greece and Latvia the growth effect is much stronger than the inclusive growth effect (measured with alpha equal to -2), implying that these countries could benefit from focussing more on equity-enhancing public spending policies. For Belgium, Denmark and Norway, on the other hand, it is the inequality reduction effect which is boosting the inclusive growth effects in these rankings.

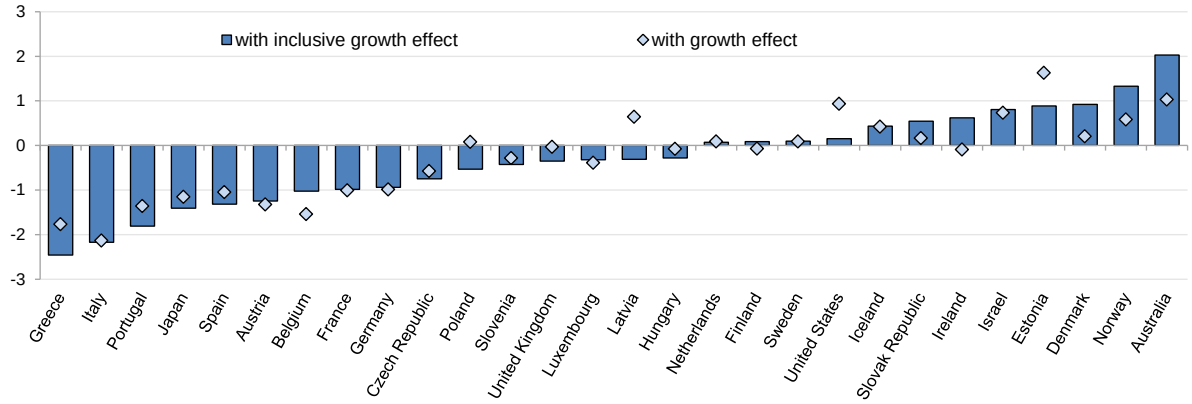
Figure 10. Public spending overall indicator: Inclusive growth effects and growth effects
2012



Note: The indicators have been centred around the average over all countries and the whole sample (from the mid-1990s to 2014 in most countries). An indicator value of 1 indicates that a country is one standard deviation above the sample average. This figure is based on a medium sensitivity to lower incomes (α= -2).

35. The spending mix indicator is driven by productive spending and thus growth-enhancing items, such as public investment along with inequality-reducing spending on programmes such as family benefits. Figure 11 shows the ranking of countries for the spending mix indicator alone (without the size and effectiveness of government) in terms of inclusive growth effects and growth effects (i.e. without accounting for any effects on equity). A number of higher ranked countries (Australia, Denmark, Ireland and Norway) show important impetus for inclusive growth (with alpha equal to -2) coming from inequality-reducing spending. Those where growth effects are clearly the strength in the "inclusive growth" formula include Estonia, Greece, Latvia, Poland and the United States. In the case of Estonia, the high ranking thus is due importantly to growth-enhancing policies, especially investment (Box 2).

Figure 11. Public spending mix indicator: Inclusive growth effects and growth effects
2012



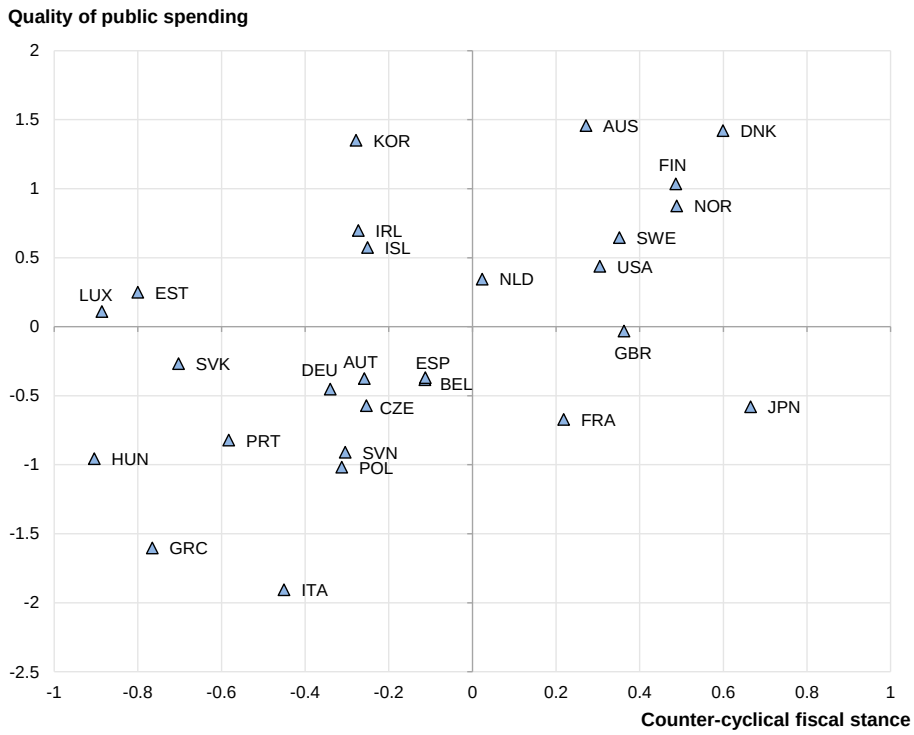
Note: The indicators have been centred around the average over all countries and the whole sample (from the mid-1990s to 2014 in most countries). An indicator value of 1 indicates that a country is one standard deviation above the sample average. This figure is based on a medium sensitivity to lower incomes (α= -2).

