Session 1

TAX AND EXPEDITURE POLICIES

WORK-RELATED TAX EXPENDITURES IN THE EU: IMPLICATIONS FOR TAX REVENUE

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We examine the impact on tax revenue (and the associated welfare cost) of a reduction in work-related tax reliefs in five European countries. We combine results from a EU-wide micro-simulation model with a theoretical model of labour supply to obtain a measure of the behavioural impacts of the reforms. We find that accounting for behavioural reactions both at the extensive (participation) and at the intensive margin (hours worked) has significant impacts on the revenue gain from the simulated reforms. In particular, our results suggest that at least one-fourth of the extra tax revenues collected through a reduction in work-related tax incentives is washed away after factoring in labour supply responses, especially through lower participation by individuals most at risk of exclusion. For policies strongly targeted at the bottom of the earnings distribution, the reform might even bring about a net revenue loss, depending upon the calibration of the labour supply elasticities to reflect heterogeneity across types of workers. The welfare gain of maintaining these tax reliefs could be far from negligible.

1 Introduction and motivation

The design of national tax systems has increasingly come to the fore of economic policy discussions due to its impacts on both economic efficiency and the sustainability of public finances, particularly in times of lukewarm economic growth and large budgetary consolidation needs. Reforms aimed at broadening the tax bases are a frequent policy recommendation, since they would not only enhance tax collection capacity but also minimise the economic distortions brought about by taxation. Reducing loopholes that facilitate tax avoidance and, more in general, streamlining tax expenditure have been identified as efficient ways to achieve that objective (OECD, 2010). Recurring examples of tax benefits include exemptions, allowances and credits, preferential tax rates for specific groups of taxpayers (e.g., low-income households, pensioners, etc.) or activities (e.g., purchase of cultural goods) or tax deferrals. Overall, the size of tax expenditures in the personal income tax system is significant in the EU (European Commission, 2013).

However, in principle, tax expenditures might also prove efficient from a fiscal standpoint if the immediate adverse impact on tax revenue is more than compensated by the stimulus to economic activity. Ultimately, this would translate into increased revenue in the medium to long run. One particular type of tax expenditure likely to have these features is work-related (or so-called make-work-pay, MWP) policies.[1] Following the example of the Earned Income Tax Credit (EITC) in the US, these schemes have been implemented in a growing number of EU countries over the past two decades in the form of in-work tax benefit, notably tax credit or

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[1] In the paper, we use the terms work-related and make-work-pay (MWP) interchangeably.

allowances, granted under the personal income tax system. The primary objective of such types of relief is to stimulate labour market participation by poor individuals or by those most at risk of exclusion. They do so by counteracting the disincentive effect exerted by the reduction/withdrawal of social benefits and, consequently, high marginal tax rates on labour income facing low-wage earners moving into employment. The effectiveness of MWP policies to reduce inequality and to enhance employment depends on several elements that go beyond the mere design of the tax relief, however. Most relevant appear social and economic factors such as the distribution of income, the functioning of the labour market, including its regulatory aspects (e.g., the existence of a minimum wage), the business cycle. In this respect, assessment based on the scheme (and experience) of a single country cannot be easily generalised to other contexts. All in all, a comprehensive cost/benefit analysis of such MWP policies should encompass both the cost per job created and the impact on income distribution (and in-work poverty in particular) as well as on reduced unemployment benefits and increase in work-related tax revenues collected (Immervoll and Pearson, 2009).

In this paper we aim at quantifying the fiscal impacts of reforms to MWP policies taking account also of the effects on the labour market equilibrium via adjustments on the supply side. We show that short-run budgetary gains from reducing those tax reliefs have indeed an economic and fiscal cost in the medium to long run when labour supply has reacted to the new policy environment. Further, we compute the marginal cost of public funds as a synthetic measure of the relative welfare effects of the simulated reforms. Our analysis rests on three building blocks: a theoretical framework for labour supply, derived from Saez *et al.* (2002), Kleven and Kreiner (2006) and Immervoll, Kleven, Kreiner and Saez (henceforth, IKKS, 2007); empirical estimates of participation and hours-of-work elasticities; simulation results obtained from a EU-wide micro-simulation model (EUROMOD). Combined together, those three ingredients allow us to model the effects that behavioural reactions along the extensive and the intensive margin have on tax revenue through changes in labour market outcomes. Consistent with the theoretical framework, we explicitly allow for heterogeneous individual responses by appropriately calibrating the labour supply elasticities across countries and types of workers. We perform our exercise on five European economies, namely France, Spain, the United Kingdom, Hungary and Slovakia, since the work-related policy is well identified for these countries. Moreover, the country sample gives rise to a very diverse set of policy configurations, not only in terms of type (credit vs. allowance) and design (e.g., conditionality on family characteristics) of the work-related tax relief, but also when it comes to the distinctive features of the whole tax-benefit system. In this respect, the use of a EU-wide micro-simulation model is essential, as the model can capture the full range of institutional features of tax and benefit systems with regards to personal income tax (PIT) and social security contribution (SSC), including pensions and other social benefits.

We believe our approach has a number of merits. First, by considering a marginal reduction in existing tax expenditures, instead of ad hoc reforms like the introduction of hypothetical harmonised policies, we make our exercise concretely based on real-life institutions, which have likely been shaped by national preferences. Moreover the choice of a marginal reform follows the political economy result that even radical tax reforms are likely to be introduced gradually. The flipside is that the marginal shocks we work with are not fully comparable across countries, since they depend on the size of the existing tax expenditures, as well as on the design of the broader tax-benefit systems they are embedded in. Secondly, by considering work-related tax reliefs as the relevant policy instrument we strengthen the case for including behavioural reactions of labour supply into the analysis. This is consistent with the empirical evidence for the US reported for instance by Eissa and Hoynes (2006), who document a strong reaction of labour supply to reforms to the EITC. When it comes to the choice of the policy instrument, our approach finds support also in the burgeoning literature on tax salience, and particularly in the experimental evidence on the EITC provided by Chetty and Saez (2009). In this respect, a simple salience argument would

indeed point to the fact that individuals adjust their labour supply more promptly in response to changes in specific and well identifiable instruments (like work-related tax benefits) than to general reforms to the personal income tax schedule, which ultimate impact on the take-home pay might be more opaque to figure out *ex ante*. Third, the theoretical framework underlying our analysis allows us to highlight the significant role played by labour supply responses along the extensive margin. It is a stylised fact that low annual or weekly hours of work occur with very low frequency in the data (Eissa *et al.*, 2008). Therefore, entry is also likely to take place at non-infinitesimal hours of work (that is, at part-time or full-time hours). Hence, policies affecting participation decisions entail first-order effects on government revenue via behavioural reactions affecting discrete choices.

The paper is organised as follows. Section 2 frames our analysis by illustrating relevant dimensions of worked-related tax expenditures, including their fiscal impact. Section 3 sets out the theoretical framework, while its empirical complement – the micro-simulation model results and the calibration of labour elasticities – is put forward in Section 4. Section 5 presents the results, including sensitivity analyses. Concluding remarks and policy implications are offered in Section 6.

2 Work-related tax expenditures: rationale, design and fiscal cost

Work-related tax reliefs are increasingly being used in Europe as an instrument to foster employment. Although their specific design differs across countries, reflecting also significant differences in the broader tax-benefit systems at the national level, they tend to have common features that go beyond the pure employment-conditionality. To frame our analysis, we briefly discuss these by focusing on the specific policies implemented in the countries we consider in our analysis, leaving a more detailed description of the different instruments, as they stood in 2010, to Appendix 2.

A work-related tax relief is normally granted as a direct reduction of the individual tax liability derived from earned income, that is, as a tax credit. Specifically, for France, the instrument is designed as a tax credit for the working poor (so-called *Prime pour l´emploi, PPE*), while the corresponding policy in the UK is the working tax credit (WTC). In both cases, the tax credit, income-tested and refundable, is granted conditional on a number of personal and family characteristics other than earned income levels.[2] Similarly, in Hungary and in Slovakia the tax relief takes the form of a proportional reduction of the tax liability, gradually phased out at higher income levels. As opposed to the previous cases, though, the amount of the relief does not depend on characteristics other than the level of individual earnings. Lastly, in Spain the tax benefit is designed as an allowance (*Deducciones por renta del trabajo*), *i.e.*, a reduction in the relevant tax base (employment income), varying in amount depending on the level of individual earnings, on the tax unit (single taxpayer or household), and on other characteristics such as the place of employment.

Detailed quantitative information on the tax relief, both at the aggregate level and along the income distribution, has been retrieved through the micro-simulation model.[3] The summary statics,

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[2] "Refundable" means that all qualifying taxpayers receive the full credit amount to which they are entitled, regardless of their tax liabilities. Otherwise said, if the credit is not fully exhausted by the tax liability, the exceeding amount is still granted to the taxpayer as a transfer.

[3] The joint consideration of taxes and benefits entitlements is all the more necessary in the simulation of the policy reforms in order to analyse the potential changes in disposable income and incentives to take-up a job as a result of changes in tax policies. These interactions can be a defining feature of MWP policies. For instance, in the UK working tax credits are determined jointly with family benefits. Also, for the other countries considered here the interaction between taxes and tax credits (or allowances) and social benefits also play a very important role, albeit in a more indirect way. We follow Avram *et al.* (2012) who propose a simple approach to capture the interactions between taxes and benefit entitlement modelled in EUROMOD. In a first step the gross taxes are simulated before allowances and credit. In a second step the tax allowances are set to zero and the gross tax rate is calculated

(continues)

reported in Table 1, shed light on the differences in the design of the tax policy instruments considered by quantifying their impacts across income deciles. For consistency with the theoretical framework employed in our main analysis, we exclude workers not employed for the year, who might thus be in transition between jobs. Likewise, public sector employees and self-employed are not included. As a consequence, the figures presented are for full-year employees in the private sector. A first remarkable result is that the scope of the policies varies considerably across countries. While the tax expenditures in Spain and Hungary benefit around 95 per cent of the working population, the tax credit schemes in the remaining countries appear targeted at the lower end of the income distribution. The French PPE affects around 20 per cent of the working population, and, expectedly, its coverage is monotonically decreasing with income. While two out of three workers in the first income decile are entitled to the tax relief, only 5 per cent of those in the seventh decile receive it. The WTC in the UK affects roughly 14 per cent of the total working population, mostly concentrated in the lower half of the income distribution. Targeting is even more specific in Slovakia, where the tax credit de facto benefits almost all and only workers in the first income decile, roughly 9 per cent of the total working population. Substantial heterogeneity emerges also when looking at the money amounts involved. Averaged across recipients, the monthly tax credit ranges from around € 9 in Slovakia to € 177 in the UK. In Spain, the tax allowance translates into a decrease of the average individual tax liability of nearly € 42 per month.[4] Those differences naturally carry over to the aggregate value of the tax relief. The tax credits cost the budget foregone revenues ranging from roughly € 19 million in Slovakia to € 1.822 billion in the UK. To put those numbers in perspective, they equal, respectively, 5 per cent and nearly 18 per cent of the aggregate tax liability from PIT and SSC in the sample.[5]

3 Theoretical framework

3.1 The revenue impact of reforming work-related tax expenditures

To account for changes in behaviour following reforms to the in-work tax relief we need a model of labour supply with participation and in-work decisions. We derive the theoretical predictions from the framework proposed by IKKS (2007) building on Saez (2002), illustrated more in detail in Appendix 1. The economy is made of individuals endowed with exogenous productivity and heterogeneous preferences, and faced with a non-linear income tax schedule, who decide on their labour supply. In particular, individuals take decisions about whether to work or not, which reflects the presence of fixed costs related to working (*i.e.*, the extensive margin). Conditional on being in work, the number of hours worked is chosen (*i.e.*, the intensive margin). Individuals thus face a nonlinear tax schedule from zero to positive income tax rate depending on their decision to work and on the number of hours worked. Changes in the tax system – including reforms on tax expenditures – alter the net-of-tax wage rate and, consequently, the opportunity cost of not working (through the labour/leisure decision). Under the assumption that entry does not take place at an infinitesimal level of working hours, which finds empirical support in the literature,

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before the tax credits are begin computed. The fiscal cost of tax allowances is then calculated as the difference between the taxes calculated in the first step and in the second step. Importantly, setting allowances to zero also modifies the benefit entitlements reflecting the interaction between tax and benefits necessary to consider the full range of the impact of tax reforms. The fiscal cost of the tax credit is then determined subsequently by calculating the difference between the gross taxes paid in the second step and the final net taxes paid (*i.e.*, net of allowances and credits).

4 The fiscal cost of the tax allowance is obtained as the difference between the gross tax liability without and with the allowance (see footnote 3). Given the nature of the relief (*i.e.*, a deduction against earned income), its value to the individual taxpayer increases with the marginal tax rate on personal income.

5 We have also cross-checked the results obtained from EUROMOD, both at the aggregate level and by income deciles, with comparable information available from national sources. We find that EUROMOD reproduces the income profiles of the tax reliefs and their aggregate value in a very precise way. The comparison tables are available upon request.

Table 1

MWP Tax Expenditures in Selected EU Countries: Summary Statistics

Decile	Fraction of Recipients	Total MWP Tax Expenditure	Average Monthly MWP Tax Expenditure	Total Taxes (*)	Total Benefits	Total Net Taxes
France						
1	65.18%	638.4	35.7	1058	620	438
2	34.6%	178.8	18.7	1782	433	1349
3	26.1%	124.8	18.3	2232	330	1902
4	18.9%	169.2	34.8	2475	296	2179
5	21.7%	178.8	36.8	2701	331	2370
6	13.0%	124.8	43.6	2865	301	2564
7	5.5%	49.8	41.5	3365	246	3119
8	1.7%	13.3	38.2	3529	251	3278
9	0.3%	3.0	48.1	4477	200	4277
10	0.2%	1.0	31.9	6120	303	5817
All deciles	20.8%	1481.9	30.6	30605	3311	27294
Spain						
1	66.8%	2806.0	211.5	308	92	216
2	96.9%	3427.2	242.0	509	38	471
3	98.4%	3227.0	218.3	694	33	661
4	99.2%	3135.1	219.6	770	19	751
5	99.9%	3239.2	221.0	907	31	876
6	100.0%	3426.3	221.6	1121	33	1088
7	100.0%	3300.2	221.7	1278	21	1257
8	100.0%	3488.3	221.3	1653	31	1622
9	100.0%	3191.0	221.5	1922	21	1901
10	100.0%	3234.1	221.4	2929	27	2902
All deciles	96.3%	32474.2	231.4	12091	345	11746

Table 1 *(continued)*

MWP Tax Expenditures in Selected EU Countries: Summary Statistics

Decile	Fraction of Recipients	Total MWP Tax Expenditure	Average Monthly MWP Tax Expenditure	Total Taxes (*)	Total Benefits	Total Net Taxes
UK						
1	23.8%	369.9	197.2	168	168	0
2	36.5%	740.7	290.9	341	104	236
3	42.5%	401.4	145.5	455	94	361
4	28.1%	216.0	115.2	559	71	488
5	15.2%	76.5	71.4	703	68	635
6	1.7%	15.0	126.1	845	62	783
7	0.4%	2.9	105.1	1048	62	987
8	0.0%	0.0	0.0	1257	63	1194
9	0.0%	0.0	0.0	1618	65	1553
10	0.0%	0.0	0.0	3346	77	3270
All deciles	13.8%	1822.5	177.4	10340	832	9508
Hungary						
1	99.9%	12.2	51.4	23	8	15
2	100.0%	12.9	55.6	26	7	19
3	99.7%	12.6	56.6	33	5	28
4	100.0%	13.0	56.9	40	5	35
5	100.0%	13.2	57.3	47	7	40
6	99.8%	13.1	57.5	55	7	49
7	100.0%	13.8	58.4	69	8	60
8	99.5%	12.8	57.6	79	7	71
9	99.3%	11.9	50.1	110	9	101
10	49.4%	2.6	11.8	211	11	200
All deciles	94.6%	118.2	51.4	693	75	617
Slovakia						
1	97.1%	18.7	8.8	30	10	20
2	0.7%	0.1	3.7	59	7	52
3	0.0%	0.0	0.0	26	3	23
4	0.0%	0.0	0.0	53	5	48
5	0.0%	0.0	0.0	60	6	54
6	0.0%	0.0	0.0	66	5	61
7	0.0%	0.0	0.0	81	6	75
8	0.0%	0.0	0.0	81	4	77
9	0.0%	0.0	0.0	104	5	99
10	0.0%	0.0	0.0	160	6	154
All deciles	9.4%	18.7	8.8	720	58	662

Notes: All figures in Mio euros, except for average monthly MWP tax expenditure (in euros). Average monthly MWP tax expenditure for recipient households. (*)Total taxes includes PIT and SSC. For France, total taxes includes PIT, SSC, CSG and CRDS.
Source: authors' calculations, based on Euromod F6.0++ simulations.

responses at the extensive margin will thus exert first-order effects on government revenue. Our aim is indeed to gauge not only the overall size of such revenue impacts, but also the relative magnitude of the behavioural vs. the mechanical effect of a given change in tax expenditures. Therefore, naturally, we depart from IKKS by not assuming revenue neutral reforms. Secondly, in line with the theoretical model we consider marginal changes in existing policies rather than the introduction of new hypothetical policies.

Following IKKS and Saez (2002), we stick to the assumption of ruling out income effects on labour supply, which simplifies considerably the theoretical analysis, and in particular welfare aggregation. In practice, after working through the model (see Appendix 1), it is possible to express in compact way the overall change in tax revenue following a generic marginal tax reform (∂z) affecting disposable income. Formally, this can be written as:

$$dR = dM + dB = \sum_{i=1}^{I} \left[\underbrace{\frac{\partial T_i}{\partial z} E_i + \frac{\partial T_0}{\partial z}(N_i - E_i)}_{\text{mechanical}} - \underbrace{\left(\underbrace{\frac{\tau_i}{1-\tau_i} \frac{\partial \tau_i}{\partial z} E_i w_i l_i \varepsilon_i}_{\text{intensive margin}} + \underbrace{\frac{a_i}{1-a_i} \frac{\partial (T_i - T_0)}{\partial z} \eta_i E_i}_{\text{extensive margin}} \right)}_{\text{behavioural}} \right]. \quad (1)$$

In equation 1, the overall revenue effects from the tax reform – obtained as an aggregation over the groups of individuals in the income decile i – can be decomposed into two separate parts, the mechanical and the behavioural components. The former gauges the impacts of the policy reform absent any behavioural reactions, whereas the latter quantifies the revenue effect brought about precisely by individuals reacting to the new policy environment. In particular, the first term of the mechanical element captures the direct change in tax revenues collected from those in employment (E_i), while the second term is the effect of the tax reform on the benefits received by non-working individuals $(N_i - E_i)$. The terms $T_i \equiv T(w_i l_i, z)$ and $T_0 \equiv T(0, z)$ are the tax liabilities for those working and for those unemployed, respectively, given the current policy z. Similarly, the behavioural component of the change in tax revenues can be further decomposed into two separate effects, corresponding to the changes to hours worked and participation decisions. In particular, the first term captures the adjustment along the intensive margin, with τ_i the marginal effective tax rate, wl labour income (w is the wage rate and l hours worked), and ε_i the intensive labour supply elasticity for individuals in group i. The second term in the behavioural component represents the adjustment along the extensive margin. As it is apparent, this depends on the change in the tax liability in the transition from unemployment into work $\partial(T_i - T_0)$ and on the extensive elasticity η_i, defined as the percentage change in the number of workers in group i following a one percent change in income net of taxes (which is equivalent to consumption) between working and not working. Importantly, the magnitude of effect along the extensive margin depends also on the participation tax rate, $a_i = [T_i(w_i l_i) - T(0)]/(w_i l_i)$.

3.2 A measure of the welfare cost: the marginal cost of public funds

The amount of tax revenues foregone due to the tax breaks is influenced by both the number of workers targeted by MWP policies and by the generosity of the relief. The potential cost of reforming MWP policies should thus be gauged in terms of a trade-off between equity and efficiency related to the revenue outcomes of the schemes. Isolating the behavioural component of the overall effects of a tax reform allows one to directly assess the non-monetary cost of the policy intervention. The theoretical framework sketched above naturally lends itself to the application of a synthetic measure of such cost, namely the marginal cost of public funds (MCF), which has

emerged as one of the most important concepts in modern public finance. The MCF can be expressed as the ratio, taken with negative sign, between the change in welfare and the change in revenue brought about by a marginal arbitrary tax rate increase. As such, it indeed quantifies the welfare loss incurred by society in raising an extra euro of revenue to finance public spending. An analytical expression for the MCF from taxing labour income in the presence of fixed costs and endogenous labour force participation is derived by Kleven and Kreiner (2006). In particular, they show that, in this framework, the aggregate welfare effect is simply the sum of what we call the mechanical increase in the tax liabilities for each group of individuals. This is a direct consequence of the fact that in this type of model, at equilibrium, optimized hours of work are not affected by marginal tax reforms. The change in government revenue is derived in a straightforward way by factoring in the behavioural responses along the intensive and the extensive margin of labour supply. All in all, equation 1 provides already all the ingredients needed to compute the MCF, which can be expressed compactly as:

$$\mathrm{MCF} = -\frac{\mathrm{dWelfare}}{\mathrm{dRevenue}} = \frac{\mathrm{dM}}{\mathrm{dR}} = 1 + \frac{|\mathrm{dB}|}{\mathrm{dR}} \tag{2}$$

Recalling notation from equation 1, dM indicates the mechanical change in revenue, which is equal, as explained above, to minus the welfare effect, and dR is the total, or net, revenue impact of the reform. The last term in equation 2 stems from the equivalence result linking the MCF and the marginal excess burden from taxation, *i.e.*, the excess distortion generated in raising an additional euro of tax revenue (Dahlby, 2008).[6] In our framework, the marginal excess burden can be immediately singled out through the behavioural component, and is therefore captured by the ratio |dB|/dR, where again, dB quantifies the change in revenue following labour supply adjustments.

Kleven and Kreiner (2006) also define the broader concept of social marginal cost of public funds (SMCF), which takes distributional preferences into account in the quantification of the aggregate cost. In this case, the group-specific welfare changes are aggregated using ad hoc weights that reflect the average social marginal utility of income among the working population in each group. Although this might be a natural approach to adopt in our framework, nonetheless we prefer not to impose assumptions on the distributional preferences of the countries we analyse. Hence, we stick to an unweighted welfare aggregation. Appropriately substituting the expressions for the different components of MCF demonstrates that, even ignoring distributional concerns, observed heterogeneity in earnings, behavioural parameters, and taxes and benefits do matter for the welfare cost of raising additional government revenue. Insofar as the policies we are analysing are targeted at the low end of the earnings distribution, which is mostly the case for the countries we're looking at, the MCF formula will arguably provide us with a lower bound for the SMCF. Given the inclusion of discrete responses along the extensive margin in the underlying theoretical model, our estimates turn out to be already larger than the results commonly found in the traditional MCF literature focusing only on infinitesimal adjustments in hours worked.

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[6] As pedagogically presented by Dahlby and Ferede (2011), if a government raises a tax rate by 10 per cent and the private sector responds by reducing the amount of the taxed activity by 2 per cent, the government's tax revenue will increase by 8 per cent, not 10 per cent. The efficiency loss from the reallocation of resources in the economy due to a tax is reflected in this shrinkage of the tax base. To illustrate how this phenomenon affects the calculation of the marginal cost of public funds, because the 10 per cent tax rate increase generates only an 8 per cent increase in tax revenue, the cost of raising that last, or marginal, dollar of tax revenue is 10/8=1+2/8, or 1.25. Of course, this reasoning is illustrative, since it should be considered strictly speaking only valid in marginal terms. In other words, at the existing tax rate, raising an additional euro of tax revenue costs society 1.25 euro.

4 Estimating the impact of reforming tax expenditures: implementation

Implementing the theoretical framework above requires a realistic calibration of a number of parameters. Firstly, we need to gauge the level and the changes in the tax burden on the workers under the current policy regime and the simulated scenarios. Secondly, participation and in-work labour supply elasticities must also be obtained. We discuss our methodological choices on these two issues in turn.

4.1 Simulation of the tax parameters

The baseline scenario of our exercise assumes the marginal reform as a 1 per cent decrease in the size of the tax expenditure at the individual level. As a sensitivity check, we simulate a lump-sum change in the tax expenditure equal to € 1 (per month) again at the taxpayer level. The change in the policy instrument, represented by z in equation 1, ultimately results in an increase of the tax liability, and thus of the effective tax rate, for the workers. These parameters are clearly worker-specific, and, importantly, depend on the features of the national tax and benefit systems. To account for such complex interactions, we derive them using the EUROMOD microsimulation tool.

Starting with the components of the mechanical effect, $\partial T_i / \partial z$ captures the change in the net tax liability of the workers from the actual to the reformed policy setting. In our framework, the term $(\partial T_i / \partial z)E$ exhausts the mechanical effect of a change in tax expenditure because non-working individuals are not affected by the simulated policy change. Since we do not adopt a balanced budget rule, the second term comprising the mechanical effect in equation 1 – the potential compensatory changes in the transfers received by the unemployed – will be equal to zero. The aggregate measure of the mechanical revenue impacts is obtained from the individual effects by applying employment rates (the term E_i) taken from the Labour Force Surveys.

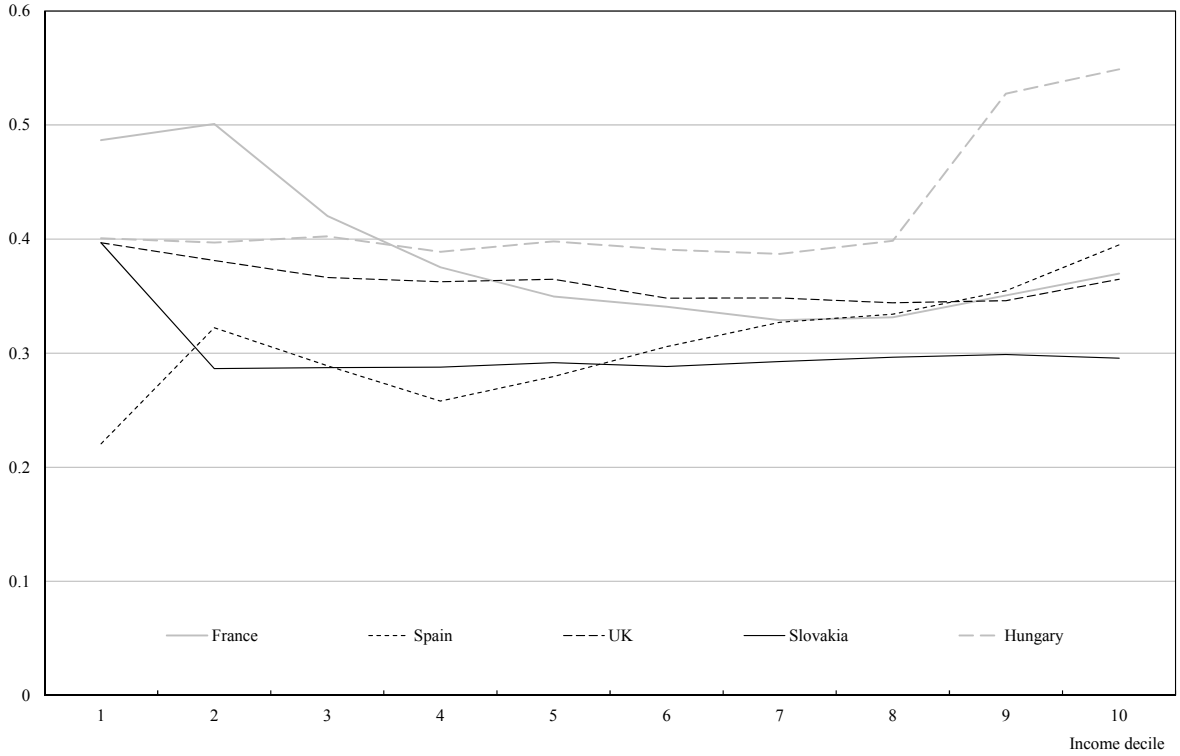
When moving to the behavioural component of the revenue effect, one needs to measure the level of the individual effective marginal tax rates (EMTR) τ_i and their marginal changes ($\partial \tau_i$) following the tax expenditure reform. In order to calculate the EMTRs we follow the approach of Jara and Tumino (2013) which explicitly accounts for all elements affecting household current cash disposable income. Thus, the EMTRs for each individual are evaluated on the basis of taxes paid by (and benefits paid to) all members of a household. Formally, individual level EMTRs are calculated as:

$$\text{EMTR} = 1 - \frac{Y_{HH}^1 - Y_{HH}^0}{G_k^1 - G_k^0} \tag{3}$$

where Y_{HH} is the household disposable income and G represents the earnings of the individual household member. Operationally, the household disposable income is calculated first. Then, the income of each earner in the household is increased sequentially by a given amount, while accounting for all simultaneous changes induced on the tax liability and benefit entitlement for all other household members. In computing the EMTR we have chosen to increase marginally only the largest component of the individual total income – that is, gross labour income ($w_i l_i$, using the notation in equation 1). This warrants further consistency with the underlying theoretical framework of labour supply responses. We applied a marginal increase of 3 per cent of the gross wage, which corresponds approximately to the additional earnings from a one hour increase in working hours (assuming a full-time employee working 40 hours per week).

Figure 1

Effective Marginal Tax Rates by Income Decile



Source: authors' calculations, based on Euromod F6.0++ simulations.

Figure 1 plots the simulated EMTRs across income deciles for the five countries.[7] In the cross-country comparison, low income earners tend to face relatively high marginal tax rates in France and relatively low rates in Spain. As from the fourth income decile Hungary displays the highest marginal rates, with a peak above 50 per cent at the top of the income distribution.[8] The three "old" EU Member States also show a rather similar pattern for EMTRs at the highest earnings deciles. Marginal rates do not always increase monotonously, as it appears for France and the UK. There are several reasons for this. For instance, the joint tax system in France can result in very high marginal income tax rates for low-wage spouses of high-income earners. Moreover, in general, the withdrawal of income-related benefits can increase marginal tax rates at the lower end of the income distribution. Also, discontinuities in the SSC schedules (such as earnings thresholds) can give rise to very high marginal rates (as well as participation tax rates) for some low wage earners. By contrast, at the same time, ceilings on the contribution base can result in relatively low marginal SSC rates for the highest deciles.

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[7] Overall, the simulated values are in line with those in Jara and Tumino (2013). Some differences emerge for the average values. For instance, we obtain average EMTRs (non-reported) of 38.7, 30.9 and 37.1 per cent for France, Spain and the UK, respectively, while their calculations give 36.5, 25.9 and 39.4 per cent for the same countries. These discrepancies are likely caused by our sample selection rule.

[8] It is worth noting that, since our simulations are based on 2010 policies, the results for Hungary reflect the progressive personal income tax schedule in place then, with a top marginal rate of 32 per cent. In addition, in 2010 a so-called "super gross-up" regime was introduced, whereby the tax base (aggregate taxable income) was grossed-up of social security contributions.

The second term in the behavioural impact in equation 1 represents the change in net tax revenues related to the extensive margin of labour supply. To compute that, we derive from EUROMOD a measure of the change in the tax liability, that is the term $\partial(T_i - T_0)$, which represents the difference between the net taxes (*i.e.*, net of social benefits) paid by the individual when working and the net taxes paid by when not working (*i.e.*, when wage income is zero). We also need to retrieve the participation tax rates (the term a_i), that is the difference between the net taxes paid by worker i when working and the net taxes paid by the same individual when not working, relative to labour income. Figure 2 plots the participation tax rates. The UK appears to have the lowest participation tax rate across all earning deciles. In all countries, except Slovakia, the participation tax rate tends to increase across income deciles. By contrast, the profile is relatively flat for Slovakia, which shows the largest participation tax rates, ranging between 73 per cent and 79 per cent.

Lastly, two additional parameters are crucial to translate the static microsimulations into the dynamic effects behind the behavioural contribution to the revenue change. The term ε_i represents the (uncompensated) in-work elasticity of labour supply, *i.e.*, the variation in the number of hours worked as a result of a change in the gross labour income. Likewise, η_i represents the participation elasticity, which affects the impacts along the extensive margin. The calibration of these parameters is illustrated in the next section.

4.2 Calibration of labour supply elasticities

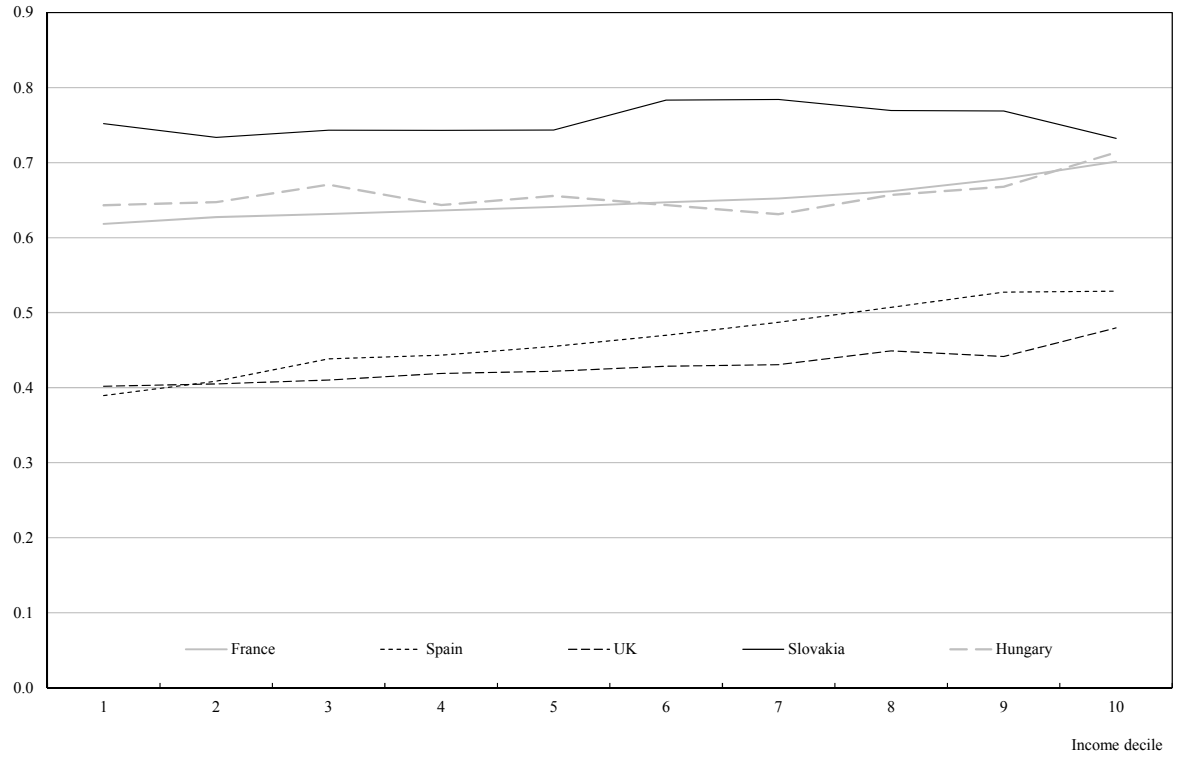
The calibration of the labour supply elasticities – both the intensive and the extensive margin – is crucial to gauge the behavioural impacts of the tax reforms. Our choices regarding these elasticities were guided by two main considerations. Firstly, the high degree of heterogeneity observed in the labour market, documented for instance in Blundell *et al.* (2011), need be accounted for. This would also allow us to have the heterogeneity uncovered by the microsimulation model reflected into the dynamic impacts. Thus, ideally the elasticities should be differentiated by type of individuals. Secondly, from a purely methodological standpoint, cross-country comparability of the elasticities is a potential source of concern. Country-specific studies have often obtained different labour supply elasticities depending on the specific period considered, the focus on specific categories of workers or the estimation method. To avoid this uncertainty, we narrow down the number of sources we rely upon to two. Thus, we take our baseline elasticities from Bargain et al. (2012) who provide both intensive (*i.e.*, number of hours worked) and extensive (*i.e.*, participation) labour supply elasticities for a range of European countries, including the five countries considered in our analysis. They are reported in Table 2. In addition, we use other estimates on the elasticities at the extensive margin, as reported in IKKS. Importantly, these are specific to type of individual and decreasing across income deciles. By doing so, we can capture, at the finest possible level of granularity, the effect of heterogeneity, which, according to recent results from empirical studies, are significant for participation decisions but relatively small adjustments in hours worked. All in all, we differentiate two baseline cases depending on the degree of heterogeneity in labour supply elasticities, as follows:

Case 1: baseline participation and hours-of-work elasticities – country-specific and aggregate value across income distribution[9] – from Bargain *et al.* (2012). For *lone parents* only, participation

[9] The elasticities by decile shown by Bargain *et al.* (2012) do not parse the extensive and the intensive margin. Moreover, they are computed over a more limited sample. Moreover, the distribution of the elasticities across income deciles is U-shaped. This result, although interesting, is not fully convincing, and deserves further investigation.

Figure 2

Participation Tax Rates by Income Decile



Source: authors' calculations, based on Euromod F6.0++ simulations.

elasticities - decreasing across deciles but not varying across countries – are taken from IKKS.[10]

Case 2: baseline participation and hours-of-work elasticities – country-specific and aggregate value across income distribution – from Bargain *et al.* (2012). For *lone parents and married women*, participation elasticities – decreasing across deciles but not varying across countries – are taken from IKKS.

The two sets of elasticities are applied to the proportional (marginal) reform (scenarios 1 and 2), whereas elasticities as in case 1 applied to the lump sum reform (scenario 1.a). Moreover, as an additional sensitivity analysis, in the latter policy intervention, we also show the result obtained by averaging the elasticities under case 1 across countries, so as to single out the effect of the different policies (combined with that of dissimilar income distributions). We label this as scenario 3.

We are aware that the current situation in the labour market would call for considering young people as one of the groups deserving a differential analysis. Although youth unemployment is an important issue, we remain sceptical about the existence of sound estimates of labour supply elasticities for the younger cohorts that could be used in our analysis.

[10] The values of the participation elasticities for lone parents are 0.9 for deciles 1 and 2, 0.6 in deciles 3 and 4, 0.4 in deciles 5 and 6, 0.2 in deciles 7 and 8 and 0 in deciles 9 and 10.

Table 2

Labour Supply Elasticities
(simulation: 1 percent tax policy change)

	France		Spain		UK		Hungary		Slovakia	
Scenario 1	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Married men	0.02	0.04	0.07	0.07	0	0.06	0	0.07	0	0.07
Single women	0.02	0.09	0.04	0.19	0.04	0.24	0.01	0.07	0.01	0.07
Single men	0.02	0.12	0.09	0.47	0.01	0.22	0.01	0.15	0.01	0.15
Lone parents	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*
Scenario 2	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Married men	0.02	0.04	0.07	0.07	0	0.06	0	0.07	0	0.07
Single women	0.02	0.09	0.04	0.19	0.04	0.24	0.01	0.07	0.01	0.07
Single men	0.02	0.12	0.09	0.47	0.01	0.22	0.01	0.15	0.01	0.15
Lone parents	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13

Source: Bargain *et al.* (2012), Immervoli *et al.* (2007).

Table 2 *(continued)*

Labour Supply Elasticities
(simulation: 1 euro tax policy change)

	France		Spain		UK		Hungary		Slovakia	
Scenario 1.a	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Married men	0.02	0.04	0.07	0.07	0	0.06	0	0.07	0	0.07
Single women	0.02	0.09	0.04	0.19	0.04	0.24	0.01	0.07	0.01	0.07
Single men	0.02	0.12	0.09	0.47	0.01	0.22	0.01	0.15	0.01	0.15
Lone parents	0.02	0.1	0.08	0.43	0.02	0.07	0.01	0.13	0.01	0.13
Scenario 3	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**	**Intensive**	**Extensive**
Married women	0.03	0.18	0.03	0.18	0.03	0.18	0.03	0.18	0.03	0.18
Married men	0.02	0.06	0.02	0.06	0.02	0.06	0.02	0.06	0.02	0.06
Single women	0.03	0.15	0.03	0.15	0.03	0.15	0.03	0.15	0.03	0.15
Single men	0.03	0.24	0.03	0.24	0.03	0.24	0.03	0.24	0.03	0.24
Lone parents	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*	*as single*

Source: Bargain *et al.* (2012), Immervoli *et al.* (2007).

5 Results

This section discusses the results from a marginal reduction in work-related tax reliefs. In the baseline case, the marginal reduction is proportional, whereas the case of a lump-sum equally-sized decrease is also investigated as a sensitivity check.

5.1 Baseline: a proportional reduction in work-related tax expenditures

In all of the baseline simulations, we define our policy shock as a reduction in the taxpayer-specific amount of the considered tax expenditure by 1 percent. As such, the country-specific size of the shock is not fully comparable across countries. This lack of comparability is partly endogenous, stemming directly from the different design of the tax provisions in place in the countries considered. A way to circumvent the issue would be to assume that the same policy is introduced in all the countries. However this would be an inherently different exercise which we leave for further research. As mentioned, we believe that our approach is most useful in understanding the impacts of gradual tax reforms. The "marginal approach" used in the paper is in line with the findings of the political economy literature, suggesting that even radical tax reforms are likely to be introduced gradually.

Table 3 shows the results for France. The mechanical effect – by construction unchanged in both scenarios, as it is independent from the behavioural reactions – is around € 0.73 million. The modest size of the impacts reflects the design features of the policy, in terms both of the number of recipients and the magnitude of individual entitlements, as documented in our descriptive analysis and underpinned by other studies (Immervol and Pearson, 2009). In scenario 1, the total behavioural impact is € –0.34 million. The results suggest that almost one half of aggregate extra-tax revenues raised through the decrease in the tax expenditure is lost once the labour supply reaction is factored in. The total behavioural effect is driven by the changes in participation which appear concentrated in the fourth decile. By contrast, reactions along the intensive margin take place at the very bottom of the income distribution, perhaps not surprisingly given the design of the PPE, targeted at low wage earners. Scenario 2 replicates the exercise differentiating the participation elasticities for lone parents and married women as well. At € –0.68 million, the overall behavioural effect is twice as large as the corresponding value in scenario 1. In other words, more than 90 per cent of the mechanical revenue gain is taken away as a consequence of the reduced labour supply, mainly stemming from adjustment along the extensive margin. Overall, this ultimately eats away the static revenue gain from the tax reform, which amounts to only € 0.05 million.

Table 4 provides simulation results for Spain. In the Spanish case the estimated mechanical effect of a decrease in the tax allowance for employment income – unchanged, by construction, across all simulated scenarios – is estimated at around € 50 million per month. The order of magnitude clearly shows the broad range of application of this tax relief – potentially all employment income earners, with disadvantaged categories receiving a more generous allowance. In contrast with the French case, the reduction in tax expenditure in the Spanish case affects the tax revenues only indirectly since the 1 percent reduction is in fact affecting the tax base in the first place. The differences in magnitude carry over when it comes to the overall impact of the behavioural effect. In scenario 1, roughly one third of the mechanical revenue effect is compensated by the reduced revenue due to lower labour supply, with a negligible contribution from the adjustment on the intensive margin. Overall, the net impact on the budget is an increase in revenue of around € 35 million. Given the nature of the policy instrument, and the assumed constant elasticities in scenario 1, the profile of the behavioural component appears relatively flat along the income deciles, as expected, with the exception of a spike in decile 2. Changing the

Table 3

France: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.07	0.15	–0.09	–0.02	–0.06
2	0.19	0.23	–0.04	–0.04	0.01
3	0.05	0.06	–0.01	–0.01	0.00
4	0.02	0.16	–0.14	–0.15	0.01
5	0.03	0.07	–0.04	–0.04	0.00
6	0.02	0.05	–0.03	–0.03	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.39***	***0.73***	***–0.34***	***–0.29***	***–0.05***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 3 *(continued)*

France: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	–0.10	0.15	–0.25	–0.19	–0.06
2	0.07	0.23	–0.15	–0.16	0.01
3	0.02	0.06	–0.05	–0.05	0.00
4	0.00	0.16	–0.16	–0.16	0.01
5	0.02	0.07	–0.05	–0.04	0.00
6	0.02	0.05	–0.03	–0.03	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.05***	***0.73***	***–0.68***	***–0.63***	***–0.05***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 4

Spain: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.45	0.82	–0.38	–0.25	–0.12
2	3.11	5.41	–2.30	–2.01	–0.29
3	4.02	5.39	–1.38	–1.71	0.33
4	2.80	4.04	–1.24	–1.21	–0.02
5	3.04	4.27	–1.23	–1.19	–0.03
6	3.54	5.23	–1.70	–1.48	–0.22
7	3.93	5.27	–1.34	–1.31	–0.02
8	4.08	5.41	–1.33	–1.33	0.00
9	4.02	5.65	–1.63	–1.28	–0.35
10	5.75	7.16	–1.40	–1.35	–0.05
total	***34.73***	***48.65***	***–13.92***	***–13.14***	***–0.78***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 4 *(continued)*

Spain: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.38	0.82	–0.45	–0.32	–0.12
2	2.63	5.41	–2.78	–2.49	–0.29
3	3.85	5.39	–1.55	–1.88	0.33
4	2.67	4.04	–1.37	–1.35	–0.02
5	3.06	4.27	–1.20	–1.17	–0.03
6	3.57	5.23	–1.66	–1.44	–0.22
7	4.14	5.27	–1.13	–1.11	–0.02
8	4.33	5.41	–1.08	–1.08	0.00
9	4.64	5.65	–1.01	–0.66	–0.35
10	6.40	7.16	–0.76	–0.71	–0.05
total	***35.67***	***48.65***	***–12.99***	***–12.20***	***–0.78***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 5

UK: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	4.14	5.12	–0.99	–0.97	–0.02
2	1.69	2.28	–0.58	–0.57	–0.01
3	0.86	1.14	–0.28	–0.27	–0.01
4	0.17	0.28	–0.10	–0.10	0.00
5	0.15	0.21	–0.06	–0.06	0.00
6	0.02	0.02	0.00	0.00	0.00
7	0.08	0.09	–0.01	–0.01	0.00
8	0.01	0.01	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***7.12***	***9.14***	***–2.02***	***–1.98***	***–0.04***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 5 *(continued)*

UK: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	3.65	5.12	–1.48	–1.46	–0.02
2	1.49	2.28	–0.78	–0.77	–0.01
3	0.78	1.14	–0.37	–0.36	–0.01
4	0.17	0.28	–0.11	–0.11	0.00
5	0.15	0.21	–0.06	–0.06	0.00
6	0.02	0.02	–0.01	–0.01	0.00
7	0.08	0.09	–0.01	–0.01	0.00
8	0.01	0.01	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***6.33***	***9.14***	***–2.81***	***–2.77***	***–0.04***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 6

Hungary: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.51	0.85	–0.35	–0.35	0.00
2	0.43	0.78	–0.35	–0.35	0.00
3	0.68	1.00	–0.32	–0.32	0.00
4	0.78	1.01	–0.24	–0.24	0.00
5	0.75	1.02	–0.27	–0.27	0.00
6	0.71	0.96	–0.24	–0.24	0.00
7	0.90	1.12	–0.22	–0.22	0.00
8	0.84	1.04	–0.20	–0.20	0.00
9	0.82	0.96	–0.14	–0.16	0.02
10	0.16	0.18	–0.02	–0.02	0.00
total	***6.59***	***8.93***	***–2.34***	***–2.36***	***0.02***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 6 *(continued)*

Hungary: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.17	0.85	–0.68	–0.68	0.00
2	–0.04	0.78	–0.82	–0.82	0.00
3	0.39	1.00	–0.61	–0.61	0.00
4	0.50	1.01	–0.51	–0.51	0.00
5	0.59	1.02	–0.43	–0.43	0.00
6	0.58	0.96	–0.38	–0.38	0.00
7	0.87	1.12	–0.26	–0.26	0.00
8	0.80	1.04	–0.24	–0.24	0.00
9	0.87	0.96	–0.09	–0.11	0.02
10	0.17	0.18	–0.02	–0.02	0.00
total	***4.89***	***8.93***	***–4.04***	***–4.06***	***0.02***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 7

Slovakia: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.05	0.13	–0.08	–0.09	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.05***	***0.13***	***–0.08***	***–0.09***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 7 *(continued)*

Slovakia: Decomposition of the Impact of a 1 Percent Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 2: participation elasticities for lone parents and married women decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	–0.13	0.13	–0.26	–0.26	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***–0.13***	***0.13***	***–0.26***	***–0.26***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

participation elasticities for married women – as in scenario 2 – results in a marginal change in the overall behavioural revenue effect (€ –13 million) and slightly differentiated impacts along the various deciles of the income distribution. In particular, a larger revenue impact (in absolute value) is apparent in deciles 1-4 as opposed to a smaller contribution from deciles 5-10. Thus, the revenue loss from the lowest deciles is larger in scenario 2 than in scenario 1.

