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Inequality & Structural Reforms: Methodological Concerns & Lessons from Policy

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Edited by Caterina Astarita and Gaetano D'Adamo

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Inequality and Structural Reforms: Methodological Concerns and Lessons from Policy

Proceedings of the workshops organised by the Directorate-General for Economic and Financial Affairs held in Brussels on 16 May and 19 June 2017

Edited by Caterina Astarita and Gaetano D'Adamo

Abstract

Income inequality became more and more prominent in the academic and policy debate in recent years and particularly since the economic downturn. Inequality, indeed, may have long-term effects on (potential) growth and macroeconomic stability, reinforcing existing inequalities and reducing opportunities, skills development and social and occupational mobility. Structural reforms, i.e. labour and product market reforms and tax-benefit systems reforms, are one of the main tools available for public interventions aimed at boosting growth while not being detrimental to equality. In this context, DG ECFIN of the European Commission organised two workshops held on the 16th of May and the 19th of June 2017 aimed at enriching the existing knowledge of the relationship between structural reforms and inequality and taking place at a time where Europe discusses the social dimension, notably the European Pillar of Social Rights as proposed by the Commission and proclaimed at the Social Summit in Gothenburg. The first workshop focused on the methodological issues whilst the second one focused on policy evidence of the impact of structural reforms on inequality. These proceedings take stock of the discussions held in the workshops, in order to contribute to the growing debate on how to better take into account distributional effects when formulating policy advice.

JEL Classification: C2, C3, C53, C61, C68, D1, D2, D3, D4, E6, H2, H3.

Keywords: structural reforms, labour market reforms, product market reforms, tax reforms, income inequality, general equilibrium models, agent-based models, panel data models, synthetic control method, microsimulation models.

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1. WORKSHOP OF 16th MAY. SESSION I –"INEQUALITY AND STRUCTURAL REFORMS: METHODOLOGICAL CONCERNS" ANALYSIS OF LABOUR AND PRODUCT MARKET REFORMS

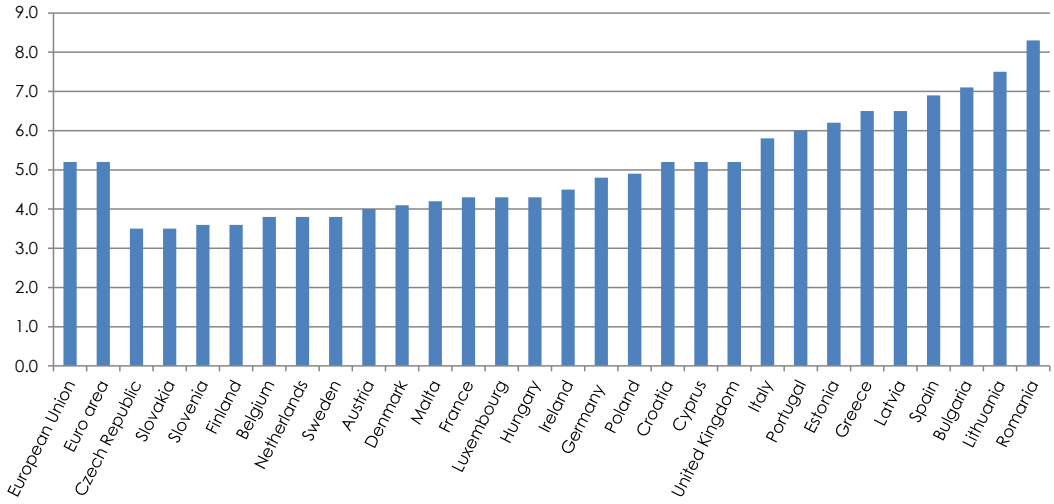
INTRODUCTION

by Mary Veronica Tovšak Pleterski*

In the context of the rising attention for income inequality in academic and policy debates, this workshop aimed at improving the methodological knowledge of the theoretical and empirical tools to assess the impact of structural reforms on income inequality.

Since the beginning of his mandate in November 2014, the President of the European Commission, Jean-Claude Juncker, has stressed on several occasions the importance of tackling income inequality. Addressing inequality is a political imperative for the EU, both because of its implications for social fairness and for reasons of economic efficiency. At the end of April, the Commission's proposal for a European Pillar of Social Rights was adopted[1], together with a reflection paper on the future of the EU's social dimension[2] that looked at the issue of income inequality.

Figure 1. **Inequality of income distribution, 2015 (income quintile share ratio)**



Note: Eurostat code ilc_di11. The income quintile share ratio (S80/S20 ratio) is a measure of the inequality of income distribution. It is calculated as the ratio of total income received by the 20% of the population with the highest income (the top quintile) to that received by the 20% of the population with the lowest income (the bottom quintile).

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[1] In April 2016 the Pillar was presented under two legal forms: as a Commission Recommendation, effective as of 26th April 2017, and as a proposal for a joint proclamation by the Parliament, the Council and the Commission.

[2] European Commission "Reflection Paper on the Social Dimension of Europe", COM(2017) 206 of 26 April 2017.

Europe is home to the most equal societies in the world; nevertheless significant disparities exist between households. On average, the wealthiest 20% of households in the EU earn 5.2 times more than the poorest 20%. For the EU, the gap between the 20% of the population with the highest income and the 20% of the lowest income (the income quintile share ratio) varies considerably across Member States, from 3.5 in Slovakia and the Czech Republic, to 6.0 or more in Portugal, Estonia, Greece, Latvia, Spain, Bulgaria and Lithuania and Romania. Income inequality [S80/S20] in the EU has increased since 2006 and reached 5.2 that remained stable for 2014 and 2015.

The workshop sought to improve the analytical tools to assess the impact of structural reforms on income inequality in the context of enhancing economic performance.

The aim was to analyse the impact of structural reforms on income inequality, as the latter may affect economic performance. Although the effect of income inequality on growth is controversial, recent publications by international organisations such as the OECD[3], the World Bank[4], The International Labour Organization[5] and the International Monetary Fund[6] suggest that income inequality may have a long-term negative impact on potential growth by consolidating and reinforcing existing inequalities, limiting skills development and hampering social and occupational mobility.

The workshop, inter alia, discussed aftermarket structural reforms, such as those that increase the progressivity of tax and transfer systems, which can reduce net income inequality. It was also considered how well-designed labour and product market reforms can have a positive impact on market income inequality.

This workshop aimed to reflect the state-of-the-art literature regarding the theoretical and the empirical methodologies for analysing the effect of structural reforms on income inequality and presenting a selection of the most recent work of experts in the field. The first part of the workshop focused on labour and product market reforms and discussed modelling and econometric results. The second part presented empirical results of tax reforms with the focus on microsimulations models.

[3] See for example: Cingano, F. (2014), "Trends in Income Inequality and its Impact on Economic Growth", OECD Social, Employment and Migration Working Papers, No. 163, OECD Publishing, Paris (and many of the papers cited among his references) or OECD (2015). "In It Together: Why Less Inequality Benefits All", OECD Publishing, Paris.

[4] See for example Ferreira, F., Lakner, C., Lugo, M. and Ozler, B. (2014). "Inequality of Opportunity and Economic Growth: a Cross-Country Analysis". Policy Research Working Paper, No. WPS 6915. Washington, DC: World Bank Group or Brueckner, M. and Lederman, D. (2015). "Effects of Income Inequality on Aggregate Output". Policy Research Working Paper, No. WPS 7317. Washington, D.C. World Bank Group.

[5] See for example ILO (2015) "Income Inequality and Labour Income Share in G20 countries: Trends, Impacts and Causes" Report prepared for the G20 Labour and Employment Ministers Meeting and Joint Meeting with G20 Finance Ministers (Ankara, Turkey, 3-4 September 2015) by the International Labour Organization (ILO), the International Monetary Fund, the Organisation for Economic Cooperation and Development (OECD), and the World Bank Group.

[6] See for example Jonathan D. Ostry, J. Berg, A. and Tsangarides, G. (2014) "Redistribution, Inequality and Growth", IMF Staff Discussion Note.

1.1. A GENERAL EQUILIBRIUM (LABOUR MARKET and PRODUCT MARKET REFORMS) PERSPECTIVE TO INEQUALITY.

How do product and labour market regulations affect aggregate employment, inequalities and job polarisation? A general equilibrium approach.

by Julien Albertini*, Jean-Olivier Hairault (Speaker) François Langot*** Thepthida Sopraseuth******

1.1.1. Introduction

The dynamic in the level of employment and in income/wage inequalities can be driven, among other economic forces, by the task biased technological change (TBTC) and by the consequent job polarisation phenomenon. This latter consists in a decrease of the demand for routine jobs and in an increase of abstract and manual jobs. The reason behind the job polarisation is the technological progress that generates the computerisation of the routine tasks. In the future, the developed economy will continue to experience the computerisation process of the routine tasks with the implication of a lengthy process of employment reallocation. The allocation of workers to different firms and to different sectors will depend on the above mentioned technological opportunities, but also on the evolution of product and labour market institutions. In the study here presented the deep interaction between labour/product market institutions and technological progress has been analysed. Three countries: US, France and Germany, representative of alternative institutional settings and having the potential to induce divergent time paths in the evolution of labour market outcomes during the process of technological transition, are considered to provide empirical examples. In this analysis the objective is first to unveil the respective role of the task biased technological change, of the rise share of high skill workers in labour supply and of the labour market institutions in the economic performance in terms of employment and in terms of equalities. In other words, the objective of the model is first to be able to fit the data and in a second step to evaluate some policy reforms and making some counterfactual analysis.

The models belong to that strand of research of Autor and Dorn (2013) which embody the features of the polarisation and of the technological progress plus search and matching frictions, and endogenous occupational choices. In the model we take into account three exogenous trends: There is the trend at the root of the technological progress that is the fact that we have the fall and the continuous fall in the price of computer capital. We also have differentiated evolution of labour and product market institutions across countries. For each country we analyse the prediction in terms of employment and the dynamic of inequality.

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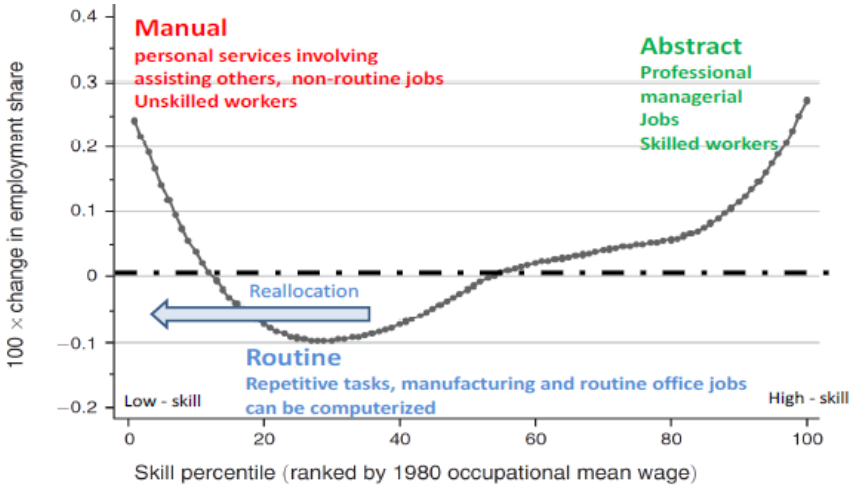
**** Thepthida Sopraseuth is Professor of Economics at the University of Cergy-Pontoise, THEMA. Her main research interest lies in employment policies, macroeconomic dynamics, monetary and fiscal Policy.

1.1.2. Job polarisation and employment rate dynamics

As shown in Figure 1, job polarisation consists in the disappearance of routine jobs (the repetitive tasks, manufacturing and routine office jobs that can be computerised) relative to those at the bottom (manual jobs such as personal services involving assisting others) and top of the wage distribution (abstract jobs such as professional and managerial jobs). These evidences have been extensively documented in the literature by Autor and Dorn (2013).

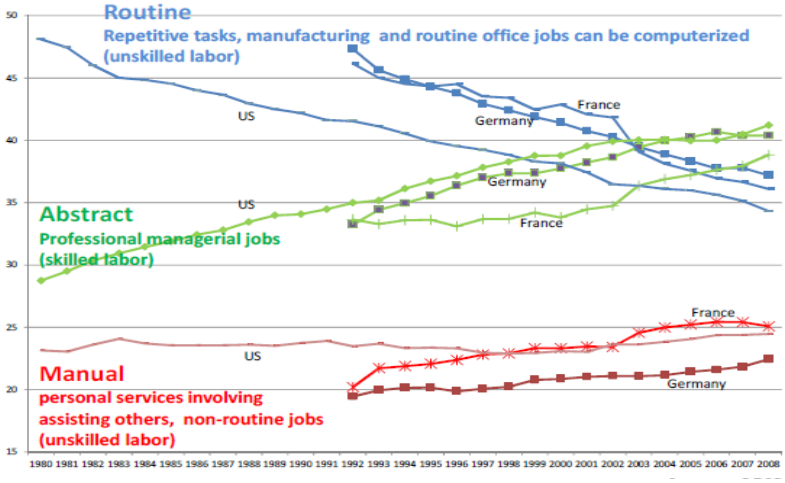
Figure 1. **Smoothed changes in employment by skill percentile, 1980-2005**



Source: Autor and Dorn (2013)

The decline in routine jobs, along with the increase in abstract jobs and in manual jobs is clearly visible in the three countries under scrutiny in this analysis: US, France and Germany (Figure 2).

Figure 2. **Job polarisation: changes in employment share in abstract, routine, and manual tasks.**

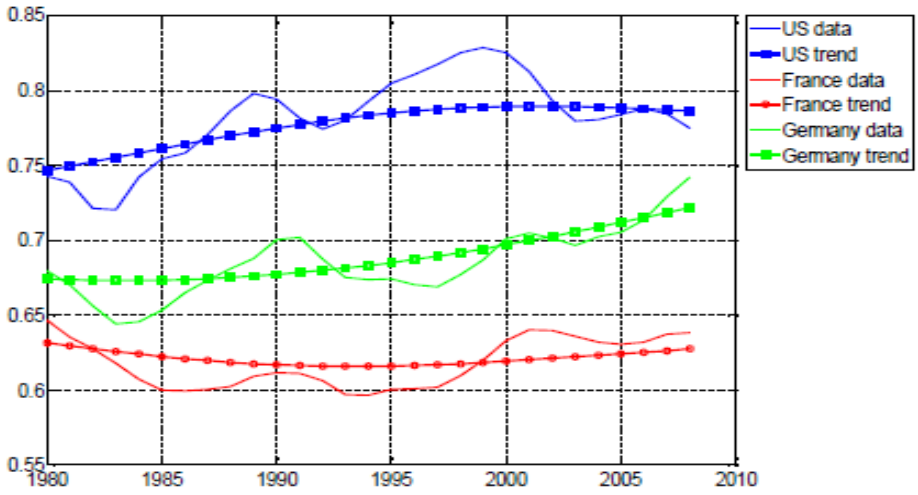


Note: OECD computations based on CPS US data, French and German labour surveys. Total employment by occupational groups is disaggregated by occupational groups. Occupations are then divided into abstract, routine or manual jobs based on Goos and Manning (2009) classification.

It can be also noticed that, although job polarisation is at work in the US, Germany and France, aggregate employment evolved very differently with a striking rise in aggregate employment in the US

between 1980 and 2000, a rise that begin after 1990 in Germany and a downward trend in aggregate employment in France until the end of 90s (Figure 3). Read together, Figures 2 and Figure 3 suggest that job polarisation must be understood in relation with the evolution of the level of aggregate employment, and can imply very different amounts of underlying reallocation. Indeed, in Figure 1, the US employment share of service occupation jobs has increased by only 6% over the last 30 years. Given the rapid rise in the US aggregate employment level in the 1980s and 1990s, however, this apparently limited increase actually involves large labour reallocations from routine to manual jobs. The evolution of the labour supply, where the supply of skilled workers increases, makes this increase in the share of manual tasks even more remarkable. In contrast, in a country like France the increasing share of workers in service occupations might just be mirroring a mere mechanical effect of the fall in overall employment: in an extreme case where all workers from the routine sector had become permanently non-employed, constant levels of jobs in abstract and manual tasks would have been enough to lead to a rise in their respective employment shares.

Figure 3. **Employment rates.**



Note: OECD data. Employment rate 18-64 years old

1.1.3. The model

With the aim of describing the dynamics of workers reallocation process a non-stationary general equilibrium model with search and matching frictions, workers' endogenous occupational choices and job polarisation due to the deterministic task biased technological change, is presented.

The model is based on three building blocks (as shown in Figure 4):

- The firm sector (middle of Figure 4) includes the good producing sector and the manual non-routine services sector.

- The good producing sector uses two intermediate goods: a high-tech good and a low-tech good. The high-tech good is produced by high-skilled workers occupied in abstract non-routine cognitive jobs. The low-tech goods are produced by a CRS production function that uses: i) unskilled workers employed in routine jobs and ii) technology intended as equipment, computers, machine that can also perform repetitive tasks.

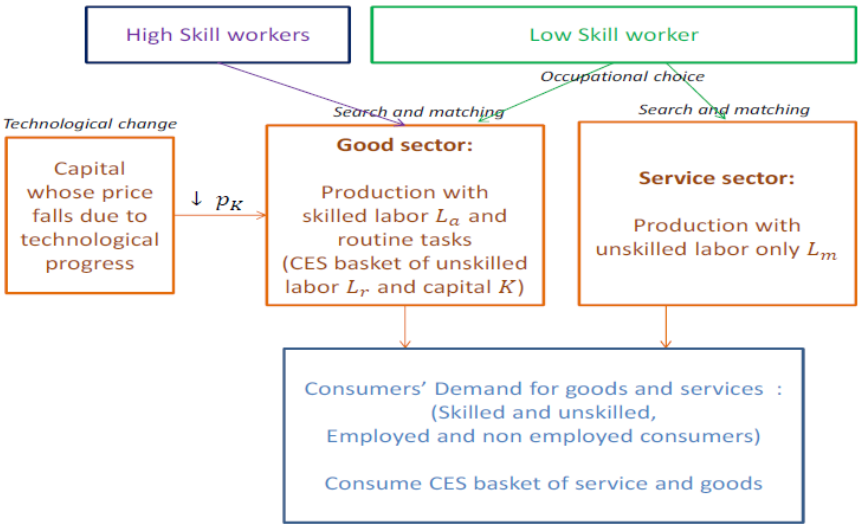
- The manual service producing sector employs only unskilled workers that perform "manual" tasks.