4. Public spending and demand shocks

4.1. Counter-cyclical fiscal stance and public spending

36. Two main features are considered here to assess how the public finances are affecting growth. First, a short-term dimension is captured by the link between the primary balance and the output gap. The public finances can dampen growth during booms and can mitigate recessions during crises with a counter-cyclical fiscal stance. A positive correlation between the output gap and the primary balance indicates a tight fiscal stance during booms and a loose fiscal stance during downturns. Second, a long-term dimension is added here with the overall inclusive growth indicator (with alpha equal to -2) that illustrates the extent to which public spending is used wisely to support long-term growth. These two aspects are positively correlated: countries with a counter-cyclical fiscal stance also tend to be countries with a higher quality of public spending (Figure 12). For instance, Australia, Denmark, Finland and Norway enjoy both a high quality of public spending and a counter-cyclical fiscal policy, while Greece, Hungary, Italy and Portugal suffer from both a pro-cyclical fiscal stance and a low quality of public spending. This concomitance is not causation of course, and it may well be a consequence of common causes, such as sound institutions (including effective fiscal councils) that favour both a counter-cyclical fiscal policy and high quality public spending.

Figure 12. Counter-cyclical fiscal stance and public spending

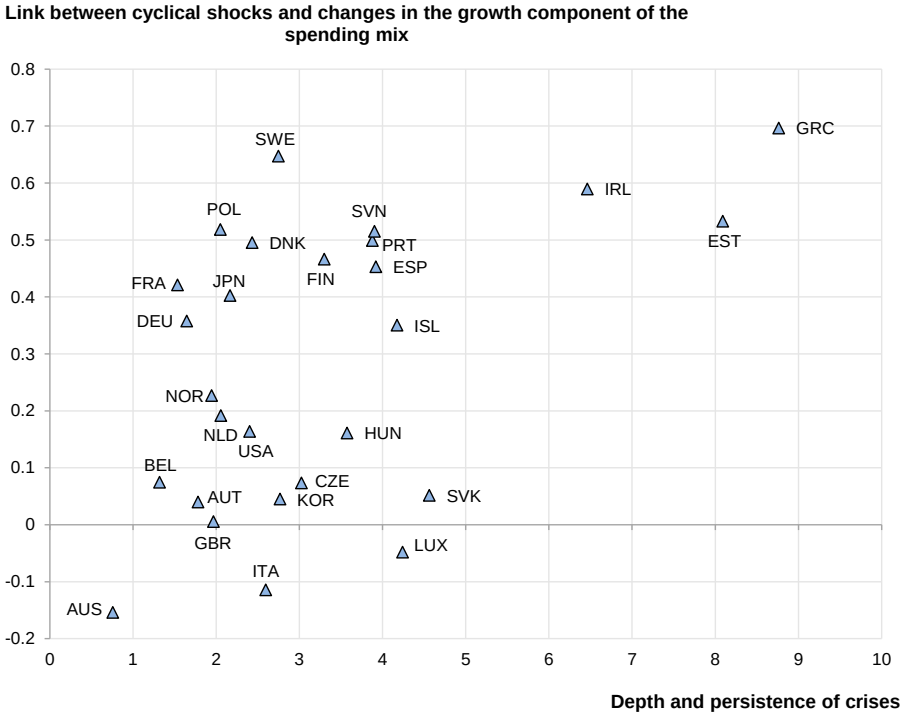


Note: The counter-cyclical fiscal stance is measured by the correlation between the country-specific output gap estimated by the OECD and the primary balance. The average quality of public spending over time with the overall indicator is reported on the vertical axis. This figure is based on a medium sensitivity to lower incomes (α= -2).