Table 5 shows the simulation results for the UK, where the work-related tax relief is provided via an income-tested refundable tax credit. Overall, the marginal change in the tax expenditure – independent from the labour supply assumptions – results in a mechanical revenue gain of around € 9 million per month. Similarly to the French case, the mechanical revenue gain is concentrated on the low-wage earners, in particular those in deciles 1 to 3. In scenario 1, the overall behavioural impact takes away roughly one-fourth of the mechanical effect, with the adjustment along the extensive margin accounting for almost the full decrease in revenue. Inspection of the results by deciles clearly shows that the contribution to the revenue erosion is decreasing monotonically with income, and is concentrated in the lower half of the distribution. Assuming participation elasticities decreasing across deciles also for married women (as in scenario 2) increases the total behavioural revenue loss by 40 per cent, to slightly less than € 3 million. The total net impact on revenue would then be in the order of € 6 million per month.

Results for Hungary are shown in Table 6. A marginal reduction in the tax credit yields around € 9 million of extra-revenue, without accounting for labour supply responses. Once those are factored in, revenues increase by slightly less than € 7 million (scenario 1) or € 5 million (scenario 2). While, following the assumptions on the elasticities, the behavioural impacts on the extensive margin decrease monotonically along the entire income distribution, the mechanical effects have roughly the same order of magnitude across deciles (except for the top decile). Strikingly, adjustments in hours worked are practically null in both scenarios.

The results for Slovakia are reported in Table 7. As is apparent, the policy (change) affects only workers in the bottom decile of the income distribution. The purely mechanical effect is around € 0.13 million per month, whereas the behavioural impacts (only due to adjustments in participation) range from € 0.08 million (scenario 1) to € 0.26 million (scenario 2), in absolute value. As a result, when one allows for heterogeneous labour supply responses from married women, the reduction in the work-related tax credit turns out worsening the public balance.

5.2 Sensitivity analysis: a lump-sum reduction in work-related tax expenditures

The results in the previous section show a large degree of heterogeneity across countries, in terms both of the magnitude of the aggregate impacts and of their distributional effects. The discrepancies stem from the differences in the national tax-benefit systems, and in particular in the design of the tax reliefs considered. Although, as such, they are largely unavoidable, it is nonetheless interesting to check whether the results are robust to different working assumptions. We run sensitivity analyses based as before on a marginal shock. However, in this case, it is assumed to take the form of a lump-sum reduction in the work-related tax expenditure at the taxpayer's level equal to € 1 per month. We simulate the policy change applying the set of elasticities that allows for a differentiated participation response only for lone parents (scenario 1.a, directly comparable to the baseline scenario 1). In addition, to "clean" the results from the effects of different labour supply responses across countries we re-calculate the behavioural impacts using average elasticities (scenario 3). In this way, the cross-country differences in the results should capture the pure effects of the national tax (and benefit) policies, and of the underlying income distributions, rather than differences in labour market and other institutions which might be behind the labour supply elasticities.

Table 8 shows the results for France. The mechanical impact of the lump sum reform is almost € 6 million per month, around 8 times as large as the one form the proportional policy change, indicating that the individual monetary gain from the PPE might indeed be tiny for a significant share of recipients.[11] The overall behavioural impact is roughly € 3.3 million, around 60 per cent of the mechanical impact. In the scenario with equal elasticities across countries the cost of the reform in terms of revenue loss increases to € 4 million per month.

In the case of Spain, the lump sum policy change halves the size of the mechanical effects (now around € 23 million per month) compared to the case of a proportional change in the tax allowance (Table 9). The total behavioural impact is reduced by the same proportion when country-specific elasticities are used, whereas averaging the elasticities across countries would imply a much smaller revenue loss (around € 3.8 million).

Also for the UK, the lump sum shock implies a reduced mechanical revenue gain compared to the proportional change in the tax credit (Table 10). The aggregate value is around € 4.7 million. Like in the baseline case, roughly one-fourth of the gain is eroded by the behavioural reactions, slightly more pronounced when average elasticities are considered.

Both for Hungary and Slovakia (Tables 11 and 12) the lump sum shock translates into larger mechanical revenue effects compared to the proportional policy change. In Hungary, the revenue gain absent behavioural reactions reaches almost € 16 million per month. The reduction due to the labour supply responses hovers at around one-third, and is dampened in the case with average elasticities. For Slovakia, a lump sum reduction in the tax credit would increase the revenue impacts tenfold compared to the proportional policy shock under scenario 1.a, implying an overall revenue loss of roughly € 1.5 million a month. The sign of the net effect on revenues is reversed in the case of average elasticities, with a positive contribution to the budget equal to € 0.3 million.

5.3 Quantifying the marginal cost of public funds

Equipped with the full set of results illustrated in the previous sections, we can straightforwardly derive the MCF of the different simulated reforms by applying equation 2. In Table 13 we report the values for the aggregate MCF obtained by first aggregating the relevant variables, *i.e.*, the welfare and the revenue changes, across deciles, and then taking the ratio between the two. As a sensitivity check, we also calculated decile-specific MCF and then averaged these measures across the deciles affected by the policy (change). The relative magnitude of the measures is mostly unchanged. The aggregate values in Table 14 are clearly above 1, the benchmark level for the MCF for a proportional tax reform in the absence of extensive labour supply responses (Ballard and Fullerton, 1992).[12] In some cases, the deviation from the unit benchmark is substantial.

Scenario 1, which simulates the proportional reform in tax expenditure with a minimum level of differentiation in labour supply elasticities, leads to relatively modest aggregate welfare losses for all countries except France and Slovakia, where the tax credits are more targeted to low income earners, and the resulting MCF is slightly below 2 and 3, respectively. The distortions are minimal in the UK case by contrast, which is likely to be due to the compensating effect of extra child benefit provided since a loss in disposable income due to the reduction in tax credit is automatically compensated by an increase in the child benefit.

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[11] In this respect, the policy change should be intended as equal to € 1 at most, as for some taxpayers the individual tax credit before the policy change is lower than that amount.

[12] The uncompensated hours-of-work elasticity is assumed equal to zero.

Table 8

France: Decomposition of the Impact of a Lump-sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.38	0.40	–0.02	–0.06	0.04
2	0.49	1.45	–0.97	–0.25	–0.72
3	0.80	1.03	–0.23	–0.23	0.00
4	0.11	0.64	–0.53	–0.49	–0.04
5	0.36	0.98	–0.63	–0.59	–0.04
6	0.49	1.41	–0.91	–0.92	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***2.63***	***5.92***	***–3.29***	***–2.54***	***–0.75***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 8 *(continued)*

France: Decomposition of the Impact of a Lump-sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.36	0.40	–0.05	–0.11	0.06
2	–0.07	1.45	–1.52	–0.45	–1.07
3	0.68	1.03	–0.35	–0.35	0.00
4	0.07	0.64	–0.57	–0.51	–0.06
5	0.32	0.98	–0.66	–0.61	–0.06
6	0.49	1.41	–0.92	–0.93	0.01
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***1.84***	***5.92***	***–4.08***	***–2.96***	***–1.12***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 9

Spain: Decomposition of the Impact of a Lump-sum Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.60	1.23	–0.62	–0.46	–0.17
2	1.93	2.71	–0.78	–0.96	0.18
3	1.35	1.98	–0.63	–0.62	–0.01
4	1.49	2.15	–0.66	–0.66	–0.01
5	1.25	1.84	–0.59	–0.52	–0.07
6	1.69	2.38	–0.69	–0.65	–0.03
7	1.77	2.34	–0.57	–0.56	–0.01
8	1.83	2.44	–0.61	–0.60	–0.01
9	1.84	2.59	–0.75	–0.59	–0.16
10	2.53	3.18	–0.65	–0.63	–0.03
total	***16.28***	***22.84***	***–6.56***	***–6.25***	***–0.31***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 9 *(continued)*

Spain: Decomposition of the Impact of a Lump–sum Decrease in MWP Tax Allowance on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.83	1.23	–0.40	–0.32	–0.07
2	2.14	2.71	–0.57	–0.64	0.08
3	1.58	1.98	–0.40	–0.40	0.00
4	1.77	2.15	–0.38	–0.37	0.00
5	1.52	1.84	–0.32	–0.29	–0.03
6	2.00	2.38	–0.38	–0.37	–0.01
7	2.02	2.34	–0.31	–0.31	0.00
8	2.10	2.44	–0.33	–0.33	0.00
9	2.22	2.59	–0.37	–0.31	–0.06
10	2.83	3.18	–0.35	–0.34	–0.01
total	***19.03***	***22.84***	***–3.80***	***–3.68***	***–0.12***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 10

UK: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	1.49	1.81	–0.32	–0.33	0.00
2	1.09	1.35	–0.26	–0.26	0.00
3	0.87	1.04	–0.17	–0.17	0.00
4	0.29	0.34	–0.05	–0.05	0.00
5	0.06	0.07	–0.01	–0.01	0.00
6	0.02	0.02	0.00	0.00	0.00
7	0.04	0.04	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***3.86***	***4.68***	***–0.83***	***–0.82***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 10 *(continued)*

UK: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	1.42	1.81	–0.39	–0.28	–0.12
2	1.19	1.35	–0.16	–0.23	0.07
3	0.87	1.04	–0.17	–0.15	–0.02
4	0.16	0.34	–0.18	–0.05	–0.14
5	0.01	0.07	–0.06	–0.01	–0.04
6	0.00	0.02	–0.02	0.00	–0.01
7	0.04	0.04	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***3.70***	***4.68***	***–0.98***	***–0.72***	***–0.26***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 11

Hungary: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.57	1.71	–1.14	–1.13	–0.01
2	0.42	1.33	–0.91	–0.95	0.04
3	0.83	1.62	–0.79	–0.78	–0.01
4	0.97	1.69	–0.72	–0.71	–0.01
5	1.08	1.69	–0.60	–0.59	–0.01
6	1.09	1.63	–0.54	–0.54	0.00
7	1.44	1.80	–0.36	–0.36	0.00
8	1.36	1.69	–0.33	–0.33	0.00
9	1.62	1.80	–0.18	–0.18	0.00
10	0.72	0.81	–0.09	–0.09	0.00
total	***10.10***	***15.75***	***–5.66***	***–5.66***	***0.00***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 11 *(continued)*

Hungary: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.96	1.71	–0.75	–0.72	–0.03
2	1.08	1.33	–0.25	–0.39	0.13
3	1.08	1.62	–0.54	–0.51	–0.03
4	1.20	1.69	–0.49	–0.46	–0.02
5	1.14	1.69	–0.55	–0.49	–0.06
6	1.15	1.63	–0.47	–0.46	–0.01
7	1.39	1.80	–0.41	–0.42	0.01
8	1.30	1.69	–0.39	–0.39	0.00
9	1.44	1.80	–0.36	–0.36	0.00
10	0.66	0.81	–0.14	–0.14	0.00
total	***11.41***	***15.75***	***–4.34***	***–4.33***	***–0.01***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 12

Slovakia: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 1.a: participation elasticities for lone parents decreasing across income deciles)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	–1.42	1.39	–2.81	–2.83	0.02
2	–0.02	0.01	–0.03	–0.03	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***–1.44***	***1.40***	***–2.84***	***–2.86***	***0.02***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 12 *(continued)*

Slovakia: Decomposition of the Impact of Lump–sum Decrease in MWP Tax Credit on Labour Tax Revenue
(scenario 3: elasticities as in scenario 1, but averaged across countries)
(million euros)

decile	total	mechanical	behavioural_total	behavioural_extensive	behavioural_intensive
1	0.31	1.39	–1.08	–1.16	0.08
2	0.00	0.01	–0.01	–0.01	0.00
3	0.00	0.00	0.00	0.00	0.00
4	0.00	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00	0.00
8	0.00	0.00	0.00	0.00	0.00
9	0.00	0.00	0.00	0.00	0.00
10	0.00	0.00	0.00	0.00	0.00
total	***0.31***	***1.40***	***–1.09***	***–1.17***	***0.08***

Source: authors' calculations, based on Euromod F6.0++ simulations.

Table 13

The Marginal Cost of Public Funds for a Reduction in MWP Tax Expenditure

	Simulated Scenarios				*Cross–scenario st. dev.*
Country	**S1**	**S2**	**S1.a**	**S3**	
France	1.87	15.37	2.25	3.22	*5.62*
Spain	1.40	1.36	1.40	1.20	*0.08*
UK	1.28	1.44	1.21	1.26	*0.09*
Hungary	1.36	1.83	1.56	1.38	*0.19*
Slovakia	2.85	–	–	4.47	*0.81*
Cross–country st. dev.	*0.59*	*5.99*	*0.39*	*1.32*	

Source: authors' calculations, based on Euromod F6.0++ simulations.

Allowing for differentiated elasticities for lone parents increases the cost of reforming the tax reliefs granted through a direct reduction of the tax liability (for France, the UK and Hungary), whereas leaves the welfare cost of reducing the allowance (as it is the case for Spain) virtually unaffected. The welfare cost jumps to 15 for France, showing the sensitivity of the MCF to the participation elasticities for more vulnerable groups. Although this might seem a rather high value, particularly against the standard setup where the MCF is derived, it is still well in the range of estimates which can be obtained in the context of labour tax reforms accounting for responses along the extensive margin. In fact, the result is driven by the very low value of the denominator, because net revenue raised for France approach zero under the assumption of heterogeneous labour supply responses, as in scenario 2. Importantly, averaging the decile-specific MCF across the affected deciles would result in an overall MCF of 9.

The variability in the estimates of the MCF is to a large extent explained by the assumptions used regarding the elasticity of labour supply at the extensive margin. The cross-country variability in results (measured by the standard deviation of the MCFs) is indeed nearly tenfold when moving from Scenario 1 to Scenario 2 in the last row of Table 14. France and Slovakia are the countries for which the assumptions regarding the labour supply elasticities have the biggest impact. When using a homogenous definition of the tax policy change (€ 1) as in Scenario 1.a the cross-country differences in results becomes much smaller (with a standard deviation of 0.4), thus pointing to an important role played by the country-specific tax policy rules in places and possibly also due to the differences in income distributions. Interestingly, when moving from Scenario 1.a to Scenario 3 where elasticities are assumed to be identical across countries, the cross-country differences in MCF are more than tripled, thus pointing to the strong country-specific component of our results. Overall, the results obtained on the MCF point to large efficiency losses tied to reduction in the tax reliefs offered to low-wage workers.

6 Conclusion and discussion

The paper examines the impact on tax revenue of a marginal reduction in actual work-related tax expenditures in five European countries, France, Spain, the United Kingdom, Hungary and

Slovakia. The marginal approach used in the paper is in line with the findings of the political economy literature, suggesting that even radical tax reforms are likely to be introduced gradually. Moreover, assuming reforms to existing policies makes the exercise concretely based on real-life institutions, and allows for a significant degree of heterogeneity given the differences in the national tax-benefits systems considered. We combine static results from the micro-simulation model EUROMOD with a relatively new theoretical framework to obtain a measure of the behavioural impacts induced by the adjustment of the labour supply both at the extensive (labour market participation) and at the intensive margin (hours worked).

The results suggest that the behavioural effects wash away at least one-fourth of the mechanical impact of the reform, and in most instances between one-third and two-thirds of it. Participation decisions play a pivotal role in determining the size of the behavioural impacts. This would be the combined effect of both the behavioural reactions (particularly the calibration of the labour supply elasticities to allow for heterogeneity across groups) and the individuals targeted by the work-related tax benefits being concentrated at the bottom of the earnings distribution.

Differences across countries are remarkable, and mostly driven by the design of the tax relief. In particular, the revenue gain erosion might become significant the more the tax instrument is targeted at the low end of the income distribution. In extreme cases, the reduction of the tax expenditure might even ultimately translate into a revenue loss. As suggested by the use of different scenarios, the results are affected by the calibration of the labour supply elasticities across agents, with the extensive margin playing a much larger role than the intensive margin, as expected. Moreover, allowing for more heterogeneity in the behavioural responses across groups of individuals, and particularly singling out married women and lone parents, leads to larger revenue losses.

Since participation responses are mostly concentrated at the bottom of the earnings distribution, the revenue effects are more pronounced in countries where such low income levels are supported (e.g., via minimum wage or work-tested benefits). At the same time, the purely mechanical effect on revenue is largest at the lower end of the distribution for the policies clearly targeted at the low income workers, like it is the case for the tax credits in place in Slovakia, France and, to a lesser extent, the UK. The implications for the costs of the reforms are substantial. The revenue erosion from a proportional shock is at least 50 per cent in the case of France and Slovakia, and might grow even larger than the static mechanical impact in the case with more heterogeneous elasticities. As in our framework there is a direct correspondence between the mechanical impacts and the change in welfare, the size of the behavioural component determines also the welfare cost of the reform. Normalising that in terms of revenue raised, as indicated by the MCF, shows that aggregate welfare loss per unit of revenue raised is unambiguously above one, and in some of the simulated scenarios significantly larger than that.

Some limitations of our analysis should be borne in mind when drawing policy conclusions. In particular, arguably, the assumption of competitive labour markets with voluntary unemployment underlying the theoretical model might severely limit the applicability of our framework to the current juncture. Nonetheless, as pointed out by Kleven and Kreiner (2006), theories of imperfect labour markets would still predict higher unemployment following tax rate increases, while differing from the perfect labour market model only in the transmission mechanism (wages instead of individuals' voluntary participation decisions). Since unemployment would still have a revenue impact, our reasoning on the risk of revenue erosion would still apply to the new scenario.

A second factor which might play an important role in adverse business cycle conditions is the presence of the underground economy. Although its level should not affect our results, given that they depend only on observed revenue, however dropping out of the official labour market

following a tax increase might be a somewhat appealing option for low income earners. Nonetheless, in this respect, we are confident that the size of the labour supply elasticities used in our computations account for those factors, and therefore consider our result sufficiently robust to this other caveat.

All in all, although the budget consolidation needs currently faced by many European countries call for increasing government revenue, particularly by reviewing and reducing tax exemptions and relief, our results suggest some caution with respect to which tax expenditures might more efficiently be reduced. In particular, reducing work-related tax relief appear particularly costly, both in terms of the revenue erosion and in terms of the welfare costs to society following behavioural responses in labour supply. Put in a more positive way, the budgetary cost of tax expenditures in MWP policies turns out to be much lower when taking into account the behavioural effects, while they generate significant gains in terms of both economic activity – induced by a stronger labour supply – and welfare – caused by higher consumption.

APPENDIX 1
THEORETICAL FRAMEWORK

Following Immervoll *et al.* (2007) and Saez *et al.* (2012) we set up a theoretical framework where heterogeneous taxpayers take decisions on labour and pay taxes. Individuals take decisions about whether to work or not, which reflects the presence of fixed costs related to working (*i.e.*, the extensive margin). Conditional on this decision, the number of hours worked is chosen (*i.e.*, the intensive margin). Individuals thus face a nonlinear tax schedule from zero to positive income tax rate depending on their decision to work and on the number of hours worked. Changes in the tax system alter both the net-of-tax wage rate and, consequently, the opportunity cost of working (through the labour/leisure decision). Building on this simple framework we derive analytical expressions in which the changes in government tax revenues reflects the potential changes in labour supply and thus allows to gauge the relative strength on the behavioural vs. mechanical effect of a given change in tax expenditure and corresponding change in effective taxation.

Let us assume that the total population N is divided into i groups according to their skill level, which in turn determines their pre-tax wage. Each group has N_j individuals that earn the same exogenous wage rate w_i. Individuals within each group may differ in the fixed cost of working such that they may also differ in their extensive responses. Preferences are represented by the following additively separable utility function:

$$u_i(c, l, q) \tag{4}$$

where c is consumption, l labour and q the fixed cost of working. The partial derivative of (4) with respect to c is positive while the partial derivatives with respect to l and q are negative, conditional on labour participation. The budget constraint is given by:

$$c = w_i l - T(w_i l, z) \tag{5}$$

where $T(w_i l, z)$ represents the net taxes paid by the individual of group i; the parameter z is just a way to denote the tax reforms considered below. When the individual does not work (l=0), the above tax function becomes $-T_0(0, z)$, that is, the welfare benefit received by those who do not work. In such case, the budget constraint is $c_0 = -T_0(0, z)$.

Plugging (5) into (4) and maximising the new expression gives the optimal labour supply

$$l_i((1 - \tau_i)w_i) = l_i(W_i) \tag{6}$$

where Wi is the net-of-tax wage rate. As usual in the literature, we ignore income effects on labour supply in order to simplify the analysis and in absence of a general consensus in the literature about the size of such as income effects (see Blundell and MaCurdy, 1999, for a survey), which in many cases is simply insignificant.

A key variable in this analysis is the elasticity of labour supply with respect to the net-of-tax wage rate. In absence of income effects, the uncompensated and compensated elasticities can be considered as being identical, such that we have:

$$\varepsilon_i = \frac{\partial l_i}{\partial W_i}\frac{W_i}{l_i} \tag{7}$$

In relation to the extensive response, we first need to define the critical value of the fixed cost q that determines whether the individual enters the labour market or not. In terms of utility levels, the necessary condition to supply a strictly positive number of hours of work is given by:

$$u_i(w_i l - T(w_i l, z), l, q_i) > u_i(-T(0, z)) \tag{8}$$

which implicitly defines an upper-bound value for qi, denoted by $\bar{q}_i$. Provided that the individual cost of working qi is below $\bar{q}_i$, the labour supply will be strictly positive. Let the fixed cost qi be distributed across the individuals belonging to group i following the distribution function $F_i(q)$, with $f_i(q)$ as density function. Hence, $F_i(\bar{q}_i)$ is the proportion of individuals who choose to work because their qi is below $\bar{q}_i$. The total employment in group i is then given by $E_i \equiv N_i F_i(\bar{q}_i)$.

In line with Saez (2002), let the extensive elasticity for each individual of group i be defined as:

$$\eta_i = \frac{\partial F_i}{\partial (c_i - c_0)} \frac{(c_i - c_0)}{F_i} = \frac{f_i(\bar{q}_i)(c_i - c_0)}{F_i(\bar{q}_i)} \tag{9}$$

The variable ηi represents the percentage change in the number of workers in group i as result of a one-percentage change in the difference in consumption when working and not working are compared.

At this point, the mechanical effect of a tax reform (given by a change in the personal tax expenditures in our case) can be defined as:

$$dM = \sum_{i=1}^{I} \left[\frac{\partial T_i}{\partial z} F_i N_i + \frac{\partial T_0}{\partial z} (1 - F_i) N_i \right] \tag{10}$$

The first term refers to the change in the tax revenues by modifying personal tax expenditures in the case of employed individuals while the second term is the effect of the tax reform on the benefits received by non-working individuals.

The behavioural effect, on the other hand, takes into consideration the effect of changes in the labour supply (intensive response) and in the decision on participation in labour market (extensive response) on the tax revenues after the tax reform. Analytically this can be expressed by the following expressions:

$$dB = \sum_{i=1}^{I} \left[\tau_i d(w_i l_i) E_i + (T_i - T_0) \frac{dF_i}{dz} N_i \right]. \tag{11}$$

The first term of 11) is the behavioural effect related in the intensive response while the second term represents the behavioural effect in the extensive response. After differentiating totally the labour income and some algebraic manipulations using 7), we arrive at the following

expression of the first term of (11): $\sum_{i=1}^{I}\left[-\frac{\tau_i}{1-\tau_i}d\tau_i E_i w_i l_i \varepsilon_i\right]$, where the usual assumption that there is no incidence effect of changes in labour supply on pre-tax wage rate (dw=0) has been used.

As mentioned above, the second term of (11) refers to the behavioural effect related to the extensive response. Denoting by $a_i = \frac{T(w_i l_i) - T(0)}{w_i l_i}$ the participation tax rate, a more comprehensive expression of this second term can be obtained: $\sum_{i=1}^{I}\left[-\frac{a_i}{1-a_i}\frac{\partial(T_i - T_0)}{\partial z}\eta_i E_i\right]$, where the expression 5) – and its equivalent when l=0 –, the elasticity 9), dw=0 and the envelope theorem have been used. Hence the total behavioural effect of expression 11) can be rewritten as:

$$dB = \sum_{i=1}^{I}\left[-\frac{\tau_i}{1-\tau_i}d\tau_i E_i w_i l_i \varepsilon_i - \frac{a_i}{1-a_i}\frac{\partial(T_i - T_0)}{\partial z}\eta_i E_i\right]. \quad (12)$$

Finally, adding expression (10) and (12), we obtain the total change in the personal income tax revenues:

$$dR = dM + dB =$$
$$\sum_{i=1}^{I}\left[\frac{\partial T_i}{\partial z}E_i + \frac{\partial T_0}{\partial z}(N_i - E_i) - \frac{\tau_i}{1-\tau_i}d\tau_i E_i w_i l_i \varepsilon_i - \frac{a_i}{1-a_i}\frac{\partial(T_i - T_0)}{\partial z}\eta_i E_i\right], \quad (13)$$

where terms among brackets are, respectively, the intensive mechanical effect, the extensive mechanical effect, the intensive behavioural effect and the extensive behavioural effect.

APPENDIX 2
MAKE-WORK-PAY TAX EXPENDITURES IN FRANCE, SPAIN, THE UK, HUNGARY AND SLOVAKIA

The main features of the work-related tax expenditures in our sample of countries are described in this section. The reference year for the tax rules is 2010.

France

The Employment Bonus (Prime pour l'emploi – PPE) is an individual tax credit established in order to encourage the return to employment and improve earnings from working.

The amount depends on:

- The earned income (employee and self-employment)
- The tax unit income
- The number of hours worked

To be eligible for the PPE, the household *"Revenu Brut Global"*, must be under € 16,251 for a single person, or € 32,498 for couples. Each dependent child increases the basic amount by € 4,490. The PPE is also based on the individual earned income, corresponding to employment income and self-employment income. For part-time workers, this earned income is converted to full-time equivalent.[13] The credit is equal to 7.7 per cent of the annual employment or self-employment income earned when not exceeding the minimum wage (€ 12,475), increased by € 36 for each dependent person (double for the first child of a single, divorced or widowed person). If the earned income exceeds this amount, the credit is 17 per cent of the difference between the earned income and the ceiling (€ 17,451 or 26,572, for a single, divorced or widowed person with one child or more; or for a married person with a non-working spouse). The credit is assessed by the tax authorities and is aggregated at the household level. If the total tax credits exceed the household's income tax liability, the excess is refunded.

Spain

Work-related tax incentives (*Reducción por rendimientos del trabajo, prolongación de la actividad laboral y movilidad geográfica y personas con discapacidad que obtengan rendimientos del trabajo como trabajadores activos*) are granted through an income related non-refundable tax allowance for taxpayers who receive employment income. The amount of the allowance diminishes as the level of net employment income increases, and varies between € 2,652 and € 4,080.[14]

The allowance, which cannot exceed total net employment income, is doubled for employees who accept an employment in a different city or who are older than 65. Further provisions are applicable in case of disabled taxpayers. In the case of joint taxation, and even if both partners have incomes from work, the allowance is only applicable once.

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[13] The conversion coefficient is defined as: 1820/ yearly number of hours worked for employees or 365/yearly number of days worked for self-employees.

[14] Tax payers with net employment income equal or below € 9,180 may reduce the tax base by € 4,080. Taxpayers with net income over € 13,260 or non-employment income over € 6,500 may only reduce the tax base by € 2,652. Tax payers in between will reduce their tax base by € 4,080 minus the result of multiplying by 0.35 by the difference between net income and € 9,180.

United Kingdom

The working tax credit (WTC) is an income-tested refundable tax credit, calculated on the basis of the previous tax year's annual income. WTC contains a number of elements depending on family composition (basic, couple and lone parent element), health (disability and severe disability element), number of hours worked (30 hour element) and age of the claimant (50+ element).

The eligibility conditions for working adults are:

- working at least 30 hours per week and aged above 24 years old,
- working at least 16 hours per week and have a dependent child or
- working at least 16 hours per week and disabled.

Examples of the different elements are as follows:

- a basic element of £1,890 payable to everyone (in 2009/10)
- a couple and lone parent element (£1,860)
- a 30 hour [working week] element (£775)
- a disabled worker element (£2,530)
- a severely disabled worker element (£1,075)
- a 50+ return-to-work payment (discontinued after April 2012).

Hungary

The Employee Tax Credit is a refundable tax credit for low income individuals. It amounts to 17 per cent of wage income earned, subject to a monthly maximum credit of HUF 15,100 (€ 55). That implies that the tax credit can be fully exploited if the annual wage earnings are lower than HUF 3,188,000 (€ 11,572). The tax credit tapers off in the income range HUF 3,188,000-4,698,000 (€ 17,054), when the reduction is equal to 12 per cent of the income exceeding HUF 3,188,000 (€ 11,572). No tax credit is available for those earning more than HUF 4,698,000 (€17,054). Eligibility does not depend on family (e.g., number of children) characteristics. Note: the tax credit was abolished as of 2013.

Slovakia

The employee tax credit was introduced in January 2009. Entitled are employees who have worked at least 6 months during the year and have annual earnings of at least 6 minimum wages (with the minimum wage standing at € 307.7 per month in 2010). Eligibility is conditional on receiving only employment income. If annual earnings are lower than 12 minimum wages, the tax credit amounts to 19 per cent of the difference between the basic tax allowance (equal to 22.5 × the minimum subsistence level, fixed at € 185.19 per months in 2010) and the minimum wage less social insurance contributions. If annual earnings are higher than 12 minimum wages, the tax credit amounts to 19 per cent of the difference between the individual basic tax allowance and taxable income. The tax credit becomes zero when taxable income is equal to the basic tax allowance. The tax credit is refundable.

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COMMENT TO "WORK-RELATED TAX EXPENDITURES IN THE EU: IMPLICATIONS FOR TAX REVENUE" BY SALVADOR BARRIOS, SERENA FATICA, DIEGO MARTÍNEZ LÓPEZ AND GILLES MOURRE

Ferhan Salman[*]

Main takeaways

By combining the EUROMOD simulations with labor supply elasticities the paper traces the behavioral impact of tax expenditure reforms and argues that the welfare gain of maintaining these measures are not negligible.

At least one-fourth of the extra tax revenues collected through a reduction in make-work pay tax incentives is washed away after factoring in labor supply responses, especially through lower participation by individuals most at risk of exclusion.

In some instances, the revenue gain erosion might become substantial. Even for policies strongly targeted at the bottom of the earnings distribution, the reform might even bring about a net revenue loss, depending upon the calibration strategy of the labor supply elasticities and reflecting the heterogeneity across types of workers.

Policy implication: Removing tax expenditure in upper income quintile can minimize the labor supply distortions and maximize fiscal revenues.

Comments

The main results are derived from benchmarking France and UK against Hungary and Slovakia. These two groups of countries represent different income levels and tax to GDP ratios neglecting the smaller tax bases of the latter group. Results would likely to be overestimating the impact on Hungary and Slovakia due to the higher share of informal economies.[1] In this respect, the paper can benefit from benchmarking to a more comparable sample for robustness i.e. other emerging economies could be used as benchmarks for Hungary and Slovakia.

One of the shortcomings of these models is the difficulty in aggregation (Tyson, 2014) with overlapping tax expenditures. This may lead to multiple equilibria in identifying the macroeconomic feedbacks with the use of varying models to trace microeconomic dynamics, *i.e.*, Various tax expenditure policies may lead to various tax outcomes.

Could the paper extend the current strategy of policy change to optimal policies? With tax expenditures governments presence grow, which can be distortionary. However, such approach ignores positive spillovers (e.g., incentive to work) and introduces another layer of cost for the benefit of transparency (ITEP, 2011). Rather than simulating policy changes, welfare improving policies should be preferred to minimize the tax burden. Such a strategy will be able to deliver a superior welfare outcome and can highlight the tradeoff between austerity and growth.

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* International Monetary Fund.

1 The size of the informal economy is estimated to be around 20-25 per cent in Hungary and Slovakia, and 12-15 per cent in the UK and France (Schneider, 2001)

It would be useful to clarify the benchmark tax rate in the model. A uniform tax rate could be associated with efficient tax expenditures and would identify the space for maneuver and balance growth when redistributive tax policy is in question.

The paper can benefit from providing the details of how EUROMOD integrates the labor supply model for an average reader.

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A FISCAL JOB? AN ANALYSIS OF FISCAL POLICY AND THE LABOR MARKET

Elva Bova,[*] Christina Kolerus[*] and Jules S. Tapsoba[*]

This paper examines the impact of fiscal policy on labor market outcomes, including at times of recessions and recoveries. Using a panel of 34 OECD countries over the last three decades (1975-2012), we find that unemployment gaps widen during recessions, while they do not change significantly at times of recoveries, suggesting that recoveries may be on aggregate neither jobless nor jobful. Fiscal policy can help close unemployment gaps, through discretionary current spending, especially spending on goods and services and on public sector wages. We also find that lower statutory tax rates reduce unemployment in the short term, and that the impact on employment of social contributions is higher than that one of consumption taxes (VAT). Consistently with the relevant literature, unemployment benefits and early retirement benefits have a positive impact on unemployment (also when a one-year lag is considered), while evidence on active labor market policies is mixed. Finally, we find that the impact of fiscal variables on the labor market does not change substantially during recessions and recoveries.

1 Introduction

The global financial crisis has exacerbated conditions in the labor market of many advanced economies, most of which were already marked by high structural unemployment at the onset of the crisis. According to recent statistics, unemployment currently amounts to 7.6 per cent in the OECD, corresponding to about 46 million unemployed, 11 millions more than in July 2008 (OECD, January 2014). The years of the crisis have been crucial in terms of policy making, as they triggered a series of old and new policy responses aimed at containing job losses, through incentives to the labor demand and supply (IMF, 2012).

While the literature provides a comprehensive review of fiscal policy's role for growth during the global financial crisis, studies on how specific tax or expenditure measures sustain jobs in this context are limited. This paper provides an analysis of the channels through which fiscal policy can impact the short-term dynamics of the labor market by addressing three main questions. First, we empirically investigate how specific fiscal instruments can prop up jobs in the short term, looking at changes in the unemployment and employment gaps. Second, we analyze whether the impact of these instruments is different along output deviations from its long-term trend. Third, we check the effectiveness of these instruments at times of recessions and recoveries.

We examine the effectiveness of fiscal instruments using a panel of 34 OECD countries for the period 1975-2012. To address these questions, we consider the short-run dimension of the labor market, where movements in both labor demand and supply are affected by deviations of output from its long-run trend, as predicated by the so-called Okun's law (Okun, 1962). Hence, the focus of the paper is to assess how fiscal policy impacts on (un)employment gaps through labor demand and labor supply, where (un)employment gaps are defined as (un)employment's deviations from its long run trend. By looking at both unemployment and employment gaps, we also capture differences in the labor force participation.

We find a stable relationship between (un)employment gaps and output gaps across different specifications, providing further evidence of the validity of the Okun's law, as largely documented in the literature. Recessions cause a widening of unemployment gaps during a time horizon of up to

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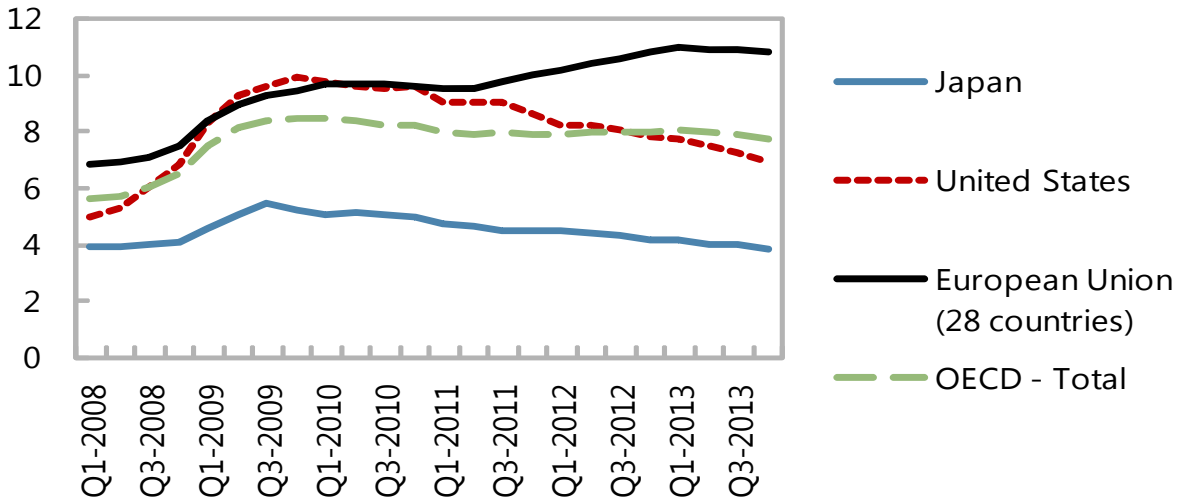
Figure 1

Global Financial Crisis: Harmonized Unemployment Rate



Source: OECD.

two years, while the impact of recoveries is not stable. Fiscal policy can help close unemployment gaps, through discretionary current spending, especially spending on goods and services and on public sector wages. We also find that cutting statutory tax rates reduces unemployment gaps in the short term. In particular, the positive impact of cutting social contributions on employment is higher than the one of consumption taxes (VAT), suggesting that fiscal devaluations, conducted through a reduction in social contributions and an increase in consumption taxes, can have a positive impact on employment. Consistent with the relevant literature, unemployment benefits and early retirement benefits worsen unemployment, while evidence on active labor market policies is mixed. Finally, we find that the impact of discretionary spending on the labor market does not change during recessions and recoveries, while the impact of the personal income and consumption tax rates during recessions is different from that one at normal times.

The remainder of the paper is structured as follows. Section 2 provides a review of the theoretical and empirical literature; Section 3 presents the empirical analysis, with a focus on the model, data and the results of the estimation; Section 4 concludes.

2 A review of the literature

In the classical labor market model, the labor demand identifies the number of workers (or working hours) firms are willing to hire at any given rate of the real wage. The hiring decision depends on a firm's profit maximization function and is, thus, determined by the level of real wages and the marginal productivity of labor *vis-à-vis* the capital stock and the level of technology. The labor supply identifies, instead, the number of workers willing to supply labor at each level of the real wage by maximizing workers' utility derived from leisure activities and the consumption of goods and services.

Overall changes in output directly affect labor demand, thereby lowering unemployment. In assessing the impact of fiscal policy on the labor market most studies do, in fact, focus on the

growth channel, and examine how fiscal policy affects aggregate demand and through this the labor market.[1] Yet, fiscal policy can shape the efficiency of labor markets through more direct channels with an impact both in the short and medium terms. In the short term, these policies could stimulate job creation by boosting labor demand, improving the matching of workers with existing job vacancies, and create incentives to work.

On the expenditure side, **spending on goods and services and capital spending** directly affects aggregate demand and through this labor demand. The impact of **the wage bill** is instead more direct, as the public sector is usually the largest single employer in the country. Studies for the United States (Fatás and Mihov, 2001; Burnside *et al.*, 2004; Galí *et al.*, 2007; Cavallo, 2005) find positive effects on employment following a government spending shock. In particular, Monacelli *et al.* (2010) provide an empirical estimate of the unemployment multipliers of government spending in US data, focusing in more detail on the transmission of fiscal policy to the labor market. They show that an increase in government spending boosts total hours, employment and the job finding probability. In a real business cycle model with competitive labor markets and lump-sum taxation, Finn (1998) suggests that an increase in government employment can lead to lower private sector employment (if the wealth effect is small) and higher real wages, as well as lower private sector hours, output and investment. However, Lane and Perotti (2003) and Alesina *et al.* (2002) find evidence of the opposite impact. They show that an increase in government purchases and the wage bill leads to higher wages in the private sector, lower firm profits and ultimately lower employment and business investment in current and future periods. As a result, output, income and private consumption expenditure contract.[2]

It is usually acknowledged that **social benefits** weaken the link between labor supply and incomes. In general, as they make labor more costly, they tend to reduce the labor demand. Social assistance can reduce work incentives, especially if benefits are withdrawn as earnings rise.[3] **Pension benefits** (usually the largest share of social benefits) tend to affect pension decisions and when they increase they would reduce the labor force, and employment. There is a consensus on the fact that **unemployment benefits** have a significant positive impact on unemployment (Duval and Bassanini, 2006; Scarpetta, 1996; Nickell, 1998; Nunziata, 2002). Duval and Bassanini estimate that a 10 per cent increase in unemployment benefits would increase unemployment by 1.2 percentage points. Krueger and Meyer (2002) conclude that a 10 per cent increase in unemployment benefits raises the average duration of unemployment by around 5 per cent – although this impact is likely to be much higher in countries with relatively weak eligibility conditions. Empirical evidence also suggests that strengthening the link between contributions and benefits improves labor market outcomes (Disney, 2004).

On the revenue side, the literature agrees that **labor taxes** (personal income tax and social security contributions) negatively affect employment by impacting both on the labor supply and demand. Higher taxes reduce after-tax wages for workers which supply less work as the incentive to opt for leisure as opposed to work is now higher (if the substitution effect prevails). Higher taxes on labor reduce labor demand as they can drive up labor costs. Whether the burden of the tax is borne more by the workers or the firms depends ultimately on the elasticities of labor supply and

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1 The empirical literature shows that different combinations of spending measures and taxes can have positive and negative effects on economic growth and, through this, on employment (Dao and Loungani, 2010; Vitek 2010; OECD, 2009; IMF, 2010; Darius *et al.*, 2010; Chen *et al.*, 2011).

2 See also Pappa (2009), Cavallo (2005) and Ardagna (2007).

3 The mode of financing of social benefits also matters. Depending on workers' perceptions, financing social benefits through payroll contributions rather than taxes could help employment. From a worker's perspective, mandatory payroll deductions that have no or only weak links to the benefits they finance are likely to have the same adverse effect on labor supply as a tax on wages. However, where workers perceive a strong relationship between the amount and number of years of contributions to the pension system and pension benefits, the adverse impact on labor supply will be mitigated (IMF, 2012).

labor demand. Cahuc and Zylberberg (2004) find that the price elasticity of labor demand is close to about –1, implying that a reduction of personal tax rates by three per cent would increase labor demand by about 2.5 per cent. On the other hand, the elasticity of labor supply to real wages is found to be between 0.2 and 0.5 per cent (IMF, 2012).

Given the negative elasticity of labor demand, adjustments in the rate of labor income taxes have a significant impact on the labor market. Similarly, the higher **the tax wedge**, *i.e.*, the difference between the cost of a worker to the firm and take home pay, the lower labor demand and labor supply, hence the higher unemployment. Bassanini and Duval (2006) focusing on OECD countries find that higher labor taxes (whether including consumption taxes or not) raise unemployment; in particular they estimated that a 10 percentage points higher labor tax wedge would raise structural unemployment by 2.8 percentage points. Likewise, **taxes on final consumption** (VAT, excises) have the impact of increasing the costs for consumption goods therefore they reduce real wages which, if the substitution effect prevails over the wealth effect, would lower the labor supply.