- Technological change is captured by a downward trend in the price of technology which creates a strong incentive for low-tech good producing firms to substitute workers occupied in "routine" jobs for capital.

For workers (top of Figure 4) they are occupied either in "routine" jobs (that can be substituted by capital as their tasks can be easily computerised) or in "abstract" and "manual" jobs (that are not directly substitutable by capital change).

For retailers/consumers (bottom of Figure 4) Retailers in each sector buy inputs from producing firms and sell it to consumers. We have retailers in good and retailers in services in order to allow the policy maker to possibly lower Product Market Regulation (PMR hereafter) only in one-sector rather than the two sectors. In each retailing sector, there is Cournot competition. The price and quantity therefore depend on the endogenous number of firms. The larger the number of firms, the keener the competition, the lower the retail price, the higher the quantity produced by retailers. Firm entry is endogenous and subject to entry costs. Firm exit occurs exogenously at a fixed rate, as in Melitz (2003). For final demand households buy goods and services from retailers.

Figure 4. **Building blocks of the model.**



The cross-country heterogeneity is introduced trough labour market institutions and wage settings whereas consumer preferences, technology and distribution of abilities within unskilled labour are identical. Depending on the labour market institution and the wage settings there are three types of economies:

- type I (as the case of the US): wages are subject to bargaining between firms and workers, and hence are responsive to changes in productivity and workers' outside options (unemployment benefits, social programs).

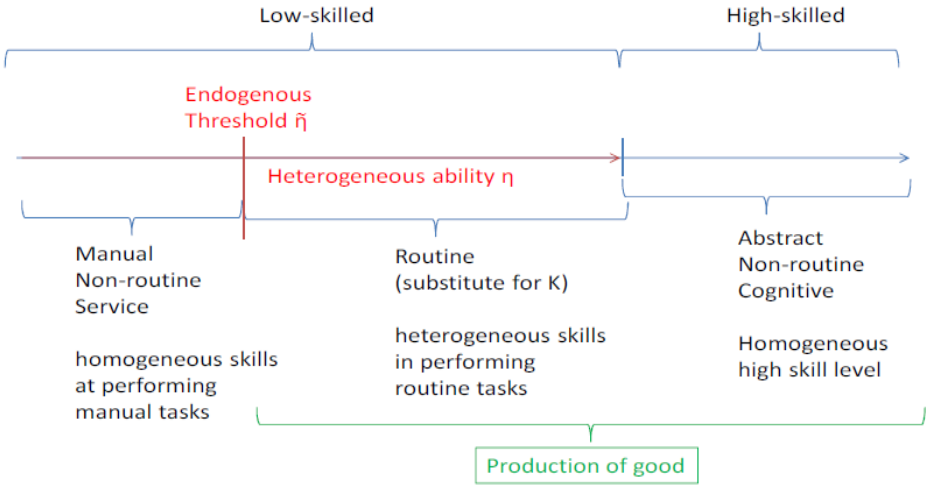
- type II (as the case of France): wage setting is bounded by a minimum wage, which is uniform for all sectors.

- type III (as the case of Germany): wage evolves with a reference to a sector-specific social norm which leads to an endogenous wage moderation specific to each sector.

Furthermore, there are imperfections in both labour and good/services markets. In the labour market, there are search and matching frictions and real wage rigidities[7]. In the good and services market there is an endogenous number of firms determined by costly entry in imperfect competition markets[8].

Focussing on labour allocation[9], in this section, we give a closer look at the top of Figure 4. Labour supply consists of skilled and unskilled workers (as shown in Figure 5). As far as their abilities are concerned, skilled workers are homogeneous and all perform abstract tasks (non-routine, cognitive jobs) in the good-producing firms. Unskilled workers differ with respect to their abilities. Indeed, they have either homogeneous or heterogeneous levels of abilities depending on belonging to the manual or routine pool. There is also an endogenous threshold of ability that separates the manual jobs from the routine jobs (below the endogenous threshold workers choose to work in manual jobs). Occupational choices, by affecting the number of workers in each unemployment pool, directly alter unemployment rates in each sector of the economy as well as job finding probabilities.

Figure 5. **Labour market flows**



As far as labour market flows and occupational choices are concerned, skilled workers are employed in abstract tasks. When fired, they join the pool of unemployed skilled workers and look for an abstract job. Unskilled workers can be employed either in routine tasks in the good producing firm or in manual tasks in the service sector. When fired from the good-producing firms, routine unemployed workers can choose to switch occupation (we call them new movers) and join the pool of unemployed workers looking for manual jobs. New movers differ from other unemployed workers looking for a manual jobs because i) their unemployment benefit depends on their past occupation as routine workers, ii) they just arrived on the market for manual jobs and lack proper information about the tasks and firms on the market. New movers gradually learn about the tasks and the market: their productivity as manual workers is lower than their counterparts.

[7] As in Mortensen and Pissarides (1994).
[8] As in Melitz (2003).
[9] This part of the model is based on Autor and Dorn (2013).

1.1.4. Labour market and product market reforms and their effects on employments and on wage/income inequality

Table 1. **Summary of the (past) labour market reforms in the US, France and Germany.**

	Replacement Ratio	Bargaining Power	Minimum Wage	Social Assistance
US	low and decreasing	low and decreasing	low and decreasing	middle and decreasing
France	high and increasing	high and increasing	high and increasing	high and increasing
Germany	high and decreasing	high and decreasing	no minimum wage	high and decreasing

Note: red indicates the period starting since the beginning of the 80s and blue indicates the period starting since the middle of the 90s.

As far as labour market institutions (LMI) are concerned, four institutions are here considered: replacement rate, bargaining power, minimum wage and social assistance. As it is shown in Table 1, for the US there is a continuous decline in the generosity of labour market institutions started at the beginning of the 1980s with President Reagan. In France, on the contrary, it can be observed, since the mid-1980s (with President Mitterand), an upward trend in generosity of labour market institutions. Germany is characterised by 2 sub-periods, with first, as in France, an upward trend in generosity (until the mid-1990s), then, starting from 1995, a reversal on workers' bargaining power and generosity of assistance programs as well as replacement ratios (with Chancellors Kölh and Schröder). The different paths in labour market institutions interact differently with the same level of technological progress generating, thus, different outcomes in terms of employment and income/wage inequalities.

Table 2. **Summary of the counterfactual analysis results labour market reforms in the US, France and Germany.**

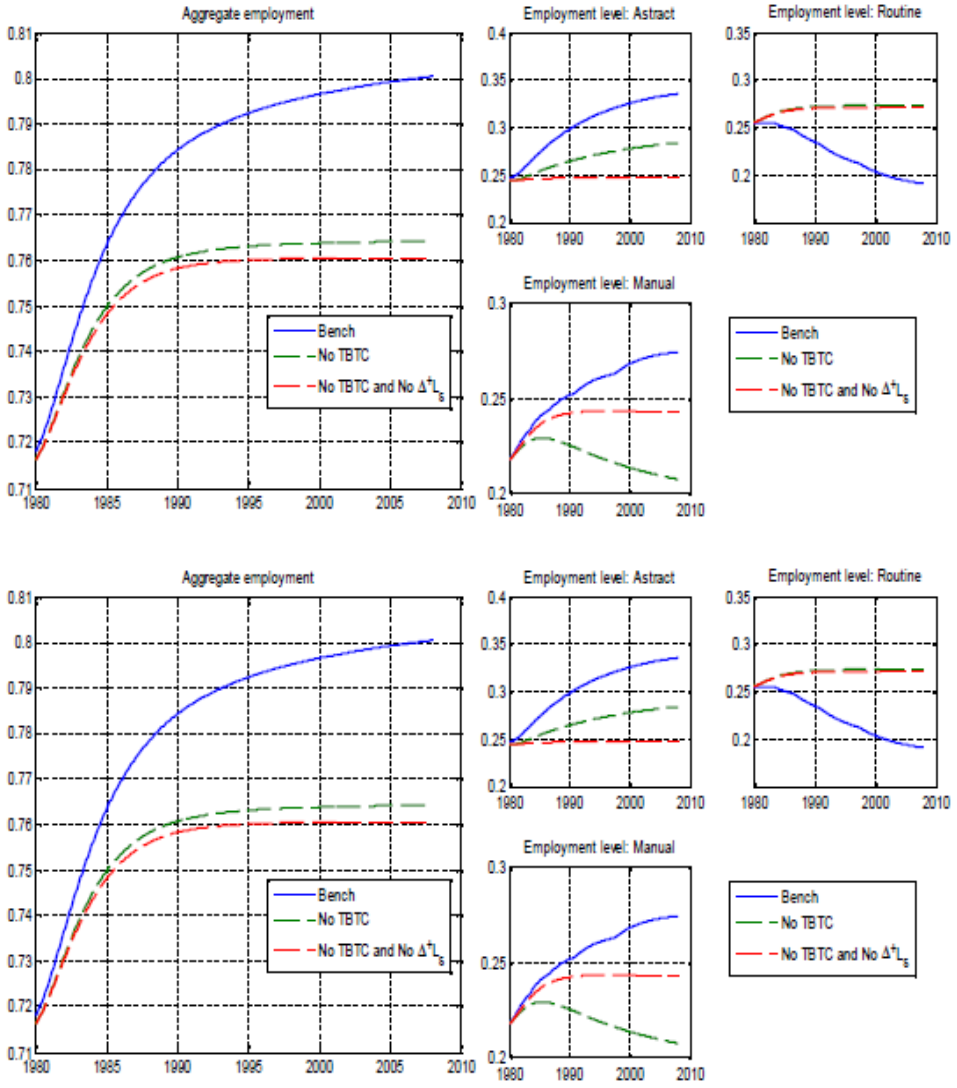
	labour market institutions	additional effect of labour supply	additional effect of TBTC	total
US	+4 pp	+0.5 pp	+3.5 pp	+8 pp
France	-7 pp	+5 pp	-4 pp	-6 pp
Germany	+3 pp	+0.5 pp	+1.5 pp	+5 pp

A counterfactual analysis is used in order to disentangle the relative role and weight of labour market policies, of labour supply and of technological change for the period 1980-2010. Results are summarised in Table 2, whereas Pictures 5, 6 and 7, respectively for the US and France, that present pretty different features and outcome, show which would have been the path of the economy in the absence of the TBTC and of the increase in labour supply. The benchmark scenario includes both TBTC and increase in labour supply.

- for the US economy in the benchmark case routine employment falls while manual and abstract employment both increase. TBTC is the leading force behind changes in employment shares across tasks. It results in a strong rise in aggregate employment rate of about 8 percentage points (from the beginning to the end of the transition, employment rate goes up from 0.72 to 0.80). In the case without technological change, the employment level in the routine sector would have increased on impact due to the small decline in workers bargaining power which lowers negotiated wages and prompt employers to post more vacancies. But there is no reallocation. Employment in services declines slightly, meaning that the rise in aggregate employment is almost entirely governed by the labour supply shock of abstract job. It should be noted that TBTC amplifies the rise in abstract jobs by raising the level of capital and therefore their productivity. Absent TBTC, employment growth would have been of 4 percentage points (from 0.72 to approximately 0.76) rather than the 8 percentage points in the benchmark economy. Without technological change, the rise in US employment would have been cut by half. When we remove the increase in educational attainment, the transitional dynamic exhibits a weak increase in abstract employment. In turn, aggregate employment declines with respect to the benchmark scenario. The gap between the benchmark and the

counterfactual amounts to 1.5 percentage point, which suggests that, absent the rise in the supply of skilled labour, the US employment growth would have been 20% (1.5pp divided by 8pp) lower.

Figure 6 and 7. **Counterfactual/TBTC/Labour Supply/LMI for the US and France**



- for the French economy the benchmark economy experiences a decline in employment by around 7 pp: aggregate employment rate goes down from approximately 0.63 to 0.56. Despite the increase in employment in abstract jobs, the fall in low-skill employment (routine and service) explains the downward trend in aggregate employment. While the routine sector declines, the service sector does not depict any clear increase. In other words, there is no reallocation from routine to service, workers remain unemployed. Since TBTC generates employment fall, the counterfactual French economy without TBTC is better off than the benchmark scenario. Due to the increasing generosity of French LMI, aggregate employment rate still falls in the long run (by 2 pp, from 0.63 in the initial steady state to 0.61 approximately in the final steady state). However, this fall is lower than the one observed in the benchmark scenario (7pp). We then conclude that, without technological change, the fall

in French employment would have been cut by 70%.The counterfactual economy without the rise in educational attainment displays a larger fall in aggregate employment (from 0.63 to 0.51) than the benchmark scenario (from 0.63 to 0.56). The model also predicts that, without the increase in skill labour, the fall in employment would have doubled. The improvement in educational attainment dampened the unfavourable consequences of technological change.

From the policy maker's point of view, TBTC cannot only generate employment gains (losses) but can also have negative redistributive effects. More specifically:

- for the US labour market reforms accompany the opportunity of technological changes, new jobs are created at the top and at the bottom of the wage distribution, there are large employment gains but at the same time high wage inequalities.

- for France, in the presence of Minimum Wage, priority is given to solve lower wage inequalities but at the expense of lower job creations in manual jobs.

- for Germany the wage moderation and the fall in social program since the middle of the 90s with the job creation for abstract and manual implied a large employment gains but high wage inequalities.

Our view on the reforms is that the structural change must be accompanied by policy measures that magnify its positive impact on job creation, but at the same time, that limit inequalities. Any policy that aims at protecting the declining tasks is inefficient in the medium and in the long run. By contrast, the most efficient reforms are those that favour reallocation towards the expanding activities. These targeted reforms include targeting active labour market policies and payroll taxes reductions to low skilled workers along with the liberalisation of the service sector.

Active labour market policies: Among the active labour market policies, one possibility is that of a subsidy on hiring costs for workers who choose to move from the routine labour market towards manual tasks. This is particularly relevant when the reallocation unemployment is the main issue. In this case the impact on wage inequalities is not significant, but is relevant for the reduction in income inequalities since the cost of the reallocation is reduced by a shorter unemployment spell. This reduces the number of workers receiving low revenues, thus income inequalities decrease. Other kind of useful policies in this context are the implementation of the training programs for workers. Comparing the active labour market policies with some other policies implemented in the past, such as, reducing unemployment benefit (UB) generosity it can be seen that: i) the impact of the UB reduction on wage inequalities depends on the existence of minimum wages (MW). Without MW, for low paid workers, the reduction in UB significantly reduces wages, thereby raising inequalities (for high paid workers, the share of UB in the wage is less important; ii) The costs for the neutrality on wage inequality, are the employment losses induced by the MW: given that the UB reduction does not change the labour costs at the bottom of the distribution in an economy with a MW, there is no employment gains induced by the reform in that part of the distribution, only unemployed workers who are less paid. This is not the case in countries where UB reduction leads to more employment at the bottom of the distribution.

Payroll tax subsidies: The payroll tax subsidies need to be targeted at the low skilled workers as this turns to be relevant when there is job reallocation toward the bottom of the wage distribution. The main impact of this policy is to increase the "employment chances" at the bottom of the distribution and hence its impact on wage inequalities is negligible. Concerning income inequality, this policy reduces them in all countries. This contrast with the reduction in UB: even in countries of type II, we observe a reduction in inequalities induced by the reform. Indeed, unskilled workers enjoy higher "employment opportunities", and do not suffer from a fall in their income when they are unemployed.

Regulating competition on the good markets: consists in reducing the entry cost on the good market and accelerating the path of the technological progress. The main impact of the increase in competition in the good sector is a rise in wages at the top of the distribution. The decline in labour demand for routine tasks is accelerated when we introduce an acceleration of the technological change after the reform (more incentives to innovate for competitive firms). Hence, wages of these workers decrease rapidly. A large amount of reallocations arrives at the same time in labour market of the service sector. This generates congestion effects. All these mechanisms explain the large increase in inequalities in the short run: the wages of abstract workers go up whereas the others' are compressed at the bottom.

1.1.5. Conclusions

This analysis develops a multi-sectorial search and matching model with endogenous occupational choice in a context of biased technological change. Our objective is to shed light on the way labour market institutions affect aggregate employment, job polarisation and inequalities observed in the US and in European countries. We consider the cases of the US, France and Germany that are representative of alternative institutional settings, having the potential to induce divergent time paths in the evolution of labour market outcomes during the process of technological transition. In the US, we find employment gains from technological change and job polarisation, whereas, in France, the technological change reduces aggregate employment in a context of job polarisation. With counterfactuals experiments, we quantify the hypothetical change in aggregate employment without technological change or rise in the supply of skilled labour. In the US, without technological change (without the rise in skilled labour), employment growth would have been cut by half (by 20%). In France, the change in LMI, especially the rise in the minimum wage, affects new job opportunities in manual jobs: the reallocation of routine workers towards manual jobs is obstructed for want of job creations of manual services. Job polarisation in France only mirrors the fall in aggregate employment. Hence, without technological change, the fall in French employment would have been cut by 70%. The model also predicts that, without the increase in skilled labour supply, the fall in French employment would have doubled. The improvement in educational attainment dampened the unfavourable consequences of technological change.

1.1.6. References

Autor, D. H. and Dorn, D. (2013). The growth of low-skill service jobs and the polarisation of the US labor market. American Economic Review 103(5): 1553–1597.

Goos, M, Maling, A. and Salomons, A. (2014). Explaining job polarisation: Routine-biased technological change and o shoring. American Economic Review 104(8): 2509–2526.