4.2. The spending mix worsened when large negative demand shocks hit

37. Beyond the pro-cyclicality of the fiscal stance, large downturns have an adverse effect on the public spending mix, which adds an additional negative effect. This can first be seen by looking at the correlation between the output gap and the growth component of the spending mix indicator. If the correlation is positive, this means that during booms countries increase the share of productive spending and during downturns they cut productive spending rather than current spending. This correlation is positive in most countries (Figure 13). In those countries that experienced large shocks such as Estonia, Greece and Ireland, and hence for which the pressure to cut spending may have been stronger, the association between the quality of the spending mix and the business cycle is particularly tight. By contrast, in Australia and Italy, crises are less deep and the quality of public spending improves somewhat during downturns.

Figure 13. Spending mix changes tend to amplify demand shocks



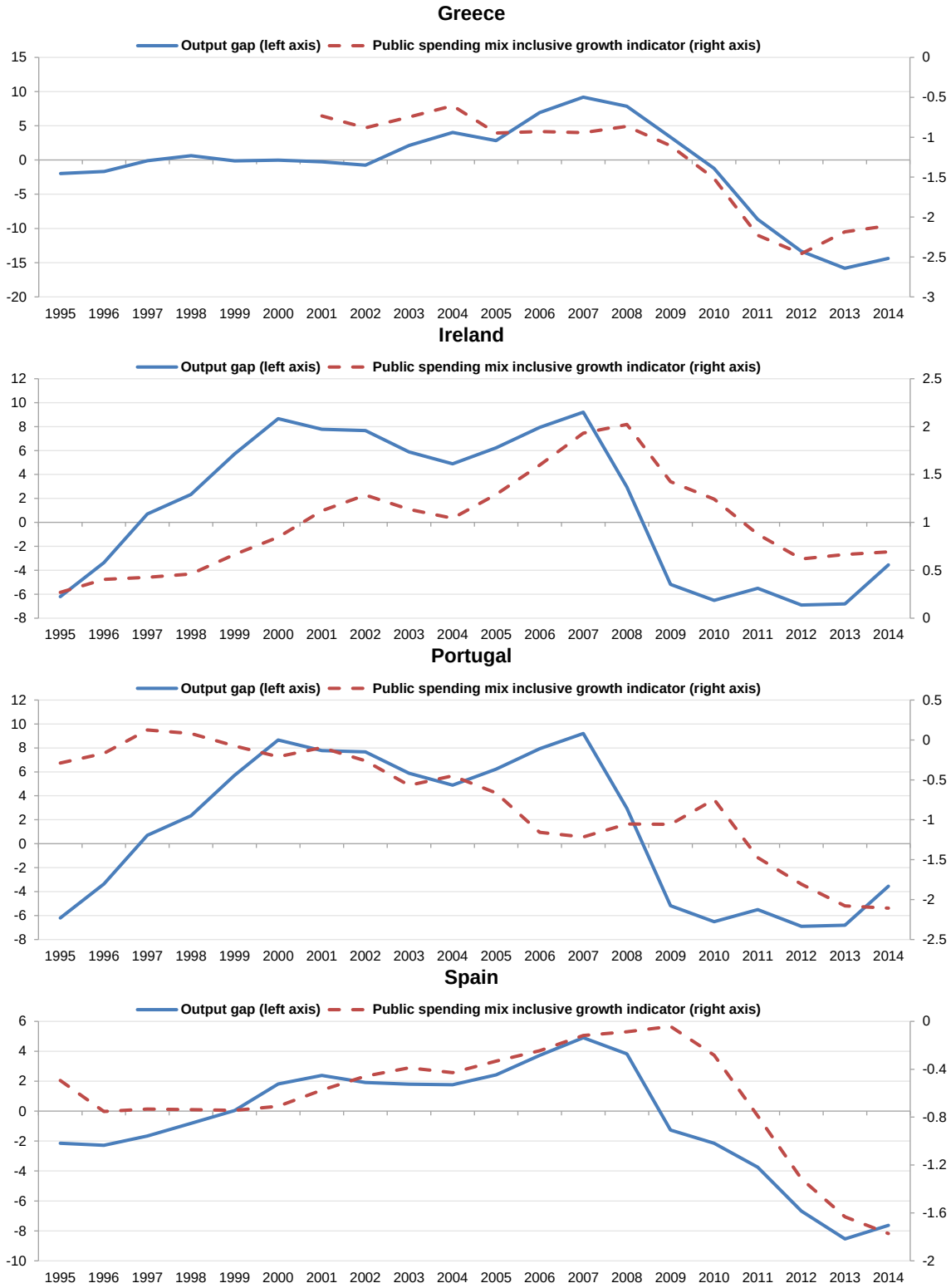
Note: The link between cyclical shocks and the change in the growth component of the spending mix is measured by the correlation between the change in the country-specific output gap estimated by the OECD and the change in the indicator component. The depth and persistence of crises is measured by the standard deviation of the country-specific output gap.