Corporate taxes can affect employment by reducing investment and production, and by reducing labor supply to the extent that firms pass on these taxes to employees in the form of lower wages.[4] For instance, business tax relief can ease financing constraints for firms relying on retained earnings and boost investment. These effects are consistent with the finding that reductions in the cost of capital reduce unemployment (Phelps, 1994, Blanchard, 1997).

In addition, **compositional shift of taxes** from labor to consumption taxes could boost labor demand. For instance, reductions in employer social security contributions financed by higher consumption taxes (as in a fiscal devaluation case) can raise labor demand by lowering (non-wage) labor costs. The long-term employment effects of tax shifts depend on the extent to which the tax burden is shifted away from labor income and onto other incomes. Compared to the long-run equilibrium under full wage flexibility, the impact of a tax shift on employment is thus expected to gradually disappear across time.[5]

Active labor market policies (ALMP) consist of job placement services and labour market programs such as job-search, vocational training or hiring subsidies. These are supposed to have a positive impact on employment as they improve the matching of labor demand and supply and hence reduce labor demand frictions. The largest components of ALMPs are usually training and job searching/matching services. Empirical evidence has not found a robust impact of ALMPs on the labor market (IMF, 2012). However, when proper account is made for the long-term impact, intensive employment services, individual case management and mixed strategies with selective referrals to long-term programs are found to have a large impact negative impact on unemployment. A study by Card and others (2010) examines how participation in active labor market program (ALMP) affects labor market outcomes. Consistent with earlier summaries, their analysis suggests that subsidized public sector employment programs are relatively ineffective, whereas job search assistance and related programs have generally favorable impacts, especially in the short run. Classroom and on the job training programs are not particularly effective in the short run but have more positive impacts after two years. Orlandi (2012) finds that ALMPs have a negative and significant impact on unemployment. Estevão (2007) finds that ALMPs do increase

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4 Reductions in the effective tax rate on corporate income have two opposing effects: substitution from labor to capital reduces labor demand higher investment raises output – including over the longer term – and therefore labor demand.

5 The adjustment, however, can take quite some time (De Mooij and Keen, 2012). Moreover, there may be more subtle effects that render the long-term effects of a tax shift positive on growth and employment. This is confirmed by model simulations (Auerbach and Kotlikoff, 1987) as well as empirical studies (Daveri and Tabellini, 2000; Arnold, 2008). For instance, consumption taxes have a broader base than social contributions, bearing on all incomes that support consumption, including income from economic rents and social transfers.

employment, especially in the form of direct subsidies for job creation; whereas expenditure in training programs seems to have been largely ineffective.[6]

There is no consensus in the literature on the concept of **jobless recoveries**. While there is clear evidence on the existence of lags between labor market recovery and economic recovery in the shorter term (IMF, 2010; Groshen and Potter, 2003; Aaronson *et al.*, 2004), a sustained deviation of the Okun's law in the longer term is not documented. Galí *et al.* (2012), for instance, argue that there are no jobless recoveries but simply delays in the response of unemployment in recovery periods. Most studies, however, acknowledge that the rebound employment following recessions has become less forceful in recent years. Jaimovich and Siu (2012) explain this phenomenon by job polarization (disappearance of occupations in the middle of the skill distribution) due to progress in technology which substitutes for labor in routine tasks. Also, as a consequence of recent reforms in various countries which rendered labor market institutions more flexible, the responsiveness of unemployment to output has increased during recessions and crises (IMF, 2010; Cazes *et al.*, 2013), generating higher unemployment or employment losses which need more time to recover.

3 Empirical analysis

3.1 The model

To assess the effectiveness of fiscal policy on the labor market, we rely on the short term relationship between (un)employment gaps and output gaps, better defined as the Okun's law:

$$U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) \quad (1)$$

$$E_t - E_t^* = \alpha_o + \alpha_1(Y_t - Y_t^*) \quad (2)$$

The main prediction of the Okun's law is that short-term shifts in aggregate demand cause output to fluctuate around its long term trend. Output movements affect firms' decisions to hire and fire workers, causing employment to deviate from its long term trajectory and the unemployment rate to move in the opposite direction (Okun, 1962; Ball *et al.*, 2013).

Within the Okun's law we assess whether fiscal variables impact (un)employment gaps either directly or through their interaction with the output gap:

$$U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) + \beta_2(X_t) + \beta_3(Y_t - Y_t^*)(X_t); \quad (3)$$

$$E_t - E_t^* = \alpha_o + \alpha_1(Y_t - Y_t^*) + \alpha_2(X_t) + \alpha_3(Y_t - Y_t^*)(X_t); \quad (4)$$

where:

- $Y_t - Y_t^*$ represents the output gap obtained from the current real output level minus its long term level; $U_t - U_t^*$ and $E_t - E_t^*$ are unemployment and employment gaps obtained as a deviation of their current levels from their long-term values. Y_t^*, U_t^* and E_t^* are all calculated using Hodrick-Prescott filtering.[7]
- X_t represents a vector of fiscal variables: i) total public expenditure, current primary expenditure, capital expenditure, spending on wages and salaries, on goods and services, on social benefits; ii) statutory tax rates of corporate and personal incomes taxes, value added tax and social security contributions; iii) the tax wedge; and, iv) active and passive labor market policies, including public employment services, training, job rotation and job sharing;

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6 See also Tagkalakis (2013) for the impact of ALMPs on Greece.

7 In both cases we used 6.25 as a smoothing parameter; however, other parameters were considered and the results do not change significantly.

employment incentives; supported employment and rehabilitation; direct job creation and startup incentives, as well as unemployment benefits and early retirement.

- the coefficients β_3 and α_3 express the impact of fiscal policy on unemployment and employment gaps, respectively, conditional to changes in the output gap.

As high unemployment (or low employment) can trigger immediate fiscal policy responses, for instance via unemployment benefits and other automatic stabilizers, the model is sensitive to endogeneity. To solve for endogeneity in government expenditures, we follow Fatás and Mihov (2003, 2006), Afonso *et al.* (2010), and Agnello *et al.* (2013). Discretionary fiscal policy is calculated by extracting the automatic stabilizer component of public spending. To this end, we estimate a "fiscal rule" accounting for inflation, GDP, debt, and a time trend. The residual is then taken as the proxy of discretionary policy. Further, we include lags to solve for endogeneity in non-spending variables and use panel fixed effects to control for the simultaneous bias.

We control for differences in the flexibility of the labor market (employment protection legislation) and other institutional variables (minimum wage, union concentration and membership) but find that these estimates are not robust while the loss of observation was sizeable. This is consistent with some of the literature which finds estimates of the effects of labor institutions on employment to be not very conclusive (IMF, 2012). As follows, our baseline only controls for differences in the output gap, assuming that other country-specific differences would be accounted for by panel fixed effects.

Several studies show that the impact on output of fiscal variables can be different along the business cycle and at time of recessions or negative output gaps (Auerbach and Gorodnichenko, 2012; Baum *et al.*, 2012). Hence we examine how fiscal policy impacts unemployment and employment in periods of recessions and recoveries:

$$U_t – U_t^* = \beta_o + \beta_1(Rec) + \beta_2(X_t) + \beta_3(X_t)\,(Rec) + \beta_4(X_t)(Recov) \quad (5)$$

$$E_t – E_t^* = \alpha_o + \alpha_1(Rec) + \alpha_2(X_t) + \alpha_3 f(X_t)(\,Rec) + \alpha_4(X_t)(Recov) \quad (6)$$

- where *Rec* identifies a recession dummy which takes value one when real output growth is negative. In the sample of 34 OECD countries for 1975 to 2012 we find 173 recession years. *Recov* is a recovery dummy for the time span following a recession until real GDP is equal to or higher than real GDP of the year before the recession. Using this filter, we identify 132 recovery years, and most recoveries take place in only one year after the recession.

3.2 Data

The analysis is based on a panel of 34 OECD countries for the period 1975-2012. Data on unemployment and employment come from the OECD database. Data on real GDP and public spending items are from the IMF-WEO database. The tax wedge comes from the OECD and corresponds to the average tax wedge of one-earner married couple at 100 per cent of average earnings with 2 children. Spending on labor market policies are also from the OECD database. Statutory tax rates are from Iltzeski's (2011) database, which has observations for 15 countries for the period 1981-2008.[8] We also introduce as control variable an index of strictness in the labor market regulations which comes from the World Economic Freedom dataset (WEF) but find it to be not significant in almost all specifications.

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[8] Available at http://personal.lse.ac.uk/ilzetzki/index.htm/Data.htm

Table 1

Testing the Okun's Law

	HP ?=6.25		HP ?=100	
	u-gap	**e-gap**	**u-gap**	**e-gap**
yokun	–0.339***	0.235***	–0.357***	0.247***
	(0.0256)	*(0.0234)*	*(0.0317)*	*(0.0219)*
Observations	763	512	763	512
R^2	0.534	0.449	0.572	0.491
Number of countries	34	34	34	34

Standard errors in parentheses. *** p<0.01, ** p < 0.05, * p < 0.1.
Note: the regression has been done with country-fixed effect; an intercept has been included.

3.3 Estimation results

We find that the Okun's law is strongly and statistically significant throughout the different specifications of the model with a magnitude of around 0.3, similar to what has been found by the literature (Table 1). This can imply that a deviation from long term output of one per cent would lead to a deviation of unemployment from its natural rate (or long term trend) of about 0.3 per cent. The coefficient is slightly lower for employment gaps (with opposite sign) suggesting that short term changes in output do also affect labor force participation.

Compared to normal times, the contemporaneous unemployment gap widens by about 0.4 per cent during a recession, with a widening of almost 1.4 per cent on a cumulative basis for about three years; and the impact disappears after the third year.[9] During recoveries, the contemporaneous unemployment gap widens by about 0.6 per cent, but this effect is not robust when including the outer years. Overall, unemployment losses occurred during recessions seem to not be made up during recoveries (Table 2). The impact on employment gaps is less clear, as recessions and recoveries cause a reduction in the gap during the first year but the impact on the outer years is not stable.

Discretionary spending has a strong negative (positive) effect on unemployment (employment) gaps with the impact being significant for current primary spending and insignificant for capital spending (Table 3). An increase of one per cent of GDP in discretionary current primary spending would reduce unemployment gap by 10 per cent. The impact comes mostly from wages and spending on goods and services which reduce the unemployment gap by 20 and 34 per cent, respectively. Social benefits seem to negatively affect the unemployment gap by 16 per cent. In advanced economies about two-thirds of social benefits consist of pension spending. In theory, the higher pension benefits, the higher the incentive for retirement, with no anticipated effect on unemployment (given the withdrawal from the labor force) but a reduction in employment. Here we find the opposite dynamics, suggesting that higher pension benefits reduce unemployment. This

[9] Following the Akaike information criterion, our analysis uses specifications (2) and (4).

Table 2

What Is the Impact of Recessions and Recoveries on U- and E-gaps?

	1	2	3	3	4	5
	u-gap	**u-gap**	**u-gap**	**e-gap**	**e-gap**	**e-gap**
recess	0.00447***	0.00249*	0.00271*	–0.00232**	–0.000557	–0.000703
	(0.00108)	*(0.00142)*	*(0.00142)*	*(0.000973)*	*(0.00124)*	*(0.00121)*
L.recess		0.00796***	0.00689***		–0.00641***	–0.00575***
		(0.00247)	*(0.00213)*		*(0.00224)*	*(0.00194)*
L2.recess			0.00378**			–0.00256
			(0.00184)			*(0.00159)*
L3.recess						
recov	0.00595***	–0.000678	–0.000580	–0.00379***	0.00142	0.00160
	(0.000908)	*(0.00187)*	*(0.00192)*	*(0.000680)*	*(0.00163)*	*(0.00172)*
L.recov		0.00230***	–0.000971		–0.00215***	–6.82e-05
		(0.000590)	*(0.00149)*		*(0.000648)*	*(0.00138)*
L2.recov			0.00104*			–0.000464
			(0.000584)			*(0.000385)*
Observations	833	828	823	538	536	534
R^2	0.079	0.122	0.131	0.044	0.094	0.102
Number of countries	34	34	34	34	34	34

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Note: the regression has been done with country fixed effects and an intercept has been included.

could be explained by the fact that large spending on pension is associated with a higher share of long term contracts as opposed to short term contracts, which are usually more affected by job cuts. For employment gaps, the coefficients are positive and significant for wages, goods and services and social benefits, with the magnitude for social benefits higher than for unemployment gaps, suggesting an impact on the labor force participation. Interactions with the output gap are insignificant implying that the impact of expenditure items on the labor market does not change at different levels of the output gap.[10]

The impact of total and current spending on (un)employment gaps is slightly higher than the Okun's law specification when using the alternative baseline with recessions and recoveries, although wages and salaries are now insignificant. The interaction terms suggest that the impact of fiscal policy on the labor market considering times of recessions and recoveries is not different from normal times (Table 4).

[10] The size of the expenditures coefficients with and without interaction term is very similar, supporting the assumption that discretionary spending has been correctly identified and there is no remaining collinearity between spending and the output gap.

Table 3

What is the Impact of Expenditure on Unemployment and Employment Gaps?

	1 u-gap	2 u-gap	3 u-gap	4 u-gap	5 u-gap	6 u-gap	7 e-gap	8 e-gap	9 e-gap	10 e-gap	11 e-gap	12 e-gap
yokun	-0.345*** *(0.0269)*	-0.348*** *(0.0372)*	-0.319*** *(0.0274)*	-0.338*** *(0.0329)*	-0.345*** *(0.0351)*	-0.347*** *(0.0319)*	0.232*** *(0.0250)*	0.214*** *(0.0340)*	0.213*** *(0.0274)*	0.210*** *(0.0313)*	0.212*** *(0.0332)*	0.212*** *(0.0261)*
disexpy	-0.0604*** *(0.0206)*						0.0544*** *(0.0206)*					
yokundisexpy	-0.332 *(1.528)*						1.503 *(1.720)*					
discurexp		-0.0975*** *(0.0349)*						0.0901** *(0.0407)*				
yokundiscurexp		-1.628 *(2.372)*						2.674 *(1.899)*				
discapexp			0.0647 *(0.0493)*						0.00496 *(0.0596)*			
yokundiscapexp			-2.452 *(2.310)*						2.036 *(4.567)*			
dis_W&S				-0.204** *(0.102)*						0.260** *(0.122)*		
yokundis_W&S				-11.26 *(8.258)*						8.471 *(6.545)*		
dis_G&S					-0.343*** *(0.120)*						0.279* *(0.164)*	
yokundis_G&S					-1.840 *(9.167)*						10.67 *(10.58)*	
dis_SocBen						-0.158** *(0.0788)*						0.213*** *(0.0819)*
yokundis_SocBen						4.010 *(5.973)*						3.657 *(3.620)*
Observations	639	367	527	402	389	498	508	293	426	321	307	399
R^2	0.557	0.529	0.502	0.512	0.520	0.512	0.466	0.383	0.386	0.376	0.371	0.386
Number of countries	34	21	30	23	22	26	34	21	30	23	22	26

Standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects and bootstrapping; an intercept has been included.

Table 4

What is the Impact of Discretionary Spending on U-gaps and E-gaps During Recessions and Recoveries?

	1	2	3	4	5	6	7	8	9	10	11	12
	u-gap	u-gap	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap	e-gap	e-gap
recess	0.00216	0.00370	0.00228	0.00324*	0.00332	0.00365**	-0.000282	-0.00186	-0.000680	-0.00172	-0.00162	-0.00134
	(0.00173)	(0.00247)	(0.00161)	(0.00189)	(0.00231)	(0.00184)	(0.00136)	(0.00179)	(0.00130)	(0.00138)	(0.00169)	(0.00151)
L.recess	0.00887***	0.00676***	0.00619***	0.00565***	0.00672***	0.00655***	-0.00654***	-0.00457*	-0.00471**	-0.00440*	-0.00460*	-0.00442**
	(0.00243)	(0.00228)	(0.00180)	(0.00212)	(0.00229)	(0.00186)	(0.00218)	(0.00250)	(0.00203)	(0.00241)	(0.00242)	(0.00208)
recov	-0.00171	-0.000933	-0.000486	2.37e-05	-0.000399	0.000606	0.00180	0.000763	0.000824	0.000601	0.000504	0.000399
	(0.00184)	(0.00223)	(0.00167)	(0.00219)	(0.00225)	(0.00177)	(0.00164)	(0.00206)	(0.00162)	(0.00208)	(0.00201)	(0.00172)
L.recov	0.00230***	0.00245***	0.00164**	0.00239***	0.00243***	0.00223***	-0.00201***	-0.00192**	-0.00160**	-0.00194**	-0.00202**	-0.00212**
	(0.000695)	(0.000934)	(0.000701)	(0.000924)	(0.000894)	(0.000806)	(0.000682)	(0.000939)	(0.000694)	(0.000946)	(0.000895)	(0.000835)
disexpy	-0.101***						0.0961***					
	(0.0346)						(0.0237)					
recovdisexpy	-0.179						0.0886					
	(0.132)						(0.112)					
recessdisexpy	0.110						-0.117					
	(0.107)						(0.0920)					
discurexp		-0.118**						0.0656				
		(0.0496)						(0.0510)				
recovdiscurexp		-0.197						0.0726				
		(0.236)						(0.163)				
recessdiscurexp		-0.0817						0.125				
		(0.116)						(0.119)				
discapexp			-0.00699						0.0465			
			(0.0542)						(0.134)			
recovdiscapexp			0.0879						0.0243			
			(0.164)						(0.194)			
recessdiscapexp			0.354*						-0.139			
			(0.212)						(0.239)			
dis_W&S				-0.193						0.168		
				(0.150)						(0.146)		
recovdis_W&S				-0.341						-0.137		
				(0.521)						(0.675)		
recessdis_W&S				-0.365						0.539		
				(0.595)						(0.422)		
dis_G&S					-0.341**						0.155	
					(0.171)						(0.200)	
recovdis_G&S					-0.745						0.497	
					(0.840)						(0.667)	
recessdis_G&S					-0.664						0.927	
					(0.555)						(0.602)	
dis_SocBen						-0.185						0.200**
						(0.141)						(0.0945)
recovdis_SocBen						0.0848						0.0589
						(0.276)						(0.235)
recessdis_SocBen						-0.325						0.132
						(0.276)						(0.273)
Observations	639	367	527	402	389	498	508	293	426	321	307	399
R-squared	0.161	0.118	0.129	0.098	0.114	0.142	0.120	0.093	0.075	0.090	0.092	0.090
Number of code	34	21	30	23	22	26	34	21	30	23	22	26

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects and bootstrapping; an intercept has been included.

The impact of **statutory taxes** is significant mostly for employment gaps, but the personal income tax seems to worsen unemployment as well. A one per cent increase in each of these tax rates is equivalent to a reduction in employment gaps of about 0.9 per cent for personal income tax and VAT, one per cent for corporate income tax and 1.8 per cent for social contributions. The fact that the impact of social contributions is greater than that one of VAT may imply that a fiscal devaluation could have a positive impact on employment. In this case as well, the interaction term is insignificant indicating that the impact of statutory tax rates does not change at different positions of output *vis-à-vis* its long term trend (Table 5).

Considering the alternative baseline specification with normal, recession and recovery times, personal income tax rates have a stronger positive impact on unemployment gaps during recessions and a stronger negative impact on employment. On the contrary, the VAT rate has a less negative impact on employment gaps during recessions (Table 6).

The tax wedge has no significant impact on (un)employment gaps in the baseline specification, including when it interacts with the output gap (Table 7). It has a weakly significant and positive impact on unemployment gaps and stronger negative impact on employment at normal times, in the alternative specification when controlling for recessions and recoveries (Table 6).

Labour market policies have an impact on unemployment (employment) gaps (Table 8). As consistent with the literature, passive labor market policies, namely unemployment and early retirement benefits, have a negative and significant impact on employment of a magnitude of about 0.4, implying that a one per cent increase would lead to a 40 per cent reduction of employment gaps. For retirement benefits no impact is discernible on unemployment, suggesting that changes in these benefits affect the labor force together with the unemployed; while unemployment benefits have a positive impact on unemployment gaps with a magnitude of about 0.18; but when they are associated with changes in the output gap the impact is slightly higher.[11] For active labor market policies, we find only job rotation to substantially reduce the unemployment gap while training seems to increase employment gaps.

Considering the alternative specification with recessions and recoveries dummies, the coefficients for labor market policies are higher at normal times than in the baseline specification. Also, we find that during recoveries employment services (PES), incentives, and rehabilitation services might work to reduce unemployment gaps (Table 9).

4 Conclusion

This study investigates the impact of fiscal policy instruments on unemployment. In the short run, the theory postulates that unemployment and employment deviations from their long-term trend are tightly linked to output deviation from its long term trend. We find a strong evidence of this relationship. While there is a consensus on the negative impact of recessions on employment, various conjectures exist on (un)employment dynamics during recoveries. We find that recessions exacerbate unemployment over a two–year time period, while the impact of recoveries on unemployment and employment is not significant or worsen labor market outcomes. This may suggest that the job losses of a recession are not reversed during a recovery, defined as the catch-up phase of GDP until its pre-crisis level.

We find that fiscal policy can help close unemployment gaps, through discretionary current spending, especially through spending on goods and services and on public sector wages. We also

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[11] This is because the average value of the output gap is negative and very small (–.0004).

Table 5

What Is the Impact of Statutory Tax Rates on Unemployment and Employment Gaps?

	1 u-gap	2 u-gap	3 u-gap	4 u-gap	5 e-gap	6 e-gap	7 e-gap	8 e-gap
yokun	-0.307***	-0.383***	-0.297***	-0.355***	0.188***	0.344***	0.142***	0.288***
	(0.0661)	(0.0809)	(0.0531)	(0.0689)	(0.0479)	(0.0671)	(0.0455)	(0.0741)
L.PITr	0.00627**				-0.00924**			
	(0.00210)				(0.00401)			
yokunlpitr	-0.166				0.189			
	(0.292)				(0.249)			
L.VATr		0.00458				-0.00847***		
		(0.00290)				(0.00254)		
yokunlvatr		0.276				-0.705*		
		(0.480)				(0.391)		
L.CITr			0.00424				-0.0110**	
			(0.00338)				(0.00417)	
yokunlcitr			-0.169				0.334*	
			(0.177)				(0.188)	
L.SCr				0.00757				-0.0188***
				(0.00495)				(0.00448)
yokunlsstr				0.0254				-0.185
				(0.211)				(0.204)
Observations	281	281	281	232	182	182	182	148
R-squared	0.568	0.564	0.565	0.575	0.551	0.559	0.559	0.591
Number of code	14	14	14	13	14	14	14	13

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: a constant has been included in the regression.

Table 6

What Is the Impact of Statutory Tax Rates on U- and E-gaps during Recessions and Recoveries?

	1	2	3	4	5	6	7	8
	u-gap	u-gap	u-gap	u-gap	e-gap	e-gap	e-gap	e-gap
recess	0.00455*	0.00447*	0.00442*	0.00360	-0.00268	-0.00241	-0.00243	-0.000806
	(0.00226)	(0.00233)	(0.00229)	(0.00265)	(0.00216)	(0.00225)	(0.00212)	(0.00266)
L.recess	0.00612	0.0117**	0.0134	0.0122*	-0.00544	-0.0157***	-0.00553	-0.0136**
	(0.00556)	(0.00394)	(0.0118)	(0.00627)	(0.00418)	(0.00339)	(0.00976)	(0.00493)
recov	-0.00166	0.000323	-0.000131	-0.00136	0.00500	0.00432	0.00411	0.00692
	(0.00450)	(0.00406)	(0.00450)	(0.00526)	(0.00395)	(0.00382)	(0.00403)	(0.00527)
L.recov	0.00393*	0.00645***	0.00626	0.00717**	-0.00432***	-0.00811***	-0.00404	-0.00542**
	(0.00213)	(0.00125)	(0.00495)	(0.00239)	(0.000973)	(0.000763)	(0.00289)	(0.00210)
L.pitr	0.00454				-0.00954			
	(0.00463)				(0.00765)			
L.recovpitr	0.00358				-0.00404			
	(0.00930)				(0.00608)			
L.recesspitr	0.0224***				-0.0241***			
	(0.00713)				(0.00612)			
L.vatr		0.000919				-0.00913		
		(0.00819)				(0.00581)		
L.recovatr		-0.0137				0.0211**		
		(0.0140)				(0.00734)		
L.recessvatr		-0.0183				0.0489***		
		(0.0250)				(0.0131)		
L.citr			0.00399				-0.0114**	
			(0.00495)				(0.00501)	
L.recovcitr			-0.00560				-0.00234	
			(0.0109)				(0.00707)	
L.recesscitr			-0.0114				-0.0110	
			(0.0215)				(0.0182)	
L.sstr				0.000727				-0.0192
				(0.0108)				(0.0174)
L.recovsstr				-0.00619				0.00182
				(0.00825)				(0.00836)
L.recesssstr				-0.00478				0.00742
				(0.0149)				(0.0193)
Observations	281	281	281	232	182	182	182	148
R-squared	0.154	0.143	0.143	0.129	0.164	0.162	0.147	0.140
Number of countries	14	14	14	13	14	14	14	13

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: the regression has been done with country fixed effects; an intercept has been included.

Table 7

What is the Impact of the Tax Wedge on U and E-gaps, Including During Recessions and Recoveries?

	1	2	3	4
	u-gap	u-gap	e-gap	e-gap
yokun	–0.347***		0.293***	
	(0.0622)		*(0.0841)*	
L.taxwed	0.00799		–0.00964	
	(0.00656)		*(0.00649)*	
yokunltaxwed	0.0563		–0.205	
	(0.237)		*(0.270)*	
recess		0.00100		–6.82e-05
		(0.00171)		*(0.00132)*
L.recess		0.0130***		–0.0108**
		(0.00411)		*(0.00459)*
recov		–0.00312		0.00166
		(0.00189)		*(0.00160)*
L.recov1		0.00172		–0.00172
		(0.00138)		*(0.00166)*
L.taxwed		0.0313*		–0.0277**
		(0.0164)		*(0.0134)*
recov1xltaxwed		0.000460		–0.000169
		(0.00527)		*(0.00519)*
recess1xltaxwed		–0.0115		0.0135
		(0.0106)		*(0.0116)*
Observations	393	393	388	388
R^2	0.558	0.126	0.477	0.113
Number of countries	34	34	34	34

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1
Note: the regression has been done with country fixed effects; an intercept has been included.

Table 8

What Is the Multiplicative Impact of Labor Market Policies on Unemployment and Employment Gaps?

	1 u-gap	2 u-gap	3 u-gap	4 u-gap	5 u-gap	6 u-gap	7 u-gap	8 u-gap	9 u-gap	10 e-gap	11 e-gap	12 e-gap	13 e-gap	14 e-gap	15 e-gap	16 e-gap	17 e-gap	18 e-gap
yokun	-0.355***	-0.326***	-0.358***	-0.350***	-0.352***	-0.340***	-0.308***	-0.269***	-0.356***	0.260***	0.228***	0.241***	0.258***	0.243***	0.243***	0.233***	0.195***	0.245***
	(0.0542)	(0.0457)	(0.0330)	(0.0344)	(0.0371)	(0.0420)	(0.0363)	(0.0443)	(0.0356)	(0.0368)	(0.0323)	(0.0285)	(0.0274)	(0.0306)	(0.0278)	(0.0327)	(0.0289)	(0.0294)
L.pes	0.742**									-1.119*								
	(0.363)									(0.564)								
yokunlpes	1.130									-18.60								
	(22.39)									(14.50)								
L.training		0.0337									-0.683**							
		(0.167)									(0.320)							
yokunltraining		-16.22									9.144							
		(10.43)									(13.84)							
L.jobrot			-3.255***									0.978						
			(1.031)									(1.026)						
yokunljobrot			141.7									-79.28						
			(134.2)									(77.62)						
L.incentives				0.398									-0.274					
				(0.337)									(0.383)					
yokunlincentives				-5.416									-28.79					
				(20.07)									(23.70)					
L.rehab					0.373*									-0.496				
					(0.187)									(0.435)				
yokunlrehab					-2.497									-8.282				
					(10.91)									(9.833)				
L.jobcreat						0.170									-0.401			
						(0.221)									(0.407)			
yokunljobcreat						-17.56									-8.428			
						(14.52)									(33.15)			
L.startup							1.379									-1.636		
							(0.852)									(1.321)		
yokunlstartup							-287.4**									44.89		
							(122.8)									(121.6)		
L.benefit								0.182***									-0.416***	
								(0.0508)									(0.0881)	
yokunlbenefit								-9.144***									4.981*	
								(3.036)									(2.798)	
L.ealryret									0.131									-0.423***
									(0.103)									(0.142)
yokunlealryret									2.574									-8.608
									(10.40)									(8.901)
Observations	608	636	649	645	643	641	648	647	649	409	430	443	439	437	439	442	441	443
R-squared	0.537	0.531	0.532	0.531	0.530	0.534	0.552	0.572	0.529	0.464	0.464	0.452	0.460	0.453	0.454	0.454	0.507	0.454
Number of code	31	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note: a constant has been included in the regression

Table 9

What Is the Impact of LMPs on Unemployment and Employment Gaps at Times of Recessions and Recoveries?

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	uokun	uokun	uokun	uokun	uokun	uokun	uokun	uokun	uokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun	eokun
recess	0.00152	0.000856	0.000824	0.000884	0.000925	0.000879	0.000905	0.00126	0.00103	-1.85e-05	0.000295	0.000530	0.000542	0.000490	0.000376	0.000507	0.000180	0.000309
	(0.00135)	(0.00134)	(0.00137)	(0.00141)	(0.00138)	(0.00137)	(0.00135)	(0.00129)	(0.00137)	(0.00122)	(0.00116)	(0.00120)	(0.00122)	(0.00122)	(0.00120)	(0.00119)	(0.00111)	(0.00121)
L.recess	0.0120**	0.00757*	0.00840***	0.00921**	0.00859**	0.00710**	0.00841***	0.00703*	0.00839***	-0.00841*	-0.00552	-0.00624**	-0.00833**	-0.00600*	-0.00624**	-0.00670**	-0.00551	-0.00658**
	(0.00482)	(0.00373)	(0.00275)	(0.00354)	(0.00333)	(0.00333)	(0.00280)	(0.00350)	(0.00302)	(0.00429)	(0.00340)	(0.00268)	(0.00340)	(0.00307)	(0.00293)	(0.00285)	(0.00334)	(0.00287)
recov	-0.00199	-0.00104	-0.00112	-0.00108	-0.000967	-0.000874	-0.000916	-0.00147	-0.00111	0.00170	0.000920	0.000944	0.000829	0.000839	0.000678	0.000790	0.00109	0.000753
	(0.00182)	(0.00187)	(0.00178)	(0.00201)	(0.00194)	(0.00190)	(0.00182)	(0.00186)	(0.00175)	(0.00182)	(0.00177)	(0.00169)	(0.00182)	(0.00182)	(0.00184)	(0.00171)	(0.00188)	(0.00170)
L.recov	0.00451***	0.00264**	0.00266***	0.00396***	0.00331***	0.00285***	0.00204**	0.00307**	0.00306***	-0.00331**	-0.00194	-0.00243***	-0.00251**	-0.00219**	-0.00213**	-0.00203**	-0.00134	-0.00241**
	(0.00104)	(0.00112)	(0.000818)	(0.000941)	(0.000875)	(0.000942)	(0.000859)	(0.00118)	(0.000835)	(0.00121)	(0.00115)	(0.000775)	(0.00104)	(0.000850)	(0.000832)	(0.000901)	(0.00138)	(0.000886)
L.pes	1.435*									-1.401*								
	(0.760)									(0.729)								
L.recovpes	-1.007**									0.557								
	(0.464)									(0.473)								
L.recesspes	-1.295									0.562								
	(1.511)									(1.207)								
L.training		0.0307									-0.749**							
		(0.271)									(0.290)							
L.recovtraining		0.0433									-0.227							
		(0.337)									(0.366)							
L.recesstraining		0.421									-0.487							
		(0.627)									(0.844)							
L.jobrot			-3.767**									1.821						
			(1.461)									(2.023)						
L.recovjobrot			1.252									2.611						
			(4.275)									(2.050)						
L.recessjobrot			3.952									-3.493						
			(2.900)									(3.851)						
L.incentives				0.506									-0.405					
				(0.534)									(0.597)					
L.recovincentives				-0.932***									0.155					
				(0.321)									(0.378)					
L.recessincentives				-0.567									2.059					
				(0.769)									(1.270)					
L.rehab					0.404									0.0526				
					(0.350)									(0.828)				
L.recovrehab					-0.583**									-0.304				
					(0.256)									(0.236)				
L.recessrehab					-0.146									-0.365				
					(0.698)									(0.524)				
L.jobcreat						0.162									-0.545			
						(0.306)									(0.371)			
L.recovjobcreat						-0.118									-0.433			
						(0.514)									(0.570)			
L.recessjobcreat						1.305									0.175			
						(0.987)									(1.931)			
L.startup							-0.857									-0.707		
							(1.891)									(2.303)		
L.recovstartup							3.464									-1.684		
							(2.134)									(1.890)		
L.recessstartup							0.314									2.804		
							(3.626)									(3.286)		
L.benefit								0.345***									-0.536***	
								(0.0659)									(0.130)	
L.recovbenefit								-0.0953									-0.0161	
								(0.0735)									(0.133)	
L.recessbenefit								0.0593									0.0369	
								(0.138)									(0.177)	
L.ealryret									0.542**									-0.822**
									(0.217)									(0.354)
L.recovealryret									-0.105									-0.175
									(0.230)									(0.347)
L.recessealryret									0.203									0.409
									(0.528)									(0.562)
Observations	608	636	649	645	643	641	648	647	649	409	430	443	439	437	439	442	441	443
R-squared	0.143	0.113	0.115	0.116	0.114	0.120	0.114	0.164	0.116	0.126	0.107	0.097	0.112	0.098	0.098	0.099	0.162	0.105
Number of countries	31	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32	32

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Note:the regression has been done with country fixed effects; an interecept has been included in the regression.

find that cutting statutory tax rates reduces unemployment in the short term, and that the positive impact of cutting social contributions on employment is higher than the one of consumption taxes (VAT), suggesting that fiscal devaluations (conducted through a reduction in social contributions and an increase in consumption taxes) can have a positive impact on employment. Consistent with the relevant literature, unemployment benefits and early retirement benefits worsen unemployment, and evidence on active labor market policies is mixed. Finally, we find that the impact of discretionary spending on the labor market does not change at different output's levels relative to its long term trend. Also, discretionary spending, social contributions and corporate income taxes have no different impact on the labor market at times of recessions and recoveries. On the contrary, personal income and value added tax rates, and some specific active labor market policies affect labor market outcomes differently at times of recessions or recoveries.

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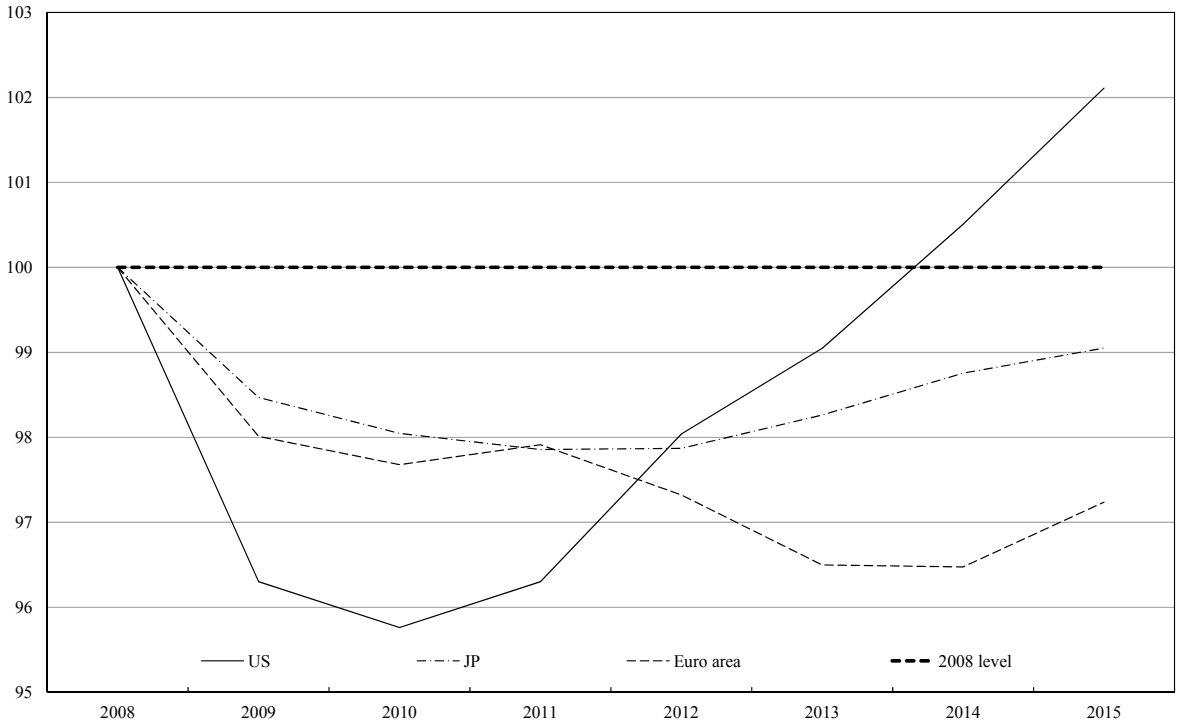
COMMENT TO "A FISCAL JOB? AN ANALYSIS OF FISCAL POLICY AND THE LABOR MARKET" BY ELVA BOVA, CHRISTINA KOLERUS AND JULES S. TAPSOBA

Gilles Mourre[*]

The paper is very rich and offers two complementary focuses. The first one regards the analysis of the cyclical pattern of employment and unemployment, in particular of its asymmetry. This analysis echoes the "jobless recovery" literature and is particularly topical in this time of nascent and moderate recovery (see Figure 1). The second focus is on the impact of public finances on the business cycle and the identification of fiscal variables apt to boost a recovery. This perspective is relevant in the current context of fiscal constraints in many countries, highlighting the importance of quality of public finances. This discussion sets out the main findings of the paper and continues with general remarks. Then, it presents some caveats or room for improvement.

Figure 1

Employment Level
(2008=100)



Source: AMECO (Autumn 2013).

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The views expressed therein are those of the author only and do not necessary reflect those of the European Commission.

Table 1

Impact of Fiscal Variables

Increasing discretionary current spending
Spending on goods and services (++)
Public sector wages (+)
Unemployment benefits (–)
Early retirement benefits (–)
Active labor market policies (?)
Cutting tax rates
Labour taxation (social contributions on employment) (++)
Consumption taxes (VAT) (+)
Therefore: **fiscal devaluation** (+)
Personal income tax (+)
Corporate income tax (+)
Fiscal policy can help close the employment gap
Effect unchanged in recessions and recoveries w.r.t. normal times
Spending on goods and services (++)
Public sector wages (+)
Unemployment benefits (–)
Early retirement benefits (–)
Social contributions on employment) (++)
Corporate income tax (+)
Different in recession and recoveries w.r.t. normal times
Consumption taxes (VAT) (+)
Personal income tax (+)
Active labor market policies (?)

1 Main findings

The paper confirms the validity of the Okun's law, by finding a stable relationship between unemployment/employment gaps and output gaps across different specifications. It also shows its asymmetric pattern. Recessions cause a widening of unemployment gaps during a time horizon of up to two years, while the cumulated impact of recoveries is not stable.

The paper also shows that fiscal policy can help close the employment gap. Table 1 summarises the main findings related to the impact of fiscal variables.

2 General remarks

The topics covered by the paper are very relevant. Its findings are in line with the literature. The paper is well drafted, albeit too concise sometimes. It highlights key policy messages, based on sound intuitions rather than econometric sophistication.

The approach of the paper rests on macroeconometric panel analysis, covering many relevant fiscal variables (see Table 1 above) in a holistic view. The empirical framework is fairly simple but uses a relatively large numbers of empirical observations (although not for all variables), covering 25 years over 32 OECD countries.

The two specifications used are:

- Okun's law (U, E) + fiscal variables + interacted terms
  $U_t - U_t^* = \beta_o + \beta_1(Y_t - Y_t^*) + \beta_2 f(X_t) + \beta_3(Y_t - Y_t^*) f(X_t)$
- Dummy variables (with lags) of recessions and recoveries + fiscal variables + interacted terms
  $U_t - U_t^* = \beta o + \beta 1(Rec) + \beta 2 f(Xt) + \beta 3 f(Xt)\,(Rec) + \beta 4 f(Xt)\,(Recov)$

3 Caveats and room for improvement

Following are four main points that may deserve specific discussions or further work.

3.1 Running robustness checks on the indicators of business cycle

The definition of the cycle is convenient but rough, namely the use of the HP filters, while heated debates in some countries arose about the true magnitude of the business cycle (e.g., for Spain). There is a need to cross-check the results using NAWRU and potential output (based on a production function approach instead of a purely statistical filtering. The use of annual data is not fully adequate to a recession/recovery analysis, where quarterly data preferable when it comes to computing the output gap. Lastly, alternative definitions of discretionary measures could be used. While the paper uses a top down approach (residual from simple fiscal rules), it could be complemented by a bottom up perspective, using the sum of legislated changes in spending.

3.2 Acknowledging the microeconomic dimension and the quality of policy design, not captured by marcro approaches

The macro-approach needs to be qualified. Beyond the monetary value of expenditures and revenue, the micro policy design should be taken into account. The importance of micro effects should be recalled shortly in the paper.

For revenue, the detailed policy design matters a lot:

- Targeting tax cuts on the most vulnerable groups (tax shift focused on the low-skilled/low wage earners and second earners)
- Design of tax bases (e.g., Keen, 2013, for the structure of VAT, exemption and reduced rates),

- Interaction with tax compliance (some increases in statutory rates may stimulate grey economy and blur the frontier unemployment/employment in absence of good tax governance).

For expenditures, the policy design matters a great deal as well, explaining some unclear macro results (Arpaïa and Mourre, JES, 2009):

- Role of the incentives (activation mechanism and monitoring in ALMP, duration and job-search criteria for unemployment benefits),
- Targeting expenditures on the most vulnerable groups (employment support, in-work benefits),
- Administrative capacity for efficient implementation (public employment services, vocational training).

3.3 Fleshing out the very brief discussion of fiscal devaluation

The paper could include a short discussion on tax shift, which recalls its two main dimensions:

- supply side effects (increase incentives to work) operating mainly in the long run but also in the short term. This corresponds to the structural impact of a tax shift,
- short term competiveness effects or "fiscal devaluation" effect. It operates through cuts in labour costs, with increase in labour demand, as claimed in the paper, but also through terms of trade effect since exports are VAT-free.

The fiscal devaluation impact is not very strong, if many countries are applying it at the same time (beggar-thy-neighbour policy). Moreover, fiscal devaluation is perhaps less suited in times of recession or low business cycle, while it is possibly better suited in case of structural loss in trend output, due to cumulated loss of competiveness.

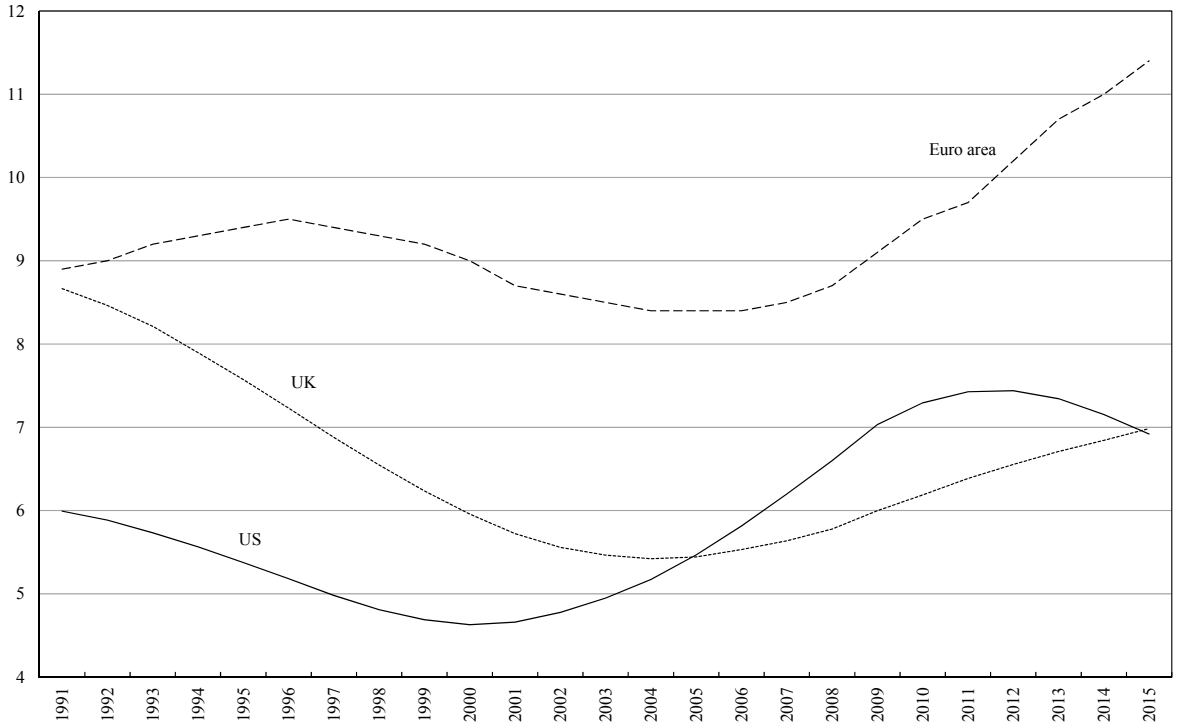
3.4 The development of (un)employment gap in recovery: checking if the results hold in different country groups

The evidence supporting an unstable effect of recovery on (un)employment gaps is a bit thin. A possible explanation (not highlighted in the paper) is the great deal of uncertainty at times of nascent recovery. The latter is also established statistically with some delay. This encourages prudent behaviour by firms regarding hiring and investment.