Melitz, M.J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. Econometrica 71(6): 1695-1725.

Mortensen, D. and Pissarides, C. (1994). Job creation and job destruction in the theory of unemployment. Review of Economic Studies 61: 397-415.

1.2. THE EFFECTS OF LABOUR MARKET REFORM: AN AGENT-BASED MODEL APPROACH.

The unexpected damages of labour market flexibility and structural reforms: insights from the "Schumpeter meeting Keynes" agent-based models.

by Giovanni Dosi*

1.2.1. Introduction

In this work we discuss the findings obtained from the "Schumpeter meeting Keynes" family of Agent-Based Models (ABMs) concerning comparative dynamic exercises on artificial economies, populated by heterogeneous interacting agents, characterised by different degrees of labour market flexibility (Dosi et al., 2017) or hit by institutional shocks entailing labour market structural reforms (Dosi et al., 2016).

The obvious theoretical counterpart is the general idea, widespread in the literature that the primary cause of unemployment rests on various forms of labour market rigidities. The OECD (1994) Jobs Study is a classic reference in the advocacy of the benefits from labour market liberalisation. The report basically argued that the roots of unemployment rest in social institutions and policies such as unions, unemployment benefits, and employment protection legislation. Under this perspective, the ultimate target for reforms should be fostering productivity and output growth by tackling such bottlenecks. More precisely, the "Jobs Strategy" contained three recommendations directed at making wage and labour cost more flexible, namely (i) removing restrictions that prevent wages to be respondent to local market conditions; (ii) reform the employment protection legislation (EPL), abolishing legal provisions that can inhibit the private sector's employment dynamics; and (iii) reform the Social Security benefits such that equity goals can be reached without impinging the efficient functioning of labour markets These policy recommendations were the results of a so called "Unified Theory" or "Transatlantic Consensus", also known as the "OECD-IMF orthodoxy" (Howell, 2005) or the "Berlin-Washington Consensus" (Fitoussi and Saraceno, 2013) according to which labour market institutions such as collective bargaining, legal minimum wages, employment protection laws and unemployment benefits foster rigidities that make job creation less attractive for employers and joblessness more attractive for workers. This is supposed to occur via two routes, namely, first, the induced downward rigidity on wages (and thus the purported reduction of labour demand) and, second, an excessively high wage for low-skilled workers (and, thus, again a purported lower demand for them). Such a theory would in fact predict an efficiency-equity trade-off: societies have to choose between efficiency (reducing unemployment but increasing inequality) or equity (reducing inequality but increasing unemployment).

Unfortunately, the empirical side of this theory has proved to be rather weak. Howell and Huebler (2005) find little evidence of the unemployment-inequality trade-off both in level and growth variables for 16 OECD countries in the period 1980-1995. On the contrary, Stiglitz (2012, 2015) suggests that high income inequality induces a lack of aggregate demand which yields higher unemployment rates, having rich people a lower propensity to consume, in line with the whole Keynesian/Kaldorian

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tradition. Heathcote et al. (2010) find evidence that during recessionary phases low-income workers are more severely hit by layoffs, implying that income concentration diverts toward upper classes in these periods. Maestri and Roventini (2012) confirm a positive cross correlation between inequality and unemployment in Canada, Sweden, and the United States.

Concerning labour market structural reforms, during the years of the recent European crisis (and also before), several countries and particularly the Mediterranean ones have introduced policies aimed at labour market flexibilisation such as the Jobs Act in Italy and the reform of the Code du Travail in France. However, Oswald (1997), Baccaro and Rei (2007), Avdagic and Salardi (2013), Avdagic (2015) and Storm and Naastepad (2012), on more recent datasets, find no compelling evidence on the revealed benefits of labour market liberalisation.

Regarding inequality and focusing on the US, DiNardo et al. (1996) and Fortin and Lemieux (1997) find that de-unionisation (for men) and the stagnant minimum wage (for women) have been the core institutional determinants leading to increasing inequality trend in the country. In a similar vein, a recent IMF report (Jaumotte and Buitron, 2015) focuses, among all possible causes of inequality, on the institutional changes that occurred in the labour market as a driver of more unequal income distribution. Interestingly, the authors find in the transformation of labour market institutions the source of both functional and personal inequalities.

Due to the blossoming evidence which markedly question the "recipe" of labour market structural reforms, in the last decade the OECD retreated from some of the questionable claims proposed in the Jobs Strategy, acknowledging that the evidence on the effect of EPL is not conclusive, the emergence of temporary contracts can have undesirable effects like dualism in the job market, and that the effect of unionisation should be more carefully analysed (Freeman, 2005). However, notwithstanding the lack of any compelling evidence on the ability of labour market structural reforms to reduce unemployment, such a belief stubbornly persists.

Indeed, our results boil down to a complete debunking of the old “OECD-IMF consensus”. In fact, by means of the “Schumpeter meeting Keynes” ABMs, first, we show that the more flexible are wages and employment and the weaker are institutions supporting wages and workers welfare, the more fragile is the economy. Keynesian coordination failures are higher and severe crises more likely. Conversely, seemingly more rigid labour markets and industrial relations are conducive to coordination successes with higher and smoother growth. Second, the introduction of labour market structural reforms – aimed at altering the wage formation mechanisms and reducing unionisation, unemployment benefits and minimum wages – are likely to yield both higher inequality and structural unemployment without fostering productivity or GDP growth.

In Section 2 we offer a concise discussion of the rationale of Agent-Based Models. Section 3 presents the main features of the “Schumpeter meeting Keynes” model(s). The results are presented in Section 4. Section 5 offers a general discussion and concludes the paper.

1.2.2. The Agent Based methodology

As well known, a familiar approach to macroeconomic phenomena involves the compression of the dynamics of a complex evolving system into the behaviour of a rational forward-looking representative agent, possibly perturbed by some frictions, adjustment lags or informational imperfections. However, such an assumption, that the working of modern economies is basically equivalent to the behaviour of a central planner, rules out by construction all macro questions which entail interdependencies and coordination (and possibly coordination failures). The ABMs approach is

at the opposite methodological end and explicitly acknowledges the thread of interdependencies among multitudes of functionally differentiated agents.

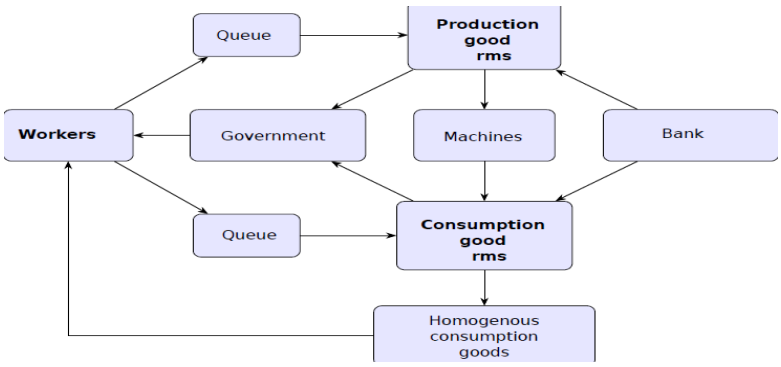
More in details, Agent-Based Models (ABMs) are large-scale, computational models which allow the simulation of artificial economies wherein ensembles of heterogeneous agents interact on the ground of simple behavioural rules. Aggregate-level outcomes are the emergent properties from the interactions of such boundedly rational agents.[10] Unlikely DSGE models driven by the search of closed-form solutions derived from linearisation around equilibrium conditions, ABMs are open-ended systems where the notion of coordination substitutes the one of equilibrium. Moreover such models may display path-dependency along each simulation history, as well as between alternative simulations. Short of any derivation from some principle of rationality, ABMs ought to be primarily judged on their ability to reproduce as emergent properties sets of stylised facts, i.e. empirically observed statistical regularities. The use of agent-based models has become the standard practice in many disciplines dealing with complex phenomena, wherein the micro and the macro levels are not isomorphic. More recently, these models have also been adopted in economics (for a recent review of ABM macroeconomics, see Fagiolo and Roventini, 2017). Indeed, the features of ABMs are particularly suited to the analysis of economic phenomena characterised by (i) disequilibrium processes and (ii) persistent heterogeneity.

The results presented here come from versions of the "Schumpeter meeting Keynes" (K+S) family of models (Dosi et al., 2017, 2016)[11] which explicitly account for decentralised labour markets under different labour relation regimes.[12]

1.2.3. The model

As mentioned, the K+S are general disequilibrium agent-based models, populated by heterogeneous firms and workers, who behave according to boundedly rational behavioural rules. In the versions whose results are presented here, we extend the early K+S model (Dosi et al., 2010) to account for explicit, decentralised interactions among firms and workers in the labour market.

Figure 1: **The model structure. Boxes in bold style represent heterogeneous agent's populations.**



[10] For a general overview in ABM methodology application in economics and the social sciences, see Tesfatsion (2006), Epstein (1999), and Gilbert (2008). Axelrod and Tesfatsion (2006) provide a concise introduction.
[11] See also (Dosi et al., 2010, 2013, 2015).
[12] The K+S models belong to the broader tradition of Agent-Based evolutionary models (Nelson and Winter, 1982).

In particular, such a decentralised version allows (i) to create an alternative model to the standard search and matching models bound to account for unemployment as only a frictional phenomenon in the matching process, and not as a structural-disequilibrium one; (ii) to nest the process of endogenous technological change in a model characterised by an institutional dynamics of the labour market, with varying degrees of flexibility and alternative firing schemes; (iii) to model both functional and personal income inequality, which in absence of a heterogeneous workforce could not be possible; (iv) to account for the set of stylised facts of the labour market, namely, matching functions, Beveridge-, Wage- and Okun curves, frequencies of hiring and firing rates, relative standard deviations of productivity vs unemployment-vacancy rates.

The two-sector economy is composed of three populations of heterogeneous agents, namely capital-good firms, consumption-good firms, consumers/workers, plus a bank and the Government. The basic structure of the model is depicted in Figure 1. Capital-good firms invest in R&D and produce heterogeneous machine-tools whose productivity stochastically evolves over time. Consumption-good firms combine machines bought from capital-good firms and labour in order to produce a homogeneous product for consumers. There is a minimal financial system represented by a single bank that provides credit to firms to finance production and investment plans. Workers submit job applications to a random subset of firms, with probability proportional to the size of the latter. Firms hire according to their individual adaptive demand expectations. The government levies taxes on firms and pays unemployment benefits, according to the policy setting, keeping a relatively balanced budget in the long run.

1.2.2.1. The capital- and consumption-good sectors

The capital-good industry is the locus where innovation is endogenously generated in the economy. Capital-good firms develop new machine-embodied techniques or imitate the ones of their competitors in order to produce and sell more productive and cheaper machinery, supplied on order to consumption-good firms. The capital-good market is characterised by imperfect information and Schumpeterian competition driven by technological innovation. Machine-tool firms signal the price and productivity of their machines to their existing customers as well to a subset of potential new ones and invest a fraction of past revenues in R&D in order to search for new machines or copy existing ones. On order, they produce machine-tools with labour only. Prices are set using a fixed mark-up over unit (labour) costs of production.

Consumption-good firms produce a homogeneous good employing capital (composed by different "vintages" of machines) and labour under constant returns to scale. Desired production is determined according to adaptive demand expectations. Given the actual inventories, if the capital stock is not sufficient to produce the desired output, firms order new machines in order to expand their installed capacity, paying in advance – drawing on their cash flows or, up to a limit proportional to its size, on bank credit. Moreover, they replace old machines according to a payback-period rule. As new machines embed state-of-the-art technologies, the labour productivity of consumption-good firms increases over time according to the mix of vintages of machines present in their capital stocks. Consumption-good firms choose in every period their capital-good supplier comparing the price and the productivity of the machines they are aware of. Firms then fix their prices applying a variable mark-up rule on their production costs, trying to balance higher profits and the growth of market share. More specifically, mark-up dynamics is driven by the evolution of the latter: firms increase their price whenever their market share is expanding and vice versa. Imperfect information is also the normal state of the consumption-good market so consumers do not instantaneously switch to the most competitive producer. Market shares evolve according to a (quasi) replicator dynamics: more competitive firms expand while firms with relatively lower competitiveness levels shrink, or exit the market.

1.2.2.2. The labour market

The labour market implements a decentralised search and hiring process among workers and firms. The aggregate supply of labour is fixed and all workers are available to be hired in any period. Also the labour market is characterised by imperfect information. When unemployed, workers submit a certain number of job applications to firms. Employed workers may or may not apply for better positions, according to the institutional set-up. Larger firms, in terms of market share, have a proportionally higher probability of receiving workers applications, which we metaphorically represent as firm-specific queues. Firms decide their individual labour demand based on the received orders (capital-good sector), the expected demand (consumption-good sector), and their current labour productivity level. Giving their labour force, firms decide to (i) hire new workers, (ii) fire some of their employees, or (iii) keep them. Hiring firms define a wage offer for the applicant workers, based on their internal conditions and their received applications. Workers select the best offer they get from the firms to which they submitted applications, if any. There is no second round of bargaining between workers and firms during the same time period and, so, firms have no guarantee of fulfilling all the open positions (no market clearing). Moreover, there are no firing or hiring transaction costs. We study two labour market regimes, which we call Fordist and Competitive. They are telegraphically sketched in Table 1. Under the Fordist regime, wages are insensitive to the labour market conditions and indexed on a convex combination between economy-wide and firm-level productivity growth. The same wage is simultaneously paid to all existing workers of a firm, so there are no intra-firm wage differentials. There is a sort of covenant between firms and workers concerning "long term" employment: firms fire only when their profits get negative, while workers are loyal to employers and do not seek for alternative occupations. Labour market institutions include a minimum wage fully indexed to aggregated economy productivity and unemployment benefits financed by taxes on profits. The main features of the Fordist regime we want to capture are (i) the low probability of a worker being unemployed, (ii) a wage dynamics mostly insensitive to the business cycle, (iii) a wage growth rate indexed upon productivity growth, (iv) the mass production and consumption of goods, (v) a low degree of inequality, and (vi) significant, tax-based unemployment benefits.

Conversely, in the Competitive regime, flexible wages respond to unemployment and market conditions, set by means of an individual bargaining process where firms have the last say. Employed workers search for better paid jobs with some positive probability. The Competitive regime is also characterised by different labour institutions: minimum wage is only partially indexed to productivity and unemployment benefits – and associated taxes on profits – might or might not be there. Workers have a (institutionally determined) reservation wage equal to the unemployment benefit they would receive in case of unemployment, if any. The wage desired by each worker is a function of the individual unemployment conditions and the past wages history. If the worker was unemployed in the previous period, her request shrinks: she will request the maximum between the unemployment benefits (if available) and her own satisfying wage, accounting for the recent worker-wage history. Firing occurs whenever a firm desires the shrinkage of its production.

Table 1: **The two archetypal labour regimes main characteristics configured in the model.**

	FORDIST	COMPETITIVE
Wage sensitivity to unemployment	rigid	flexible
Search intensity	unemployed only	unemployed and employed
Firing rule	under losses only	shrinkage on production
		only temporary contracts increasing protection contracts
Unemployment benefits / tax on profits	yes	no or reduced
Minimum wage productivity indexation	full	partial

1.2.2.3. Timeline of events and empirical validation

In each time step, firms and workers take their decision according to the following timeline: 1) machines ordered in the previous period are delivered; 2) Capital-good firms perform R&D and signal their machines to consumption-good firms; 3) Consumption-good firms decide on how much to produce, invest and hire/fire; 4) To fulfil production and investment plans, firms allocate their cash-flows and (if needed) borrow from bank; 5) Firms send/receive machine-tool orders for the next period (if applicable); 6) Firms open job queues and job-seekers send applications ("queue"); 7) Wages are set (by indexation or bargaining) and job vacancies are partly or totally filled; 8) Government collects taxes and pays unemployment benefits; 9) Consumption-good market opens and the market shares of firms evolve according to competitiveness; 10) Firms in both sectors compute their profits, pay wages and repay debt; 11) Entry and exit take places, firms with near zero market share or negative net assets are eschewed from the market and replaced by new ones; 12) Aggregate variables are computed and the cycle restarts.

The K+S model has already shown to be able to reproduce a rich set of macro and micro stylised facts. Moreover, the present version, which explicitly accounts for microeconomic firms-workers interactions, has already proved to be able to robustly reproduce most of the labour market empirical regularities, as outlined in Table 2.

Table 2: **Stylised facts matched by the model at different aggregation levels.**

FIRM-LEVEL STYLISED FACT	AGGREGATE-LEVEL STYLISED FACT
Skewed firm size distribution	Endogenous self-sustained growth with persistent fluctuations
Fat-tailed firm growth rate distribution	Fat-tailed GDP growth rate distribution
Productivity heterogeneity across firms	Endogenous volatility of GDP, consumption and investment
Persistent productivity differentials among firms	Cross-correlation of macro variables
Lumpy investment rates of firms	Pro-cyclical aggregate R&D investment
	Persistent unemployment
	Endogenous volatility of productivity, unemployment, vacancy, separation and hiring rates
	Unemployment and inequality correlation
	Beveridge curve
	Okun curve
	Wage curve
	Matching function

1.2.3. Comparative institutional analysis and policy shocks

We employ the foregoing extension of the K+S model and, first (Section 4.1), we undertake a few exercises of comparative institutional dynamics, evaluating the long-term performance of economies characterised by different degrees of labour market liberalisation. Second (Section 4.2), we study the effect of institutional shocks – the structural reforms – within each simulation. In both sets of exercises, the basis for comparison shall be the performance of the economy measured by a set of statistics, e.g. rate of growth and volatility of GDP, likelihood of crises, unemployment and inequality measures.

1.2.3.1. Comparative dynamics under different labour market regimes

Let us compare the Fordist regime (1. reference set up) with different varieties of Competitive set-ups, namely: 2. Competitive with full indexation of minimum wage and unemployment benefits; 3. Competitive with partial indexation of minimum wage and no unemployment benefits; 4. Competitive with full indexation of minimum wage and no unemployment benefits. 5. Competitive without minimum wage and without unemployment benefits.