38. The public finances can be under pressure because of a rise of sovereign interest rates, which typically occurs during deep economic crises. In countries that have experienced such a stress (Greece, Ireland, Italy, Portugal and Spain), the design of the public spending mix is strongly linked with the economic cycle. A regression can be used to identify to what extent crises trigger a worsening of the public spending mix via market pressure. In a cross-country panel regression that considers the growth components of the spending mix as the dependent variable, country and year fixed effects and both the output gap and the difference between the 10-year bond rate and the nominal potential growth rate as explanatory variables, the two indicators are significant.[5] This suggests that market pressure is one channel, but this is not the only one that contributes to the deterioration of the public spending mix.

39. A focus on the euro area countries under IMF adjustment programmes illustrates that the decline of the quality of public spending is tightly linked with the cycle (Figure 14). These four countries have all experienced unusually large negative output gaps during the crisis. Simultaneously in Greece and Portugal, or after a small lag in Ireland and Spain, the spending mix has become much less favourable to long-term growth. This most likely reflects that it is easier to cut investment rather than current spending to meet short-term budgetary pressures.

5. As Figure 10 shows, the effect of the output gap on the spending mix quality varies substantially across countries, while a simple regression assumes a common coefficient across countries. Given this feature, the focus is on country-specific correlations.

Figure 14. The spending mix quality declines following the global financial crisis in Greece, Ireland, Portugal and Spain



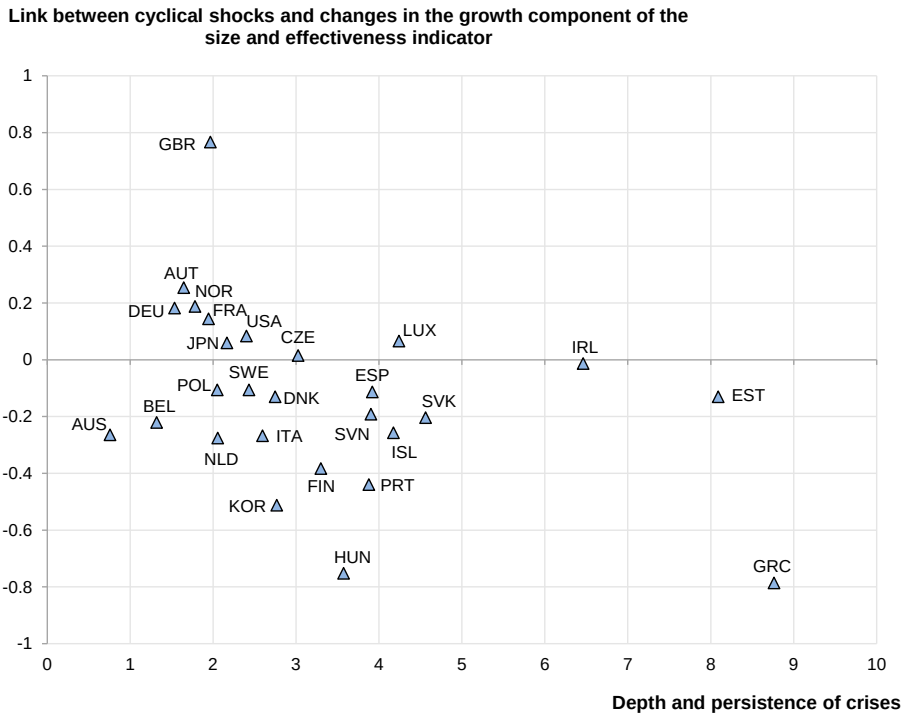
Note: The indicator has been centred around the average over all countries and the whole sample (from the mid-1990s to 2014 in most countries). An indicator value of 1 indicates that a country is one standard deviation above the sample average. This figure is based on a medium sensitivity to lower incomes (α= -2).

40. The link between the pro-growth nature of the public spending mix and the cycle can also be observed in several other countries, such as the United States. However, this is not a systematic pattern, and in some countries, other features emerge. For instance, in France, the worsening of the spending mix is a steady and slow process that began before the global financial crisis, with no visible change when the crisis occurred.