As a concrete suggestion, the paper may differentiate by group of countries, to see if the pooling assumption is correct. This would be economically justified by the difficulty to disentangle cycles from trends and the existence of very different trends across (groups of) countries. For instance, different results are expected for European Countries, compared with other advanced economies and emerging economies. In the euro area, the structural unemployment, captured by the NAWRU, is higher than that of the US or UK and on an upward trend, as shown in Figure 2.

Figure 2

NAWRU



Source: AMECO (Autumn 2013).

DISAPPOINTING PERFORMANCE OF PENSION PRIVATIZATION IN EASTERN EUROPE

Nikola Altiparmakov[*]

During first 15 years of their existence, mandatory private pension funds in Eastern Europe have realized rates of return that were lower and more volatile than the corresponding Pay-As-You-Go rates of return, even before the emergence of global financial crisis. Suboptimal investments in domestic government bonds dominated pension portfolios in many countries. Econometric analysis suggests that pension privatization failed to produce anticipated side-effect benefits, such as increased national saving or accelerated economic growth. If pension privatization structural weaknesses are unlikely to be resolved successfully then implementing reform reversals could improve short-term fiscal balance without deteriorating long-term pension sustainability.

1 Introduction

While transitioning from centrally-planned to free-market economies, many Eastern European countries opted for radical *pension privatization* reforms around the turning of the millennium. This approach entailed partial termination of existing public Pay-As-You-Go pension schemes and introduction of mandatory private pension funds in their place, the so-called *second pension pillar*. The professional public at the time was strongly divided regarding the feasibility of this reform approach. While the World Bank (1994) favored pension privatization and argued that it would not only enable future beneficiaries to obtain higher returns on their pension contributions but would also increase national saving and accelerate economic growth, opponents challenged most of the promised reform benefits (Beattie and McGillivray, 1995; Stiglitz and Orszag, 2001; Barr, 2000).

In this paper we analyze initial reform results and experiences from Eastern European countries 15 years after the start of pension privatization trend. We show that most of the reform expectations have thus far remained unfulfilled. Pension privatization failed to produce anticipated side-effect economic benefits such as improved national saving or accelerated economic growth. Most disappointingly, second pillar returns were lower and more volatile than PAYG returns in most Eastern European countries, even before the occurrence of global financial crisis in 2008. Besides known pension privatization weaknesses, such as high operating costs and inadequate organization of the payout phase, we identify the prevalence of domestic government bonds in second pillar portfolios as a major structural deficiency of pension privatization in Eastern Europe.

Faced with the absence of positive economic effects and the need to finance significant transitional deficits, many Eastern European countries have recently decided to partially or completely reverse pension privatization reforms. Concerns have been raised that these reform reversals represent short-sighted and irresponsible policies that deteriorate long-term pension sustainability. However, we show that poor second pillar performance makes it possible for reform reversals to improve short-term fiscal position without necessarily deteriorating long-term sustainability. Consequently, recent economic crisis should not be considered a major driver behind

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reform reversals but merely a catalyst that highlighted and exacerbated existing pension privatization structural deficiencies (Fultz, 2012). These deficiencies need to be resolved in order to avoid maintaining a suboptimal pension system design throughout the 21st century.

This paper is organized as follows: Section 2 describes pension privatization dynamics in Eastern Europe and Section 3 shows that second pillar returns were lower and more volatile than PAYG returns. In Section 4 we explain that second pillar portfolios were often dominated by the inefficient investments in domestic government bonds. Econometric analysis in Section 5 shows that pension privatization failed to produce statistically significant improvements in national saving or economic growth. In Section 6 we argue that concerns over recent reforms reversals have not been backed with solid economic analysis, while the concluding remarks are presented in Section 7.

Appendix A briefly describes political aspects of recent reform reversals in several countries. Appendix B presents annual data on the performance of mandatory private pension funds in Eastern Europe. Appendix C explains that stark differences between this paper and World Bank policy conclusions can at least partly be explained by the fact that recent World Bank studies have been based on incorrect and upwardly biased data on the performance of mandatory private pension funds in Eastern Europe.

2 Description of Pension Privatization in Eastern Europe

Reforming countries opted for scaling down of existing Bismarck-style public PAYG systems and partial pension privatization approach whereby one quarter to one third of existing PAYG contribution was diverted from the public pension system to the newly created system of mandatory private pension funds (MPFs) based on full funding and individual accounts. This *carve-out approach* to pension privatization created a huge revenue shortfall in the public PAYG system, the so-called *transitional deficit*, which has to be financed over the next four to five decades until existing accrued PAYG liabilities are serviced in full.[1]

Since inception, many reforming countries have been progressively increasing the second pillar contribution rate over the years, thus consequently increasing the revenue shortfall in the public PAYG system. This trend lasted until 2008 when the global economic crisis triggered fiscal destabilization of many Eastern European economies which had to cope not only with the economic recession but also with financing significant pension privatization transitional deficits which in 2010 equaled 1.1 per cent of GDP in Estonia, 1.2 per cent of GDP in Slovakia, 1.4 per cent of GDP in Hungary, 1.7 per cent of GDP in Poland and 2.3 per cent of GDP in Latvia (Egert, 2012). Faced with severely strained public finances, several reforming countries – Poland, Latvia, Lithuania, and Slovakia – have decided to permanently reduce the amount of pension contributions diverted to MPFs. Hungary decided to nationalize MPFs and completely terminate the second pension pillar in 2011.

3 Performance of mandatory private pension funds in Eastern Europe

The *Samuelson-Aaron Theorem* explains that in a PAYG system contributors earn a rate of return equal to the GDP growth g while contributors in funded systems earn the rate of return r on

[1] The carve-out approach should be contrasted with the *add-on pension privatization* where MPFs' contributions are legislated on top of existing PAYG contributions, thus avoiding the emergence of transitional deficits. The add-on approach is however feasible only in countries with modest Beveridge-style public pension systems, such as Australia or Denmark.

Table 1

Dynamics of Pension Privatization in Eastern Europe

Country	Pillar 2 Inception	Pillar 2 Contribution Rate *(percent of wage)*		
		At Inception	2007	2012
Hungary	Jan 1998	6.0	8.0	0.0
Poland	Jan 1999	7.3	7.3	2.3
Latvia	Jul 2001	2.0	8.0	2.0
Bulgaria	Apr 2002	2.0	5.0	5.0
Croatia	May 2002	5.0	5.0	5.0
Estonia	Jul 2002	6.0	6.0	6.0
Lithuania	Jun 2004	2.5	5.5	1.5
Slovakia	Apr 2005	9.0	9.0	4.0
Macedonia	Feb 2006	7.4	7.4	7.4
Romania	May 2008	2.0	n.a.	3.5
Average		4.9	6.8	3.7

Notes: Estonia is the only country which partially relied on the add-on approach – MPFs' contributions totaled 6 per cent of gross wages with 4 per cent being diverted from the PAYG system and 2 per cent representing additional contributions for workers participating in the second pillar. Lithuania implemented a quasi-mandatory second pillar whereby workers were allowed to voluntary opt-in but could not opt-out afterwards.

accumulated pension assets (Samuelson, 1958; Aaron, 1966). Funded pension systems are thus more efficient, in a Pareto sense, and provide higher pension payments for the same amount of contributions made if and only if $r > g$. It should be stressed that the Samuelson-Aaron criterion is directly applicable only in the case of add-on pension privatization.[2] Due to the existence of accrued PAYG liabilities (*implicit pension debt*) and transitional deficits, it is impossible to implement carve-out pension privatization that would constitute a Pareto improvement for all generations (Breyer, 1989).[3]

Pension privatization could nonetheless be justified if the $(r - g)$ spread is significant and social preferences of existing generations are such that the welfare of future generations is highly valued.[4] A major motivation for implementing pension privatization was precisely the fact that

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[2] As Settergren and Mikula (2005) stress, the Samuelson-Aaron theorem holds exactly only for populations in a steady state. Increasing life expectancy, present in most countries, actually makes the PAYG IRR slightly larger than the GDP growth. For simplicity reasons, we will ignore this issue in this paper.

[3] A few authors have tried to identify Pareto transitions from PAYG to funded pension systems. In doing so, they have either relied on efficiency-driven tax reform (Kotlikoff, 1998; Breyer and Straub, 1993) or on positive externalities to capital accumulation (Belan *et al*., 2000). If such Pareto improvements would indeed be feasible in reality, they should be undertaken irrespective of pension reform efforts.

[4] Emergence of PAYG systems in the early 20th century seems to imply the opposite in social preferences – the welfare of existing generations had been given precedence over the welfare of future generations.

Table 2

Initial Performance of Second Pension Pillar in Eastern Europe
(percent)

Country	Second Pillar Inception	Since Inception Until end-2007			Since Inception Until end-2012			Standard Deviation	
		2nd Pillar	GDP	Diff	2nd Pillar	GDP	Diff	2nd Pillar	GDP
Hungary	Jan 1998	2.6	3.6	–1.0	1.4	2.4	–0.9	9.3	3.1
Poland	Jan 1999	8.2	4.1	4.1	5.3	3.9	1.5	9.0	1.8
Latvia	Jul 2001	–2.4	8.9	–11.4	–1.6	3.8	–5.4	8.8	8.2
Bulgaria	Apr 2002	4.3	6.1	–1.8	0.3	3.5	–3.3	9.5	3.9
Croatia	May 2002	4.5	4.8	–0.4	2.6	1.6	1.0	7.3	4.1
Estonia	Jul 2002	3.4	8.1	–4.7	–0.2	3.7	–3.9	11.6	7.2
Lithuania	Jun 2004	2.4	8.3	–5.9	–0.1	3.1	–3.1	12.2	7.4
Slovakia	Apr 2005	1.3	8.7	–7.4	–1.3	4.3	–5.6	3.8	4.7
Macedonia	Feb 2006	2.7	5.6	–2.9	1.8	2.9	–1.1	8.8	2.7
Romania	May 2008	–	–	–	5.7	–0.2	5.9	4.4	5.1
AVERAGE		3.0	6.5	–3.5	1.4	2.9	–1.5	8.5	4.8

Notes: Authors calculations based on official data from national supervisory authorities. Average performance is based on geometric averaging. Calculations appropriately take into account cases where second pillar inception was in mid-year. Data for Hungary concludes with 2010.

Table 3

Portfolio Structure of Mandatory Private Pension Funds
(end-2007)

Country	Assets *(percent of GDP)*	2nd Pillar Portfolio Structure			
		Gov't Bonds	**Equities**	**Bank Deposits**	**Other**
Hungary	7.8%	58.5%	32.8%	0.9%	7.9%
Poland	11.9%	59.9%	34.9%	2.9%	2.3%
Latvia	1.6%	33.4%	24.3%	42.1%	0.2%
Bulgaria	2.1%	18.5%	28.3%	16.2%	37.0%
Croatia	6.7%	63.6%	26.7%	2.2%	7.4%
Estonia	4.5%	31.0%	40.0%	8.0%	21.0%
Lithuania	1.7%	29.6%	39.3%	17.5%	13.6%
Slovakia	2.8%	49.6%	15.1%	30.5%	4.8%
Macedonia	0.9%	59.9%	21.6%	18.5%	0.0%

Source: Altiparmakov (2011).
Note: We analyze end-2007 data since later data could be considered biased due to the emergence of global financial crisis. *Other assets* include corporate and municipal bonds, and also "investments abroad" for countries where these investments are treated separately (Bulgaria and Croatia).

(gross) returns on capital are in general tangibly higher than GDP growth.[5] At the time pension privatization was being implemented in Eastern Europe, most simulations assumed that mandatory private pension funds' net returns would outperform GDP growth by 1.5 to 2 percentage points in the long term (World Bank, 2013, p. 61). However, early empirical evidence from Eastern Europe in Table 2 suggests that net second pillar returns were mostly lower than GDP growth.[6]

Data for the first 15 years of pension privatization in Eastern Europe reveals a very disappointing performance of mandatory private pension funds. Second pillar returns in most countries were lower than GDP growth, even before the global financial crisis. It is especially disappointing that MPFs in Estonia, Latvia, Lithuania and Slovakia posted negative real returns, while the returns in Bulgaria were barely positive. Polish second pillar seems to represent a major exception with returns tangibly higher than GDP growth both before and after the emergence of the global financial crisis.[7]

While realized returns were much lower than expected, the volatility of second pillar returns is, in line with expectations, tangibly higher than GDP volatility.[8] This echoes the fact that returns to capital are inherently more volatile and risky thus requiring an appropriate downward risk adjustment when being compared against less volatile PAYG returns (Geanakoplos *et al.*, 1998; Orszag and Stiglitz, 2001). It should be stressed that poor second pillar performance was not driven by the global financial crisis since even before the crisis only Polish second pillar funds were able to outperform GDP growth.[9] In order to analyze this issue more carefully we break down MPFs' investment portfolios into four major asset classes.

We can notice that the majority of MPFs' assets in Central Europe have been invested in government bonds which, at the end of 2007, accounted for over 50 per cent of second pillar portfolios. Investments in government bonds have been much less pronounced in the Baltic States, reflecting, *inter alia*, more liberal regulations with respect to investments abroad. On the other hand, Central European countries adopted strict limitations to investing abroad, hoping to use most of the accumulated mandatory retirement saving to finance domestic investments and accelerate economic growth.

Investments in government securities seemed to solve both the investment challenges of private pension funds and the government financing problems. Faced with shallow and undeveloped capital markets in transitioning Eastern European economies on one side and limitations on investments abroad on the other, government bonds represented a natural investment choice for MPFs. At the same time, Eastern European governments have realized that transitional deficits have been seriously underestimated and neglected during the preparatory stage of pension privatization (Drahokoupil and Domonkos, 2012). Faced with the task of financing significant

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[5] Opponents argued that although gross rates of return on capital are in general higher than GDP growth, one can not *a priori* justify pension privatization due to high management costs of private pension funds, appropriate risk adjustment and the need to finance accrued PAYG liabilities (Barr, 2000).

[6] Second pillar returns in Table 2 could be more precisely described as "semi-net return" since they measure gross returns net of annual management fees but gross of any contribution and exit fees. These fees were not deducted in order to avoid possible methodological ambiguities.

[7] Romania has only recently introduced second pillar, after the emergence of global financial crisis, which makes the data for this country statistically unreliable for extrapolating long-term trends or drawing firm conclusions. Also, the Croatian data is somewhat upward biased due to politically motivated inflation of second pillar returns in the inception year – government bonds were sold with an extraordinarily high discount yielding a 15 per cent real rate of return in the inception year (Matkovic *et al.*, 2009).

[8] Low volatility of returns in Romania and Slovakia are exceptions. As mentioned, second pillar has been introduced in Romania after the emergence of global financial crisis and cannot be considered representative. Since 2009 MPFs in Slovakia were required to cover, from own capital, any negative nominal returns to retirement savings. This stringent regulation has induced pension funds to mostly invest in low-risk assets with a correspondingly low, even negative, level of real returns.

[9] Bielecki (2011) shows that second pillar returns net of all fees were actually lower than PAYG returns in Poland over the 1999-2010 period. As mentioned, we will not be deducting front-loaded contribution fees from second pillar returns in this article to avoid any methodological ambiguities.

transitional and budget deficits, issuing bonds and borrowing from cash-rich MPFs was a quick-fix solution for government finances. These short-term partial solutions however gave rise to a suboptimal allocation of resources from the overall national perspective.

4 Disguised-PAYG financing mechanism

For decades, government bonds have represented a crucial investment instrument for pension funds in most developed countries. However, the pension privatization environment in Eastern Europe is not directly comparable to that of developed countries, not the least because participation in private pension funds is voluntary in most developed countries implying different intra- and inter-generational distribution of risks and benefits compared to the mandatory carve-out participation in Eastern Europe. In the context of the carve-out pension privatization, beneficiaries' welfare would have been higher if MPFs assets invested in government bonds had not been diverted from the PAYG system in the first place. Diverting first pillar PAYG contributions to the second pillar only to have MPFs invest the money back to the government represents a very expensive form of PAYG financing which we will refer to as *disguised-PAYG* financing.

Traditional PAYG financing strictly dominates disguised-PAYG financing due to hefty second pillar management fees. In particular, (un-weighted) average contribution fee in Eastern Europe stood at 2 per cent in 2012 while the average management fee was 0.8 per cent.[10] Inferiority of disguised-PAYG financing is most obvious exactly in the case of Poland which runs an NDC first pension pillar.[11] In this case beneficiaries could have earned a notional rate of return in the first pillar NDC accounts by about 0.5 percentage points higher than what they have been earning in the second pillar DC accounts.

It should be stressed that disguised-PAYG financing is not suboptimal only in countries running an NDC first pension pillar – it applies to all instance of carve-out pension privatizations since NDC systems, point systems and traditional defined-benefit systems are basically equivalent forms of PAYG financing (Whitehouse, 2006). Disguised-PAYG financing thus represents a major pension privatization deficiency in Eastern Europe which not only reduces beneficiaries' welfare but also increases public debt (Section 6).[12] In particular, at the end of 2012 government debt securities accounted for 65 per cent of second pillar assets in Croatia, Slovakia and Macedonia and 75 per cent in Romania.[13]

The problems of disguised-PAYG financing and low second pillar returns bellow GDP growth have already been documented in the literature, for example Impavido and Rocha (2006) in the case of Hungary. However, these were mostly considered as isolated cases or exceptions to the general trend of impressive second pillar performance. In fact, the World Bank (2009, Table 2, p. 7) incorrectly asserts that second pillars in Eastern Europe were able to outperform GDP growth before the global financial crisis, when we can clearly see from Table 2, and also from Appendix C – that quite the opposite was the case.

Disappointing second pillar returns have lead many countries to amend investment regulations and consider more liberal limits to investments abroad, expansion of alternative risk-return portfolios and introduction of life-cycle investment strategies. However, from national

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[10] It should be remembered that management fees reduce pension saving exponentially – 1 per cent annual management fee reduces any pension savings by 20 per cent over the 40-year working career (Whitehouse, 2001).

[11] NDC stands for Notional Defined Contribution – a PAYG scheme that mirrors the functioning of private fully-funded defined contribution pension funds.

[12] Disguised-PAYG financing could also increase labor market distortions since it replaces pension contributions with tax levies and thus completely breaks the link with potential pension benefits.

[13] Extremely high second pillar returns in Romania in Table 2 are also due to disguised-PAYG financing.

point of view, the crucial aspect of second pillar portfolios that should be addressed is the presence of suboptimal disguised-PAYG financing.

Groundbreaking pension privatization in Chile was preceded with draconian austerity measures that produced a surplus of 8 per cent of GDP in the non-pension part of the public sector (Arenas De Mesa and Mesa-Lago, 2006). This huge surplus allowed for non-debt financing of transitional deficits and precluded the dominance of disguised-PAYG financing. However, other reforming countries were mostly unsuccessful at implementing appropriate austerity measures to support pension privatization "resulting to a large extent on a debt-financed transition and relatively large issues of Government bonds, which ended up in the portfolios of pension funds" (Impavido and Rocha, 2006, p. 8).[14]

Lack of political support for strict and long lasting austerity measures required to preclude the emergence of disguised-PAYG financing severely undermines the feasibility of carve-out pension privatization. A "modest second pillar, financed by about 3 percentage points diverted from the first pillar, seems to be a maximum that is politically feasible in Central-Eastern European countries" (Drahokoupil and Domonkos, 2012). However, such a modest second pillar would represent a poor diversification of retirement provision and would likely be inefficient due to relatively high management costs. If current generations are not willing or not able to make a sacrifice big enough to enable the creation of a meaningful second pension pillar, then one should consider alternative reform approaches.

For example, Eastern European countries with good public governance record could consider establishing a public pension reserve fund in line with best international practices. This approach would enable the minimization of management costs even at a relatively low level of annual funding commitments and would also solve the second pillar payout phase problems.[15] Countries with less than satisfactory quality of public governance could consider the option of public debt repayment, which represents an alternative form of intergenerational transfer from current to future generations (Diamond, 1965). Further strengthening of voluntary retirement savings is another option Eastern European countries have at their disposal. However, the workers should not be allowed to choose between public PAYG provision and private second pillar since common citizens neither have technical expertise nor relevant information to make a rational welfare-maximizing decision in this case. For example, for many older workers which voluntarily joined Hungarian second pillar in 1998 the ultimate accumulated second pillar savings were lower than the foregone PAYG benefits.

5 Macroeconomic side-effects of pension privatization

In this section we use reduced-form regressions to investigate whether pension privatization produced statistically significant improvements in the national saving rate or the rate of economic growth. We use a balanced panel of annual data over the 1998 to 2012 period for 10 Eastern European countries for which comparable macroeconomic data was available from the Eurostat database. Pension privatization is modeled by the percentage points of pension contributions diverted from the PAYG system into the second pillar in any particular year. This allows us to

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[14] Disguised-PAYG financing described in this paper is actually a special case of a more general issue: if carve-out pension privatization is not accompanied with appropriate austerity measures to cover transitional deficits then long-term pension sustainability would be improved only if second pillar returns are higher than both GDP growth *and* the cost of government borrowing required to finance the transitional deficits.

[15] Public reserve fund might be an appealing alternative to maintaining a next to meaningless second pillar in Poland with the reformed contribution rate set at only 2.9 per cent of wage. Especially since Poland already has a Demographic Reserve Fund whose operations could be modernized and expanded for this purpose.

Table 4

National Saving Regression Results

Variable	Const	Growth Rate	Unemployment	Inflation	Investment	Second Pillar
Value	13.39954	–0.066835	0.180773	–0.116444	0.208760	0.051941
p-stat	0.0000	0.1720	0.0273	0.0019	0.0030	0.6147

Note: R-squared value is 0.651610, adjusted R-squared is 0.615481

capture the variability of second pillar size over different countries as well as the second pillar variability within the country over the years. Panel regression with fixed country effects was used to estimate second pillar effects.[16]

Table 4 presents results from the national saving regression. GDP growth rate, unemployment rate, inflation and domestic investment (as per cent of GDP) were used as control variables. Except for the GDP growth rate, all other control variables are found to be statistically significant and broadly in line with expectations – higher inflation rate was found to discourage saving, uncertainty associated with higher unemployment was found to increase (precautionary) saving, while domestic investment was found to be positively correlated with national saving rate in line with Feldstein-Horioka puzzle. The effect of pension privatization on national saving rate was found to be insignificant. The emergence of disguised-PAYG financing no doubt contributed to the absence of positive effects on national saving since debt financing of transitional deficits is unlikely to increase national saving (World Bank, 2014, p. 117).

Dragutinovic-Mitrovic and Ivancev (2010) analyze growth performance of Eastern European countries in the second decade of transition and find statistically significant effects of macroeconomic stabilization policies (captured by the rate of inflation), public sector reforms (captured by the share of government expenditures in GDP) and foreign trade liberalization (captured by the share of imports and exports in GDP). We extend their model with the second pillar explanatory variable, see Table 5. All the control variables are found to be statistically significant and in line with expectations. The effect of pension privatization on economic growth was found to be negative and statistically significant. Testing alternative regression specifications can produce one or two specifications with a statistically insignificant effect of pension privatization. However, no regression specification has been found to suggest statistically significant positive effects of pension privatization. Thus, we can conclude that the absence of positive effects of pension privatization on economic growth is a fairly robust empirical result.

Empirical analysis in this section suggests the absence of macroeconomic improvements associated with pension privatization in Eastern Europe. This conclusion is in line with earlier findings of the World Bank Independent Evaluations Group (2006) that secondary objectives of pension privatization "have remained largely unmet".[17] The absence of side-effect benefits further added to the discontent over disappointing second pillar performance, thus reinforcing the likelihood of reform reversals.

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[16] Countries included in the panel analysis are Hungary, Poland, Latvia, Estonia, Lithuania, Romania, Bulgaria, Slovakia, Czech Republic and Slovenia.

[17] World Bank Independent Evaluations Group reached this conclusion mostly based on the experiences from Latin America. This article shows experiences from Eastern Europe portray a similar picture.

Table 5

Economic Growth Regression Results

Variable	Const	EU-15 Growth Rate	Investment	Foreign Trade	Government Expenditures	Inflation	Second Pillar
Value	21.06608	1.248551	0.256400	0.034820	–0.685004	–0.099223	–0.292287
p-stat	0.0001	0.0000	0.0001	0.0256	0.0000	0.0135	0.0060

Note: R-squared value is 0.715471, adjusted R-squared is 0.683620.

6 Concerns over reform reversals

Faced with the disappointing second pillar returns, the absence of side-effect economic benefits and the need to finance significant transitional deficits amid global economic recession, many Eastern European countries implemented reform reversals in recent years. Estonia temporarily reduced second pillar contribution rate from 6 to 2 per cent over the 2009-2011 period. Latvia, Lithuania and Slovakia opted for permanent reductions and down-sizing of second pension pillars (Table 1). Poland legislated provisions to prevent the emergence of disguised-PAYG financing in the future and has reduced the second pillar contribution rate from 7.3 to 2.9 per cent in 2013. Hungary decided to completely terminate and nationalize second pension pillar in 2011.

Several international institutions, including the World Bank and OECD, have raised concerns that reform reversals represent short-sighted policies that improve short-term fiscal position at the cost of deteriorating long-term pension sustainability. In particular, World Bank (2014, p. 145) states that reversing pension privatization "addresses the short-term problem at the cost of significantly worsening the long-term fiscal situation, reducing the future pensions of individuals, or a combination of both". In this section we evaluate the validity of these concerns and investigate the arguments behind them.

When analyzing second pillar retrenchment in Poland, OECD notes that "the increased role of the public pay-as-you-go system in a context of rapid population ageing may further lower future replacement rates" (OECD, 2014, p. 18). However, it seems unlikely that terminating second pillar disguised-PAYG financing and replacing it with the traditional first pillar NDC PAYG financing would result in lower future replacement rates. In fact, the elimination of hefty second pillar management fees should improve pension system sustainability without reducing future entitlements, or equivalently, pension entitlements could be improved without deteriorating long-term sustainability. OECD concerns are based on the OECD Working Paper (Egert, 2012) which makes alternative simulations 200 years into the future and identifies that Polish reform reversal might deteriorate pension system sustainability in some (pessimistic) scenarios. However, it seems ill-advised to base the assessment on inherently unreliable 200-year long projections when the crucial information on Polish reform reversal is already available at hand. If disguised-PAYG financing is indeed inferior to traditional PAYG financing, as we have been suggesting in this paper, then Polish reform reversal can not lead to the deterioration of long-term sustainability under any simulation scenario.

World Bank (2014, p. 146) states that the "asymmetry in the treatment of explicit and implicit debt is at the heart of the incentives for reversing pension reforms". It should be noted that the asymmetrical treatment is well deserved due to significant differences between the two and the fact that implicit pension debt is likely to be more easily manageable than explicit public debt (Franco, 1995). Nonetheless, even if implicit and explicit debt were to be hypothetically treated equally within the Stability and Growth Pact framework, disguised-PAYG financing would still be dominated by NDC PAYG financing due to the absence of hefty management fees. Thus, incentives for eliminating disguised-PAYG financing go beyond statistical treatment of implicit pension and explicit public debt and rest on the possibility to increase pension benefits without deteriorating long-term sustainability.

Disguised-PAYG financing was also a major issue in Hungary where more than 60 per cent of second pillar assets were invested in government bonds. Hungary however opted for a more radical reform reversal whereby not only disguised-PAYG financing was eliminated but second pension pillar was terminated altogether. Complete pension privatization reversal has several potential advantages over partial reversal aimed only at eliminating the disguised-PAYG financing. Under reasonable assumptions, workers should save (at least) 20 per cent of their wages during the working career in order to afford adequate consumption smoothing in retirement. A very small second pillar with a contribution rate of only 2.9 per cent provides rather poor diversification of retirement income against the public PAYG system. Furthermore, pension fund business is a fixed cost per account business (Schwartz, 2011), which means that second pillar fees could eat up even more retirement savings as second pillar contributions get smaller. Also, complete nationalization solves the second pillar payout phase problem which Eastern European countries were unable to resolve using private market instruments.[18] The final argument in favor of complete reform reversal is the fact that second pillar returns in Hungary, as in most Eastern European countries, were lower and more volatile than PAYG returns.

Slovakia, Latvia and Lithuania opted to permanently reduce second pillar contribution rates in recent years (Table 1). Second pillar returns in these countries were not only lower than PAYG returns, but were in fact negative in real terms.[19] Latvian real returns are especially troublesome since they were significantly negative even before the global financial crisis. Negative real rates of return can not possibly produce decent replacement rates which were anticipated at the time of pension privatization. Thus, down-sizing the second pillar and relying more heavily on the first PAYG pillar can make sense in these countries given the extremely poor performance of their mandatory private DC funds.

The World Bank (2014, p. 144) states that pension privatization "solves a long-term fiscal problem, but it also creates discomfort during the transition, often requiring additional fiscal efforts for at least a couple of decades". However, in order for pension privatization to improve pension sustainability in the long term two crucial preconditions have to be met: 1) disguised-PAYG financing should not dominate second pillar operations and 2) second pillar returns should be tangibly higher than GDP growth. No country in Eastern Europe has thus far been successful at fulfilling these two preconditions. Failure to fulfill them would mean that pension privatization would deteriorate short-term fiscal position without improving long-term pension sustainability. In this case reform reversals could improve short-term fiscal balances without necessarily deteriorating long-term sustainability.

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[18] In fact, recent reforms in Poland prescribe that the government will become responsible for paying out second pillar savings in order to allow adequate inflation and longevity insurance. A similar solution had been contemplated in Hungary before MPFs were nationalized.

[19] Despite extremely poor performance, MPFs in the Baltics have been charging the highest management fees in Eastern Europe in 2012 which stood at 1.5 per cent of assets in Latvia and Estonia, and 1 per cent in Lithuania.

7 Concluding remarks

Critical assessments of pension privatization strengths and weaknesses seem to have been absent in many Eastern European countries at the time this reform approach was being implemented. One crucial aspect that was not properly addressed at the time is the need to finance substantial transitional deficits over the period of 40 years or more. Initial empirical evidence shows that second pillar returns in Eastern Europe were disappointingly low, negative in real terms in some countries, even before the emergence of global financial crisis. Pension privatization also seems to have failed to increase national saving or accelerate economic growth.

In order for the carve-out pension privatization to improve long-term pension sustainability two crucial preconditions have to be fulfilled: 1) disguised-PAYG financing should not dominate second pillar operations and 2) second pillar returns should be tangibly higher than GDP growth. None of the Eastern European countries have thus far succeeded in fulfilling these preconditions. Not fulfilling those means that pension sustainability will not improve even if countries are able to successfully finance 40 or 50 years of transitional deficits. In this scenario reform reversals could improve short-term fiscal position without necessarily deteriorating long-term sustainability.

Recent economic crisis created an opportunity to use the available data and experiences to critically assess pension privatization performance thus far and to see to what extent have reform expectations been fulfilled. If second pillar weaknesses identified in this paper are unlikely to be successfully resolved it seems reasonable to consider partial or complete reform reversal plans instead of maintaining a suboptimal pension system design throughout the 21st century. Regardless whether Eastern European countries opt to preserve or reverse pension privatization, long-term pension sustainability in these countries will inevitably have to rely on the appropriate parametric changes and PAYG reforms in the coming years – as is the case in most Western European countries that have not resorted to carve-out pension privatization.

APPENDIX A
POLITICAL ASPECTS OF REFORM REVERSALS IN EASTERN EUROPE

Proponents of pension privatization have been arguing that MPFs would be insulated from fiscally irresponsible political influences which were seen as a contributing factor to the insolvency of PAYG schemes in many countries (World Bank, 1994). On the other hand, opponents of pension privatization were stressing that retirement income provision presents such a crucial segment of modern societies that making it immune to political interferences was highly unrealistic (Orszag and Stiglitz, 2001; Barr, 2000). In fact, even in the case of the ground-breaking complete pension privatization in Chile the pension system failed to be immune from political interference. Inability of MPFs to provide adequate protection against old-age poverty created social discontent and political pressures that in 2008 lead to the introduction of non-contributory tax-financed social pensions. Partial pension privatization efforts in Eastern Europe have proven to be even more susceptible to political interference.

Carve-out pension privatization in Eastern Europe was marked with fierce political debates (Mueller, 2003). Second pillar thus never gained cross-party consensus or broad-based support from social partners. Interestingly enough, when disappointing results started to emerge, it was not only political parties that have opposed pension privatization but also parties that championed second pillar introduction – that started to express the discontent and to contemplate reform reversal plans. Examples in this section indicate that pension privatization might have, in fact, degraded the quality of political debates and resulted in suboptimal, welfare reducing, provisions in some instances.

In Croatia and Poland, the right-wing parties that championed pension privatization were the ones to introduce reform reversal plans onto political agenda. Croatian prime minister and minister of finance from the right-wing HDZ party were the first to declare "second pillar a failure" in early 2009. Their initiative was however short-lived since it met strong and well organized resistance from the local financial community. On the other hand, Polish right-wing PO party was determined to implement significant reform reversals despite strong opposition from the local financial community. In 2013 Poland implemented legal changes to eliminate disguised-PAYG financing: second pillar contribution rate has been reduced from 7.3 to 2.9 per cent of wages and mandatory private pension funds were forbidden from investing in government securities.

Downsizing of second pillars in Latvia and Lithuania also met resistance from local financial communities, albeit to a lesser extent than in Croatia or Poland. Nonetheless, Lithuanian Constitutional Court was asked to forbid the decrease of second pillar contributions.

Right-wing FIDESZ party in Hungary and left-wing SMER party in Slovakia have been long-time opponents of pension privatization. It was thus no big surprise when FIDESZ government decided to terminate and nationalize second pension pillar in 2010, after winning a land-slide election victory. Interestingly enough, the most radical reform reversal in Eastern Europe to date did not face major political resistance since the opposition Socialist party, which introduced MPFs in Hungary in 1998, was itself contemplating possible reform reversal plans to address the disappointing second pillar performance. On the other hand, SMER party faced fierce political resistance in trying to down-size Slovakian second pension pillar and reduce second pillar contributions from 9 to 4 per cent of wages.

Political debates between SMER party and right-wing parties that championed pension privatization in 2005 resulted in suboptimal pension policies which included a limited opportunity for participants to opt-out of second pillar, significant reduction of management fees from 0.7 to 0.3 per cent per annum and requirement for second pillar funds to guarantee non-negative nominal returns to their beneficiaries. However, common citizens can hardly be expected to rationally

decide whether they should opt-out or remain in the second pension pillar, especially given significant policy uncertainty regarding future prospects of the Slovakian public pension system. Furthermore, the combination of low management fees and non-negative returns guarantee resulted in extremely conservative investment portfolios which generated negative real returns. After a land-slide election victory in 2012, SMER party managed to implement its original plan and reduced second pillar contribution rate from 9 to 4 per cent of wages.

APPENDIX B

Table 6

Second Pension Pillar Performance in Eastern Europe, Until end-2012

		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Hungary	Nominal Returns	15.7	17.1	7.9	8.0	7.4	3.4	16.3	13.0	4.5	7.0	–20.0	23.7	7.6	n/a	n/a
	Real Returns	4.9	5.3	–2.0	1.1	2.5	–2.2	10.2	9.4	–1.9	–0.4	–22.7	17.2	2.8	n/a	n/a
	GDP Growth	4.1	3.2	4.2	3.8	4.5	3.8	4.6	4.1	3.9	0.1	0.7	–6.7	1.2	1.7	–1.7
Poland	Nominal Returns		15.1	13.2	7.3	13.6	10.9	14.0	15.0	16.3	6.2	–14.2	13.7	11.2	–4.6	16.4
	Real Returns		4.8	4.3	3.6	12.7	9.1	9.2	14.2	14.7	2.2	–17.0	9.8	7.8	–8.8	13.6
	GDP Growth		4.5	4.3	1.2	1.4	3.9	5.3	3.6	6.2	6.8	5.1	1.6	3.9	4.3	2.0
Latvia	Nominal Returns				4.9	6.3	0.3	3.8	6.7	2.8	2.5	–11.5	12.3	7.6	–2.0	9.0
	Real Returns				1.7	4.7	–3.1	–3.4	–0.3	–3.7	–10.1	–19.8	13.9	5.1	–5.6	7.3
	GDP Growth				7.3	7.2	7.6	8.9	10.1	11.2	9.6	–3.3	–17.7	–0.9	5.5	5.6
Bulgaria	Nominal Returns					14.1	11.0	11.8	7.6	7.3	15.4	–20.1	7.9	5.0	–0.4	7.5
	Real Returns					9.9	5.1	7.5	0.2	1.2	3.4	–25.5	6.2	0.5	–2.4	4.6
	GDP Growth					4.7	5.5	6.7	6.4	6.5	6.4	6.2	–5.5	0.4	1.8	0.8
Croatia	Nominal Returns					17.1	5.1	7.4	7.1	5.7	6.8	–12.5	8.7	8.6	0.5	12.3
	Real Returns					15.0	3.3	4.5	3.3	3.6	0.9	–14.9	6.7	6.6	–1.5	7.3
	GDP Growth					4.9	5.4	4.1	4.3	4.9	5.1	2.1	–6.9	–2.3	0.0	–2.0
Estonia	Nominal Returns					2.6	7.6	9.9	13.1	7.2	6.2	–24.3	12.7	9.7	–4.5	9.5
	Real Returns					0.0	6.5	4.7	9.2	2.0	–3.1	–29.2	14.6	4.1	–8.3	5.5
	GDP Growth					7.9	7.8	6.3	8.9	10.1	7.5	–4.2	–14.1	3.3	8.3	3.2
Lithuania	Nominal Returns							11.6	10.6	5.3	3.8	–19.7	17.3	8.8	–2.9	11.2
	Real Returns							8.5	7.4	0.8	–4.1	–26.0	15.9	5.0	–6.1	8.0
	GDP Growth							7.4	7.8	7.8	9.8	2.9	–14.8	1.5	5.9	3.6
Slovakia	Nominal Returns								4.0	4.6	4.6	–6.7	0.6	1.2	1.4	2.9
	Real Returns								0.3	1.1	2.2	–9.8	0.5	–0.1	–3.0	–0.5
	GDP Growth								6.7	8.3	10.5	5.8	–4.9	4.4	3.2	2.0
Macedonia	Nominal Returns									6.7	8.8	–9.9	14.5	7.2	1.9	8.5
	Real Returns									3.5	2.0	–13.4	16.4	4.1	–0.8	3.6
	GDP Growth									5.0	6.2	5.0	–0.9	2.9	2.9	–0.3
Romania	Nominal Returns											10.6	17.6	15.0	3.2	10.5
	Real Returns											4.1	12.3	6.6	0.1	5.3
	GDP Growth											7.3	–6.6	–1.1	2.2	0.3

Notes: Inflation and GDP data has been taken from the IMF World Economic Database, April 2013 edition. Data on nominal returns of second pillar pension funds have been taken from official national authorities' websites: http://www.knf.gov.pl (Poland), http://www.fktk.lv (Latvia), http://www.fsc.bg (Bulgaria), http://www.hanfa.hr (Croatia), http://www.pensionikeskus.ee (Estonia), http://www.lb.lt (Lithuania), http://www.adss.sk (Slovakia), http://www.mapas.gov.mk (FYR Macedonia), http://www.csspp.ro (Romania). Data for Hungary in the 1998-2007 period is based on Impavido and Rocha (2006, Table 11) and World Bank (2009), while the data for 2008-2010 period is taken from the official website http://www.pszaf.hu

National supervisory authorities in Latvia, Bulgaria, Croatia, Estonia and Lithuania produce aggregate returns data for the entire second pillar industry. National supervisory authorities in Hungary, Poland, Slovakia, Macedonia and Romania do not provide aggregate returns data for the entire second pillar industry on a regular basis, but only data pertaining to individual second pillar pension funds. Aggregate second pillar returns for these countries represent authors calculations based on weighted average returns of individual pension funds. Only private pension funds that were in operation both at the beginning and at the end of the year have been included in aggregate second pillar rate of return calculations in the referenced year. In cases where second pillar was introduced in mid-year the relevant returns data in the inception year have been annualized.

APPENDIX C
INCORRECT WORLD BANK DATA ON EASTERN EUROPE

World Bank (2009, Table 2, p. 7) and Holzmann (2009, slide 12) state that prior to the global financial crisis, second pillar returns had been higher than GDP growth in all Eastern European countries except Latvia.

Table 7

Rate of Return of Pension Funds since Inception till End 2007
(in real terms and as differential over GDP growth)

Country	Year of Inception	Real Rate of Return	RoR over GDP Growth
Bulgaria	2002	3.2	0.5
Estonia	2002	4.9	0.6
Hungary	1998	2.6	0.6
Latvia	2001	–3.5	–0.3
Lithuania	2004	5.7	0.7
Poland	1999	8.9	2.2
Slovakia	2005	0.9	0.1

Sources: World Bank staff using data from national sources.
Original World Bank Table, excerpt from World Bank (2009, p. 7) and Holzmann (2009, slide 12).

However, when we compare World Bank real rate of return estimates from Table 7 above with official GDP growth statistics from IMF WEO database (April 2014 edition) we can easily see that, with the exception of Poland, second pillar real rates of return have been tangibly lower (not higher!) than GDP growth in all Eastern European countries until the end of 2007. This sharply contrasts with the final results published in World Bank (2009) and Holzmann (2009).

Table 8

Rate of Return of Pension Funds since Inception Until end-2007
Versus the GDP Growth in the Same Period
(percent)

Country	Year of Inception	Real Rate of return (World Bank Data)	GDP Growth (IMF Data)	RoR over GDP Growth
Bulgaria	2002	3,2	6,3	-3,1
Estonia	2002	4,9	8,1	-3,2
Hungary	1998	2,6	3,6	-1,0
Latvia	2001	-3,5	9,5	-13,0
Lithuania	2004	5,7	8,3	-2,6
Poland	1999	8,9	4,1	4,8
Slovakia	2005	0,9	8,7	-7,8

Furthermore, World Bank real rate of return estimates are themselves plagued with upwardly biased calculation errors (Altiparmakov, 2014). Thus, the World Bank should consider publishing data correction and explanation notice to clarify obvious data problems in its recent publications on Eastern Europe.

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COMMENT TO "DISAPPOINTING PERFORMANCE OF PENSION PRIVATIZATION IN EASTERN EUROPE" BY NIKOLA ALTIPARMAKOV

Lukas Reiss[*]

1 Introduction

In his very interesting and well written paper, Nikola Altiparmakov discusses a hot topic with several crisis-related aspects: the rising concerns about the viability of both private and public pension systems. While many private schemes have suffered under the stock market crash of 2008 and/or the current low interest rate environment, adjustment needs for public pension systems have arisen as a result of increases in trend unemployment rates and downward revisions of potential output estimates (on top of the implications from the ageing of societies).

Figures 1 and 2 show the gross replacement rates of public and private mandatory pension systems according to the OECD pension model (OECD, 2013). The figures indicate that mandatory[1] private pension schemes/second pillars are in place in many (but certainly not all) European OECD economies.

Interestingly, mandatory second pillars are to be found in two very different types of European countries, namely several economies from Northern and Western Europe with very high incomes and transformation economies from Central and Southeastern Europe.[2] However, the author points out that most of these transition economies "carved out" (gutted) "Bismarck-style" public pension systems by decreasing contribution rates to public systems (and introducing/increasing conributions to private systems), while countries like Denmark introduced a second pillar on top of a public "Beveridge-style" system ("add-on approach").

In the following I will try to complement the conceptual comparison of public and private systems (Section 2), and I will also discuss the authors' empirical work on pension funds' yields (Section 3.1) and the growth effects of having/introducing private systems (Section 3.2).

2 Comparison between mandatory second pillars and public pension systems

A substantial part of the paper is dedicated to the comparison of mandatory second pillars and public pension systems.

2.1 Public pension liabilities are not like explicit government debt, …

When contrasting public pension liabilities with explicit government debt (like bonds), one has to bear in mind that government balance sheets are quite different from corporate ones. While

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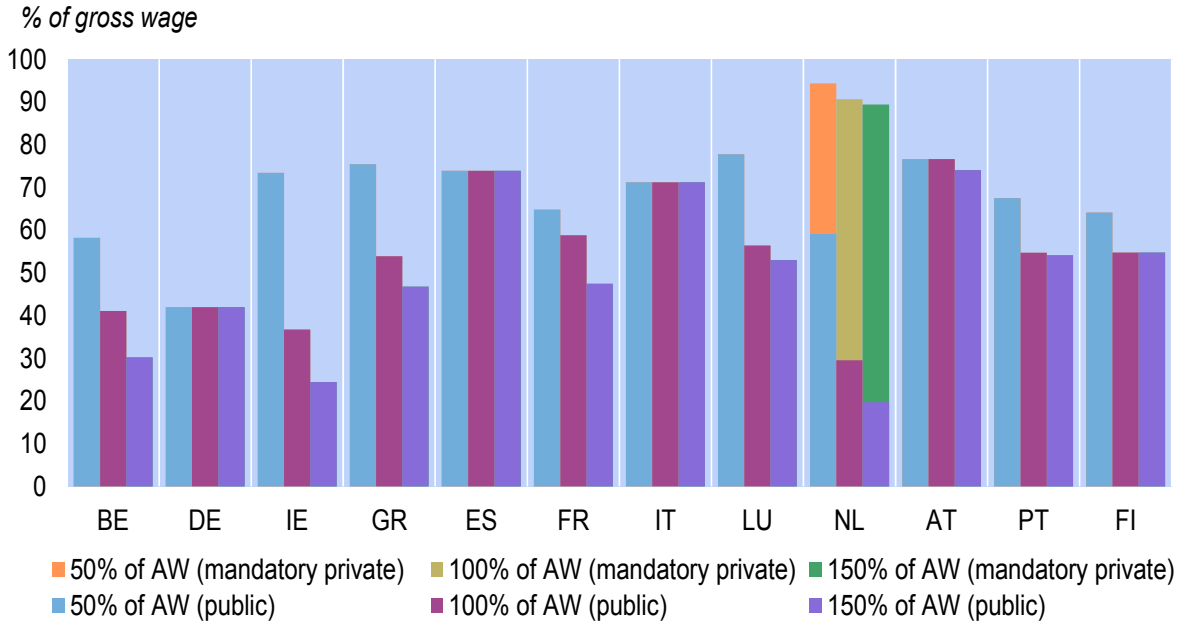
Opinions expressed by the author do not necessarily reflect the official viewpoint of the Oesterreichische Nationalbank or of the Eurosystem.