We compare the two archetypes in terms of: (i) long-run rates of GDP growth; (ii) volatility of growth rates; (iii) likelihood of crises; (iv) productivity growth; (v) average unemployment rates; (vi) frequency of full employment periods; (vii) average tenure rates of the workforce; (viii) concentration coefficient of wage levels (Gini index as such a measure of inequality, here within the labour force).

In such comparisons, we hold the Fordist regime as the benchmark, as the latter corresponds to the "Golden Age" of capitalism. Next, we dismantled one by one the supposed institutional rigidities again somewhat in line with the most recent historical record.

First, let us consider the most extreme version of the Competitive one, basically institution-free, with no employment protection and also with no minimum wage and no unemployment benefits. Note that the latter is the nearest to textbooks "market perfection". Well, under such perfection the whole system is always near to collapse (cf. last column of Table 3): the long-term rate of growth is two order of magnitude lower (basically zero) and the short-run is equally dismal with extremely high unemployment rates, higher overall volatility and higher inequality[13].

All this add to the results from Dosi et al. (2010). There, we found that the "Schumpeterian engine" of innovation without any "Keynesian engine" of autonomous demand generation/stabilisation was basically sterile. The results here strengthen and refine such finding in that an institution-free labour market tends to destroy the link between wages and aggregate demand formation[14].

The Competitive set-ups show an overall fragile and more prone to crises dynamics when compared to the Fordist, even in presence of active welfare policies. In fact, GDP growth rate (Figure 2), volatility of GDP (Figure 3), likelihood of crises (Figure 4), unemployment rate (Figure 5) are significantly higher in the competitive scenarios.

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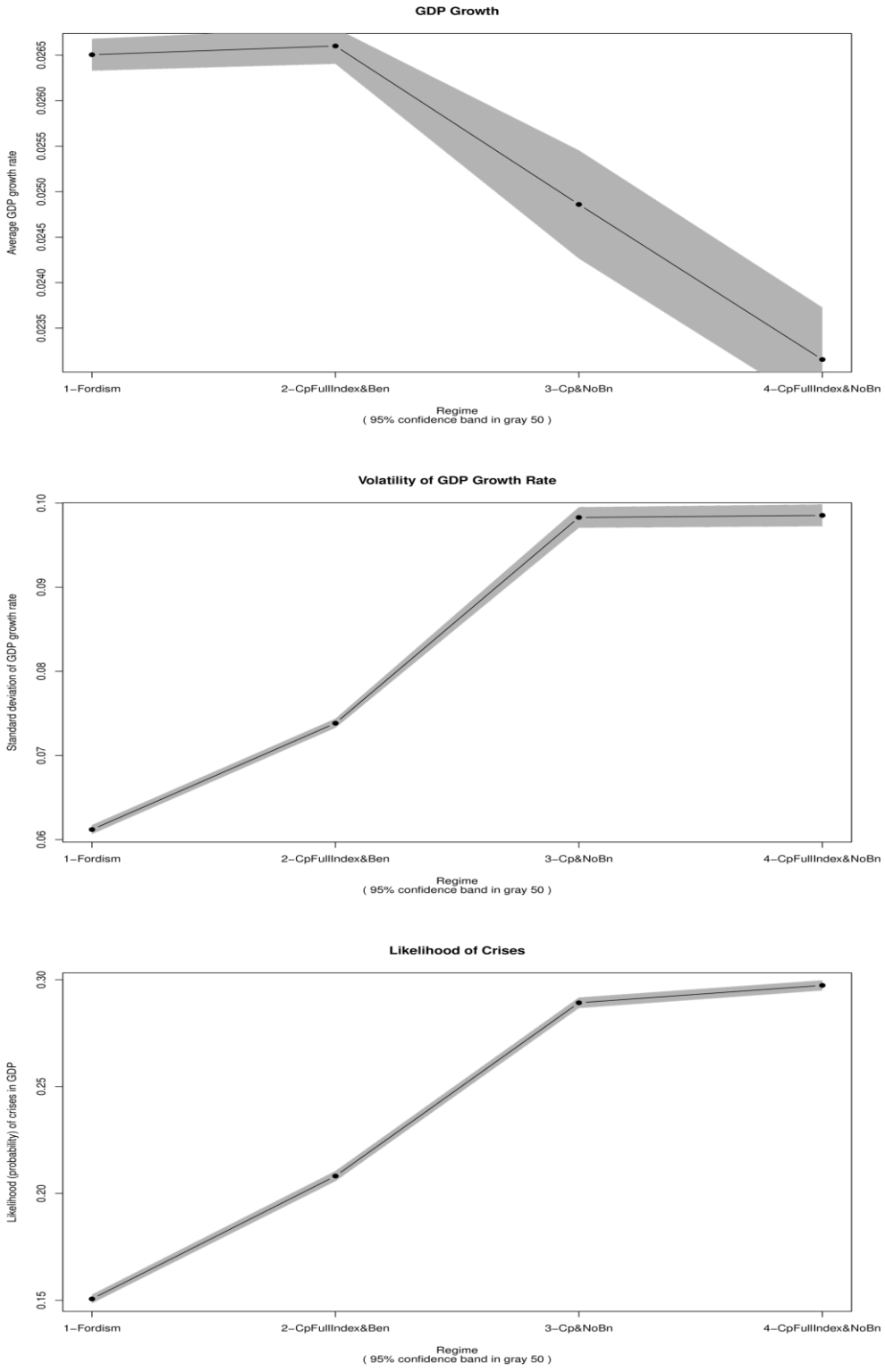
[13] Note that throughout our exercises we do not want to "calibrate and match": rather our purpose is to emphasise robust qualitative comparisons across set-ups. However, if one wants to give an interpretation of the period of the model in terms of economic time, it should be taken to be a quarter.

[14] Under zero unemployment benefits also the tax rate falls to zero. The interesting result is that, against the rhetoric according to which decreasing profit tax rate would improve investment and productivity, in the scenario with no tax the investment rate does not increase, but on the contrary it is hampered by the reduced aggregate demand.

Figure 2, 3, 4, 5 **GDP growth, volatility of GDP growth rate, likelihood of crises and unemployment**



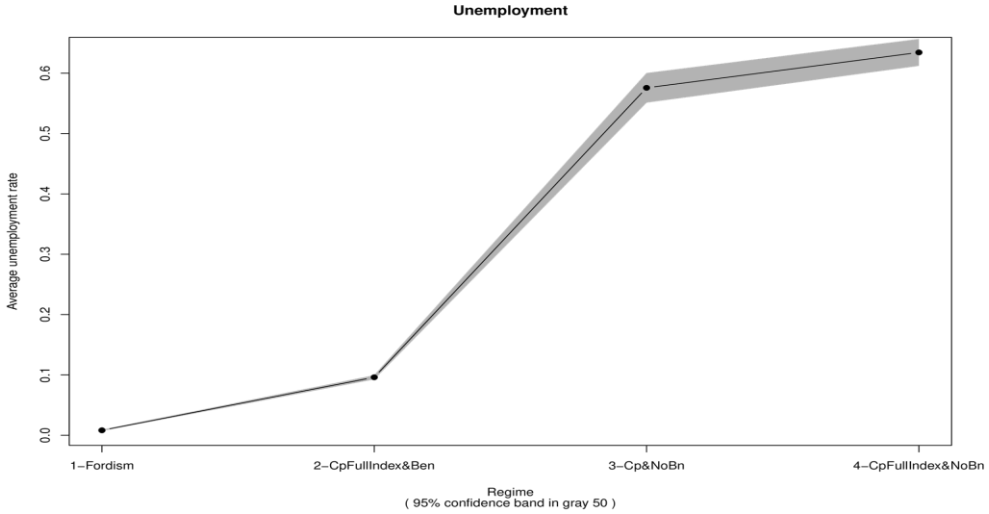


Table 3 presents the four specifications for the Competitive set-ups as a ratio with respect to the Fordist case (the baseline) for a larger set of metrics, including e.g. inequality, probability of full employment and productivity growth. We perform a two means t test comparing whether the average values of the four scenarios for the tested variables, namely are significantly different from the baseline. The reported p-values show that the Competitive regime – in all tested specifications – is significantly underperforming than the Fordist one. In fact, productivity growth is significantly lower in the Competitive scenarios 3 and 4. In the Competitive regimes inequality even among workers is higher and the more so the lower the constraints in wage settings, while the average tenure of workers is dramatically lower.

Table 3: **Comparison of [1] baseline Fordist regime with: [2] Competitive with full indexation and benefits, [3] Competitive with partial indexation and no benefits, [4] Competitive with full indexation and no benefits, and [5] Competitive with no indexation or benefits (scenario/baseline ratio and p-value for a two means test where H0: no difference with baseline).**

	Baseline[1]	Ratio[2]	Ratio[3]	Ratio[4]	Ratio[5]
GDP Growth	0.027	1.004	0.938	0.874	0.068
p-val.		0.801	0.071	0.000	0.000
Volatility of GDP Growth Rate	0.061	1.206	1.606	1.610	1.498
p-val.		0.000	0.000	0.000	0.000
Likelihood of Crises	0.151	1.381	1.919	1.973	1.483
p-val.		0.000	0.000	0.000	0.000
Productivity Growth	0.026	1.012	0.878	0.844	0.753
p-val.		0.334	0.000	0.000	0.000
Unemployment	0.008	11.672	69.931	77.054	84.757
p-val.		0.000	0.000	0.000	0.000
Frequency of Full Employment	0.597	0.213	0.080	0.042	0.067
p-val.		0.000	0.000	0.000	0.000
Tenure	15.430	0.158	0.193	0.201	1.506
p-val.		0.000	0.000	0.000	0.000
Vacancy	0.331	1.006	0.410	0.338	0.250
p-val.		0.841	0.000	0.000	0.000
Gini Coefficient	0.056	1.654	10.561	11.557	1.189
p-val.		0.000	0.000	0.000	0.000

Figure 6: **Unemployment and vacancy rates (regime transition at t=100).**

1.2.4. The institutional shocks: the effects of labour market structural reforms

In the following experiments we shall start from a Fordist regime, and at period 100, we change the institutions governing the labour market according to three alternative specification of firing schemes, which mimic the introduction of a set of new policies/legislation meant at the implementation of "flexibilising" structural reforms, namely:

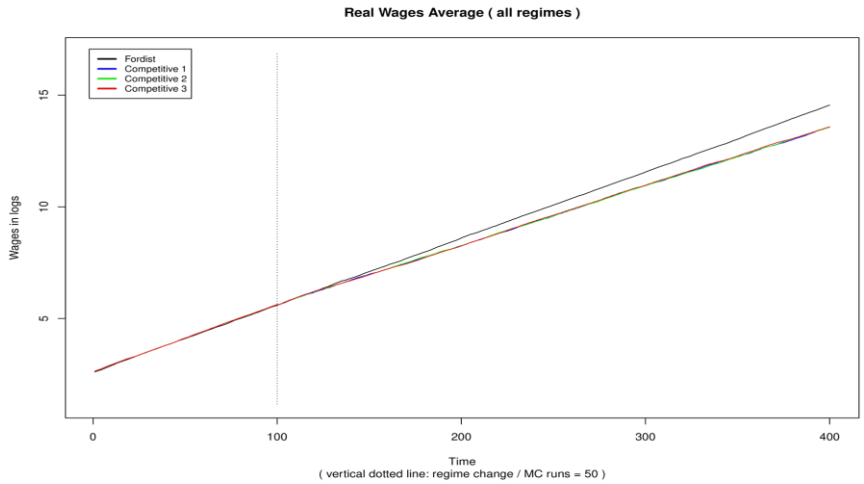
1. Competitive 1: firms fire whenever the fixed-period work contract of each worker expires. This rule captures a pattern of purely temporary employment arrangements.
2. Competitive 2: firms fires when they desire shrinkage of their production. Unneeded workers are fired.
3. Competitive 3: firms adopt increasing-protection work contracts (When first on the job, workers can be freely fired by the firm. After some time, they can be dismissed only in case of shrinkage of production. This firing rule represents an *increasing protection policy*.)

The order in which the alternative regime scenarios are proposed catches a decreasing notional flexibility: from Competitive 1 to Competitive 3 firms are free to fire but find increasing restrictions from the institutional rules. In all cases, however, the labour market conditions become now crucial in determining the wages requested by workers and offered by firms. Unlike the Fordist case, where both firm- and aggregate-level variables enter in the wage determination, here only individual employment status and firms vacancies do affect it, by means of individual bargaining processes. This implies that wages are respondent and flexible to the unemployment condition (on the supply side) and also to the firms effective labour needs (on the demand side).

Let us begin by examining the patterns for job vacancy and unemployment rates before and after the introduction of structural reforms (see Figure 6). The job vacancy (open positions) series exhibit a constant level pattern among the tested regimes, even if with different volatilities. However, the introduction of structural reforms (indicated by the vertical dotted line) at t=100 determines a markedly different behaviour in unemployment, which surges from less than 1% in the Fordist regime

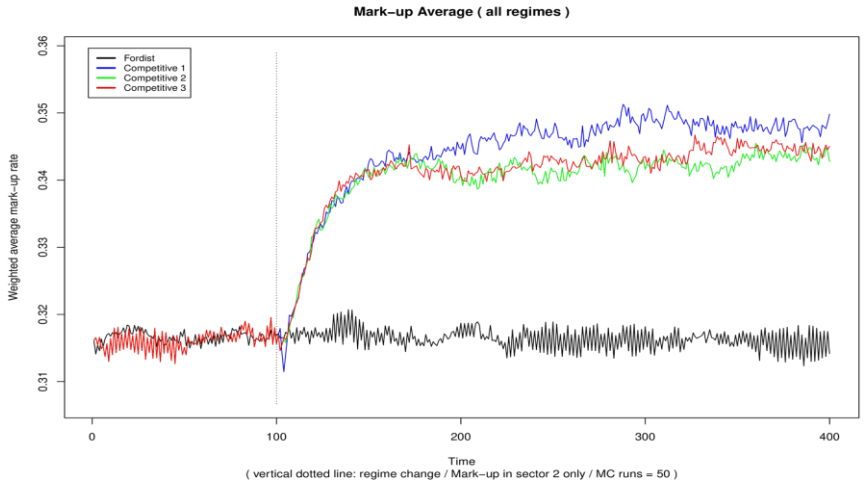
to about 10% level in Competitive 2 and 3, reaching a level around 20% in the temporary-only contracts scenario (Competitive 1).

Figure 7: **Real (log) wages dynamics (regime transition at t=100).**



The dynamics of wages is presented in Figure 7. After structural reforms, the (log) trajectories gradually diverge, with the real wage in the three Competitive scenarios moving to a lower growth path. The latter phenomenon is due to the increasing functional income inequality, as the previous wage growth trend is diverted toward profits after the flexibilisation of the labour market. The cause of such functional income redistribution rests in the fact that in all the three Competitive regimes, wage growth does not completely absorb – via wage indexation – productivity growth, which is instead captured by profits.[15] Notice the change in the functional income distribution highlighted in Figure 8 despite the invariance of the mark-up pricing rule: the actual profit share jumps, rising almost 5 percentage points.

Figure 8: **Functional income inequality: average mark-up (regime transition at t=100).**



[15] The presence/absence of the pass-through of productivity growth to wages are usually attributed to the presence/absence of strong unions, which are not explicitly modelled here.

The structural reforms aimed at "flexibilising" the labour market do not only impact on the functional income distribution, but also on the personal one (cf. Figures 9 and). The real (log) wage dispersion and the Gini index allow to grasp the change in personal income inequality from different perspectives. Real wage dispersion, which takes into account only earnings from working activity (i.e. wages from employed workers but not unemployment benefits), tends to be higher in Competitive 2 and 3 scenarios vis-à-vis Competitive 1, as in the latter case only temporary work contracts exist and all workers periodically enter and exit the unemployment status. In such a situation, the possibilities for wage differentiation among workers is obviously reduced but at the cost of an equalisation "at the bottom". Conversely, the Gini coefficient, which captures not only the wage income but also the change in the composition between employed and unemployed workers, markedly increases in the temporary-only work contracts scenario (Competitive 1), due to the higher unemployment. Consistently with Figure 6, this reflects the higher degree of income inequality among all workers, whether employed or not.

Figure 9: **Personal income inequality: wages dispersion (regime transition at t=100).**

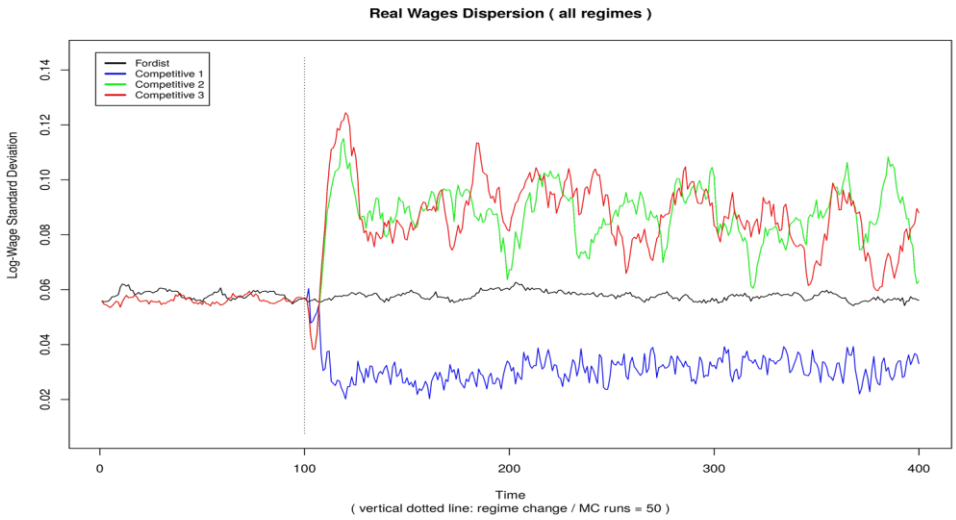


Figure 10: **Personal income inequality: Gini coefficient (regime transition at t=100).**

Finally, Table 4 provides a general assessment on the dynamics of the economy under the alternative institutional configurations of the labour market. The increased flexibility in the labour market introduced by structural reforms, but it considerably increases the unemployment rate and reduces the frequency of periods the economy spends in full employment.