4.3. The link between the economic cycle and the size and effectiveness of governments varies across countries

41. The link between the economic cycle and the size and effectiveness component of the public spending indicator (with alpha equal to -2) is much less clear and varies substantially across countries (Figure 15). This is because there is also no general link between the underlying public spending to GDP ratio and the cycle, or between the perception of government effectiveness and the cycle. However, in some countries the link can be strong. In the United Kingdom for instance, the structural public spending to GDP ratio increases while government effectiveness declines during downturns: this can impede somewhat the recovery. In countries facing large shocks such as Greece, governments tend to reduce the structural public spending to GDP ratio during downturns, and as governments in these countries are not among the most effective, the smaller size of government is likely to support growth in the long run. Hungary also displays a strong correlation between structural government size and the cycle.

Figure 15. The output gap and the size and effectiveness component



Note: The link between cyclical shocks and changes in the growth component of the size and effectiveness indicator is measured by the correlation between the change in the country-specific output gap estimated by the OECD and the change in the indicator component over time. The depth and persistence of crises is measured by the standard deviation of the country-specific output gap.

5. Robustness checks: Comparison with other indicators

42. A principal goal of the Public Spending Indicators is to identify those features of public finance which best help policymakers meet their stated objectives. The choice of coefficients applied to the various spending and institutional inputs is crucial in this endeavour and therefore a comparison with alternative coefficients is a step to validating the soundness of the measures. The weighting schemes by Cournède et al. (2013) were compared to the effects found by Fournier and Johansson (2016) in order to test the robustness of the indicators.

43. Combining long-term effects for growth and equity, Table 6 highlights the relative weights for each spending item. Some important differences are visible: Cournède et al. (2013) finds a more positive effect for education spending, and no inclusive growth effect for sickness and disability (the growth and equity effects cancel each other out). Unemployment benefits are seen as having a positive effect in the baseline indicator, while they are ranked as slightly negative in Cournède et al. (2013). Finally, public investment is considered positive for both, but more so for the baseline coefficients.

Table 6. Comparison of inclusive growth effects on the spending mix

Spending item	Baseline indicator (Fournier and Johansson, 2016)	Alternative weighting scheme (Cournède et al., 2013)
Education	+	++
Health	+	+
Other wages and intermediate consumption	-	-
Old-age and survivor pensions	-	-
Sickness and disability	+	
Unemployment benefits	+	-
Family and children	++	++
Subsidies	-	--
Investment	++	+

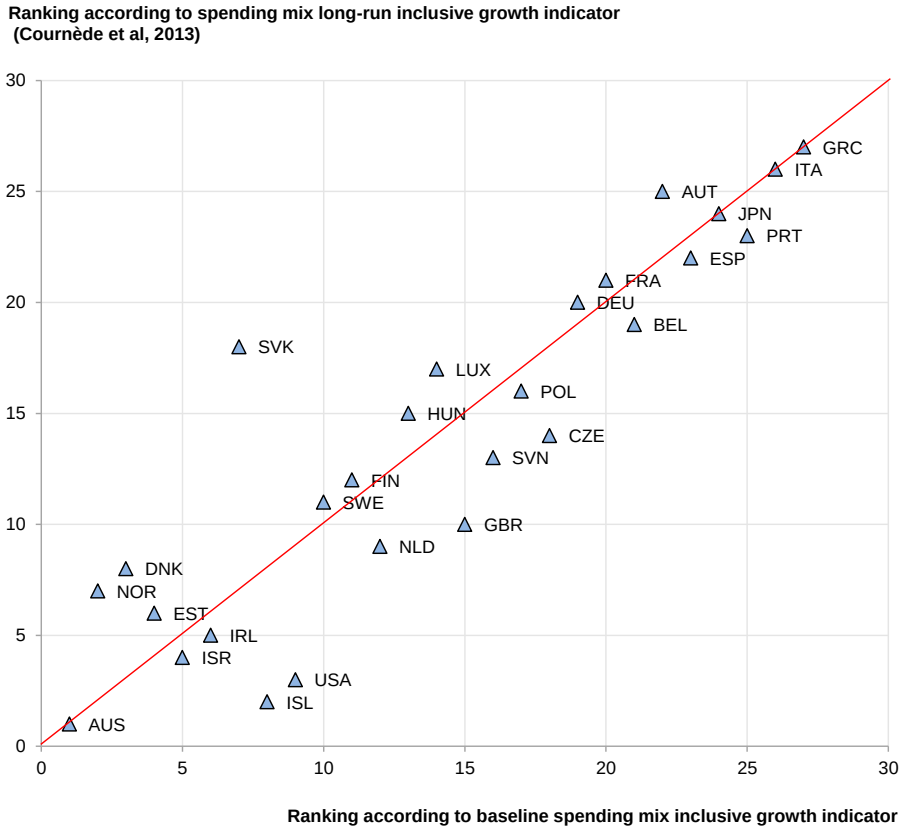
44. The correlation between these two indicators is strongly positive (0.85 over the whole sample and 0.89 for the last year). The different weighting schemes give results that are fairly close for most countries, with some exceptions. Figure 16 illustrates the country rankings using the baseline and alternative weighting schemes for inclusive growth effects on the public spending mix. The Slovak Republic stands out as having a much better ranking with the baseline weighting scheme than with the alternative one. This is largely driven by the very high level of spending on sickness and disability in the Slovak Republic at nearly three times the OECD average, which has a positive coefficient for its equity component in the baseline, but zero weight in the alternative measure.[6] The United States is ranked higher with the alternative weighting scheme, due to its lower than average subsidies, as subsidies are considered a bigger drag on inclusive growth in the alternative scenario. Likewise, Ireland performs better under the alternative scheme, as the lower than average investment spending in 2012 has a greater penalty in the baseline weighting scheme.