[1] Several further European countries have voluntary second pillars (e.g., the UK); they are not further discussed in this paper.

[2] Note that most European transformation economies which are not OECD members do have mandatory second pillars as well (e.g., the other countries mentioned in the paper, *i.e.*, Latvia, Bulgaria, Croatia, Lithuania, Macedonia und Romania) and that Hungary abolished its second pillar only relatively recently.

Figure 1

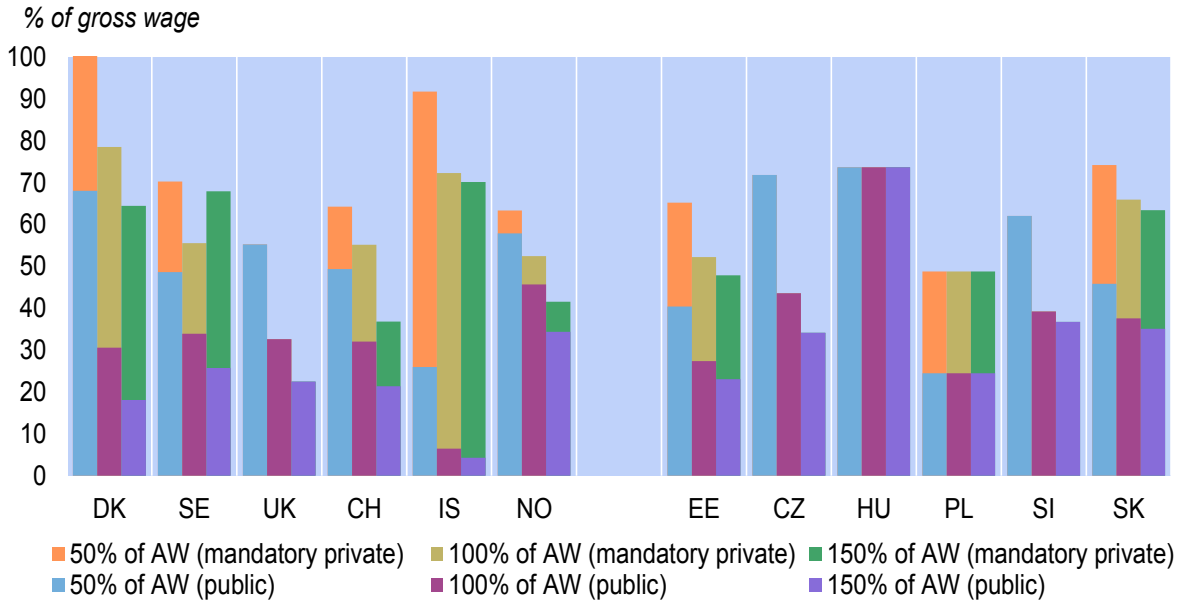
Pension Gross Replacement Rates in OECD Pension Model: EA-12



Source: OECD (2013).

Figure 2

Pension Gross Replacement Rates: Rest of (OECD) Europe



Source: OECD (2013).

implicit assets and liabilities may play some role for certain corporations (e.g., value of brands), they typically add up to immensely large amounts (typically exceeding explicit assets and liabilities by far) in government accounts. This is because of the right to tax reflected on the asset side and due to the vast amount of promises which governments give to their citizens (especially on the basis of entitlement spending legislation).

Theoretically, both high explicit debt and high "pension liabilities" (*i.e.*, high implicit debt) can be sustainable as long as tax revenue is high enough and the government/the system does not have to be shut down. However, there are several arguments why implicit debt may be less problematic from a government's viewpoint:

- Public pension liabilities typically cannot be withdrawn or traded (by "creditors"). Therefore, in contrast to explicit debt instruments, they are unlikely to cause situations with multiple equilibria where the perception of a higher default risk raises interest rates on explicit debt and therefore makes a default more likely.
- While explicit government debt instruments are mostly nominal and do generally not adjust to changes in real variables, pension liabilities adjust automatically to some extent (due to formulas for retirement age, indexation of pension payments and/or contributions to wage developments).
- Public pension liabilities are de facto "junior" to explicit government debt. While defaults on the latter have been rare in advanced economies after World War 2, there have been countless government "defaults" on pension liabilities over this time span. This includes not only major reforms, but also measures like (small) deviations from indexation formulas. While the latter may be considered as a standard consolidation measure in times of fiscal stress, "equivalent" measures on government bonds like a slight reduction of principal and/or coupons during a recession would be considered as a default.

2.2 ... hence 2nd pillars investing in government bonds do not necessarily qualify as "disguised PAYG"

However, and this is one small point of disagreement with the author, this implies that the phenomenon of pension funds heavily investing in government bonds is not necessarily "disguised PAYG" as government bonds are typically nominal and tend to be "senior" to PAYG pensions. In theory, PAYG pension liabilities could be made equally "senior",[3] but this is usually hampered by lack of trust by citizens and/or lack of (legally possible) commitment by governments.

In general, there are good reasons for such a lack of trust, especially so for younger generations: While sustained deteriorations in the present value of net pension liabilities are often not immediately reflected in measures on pension systems, fiscal space is occasionally used to give goodies to the elderly (like temporary early retirement schemes, extended by Austria in 2008 or introduced by Germany in 2013). Therefore, in a world of imperfect commitment it may make sense that pension funds invest into domestic government bonds.

2.3 Low trust in government and insurance against shocks to public finances are arguments for 2nd pillars (especially in emerging economies) ....

Arguments in favour of a mandatory second pillar are somewhat stronger for small emerging economies like the countries covered in this paper. At least according to a Gallup survey in 2011, trust in government (both absolute and relative to the financial sector) in the EU transition

[3] The underlying indexation in PAYG systems to price and/or wage developments may be considered as an advantage of PAYG anyway.

economies tends to be lower than in the rest of the EU. Furthermore, at least from the perspective of its citizens, there are good reasons to make returns to the pension system not only related to potentially volatile domestic economic developments.[4] Most EU transition economies are relatively small, and several of them have witnessed a long pre-crisis boom followed by a prolonged recession since 2008/09. Foreign investments of pension funds could reduce uncertainty concerning future returns to pension contributions.

2.4 ... but arguments for public systems are still compelling[5]

Notwithstanding these arguments, there many good reasons not to gut "Bismarck-style" pension systems:

- The adjustment cost from gutting the public pension system (*i.e.*, the shortfall in government revenue) is simply massive. The potential benefits of second pillars can be easily outweighed by the increased vulnerability due to higher explicit public debt.
- If management fees and contribution fees are as high as in several of the countries analysed by the author, the efficiency loss compared to a public system is very large.[6]
- If there are so many requirements for the design of pension insurance plans (sufficient insurance against longevity, relatively high return with low administration cost, inflation-protection …), the government may just provide it itself.

3 Some further minor comments

3.1 The choice of benchmark for yields of pension funds (in transition economies) is tricky

The analysis of yields is one of the most interesting parts of this paper. Both the differences to other institutions' estimates and the poor performance of funds in some countries are striking. However, the author may set a somewhat too ambitious benchmark for these funds by comparing their yields to domestic GDP growth. While the latter may be seen as an appropriate target in a closed economy or a high-income country, due to the reasons stated in Section 2.3 these funds may (or should) invest abroad; and (pre-crisis) GDP growth in the advanced economies was lower than in the analysed countries.

3.2 Direction of causuality is a big issue when assessing the implications of pension reforms for GDP growth

The author also provides an analysis on the macroeconomic effects of changes to private pension systems (*i.e.*, introduction, changes in contribution rates) and finds no positive effects on GDP growth. However, the interpretation of coefficients is hampered by the fact that several of the included variables are likely to influence each other. This is not only an issue for the control variables: While one would have to assess in detail how big a role short-term growth considerations played in introducing mandatory second pillars, such considerations definitely contributed to the (partial) reversion of these second pillars after the beginning of the crisis.

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[4] In theory, these investments into foreign assets could be also carried out by governments (like the sovereign wealth funds of certain oil exporting countries).

[5] Note that neither Serbia (country of author) nor Austria (country of discussant) has a mandatory second pillar.

[6] In any case, strict regulation of fees may be needed as fixed costs of running a fund and the large importance of reputation hamper free entry of pension funds.

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BETTER PENSIONS, BETTER JOBS: STATUS AND ALTERNATIVES TOWARD UNIVERSAL PENSION COVERAGE IN LATIN AMERICA AND THE CARIBBEAN

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This article offers an overview of the current state of labor markets and pension coverage in a wide sample of Latin America and the Caribbean countries, and proposes a series of possible avenues toward universal coverage, not only as an instrument to fight poverty during old age, but also as part of an agenda for increasing formal employment and productivity growth. We conclude that the region overall is experiencing a good demographic, socio-economic, and fiscal period, and this provides a real opportunity for initiating bold reforms in pensions, labor and tax needed to achieve universal coverage.

1 The pending pension reform agenda

During the 1980s and 1990s, Latin America and the Caribbean (LAC) implemented an ambitious agenda of social security reforms largely aimed at restoring financial sustainability to pension systems, and simultaneously building a clear link between contributions and benefits. It was expected that these reforms would contribute to a gradual increase in the percentage of workers who contribute, and eventually, in the percentage of elderly with a pension (see World Bank, 1994 and Lindbeck and Persson, 2003 for an analysis of these and other economic benefits, and Barr and Diamond, 2006 for an opposing view).

With approximately twenty years of experience in the region, the effects of these reforms have been many and varied. A large amount of research has addressed the merits and problems of the type of systems, for example of introducing defined contribution and individually funded systems (usually known as "private systems") compared with public pay-as-you-go systems (see Packard and Yermo, 2005 for an analysis of its impact on implicit debt, development of financial markets and pension coverage for LAC). However, much less analyzed and discussed has been the fact that, irrespective of the pension systems involved, pension coverage depends on the capacity of labor markets to create jobs in which workers and firms contribute to the pension system; in other words, formal jobs. Despite the reforms in the region, pension coverage is still considered generally low.

In the region today, according to national household surveys,[1] only four out of ten citizens aged 65 and older are receiving a contributory pension. Recently, many countries have

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[*] Inter-American Development Bank.

[**] OECD Development Centre.

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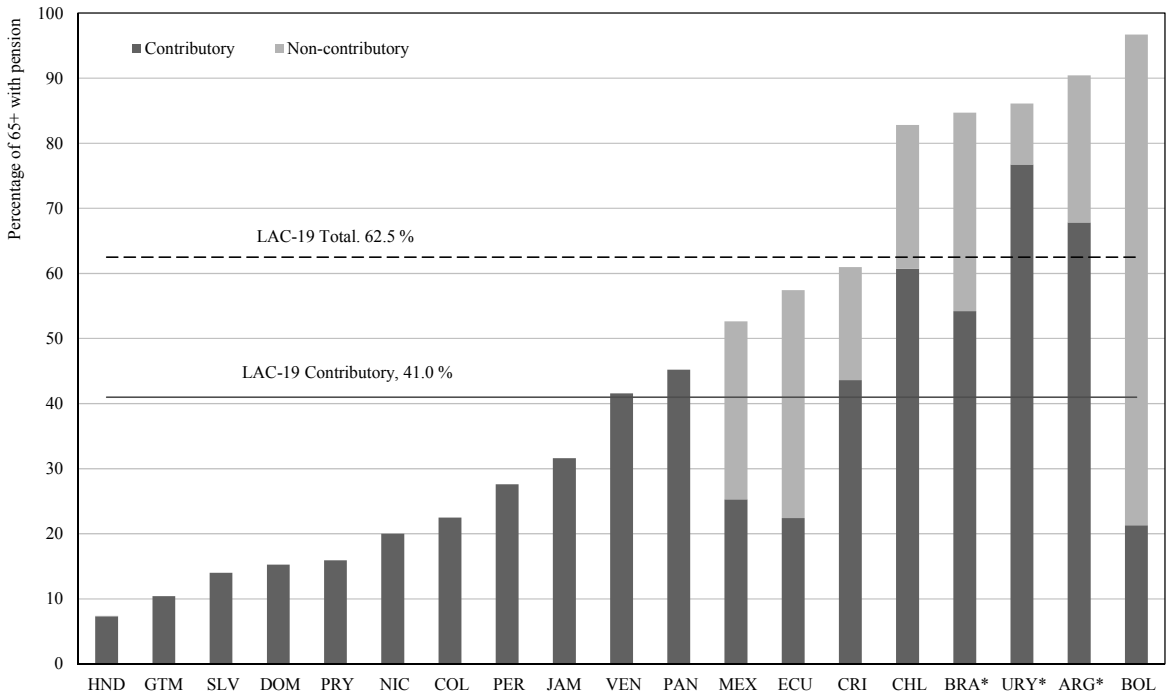
[1] Based on data availability, we are covering the following 19 Latin American and Caribbean economies: Argentina (Encuesta Permanente de Hogares – Contínua, 2010); Bolivia (Encuesta de Hogares, 2009); Brazil (Pesquisa Nacional por Amostra de Domicilio, 2011); Chile (Encuesta CASEN, 2011); Colombia (Gran Encuesta Integrada de Hogares, 2010); Costa Rica (Encuesta de Hogares de Propósitos Múltiples, 2010); Dominican Republic (Encuesta Nacional de Fuerza de Trabajo, 2010); Ecuador (Encuesta Periódica de Empleo, Desempleo y Subempleo, 2010); El Salvador (Encuesta de Hogares de Propósitos Múltiples, 2010); Guatemala (Encuesta Nacional de Empleo e Ingresos, 2010); Honduras (Encuesta de Hogares Permanente de Propósitos Múltiples, 2010); Jamaica (Labor Force Survey, 2010); Mexico (Encuesta Nacional sobre Ingresos y Gastos de los Hogares, 2010); Nicaragua

(continues)

Figure 1

Pension Coverage in LAC, 2010

(percentage of elderly adults (65+) collecting a pension, contributory and non-contributory, 2010)



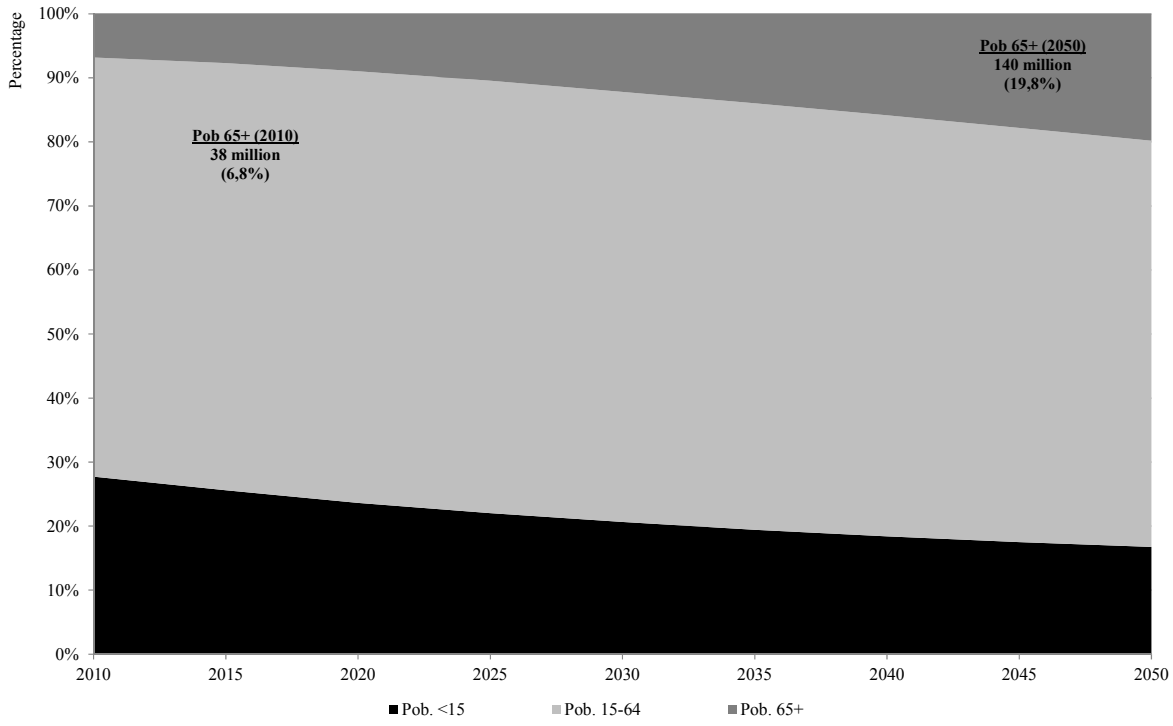
Source: Authors' calculations.
Notes: Based on household surveys (circa 2010). The share of non-contributory pensions in Argentina, Brazil and Uruguay has been obtained by dividing the number of beneficiaries of these programs, calculated as the population 65 and over in the census's administrative records. This could be an imperfect measure of coverage since eligibility for a non-contributory pension could be obtained earlier than 65. Household surveys in Colombia, El Salvador and Paraguay do not record whether individuals received a non-contributory pension. LAC-19 corresponds to the regional weighted average.

substantially increased pension coverage through programs focused on expansion of non-contributory pensions. This expansion has helped raise the proportion of older adults who receive a pension to more than six out of ten. Yet, the majority of pensions (either contributory or non-contributory) pay less than 10 dollars a day. This means that two of the key objectives of pension systems - elimination of poverty in old age and maintenance of an adequate standard of living for workers once they stop working (Barr and Diamond, 2006) are still only achieved for a small number of the region's elderly. In the absence of further reforms, the percentage of workers who contribute to the pension system is not expected to increase significantly. This implies that many will have either a limited or nonexistent access to an adequate future pension in the region (Figure 1). However, very different pension realities coexist in LAC. Our purpose is not to prescribe recipes or formulas, but rather to help understand the causes of certain pension realities and find possible avenues for improvement, taking as a starting point the evidence accumulated from policies already implemented in the region.

(Encuesta Contínua de Hogares, 2010); Panama (Encuesta de Hogares, 2010); Paraguay (Encuesta Permanente de Hogares, 2010); Peru (Encuesta Nacional de Hogares, 2010); Uruguay (Encuesta Contínua de Hogares, 2010); and Venezuela (Encuesta de Hogares por Muestreo, 2010).

Figure 2

Population Projection for LAC, 2010-50



Source: CELADE (2011).

2 Why is low pension coverage in LAC a problem?

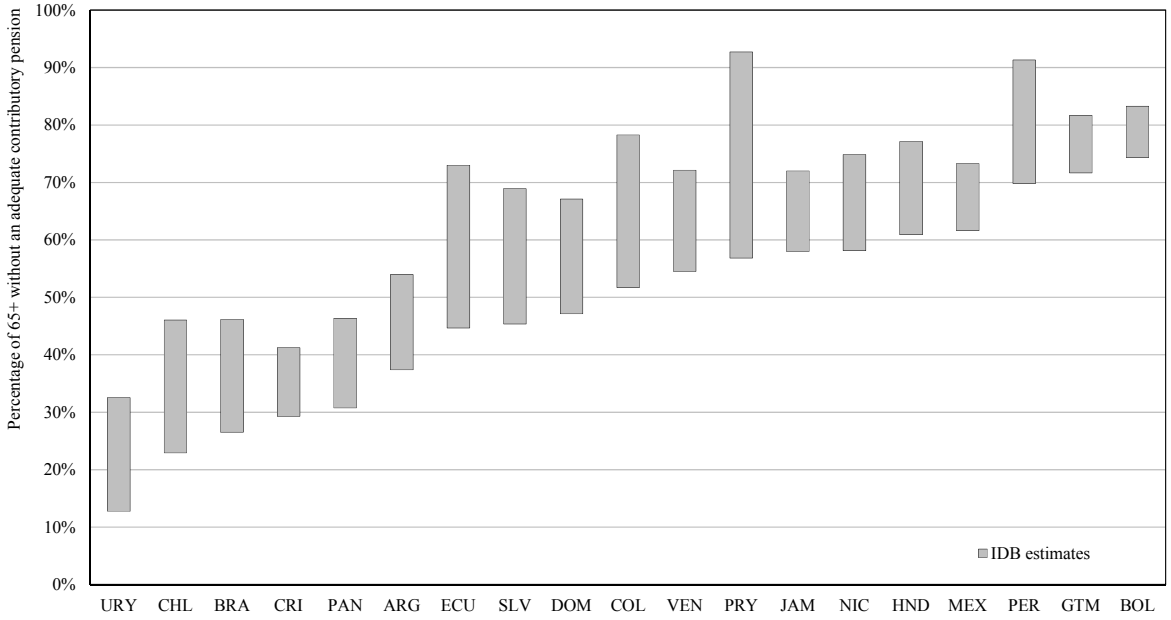
The population in LAC is young but aging rapidly. While in 2010 the percentage of adults who were 65 and older represented only 6.8 per cent of the population, projections by Celade (2011) suggest that by 2050 this age group will grow to 19.8 per cent of the region's total population. Thus, in 2050 there will be more than 140 million people aged 65 and older, nearly four times more than the 38 million elderly living in the region today (Figure 2).

LAC region is confronted with the challenge of providing an adequate income for millions of individuals who will retire in the coming decades. Yet the mechanisms to address these challenges are built on weak foundations. First, there will be fewer potential workers to support each elderly citizen. The number of working-age individuals (age 15-64) for each citizen aged 65 and older will decrease from 9.6 today to 3.2 in 2050, according to the same population projections. Second, contributory pension systems, whose purpose is to transfer present consumption (when a person is able to work) to future consumption (when a person can no longer work), are not currently capable of generating enough savings for old age since most jobs in the region are informal. In other words, the lack of savings stems for the existence of informal jobs in which firms and workers are not contributing to social security.[2] We will explore this point further later in the paper. Third,

[2] We use the term 'pension savings' to identify contributions to pension schemes, so that coverage is always referred to as passive coverage (after retirement). This is done to provide clarity since it is only appropriate for individual account systems where contributions are considered savings according to national accounting.

Figure 3

Share of Elderly Population (65+) Without an Adequate Contributory Pension, 2050



Source: Authors' calculations.

according to our projections and using standard formality-growth elasticities, economic growth, even if it continues at the rate of the last decade, will not be sufficient to fix this problem of providing adequate pensions.[3] Actually, using cross-section data from Pallares-Miralles *et al.* (2012), the LAC region tends to be well below the international trend. The share of workers contributing to social security in countries like Mexico, Colombia or Peru is between 20 and 30 percentage points lower than their respective GDP per capita would predict.

We project that in the absence of reforms, between 47 and 60 per cent of the 140 million elderly adults in 2050 (66 to 83 million people) will reach retirement without having generated the savings needed to fund an adequate pension in their old age[4] (Figure 3). Given the actual state of the labor market, the coverage deficit will be higher among women than men, and will be heavily concentrated among workers who currently have low-and middle-income jobs, work for small businesses, or are non-wage earners (for example, self-employed).

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[3] The elasticity of formality to economic growth (measured by per capita GDP increase) is set at 0.1 in the baseline scenario, following Packard (2001), Djankov *et al.* (2002), Loayza *et al.* (2005) and Loayza and Rigolini (2011). This estimate is in line with our own calculations using panel estimates with fixed effects (although lower than results obtained with cross section analysis, which are set around 0.2). We assume elasticities are the same across countries and deciles. Also, we estimate GDP per capita grows in all countries 2.5 per cent annually and contribution rates are set at 10 per cent of total wages.

[4] The results presented are based on stylized projections exercises. We use the share of workers contributing to social security by decile and by country in 2010 as the baseline. We project this share using GDP per capita growth elasticity of 0.1; *i.e.*, when the GDP per capita doubles, the share of workers contributing increases by 10 percentage points. We also assume a real GDP per capita growth of 2.5 per cent. In order to calculate the coverage share of the population over 65 years, we assume three different hypotheses. First, we assume that present contributors have contribution densities of 100 per cent, and those who do not contribute have contribution densities of 0 per cent. Second, we assume that adequate coverage demands at least a contribution density of 50 per cent. We assume that the share of contributors by decile is a good proxy for the density contributions of that particular decile. Third, we use formality rates of the second exercise and evaluate replacement rates using OECD-IDB-WB (2014). We define as uncovered those with replacement rates under 30 per cent. The calculations presented here provide an interval resulting from the maximum and minimum coverage obtained from each of these three methods.

This low coverage will have significant social, political, fiscal, and economic consequences:

- *Social:* Longer life expectancy and smaller family size means that families will need to devote greater effort and resources to the care of the elderly, which will compete with the investments families must make in health, education, or even housing for future generations.
- *Political:* In the coming decades, adults aged 65 and older will make up between 20 and 30 per cent of the potential electorate of the region, so their needs will be decisive in electing governments. In this context, achieving adequate pension coverage will be a key demand from future governments.
- *Fiscal*: Lack of coverage is a latent fiscal cost in the region. Because democratic governments in LAC are not going to ignore the demands of a growing percentage of the population, countries will have to allocate more resources to compensate for this inadequate pension coverage.
- *Economic*: How coverage gaps are closed can have an impact on the functioning of labor and investment markets and long-term productivity growth.

As a result, pensions are set to become one of the cornerstones of economic and social policy in LAC in the coming decades.

3 The labor market as the epicenter of low coverage

Social protection systems in the region were first established in the 1930s and 1940s under the influence of the social insurance system implemented in Germany by Bismarck during the late nineteenth century. This system was created with the understanding that social benefits are for wage earners who acquire them by means of contributions paid jointly with employers. As a result, by design, only citizens who were wage earners during their working lives, and their families, had access to pensions, leaving others out.

Although some countries in LAC have been including groups of non-wage earners in the pension systems, much of the low coverage observed today is due to this original design. On average, only four out of ten Latin American and Caribbean workers are contributing to a social security system at any given time, according to data taken from the aforementioned national household surveys (Figure 4).

What is even more challenging is that only two out of ten non-wage earners (such as self-employed and employers), who make up about 30 per cent of workers in the region, contribute to the pension systems; a percentage similar to that observed among wage earners in small businesses. These contributions remain low not only for low-income workers but also among middle-class workers[5] (Figure 5).

Our view is that a set of decisions taken by the state, workers, and firms has created a disequilibrium in labor markets in LAC in which only a small percentage of medium- and low-wage earners regularly contribute to the pension systems.

In order to move toward universal coverage, it is crucial to change this disequilibrium by increasing the benefits and/or reducing the costs of complying with formality for workers and employers. In the latter case, this means evaluating not only the contributions to the pension system but also the costs associated with labor legislation (health insurance, termination costs, minimum wages, registration costs) as well as other regulations. Equally important, the benefits of being

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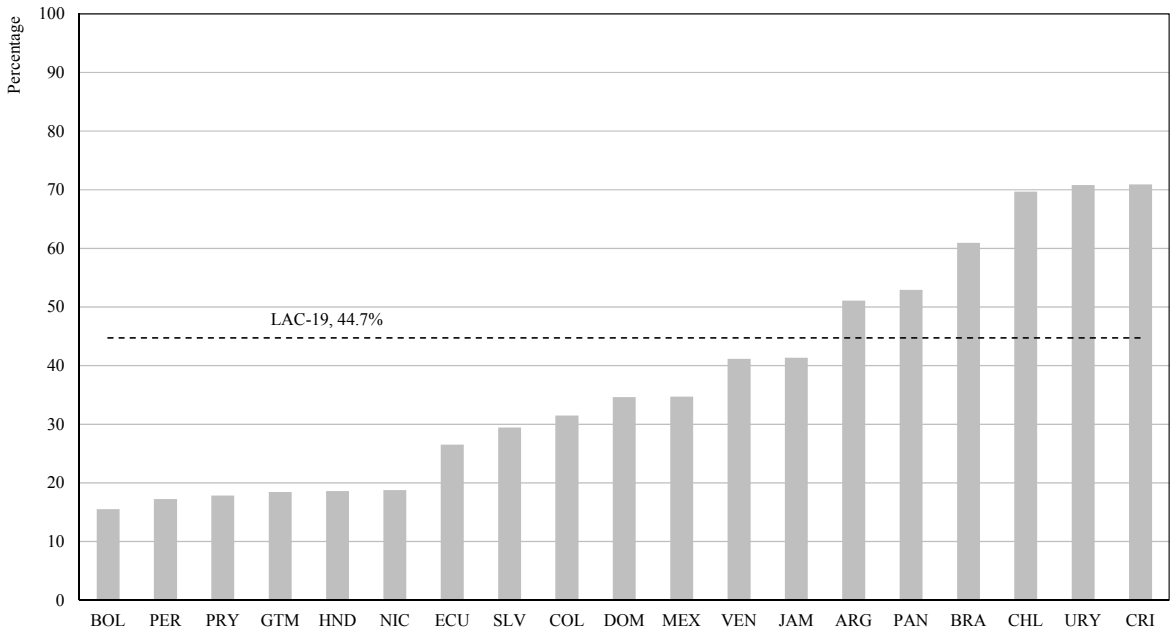
[5] We follow Easterly (2001) and consider 'middle class' those workers who are between the third and the sixth deciles of the income distribution.

Figure 4

Percentage of Contributors over Total Employment in LAC, 2010



Source: Authors' calculations.

informal need to be reduced, and those benefits granted to people who have not saved in the pension system need to be reviewed (Levy, 2008).

4 Experiences toward universal pension coverage

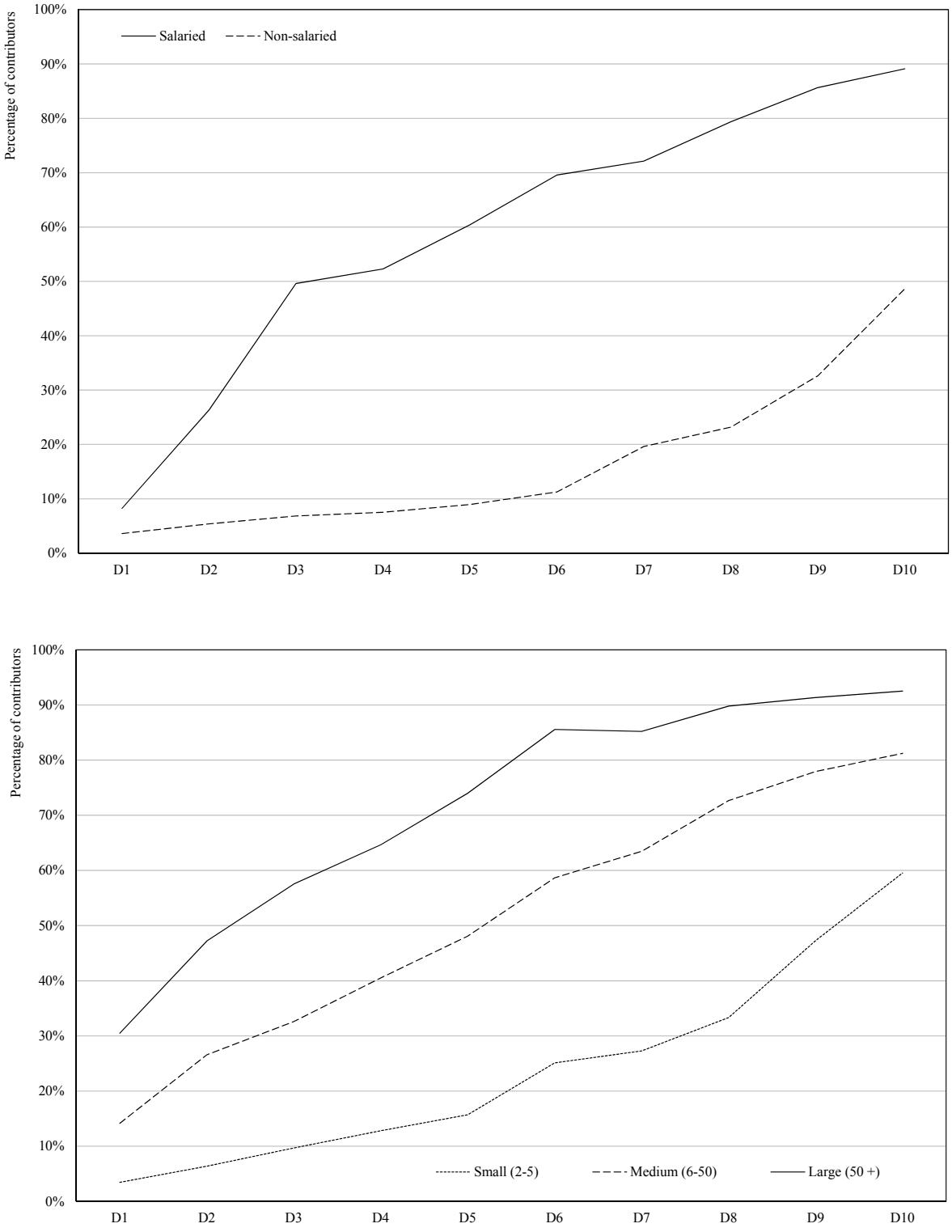
Essentially, there are two ways to increase pension coverage, each with its own advantages and disadvantages: granting pensions to those reaching retirement age who do not have social insurance coverage, or making workers currently in the labor market save for their future (*i.e.*, contribute to a pension scheme).[6] Finding the balance between the two – providing coverage for current older adults and guaranteeing coverage for future retirees – is the challenge that economic policymakers in the region need to solve.

Experiences in the region among countries with different income and formality situations, such as Bolivia and Chile, reveal that non-contributory pensions are effective in increasing the number of people with access to income in old age. In fact, it is the only tool able to provide coverage to the elderly who are currently without social insurance, as well as for the long-term informal workers who will retire in the coming decades. However, depending on their design, non-contributory pensions could significantly affect the decision to participate in the labor market and in the contributory systems (Carvalho Filho, 2008; Galiani and Gertler, 2009; Bosch and Guajarro, 2012; Rodrigues de Oliveira and Kassouf, 2012; and Juárez and Pfutze, 2012). Advances in coverage achieved through non-contributory pensions are very important (see Rofman

[6] See OECD (2010) and Ribe *et al.* (2010) for an extended summary of policy options to increase coverage, and OECD (2013) for a summary of recent reforms in OECD countries.

Figure 5

Pension Savings: Contributors to the Pension System in LAC by Income Decile, Occupation and Firm Size, 2010



Source: Authors' calculations.

et al., 2013, for a detailed description of these programs in LAC), but the design of these tools must include not only proposals for financial sustainability, but also the possible effect of these non-contributory pensions on the labor market and, in particular, on the incentives for participating in the contributory systems.

Moreover, non-contributory pensions are only part of the solution to low coverage. Although they can alleviate or even completely eliminate poverty in old age, they are not effective in ensuring that individuals, particularly those in the middle class, maintain their standard of living in old age. To generate adequate levels of future pensions, pension savings for today's workers need to be urgently increased by expanding both the number of contributors and the frequency of their contributions. To do this, the region has followed different paths. Implementing a reduction of social security costs seem to be effective in generating formal employment, especially in the groups that tend not to be associated with the pension system, such as young people, non-wage earners, and wage earners in small businesses. For example in Chile, a social security subsidy for employees and firms hiring young disadvantaged workers increased the share of these workers in between 2.5 and 4.1 percentage points (Universidad de Chile, 2012). Indeed, several countries are moving in this direction. Colombia's recent tax reform cut formal labor costs by eight percentage points (from 33 to 25 per cent of wages) for all workers, and Brazil has eliminated social security contributions for strategic sectors with the aim of increasing formal employment. Although the question remains to what extent subsidies targeted to particular groups, such as the self-employed or small business employees, could result in discouraging firms from growing or encouraging self-employment. Such outcomes could, in turn, have adverse consequences for the productivity of the economy.

The empirical literature also suggests that the increase in formality (especially among small firms) requires greater supervision but also an improvement in how firms and workers value the benefits of formality. In a controlled experiment, Andrade *et al.* (2013) show that none of the information or financial incentives had an impact on formalization of small firms in Brazil; only a visit by a labor inspector prompted an increase in the registration of these small firms. Although it seems clear that stricter monitoring in the labor market expands the number of formal jobs, it can also destroy jobs that cannot survive regularization due to low productivity or because the firms and workers reject the benefits of social security. Therefore, increased supervision needs to be accompanied by an improvement in the benefits offered by formality and/or reduction in their cost.

Innovations in how the State, and social security agencies in particular, relate to citizens can constitute a low-cost policy for expanding pension coverage. These innovations include financial education campaigns, and improvement in information and channels that facilitate contributions. For example, pilot programs in Peru and Bolivia suggest that sending reminders via a text message or a letter can be an effective and low-cost way of stimulating savings (Karlan *et al.*, 2012).

Overall, it is difficult to suggest or establish a single policy capable of correcting all the problems related to coverage given the diverse realities of the region. In order to achieve long-term solutions, governments will need to explore and make progress on several dimensions. Since the LAC countries are at very different starting points, emphasis on a particular dimension will depend on the specific challenges faced by each.

5 Eliminating poverty in old age and supporting formal employment

In our view, it is possible to move toward universal pensions coverage in LAC, and that under certain conditions, the system is affordable now and in the future. Achieving this goal requires not only establishing sustainable and efficient anti-poverty pensions, but also making a firm commitment to create more formal jobs for the people that are in the labor market today. This

is the only sustainable strategy for providing adequate pensions in the long term. Informality is the outcome of the original designs of social welfare systems, the incentives provided by the state in labor markets, and the value placed by workers and firms on the benefits of formality, all of which can be changed.

For this matter, it is not feasible or desirable to propose a single reform for all LAC countries. However, it is possible to set out a series of key principles for any of the options chosen. The most important are:

- *Universality*: understand the interaction of the pension system with the labor market and tax system.
- *Integrality*: acknowledge the interactions and attempt to connect all the provisions of the social insurance system (contributory and non-contributory) such as retirement, disability, survivors' pensions, and health and unemployment insurance.
- *Efficiency*: create good incentives for pension savings and participation in formal employment.
- *Transparency*: simplify the rules so they are understood by citizens and firms.
- *Innovation*: experiment with subsidy mechanisms for contributions and in the channels that facilitate contributions.

Based on these principles, a set of financial and non-financial instruments designed to expand coverage could be evaluated. The financial instruments, consistent with the two objectives of pension systems (poverty reduction and maintenance of the standard of living of workers after retirement), could include:

- *An anti-poverty non-contributory pension for all citizens.* Established with strict eligibility criteria in terms of age, and at a level sufficient to reduce poverty in old age. This type of pension should have a stable funding source, allow for receiving both non-contributory and contributory pensions, and be supported by strong fiscal institutions (for example, a Fiscal Council).
- *Mechanisms to promote formal employment.* Among other options, subsidies can be offered to reduce contributions for wage and non-wage earners, favoring the incorporation of low- and middle-income workers into the formal system.[7]

These financial instruments would be supplemented by changes in the design and implementation of pension policies, including:

- *Phasing non-wage earners into social security.* Establishing the obligation to contribute for all workers, irrespective of their occupational category (wage earner or not), on financial conditions equal to those of wage earners. Today, affiliation for independent workers is voluntary for all or a subset of non-wage earners in 4 countries in the region (Bolivia, Ecuador, Mexico and Venezuela). Recognition of the special characteristics of this group should be considered when designing new ways for contributing.
- *Progress in supervision, information, and financial education.* Based on links to information sources, improved inspection, and a better pension culture.[8]

Reforms that respect these principles and use the range of financial instruments could completely eliminate poverty in old age, and lead to a significant and sustainable increase in formal employment and pension savings in LAC.

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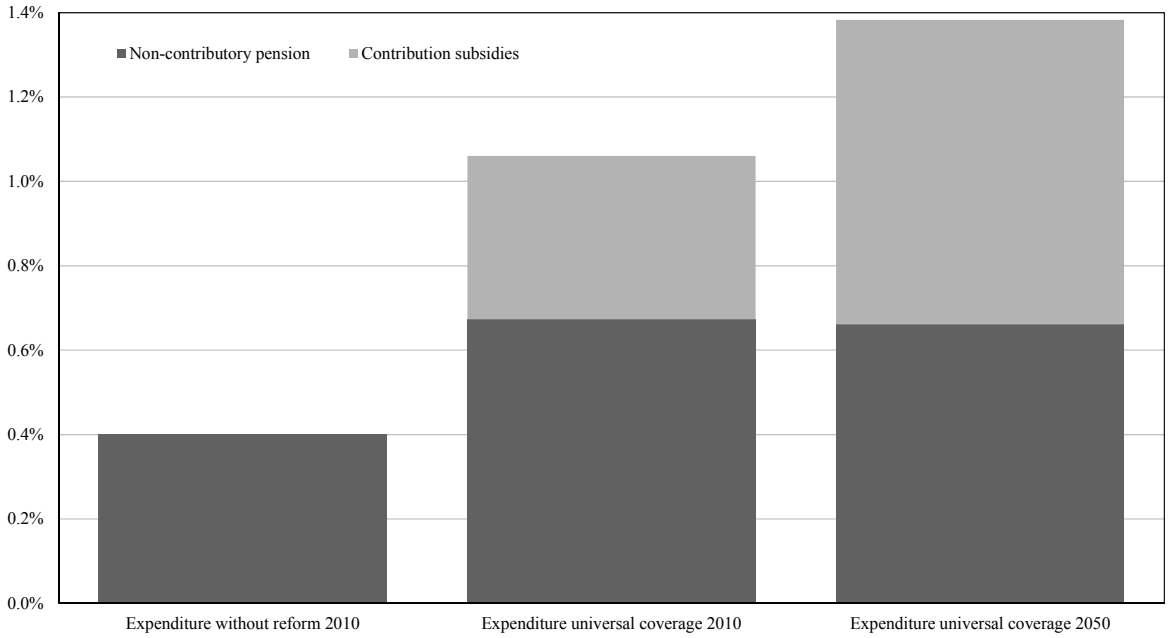
[7] A number of experiences considering subsidies and matching contributions for low-, middle- and high-income countries have been summarized in Hinz *et al.* (2012).

[8] Hastings and Mitchell (2011) and Hastings *et al.* (2010) show how financial literacy can enhance pension savings.

Figure 6

Cost of Pension Reform,
Compared with Current Spending on Non-contributory Pensions in LAC-19



Source: Authors' calculations
Note: LAC-19 refers to the simple average

To illustrate this proposal and its budgetary implications of reforms, on average in the region, a pension that provides an income of 10 per cent of per capita GDP for all those aged 65 and older in 2010 costs annually an average of 0.7 per cent of GDP (ranging from 0.4 per cent in Guatemala and Jamaica to 1.4 per cent in Uruguay).[9] This level of spending would remain stable in terms of GDP if the pensions are adjusted for inflation. Measures to stimulate formal employment require additional resources. For instance, if the government subsidizes workers' (wage earners or not) pension contributions with an amount equivalent to 50 per cent of what a worker earning a minimum wage should contribute, the total cost (universal pension and subsidies) rises to 1.1 per cent of GDP in 2010 and 1.4 per cent in 2050[10] (Figure 6).

This implies that the reform would require an additional budgetary effort of around one percentage point of GDP per year more than the amount that the region is already allocating to non-contributory pensions, and would eradicate poverty among citizens aged 65 and older and significantly increase formal employment. These gains would be even greater if, parallel to the introduction of financial instruments, the contribution channels and supervision were improved.

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[9] This benefit corresponds to a daily monetary transfer of 4 to 8 USD in PPP in Argentina, Chile o Uruguay, and between 1 and 2 USD PPP in Bolivia, Guatemala and Honduras.

[10] In the central reform scenario, we assume that a 10 per cent subsidy increases the elasticity of the share of workers contributing to their pensions with respect to per capita GDP from 0.1 (base scenario) to 0.14. This is within the bounds obtained by Heckman and Pages (2008), Kugler and Kugler (2009) and Madrian (2012). We also depicted conservative and optimistic scenarios, with 0.12 and 0.18 formality to per capita GDP growth elasticities. GDP per capita grows in all countries 2.5 per cent annually and contribution rates are set at 10 per cent of total wages. In the reform scenarios, we assume that formality only increases in deciles 3 to 10, which roughly correspond with the wage range where formal jobs are concentrated. The social contributions' subsidy (for employees or firms) is set at 50 per cent of the wage of decile 3, which for LAC-19 represents approximately the minimum wage.

The expansion of non-contributory programs could substantially reduce poverty in old age, consolidating the advances that the region has made over the last decade (Lustig and López-Calva, 2012). But perhaps more importantly, if the measures proposed here are able to shift labor from informal to formal jobs, there would be an expansion in coverage in other social insurance elements that are packaged together with pensions, for example health, disability and life insurance. Furthermore, improvements in productivity and growth will be expected to follow in the medium run as firms become more formal (Busso *et al.*, 2012).

Even so, it is worth emphasizing that there is no single formula for universal coverage of pensions. Depending on their initial coverage conditions, social preferences, institutional capacity, and availability of resources, countries can implement different reforms within this framework of principles and instruments. In particular, countries with very low pension coverage levels may consider extending their non-contributory pillars, paying particular attention to the institutional design to avoid lowering incentives to contribute, and ensure fiscal sustainability in the future. Other countries with relatively high coverage with well-developed and relatively generous non-contributory programs such as Uruguay, Brazil, and Argentina, could advance on the integration of contributory and non-contributory programs to enhance incentives to contribute. All countries would benefit in increasing formality levels using a combination of the tools presented here to close the gap with the OECD average. In particular, countries with high combined non-wage labor costs should consider shifting taxation away from payroll taxes to increase formal employment.

The set of reforms proposed here is not a substitute for parametric reforms (increasing retirement age, reducing benefits or increasing contributions) that are necessary in some defined benefit systems that are projected to be impacted from the rapid demographic change that the region will experience over the next few decades. In fact, increasing coverage can put additional pressures on these systems.