As noted above, under the different Competitive regime scenarios, both functional and personal income inequality significantly increase, as witnessed by the surge in both average mark-ups and the Gini index. In contrast to the usual claim of the economic orthodoxy and the "standard" policy discourses, structural reforms do not even improve the performance of the economy in the long run. Indeed, the higher inequality resulting from the increased flexibility of the labour market reduces aggregate demand and slows down technological search efforts and with that innovation and diffusion rates. As a consequence, productivity and GDP growth are significantly lower in the three Competitive scenarios in comparison to the Fordist regime.

Table 4: **Scenario/baseline ratio and p-value for a two means test with H0: no difference with baseline. Average values across 50 Monte Carlo runs.**

	FORDIST	COMPETITIVE 1		COMPETITIVE 2		COMPETITIVE 3	
	Baseline	**Ratio**	**p-value**	**Ratio**	**p-value**	**Ratio**	**p-value**
GDP growth rate	0.030	0.866	0.000	0.880	0.000	0.876	0.000
Productivity growth rate	0.030	0.869	0.000	0.877	0.000	0.880	0.000
Unemployment rate	0.001	215.8	0.000	102.3	0.000	98.06	0.000
Frequency of full employment	0.557	0.137	0.000	0.311	0.000	0.338	0.000
Wages dispersion	0.057	0.552	0.000	1.508	0.000	1.486	0.000
Gini coefficient	0.032	4.730	0.000	3.409	0.000	3.310	0.000
Average mark-up	0.316	1.099	0.000	1.082	0.000	1.086	0.000

1.2.5. Conclusions

This work summarises the results of several experiments undertaken on the "Schumpeter meeting Keynes" ABM family of models addressing the effects of different modes of institutional governance of labour markets and industrial relations as discussed in Dosi et al. (2017, 2016). In particular, we studied the impact of their different inbuilt degrees of flexibility in employment and wages, and the related consequences of institutional shocks – structural reforms – aimed at making labour market more flexible.

The models robustly show that more flexibility in terms of variations of monetary wages and labour mobility is prone to induce systematic coordination failures, higher macro volatility, higher unemployment and higher frequency of crises. In fact, it is precisely the downward flexibility of wages and employment – as profitable as it might be for individual firms – and the related higher degrees of inequality that lead recurrently, as system level emergent properties, to small and big aggregate demand failures. This property, we suggest, is also at the heart of both the 1929 and 2008 crises, no matter what the triggering factors (often to be found at the financial level).

The experiments we have performed vindicate the notion that a too flexible wage-labour nexus can be detrimental for aggregate economic dynamics: only when flexibility in wages and employment is accompanied by policy measures which mitigate the recurrent downward pressures, the system does not collapse. Furthermore, contrary to the argument that higher labour flexibility fosters productivity growth, our model clearly shows the opposite: productivity in the Fordist and in the Competitive regime with full indexation and unemployment benefit (which is still more volatile and prone to crises

than the Fordist) grows at the same path. Conversely, productivity growth is significantly lower in most set-ups of the Competitive regime.

These results of comparative dynamics match those obtained when along each history we introduce regime changes capturing a series of alternative policy interventions aimed at making labour markets more flexible. Yet, such policy interventions effectively cause the increase of both functional and personal income inequality, on the one hand, and of the unemployment rate, on the other. Conversely, the model fails to provide any evidence of the existence of an equity-efficiency trade-off. On the contrary, the two dimensions are highly correlated: a larger fraction of unemployed workers (who get reduced or no unemployment benefits) simply increases the level of personal income inequality. Finally, we find robust evidence on how the degrees of job protection and the wage setting policies directly affect functional income distribution.

Contrary to the economists' common wisdom, structural labour market reforms are far from being a panacea for unemployment, growth and income redistribution. On the contrary, they tend to exacerbate the asymmetry in the bargaining power between workers and firms, in favour of the latter. In turn, this pattern, especially when it comes together with the reduction or elimination of unemployment benefits, tends to worsen also macroeconomic conditions in terms of unemployment rates and the long-run growth of income and productivity. Indeed, it happens that the nearer the system gets to competitive conditions in the labour market, the harder it is for the Schumpeterian engine of innovation and growth to operate. More unequal income distribution and higher unemployment spells induce, via Keynesian dynamics, a stagnationist bias in the aggregate dynamics.

Here is where the failures of the Keynesian demand-generating mechanisms feedback upon the Schumpeterian processes of technological advance. Crises are not blissful events whereby the gales of creative destruction break incumbent bottlenecks and open up new opportunities for innovation. On the contrary, crises and the associated lack of aggregate demand reduce also the amount of resources invested in innovative search (in our model the R&D of the machine-producing sector), shrinks the investment in new vintages of equipment, and slows down the scrapping of old ones. The result is a reduction in the rates of productivity growth and, if such recessionary events occur often enough, a reduction in the long-term rates of growth of the economy, even beyond the permanent loss in GDP levels. The findings here, in fact, complement those from Dosi et al. (2016) showing the pernicious long-term effect of austerity policies: after all austerity and wage/unemployment driven deflation are exogenous (the former) and endogenous (the latter) shocks upon the demand coordination process.

Needless to say, the normative implications are far reaching and point in directions opposite to the fairytale of structural reforms. If one trusts the interpretative power of our model, more employment guarantees, more rigidities in firing rules, less wage inequality, more welfare protection are not only good for the workers concern, but also for the whole economy.

1.2.6. References

Avdagic, S. (2015). Does deregulation work? Reassessing the unemployment effects of employment protection. British Journal of Industrial Relations 53(1): 6–26.

Avdagic, S. and Salardi, P. (2013). Tenuous link: labour market institutions and unemployment in advanced and new market economies. Socio-Economic Review 11(4): 739–769.

Axelrod, R. and Tesfatsion, L. (2006). A guide for newcomers to agent-based modeling in the social sciences. Handbook of computational economics 2, 1647–1659.

Baccaro, L. and Rei, D. (2007). Institutional determinants of unemployment in OECD countries: Does the deregulatory view hold water? International Organization 61(3): 527–569.

DiNardo, J., Fortin, N. and Lemieux, T. (1996). Labour market institutions and the distribution of wages, 1973-1992: A semiparametric approach. Econometrica 64(5): 1001–1044.

Dosi, G., Fagiolo, G., Napoletano, M. and Roventini, A. (2013). Income distribution, credit and fiscal policies in an agent-based keynesian model. Journal of Economic Dynamics and Control 37(8): 1598–1625.

Dosi, G., Fagiolo, G., Napoletano, M., Roventini, A. and Treibich, T. (2015). Fiscal and monetary policies in complex evolving economies. Journal of Economic Dynamics and Control 52: 166–189.

Dosi, G., Fagiolo, G. and Roventini, A. (2010). Schumpeter meeting Keynes: A policy-friendly model of endogenous growth and business cycles. Journal of Economic Dynamics and Control 34(9): 1748–1767.

Dosi, G., Napoletano, M., Roventini, A. and Treibich, T. (2016). The short- and long-run damages of austerity: Keynes beyond Schumpeter. In Stiglitz (Ed.), Contemporary Issues in Macroeconomics, pp. 79–100. Palgrave.

Dosi, G., Pereira, M.C., Roventini, A. and Virgillito, M. E. (2016). The Effects of Labour Market Reforms upon Unemployment and Income Inequalities: an Agent Based Model. LEM Papers Series 2016/27, Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies of Pisa.

Dosi, G., Pereira, M.C., Roventini, A. and Virgillito, M. E. (2017). When more flexibility yields more fragility: the microfoundations of Keynesian aggregate unemployment. Journal of Economic Dynamics and Control 81:162-186.

Epstein, J. M. (1999). Agent-based computational models and generative social science. Complexity 4(5), 41–60.

Fagiolo, G. and Roventini, A. (2017). Macroeconomic policy in DSGE and Agent-Based models redux: New developments and challenges ahead. Journal of Artificial Societies and Social Simulation 20(1).

Fitoussi, J.-P. and Saraceno, F. (2013). European economic governance: the Berlin–Washington Consensus. Cambridge Journal of Economics 37(3): 479–496.

Fortin, N. and Lemieux, T. (1997). Institutional change and rising wage inequality: Is there a linkage? Journal of Economic Perspectives 11(2): 75–96.

Freeman, R. (2005). Labour market institutions without blinders: The debate over flexibility and labour market performance. International Economic Journal 19(2): 129 – 145.

Gilbert, N. (2008). Agent-based models. Quantitative Applications in the Social Sciences, 153.

Heathcote, J., Perri, F. and Violante, G. (2010). Unequal we stand: An empirical analysis of economic inequality in the united states, 1967–2006. Review of Economic Dynamics 13(1): 15–51.

Howell, D. (Ed.) (2005). Fighting Unemployment. Oxford: Oxford University Press.

Howell, D. and Huebler, F. (2005). Wage compression and the unemployment crisis: Labor market institutions, skill and inequality-unemployment tradeoffs. In D. Howell (Ed.), Fighting Unemployment. Oxford: Oxford University Press.

Jaumotte, F. and Buitron, C. (2015). Inequality and labor market institutions. IMF Discussion Note SDN/15/14, International Monetary Fund.

Maestri, V. and Roventini, A. (2012). Inequality and macroeconomic factors: A time-series analysis for a set of OECD countries. LEM Papers Series 2012/21, Laboratory of Economics and Management (LEM), Sant'Anna School of Advanced Studies of Pisa.

Nelson, R. and Winter, S. (1982). An Evolutionary Theory of Economic Change. Harvard: Harvard University Press.

OECD (1994). OECD Jobs Study. Technical report. Organisation for Economic Cooperation and Development.

Oswald, A. (1997). The missing piece of the unemployment puzzle. An inaugural lecture.

Stiglitz, J. (2012). The price of inequality. New York: Norton.

Stiglitz, J. (2015). The great divide. New York: Norton.

Storm, S. and Naastepad, C. (2012). Macroeconomics beyond the NAIRU. Harvard: Harvard University Press.

Tesfatsion, L. (2006). Agent-based computational economics: A constructive approach to economic theory. Handbook of computational economics 2, 831–880.

1.3. THE DISTRIBUTIONAL IMPACT OF STRUCTURAL REFORMS: AN EMPIRICAL ANALYSIS

by Orsetta Causa* and Mikkel Hermansen**

1.3.1. Introduction

Structural reforms are regularly assessed based on their ability to boost GDP per capita. This emphasis relies on the assumption that higher GDP per capita is systematically associated with rising living standards for the vast majority of citizens. This view is increasingly being challenged. The worrying evolution of income inequality in many countries suggests that distributional considerations need to be more systematically taken into account in policy making. In a nutshell, what are the policy options for making pro-growth policies inclusive?

New research by Causa et al. (2016) sheds some light on this question by adopting a more granular approach to the evaluation of pro-growth policies. First, the analysis delivers the effect of reforms on household incomes at the bottom, the middle and the top of the distribution. This helps to better understand the distributional implications from pro-growth reforms. In particular, it allows for distinguishing reforms that boost incomes across the whole distribution, but relatively more among the rich than among the poor, from those that boost incomes in the middle class and among the rich but have no effect or depress incomes among the poor. Second, the analysis considers the channels of macroeconomic growth by decomposing the policy effect into growth in employment and growth in labour productivity. This provides a better understanding of the mechanisms through which policies benefit household incomes at different points of the income distribution.

1.3.2. Using general means to uncover the granularity of income distribution

Income distributions are generally characterised using income standards, i.e. functions that gauge the distribution by a single income level indicating the general affluence of the distribution or some part of it (Foster and Szekely, 2008). The mean and the median are examples of income standards that are widely used as stylised measures of a country's overall level of material conditions. More narrowly, the mean income of some specific part of the population such as the bottom 40% or 20%, called partial means, are also used, in particular for the measurement of poverty.

The analytical framework outlined in Causa et al. (2015) and Hermansen et al. (2016) aims to uncover the granularity of the income distribution, moving progressively from the bottom to the top, by the use of general means as income standards. Unlike partial means, general means take into account the entire income distribution, but emphasise lower or higher incomes depending on the value taken by a specific parameter α, often referred to as the order of the general mean. Taking the entire income distribution into account avoids the need to set arbitrary thresholds that give full weight to some parts of the distribution and no weight to the remaining parts, as is the case in poverty measurement for example. General means adopt a more flexible stance by putting different weights on different parts of the income distribution. Such flexibility allows for explicitly considering a continuum of social preferences, depending on e.g. the differential weight attributed to the living conditions of the poor relative to those of the middle class. For an income distribution $x=(x_1,\ldots,x_N)$, the general mean of order α, $\mu(x, \alpha)$, is defined as:

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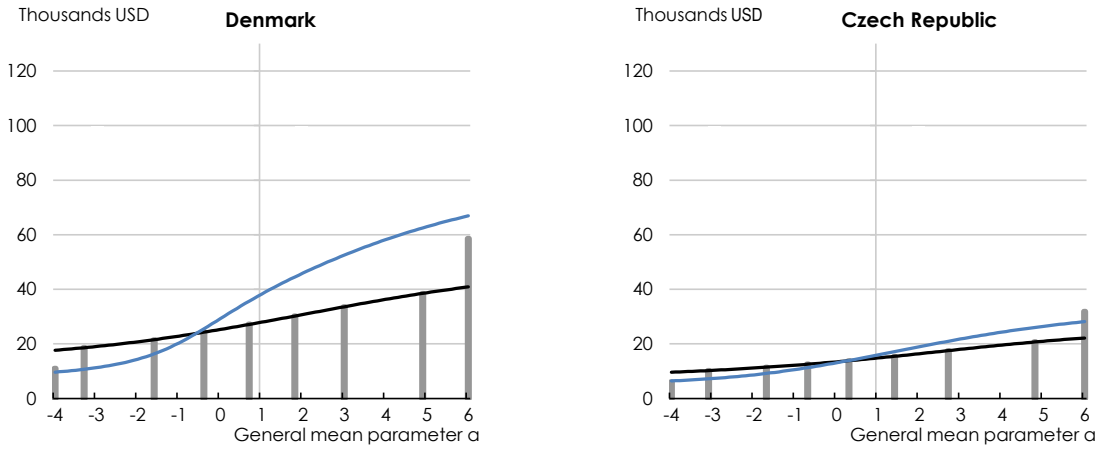
$$\mu(x,\alpha) = \left(\frac{1}{N}\sum_{i=1}^{N} x_i^{\alpha}\right)^{\frac{1}{\alpha}} \; if \; \alpha \neq 0$$

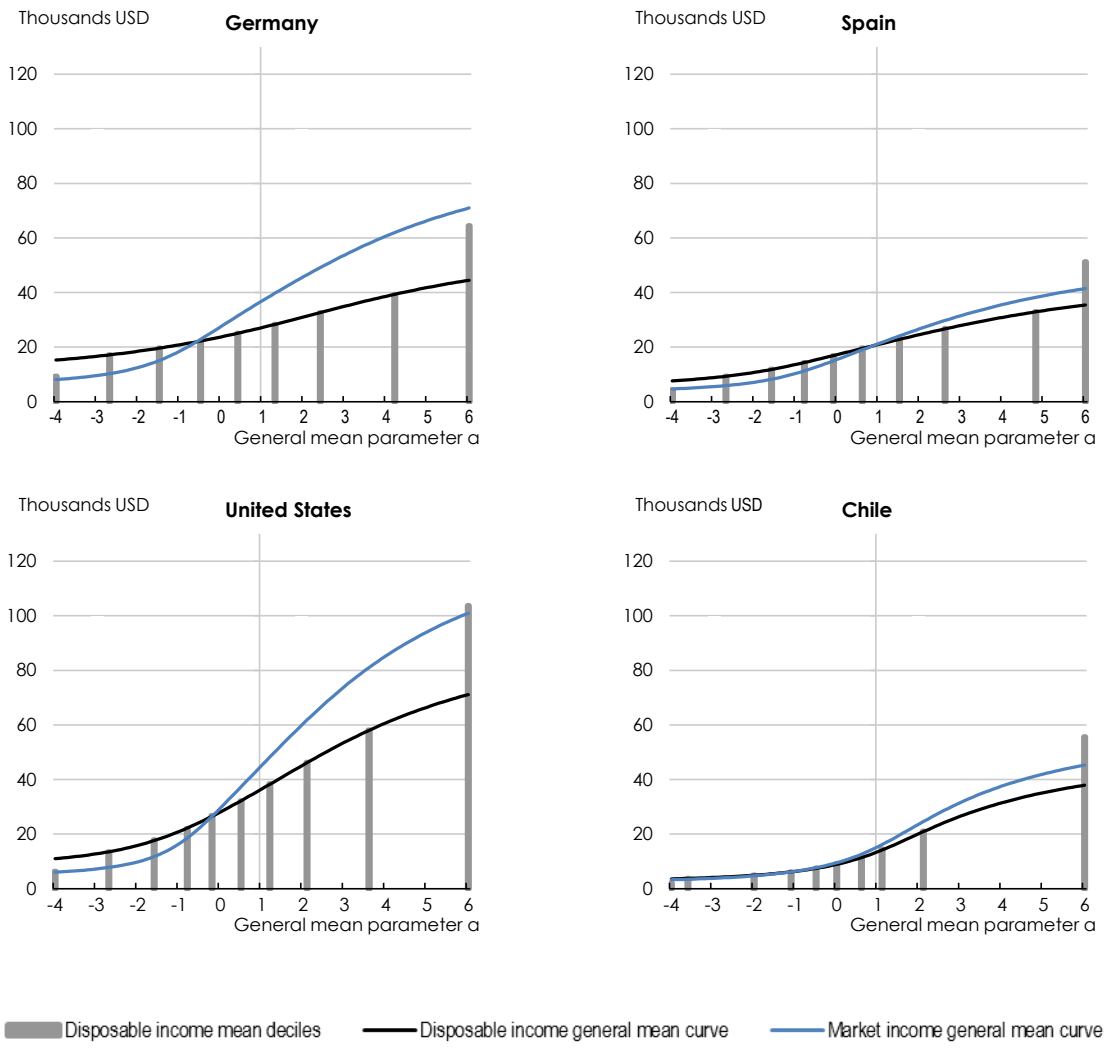
$$= \prod_{i=1}^{N} x_i^{\frac{1}{N}} \; if \; \alpha = 0$$

A useful property of the general means is their monotonicity with respect to the parameter α, i.e. α'> α implies μ(x,α')> μ(x,α). General means increase as α rises and decrease as α declines: a lower α gives more emphasis to lower values in an income distribution while conversely a higher α gives more emphasis to higher values in an income distribution. The arithmetic mean, thus, becomes a special case (α=1) of the general mean, which forms a natural benchmark and a dividing line between bottom and top-sensitive general means. Thus, variations in the parameter α allow for computing income levels focusing on any segment of the income distribution, from the bottom to the top. In fact, the more α approaches -∞, the more μ(x,α) converges towards the lowest income in the distribution. This case echoes the Rawlsian perspective, as the income distribution is summarised by the affluence of its poorest member. Conversely, when α approaches +∞, μ(x,α) converges towards the income of its richest member.