6. It is worth noting that for the Slovak Republic, the overall indicator is less favourable because the perceived effectiveness of government is rather low. This illustrates that an advantage of the overall indicator is that it is less sensitive to each particular driver.

45. Annex I details additional robustness checks. Attention was given to weighting schemes and spending breakdowns from alternative studies, as well as various methodological choices of coefficients based on Fournier and Johansson (2016) and the time sensitivity of the indicators. Overall, country rankings are fairly stable with respect to using coefficients from another study and changes to methodological choices.

Figure 16. Comparison of country rankings based on the inclusive growth spending mix indicators under the baseline and alternative weighting methods

2012



Note: The baseline used in this comparison assumes a medium sensitivity to lower incomes (α= -2).

6. Conclusion and next steps

46. Much attention has been given to key public finance indicators which are easily observed, such as the size of general government spending and the fiscal stance as measured by the primary balance. By contrast, the quality of public spending is more difficult to observe in a comparable manner, and has attracted less attention in international comparisons and studies. This paper provides new indicators to gauge the quality of public spending in terms of inclusive growth friendliness. The robustness analysis suggests that the results are quite similar to those that could be obtained with an alternative assessment of growth and inequality effects of the public spending mix, thereby validating the choice of coefficients.

47. A major insight is that it is not only the overall public spending level or the size of public deficits that have changed during the global financial crisis, but also the quality of public spending itself. And a disturbing result is that in the aftermath of such a large economic crisis, public spending

quality has worsened in most countries. This can affect long-term growth, and along with long-term unemployment and weak private investment, contribute to keep OECD countries in a low growth trap.

48. These indicators can be regarded as a first step toward a broader set of indicators which would provide a more comprehensive view on the growth and inclusive growth friendliness of public finances. The public spending mix component could be accompanied by a public revenue mix component, which would gauge to what extent the tax mix supports long-term inclusive growth. Users could use their own preferences for growth and inequality to shape the indicator outcomes.

49. Better tools could be developed to measure the contributions of in-kind services to meeting inclusive growth targets and to take into account the mix of public and private funding in some areas, such as infrastructure. Finally, more in-depth analyses of specific areas of productive spending could offer further insights into how policymakers can favour inclusive growth policies, while zooming in on effectiveness and efficiency in individual policy areas.

ANNEX A. ROBUSTNESS CHECKS ON THE SPENDING MIX AND INCLUSIVE GROWTH INDICATORS

50. Indicators are by nature dependent upon the raw material from which they are constructed. In the case of this study, the indicators are based on a particular breakdown of general government spending (as illustrated in Table 2 of the main text) and a set of coefficients which are the results of the empirical work elaborated in Fournier and Johansson (2016). In order to better gauge the representativeness of these indicators, it is important to compare the resulting information to information which other methods and other studies might give, under similar circumstances. Note that for the sake of comparability, a medium sensitivity to lower incomes (α= -2) is used as the baseline of the robustness checks.

51. Table A1.1. illustrates how coefficients from different studies may affect spending mix indicators. The comparison of this study with the work of Cournède et al. (2013) is a natural one, as the spending mix breakdown was similar between the two studies and both were motivated by the potential impact of different public expenditure items on growth and inequality. As can be seen in this table, as well as in Figure 16 in the main text, the resulting country rankings show quite similar results, with a few exceptions discussed in the main text.

52. Table A1.2 compares the current study with that of Gemmell et al. (2014), where the effects of the public spending mix on growth were examined using IMF Government Finance Statistics data and a different spending breakdown. Notably, Gemmell et al. (2014) single out Transportation and Communications, which according to their study give an important positive impetus to growth. However, they do not provide spending by transaction, and therefore have no specific overall government investment category and no government wages and intermediate consumption category. Furthermore, they do not break down social expenditure, and do not attempt to quantify the effects of public spending on inclusive growth.