6 On the political economy of pension and tax reform

LAC is experiencing a good demographic, economic, and fiscal period. These factors provide a real opportunity for initiating bold reforms to move toward universal pension coverage. Demographically, the region is still young. Only Argentina, Brazil, Chile, Costa Rica, Cuba, and Uruguay show an advanced stage of demographic transition. However, this window of opportunity, which now facilitates political approval of the reforms, will gradually close as the population ages, and the reforms will become more urgent and costly.

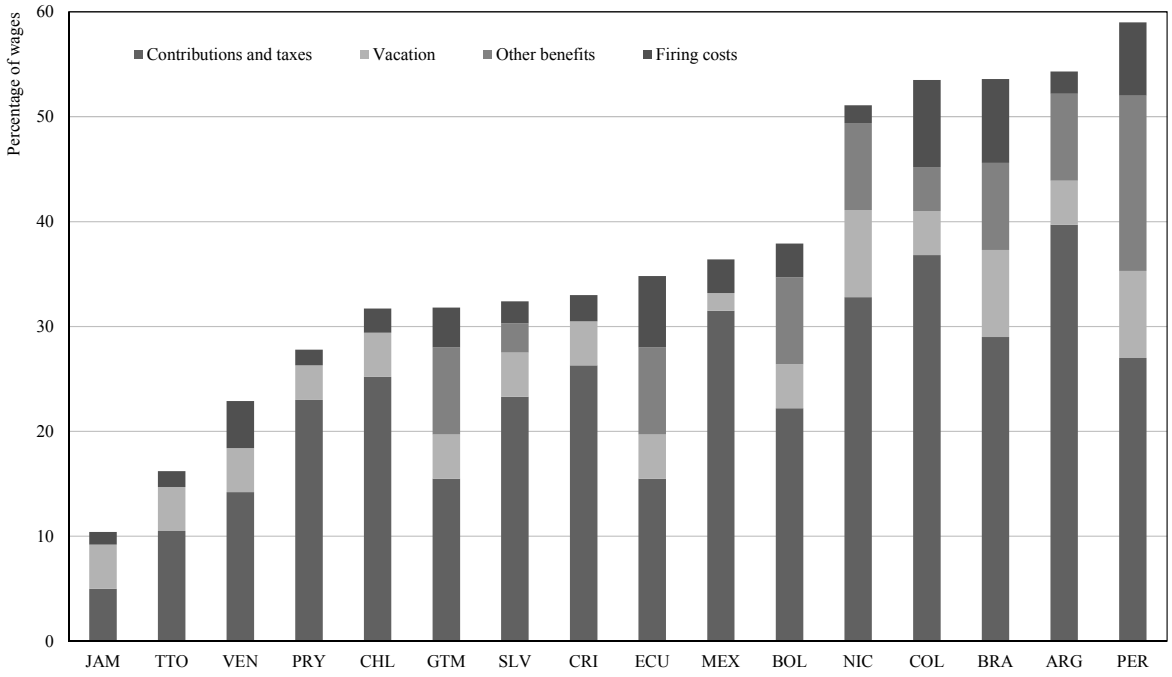
In economic terms, reforming pension systems, especially in relation to improved functioning of the labor market, is a key element in a strategy to boost productivity and potential growth, and is considered a motivation shared by all economies in the region (Pagés, 2010). Some simulations show that if all countries in the region implemented appropriate reforms, including labor and pensions, the region's potential growth could increase by up to two percentage points per year, overcoming the so-called 'middle-income trap' (Powell, 2013).

Finally, the pension reforms aimed at expanding coverage, especially those implemented during the working life of citizens, could improve the fiscal situation in the medium and long term. In the absence of changes in pension systems, the size of the population unprotected during old age in LAC will increase significantly. As a result, social pressure on governments to establish and/or expand non-contributory pension programs will intensify.

However, recognition of the importance of pension reform and the favorable moment are not enough; challenges related to funding and the political economy must be overcome. The funding of pension reform, at least in the short term, requires an increase in the resources allocated to these

Figure 7

Non-wage Costs in LAC



Source: Pages (2010).
Note: The 2012 tax reform in Colombia may have reduced non-labor cost 13.5 percentage points, down to 40 per cent of wages.

policies, a not insignificant challenge in the region in technical and political terms (Corbacho *et al.*, 2013). A central recommendation would be to limit the heavy charges on formal employment, or at least not add additional burdens, because of their negative effects on formal employment. It is important to note that it is plausible to have low fiscal pressure (over GDP) but high non-wage costs on formal workers. In fact, countries with large informal sectors tend to have higher non-wage costs and less taxation revenues (e.g. Colombia, Mexico and Peru) (Figure 7). In this respect, initiatives have appeared that aim to allocate, in a formal way, part of the collection of value-added tax (VAT) or natural-resource taxes to fund the non-contributory pillar.

The funding challenges are compounded by the fact that, perhaps because of the young population, pensions are not social or economic priorities of citizens of LAC. Pensions do not appear in the top 20 main priorities/concerns of the Latin American population. The *Social Protection Survey* in Chile and similar surveys conducted by the IDB (IDB, 2008) show that a great majority of citizens have never thought how they will finance their old age, even those close to the retirement age. This lack of concern about future pensions, in principle, limits the set of potential contributors and reduces governments' priority for moving forward in this area.

However, these citizens themselves expressed two aspirations that are intrinsically related to pension reform as proposed in this study: reduction of poverty and unemployment. They are even willing to pay more taxes to fund quality public services in health, education, and security (Daude and Melguizo, 2010). These demands from the population could be capitalized in favor of the reforms.

Access to formal job facilitates access to the middle class, and has even been considered a necessary condition. The reality in Latin America and the Caribbean is that the region's new middle classes are still largely informal and exposed to great vulnerability if economic conditions are no longer favorable (OECD, 2010 names them *middle sectors*; Ferreira *et al.*, 2012 the *strugglers*). In this context, the emerging middle classes of LAC could act as triggers for a series of ambitious pension changes, in line with the contents of the proposed reform, leading to an expansion of formal employment for people with low and medium incomes.

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COMMENT TO "BETTER PENSIONS BETTER JOBS: STATUS AND ALTERNATIVES TOWARD UNIVERSAL PENSION COVERAGE IN LATIN AMERICA AND THE CARIBBEAN" BY MARIANO BOSCH, ÁNGEL MELGUIZO AND CARMEN PAGES

Renee Philip[*]

1 Introduction

I would like to thank the organisers for the invitation to the workshop and the opportunity to comment on this interesting paper. Although pension policy in New Zealand is quite different to that in many Latin America and Caribbean (LAC) countries, New Zealand also faces challenges related to pensions, in particular, the growing cost of pensions arising from an ageing population, and so pension reform is an area of interest.

2 Main messages of the paper

The focus of the paper is on options for future pension reform in Latin America and the Caribbean (LAC). This includes options that can not only eliminate poverty in old age, but can contribute to boosting formal employment.

During the 1980s and 1990s, pension reform in many Latin American countries involved shifting from state-run, pay as you go social security systems to privately managed individual accounts. These reforms were in response to a range of problems including an uneven distribution of benefits, low coverage, and difficulty financing the benefits.

These reforms have been widely studied. This paper focuses on coverage. It summarises the current state of pension coverage in many LAC countries, which shows that low coverage remains a problem even after recent expansions of many non-contributory pensions. Only 6 out of 10 older adults receive a pension. In addition, low pension levels raise concerns about both old age poverty and inability to maintain an adequate standard of living for workers once they stop working. These policy issues are likely to become more of a problem in the future. Although the population in many countries in the region is relatively young, it will experience an ageing population, in common with many advanced economies.

The paper also summarises participation in contributory schemes, which is also low, particularly among low and middle income earners. The paper argues that this low participation is due to the large informal job sector and the focus of contributory pension systems on formal jobs.

The paper argues that coverage is not expected to increase significantly in the absence of further reform, particularly for women and low and middle income earners.

Therefore the paper outlines two main ways to increase pension coverage:

1) Grant pensions to those reaching retirement age who do not have social insurance coverage, through increasing non-contributory pensions. This would help to reduce old-age poverty.

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The views expressed are those of the author and do not necessarily reflect the views of the New Zealand Treasury.

2) Increasing formal jobs to increase the numbers of workers in the labour market who are saving for their future i.e. increasing contributions to contributory pensions. This would help workers to maintain their standard of living in retirement.

There are some tensions and trade-offs between these two objectives, which the paper explains. For example, expanding non-contributory pensions:

- Could reduce incentives to participate in the labour market – for example, if these are funded by a social security tax, and
- Could reduce incentives to contribute to contributory systems.

3 Some evidence from New Zealand

Although the context in New Zealand is very different, some of our experience would tend to support some of these risks that can arise with a non-contributory pension. New Zealand has a public non-contributory system – known as New Zealand Superannuation – which is a universal, flat-rate benefit paid from age 65 subject to a residency requirement. Not surprisingly, this is generally considered effective in preventing old age poverty. However, the costs of such a scheme are expected to increase as the population ages – from around 4.5 per cent of GDP now to around 8 per cent of GDP in 2050.

What lessons from NZ are relevant for these proposals?

- First, on labour market participation. The New Zealand system has strong incentives for older people to stay working: no legal retirement age, no income or work tests. However, there is evidence that labour market participation falls sharply at the age of eligibility (although New Zealand's labour market participation is relatively high in lower age groups). It would be useful if the paper could distinguish between concerns about labour force participation at retirement vs. earlier ages.
- Second, on contributions to private pensions. Workplace-based private pensions declined in New Zealand from 23 per cent of workers in 1990 to 14 per cent of workers in 2006, as without any tax incentives and with a large non-contributory pension, there was little incentive to contribute to individual accounts. This does not mean, however, that people weren't saving for their retirement in other ways. But it does suggest a need to carefully consider how the introduction of a non-contributory scheme would affect incentives to contribute to a contributory scheme.

On the second option of increasing contributions to contributory pensions, the paper notes two main pathways to achieve this:

- increasing formal employment, and
- using innovations in how the state or private schemes communicate with citizens, such as text message reminders, to increase savings.

On the first, increasing formal sector jobs is a bigger challenge for the region than can be solved by pension policy alone. The paper notes some of the policy options in this area, such as tax reform to reduce formal labour costs. It also points to the need to ensure that any expansion of non-contributory pensions does not lead to higher costs on formal labour which could reduce formal jobs. I agree that increasing formal jobs is important in its own right and would also help to increase coverage. However, given the scope of the challenge, for the purpose of pension policy it would seem more pragmatic to take as given the presence of informal labour markets and consider how pension schemes can be designed to best work in these circumstances.

In terms of mechanisms to increase participation in private pensions, again I'd like to share some experience from New Zealand. In 2007, New Zealand introduced a new scheme with privately-managed individual accounts (KiwiSaver). The scheme is voluntary, employees are automatically enrolled when they start a new job but can opt out. It is open to all citizens under age 65. Workers who contribute will also receive a contribution from their employer, and there are some government subsidies tied to individual contributions (including for those of working age who are not currently working).

Enrolment in KiwiSaver has grown by an average of 20 per cent per annum over the last six years – around half of the total population have enrolled to date, with around 60 per cent of members opting in and around 40 per cent who were automatically enrolled when they started a new job. Many of the design features have aimed to make it as simple as possible for non-informed citizens to begin saving and encourage this to become a habit. It is too early to know how much this will increase retirement income over the long term, particularly because contribution levels are relatively low, but research suggests around one third of private contributions to KiwiSaver represent savings that would not otherwise have been made.

4 Suggestions for the paper

In terms of suggested improvements to the paper, I have four suggestions. First, it would be nice to see more discussion about the estimates of fiscal costs and the risks to the estimates of fiscal cost of expanding non-contributory pensions. The paper argues that moving toward universal coverage under certain conditions is affordable and can be achieved at a cost of around 1 percentage point of GDP, a level which would provide a pension of 10 per cent of per capita GDP. However, there are likely to be risks to this estimate. For example, a higher proportion of elderly in the population may lead to pressures to increase the level of the pension, which would increase the future cost by more than the estimates in the paper.

Second, there is little discussion around the choices between expanding non-contributory schemes for the current generation of retirees, compared with future generations. While it is possible to fund an expansion of non-contributory pensions for future retirees through a save as you go mechanism, this isn't possible for the current generation of retirees. The choice between SAYGO and PAYGO funding has implications for long run tax rates, intergenerational equity, capital accumulation, saving and risk sharing that it would be interesting to see considered further.

Third, in terms of non-financial instruments, the paper talks about examples such as providing information and financial education. While these mechanisms are important, decisions around pensions are complex and better information on its own may not be sufficient. The behavioural economics literature has much to say about non-financial mechanisms to increase saving, such as automatic enrolment, and it would be good to see some examples from countries that have tried some of these approaches and discussion about how these could be made to work in LAC countries, in the context of large informal labour markets.

Finally, the LAC region consists of a range of countries that have differing circumstances, and there is no one policy that will be suitable for all. Although the paper acknowledged this, overall I found that the paper was not clear about what specific policies could achieve the ambitious aims set out in the paper.

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CHOOSING FISCAL CONSOLIDATION INSTRUMENTS COMPATIBLE WITH GROWTH AND EQUITY

Boris Cournède,[*] Antoine Goujard[*] and Álvaro Pina[*]

Despite sustained efforts made in recent years to rein in budget deficits, a majority of OECD countries still face substantial public finance consolidation needs moving forward, owing to the legacy of debt accumulation before the crisis, and to the role played by fiscal policy in rescuing the banking system and supporting aggregate demand in the aftermath of the recession. Further budget consolidation is also needed over a much longer horizon to face long-term public spending pressures, in particular from pensions and health care.

Fiscal consolidation complicates the task of achieving other policy goals. In most cases, it weighs on demand in the short term. And, if too little attention is paid to the mix of instruments used to achieve consolidation, it can slow the process of global rebalancing, undermine long-term growth and exacerbate income inequality. It is therefore important for governments to adopt consolidation strategies that minimise these adverse side-effects. The analysis assesses the near and long-term consolidation needs for OECD countries and proposes consolidation strategies that take into account other policy goals as well as country-specific circumstances and preferences. To do so, increases in particular taxes and cuts in specific spending areas are assessed for their effects on short- and long-term growth, income distribution and external accounts. The results of detailed simulations indicate that a significant number of OECD countries may have to raise harmful taxes or cut valuable spending areas to deliver sufficient consolidation, underscoring the need for structural reforms to counteract these side-effects.

1 Introduction

Despite considerable progress in recent years, at the end of 2012 many OECD countries were still facing sizeable fiscal consolidation needs to bring back, or keep, public debt within manageable levels. Building on previous work by OECD and others, the present study presents a structured approach to the design of fiscal consolidation strategies to meet these needs while minimising adverse side-effects on growth and equity in the short and the long term, as well as on current-account balances. The paper subsequently goes on to provide some illustrative applications of the approach.

In a preliminary step, to serve as an input for the subsequent analysis of ways to minimise the side-effects of consolidation, the study provides estimates of consolidation needs in the short to medium term as well as the long term (Section 2). It then moves to its core subject and discusses the definition of growth, equity and current account objectives before presenting the list of potential consolidation instruments, evaluating their effects on these three objectives and proposing a generic illustrative hierarchy of instruments (Section 3). On that basis, Section 4 proposes a

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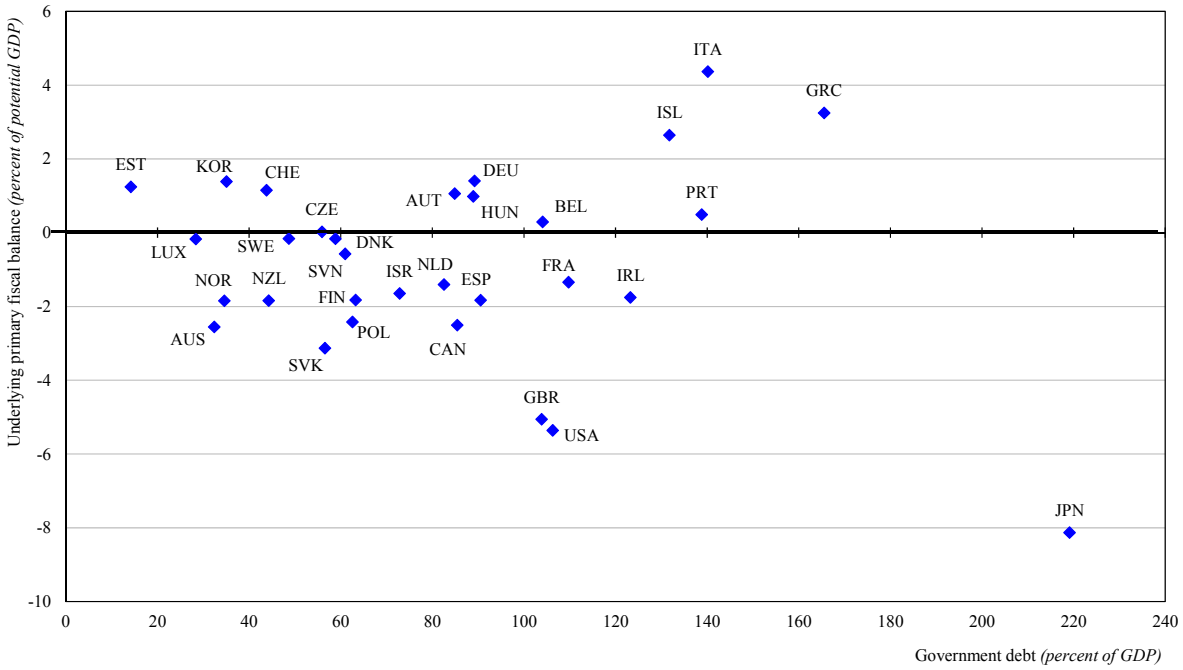
Figure 1

Debt and Underlying Primary Balances in 2012



method for developing differentiated hierarchies of instruments taking into account country specificities, in particular as regards vulnerabilities to the persistence of high unemployment. The study proceeds with an illustrative evaluation of how far down each country has to go on its list from more to less welcome instruments to meet its consolidation objectives without departing too much from its revealed preferences about government spending and revenue items and checks the robustness of the findings (Section 5). The results underscore the need for structural changes to be part of fiscal adjustment and for institutions to play a supportive role (Section 6). Section 7 concludes.

2 Estimated consolidation needs

The legacy of the financial crisis and earlier fiscal imbalances has burdened many OECD governments, with high debt levels, often accompanied by still significant structural deficits (Figure 1) which call for large consolidation efforts to reduce debt to more prudent levels. As a necessary preliminary step to permit a quantitative analysis of the composition of consolidation strategies, this section presents estimates of consolidation needs at the end of 2012 for both the short to medium term and the long term. The calculations assume a gradual consolidation effort, embodied in smooth time paths for the structural primary budget balance. The methodology is presented in full detail in Section 2 and Appendix 2 of Cournède, Goujard and Pina (2013). This approach ensures that the debt ratio is on a stable trajectory at the end of the consolidation horizon (2060). Second, in order to ensure that by 2060 the debt ratio not only stabilises but does so at the desired target level (set at 60 per cent of GDP), it differentiates short- from long-term consolidation needs, as explained in greater detail below. As developed in Box 1, this approach differs in purpose and methodology from the consolidation requirements reported in OECD's *Economic Outlook of May 2013* (OECD, 2013a).

BOX 1
SHORT- *VS.* LONG-TERM CONSOLIDATION NEEDS AND AVERAGE REQUIREMENTS

The estimated consolidation needs presented here differ from the average consolidation requirements reported in OECD (2013a) as they serve different purposes and therefore use different assumptions. The present set of consolidation needs forms a basis for the subsequent quantitative analysis of detailed consolidation packages that minimise side effects. The focus is firstly on how far these packages need to go in the short to medium term to bring debt under control and secondly on what has to be done to keep debt stable in the very long term, that is to say in 2060 and beyond. This differs from the objective of the requirements reported in OECD (2013a) which was to show how much effort beyond that already built into the near-term projection is needed *on average* from 2015 to 2030. From these different purposes and perspectives result different methodological choices with the main differences summarised as follows:

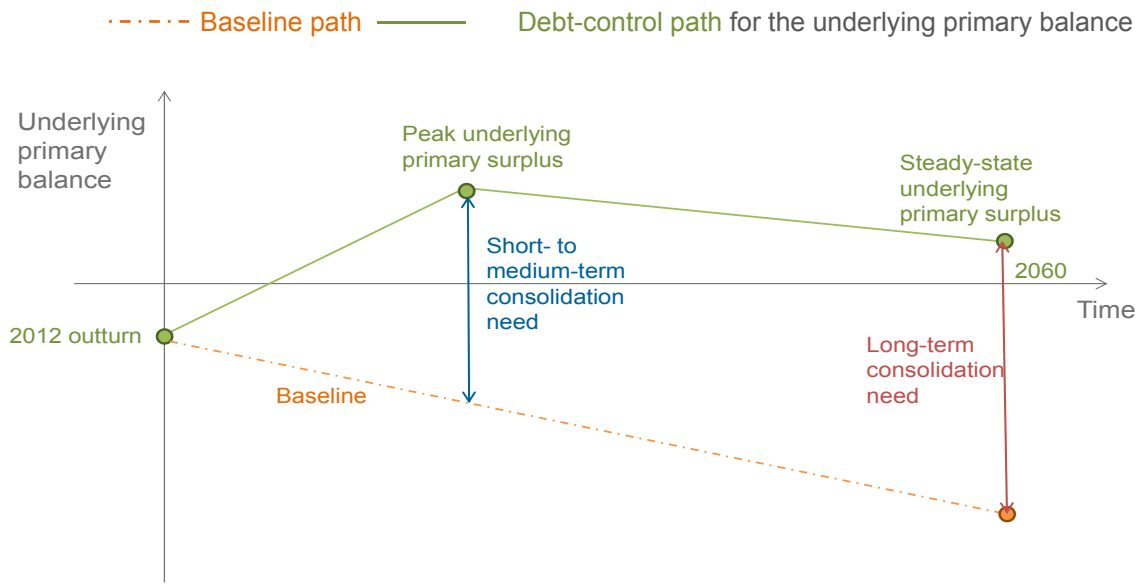
- The reference point for comparisons is 2012 in the current study, so that needed changes in individual areas of tax and spending can be compared to the latest historical point (or estimate). The reference point in OECD (2013a) is fiscal projections to 2014 to provide an idea of how much remains to be done in aggregate after the expected consolidation to 2014.
- The present estimates refer to the peak effort needed in the short- to medium-term and in 2060 whereas the requirements reported in OECD (2013a) relate to the average effort over 2015-2030. The former is needed for the present exercise as the point to assess how far, at the peak, instruments have to be used, and whether these instruments have to be maintained or can be partly reversed afterwards. To assess the size of aggregate consolidation efforts in an extended medium-term perspective as is the case in OECD (2013a), however, the average offers a more robust measure given that many different paths with many different peaks can be imagined for moving to debt stabilisation.
- In order to allow more realistic estimates of consolidation needs in the very long run (2060), the present estimated needs are calculated over a baseline where government expenditure on health and long-term care increases gradually over time. The baseline for comparisons in OECD (2013a) does not incorporate such cost pressures which have a lesser impact when looking at average effort over 2015-30.
- For the sake of comparability of consolidation packages and in line with the long-term focus of the study, the present set of estimates assumes that all countries reach 60 per cent gross debt-GDP ratios by 2060. In OECD (2013a), in line with the extended medium-term focus, the time horizon is 2030 but, to avoid too abrupt changes, some countries are allowed to reach their 60 per cent target after 2030.

Despite the differences of purposes and method, the cross-country correlation between the present set of short- to medium-term consolidation needs and the requirements presented in OECD (2013a) is very strong with a coefficient of 96 per cent.

Source: OECD (2013a), *OECD Economic Outlook*, May 2013.

Figure 2

Defining Short- to Medium-term and Long-term Consolidation Needs



The short- to medium-term consolidation need is defined as the difference between a baseline and the peak of a trajectory for the underlying primary balance that brings gross general government debt to 60 per cent of GDP by 2060. Evidently, different consolidation paths can be taken to attain the 60 per cent target, each leading to a different profile for the underlying primary balance (see Box 4.5 in OECD, 2013). For the purpose of this exercise, and although some countries have plans to adjust faster, the underlying primary balance is assumed to improve from its 2012 level at a rate of one per cent of potential GDP each year for as long as necessary to put debt on a trajectory toward the target. After that initial phase of consolidation, the length of which varies considerably across countries, the underlying primary balance is assumed to converge very gradually to the 2060 level which stabilises debt at 60 per cent of GDP (see Figure 1). With a starting point of high debt and deficit ratios, shared by many countries, initial improvement in the underlying primary balance at the annual pace of one per cent (1½ per cent in Japan) helps to ensure that debt is put on a downward path in a not-too-distant future (see Cournède, Goujard and Pina, 2013 for charts depicting all simulated trajectories).[1]

Both short- to medium-term and long-term consolidation needs compare the "debt-control" underlying primary balance with the baseline at the relevant point in projection period (Figure 2). The baseline corresponds to a policy scenario where sufficient reforms are introduced for public pension spending to remain constant relative to potential GDP and for government expenditure on health and long-term care to grow at a contained pace. Other tax and expenditure components are assumed to be unchanged from their 2012 levels relative to GDP except for cyclical effects associated with the projected closure of output gaps.

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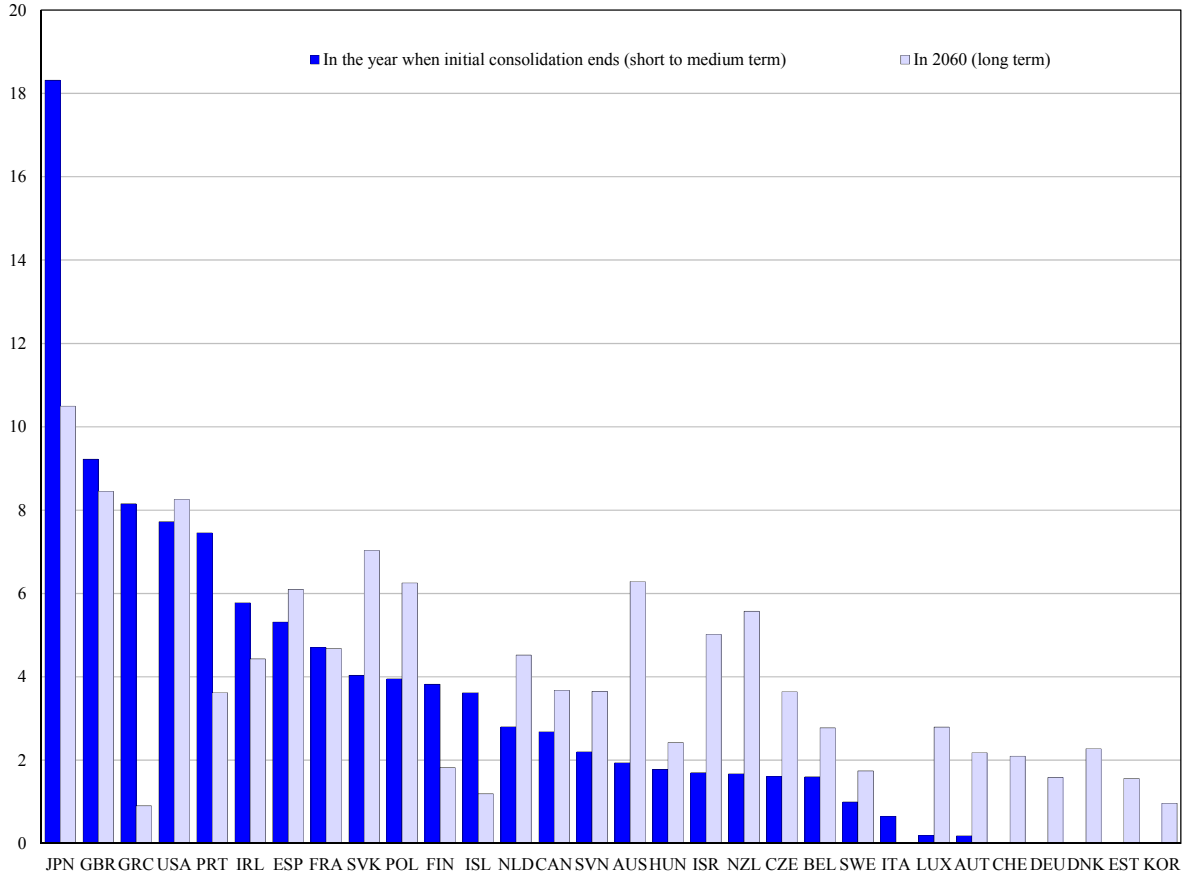
[1] This initial improvement at a fast pace, which generates a peak in the trajectory for the underlying primary balance, is needed in most but not all countries. Countries with a better starting fiscal position do not need such a peak. Nevertheless, the time path for the underlying primary balance always exhibits a kink (often, but not always, a peak), which provides the point where short- to medium-term consolidation needs are calculated.

Figure 3

Estimated Consolidation Needs at Different Time Horizons
(difference between debt-control and baseline underlying primary surplus, percent of potential GDP)



Source: *OECD Economic Outlook* of May 2013 long-term database and OECD calculations.

Estimates based on the approach described above suggest that in Greece, Japan, Portugal, Spain, United Kingdom and the United States, a short- to medium-term consolidation in excess of 5 per cent of potential GDP is required to reduce debt to 60 per cent of GDP by 2060 (Figure 3). This is the result of currently high debt levels (Greece, Ireland, Portugal, Spain) or their combination with large initial underlying primary deficits (Japan, United Kingdom, United States). To bring debt to the same level, another group needs short- to medium-term consolidation by more than 3 per cent of GDP — though less than 5 per cent — because of high debt levels (France, Iceland) or a significant underlying primary deficit (Finland, Poland, Slovak Republic). Other countries, including in particular Italy and Germany, face little or no short- to medium-term structural consolidation needs, though high debt in the former makes this conclusion vulnerable to interest rate changes. When needed, consolidation is in most cases relatively brief in the simulations: three out of four countries that require short- to medium-term consolidation complete it in four years or less. Many countries have made consolidation plans that go a long way toward meeting these consolidation needs (see OECD, 2013, for country-by-country projections of consolidation efforts in 2013 and 2014).

Consolidation needs are larger in the long than the short term for the majority of countries, with the difference particularly large in countries where short-term needs are limited thanks to low initial debt levels. The high estimated level of long-term consolidation needs reflects the large expected spending increases on health and long-term care. That said, since the cross-country variation in projected increases in government health spending is limited, it does not account for much of the differences in estimated long-term consolidation needs. The latter are primarily due to the starting point for the underlying primary surplus in 2012. Another significant source of differences is that the OECD long-term growth scenarios project interest rates rising well above nominal GDP growth rates by 2060, which leaves governments holding large amounts of financial assets with substantial capital income to service their debt. This effect reduces the estimated long-term consolidation needs of Canada, Finland, Japan, Korea and Norway by 2½ per cent of GDP or more compared with a situation where these countries' governments had no financial assets.

Estimates of consolidation needs are fraught with uncertainty and sensitive to the assumptions made and targets chosen. Cournède, Goujard and Pina (2013, Section 2) discuss sources of uncertainty and provide alternative estimates of consolidation needs, which can be summarised as follows:

- The estimated long-term consolidation needs are sensitive to the assumption that pension reforms keep government spending constant as a share of GDP in this area in the baseline. If instead public pension spending were assumed to increase in line with projections based on unchanged policies, long-term consolidation needs would be estimated to be much larger in many countries.
- Hypotheses regarding the use or not of government financial assets can influence estimated consolidation needs. A number of countries have large holdings of financial assets which can be sold to facilitate progress toward any gross debt targets, reducing estimated short- to medium-term consolidation needs. Asset draw-down strategies of this nature however come at the cost of increasing long-term consolidation needs as in the long run they leave governments with reduced recurring financial income.
- Estimates of consolidation needs are sensitive to the chosen level of the debt target. Aiming for instance at gross debt-GDP ratios of 100 per cent (instead of 60 per cent) by 2060 would reduce estimated to medium-term needs substantially. However, such a change in the debt target raises long-term consolidation needs significantly as governments would have to generate higher primary surpluses in order to ensure the stability of a larger stock of debt.

3 The effects of consolidation instruments on other policy objectives

3.1 Other policy objectives

While the point of fiscal consolidation is to reduce debt, it cannot ignore other policy objectives. The present study looks at the extent to which fiscal consolidation can proceed while minimising adverse effects on short-term growth, preserving long-term prosperity, avoiding exacerbating income inequality in the short and long term and contributing to global rebalancing. In addition to being an objective in its own right, equity may influence the sustainability of fiscal adjustment programmes. Consolidation strategies perceived as inequitable are more likely to be reversed and to fail to reduce debt.

The distinction made here between short- and long-term effects does not relate to specific time spans but to adjustment processes. Short-term effects correspond to the direct impact of measures as they are implemented. Long-term effects describe their consequences when cyclical adjustment has run its course and behaviour has responded fully to the measures.

Table 1

Instruments of Consolidation

Expenditure Cuts	Revenue Increases
Public consumption: education	Personal income taxes
Public consumption: health	Social security contributions
Public consumption: other (except family)	Corporate income taxes
Cash transfers: pensions	Environmental taxes
Cash transfers: unemployment benefits	Consumption taxes (non-environmental)
Cash transfers: sickness and disability	Recurrent taxes on immovable property
Public consumption and cash transfers: family	Other property taxes
Subsidies	Sales of goods and services
Public investment	

Source: Cournède, Goujard and Pina (2013).

3.2 Instruments

The instruments considered are policies that permanently affect government underlying primary spending and revenues. Government underlying primary spending is broken into ten categories, including four consumption items, three transfer items, subsidies, public investment (Table 1) and a residual item which is not considered as an instrument of consolidation. The expenditure breakdown broadly follows national accounts classifications with the difference that user charges are not netted out from government consumption. Instead, user charges are included among the eight consolidation instruments considered on the revenue side (Table 1). Cutting tax expenditures, a potentially large and attractive source of revenue, is nevertheless not included as an instrument because of the lack of sufficiently reliable and internationally comparable data across countries. Section 6 however discusses how reductions in tax expenditures can contribute to policy strategies that combine fiscal consolidation with structural reform.[2]

3.3 The effects of instruments on objectives

An attempt is made at evaluating the effect of revenue increases and expenditure cuts on growth, equity and global rebalancing objectives. The effects of instruments on the current account are also evaluated because consolidation strategies should take into account coordinated efforts in multilateral settings such as the G20 to achieve balanced growth at the global level. For the purpose of this exercise, the instruments are assessed on their own, without considering how their side-effects on long-term growth and equity could be minimised through structural reforms in the

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[2] In Section 2 of Appendix 2, Cournède, Goujard and Pina (2013) provide details on the definition of the categories, on the sources used and on the methods employed to gather data from different sources in a way that adds up to government primary spending as recorded in national accounts.

tax or spending area under consideration, other structural reforms, or redistributive policies. The distinction between purely fiscal changes and structural reform is obviously not so clear cut in practice.[3] Still, it is useful insofar as it allows for an assessment of the side-effects that some consolidation instruments can imply for other policy objectives (this section) before discussing the benefits of joint policy strategies that combine consolidation with structural reform (Section 6).

The present assessment builds on previous work by the OECD and the wider literature complemented by new estimates presented in Cournède and Barbiero (2013). Table 2 summarises this assessment, and the main points are discussed below while additional details about the evaluation of individual instruments are described in Cournède, Goujard and Pina (2013, Appendix 2, Section 3). Besides showing the estimated direction of the effect, some crude indications of the relative strength are also provided, based on empirical evidence.

3.3.1 Long-term growth effects

A number of fiscal consolidation instruments can enhance the long-term level of output. Evidence suggests that, in advanced economies in general, reducing the size of government up to a point increases long-term output although there is clearly no consensus on what constitutes the optimal size of the public sector even from a strict efficiency point of view. This output-enhancing effect of reducing government spending is likely to be stronger in areas such as subsidies[4] where public expenditure frequently distorts the allocation of resources in the economy. Similarly, cuts in public spending that can prompt a positive response of labour utilisation, such as in pensions, are likely to have a particularly favourable effect on the long-term level of output per capita. Reductions in public spending on unemployment benefits can also boost employment and output per capita insofar as they do not bring unemployment insurance down to a level prompting inefficient employee-job matches that could curb productivity. Cuts in disability payments can boost labour utilisation (Hagemann, 2012) although this effect will arise only insofar as workers with significant residual capacity are receiving disability assistance.

Some revenue measures can also contribute positively to long-term output when they promote more efficient use or allocation of services or resources that were previously inadequately priced. To the extent that their current levels correspond to under-pricing, higher user charges reduce the waste of economic resources, thereby boosting productivity and output (de Serres *et al.*, 2010). Better pricing the use of environmental services through taxation can also lead to welfare gains through improved environmental amenities that are not measured in GDP.

In contrast, other consolidation instruments can reduce the productive potential of economies. At a general level, raising the tax burden tends to reduce factor supply and long-term output (OECD, 2003; Bouis *et al.*, 2011). Evidence on the impact of the tax structure (Johansson *et al.*, 2008; Bouis *et al.*, 2011) indicates that taxes on mobile or adjustable production factors affect aggregate supply with particular severity. In the present classification of instruments, personal income taxes, social security contributions and corporate income taxes fall into this category. Other taxes such as value-added or consumption taxes have proven to exert still meaningful but less strong distortionary effects (Johansson *et al.*, 2008).

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[3] On the spending side, for instance, cuts in education spending achieved through reduced service provision can be described as pure budgetary measures whereas efficiency gains that can maintain a similar level of service for lower costs represents structural reform. On the revenue side, one example where the distinction is clear is indirect taxation where an increase in the standard VAT rate can be seen as a pure fiscal change while measures such as reducing the reliance on reduced rates and exemptions are part of structural tax reform. One example where the distinction is difficult to make is unemployment insurance where almost any form of reduction in benefits will amount to a change in structural policy settings.

[4] Some categories of subsidies, however, can work in the direction of raising growth potential. In particular, government subsidies can encourage business research and development activities where the social rate of return exceeds the private rate of return because of cross-company spillovers (Jaumotte and Pain, 2005).

Table 2

Summary Assessment of Growth and Equity Effects of Fiscal Consolidation Instruments

	Growth		Equity		Current Account[(a)]
	Short-term	**Long-term**	**Short-term**	**Long-term**	**Short- to Medium-term**
Spending cuts					
Education	--	--	-	--	+
Health services provided in kind	--	-	-	-	++
Other government consumption (excluding family policy)	--	+	-		+
Pensions		++			++
Sickness and disability payments	-	+	--	-	++
Unemployment benefits	-	+	-		++
Family	-	-	--	--	+
Subsidies	-	++	+	+	+
Public investment	--	--			++
Revenue increases					
Personal income taxes	-	--	+	+	+
Social security contributions	-	--	-	-	
Corporate income taxes	-	--	+	+	++
Environmental taxes	-	+[(b)]	-		+
Consumption taxes (other than environmental)	-	-	-		++
Recurrent taxes on immovable property	-				+
Other property taxes	-		++	+	+
Sales of goods and services	-	+	-	-	+

Note: (a) Current-account effects refer to a deficit country, and would switch sign in the case of a surplus country. (b) This + sign reflects positive welfare effects as the long-term impact on output narrowly defined as GDP may be ambiguous.
Source: see main text and Section 3 of Appendix 2 in Cournède, Goujard and Pina (2013).

Spending reductions can entail potentially large long-term losses in output when they cut into areas where governments provide particularly valuable public goods or growth-enhancing services that are insufficiently produced by market forces. Empirical evidence (OECD, 2003; Sutherland and Price, 2007) suggests that cuts in public investment or government spending on education broadly fall into this category. As developed in Section 6, cuts in government investment or education that respectively focus on low-externality projects or are accompanied by education reform can have more limited, or even favourable, growth effects. However, as mentioned earlier, the simple assessment summarised in Table 2 is concerned only with plain fiscal changes without structural reform, implying a lower provision of public goods and services. Cuts in health care can also reduce output per capita by reducing labour supply and productivity. When controlling for taxes, public health spending appears to have a positive, albeit moderate, effect on output per capita (Barbiero and Cournède, 2013).[5] Through its contribution to well-being, health spending is most likely to have additional positive welfare effects that are not measured in GDP.

Cuts in childcare can reduce output per capita primarily by depressing labour force participation (OECD, 2007). Reductions in family benefits have a more ambiguous effect on output per capita through two channels that work in opposite directions. Firstly, they can prompt greater labour market participation, boosting output per capita. Secondly, such cuts can increase child poverty (Whiteford and Adema, 2007), hampering the formation of human capital and resulting in durably lower long-term output per capita. Overall, the net effect of cuts in the aggregate of childcare and family benefits on long-term output per capita is likely to be negative. Some consolidation instruments are likely to have neutral or very weak long-run effects on output. Such is the case of taxes with relatively low distortive effects, such as property taxes (Johansson *et al.*, 2008).

3.3.2 Short-term growth effects

Most fiscal consolidation instruments are harmful for growth in the short run, but there are differences among them and a few exceptions. Although the vast literature on fiscal multipliers has not achieved consensus, international experience suggests by and large that they are highest for public investment and government consumption and substantial but smaller for transfers and taxes (Figure 4; OECD, 2009; Barrell *et al*, 2012). The main reason behind this difference is that changes in government investment and consumption affect activity directly while the effects of changes in taxes and transfers transit through the accounts of households and firms, offering greater possibilities for offset from saving behaviour. Consistent with this ranking, empirical evidence indicates that private-sector offsets from changes in government balances depend on their composition and are strongest for revenues, intermediate for spending and weakest for investment (Röhn, 2010).

The short-term output effects of instruments will depend on their design. In most cases, this design dependence does not preclude a broad assessment of their effect, but as far as cuts in pension spending are concerned, even the direction of the impact can change depending on how they are implemented. If cuts fall on current pensioners, they correspond to a reduction in transfers and are likely to affect output with a similar multiplier. In contrast, if pension spending is cut by raising the retirement age including for workers close to this age when the change is implemented, some positive demand effects are possible (Kerdrain *et al.*, 2010) at the same time as supply expands, with an ambiguous net effect on the degree of economic slack.

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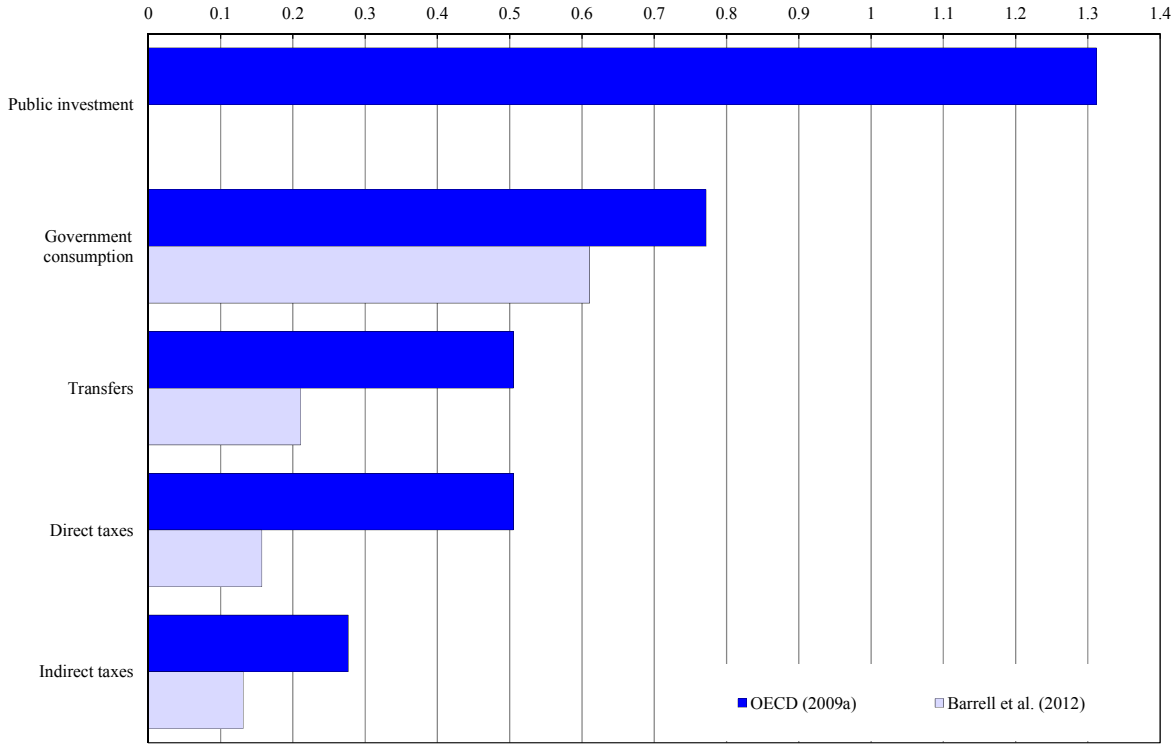
[5] Although part of the empirical literature finds a negative effect of public health spending on GDP per capita, this appears to be related to the output cost of the associated taxes which the present study considers separately (see for instance Box 6.1 in OECD, 2011a).

Figure 4

Estimates of Short-term Fiscal Multipliers for Different Consolidation Instruments

(GDP contraction from a permanent 1 percentage-point increase in the underlying primary balance, percent)



Note: the effects plotted in the chart are unweighted averages of country estimates reported in the quoted documents. The effect is averaged over the first and second years of consolidation for OECD(2009) estimates and refers to the first year for Barrell *et al*.'s (2012) estimates. The simulations underlying Barrell *et al*.'s (2012) multipliers assume unchanged monetary policy in the year of the fiscal shock, but they incorporate the positive output effect of a fall in long-term interest rates resulting from the anticipation of a more accommodative monetary-policy path in the years following the shock. No multiplier estimate is available for public investment in Barrell *et al.* (2012).