Using real household income data from the OECD Income Distribution Database, Figure 1 display general means curves for market income and disposable income for selected countries. Each panel presents the value of general means associated with a continuum of α. For example, for both market and disposable income all bottom-sensitive general means (α<1) are similar in Germany and the United States, whereas all top-sensitive general means (α>1) are higher in the United States. As a result, the difference in inequality (as well as in average income) between Germany and the United States comes almost entirely from differences in the upper part of the distribution. Thus, general means make it possible to assess the "location" of inequality, i.e. to identify the portions of the income distribution that drive inequality.

Figure 1. **General means curves for selected OECD countries**





General means allow also for shedding light on the impact of redistribution through taxes and transfers. This can be achieved by comparing market and disposable income-based general means. For instance, in Denmark, Germany and the United States, redistribution reduces disposable income compared to market income in the upper part of the distribution, while increasing it in the lower part. By contrast, in Chile, Czech Republic and Spain, taxes and transfers tend to leave virtually unchanged disposable income compared to market income in the lower-half of the distribution while slightly reducing it in the upper-half.

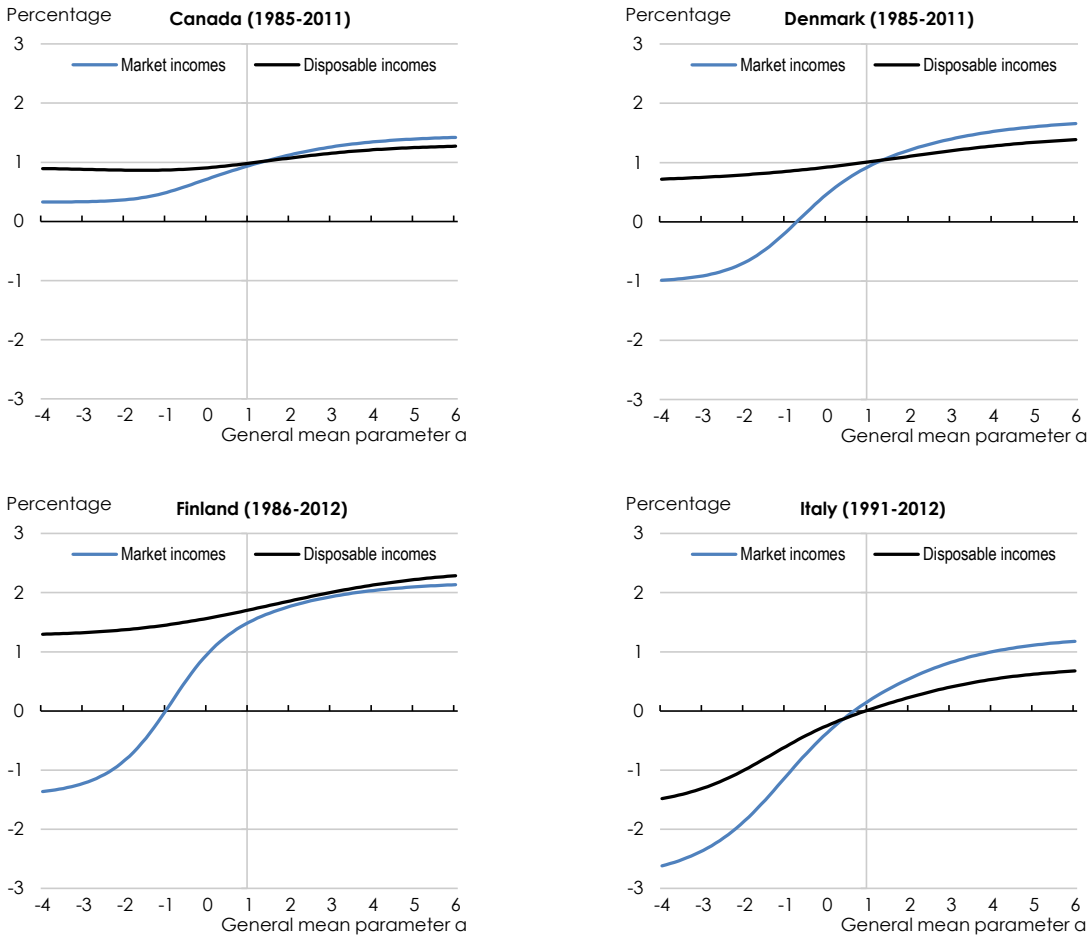
Finally, the granular general mean-based approach can be used to analyse income developments at any point of the distribution. Growth in the general mean of order α, $g(x_{t+1},x_t, \alpha)$, is given by:

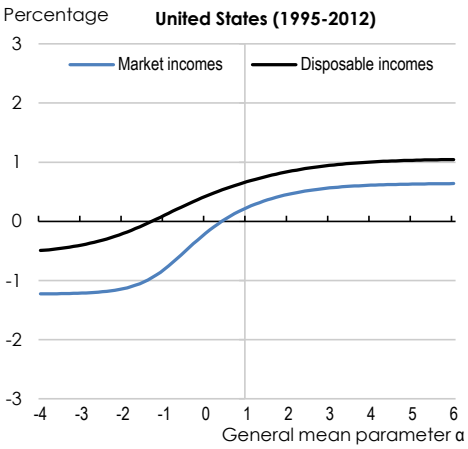
$$g(x_{t+1}, x_t, \alpha) = \frac{\mu(x_{t+1}, \alpha) - \mu(x_t, \alpha)}{\mu(x_t, \alpha)}$$

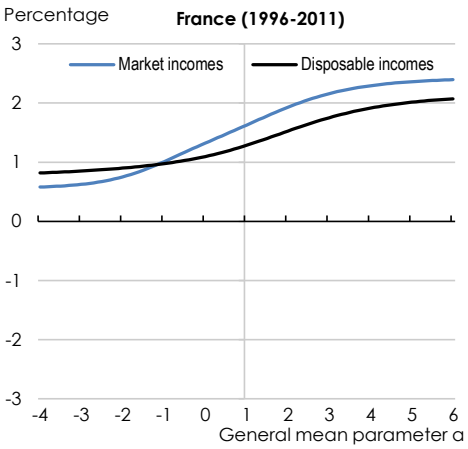
Figure 2.a and 2.b show general means-based growth curves on the basis of real household market and disposable income data for selected OECD countries over the period covered by the analysis. The vertical axis represents $g(x_{t+1},x_t, \alpha)$ and the horizontal axis the values of α. When α=1, the curve's height measures growth in average income. For α>1, faster growth in the general mean than in average income points to an increase in inequality. Conversely, for α<1, faster growth in the general mean than in average income points to a decrease in inequality. More generally, an S-profile indicates an increase

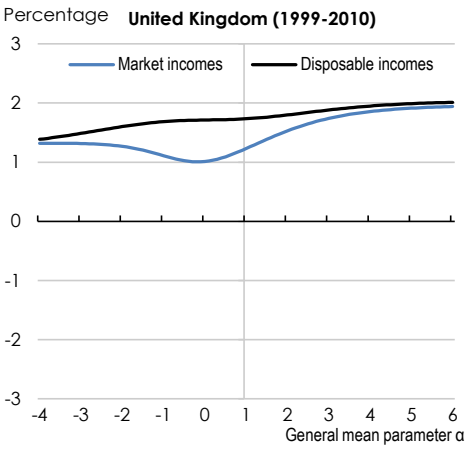
in inequality (e.g. Italy, the United States and France) and an inverted S-profile a decrease (e.g. Czech Republic, Turkey and Poland). The relative flatness of the curve provides a qualitative assessment of the magnitude of associated changes in inequality along with their underlying sources. For instance, not only inequality in disposable income increased more strongly in Italy than in Canada, but it happens that the poor in Italy lost ground even in absolute terms while in Canada all incomes have grown, albeit in an unequal way.

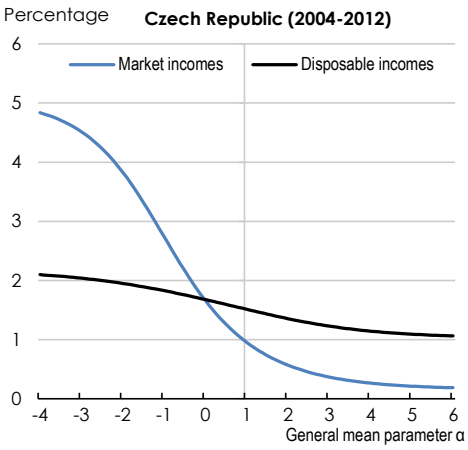
Figure 2.a **General means-based growth curves for selected OECD countries**

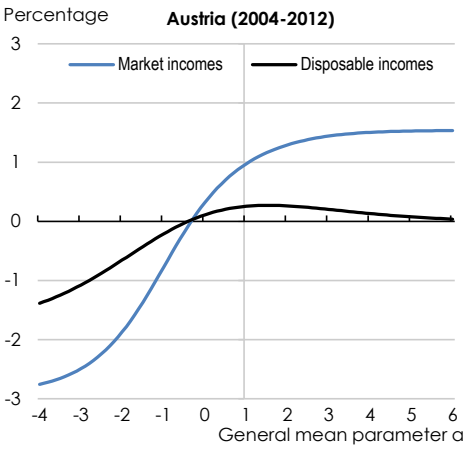


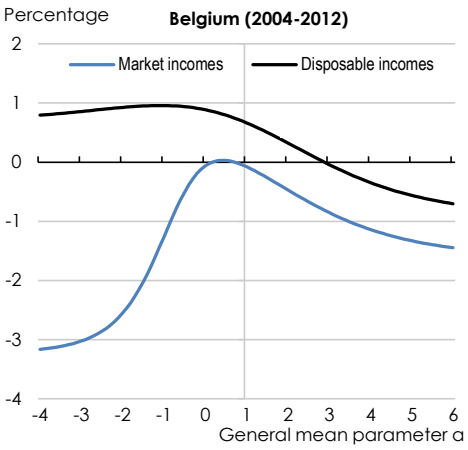

Percentage
United States (1995-2012)
Market incomes
Disposable incomes
3
2
1
0
-1
-2
-3
-4 -3 -2 -1 0 1 2 3 4 5 6
General mean parameter a

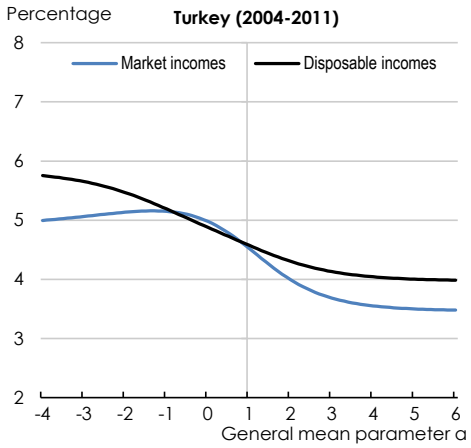

Percentage
France (1996-2011)
Market incomes
Disposable incomes
3
2
1
0
-1
-2
-3
-4 -3 -2 -1 0 1 2 3 4 5 6
General mean parameter a

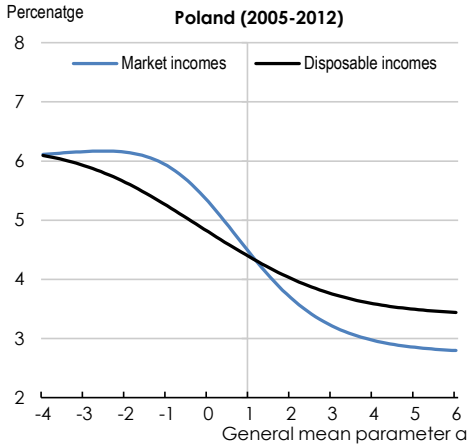

Percentage
United Kingdom (1999-2010)
Market incomes
Disposable incomes
3
2
1
0
-1
-2
-3
-4 -3 -2 -1 0 1 2 3 4 5 6
General mean parameter a


Percentage
Czech Republic (2004-2012)
Market incomes
Disposable incomes
6
5
4
3
2
1
0
-4 -3 -2 -1 0 1 2 3 4 5 6
General mean parameter a


Percentage
Austria (2004-2012)
Market incomes
Disposable incomes
3
2
1
0
-1
-2
-3
-4 -3 -2 -1 0 1 2 3 4 5 6
General mean parameter a


Percentage
Belgium (2004-2012)
Market incomes
Disposable incomes
2
1
0
-1
-2
-3
-4
-4 -3 -2 -1 0 1 2 3 4 5 6
General mean parameter a





As an extension, general means growth curves allow for assessing the impact of taxes and transfers on income distribution developments. For instance in Canada, Denmark and Finland, the rise in market income inequality has been almost completely offset by redistribution: growth in real disposable income has been very similar across the distribution while that of real market income has been stronger in the upper compared to the lower half of the income distribution. Finally, this granular approach allows for uncovering the very specific and differentiated impact of redistribution on specific income groups. Such is the case in the United Kingdom, where mean disposable income of the middle class grew faster than mean market income while such incomes grew at the same rate at the low and the high end of the distribution. This indicates that redistribution has tended to benefit the middle class. General means growth curves can thus provide a nuanced and extensive analysis of income distribution developments.

To summarise, using general means as income standards delivers, within a single analytical framework, a comprehensive assessment of countries' income distributions. It can be used all at once to track changes in income levels for different income groups as well as to see whether the resulting changes in inequality have been widespread or concentrated in narrower segments of the distribution. It is thus particularly well-suited for policy analysis and for tracking the incidence of growth on inequality: the possibility to diagnose, on the basis of a simple measure, whether inequality increases occurred across the whole distribution of income or within a narrower part of the distribution allows for a finer understanding of distributional developments – and, as a result, for a better fine tuning and design of appropriate policy responses.

1.3.3. The distributional effects of growth and its sources: baseline estimates

As a baseline step, the analysis starts by revisiting the link between growth and household incomes across the distribution (Box 1). This sets the stage for the analysis of the link between growth-enhancing reforms and household incomes across the distribution, that is, the distributional effects of growth-enhancing reforms. Growth is likely to have differential effects on different income groups, and this is captured though the general means approach.

Box 1. BASELINE SPECIFICATION OF THE DISTRIBUTIONAL INCIDENCE OF GROWTH AND ITS SUBCOMPONENT.

The fundamental determinants of GDP, i.e. human and physical capital, labour-augmenting efficiency and population growth, are well established in growth theory and the production function framework, but there exists no such framework in the case of household incomes with an explicit consideration of its distribution. In the absence of a theoretical foundation, a natural starting point is to assume that in the long run the level of household income at each point of the distribution is mainly driven by the level of GDP per capita, which transmits to households with a lag (see Causa et al., 2015):

$$\Delta \ln \mu_\alpha(x_{it}) = \beta_{0,\alpha} - \beta_{1,\alpha} \ln \mu_\alpha(x_{it-1}) + \beta_{2,\alpha} \Delta \ln GDP_{it} + \beta_{3,\alpha} \ln GDP_{it-1} + \beta_{4,\alpha} NX_{it} + \gamma_t + \eta_i + \varepsilon_{it}$$

where periods t and t-1 correspond to observations 2 years apart, $\Delta \ln \mu_\alpha(x_{it})$ is the growth in household income across the distribution (the order of the general mean α allows for uncovering different portions of the distribution, from bottom to top), $\Delta \ln GDP_{it}$ is the growth in GDP per capita, NX_{it} is the ratio of net exports to GDP included to control for persistent gaps between household incomes and domestic output,[2] γ_t denotes time controls (a linear time trend), and η_i denotes country fixed effects. Due to the presence of the lagged dependent variable to account for convergence, the specification is estimated through System GMM.[3] This allows for deriving a consistent estimate of the long-run elasticity of household incomes with respect to GDP per capita, given by $\varepsilon_{\mu_\alpha,GDP} = \beta_{3,\alpha}/\beta_{1,\alpha}$.

The impact of GDP is subsequently decomposed along its two main sub-components, labour productivity (LP) and labour utilisation (LU), expanding the previous specification as follows:

$$\Delta \ln \mu_\alpha(x_{it}) = \theta_{0,\alpha} - \theta_{1,\alpha} \ln \mu_\alpha(x_{it-1}) + \theta_{2,\alpha} \Delta \ln LP_{it} + \theta_{3,\alpha} \ln LP_{it-1} + \theta_{4,\alpha} \Delta \ln LU_{it} + \theta_{5,\alpha} \ln LU_{it-1} + \theta_{6,\alpha} NX_{it} + \gamma_t + \eta_i + \varepsilon_{it}$$

Labour productivity and labour utilisation are (as GDP) treated as endogenous variables and the equation is also estimated through System GMM. This allows for deriving consistent estimates of the long-run elasticity of household incomes across the distribution with respect to labour productivity, $\varepsilon_{\mu_\alpha,LP} = \theta_{3,\alpha}/\theta_{1,\alpha}$, and with respect to labour utilisation, $\varepsilon_{\mu_\alpha,LU} = \theta_{5,\alpha}/\theta_{1,\alpha}$.