Table A1.1. The robustness to the source of coefficients

Country rankings, 2012

	Baseline spending mix inclusive growth indicator	Spending mix long-run inclusive growth indicator (Cournède et al., 2013)	Spending mix short-run inclusive growth indicator (Cournède et al., 2013)
Australia	1	1	1
Austria	22	25	24
Belgium	21	19	17
Czech Republic	18	14	16
Denmark	3	8	7
Estonia	4	6	8
Finland	11	12	11
France	20	21	22
Germany	19	20	20
Greece	27	27	26
Hungary	13	15	15
Iceland	8	2	2
Ireland	6	5	6
Israel	5	4	4
Italy	26	26	27
Japan	24	24	25
Luxembourg	14	17	19
Netherlands	12	9	9
Norway	2	7	5
Poland	17	16	18
Portugal	25	23	23
Slovak Republic	7	18	13
Slovenia	16	13	14
Spain	23	22	21
Sweden	10	11	12
United Kingdom	15	10	10
United States	9	3	3

53. In order to build the Gemmell indicators, the coefficients reported in Gemmell et al. (2014) are applied to a breakdown which follows as closely as possible the breakdown of their original data sources, using current COFOG data. A 3-year moving average is shown, in order to minimize any cyclical effects. The results, which are only available for a sub-set of OECD countries, give similar results for most countries, but differ significantly for others, highlighting the importance of the spending mix breakdown choices. For example, the Czech Republic ranks much higher under the Gemmell methodology, notably due to high spending on transportation and communications, which are subject to a particularly high coefficient in Gemmell et al. (2014), but which are not singled out in Fournier and Johansson (2016). Denmark, on the other hand, has a better ranking in this study, due to relatively high spending on families and children, which has a positive effect in Fournier and Johansson (2016), whereas this spending item is treated as part of total social spending in Gemmell et al. (2014) and has a negative weight. Nonetheless, the correlation between the results of these two methods remains positive at 0.68 over the sample period.

Table A1.2. Robustness to spending mix breakdown choices

Average 2010-12

	Baseline spending mix growth indicator	Spending mix growth indicator based on Gemmell et al. (2014)
Austria	20	15
Belgium	22	16
Czech Republic	14	3
Denmark	5	14
Estonia	1	1
Finland	11	13
France	17	18
Germany	18	21
Greece	21	23
Hungary	10	12
Ireland	6	17
Italy	23	22
Japan	19	20
Luxembourg	12	4
Netherlands	7	11
Norway	2	7
Poland	3	2
Portugal	16	6
Slovak Republic	4	5
Slovenia	13	9
Spain	15	19
Sweden	9	8
United Kingdom	8	10

54. It is important to examine whether various data and parameter choices have important effects on the Public Spending Indicators. Table A1.3 highlights the results the indicators would give if cyclically-adjusted data were not used, and to what extent the sensitivity to lower incomes moves the inequality aspect of the indicators. These comparisons are done for two years, which are in a different stage of the business cycle. With regard to the choice between using cyclically-adjusted data and unadjusted data, there is virtually no difference in outcomes, for either year. Regarding the choice of sensitivity to lower incomes, the results are highly correlated at 0.95 in 2007 and 0.97 in 2012 for both higher and lower sensitivity compared to the baseline.

Table A1.3. The robustness to method choices

Country rankings, 2007 and 2012

	2007				2012			
	Baseline spending mix inclusive growth indicator (α= -2)	Spending mix inclusive growth indicators based on non-cyclically adjusted data (α= -2)	Spending mix inclusive growth indicators, with less sensitivity to lower incomes (α= -1)	Spending mix inclusive growth indicators, with greater sensitivity to lower incomes (α = -3)	Baseline spending mix inclusive growth indicator (α= -2)	Spending mix inclusive growth indicators based on non-cyclically adjusted data (α= -2)	Spending mix inclusive growth indicators, with less sensitivity to lower incomes (α= -1)	Spending mix inclusive growth indicators, with greater sensitivity to lower incomes (α = -3)
Australia	1	1	3	1	1	1	1	1
Austria	26	26	25	24	22	23	23	22
Belgium	24	24	27	23	21	21	22	17
Czech Republic	15	15	14	15	18	18	18	18
Denmark	4	5	7	5	3	3	5	3
Estonia	7	7	4	9	4	5	2	7
Finland	10	10	11	10	11	11	12	9
France	22	22	23	21	20	20	20	20
Germany	25	25	26	25	19	19	19	21
Greece	23	23	22	28	27	27	27	27
Hungary	16	16	15	17	13	14	14	15
Iceland	6	6	6	6	8	8	8	8
Ireland	2	2	1	2	6	6	7	4
Israel	12	11	9	13	5	4	4	5
Italy	29	29	29	29	26	26	26	26
Japan	28	28	28	27	24	24	24	23
Korea	5	4	2	8	..	..	..	..
Luxembourg	18	18	20	12	14	13	16	12
Netherlands	14	14	12	14	12	12	10	11
Norway	3	3	5	4	2	2	3	2
Poland	21	21/	21	22	17	17	15	19
Portugal	27	27	24	26	25	25	25	25
Slovak Republic	9	9	10	7	7	7	9	6
Slovenia	20	20	19	16	16	16	17	14
Spain	19	19	16	20	23	22	21	24
Sweden	13	13	13	11	10	10	11	10
Switzerland	8	8	18	3	..	..	..	..
United Kingdom	17	17	17	19	15	15	13	16
United States	11	12	8	18	9	9	6	13