In countries that are experiencing confidence crises because of their fiscal positions, the estimated multipliers reported above, which are calculated as historical averages, may not apply to their current circumstances. In fiscal-crisis countries, the absence of consolidation could translate into a massive loss of confidence triggering economic collapse. If it helps avoiding such extreme counterfactual scenarios, consolidation may be highly expansionary. There is also a possibility that, in such circumstances, different instruments may have different expansionary effects, notably by signalling the degree of determination of public authorities and thereby the likelihood that consolidation may be maintained. In particular, cuts in spending areas that raise serious political-economy challenges, such as subsidies, has been found to increase the probability of large consolidations to be successful (Molnar, 2012). There is however no consensus on the existence of these potential expansionary effects of consolidation, on their strength, on measuring when they may apply and how they may differ across instruments at a disaggregated level. For these reasons, these potential expansionary effects are not integrated in the assessment but should be seen as caveats regarding the extent to which the summary assessment presented in Table 2 applies to actual or potential crisis countries.

3.3.3 *Effects on equity*[6]

Many consolidation instruments work in the direction of aggravating income inequality (Table 2). Transfers in particular have strong redistributive power so that cuts in benefits are generally regressive, perhaps with the exception of public pensions where the equity effect is likely to be muted in countries where they are based on earned income and close to actuarial neutrality. Reducing the provision of public services likewise contributes to increasing inequality in effective consumption (OECD, 2011b).[7] Also, a number of taxes fall more heavily on lower-income households, with the implication that increasing them would raise disposable income inequality.

Some fiscal consolidation instruments, on the other hand, can reduce income or wealth inequality. Such is particularly the case of hikes in inheritance and capital gains taxes, which the classification used in the present study includes among "other property taxes".[8] Increasing taxes that are typically designed to be progressive, such as personal income taxes, also goes in the direction of reducing disposable income inequality. The same holds for hikes in revenue instruments that are concentrated on capital income such as corporate income taxes (although some of their burden also falls on labour).

The equity implications of fiscal consolidation instruments can also evolve as behaviour responds to fiscal changes. Cuts in unemployment insurance payments, disability benefits or other social assistance programmes that are partly used as a way of withdrawing from the labour market can over time foster greater labour force participation. Since labour income tends to be greater than benefit payments, the supply response will work over time to reduce the regressive impact of cuts. On the tax side, environmental taxes, although they tend to be regressive in the short term, provide benefits that accrue in priority to low-income groups as those are more exposed to environmental degradation (Serret and Johnstone, 2006). Some of these effects, such as better health allowing greater labour supply, are reflected in higher measured income. Other often lagged effects such as improved well-being from better environmental conditions are not reflected in income distribution data. Consumption taxes, which are regressive in the short term because low-income households save a smaller share of their income than better-off ones, are neutral in a lifetime perspective taking into account the period when former savers spend what they previously accumulated. Finally, the redistributive benefits of some consolidation measures can wane over time as individuals put in place effective avoidance strategies as appears to be the case for inheritance taxes (Kopczuk, 2007).

3.3.4 *Short- to medium-term effects on the current account*

At a broad level fiscal consolidation works to push the current account towards a surplus over the short to medium term, but different instruments can have different effects depending on how they shape private saving and investment decisions. The impacts of individual consolidation instruments over and above the general macro-economic effect are assessed based on the results

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[6] The assessment of the effect of instruments on income inequality draws largely on OECD (2012) and Rawdanowicz *et al.* (2013). Supporting material for the broad assessment summarised here is provided in Appendix 2, Section 3 of Cournède, Goujard and Pina (2013).

[7] The study however incorporates no assessment of the impact of public investment on inequality. At a conceptual level, the effect is ambiguous. By providing the basis for public capital services that are consumed without relation to income, public investment should promote equality in effective consumption. On the other hand, inasmuch as public capital is complementary to private capital and boosts returns on capital, it could work in the direction of exacerbating income inequality because of the concentration of control over private capital. While there is evidence in favour of net equality-enhancing effects of public investment in developing countries, there are no comparable findings for OECD countries.

[8] No positive or negative assessment is included for real estate taxes because of a lack of clear evidence. In most OECD countries, lower-income households pay a higher share of their income in recurring property taxes than higher income taxes, so that on this count recurring property taxes might be described as regressive. However, this situation largely reflects larger home ownership among retirees, implying that recurring property taxation is not necessarily regressive in a dynamic perspective, and may even be progressive if adjusting income fully for the market value of owner-occupied housing services.

reported in Kerdrain *et al.* (2010). Reductions in health care spending and in unemployment or disability benefits are likely to strengthen the current account through increased precautionary saving, whereas cutting pension benefits should lead to higher saving by the working-age population to smooth consumption over the life cycle. An increase in corporate taxation could improve the current account through lower investment (Schwellnus and Arnold, 2008; Vartia, 2008). Higher consumption taxes tend to penalise imports relative to exports, and thus may temporarily strengthen the current account, while the opposite holds for social security contributions.

3.4 A generic hierarchy of instruments

Based on the estimated impacts reported above, a generic hierarchy of consolidation instruments can be established (Figure 5). This is done simply by putting the same weight on each objective, assigning numerical values to the pluses and minuses and using the resulting scores to rank the instruments. The generic hierarchy puts no weight on the current-account because the pursuit of global rebalancing operates in opposite ways depending on the sign of the imbalance and not at all in countries that have broadly balanced positions. Instead, current-account effects enter at a more country-specific level (see further below).

A long-term variant of the generic hierarchy can also be established for the purposes of looking solely at very long-term consolidation strategies by considering only to long-term growth and equity effects. In this long-term variant, the instruments follow this ranking: 1) Subsidies, 2) Pensions, 3) Other government consumption, Unemployment benefits, Environmental taxes and Other property taxes, 7) Sickness and disability payments, Recurrent taxes on immovable property and Sales of goods and services; 10) Consumption, Personal income and Corporate income taxes; 13) Public Investment, Health services; 15) Family policy and Social security contributions; 17) Education.

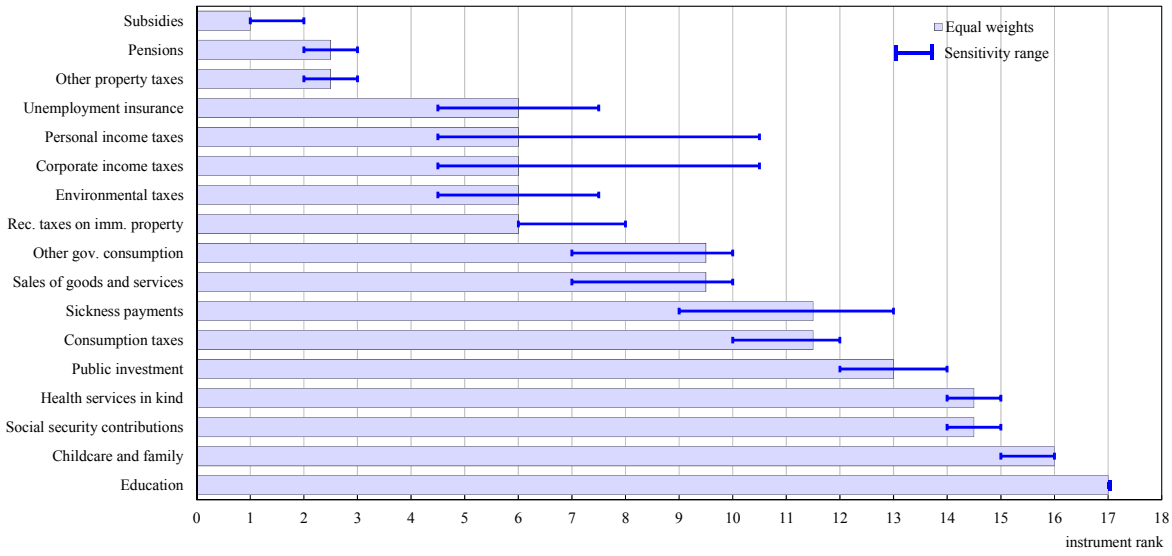
Figure 5 also illustrates the sensitivity of instrument rankings to different weighting schemes and to uncertainty about the assessment of effects. A certain degree of sensitivity is indeed observed as instruments score differently across objectives, but the ranking of most instruments remains broadly stable in particular at both ends of the spectrum (Figure 9). Reductions in subsidies and in pension spending as well as increases in other property taxes come out robustly as preferred consolidation instruments. At the lower end, spending cuts in the areas of education, health care and family policy, as well as hikes in social security contributions, appear as particularly unfavourable in terms of generating adverse side effects for growth and equity. In contrast, the middle part of the ranking is more fluid. Hikes in corporate and personal income taxes can take different places in the ranking depending on the weights given to objectives, reflecting that they raise severe trade-offs between output and equity considerations.

In addition to the arbitrary nature of the scoring and weighting scheme, considerable caveats surround the rankings above. They are based on an assessment of equity and growth effects of consolidation instruments which is drawn primarily from studies that estimate average effects in historical experience across countries. In practice, however, the growth and equity effects of instruments vary across countries: for instance, cutting investment in new roads in a country where highway density is already high should be less harmful to long-term growth than in a country with severe infrastructure gaps. Taking this cross-country variation into account is beyond the scope of this study, but it nonetheless goes beyond a pure one-size-fits-all approach. More specifically, the economic and social situation of countries in need of consolidation is taken into account by changing the weight of the different objectives, as is developed below. Also, the way in which the room for manoeuvre is evaluated for each instrument takes into account whether or not the level of taxation or spending in this area is particularly high in the country under consideration.

Figure 5

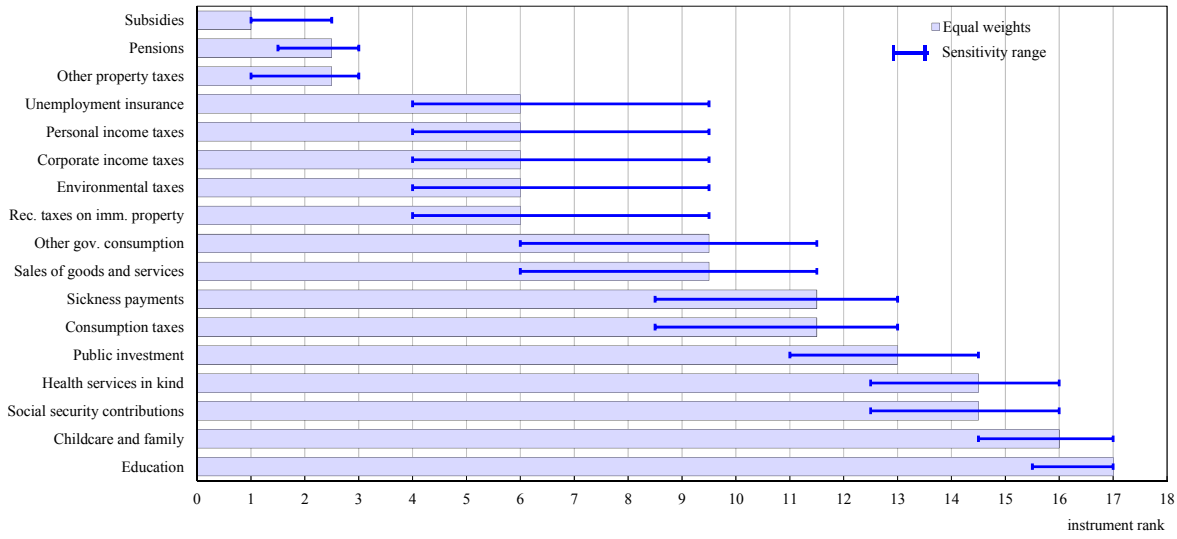
A Possible Generic Hierarchy of Consolidation Instruments and Its Sensitivity to Assumptions

A) Sensitivity to Uncertainty About the Weights Given to Objectives



Note: The rankings are based on the assessment in Table 2. Scores of +1 and -1 are given to each + and- signs respectively, each objective (except the current account) is given a weight, and the resulting indicator is used to rank instruments. For deriving ranges, weights ranging each from 0.15 to 0.55 and summing to unity have been given to each objective in 10,000 random draws. Weights have been restricted to no smaller than 0.15 because each objective is considered important. The sensitivity range displays the 10th and 90th percentiles of the instrument rankings.

B) Sensitivity to Uncertainty about the Assessment of Instruments (Pluses and Minuses) in Table 2



Note: The rankings are based on Table 2. Scores of +1 and -1 are given to each + and- signs respectively, each objective (except the current account) is given a weight of one quarter, and the resulting indicator is used to rank instruments. For deriving ranges, each individual instrument score along each objective shown in Table 2 is kept with a probability of ¾ or increased by +1 with a probability of ⅛ or reduced by -1 with a probability of ⅛ using in 10,000 random draws. The sensitivity range displays the 10th and 90th percentiles of the instrument rankings.

4 Adjusting instrument rankings for country-specific circumstances over the short to medium term

The generic hierarchy is adapted to country-specific circumstances by adjusting the weights put on growth, equity and global rebalancing objectives. Summary indicators are defined for each of the growth, equity and current account dimensions, and then used to compare country situations and form country groups. This makes it possible to derive a set of weights for each group and therefore a hierarchy of instruments for each group. While technically feasible, a country-specific ranking of instruments would give a false impression of accuracy with respect to country-specific instrument impacts and risk obscuring the substantial uncertainties and error margins of the exercise.

The group-specific rankings derived here will guide the choice of instruments for short- to medium-term consolidation in the illustrative simulations. In the long run, however, a single hierarchy of instruments (presented in Section 3) is assumed to apply. As further addressed below, this is because some of the dimensions taken on board to form country groups lose relevance as the time horizon expands (e.g., short-run growth and current account imbalances) while a solid basis is absent for giving differentiated weights to long-run growth impacts.

4.1 Characterising country circumstances

4.1.1 Short-run growth

This study attaches different weights to the short-run growth impacts of fiscal retrenchment depending on the degree of cyclical weakness faced by countries and their vulnerability to hysteresis.[9] A deeper negative output gap makes any short-run output losses from consolidation more painful, especially if fiscal multipliers of the Keynesian kind have become larger under such circumstances. Indeed, some recent studies find multipliers to be larger in recessions than expansions (Auerbach and Gorodnichenko, 2012; Baum *et al.*, 2012), particularly in a context of financial crisis with monetary policy constrained by the zero nominal interest rate bound (IMF, 2010; Christiano *et al.*, 2011; Corsetti *et al.*, 2012). In turn, hysteresis effects could translate short-run slack into permanently lower levels of potential output through channels such as higher structural unemployment and a smaller capital stock (Bouis *et al.*, 2012). The degree of trade openness influences multipliers and could be invoked as an argument for a lower weight on short-run activity in more open economies. However, this consideration is not allowed to affect rankings to avoid a beggar-thy-neighbour approach to consolidation, given that fiscal adjustment involves strong cross-country spillovers (Goujard, 2013).[10] Box 2 presents the indicator used to measure country circumstances.

4.1.2 Long-term growth

Assessing for which countries fiscal policy needs to be more supportive of long-run growth, with a concomitantly larger weight given to this objective, would be a hazardous task. Using weaker growth prospects as an argument for a larger weight runs into the difficulty that long-term growth projections are inevitably fraught with uncertainty and depend to a significant degree on policy assumptions in a wide range of areas, such as education, retirement age or product market

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[9] Besides affecting the choice of fiscal instruments, short-run growth impacts also have important implications for the optimal pace and timing of consolidation (Rawdanowicz, 2012), an issue from which this paper largely abstracts.

[10] Nevertheless, the generic ranking to some extent reflects whether activity impacts occur domestically or abroad because one of the reasons why multipliers vary across instruments is that they have different import propensities.

Box 2
Indicators Used to Characterise Country Circumstances

The following indicators are used to characterise country circumstances:

- Short-run growth: The average of two variables, the output gap in 2012 and the 2007-12 percentage point change in the long-term unemployment rate, is used as a synthetic indicator. The run-up in long-term unemployment is used as proxy of vulnerability to hysteresis, since it is a key variable in the transmission of short-run labour market slack to structural unemployment (Guichard and Rusticelli, 2010). While in principle levels would also provide an indication of the degree of hysteresis risk, the change is used in order to focus on impacts from the current crisis rather than pre-existing structural characteristics. The latter are better addressed through structural reforms in labour markets as well as in product markets and tax and welfare systems.
- The summary indicator used to capture inequality is the average of two statistics: the Gini coefficient and the relative poverty rate (defined as the share of the population with income below 60 per cent of the median). While the Gini coefficient encapsulates the whole income distribution, the relative poverty rate focuses on the lower tail. These two indicators are computed after taxes and cash transfers.
- External imbalances are assessed using Ollivaud and Schwellnus (2013) estimates of cyclically-adjusted current account balances, which correct headline balances for the difference in output gaps between countries: a country facing a deeper downturn than its trading partners will temporarily tend to post a headline current account stronger than the adjusted one, as imports become more depressed than exports. The summary indicator used is the average of two variables: the adjusted current account balance in 2012 as a percentage of both national GDP, and the same balance as a percentage of OECD GDP. The ratio of the cyclically adjusted current-account balance to OECD GDP, which captures the absolute size of imbalances, serves a proxy for their global implications which countries are assumed to internalise as part of the global rebalancing agenda.

To ensure comparability and avoid scale effects, the variables entering the indicators are normalised by subtracting their average and dividing the result by the standard deviation.

Source: Cournède, Goujard and Pina (2013).

and trade regulations (Johansson *et al.*, 2013). The long-term growth impacts of fiscal consolidation instruments are therefore deemed equally important for all countries.

4.1.3 Income distribution

The impacts of fiscal instruments on income distribution arguably gain increased prominence in more unequal countries. The links between inequality, growth and welfare are admittedly complex, and, to some extent, inequality differences across countries are rooted in social preferences, so that strong opposition to regressive changes might arise at comparatively low levels of inequality in strongly egalitarian societies. Still, beyond certain levels, inequality, and particularly poverty, may be bad for growth. Channels of transmission of inequality's detrimental effects include hampered investment in human capital, an area where inequalities can be self-perpetuating (Causa and Johansson, 2009; Hoeller *et al.*, 2012).

4.1.4 Current account balances

Addressing significant external imbalances is also a widely shared objective of economic policy (G20, 2009), which calls for taking account of the current account impacts of different budget items when designing consolidation strategies. Imbalances carry risks for the individual countries concerned (the prospect of a hard landing for debtors, or growing credit risk for surplus countries), all the more so when they are particularly large, but also for the global economy (OECD, 2012a).

4.2 Hierarchies of instruments for groups of countries

A cluster analysis has been performed to identify groups of countries that share similar characteristics regarding short-term growth, equity and external imbalances (see Box 3 in Cournède, Goujard and Pina, 2013 for details about the clustering technique employed). Based on the summary indicators discussed above, five clusters have been identified:

1) The first cluster is formed by eleven geographically dispersed countries (Australia, Canada, Estonia, Israel, Italy, Japan, Korea, New Zealand, Poland, Portugal and the United Kingdom), which mainly have in common above-average levels of inequality. Short-term growth risks are generally moderate (Italy and Portugal being exceptions) and current account positions, though with considerable heterogeneity, do not include cases of extreme imbalances and are on average fairly close to balance.
2) The United States finds itself alone in the second cluster, as the sheer absolute size of its current account deficit places it at a considerable distance even from other deficit countries. Inequality is high and cyclical developments carry potentially substantial hysteresis risks although the materialisation of these risks would run counter to historical experience.
3) The third cluster comprises three euro area members from the geographical periphery (Greece, Ireland and Spain) sharing very high cyclical slack and hysteresis risks. Greece and Spain (but not Ireland) also display above-average inequality and large underlying external deficits.
4) A fourth cluster is formed by eleven European countries: Austria, Belgium, the Czech Republic, Denmark, Finland, France, Hungary, Iceland, Norway, Slovakia and Slovenia. It is the most egalitarian cluster. As in the first group of countries, current account imbalances are on average small, though with significant intra-group heterogeneity,[11] and short-term growth risks are generally moderate.
5) The fifth and final cluster comprises five countries, Germany, Luxembourg, the Netherlands, Sweden and Switzerland, all with large current account surpluses. Inequality levels are below-average and short-term growth vulnerability risks are among the lowest in the OECD.

For each of these clusters, specific weights are calculated for the short-term growth, equity and current-account objectives (Table 3). The weights depend on the degree to which each objective is relevant for the cluster as a whole in comparison with the other objectives (but do not compare the importance of each objective across different clusters of countries). For instance, short-run growth will attract a strong weight in groups of countries where cyclical weakness and hysteresis risks – whether very high in themselves (cluster no. 3) or only moderate (cluster no. 4) – are clearly a more important concern than equity or current account issues. Similarly, the high weight attached to the current account objective in cluster no. 5 stems from the contrast between

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[11] As is well known, Norway has a huge current account surplus (at an estimated 17 per cent of 2012 GDP in cyclically adjusted terms). However, unlike the other surplus countries covered by this study, this large positive current-account balance is largely due to the exploitation of finite natural resources (oil and gas). As the Norwegian external position reflects exceptional circumstances, it has not been taken into account when forming clusters.

Table 3

Weights Put on the Growth, Equity and Current Account Dimensions Across Groups of Countries

Cluster	Countries	Growth		Equity		Current Account
		Short Term	Long Term	Short Term	Long Term	Short Term
1	Australia, Canada, Estonia, Israel, Italy, Japan, Korea, New Zealand, Poland, Portugal, United Kingdom	0.13	0.25	0.30	0.30	0.01
2	United States	0.13	0.25	0.21	0.21	0.20
3	Greece, Ireland, Spain	0.29	0.25	0.18	0.18	0.10
4	Austria, Belgium, Czech Republic, Denmark, Finland, France, Hungary, Iceland, Norway, Slovak Republic, Slovenia	0.47	0.25	0.14	0.14	0.00
5	Germany, Luxembourg, Netherlands, Sweden, Switzerland	0.12	0.25	0.15	0.15	0.33

large surpluses and mostly benign short-term growth and equity outlooks. As mentioned above, the same weight (25 per cent) is given to long-term growth in all clusters. These cluster-specific weights are used to aggregate the pluses and minuses reported on Table 2 and give score to instruments and rank them.

Table 4 displays the ensuing cluster-specific instrument rankings. Rank variation across country groups is smallest for those instruments that have similar impacts on virtually all objectives, such as education, subsidies or property taxes, and widest for instruments with the sharpest trade-offs between growth, equity and the current account. For instance, personal and corporate income taxes come out as good candidate instruments for cluster 1, where equity objectives carry a high weight, but much less so for groups of countries such as those forming clusters 4 and 5 where relatively equal income distribution is assumed to lead to less emphasis on outcomes in this area.

5 How far down instrument rankings do countries need to go? Some illustrative simulations

In this section simulations are performed to investigate how far down instrument rankings countries will need to go in order to meet their consolidation needs. Countries are assumed to implement budget tightening according to the relevant instrument ranking, i.e., to start by adjusting the most beneficial (or least detrimental) instrument and only proceed down the list after exhausting the estimated room for manoeuvre available in the preceding instrument. In practice, implementing this approach would raise political-economy challenges: the top ranking instruments tend to be either streams of spending accruing to politically powerful constituencies, such as subsidies or pensions, or forms of taxation where planned increases often meet with strong resistance, such as property taxes. Nonetheless, it may still provide a useful benchmark for considering a consolidation strategy.

Table 4

Possible Hierarchies of Consolidation Instruments for Groups of Countries

Instruments	Generic Ranking	Cluster-specific Ranking					Long-term Ranking
		1	2	3	4	5	
Subsidies	1	1	1	2	2	1	1
Pensions	2-3	3	2	1	1	3	2
Other property taxes	2-3	2	3	3	3	2	3-6
Unemployment benefits	4-8	7	4	4	4	9	3-6
Personal income taxes	4-8	5	8	9	9-10	8	10-12
Corporate income taxes	4-8	4	5	7	9-10	12	10-12
Environmental taxes	4-8	8	6	5	4	4	3-6
Recurrent taxes on immovable property	4-8	6	7	6	6	5	7-9
Other government in kind consumption	9-10	9	9	11	11	6	3-6
Sales of goods and services	9-10	10	10	8	7	7	7-9
Sickness and disability payments	11-12	13	11	10	8	11	7-9
Consumption taxes (other than environmental)	11-12	11	12	12	12	13	10-12
Public investment	13	12	13	13	15	15	13-14
Health services provided in kind	14-15	14	14	14	16	16	13-14
Social security contributions	14-15	15	16	15	13	10	15-16
Family	16	16	15	16	14	14	15-16
Education	17	17	17	17	17	17	17

Note: The rankings are based on the assessments in Table 2 with scores of +1 and -1 given to each + and – signs, respectively, and weights resulting from the cluster analysis (see Cournède, Goujard and Pina, 2013). The current account scores of Table 2 switch sign for surplus clusters. The long-term ranking in the final column is based on equal weights given to impacts on long-term growth and equity. Cluster 1 regroups Australia, Canada, Estonia, Israel, Italy, Japan, Korea, New Zealand, Poland, Portugal and the United Kingdom. Cluster 2 includes only the United States. Cluster 3 comprises Greece, Ireland and Spain. Cluster 4 is formed by Austria, Belgium, the Czech Republic, Denmark, Finland, France, Hungary, Iceland, Norway, Slovakia and Slovenia. Cluster 5 is made up by Germany, Luxembourg, the Netherlands, Sweden and Switzerland.

The analysis is conducted separately for the short to medium term and for the long term, and requires three building blocks, themselves differentiated according to the respective time dimension: *i)* estimated consolidation needs for both horizons, as presented in Section 2; *ii)* a hierarchy of instruments, which is common to all countries in the long-run simulation (as presented in section 3) but varies across clusters in the short to medium term (Table 4 and Section 4); *iii)* estimates of the available margin for adjustment in each instrument, which is discussed next.

5.1 Room for manoeuvre in instruments[12]

Although it is an important building block when drawing up an illustrative consolidation plan, estimating the room for manoeuvre for each policy instrument – or, put differently, the margin of feasible adjustment – is necessarily judgemental. As such, it can only be done in an indicative and approximate way that is to some degree arbitrary. In a cross-country setting, it is impossible to fully account for the economic circumstances, social preferences and institutions which, in each country, shape the relative size of budget items. At one extreme, it could be assumed that the current structure of budgets already equalises the marginal costs and benefits of adjusting the different instruments (whose growth and equity impacts vary across countries, as acknowledged above), and is therefore optimal. If so, consolidation should be pursued, at least at the beginning, through a proportional adjustment of budget items. At another extreme, the budget structure status quo, hard to change as it may be, could be viewed as the suboptimal outcome of political and institutional distortions, the correction of which would require sweeping changes. For instance, it could be the case that property taxes should be increased further even in countries where they are already high by international comparison.

This exercise attempts to strike a balance between the above considerations by assuming that there is some margin, albeit limited, to scale back expenditure items that are large relative to a significant number of other OECD countries and similarly to increase revenue streams that are relatively low. One reason for not pushing adjustment along each individual item too far is that the positive and negative assessments underpinning the rankings can be expected to be most reliable in relatively standard situations. The effects may change if adjustment along one item takes a country to a more extreme situation. For instance, up to a point reducing spending on unemployment benefits improves incentives to take up a new job and boosts long-term output through higher employment, but if cuts are pushed too far they can impair the quality of labour market matches and harm output through lower productivity while also resulting in insufficient macroeconomic stabilisation. On the tax side, marginal rate increases from a high starting point are more distortive than from a low-rate baseline. At the same time, social preference and political feasibility considerations call for putting an upper bound on the amount of change to any spending cuts (tax hikes) in a given item, no matter how high (low) the departure point is.

In operational terms, two constraints are imposed on instrument use. First, the simulations assume that a spending instrument can be used up until the point where the country would join the group of the ten covered OECD countries where governments spend least, relative to GDP, in the area under consideration. Similarly, a revenue-side instrument can be used by hiking taxes or raising user charges until it would make the country one of the top-ten OECD countries in terms of revenue raised from this particular tax or charge relative to GDP. This constraint implies that each instrument is unavailable to one third of the covered countries. Secondly, an additional constraint is imposed on the room for manoeuvre by stipulating that a change in an instrument cannot exceed the standard deviation of the cross-country distribution of the GDP share of the instrument. This

[12] More detailed information on the assumptions and methodology used to define the room for manoeuvre for individual instruments is found in Box 4 of Cournède, Goujard and Pina (2013).

BOX 3
DEFINING THE ROOM FOR MANOEUVRE FOR EACH INSTRUMENT

Simulations assume that room for manoeuvre exists in a revenue instrument if a country does not belong to the group of ten OECD countries with the highest ratio of receipts from this tax to GDP. In technical terms, room for manoeuvre is available if the country is below the 66th percentile in the cross-country distribution of cyclically-adjusted receipts from this instrument as a share of potential GDP. Similarly, room for manoeuvre on the spending side exists if a country is above the 33rd percentile in the cross-country distribution of cyclically-adjusted spending on this instrument as a share of potential GDP. The room for manoeuvre is given by *i)* the gap between the value in the country under consideration and the 66th or 33rd percentile or by *ii)* the standard deviation of the cross-country distribution of the instrument at hand, whichever is smallest. It turns out that this simulation design imposes only a moderate degree of convergence in budget structures across countries.

A few additional adjustments have been made to makes the simulations more realistic:

- Spending on pensions, education and unemployment benefits as a share of potential GDP has been corrected for the number of potential beneficiaries, defined in terms of age cohorts or labour market status. For instance, this acknowledges that, all else equal, a higher NAIRU implies a smaller room for manoeuvre in reducing the unemployment benefits bill.
- Further to the above correction, a special adjustment is made to reduce the available room for cuts in pension spending to acknowledge that the baseline already incorporates significant effort. More specifically, the reform effort already incorporated into the baseline is deducted from the room for manoeuvre in this area. In addition, in the short to medium term, the room for manoeuvre is set at a quarter of its long-run value, as the budget savings from most measures in this area (e.g., raising the retirement age, or lowering the replacement rate for new retirees) will only accrue gradually over time.
- Leeway for raising personal income tax and social security contributions is assessed by looking at these two revenue sources jointly because of their strong substitutability. For instance, a country that raises very low amounts of social contributions may nevertheless have little room for manoeuvre along this instrument if it has very high personal income taxation, as is the case in Denmark.

Cournède, Goujard and Pina (2013) provide additional detail about the calculation of the room for manoeuvre.

constraint is aimed at avoiding too radical shifts in budget composition that may be interpreted as conflicting with social preferences as reflected in existing budget structures. Box 3 provides more information about the way in which the room for manoeuvre is estimated while Cournède, Goujard and Pina (2013) present the methodology in full.

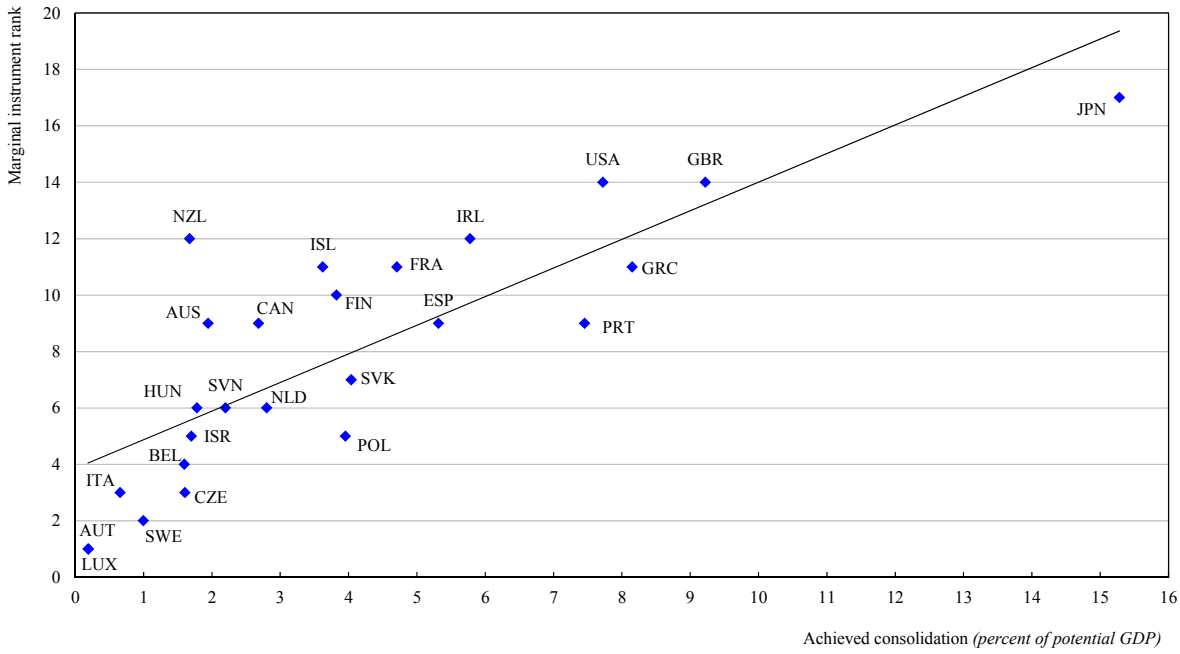
5.2 Meeting consolidation needs

5.2.1 Short- to medium-term consolidation needs

Under the simulation design outlined above, almost all countries have scope to meet their short- to medium-term consolidation needs within the constraints put on instrument use. The only

Figure 6

Marginal Instrument Rank and Achieved Short- to Medium-term Consolidation



exception is Japan where the constraints imposed by the chosen simulation design limit consolidation to 15 per cent of GDP against an estimated need of 18.5 per cent. This discrepancy implies that, in practice, the constraints imposed on instrument use would have to be eased.

However, even when fully meeting consolidation needs, several countries are forced to resort to a significant degree to instruments which lie towards the bottom of their respective instrument hierarchies (Table 4), and thus generally have an overall detrimental impact on objectives. On the basis of the marginal (*i.e.*, worst) instrument used (Figure 6), as well as the full consolidation packages pursued (Tables 7 to 11 in the Appendix), three groups of countries can be identified:

- Sixteen countries (Australia, Austria, Belgium, Canada, Czech Republic, Hungary, Israel, Italy, Luxembourg, Netherlands, Poland, Portugal, the Slovak Republic, Slovenia, Spain and Sweden) only need to use instruments featuring in the top half (first nine places) of their respective cluster-specific rankings. All these countries have short- to medium-term consolidation needs which do not exceed 3 percentage points of potential GDP. Though the simulated adjustment is not without economic costs, these will be mainly of a Keynesian nature, while negative impacts on equity or on long-term growth will be absent or, at worst, limited.
- Six countries (Finland, France, Greece, Iceland, Ireland, and New Zealand) use marginal instruments placed in the lower half of the respective cluster-specific hierarchies (ranked 10th or worse), but manage to implement consolidation packages where more than 50 per cent of the adjustment comes from instruments in the upper half. While the use of detrimental instruments remains moderate, fiscal tightening will entail costs which go beyond short-run aggregate demand, raising concerns about impacts on equity and long-term growth.
- Three countries (Japan, United Kingdom and the United States) have to resort to marginal instruments ranked 14th or worst, with more than 50 per cent of pursued consolidation packages consisting in the use of instruments placed in the lower half of rankings. Short- to medium-term

consolidation therefore presents considerable challenges for these countries as it appears difficult to avoid potentially strong detrimental effects on both growth and equity.

Among the countries covered in this study, six do not need any short- to medium-term fiscal tightening (Denmark, Estonia, Germany, Korea, Norway and Switzerland) so that no packages have been simulated for them.

5.2.2 Long-term needs

Despite generally larger consolidation needs in the long run, all countries can meet them fully while complying with the constraints imposed by the simulation design. However, as with short- to medium-term consolidation packages, there is a risk of significant negative impacts on equity and long-term growth for some countries. As above, one can identify three groups of countries according to their marginal instrument (Figure 7) and full consolidation packages (Appendix, Table 12):

- Twenty countries (Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Korea, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Sweden and Switzerland) with low or moderate consolidation needs enjoy the favourable position of only having to use instruments in the upper half (top nine places) of the uniform long-run hierarchy, of which the overall impact on long-run growth and equity can be deemed mostly beneficial or fairly neutral.[13]
- Six countries (Ireland, Israel, Japan, Slovak Republic, Spain and the United Kingdom) resort to marginal instruments in the lower half of the ranking (10^{th} to 17^{th} places), which may entail more detrimental consequences for growth and equity objectives. However, these countries have consolidation packages where more than half (and in some cases virtually all) of the adjustment comes from better instruments (those in the upper half of the hierarchy).
- Three countries (Australia, New Zealand and the United States) with large long-term consolidation needs face the unpleasant prospect of both employing low-quality marginal instruments and letting poor instruments (those in the lower half of the ranking) account for more than half of the total fiscal adjustment. Therefore this group faces a substantial risk of overall negative impacts of consolidation on growth and equity.

With the assumptions outlined above, Italy and Norway have no estimated long-term consolidation needs and therefore no simulated packages at that horizon.

Despite estimated consolidation needs being generally larger in the long than the short run, more countries rely fully on well ranked instruments in their simulated long-term packages than in the short- to medium term ones. One reason is that other government consumption, an area with substantial consolidation potential in many countries, is much better ranked in the long term when demand effects are no longer taken into account. Another reason is that the simulations are designed to offer more room for adjustment in public pension spending in the long than the short term, reflecting that expenditure savings in general accrue gradually in this area. Finally, more countries are estimated to face positive consolidation needs in the long than the short term.

At either simulation horizon, countries facing the unpleasant prospect of having to resort on a large scale to low-ranking instruments have two non-mutually exclusive options. The first, further

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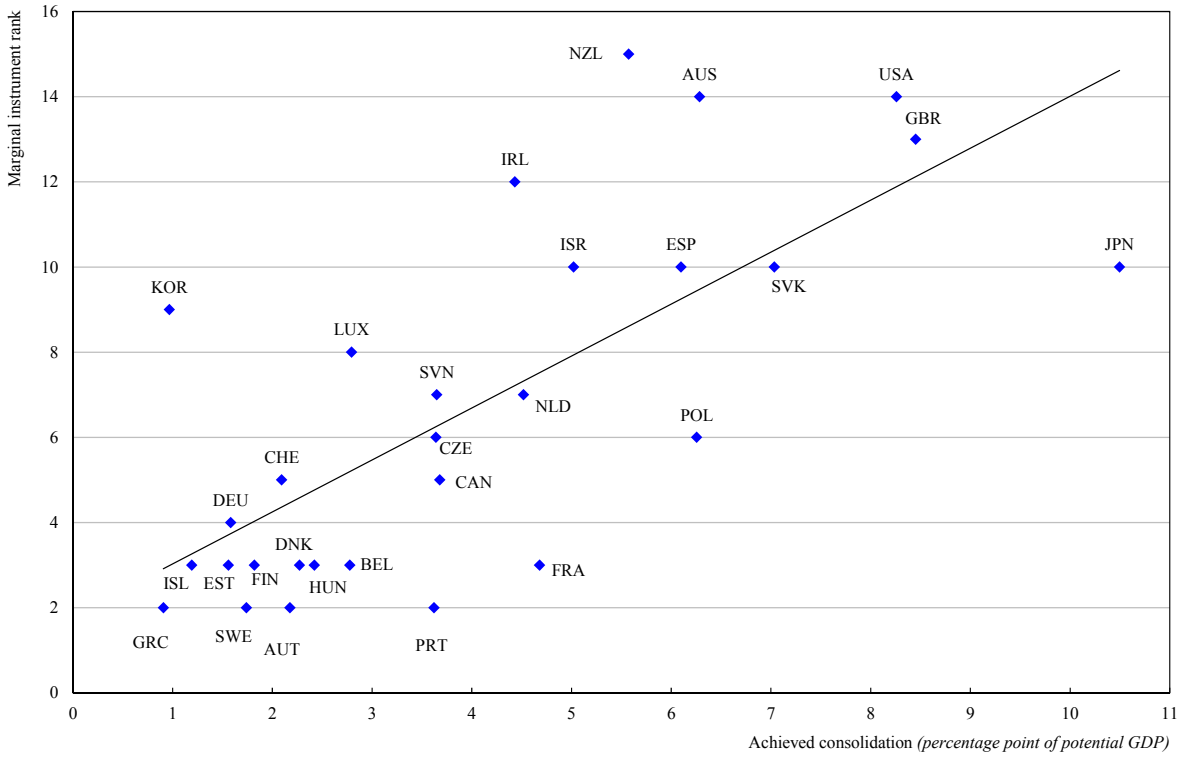
[13] The top nine instruments have either (*i)* beneficial impacts on both long-term growth and long-term equity (Table 2), as is the case of subsidy reduction, (*ii*) impacts which are beneficial on one objective and fairly neutral on the other, as it happens with other government consumption, or (*iii*) opposite impacts on long-term growth and long-term equity which can somehow be regarded as compensating each other, sickness and disability payments being an example, Implicit in this "compensation" argument is the use of +1 and –1 scores for each + and – sign in Table 2, which is admittedly a simplifying assumption, rather than an attempt to calibrate a social welfare function.

Figure 7

Marginal Instrument Rank and Achieved Long-term Consolidation



discussed in Section 6, is to supplement the use of such instruments by structural changes that make them more growth- or equity-friendly. The second option is to use the best instruments more intensively than implied by the somewhat arbitrary constraints. The simulation design implies that countries such as Australia, New Zealand and the United States which start out with an above-average use of the least detrimental forms of taxation or below-average spending in the least effective areas tend to lack room for manoeuvre in the best budget instruments. If the constraint that adjustment cannot take a country into the group of the ten OECD countries that tax most or spend least in the area of under consideration is relaxed by moving from ten- to five-country reference groups, then New Zealand and the United States achieve close to half of their simulated long-term consolidation with well ranked instruments while this proportion rises to almost three quarters in Australia.

5.3 Patterns of instrument use in simulated short- and long-term consolidation packages

The sequential nature of instrument use in the simulations, based on hierarchies which have strong resemblances across groups of countries (in the short to medium term) or are even common to all countries (in the long run), results in some instruments featuring much more often than others in consolidation packages. As a consequence, revenue and expenditure structures evolve and undergo some convergence across countries. While this subsection discusses general trends across countries, Tables 7-12 in the Appendix provide detailed information by country about the illustrative consolidation packages.

In the short to medium term, subsidy reduction and hikes of other property taxes are the most widely used instruments (Table 5). Spending reductions on unemployment benefits and pensions as well as increases in environmental taxes, corporate and personal income taxes, and recurring property taxes come next in frequency of use. Cuts in the areas of health, education and family policy are very rare in simulated packages, as are increases in social security contributions, reflecting their negative side-effects across the growth and equity dimensions.

The simulated long-term consolidation packages exhibit some differences from their short- to medium-term counterparts for two main reasons:

- Firstly, instruments resulting in cuts to public expenditure move up the ranking in the long term as their larger Keynesian demand effects are no longer taken into account. Cuts in other government consumption as a result play a much more important role in long- than in short-term simulated packages.
- Secondly, more room for manoeuvre is assumed to be available in the area of pensions (over and above the effort implicit in the baseline) in a 2060 perspective than over the medium term. Consequently, pensions are used more intensively to meet consolidation needs in the long than the short term.

These two factors result in a number of policy reversals, that is to say cases where a given country makes a larger use of a given instrument in the short to medium term than in the long term. Such policy reversals mainly concern taxes, and in particular property and corporate income taxes (Table 4), which generally fall from the upper to the lower half of instrument hierarchies as the time horizon expands.

As a result from this shift in the use of consolidation tools, the average share of spending reductions across national consolidation packages rises from 41 per cent in the short to medium term to 65 per cent in the long term. At both simulation horizons, the share of spending is particularly high among countries with modest consolidation needs, which to a large extent can be fulfilled with instruments like subsidies or pensions, which occupy top places in most rankings. In contrast, countries with substantial consolidation gaps often need to use large tax items as well, leading to a more balanced revenue-expenditure split or even to revenue-side adjustment becoming predominant.

If implemented, the simulated consolidation packages would not fundamentally alter the size of government and the structure of public finances in covered OECD countries. On average, total primary spending, adjusted for the cycle, barely changes between 2012 and 2060 (Table 6). Given the projected increase in health and long-term care spending incorporated in the baseline, this overall long-term stability masks a significant reduction in government expenditure outside the health sector. The long-term increase in taxation is very limited at only about one per cent of GDP, but in the short to medium term, however, the need to purge excess debt leads to a temporary additional increase in taxation. Despite being anchored on the same assessment of the impacts of consolidation instruments, the simulations largely respect the cross-country diversity in government spending and revenue items. The standard deviations reported in Table 6 make apparent that the degree of convergence is very small for most instruments and quite modest for three instruments that show strongest long-term convergence (pensions, other government consumption and consumption taxes). Looking at the level of individual countries, the long-term simulations seldom use any instruments for more than 2 per cent of GDP: the only such instances are pensions in Japan, Poland and France, other government consumption in Canada, Israel, the Netherlands and the United Kingdom, and personal income taxes in Japan.

Table 5

Summary Indicators About Consolidation Packages

	Number of Countries Using Instrument		Average Use Among Countries Using Instrument *(percent of GDP)*		Number of Countries with Policy Reversals
	Short Term	**Long Term**	**Short Term**	**Long Term**	
Subsidies	14	15	0.6	0.6	0
Pensions	11	12	0.5	1.7	0
Other property taxes	16	11	0.4	0.4	8
Unemployment benefits	11	13	0.6	0.5	3
Personal income taxes	9	7	1.9	1	6
Corporate income taxes	11	5	0.5	0.2	10
Environmental taxes	13	11	0.6	0.5	6
Recurrent taxes on immovable property	9	4	0.8	0.7	6
Other government in kind consumption (excluding family policy)	8	14	1	1.4	4
Sales of goods and services	7	7	0.6	0.7	2
Sickness and disability payments	4	7	0.4	0.5	2
Consumption taxes (other than environmental)	4	8	1.9	1.3	2
Public investment	4	4	0.5	0.5	3
Health services provided in kind	3	4	1.4	0.6	0
Social security contributions	1	0	0.9	0	1
Family	0	1	0	0.5	0
Education	1	0	0.3	0	0

Note: Instruments are ranked as in Figure. 8. ST and LT denote respectively short to medium term and long term. All figures in the table refer to the 24 countries common to both simulation horizons. Average shares of instruments are computed across national consolidation packages (Tables 7-12 in the Appendix). Policy reversals (cases of stronger instrument use in ST than in LT) exclude cases solely due to a smaller room for manoeuvre (*i.e.* in both ST and LT instrument use exhausts the available room for manoeuvre, which is smaller in LT than in ST).