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1. See (Hermansen et al., 2016) for a full presentation of the baseline specification and econometric approach.
2. The underlying rationale is that mean household income elasticity to domestic production is more likely to deviate from 1 in more open economies under persistent external imbalances whereby households tend to consume more (deficit) or less (surplus) than their income. In addition, previous work has shown that the difference between growth in real GDP and in real mean household income is, to a large extent, driven by differences in growth of output relative to consumer prices (Causa et al., 2015). In turn, the evidence would suggest that this is, to a good extent, driven by terms-of-trade effects. Results in this paper are qualitatively unchanged if the openness variable is replaced by the current account, the terms-of-trade, or the price of consumption relative to output.
3. See Blundell and Bond (1998).

The sample covers OECD countries for the period going from the mid-80s to around 2012, but with varying time coverage across countries. The main findings can be summarised as follows:

- There is no evidence that GDP growth triggered the rise in inequality, once controlling for other factors. On average across OECD countries, GDP growth over the last three decades has lifted household disposable incomes across the distribution. This assessment derives from visualising the GDP growth incidence curve (Figure 3, Panel A). This curve is broadly flat at the unitary GDP per capita elasticity of household disposable income. However, associated cross-country estimates inevitably encompass cross-country differences in the distributional incidence of growth. Even from a purely descriptive perspective, OECD countries experienced heterogeneous developments in this respect (Hermansen et al., 2016).

- The finding that GDP growth has benefited household disposable incomes at large results from the differential effects of the sources of growth, namely labour productivity and labour utilisation, on income distribution:

- Labour productivity growth has benefitted relatively more rich households and households in the upper middle class (corresponding to values of α roughly above 1), while associated growth dividends were somewhat lower among poor households (e.g. α=-4) (Figure 3, Panel B). This implies that productivity growth has been slightly disequalising.

- Labour utilisation growth has benefitted disproportionally poor households and households in the middle class (corresponding to values of α roughly around 0), while associated growth dividends were insignificant for rich households (e.g. α>4) (Figure 3, Panel C). This implies that labour utilisation has allowed for lifting the material conditions of the poor people and that it has been equalising.

Figure 3 Panel A. **Household disposable income elasticity to GDP per capita**

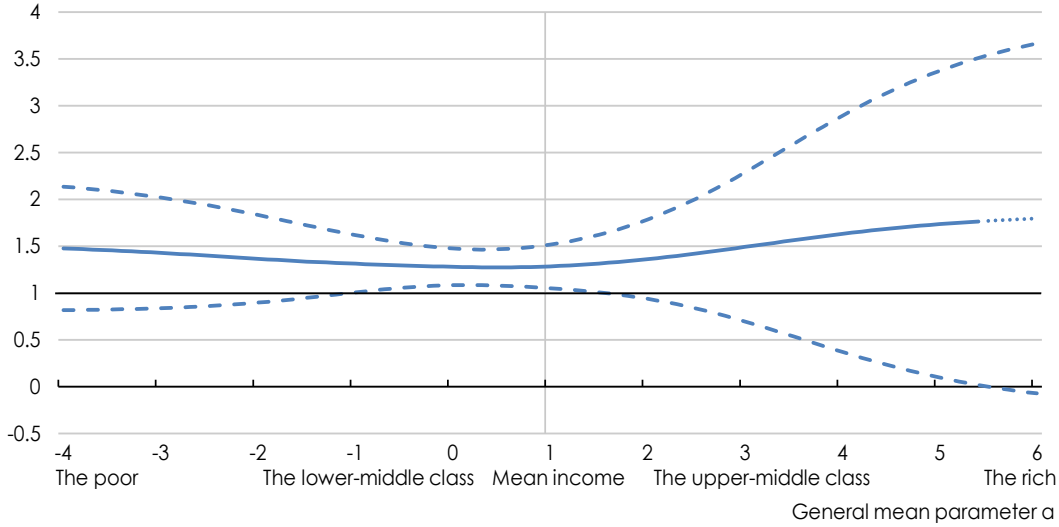


Figure 3 Panel B. **Household disposable income elasticity to labour productivity**

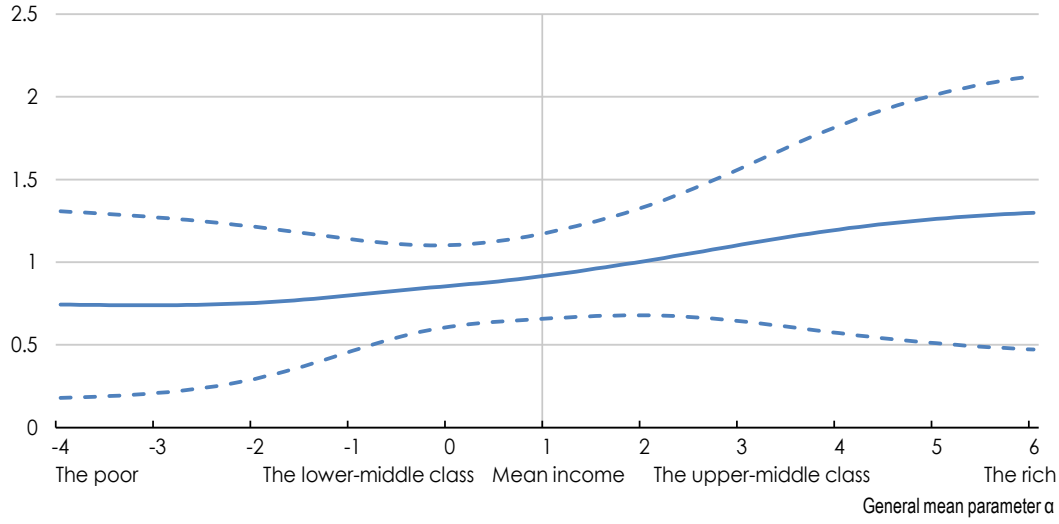


Figure 3 Panel C. **Household disposable income elasticity to labour utilisation**

Note: Elasticities estimated by System GMM. See Hermansen et al. (2016) for details. Dashed lines represent the 90% confidence interval bands.

The conclusion from this baseline analysis is that the composition of growth is a key determinant of its incidence across the distribution. Insofar as growth is ultimately driven by productivity, and insofar as this is associated with rising income inequality, ensuring that growth is associated with strong job creation is crucial to make it more inclusive. These baseline findings are combined into a macro-micro approach to deliver a complete distributional assessment of labour productivity and labour utilisation-enhancing reforms.

1.3.4. The distributional effects of structural reforms: a combined macro-micro approach

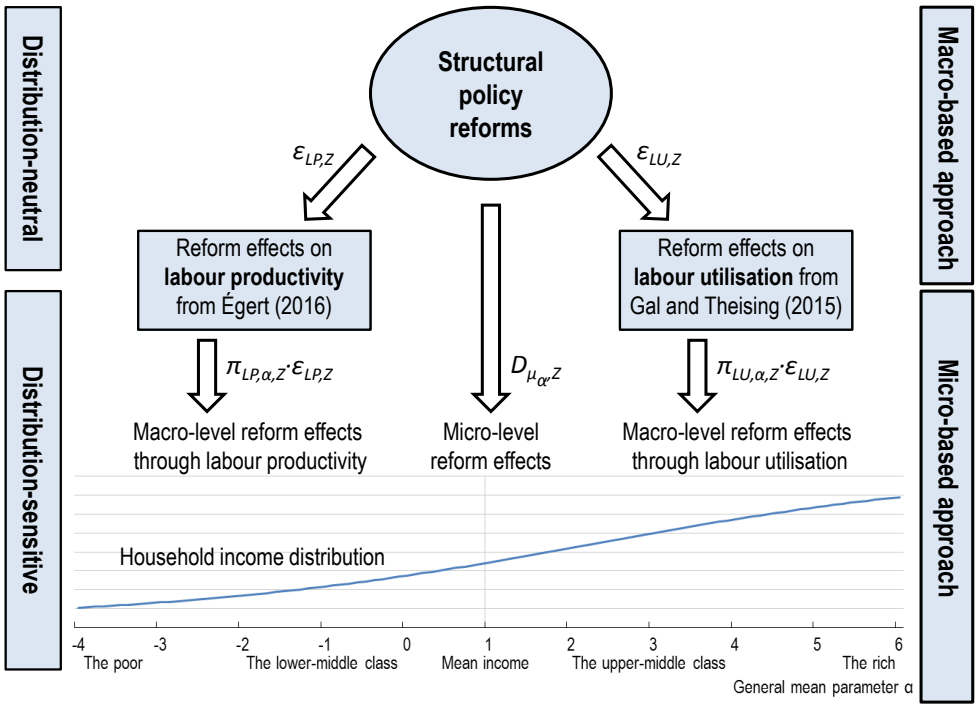
The assessment of the effects of growth-enhancing reforms on income inequality is based on a combined macro-micro approach which encompasses growth and household incomes across the distribution (see Box 2). In this vein, the total effect of a given policy reform on household incomes can be decomposed and interpreted as follows (Figure 4):

- *Macro effects:* reform-driven changes in labour productivity and/or labour utilisation which benefit household incomes across the distribution. This encompasses distribution-neutral effects calibrated on the basis of recent empirical analysis of the effects of structural reforms on growth and its components; that is, from Gal and Theising (2015) and from Egert (2017); with distribution-sensitive effects derived from the policy-augmented baseline estimation, i.e. reform-driven changes in labour productivity and labour utilisation. See Causa et al. (2016) for details about the way external estimates obtained in in above-cited papers are combined with internal estimates obtained in this paper with a view to ensure econometric consistency.

- *Micro effects:* reform-driven changes in household incomes which are not channelled through macroeconomic effects but add to reform-driven growth effects. The micro effects are based on new estimates of the effects of structural reforms on household incomes across the distribution. These estimates build on the baseline estimation framework. As a result, these micro reform effects on household incomes are *conditional* on growth effects. By contrast, they do not control for potential confounding effects from other reforms as well as for interaction effects with other reforms because the approach retained in this paper only allows policies to be considered in isolation (i.e. one at a time) This limitation should be kept in mind

when interpreting the results, the risk being that estimated effects of a given policy change result from some simultaneous change in another policy area rather than the direct effect of the policy *per se*. However, the treatment of endogeneity in the estimation aims at lowering the effects of such confounding factors.

Figure 4.



Box 2. ASSESSING THE IMPACT OF STRUCTURAL REFORMS ON INCOME DISTRIBUTION: A COMBINED MICRO-MACRO FRAMEWORK

The baseline model presented above can be augmented and combined with results on the quantification of the macroeconomic effects of structural reforms to deliver a complete assessment of the impact of structural reforms on household incomes across the distribution.

First, augmenting this baseline model with structural policy indicators (Z) allows for identifying the micro effects of growth-enhancing policy reforms on the long-term level of household incomes across the distribution1, conditional on and beyond their impact channelled through growth and its sub-components, i.e. the macro effects:

$$\Delta \ln \mu_\alpha(x_{it}) = \theta_{0,\alpha} - \theta_{1,\alpha}\ln\mu_\alpha(x_{it-1}) + \theta_{2,\alpha}\Delta\ln LP_{it} + \theta_{3,\alpha}\ln LP_{it-1} + \theta_{4,\alpha}\Delta\ln LU_{it} + \theta_{5,\alpha}\ln LU_{it-1} + \theta_{6,\alpha}NX_{it} + \theta_{7,\alpha}Z_{it-1} + \gamma_t + \eta_i + \varepsilon_{it} \quad (1)$$

Second, growth-enhancing policy reforms are deemed to deliver growth effects, i.e. changes in labour productivity (LP) and labour utilisation (LU). Such changes in labour productivity and labour utilisation benefit differentially household incomes across the distribution, i.e. growth effects also encompass distributional effects, as demonstrated in the baseline model. As a result, reform-driven

macroeconomic effects generate macro effects on the long-term level of household incomes across the distribution. Such macro effects, available in the literature and in particular from on-going work conducted by the OECD (Gal and Theising, 2015; Egert, 2017), can be combined in a fully-fledged macro-micro approach.

The combination of all these effects can be written as follows:

$$E_{\mu_\alpha,Z} = \pi_{LP,\alpha,Z} \cdot \varepsilon_{LP,Z} + \pi_{LU,\alpha,Z} \cdot \varepsilon_{LU,Z} + D_{\mu_\alpha,Z} \qquad (2)$$

where $E_{\mu_\alpha,Z}$ denotes the long-run elasticity of household income in a given income group (governed by α) with respect to a change in the policy variable Z. This corresponds to the total reform effect and combines mutually exclusive macro and micro effects:

- The first term captures the macro effect channelled through labour productivity. This is in turn the product of two effects: i) the distribution-sensitive return to household income from labour productivity growth ($\pi_{LP,\alpha,Z}$), which is conditional on policies Z, and ii) distribution-neutral macroeconomic growth effects of a policy reform on labour productivity ($\varepsilon_{LP,Z}$).

- The second term captures the macro effect channelled through labour utilisation, analogous to labour productivity.

- The third term ($D_{\mu_\alpha,Z}$) captures micro distributional reform effects, i.e. distribution-sensitive changes in household income that are not driven by changes in labour productivity and labour utilisation. Those are estimated directly from (1) using System GMM estimation techniques and assuming policy variables are strictly exogenous.

  Reform-driven macroeconomic effects ($\varepsilon_{LP,Z}$ and $\varepsilon_{LU,Z}$) have been estimated in the context of a recent updated assessment of the quantitative impact of policies and institutions on labour utilisation and productivity (Gal and Theising, 2015; Egert, 2017). Distributional effects are estimated on the basis of the policy-augmented version of the baseline model (equation 1). These layers of empirical work are combined in a single framework in order to deliver a comprehensive assessment of the impact of structural policies on growth and the income distribution.

1. Due to the limited degrees of freedom in the income distribution data used (e.g. short time horizon, break in the series, etc.), using SYS-GMM for the micro-effects precludes the estimation of multivariate reform scenarios (as well as the introduction of non-linear effects or interactions between policies). However, the lack of control for potential confounding factors is deemed to be attenuated by an appropriate treatment of endogeneity allowed by SYS-GMM.

1.3.5. The distributional effects of structural reforms: a combined macro-micro approach

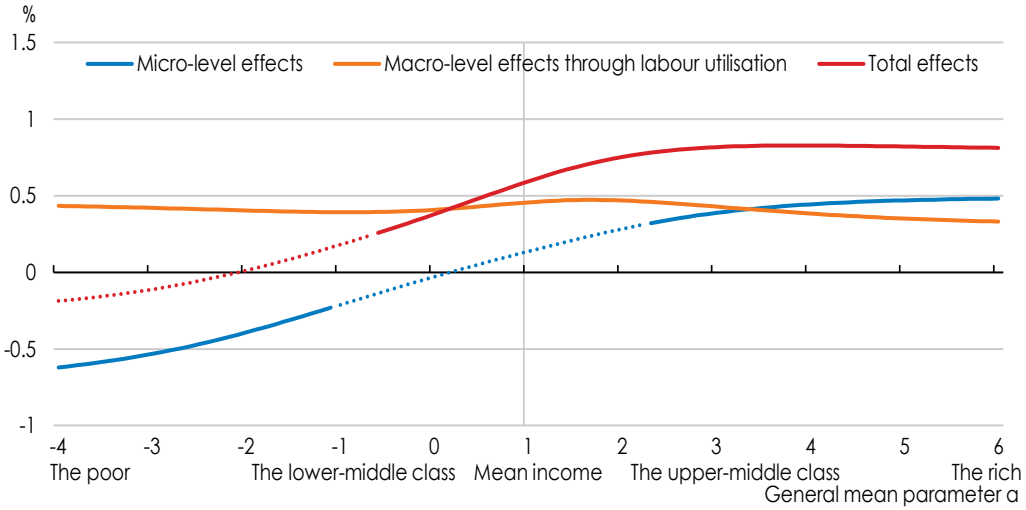
The main findings on the effects of pro-growth reforms on the distribution on household disposable income can be summarised as follows, on the basis of OECD cross-country evidence over the last 30 years:

- Most pro-growth reforms have little impact on income inequality when the latter is assessed through measures that emphasize the middle class.

- By contrast, a higher number of pro-growth reforms have an impact on income inequality and thus may raise trade-offs and synergies between growth and equity objectives when inequality is assessed through measures that emphasise the poor. This corresponds to higher degrees of inequality aversion.

- Social protection and labour market reforms are the sources of most of the trade-offs between growth and equity objectives. In particular, reductions in the generosity of unemployment benefits and social assistance are found to leave poor households behind even when such reforms generate aggregate employment gains (Figure 5). Raising employment while making it more inclusive requires well-targeted active labour market policies (ALMPs) with a view to enhancing employability among the low-skilled, the long-term unemployed and discouraged jobseekers.