55. The choice of coefficients to weight the various spending items is key to the development of the Public Spending Indicators. The coefficients chosen were not all significant in the empirical work of Fournier and Johansson (2016), but were deemed relevant for this exercise. Table A1.4. shows the indicator rankings which result when (1) only significant coefficients are employed, and (2) when all coefficients are employed. The latter refers only to the inequality portion of the work, where both the coefficients for education and for health are not regarded as relevant as they do not take into account the inequality reducing effect of in-kind services. The results show very little differences, when only significant coefficients are used (correlated at 0.94 for the growth-only indicator and 0.90 for the inclusive growth indicator) or when all coefficients are used (correlation of 0.94 between the baseline inclusive growth indicator and the alternative indicator using all coefficients).

Table A1.4. The robustness of coefficient choices

Country rankings 2012

	Baseline spending mix growth indicator	Spending mix growth indicator based on significant coefficients only	Baseline spending mix inclusive growth indicator	Spending mix Inclusive growth indicator based on significant coefficients only	Spending mix inclusive growth indicator using all coefficients
Australia	2	3	1	2	1
Austria	23	24	22	22	21
Belgium	25	26	21	24	22
Czech Republic	18	18	18	18	20
Denmark	7	14	3	7	5
Estonia	1	1	4	1	4
Finland	13	16	11	15	8
France	20	20	20	19	18
Germany	19	22	19	21	19
Greece	26	25	27	26	27
Hungary	14	13	13	12	10
Iceland	6	6	8	6	13
Ireland	15	17	6	10	9
Israel	4	5	5	4	6
Italy	27	27	26	27	26
Japan	22	19	24	20	24
Luxembourg	17	15	14	11	11
Netherlands	9	7	12	13	12
Norway	5	9	2	5	3
Poland	11	4	17	8	14
Portugal	24	23	25	25	25
Slovak Republic	8	11	7	17	2
Slovenia	16	12	16	16	16
Spain	21	21	23	23	23
Sweden	10	8	10	9	7
United Kingdom	12	10	15	14	15
United States	3	2	9	3	17

56. The time variation of an indicator illustrates that these indicators capture structural features that move relatively slowly over time. With data limitations, however, it is difficult to have a very long view. Table A1.5 compares the results for the public spending growth indicator and inclusive growth indicator at 6 year intervals starting in 2000. The resulting rankings, calculated across those countries where data for all three periods are available, are fairly stable. However, some movements highlight trends towards improvement in public spending quality (Slovak Republic, Slovenia) while others indicate increasing difficulties (Portugal, Spain) over the period.

Table A1.5. Time sensitivity

Country rankings in 2000, 2006 and 2012

	Baseline spending mix growth indicator			Baseline spending mix inclusive growth indicator		
	2000	2006	2012	2000	2006	2012
Australia	1	4	1	1	1	1
Austria	20	18	18	20	19	18
Belgium	17	19	20	14	17	17
Czech Republic	15	11	14	15	12	14
Denmark	7	7	5	2	3	3
Finland	9	12	9	4	7	8
France	16	17	16	17	16	16
Germany	19	20	15	19	18	15
Hungary	10	6	10	10	9	10
Iceland	3	2	4	6	5	6
Ireland	4	3	11	3	2	4
Italy	21	21	21	21	21	21
Luxembourg	12	14	13	9	13	11
Netherlands	5	8	7	8	10	9
Norway	6	5	3	5	4	2
Portugal	8	16	19	12	20	20
Slovak Republic	13	10	6	11	6	5
Slovenia	18	15	12	16	15	13
Spain	14	13	17	18	14	19
United Kingdom	11	9	8	13	11	12
United States	2	1	2	7	8	7

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