Table 6

Evolution of Expenditure and Revenue Structures
(percentage points of potential GDP)

	2012		2020		2060	
Expenditure	**Average**	**Standard Deviation**	**Average**	**Standard Deviation**	**Average**	**Standard Deviation**
Public investment	2.6	1.0	2.5	0.9	2.4	0.9
Education	5.3	1.1	5.2	1.1	5.3	1.1
Health services provided in kind	6.5	1.4	6.4	1.3	9.5	1.2
Other in kind consumption	8.4	2.4	8.2	2.4	7.7	2.0
Pensions	8.1	3.3	7.9	3.1	7.2	2.8
Sickness and disability payments	2.0	0.6	1.8	0.5	1.8	0.5
Unemployment benefits	1.1	0.9	0.8	0.7	0.9	0.7
Family policy	2.4	1.1	2.4	1.1	2.4	1.1
Subsidies	1.2	0.8	0.8	0.6	0.8	0.5
Residual	4.7	1.4	4.5	1.4	4.4	1.4
Total primary spending	42.2	5.5	40.5	5.5	42.3	5.4
Revenue						
Personal income taxes	8.6	3.3	9.2	3.0	8.6	3.3
Social security contributions	11.2	5.4	11.2	5.4	11.2	5.3
Corporate income taxes	2.9	0.9	3.2	0.7	2.9	0.9
Environmental taxes	2.3	0.7	2.6	0.5	2.7	0.4
Consumption taxes	9.0	2.4	9.3	2.0	9.6	1.8
Recurring property taxes	1.3	1.0	1.4	0.9	1.3	1.0
Other property taxes	0.7	0.6	1.0	0.5	0.8	0.5
Sales of goods and services	2.8	1.0	3.0	0.9	3.0	0.9
Residual	1.5	1.0	1.6	1.0	1.6	1.0
Total primary revenue	40.2	6.2	42.6	5.4	41.7	5.0

Note: The table reports the average size and cross-country standard deviation of spending and revenue areas among the 24 countries common to both short- and long-term simulation horizons. Figures for 2012 are adjusted for cyclical effects as detailed in Appendix 2 of Cournède, Goujard and Pina (2013). Figures for 2020 and 2060 reflect baseline developments in health spending as well as the consolidation packages implemented by each country in the short to medium term and in the long term, respectively. For simplicity (in particular to ensure that the averages and standard deviations are calculated using figures with baseline positions that are comparable across countries), the year 2020 is taken as the medium-term consolidation horizon, though the latter varies somewhat across countries.

5.4 Robustness of the simulated consolidation packages

Extensive checks have been performed to test the robustness of the findings to uncertainty about the assessments of the side-effects of consolidation instruments. A large number of alternative scenarios have been simulated: in each of these, one in every four assessments in Table 2 (the equivalent of a full column) is chosen randomly and modified by adding a plus or minus sign. For each random draw, cluster-specific and long-term rankings corresponding to the new assessment of impacts are calculated, and full consolidation packages are simulated for the short to medium term as well as the long term. Cournède, Goujard and Pina (2013) report detailed results showing how all the numerical results in the above tables are affected by such modelled uncertainty. The conclusions from this extensive robustness checking can be summarised as follows:

- The degree to which countries have to use poorly ranked instruments, or can avoid doing so, is robust to uncertainty about impact assessments. In particular, in the alternative scenarios, there is almost no shift from being able to achieve most of the consolidation with well ranked instruments to being forced to rely heavily on badly ranked instruments, neither is there significant movement in the opposite direction.
- The average use of each instrument is quite stable across alternative scenarios for both very well and very poorly ranked instruments. There is more variation for middle-ranked instruments.
- The finding that short- as well as long-term simulated consolidation packages very seldom involve cuts in the areas of health, education and family policy holds very strongly in the robustness checks.
- While the split between spending and tax adjustment shows sensitivity to uncertainty, especially at the country level, the findings that long-term packages rely more on spending reductions than tax increases and that short-term adjustment give a larger role to tax increases are very robust.
- Policy reversals show some sensitivity to uncertainty. The reason is that policy reversals occur mostly for instruments that feature in the middle of the generic ranking, which is the most unstable part of the ranking.

In addition, a variant of the short- to medium-term simulation of consolidation packages has been performed to check the sensitivity of the results to the weights put on objectives as a result of the clustering techniques. These alternative simulations replace the clustering analysis with three simple country groups (strongly positive, strongly negative and close-to-balance current account positions) and uniform weights. The results for this variant, which Cournède, Goujard and Pina (2013) report in full, are relatively close to the main set of short- to medium-term simulations and corroborate its main findings although they take country circumstances less well into account.

Finally, variants of the short- to medium-term and long-term simulations have been conducted to explore the influence of the constraints on instrument use. The constraint that a given instrument can be used until the country joins the group of the ten covered OECD countries with the highest levels of taxation (or lowest level of spending) in the area under consideration has been relaxed by narrowing these reference groups to a size of five countries. In the short- to medium-term as well as the long-term simulations, relaxing the constraint on instrument use in this manner makes it possible for countries to make much more of their adjustment with well ranked instruments (see Cournède, Goujard and Pina, 2013, for detailed results). At the other extreme, another possibility would be to constrain the room for manoeuvre at the median of OECD countries. In other words, for a tax instrument, the adjustment would be allowed only as long as a country does not raise more revenue with it, as a share of GDP, than half the OECD countries covered in the study. For a spending instrument, the limit on the room for manoeuvre would be to spend no less in this area than half the covered OECD countries. The asterisks appearing in the Tables 7-12 of the Appendix indicate all cases where the adjustment along one instrument crosses

the median. The large number of asterisks in these tables illustrate that crossing the median is common in the simulations. Consequently, constraining the adjustment to stop at the median would result in much greater use of poorly ranked instruments.

6 The case for combining structural reforms and fiscal adjustment

The consolidation strategies identified in the previous section were designed with no consideration given to the scope for achieving efficiency gains. Cuts in expenditures were assumed to entail corresponding reductions in the provisions of public services (or benefits in the case of transfers) and increases in revenues were assumed to come through higher tax rates. This section looks at the scope for potential efficiency gains in selected spending or tax areas where estimates are available. Some of the estimated gains reported below may indeed have been used already, not least as a response to the crisis (OECD, 2013b).

Structural reforms, while desirable in their own right, can also ease the trade-offs between consolidation, equity and long-term growth objectives. Compared with pure budgetary changes, structural reforms in the area where taxes are raised or spending reduced can alleviate negative side-effects. In the most favourable cases, structural reform can even eliminate trade-offs and bring fiscal improvements as well as progress along growth or equity goals. Consistent with this view, some studies find that structural reforms make fiscal consolidation more likely to succeed (Alesina and Ardagna, 2012; Mauro, 2011).

Structural reforms can also contribute to fiscal consolidation directly. Structural reforms that boost private-sector employment are likely to improve the budget balance permanently (OECD, 2013b). The improvement results from tax base extension and lower spending on unemployment benefits, although the reform itself can involve budgetary costs, some of a temporary nature to facilitate implementation, some permanent (such as for instance greater expenditure on active labour-market policies or childcare). Structural reforms that improve productivity in general cannot be expected to result in permanently improved budget balances as public-sector wages and transfers catch up with higher private-sector wages over time. Nevertheless, by providing a boost to the level or growth rate of GDP, productivity-enhancing structural reforms have the potential to improve public debt dynamics and thereby reduce consolidation needs.

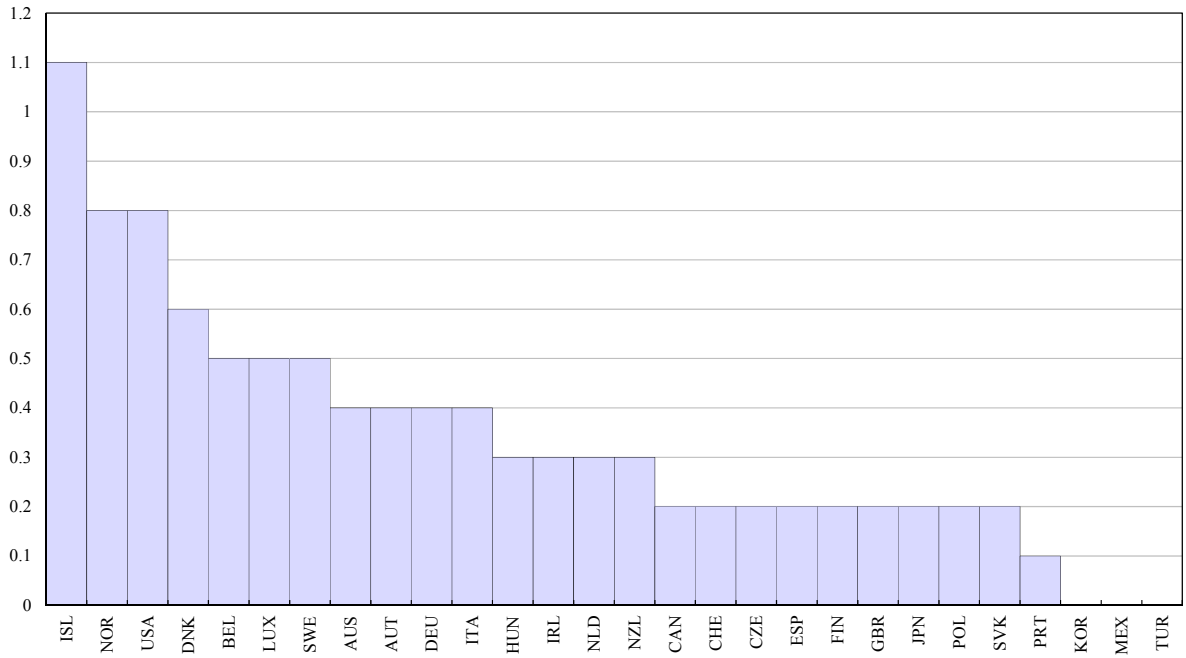
6.1 Structural reforms to accompany reductions in selected individual spending areas

At a general level, structural reforms that improve efficiency in the delivery of public services can reduce the adverse growth impact of spending cuts in productive areas of government spending. Similarly, the negative equity impact of spending cuts can be headed off by structural reforms that ensure a better targeting of public services and transfers and stimulate labour supply.

In **education**, structural reforms can bring benefits along all fiscal, growth and equity dimensions. For instance, introducing tuition fees in higher education coupled with means-tested grants or loan guarantees can improve public finances, possibly spur growth by encouraging tertiary schooling completion and educational investment in areas with greater economic potential and help to correct the regressive impact of public spending on tertiary education (Hagemann, 2012).

Figure 8

Potential Efficiency Gains in Primary and Secondary Education
(percent of GDP, 2007)



Note: Data-envelopment analysis (DEA) has been performed to estimate by how much, given students' socio-economic background, spending could be reduced while maintaining the same average level and dispersion of PISA scores. See Sutherland *et al.* (2007) for more details.
Source: Update of Sutherland *et al.* (2007) reported in Hagemann (2012).

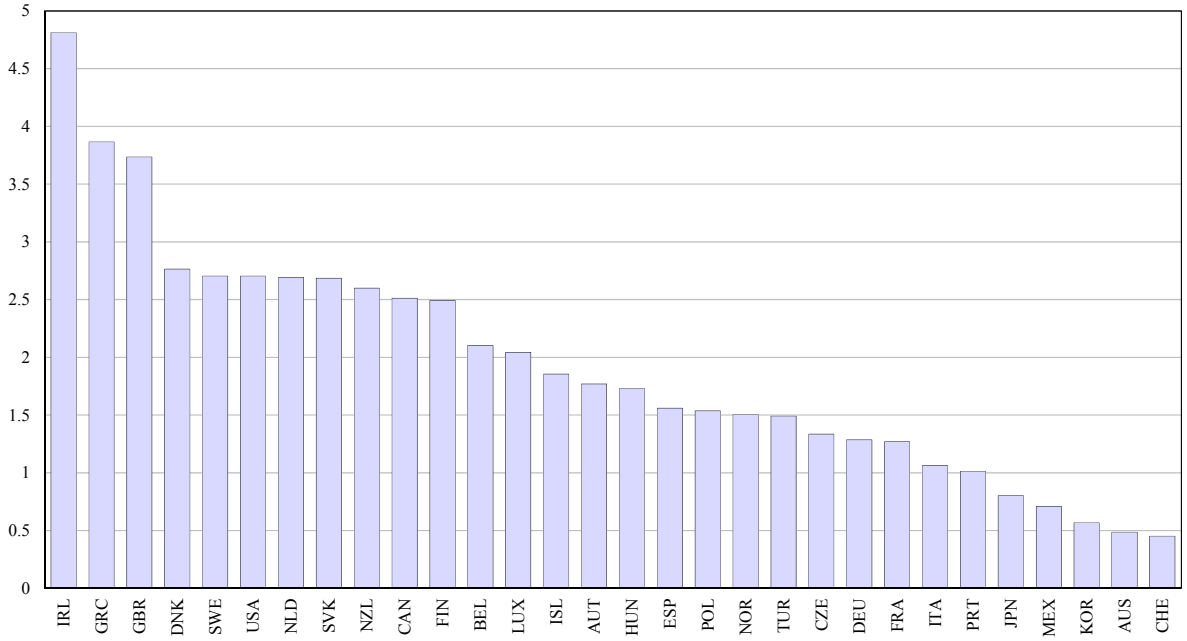
In primary and secondary education, a recent update of the analysis conducted by Sutherland *et al.* (2007) points to potentially sizeable efficiency gains in many OECD countries (Figure 8).[14] In tertiary education, European OECD countries can potentially obtain savings from efficiency gains worth around 0.4 per cent of GDP on average (St. Aubyn *et al.*, 2009). Earlier and more recent OECD work has suggested that more performance monitoring, more school autonomy and greater user choice is associated with greater efficiency in the public provision of primary and secondary schooling (Sutherland and Price, 2007, Blöchliger *et al.*, 2013). As it turns out, countries with the greatest potential for efficiency gains are generally not the ones with the largest consolidation needs, with the exception of the United States. However, in the United States, the need to address widening skill gaps identified in particular in the *2012 OECD Economic Survey* points to a case for allocating efficiency gains to providing more and better education rather than cutting expenditure (OECD, 2012b).

In **health care**, efficiency gains could also permit to improve or maintain service provision while containing cost to the public purse, therefore mitigating adverse growth and equity impacts (Hagemann, 2012). Although they are subject to considerable uncertainty, quantitative estimates

[14] This study uses data-envelopment analysis (DEA), a technique that relates outcomes with inputs and draws up an efficiency frontier based on the situation of the best performers. With a number of assumptions, countries can then be compared to this efficiency frontier to provide a rough indication of the extent to which they might achieve the same results with lower inputs. See Sutherland *et al.* (2007) for more details.

Figure 9

Potential Public-spending Savings from Efficiency Gains in Health Care
(percent of GDP, 2017)



Note: Potential savings represent the difference between a no-reform scenario and a scenario where countries would become as efficient as the best performing countries.
Source: Joumard *et al.* (2010).

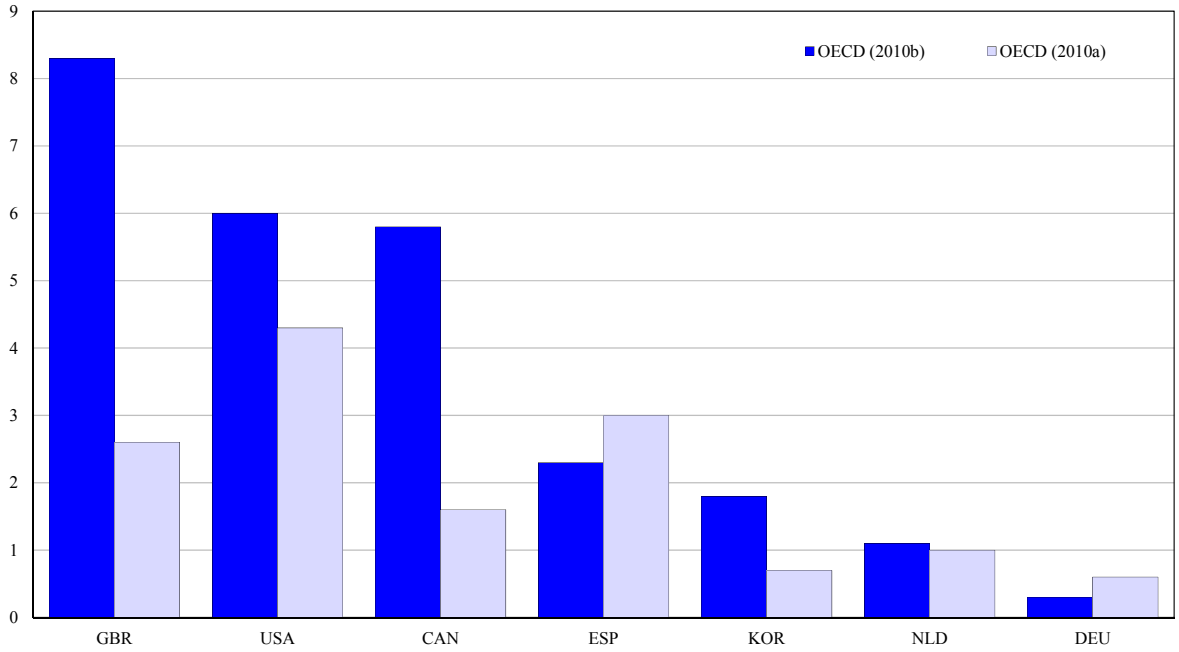
suggest that the scope for efficiency gains in the health sector can potentially be very large (Figure 9). Previous OECD work emphasised that, while structural reforms to realise potential efficiency gains vary depending on the structure of health systems, some apply to most countries. In particular, better priority setting, improved consistency in responsibility assignment across levels of government, and better user information on the quality and price of services would be reform options to consider in many OECD countries (Joumard *et al*, 2010).

6.2 Structural reforms to accompany revenue increases

On the tax side, the growth impact of hikes can be reduced through the closing of loopholes and base broadening (including by curbing fraud and evasion) rather than *via* rate increases. Hence, an important way of improving the trade-off between raising more revenue and preserving growth-friendly incentives is to cut back tax expenditures. As regards **personal and corporate income taxes**, tax expenditures often distort resource allocation and hamper productivity growth: some examples are the preferential tax treatment of owner-occupied housing or the dispersion of effective corporate tax rates. Figure 10 gives estimates from two different studies for corporate and personal income taxes. Despite the large margins of uncertainty surrounding the reported figures, in countries like Canada, Spain, United Kingdom or the United States even the smallest of the two estimates is very large, amounting to about one third to one half of short- to medium-term consolidation needs. Structural reforms in personal and corporate income taxes that curb tax expenditures will also in general lead to a more equal income distribution.

Figure 10

Tax Expenditures in Personal and Corporate Income Taxes
(different years between 2004 and 2008, percent of GDP)



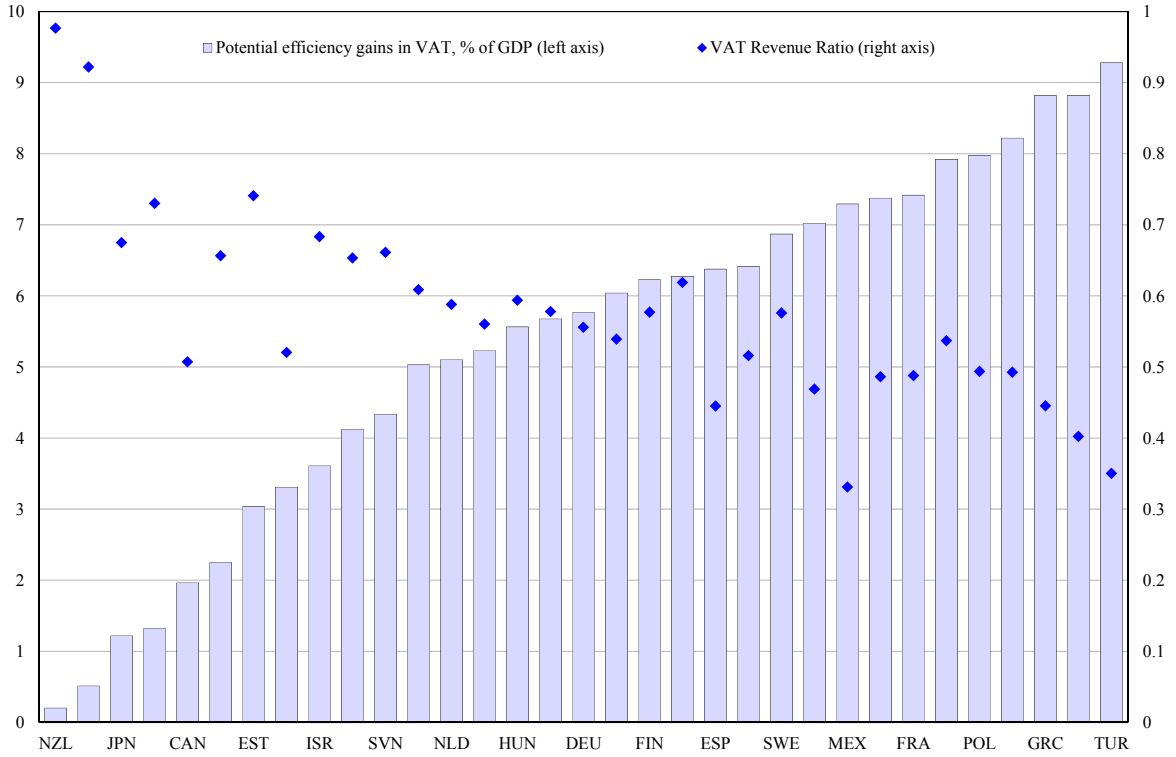
Note: international comparisons are subject to important limitations, as countries use different definitions of tax expenditures. For a given country, comparisons across studies are also hampered by factors like different years and inconsistencies in filling the questionnaires used to collect information (e.g., in OECD (2010) some countries reported only the 20 largest items, and others only those at central government level).

However, the recommendation of structural tax reform to eliminate tax breaks cannot be made across the board as some measures work to preserve productive potential or to alleviate poverty, or both. Such is the case of tax credits for low-income earners, which tackle poverty traps created by other parts of the tax and transfer system and help boost the employment of low-skill workers. Another important example are well-designed corporate income tax credits for research and development activities, which can provide remuneration for the growth-enhancing externalities from R&D (Jaumotte and Pain, 2005; Johansson *et al.*, 2008, Westmore, 2013).

In the area of **consumption taxes**, base-broadening reforms can bring in additional proceeds and reduce distortions detrimental to growth. If accompanied by targeted measures towards poorer households (for instance voucher programmes), abolishing reduced value-added or consumption tax rates may improve public finances without negative consequences for equity, at very low cost for growth (although targeted transfers involve a risk of contributing to poverty traps). Although crude and subject to important caveats (see note to Figure 11), the so-called VAT revenue ratio is the most readily available indicator to provide illustrative estimates, on a cross-country basis, of the scope for base-broadening. The ratio compares actual VAT revenue to the standard VAT rate multiplied by final consumption expenditure. The very high estimates shown in Figure 15 are uncertain and difficult to achieve in full including because the tax base would shrink in response to higher rates. Nevertheless, their sheer size suggests that, even after factoring in the costs of accompanying distributional measures, base broadening can yield substantial additional revenues while reducing cross-sector distortions.

Figure 11

VAT Revenue Ratio and Illustrative Potential Efficiency Gains in the VAT System



Note: The VAT revenue ratio (VRR) is calculated as total VAT receipts from *OECD revenue statistics* divided by an estimate of potential VAT revenues. This estimate is equal to the standard VAT rate multiplied by final consumption expenditure in national accounts (excluding VAT receipts). The estimates of potential efficiency gains shown in the chart are calculated strictly for illustrative purposes by assuming that the VRR can be raised to one. This simple calculation neglects that final consumption as calculated for national accounts purposes differs from the VAT tax base. For instance, imputed rents on owner-occupied housing and government services provided free of charge are included in final consumption but not the VAT tax base. In particular, making the government pay VAT to itself on the services it provides without charge would produce no net budget gain. On the other hand, final consumption does not include housing construction, which is subject to VAT in many countries.
Source: *OECD Consumption Tax Trends* (2012), average 2007-09, and OECD calculations.

As regards **property taxes**, broadening bases by regularly bringing real estate taxable values in line with market valuations could yield equity gains in addition to bringing in additional revenues and reducing distortions. In many countries cadastral values have become outdated, often by a large margin (by way of exemple, Austria, Belgium and France last carried out a housing valuation exercise three or four decades ago). Though the redistributive impact of updating is complex, being felt across individuals, generations and territorial units, it will tend to be progressive at least if account is taken of the distribution of wealth, and not merely of current income. Even on the basis of the latter, equity gains will ensue if those residing in buildings with more outdated values (often older buildings in city centres) tend to enjoy above-average income. Admittedly, updating cadastral values will raise difficulties for old people living on low pensions in large old houses, but this issue could be addressed by offering those taxpayers the option of paying this part of taxes in a deferred manner on their estate after their death. More generally, making the property tax structure more progressive would be an option to help offset harmful equity effects from other consolidation measures.

7 Concluding remarks

The present study proposed a structured way of looking at consolidation instruments in the light of their consequences on other economic objectives. While its aim is not to prescribe consolidation packages, some quantitative simulations have been provided for the sake of illustration as a way of gauging how deep adjustment in better instruments would have to go in order to avoid relying too much on more harmful instruments. While illustrative, these simulations cannot substitute for the analysis of country circumstances, and of interaction among instruments, that is required to design actual consolidation strategies.

APPENDIX
DETAILED COMPOSITION OF CONSOLIDATION PACKAGES

The present section provides detailed quantitative information about the illustrative consolidation packages presented in Section 5 of the main text. Tables 7 to 11 provide results about the illustrative short- to medium-term consolidation packages of countries with one table per cluster. Table 12 details the illustrative long-term consolidation packages for all covered countries. The instruments used are as described in Appendix 2, Section 2 of Cournède, Goujard and Pina (2013). The categories "used spending residual" and "used revenue residual" refer to the part of the adjustment that is achieved through residual items of primary expenditure and receipts which are not considered as instruments of consolidation as they have no direct economic interpretation. However, there is no reason to assume that they remain constant as a share of potential GDP when other budgetary items adjust, so the assumption is made that they remain fixed as shares of total primary spending or revenues (whichever is relevant).

Table 7

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 1

(percentages of potential GDP except otherwise mentioned)

Description	AUS	CAN	GBR	ISR	ITA	JPN	NZL	POL	PRT
Subsidies	0.6*	0.3	0	0	0.3	0	0	0	0
Other property taxes	0	0.5*	0.2	0.2	0	0.4*	0.7*	0.7*	0.4*
Pensions	0	0	0.3	0.2	0.3	0.8	0	0.9	0.9
Corporate income taxes	0	0.2	0.4*	0	0	0	0	0.9*	0.2
Personal income taxes	0	0	0.5	1.3	0	4.6*	0	1.3	4.1*
Recurrent taxes on immovable property	0	0	0	0	0	0	0	0	0.8*
Unemployment benefits	0	0.2*	0	0	0	0.3	0	0	0.3
Environmental taxes	0.7*	0.7	0.2*	0	0	0.7	0.7	0	0.2
Other government in kind consumption (excluding family policy)	0.6	0.6	2.2*	0	0	0	0	0	0.2
Sales of goods and services	0	0	0.7*	0	0	1.0*	0	0	0
Consumption taxes (other than environmental)	0	0	1.4*	0	0	2.5	0	0	0
Public investment	0	0	0.3	0	0	1.1	0.2	0	0
Sickness and disability payments	0	0	0.7*	0	0	0	0	0	0
Health services provided in kind	0	0	1.5*	0	0	1.5*	0	0	0
Social security contributions	0	0	0	0	0	0.9*	0	0	0
Family	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0.3	0	0	0
Used spending residual	0.1	0.1	0.9	0	0	0.6	0	0.1	0.1
Used revenue residual	0	0	0.2	0	0	0.5	0.1	0.1	0.4
Share spending efforts	65	45	62	13	100	30	9	25	20
Achieved consolidation	1.9	2.7	9.2	1.7	0.7	15.3	1.7	4	7.5
Consolidation needs	1.9	2.7	9.2	1.7	0.7	18.3	1.7	4	7.5
Share top 9 instruments	100	100	45	100	100	48	90	100	100
Instruments crossing the median	2	2	7	0	0	5	1	2	3

Note: A star sign * denotes that the proposed instrument use takes the corresponding spending (tax) item moves from above to below (from below to above) the OECD median.

Table 8

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 2

(percentages of potential GDP except otherwise mentioned)

Description	USA
Subsidies	0
Pensions	0.5
Other property taxes	0.7*
Unemployment benefits	0.2
Corporate income taxes	0.2
Environmental taxes	0.7
Recurrent taxes on immovable property	0
Personal income taxes	1
Other government in kind consumption (excluding family policy)	0
Sales of goods and services	0
Sickness and disability payments	0
Consumption taxes (other than environmental)	2.5
Public investment	0.3
Health services provided in kind	1.3*
Family	0
Social security contributions	0
Education	0
Used spending residual	0.2
Used revenue residual	0.2
Share spending efforts	31
Achieved consolidation	7.7
Consolidation needs	7.7
Share top 9 instruments	45
Instruments crossing the median	2

Note: See note to Table 7.

Table 9

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 3
(percentages of potential GDP except otherwise mentioned)

Description	ESP	GRC	IRL
Pensions	0	0.6	0
Subsidies	0.2	0	0
Other property taxes	0	0	0
Unemployment benefits	1.6	0	1.1
Environmental taxes	0.7	0.2	0.3*
Recurrent taxes on immovable property	0.4	1.0*	1.0*
Corporate income taxes	0.9*	0.2	0.8*
Sales of goods and services	1	0.3	0.3*
Personal income taxes	0.3	3.4*	0.3
Sickness and disability payments	0	0	0.3*
Other government in kind consumption (excluding family policy)	0	1.9*	0
Consumption taxes (other than environmental)	0	0	1.4
Public investment	0	0	0
Health services provided in kind	0	0	0
Social security contributions	0	0	0
Family	0	0	0
Education	0	0	0
Used spending residual	0.1	0.1	0.2
Used revenue residual	0.1	0.4	0.2
Share spending efforts	36	33	27
Achieved consolidation	5.3	8.2	5.8
Consolidation needs	5.3	8.2	5.8
Share top 9 instruments	100	75	69
Instruments crossing the median	1	3	5

Note: See note to Table 7.

Table 10

Instrument Use and Achieved short- to Medium-term Consolidation *vs.* Needs in Cluster No. 4

(percentages of potential GDP except otherwise mentioned)

Description	AUT	BEL	CZE	FIN	FRA	HUN	ISL	SVK	SVN
Pensions	0.2	0	0.1	0	0.6	0.2	0	0	0
Subsidies	0	0.8	0.8	0.7*	0.7*	0.7*	0.8*	0.5*	0.5*
Other property taxes	0	0	0.6*	0.4*	0	0.2	0.3	0.7*	0.7*
Unemployment benefits	0	0.7	0	0.9	0.8*	0.2	0.6	0	0
Environmental taxes	0	0	0	0	0.7*	0	0.5*	0.7	0
Recurrent taxes on immovable property	0	0	0	0.8*	0	0.4*	0	1.0*	0.9*
Sales of goods and services	0	0	0	0	0	0	0.3	1	0
Sickness and disability payments	0	0	0	0.7	0	0	0.2	0	0
Personal income taxes	0	0	0	0	0	0	0	0	0
Corporate income taxes	0	0	0	0.1	0.5*	0	0.5*	0	0
Other government in kind consumption (excluding family policy)	0	0	0	0	1.2*	0	0.2	0	0
Consumption taxes (other than environmental)	0	0	0	0	0	0	0	0	0
Social security contributions	0	0	0	0	0	0	0	0	0
Family	0	0	0	0	0	0	0	0	0
Public investment	0	0	0	0	0	0	0	0	0
Health services provided in kind	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0
Used spending residual	0	0.1	0.1	0.2	0.2	0.1	0.2	0.1	0.1
Used revenue residual	0	0	0	0	0	0	0	0.1	0.1
Share spending efforts	100	100	64	65	73	67	56	13	23
Achieved consolidation	0.2	1.6	1.6	3.8	4.7	1.8	3.6	4	2.2
Consolidation needs	0.2	1.6	1.6	3.8	4.7	1.8	3.6	4	2.2
Share top 9 instruments	100	100	100	97	63	100	79	100	100
Instruments crossing the median	0	0	1	3	5	2	3	3	3

Note: See note to Table 7.

Table 11

Instrument Use and Achieved Short- to Medium-term Consolidation *vs.* Needs in Cluster No. 5

(percentages of potential GDP except otherwise mentioned)

Description	LUX	NLD	SWE
Subsidies	0.2	0.6*	0.7*
Other property taxes	0	0.2	0.2
Pensions	0	0	0
Environmental taxes	0	0	0
Recurrent taxes on immovable property	0	0.8*	0
Other government in kind consumption (excluding family policy)	0	1.1	0
Sales of goods and services	0	0	0
Personal income taxes	0	0	0
Unemployment benefits	0	0	0
Social security contributions	0	0	0
Sickness and disability payments	0	0	0
Corporate income taxes	0	0	0
Consumption taxes (other than environmental)	0	0	0
Family	0	0	0
Public investment	0	0	0
Health services provided in kind	0	0	0
Education	0	0	0
Used spending residual	0	0.1	0.1
Used revenue residual	0	0	0
Share spending efforts	100	65	85
Achieved consolidation	0.2	2.8	1
Consolidation needs	0.2	2.8	1
Share top 9 instruments	100	100	100
Instruments crossing the median	0	2	1

Note: See note to Table 7.

Table 12

Instrument Use and Achieved Long-term Consolidation *vs.* Needs
(percentages of potential GDP except otherwise mentioned)

Description	JPN	GBR	USA	SVK	AUS	POL	ESP	NZL
Subsidies	0	0	0	0.5*	0.6*	0	0.2	0
Pensions	3.2	1	1.9	0	0	3.7	0	0
Other government in kind consumption (excluding family policy)	0	2.2*	0	0	1	1.1	0.6	0
Unemployment benefits	0.3	0	0.2	0	0	0	1.4	0
Environmental taxes	0.7	0.2*	0.7	0.7	0.7*	0.6	0.7	0.7
Other property taxes	0.4*	0.2	0.7*	0.7*	0	0.6*	0	0.7*
Sickness and disability payments	0	0.7*	0	0	0	0	0.7*	0.7
Recurrent taxes on immovable property	0	0	0	1.0*	0	0	0.4	0
Sales of goods and services	1.0*	0.7*	0	1	0	0	1	0
Personal income taxes	2.8	0.5	1	1.8	0	0	0.4	0
Corporate income taxes	0	0.4*	0.2	0.2*	0	0	0.1	0
Consumption taxes (other than environmental)	1.5	1.4*	2.5	0.9	2.5	0	0.4	0
Public investment	0	0.1	0.1	0	0.8	0	0	1.1*
Health services provided in kind	0	0.2	0.3	0	0.4	0	0	1.3
Family	0	0	0	0	0	0	0	0.5
Social security contributions	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0
Used spending residual	0.4	0.8	0.6	0.1	0.2	0.3	0.1	0.4
Used revenue residual	0.1	0.2	0.2	0.2	0	0	0.1	0.1
Share spending efforts	37	59	36	8	49	80	49	73
Achieved consolidation	10.5	8.5	8.3	7	6.3	6.3	6.1	5.6
Consolidation needs	10.5	8.5	8.3	7	6.3	6.3	6.1	5.6
Share top 9 instruments	57	66	46	58	39	100	85	41
Instruments crossing the median	2	6	1	4	2	1	1	2

Note: See note to Table 7.

Table 12 (cont.)

Instrument Use and Achieved Long-term Consolidation *vs.* Needs
(percentage of potential GDP except otherwise mentioned)

Description	ISR	FRA	NLD	IRL	CAN	SVN	CZE	PRT
Subsidies	0	0.7*	0.6*	0	0.3	0.5*	0.8	0
Pensions	0.8	2.2	0	0	0	0	0.4	3.4
Other government in kind consumption (excluding family policy)	2.3	1.1*	2.3	0	2.3*	2.0*	1.4*	0
Unemployment benefits	0	0.4	0.5	0.9	0.2*	0	0.4*	0
Environmental taxes	0	0	0	0.3*	0.3	0	0	0
Other property taxes	0.2	0	0.2	0	0.2*	0.7*	0.3*	0
Sickness and disability payments	0.5*	0	0.6	0.3*	0	0.2*	0	0
Recurrent taxes on immovable property	0	0	0	1.0*	0	0	0	0
Sales of goods and services	0.5*	0	0	0.3*	0	0	0	0
Personal income taxes	0.2	0	0	0.1	0	0	0	0
Corporate income taxes	0	0	0	0.3	0	0	0	0
Consumption taxes (other than environmental)	0.1	0	0	1	0	0	0	0
Public investment	0	0	0	0	0	0	0	0
Health services provided in kind	0	0	0	0	0	0	0	0
Family	0	0	0	0	0	0	0	0
Social security contributions	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0
Used spending residual	0.4	0.3	0.3	0.1	0.3	0.3	0.3	0.2
Used revenue residual	0.1	0	0	0.2	0	0.1	0	0
Share spending efforts	80	100	95	29	87	80	92	100
Achieved consolidation	5	4.7	4.5	4.4	3.7	3.6	3.6	3.6
Consolidation needs	5	4.7	4.5	4.4	3.7	3.6	3.6	3.6
Share top 9 instruments	93	100	100	65	100	100	100	100
Instruments crossing the median	2	2	1	4	3	4	3	0

Note: See note to Table 7.

Table 12 (cont.)

Instrument Use and Achieved Long-term Consolidation vs. Needs
(percentage of potential GDP except otherwise mentioned)

Description	LUX	BEL	HUN	DNK	AUT	CHE	FIN	SWE
Subsidies	0.8*	0.8	0.7*	0.8	0.8	0.8	0.7*	0.7*
Pensions	0	0	0.6	0.7	1.2	0	0	0.9*
Other government in kind consumption (excluding family policy)	0	1.3*	0.9	0.4	0	0.6	0.8	0
Unemployment benefits	0.5*	0.6	0.1	0.1	0	0.2	0.3	0
Environmental taxes	0.2	0	0	0	0	0.3	0	0
Other property taxes	0	0	0	0	0	0	0	0
Sickness and disability payments	0	0	0	0	0	0	0	0
Recurrent taxes on immovable property	0.5	0	0	0	0	0	0	0
Sales of goods and services	0.5	0	0	0	0	0	0	0
Personal income taxes	0	0	0	0	0	0	0	0
Corporate income taxes	0	0	0	0	0	0	0	0
Consumption taxes (other than environmental)	0	0	0	0	0	0	0	0
Public investment	0	0	0	0	0	0	0	0
Health services provided in kind	0	0	0	0	0	0	0	0
Family	0	0	0	0	0	0	0	0
Social security contributions	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0
Used spending residual	0.2	0.1	0.1	0.2	0.1	0.2	0.1	0.1
Used revenue residual	0	0	0	0	0	0	0	0
Share spending efforts	58	100	100	100	100	86	100	100
Achieved consolidation	2.8	2.8	2.4	2.3	2.2	2.1	1.8	1.7
Consolidation needs	2.8	2.8	2.4	2.3	2.2	2.1	1.8	1.7
Share top 9 instruments	100	100	100	100	100	100	100	100
Instruments crossing the median	2	1	1	0	0	0	1	2

Note: See note to Table 7.

Table 12 (cont.)

Instrument Use and Achieved Long-term Consolidation vs. Needs
(percentage of potential GDP except otherwise mentioned)

Description	DEU	EST	ISL	KOR	GRC
Subsidies	0.3	0.3	0.8*	0	0
Pensions	0.8	0	0	0	0.9
Other government in kind consumption (excluding family policy)	0	1.3*	0.2	0	0
Unemployment benefits	0.4	0	0.1	0.1	0
Environmental taxes	0	0	0	0	0
Other property taxes	0	0	0	0	0
Sickness and disability payments	0	0	0	0	0
Recurrent taxes on immovable property	0	0	0	0.3	0
Sales of goods and services	0	0	0	0.5	0
Personal income taxes	0	0	0	0	0
Corporate income taxes	0	0	0	0	0
Consumption taxes (other than environmental)	0	0	0	0	0
Public investment	0	0	0	0	0
Health services provided in kind	0	0	0	0	0
Family	0	0	0	0	0
Social security contributions	0	0	0	0	0
Education	0	0	0	0	0
Used spending residual	0.1	0	0.1	0	0
Used revenue residual	0	0	0	0	0
Share spending efforts	100	100	100	12	100
Achieved consolidation	1.6	1.6	1.2	1	0.9
Consolidation needs	1.6	1.6	1.2	1	0.9
Share top 9 instruments	100	100	100	100	100
Instruments crossing the median	0	1	1	0	0

Note: See note to Table 7.

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COMMENT TO "CHOOSING FISCAL CONSOLIDATION INSTRUMENTS COMPATIBLE WITH GROWTH AND EQUITY" BY BORIS COURNÈDE, ANTOINE GOUJARD AND ÁLVARO PINA

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Introduction

The topic of the paper is a most relevant issue and therefore rightly to be addressed here. In times, where we have a pressing need to consolidate public finances it is of utmost importance to look at the side effects and to search for a well suited consolidation strategy.

The problem with conflicts in politics, however, cannot easily be solved. It can be better to pursue only one goal. According to Tinbergen it is the best to have a clear assignment of economic policy goals to the respective instruments. In any case, one should avoid too complex goals. One candidate for such a complex goal would be a balanced global growth, as mentioned in the paper.

Main thrust of the paper

- The paper is very comprehensive and well and intense elaborated. It is also a package of very good analyses and I can concur with many things which had been outlined. I will therefore focus on things where I have problems but this should not be misread as being overly critical. Turning to the origin, the rise of public deficit and debt levels is primarily attributed to the legacy of the financial crisis. But it should be noted that most European countries had already a too high debt burden before the crisis. The main reasons were the failure in application of the Stability and Growth Pact and a not symmetric application of the so-called Keynesian approach.
- The paper therefore also not addresses the failure of fiscal policy coordination in the past. This should also include an assessment if the enforced fiscal rules of this coordination work more efficient. If this is not the case it has also consequences for the topics raised. It should also be more questioned that Keynesian politics have not worked sufficient. There were always arguments in bad times for deficit spending but you always miss the point in good times to save enough. This feature should also be incorporated when designing a consolidation strategy.
- The paper addresses the confidence or expectation effects of consolidation, but it gives them no big weight. It is stated that there is "no consensus on the existence of these potential expansionary effects of consolidation". I know that in economic literature this is at the moment state of the art. But, was economic literature always right in the past? To give an example, there was over decades among most economists a sheer neglect of the role of financial markets and the banking sector for the real sector. For such a neglect we all had to pay a very high price, as the most recent severe crises have shown. I am therefore here more proactive because I think expectations really matters. The sentence "deeper consolidation would, through multiplier effects, reduce growth" should be therefore revisited in this context. Literature normally states that consolidation is far more efficient when it is triggered on the expenditure than on the revenue side. The paper would benefit from addressing this issue more thoroughly.

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Ranking of policy instruments

- This ranking is well-taken but the political process is normally heavily built and don't like such a fine tuned approach. It is therefore an imminent task how to sell all this to the politicians. I think the rational and empirical base for such a ranking should also be considered and the criteria for the rational base should be clearer. On the rational, it is obvious that subsidies and pensions are on the top because these are the normal candidates for a deeper consolidation. The top positions should also be held from expenditure items since the revenue side is normally not so efficient in consolidation.
- The further items in the list are then more or less revenue items such as property taxes and income taxes. However, consumption taxes are listed at the back. Why? Are they really so regressive? Isn't also a risk that the early recourse on income taxes have negative side effects for growth? It is justified to group public investment at the end although unfortunately they are often the first choice of municipalities when it comes to expenditure cuts. The same is true for health service, childcare, family and education since these positions are the cornerstones for the wellbeing of a society. On the empirical basis, I rely on the work of the OECD.

Comments in detail

- The paper states that the debt ratio should be stabilized at 60 per cent of GDP in 2060. Is this not too late, also in the context of the huge demographic challenges? In the following private-sector indebtedness is mentioned. Would it not prudent to explore more on this? Furthermore, the baseline scenario assumes that substantial pension reforms are implemented to reduce public pension expenditures. The debate in Germany, however, shows that even with done reforms there are always risks of reversals, especially in good times.
- It is also mentioned that "other countries, including in particular Italy and Germany, face little or no short- to medium-term structural consolidation needs". I am interested in hearing by which facts such a statement for Italy can be underpinned. There is also a discussion about a possible higher public debt to GDP ratio ceiling. It is obvious that the 60 per cent value has a certain smell of being artificial. But it should be common sense that all approaches towards the 100 per cent level will create debt sustainability problems even in the short term.

Way forward

To sum up, the critical points mentioned should not blur the clear perception that the paper addresses the topic in a thorough and substantial way. However, further research and rethinking is required which is certainly a crucial element for all macroeconomic studies and should therefore not be seen as a point of criticism. Examples:

- Works fiscal policy coordination in Europe well?
- How efficient is a Keynesian approach?
- What is with expectations, how much they matter?
- What is with a very detailed advice which is for politicians not easy to handle?
- Would it not be easier to follow fiscal rules?
- Or would be the reliance on independent bodies also a way out? Obviously not, since in our world independence is in a certain way also an artificial concept. The struggle in aiming at an so called "independent" macroeconomic forecast is a good example for that.