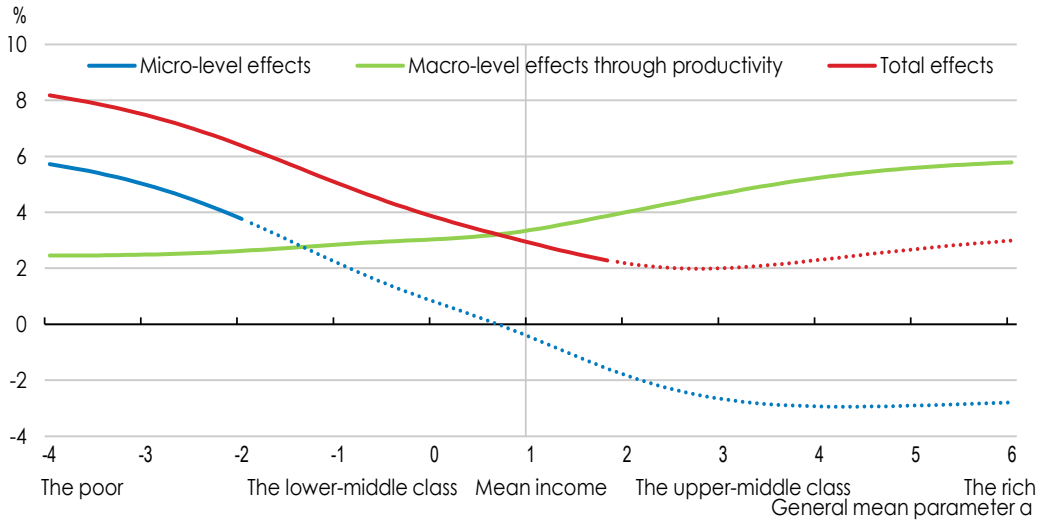
Figure 5. **Effects of a reduction in unemployment benefit average gross replacement rates on household disposable incomes**



Note: A reduction in UB average gross replacement rates by 1 percentage point is estimated to increase household disposable income by 0.3-0.8% from the lower-middle class to the most affluent households. This total effect can be decomposed along a micro-level effect and macro-level effect through labour utilisation. See Box 2 for details of the empirical approach and the definition of the effects. Non-significant estimates (at the 10% level) are indicated by dots on general mean curves.

- Increasing public spending on education, in particular on childcare and early childhood education, boosts growth and at the same time reduces income inequality, for instance by enhancing the labour market inclusion of women (Figure 6).

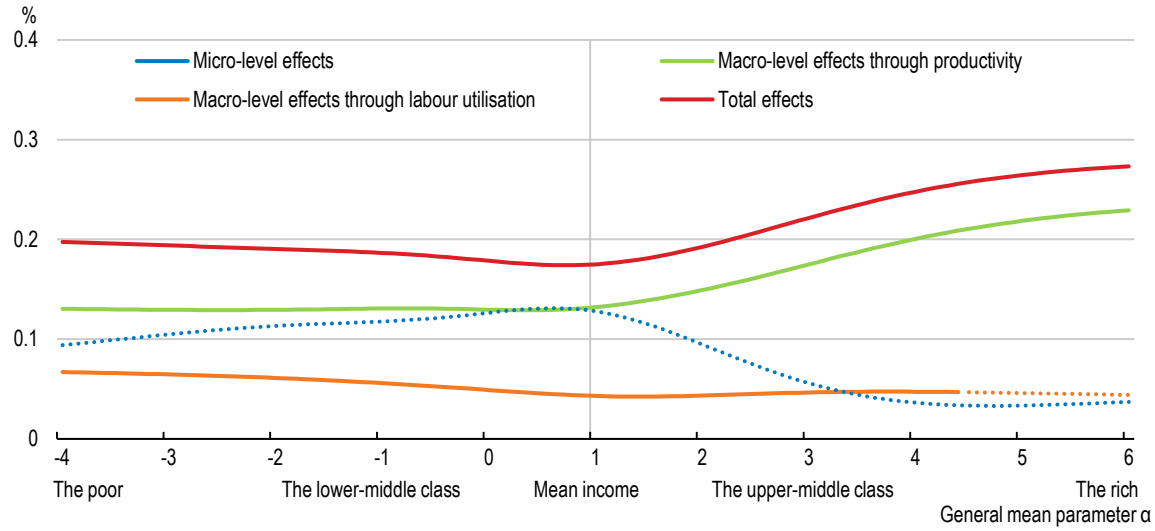
Figure 6. **Effects of an increase in government spending on education on household disposable incomes**



Note: An increase in government spending on education (in per cent of GDP) by 1 percentage point is estimated to increase household disposable incomes by 2-8% on average from the poor to the middle class. This total effect can be decomposed along a micro-level effect and macro-level effect through labour productivity. See Box 2 for details of the empirical approach and the definition of the effects. Non-significant estimates (at the 10% level) are indicated by dots on general mean curves.

Spurring productivity by easing barriers to firm entry and competition in product markets produces strong macroeconomic gains without raising trade-offs between efficiency and equity objectives since the associated income gains are fairly equally shared across households (Figure 7). This reflects two distributionally offsetting effects: higher labour productivity, which tends to benefit the most affluent households disproportionately, and higher employment, which tends to benefit the less affluent households disproportionately.

Figure 7. **Effects of a reduction in regulation in network industries on household disposable incomes**



Note: A reduction in regulation in network industries (ETCR aggregate, index 0-6) by 1% is estimated to increase household disposable incomes by around 0.2% on average across the distribution. This total effect can be decomposed along macro-level effects through labour productivity and labour utilisation. The micro-level effect is insignificant for all income groups and thus not included in the total effect. See Box 2 for details of the empirical approach and the definition of the effects. Non-significant estimates (at the 10% level) are indicated by dots on general mean curves.

1.3.6. Conclusions

Making reforms for inclusive growth is about exploiting synergies, and designing policy packages to mitigate trade-offs. It is thus all about details. At the current juncture there is a crucial need for more growth but also to make it more inclusive. This is not out of reach as countries exhibit large room for packaging structural reforms to target both growth and equity objectives.

1.3.7. References

Atkinson, A.B. (1970). On the measurement of inequality. Journal of Economic Theory 2: 244-263.

Blundell, R.W. and Bond, S.R. (1998). Initial Conditions and Moment Restrictions in Dynamic Panel Data Models. Journal of Econometrics 87:115-143.

Causa, O., de Serres, A. and Ruiz, N. (2015). Can Pro-growth Policies Lift All Boats? An Analysis Based on Household Disposable Income. OECD Journal: Economic Studies 2015: 227-268.

Causa, O., Hermansen, M. and Ruiz, N. (2016). The distributional impact of structural reforms, OECD Economics Department Working Papers, No. 1342, OECD Publishing, Paris.

Égert, B. (2017). Regulation, institutions and productivity: new macroeconomic evidence from OECD countries, OECD Economics Department Working Papers, No. 1393, OECD Publishing, Paris.

Foster, J. E. and Szekely, M. (2008). Is Economic Growth Good for the Poor? Tracking Low Incomes Using General Means. International Economic Review 49(4): 1143-1172.

Foster, J. E., Seth, S., Lokshin, M. and Sajaia, Z. (2013). A Unified Approach to Measuring Poverty and Inequality: Theory and Practice. The World Bank, Washington.

Gal, P. and Theising, A. (2015). The Macroeconomic Impact of Structural Policies on Labour Market Outcomes in OECD Countries: A Reassessment, OECD Economics Department Working Papers, No. 1271, OECD Publishing, Paris.

Hermansen, M., Ruiz, N. and Causa, O. (2016). The distribution of the growth dividends, OECD Economics Department Working Papers, No. 1343, OECD Publishing, Paris.

1.4. GENERAL DISCUSSION of SESSION I on LABOUR MARKET AND PRODUCT MARKET REFORMS

Introduced by the comments of Zsolt Darvas* and chaired by Jan in' t Veld**

Darvas first stressed the differences among the various models presented: the three papers reflect the large variety of methodological approaches. Jean-Olivier Hairault use a complex general equilibrium model with skilled and unskilled workers, Giovanni Dosi uses an agent-based approach with endogenous growth (Schumpeter) and aggregate demand (Keynes) features, while Orsetta Causa and Mikkel Hermansen use a purely empirical approach, by combing micro and macro results based on reduced-form estimation. He also explained that on the one hand, the different methodologies have both advantages and drawbacks. Theoretical models, like the general equilibrium framework and the agent-based model have the conceptual advantage of being based on theory and are able to consider second round effects. A general equilibrium framework includes a coherent interaction of various markets, yet an issue is whether the actual world is indeed characterised by general equilibrium. Moreover, in order to able to solve theoretical models, several assumptions have to be made, which can sometimes be overly restrictive with little resemblance to reality. Empirical approaches, such as the work could reveal regularities and could be used to verify or refute theories. However, model specification could be ad hoc with little connection to theory and the identification of causality, especially in a reduced form modelling framework, remains a challenge even if a sophisticated estimation technique is used. **Darvas** highlighted as well the different conclusions obtained by the different models. As example he cited the strikingly contrasting conclusions regarding the impact of lower unemployment benefits. Similarly opposing findings are reached by the three papers for a number of other key issues too. The contradicting results show how sensitive the findings are to the choice of the modelling framework, assumptions and data. He then presented some specific comment on each paper and some specific question to each speaker. For **Hairault** he suggested that in many simulations the benchmark and policy scenarios hardly differ, but there is a huge difference for product market regulations. Why? How does parametrisation influence the difference between the benchmark and the policy scenarios? Furthermore he noticed that income-inequality did not increase everywhere. For example, it fell from 1995-2013 in Italy, Ireland and Greece. He asked, then: how to reconcile this development with the assumptions made by the authors? For **Dosi** he stressed that a paper challenging the consensus in the literature could be very useful, because it fosters a debate, nevertheless he highlighted that there has been made limited effort to compare model predictions to empirical stylised facts. He pointed out also that there are actual developments in contrast to model predictions (as several countries with flexible labour markets innovate a lot as in the case of US and Canada) and suggested that the possible negative impacts of more flexible labour markets on employment and income inequality might be offset by increased social security and active labour market policies (ALMP). The prospect for offsetting policies is missing from the model. For **Causa** he questioned the comparability of the results because they were reached using different methodologies and considering different country groups and time periods. He asked for clarification about the variability of the macro-level effects, the model estimation and the omitted variables. He also asked how the method used allows the identification of the impact of a particular policy at different time horizons.

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** Jan in't Veld is a Head of Sector at the European Commission, DG Economic and Financial Affairs. He holds degrees from the Free University in Amsterdam, the London School of Economics and obtained his PhD in economics from Birkbeck College (University of London). Before joining the European Commission, he worked at the National Institute of Economic and Social Research (NIESR) in London. His research interests are in the areas of macro modelling, fiscal policy and structural reforms.

The discussion was then opened to the floor[16]. The first presenter to reply to Darvas's comments was **Hairault**. He agreed that including other countries like Italy would enrich the work. The authors do not really support a decrease in unemployment benefits in the paper as pointed out in the comments: they actually say that decreasing unemployment benefits is bad for inequality, especially if there is no minimum wage. In this framework of unemployment insurance, a better strategy involves training programs, in particular it would be ideal to have unemployment benefit reforms coupled with training programs for the unemployed. Another good instrument is hiring subsidies, especially for those coming from routine jobs. One of the objectives of the paper is to show that all these labor market and product market reforms indeed produce results in terms of employment and inequality but these effects are small compared to the changes, in particular in inequality, produced by technical progress. In some sense it can be difficult to address the issue of inequality exactly because it is mixed with technological progress forces.

As far as the critique on services is concerned, Hairault replied that there might be a misunderstanding, because the paper focuses on manual services and personal services, not about abstract jobs which, by definition, are high skilled jobs and at the top of distribution.

The mechanisms are moreover different with respect to Dosi's paper: for example, in terms of liberalisation, the model shows an increase in number of firms and decrease in mark-ups which is good for demand consumption and growth. In Dosi's work, it rather seems that the increase in the number of firms has negative effects because it increases the problem of coordination.

Dosi replied to the comments by Darvas starting from the lack of critique of the empirics supporting the IMF and OECD "orthodoxy". He agreed that job should be undertaken. A good deal of that literature almost writes the results in the assumption by which they make the estimates, e.g. when estimating the effects of labour market liberalisation, they assume that the world lives in an aggregate production function, that there are no demand effects, everything happens on the supply side, the world is in equilibrium, so on and so forth and after making all these assumptions the effect of liberalisation on labour demand is estimated. If one does more naïve and inductive estimates like even a recent IMF work which does not derive the estimates from first principles, one finds that structural reforms have a detrimental effect.

A recurring remark is that countries like the US that have a more flexible economy grow much more than, for example, Mediterranean countries which are more rigid. The answer to this, Dosi added, has nothing to do with labour market flexibility but rather with austerity policies which are even worse. The effects of austerity policies apply to all Europe, even to virtuous countries. Rather than speaking about Greece, we should speak about Finland. Finland has been the best of the class and still has a very poor performance. One might say that it's related to Nokia and indeed that is the case, but it is coupled with the restrictive policies coming from austerity packages. Relate work done by the authors show that austerity is self-defeating, increasing deficit and debt, and it exerts a permanent negative shock on the rate of growth of income and productivity. Undeniably there are also structural problems, but they are rather related to the structure of the industry, the low degree of innovativeness, the bad specialisation, etc. but have little to do with labour market institutions.

Orsetta Causa agreed that, in combining micro and macro, internal and external estimates one has to be careful with consistency, but the authors do their best to make them comparable. External estimates used were comparable in terms of sample, methodology etc. The appendix in the paper documents all

[16] And chaired by Jan in' t Veld

the math done to arrive at combined estimation. An additional point is that these are cross-country regressions, policy indicators vary slowly over time relative to how much they vary across countries, identification issues are present and thus there is potential for omitted variable bias. In some cases when identifying the effect of a policy you might be picking up the effect of another policy. Since the framework is already quite complex, not too many policies can be included in the same regression because otherwise identification would be an issue.

An additional issue is the economic cycle: the strategy adopted in the paper captures long-run effects. There are short-run controls but the identification is on the long-run effects and indeed the short-run effects may be very different and depend on the economic cycle. Labour market liberalisation occurring in a period when employment is going up has more positive effects in the short run, while, if done in a period of recession, it might exacerbate the short-run problems.

As far as the comment on the use of the general mean is concerned, Causa remarked that deciles had also been used, with similar results. However, the thresholds of the deciles can be tricky. Deciles are more unstable; when focusing, for example, on the bottom decile, the market and disposable income are very volatile and estimations become more complex. More generally, it is more interesting to look at the effects of reforms on the level or the growth rate of income than on inequality indicators: it is not the same if all incomes rise or some are losing and this latter situation would be masked if looking at an aggregate inequality indicator. It is therefore important to focus on absolute changes, also because it changes people's perception.

2. WORKSHOP OF 16th MAY. SESSION II – ANALYSIS OF TAX REFORMS

2.1. IMPLICATIONS FROM PANEL DATA TECHNIQUES

Analysis of tax reforms: implications from panel data techniques[17]

By Andreas Peichl*

2.1.1. Introduction

Recent discussion about rising inequality leads to the key question for policymakers on how to influence its level. This question implicitly assumes that governments are capable of reducing inequality despite potential countervailing behavioural effects. However, as highlighted by the literature, this assumption is questionable. Indeed, while the effect of redistributing policies on inequality may appear obvious at first glance, the expected impact is theoretically less straightforward if behavioural (second-round) adjustments of economic agents are considered. Of course, progressive taxation and social expenditures, which benefit the poor relatively more, reduce the difference between pre- and post-government inequality[18]. However, indirect second-round effects on the pre-government distribution of income might yield an opposite effect and could eventually overcompensate the initial positive effect[19]. One of the mechanisms at work is that many redistributive policies such as progressive taxes or social benefits reduce incentives to work or to invest. Given the findings in the literature[20] that labour supply elasticities are higher at the bottom of the income distribution than at the top, it is likely the case that labour supply reduction in response to redistribution measures is more prevalent among the poor than among the rich. It can thus be presumed that redistribution increases pre-government inequality and therefore, obviously, also post-government inequality. Another reason for behavioural second-round effects is grounded in the wage-setting behaviour of employers. In countries with high levels of redistribution, employers might shift away any social responsibility because they expect the government to ensure decent levels of inequality and fairness. Following this argument, gross wages of employees are lower than in a world without redistribution, whereas employers' profits are higher, thus implying higher pre-government inequality. It is to empirical analyses to explore whether second-round effects outweigh first-round effects or not. In our

[17] The contribution is based on Doerrenberg, P. and Peichl A. (2014). "The impact of redistributive policies on inequality in OECD countries". Applied Economics 46:17, 2066-2086.

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[18] This direct inequality reducing effect is confirmed by empirical studies based on individual-level data that study the effect of social policies on the difference between pre- and post-government inequality distributions (e.g., Garfinkel et al., 2006; Fuest et al., 2010).

[19] e.g., Sinn, 1995; Poterba, 2007.

[20] e.g., Roed and Strom, 2002.

intervention, we contribute to this research question investigating whether different redistributive policy measures effectively reduce inequality.

The proceeding of this article is as follows. Section 2 presents the general problems related to this kind of investigation, section 3 contains the regression analyses. Therein, the included variables are presented, before fixed effects and IV models are estimated and discussed. Finally, section 4 concludes.

2.1.2. Evaluating empirical studies

In general, from an empirical point of view, it is important to distinguish between correlation and causation. To establish causation, a credible research design is necessary. The fundamental problem of empirical research is that the counterfactual (i.e. what would have happened to the treated if they had not been treated and what would have happened to the untreated if they had been treated) is not observable. Therefore, researchers need to rely on identifying assumptions. When evaluating empirical studies, one should consider the ideal experimental design first; then formulate a feasible design and analyse its flaws relative to the ideal design. A research design is hence a source of variation in outcomes that is credibly unrelated to selection into treatment. In practice, different methods with different identifying assumptions are used such as: experiments (that generate random variation), natural experiments, instrumental variables (that have variables providing quasi-randomised variation) and structural models (that rely on testable econometric assumptions). Unfortunately, finding the causal effect of redistributive generosity on levels of post-government income inequality is characterised by difficulties as there is no quasi-experimental set-up available to identify a truly causal effect on the country level. Nevertheless an attempt ought to be made to answer such a relevant research question as credible as possible. First of all it has to be considered that policy measures are themselves responsive to economic and/or political conditions and therefore usually endogenous. In order to overcome any resulting empirical problems all the channels that affect both the policy variable and the outcome of interest (confounders) need to be controlled for in the empirical estimations (Besley and Case, 2000).

2.1.3. The role of distributive policies.

In order to estimate the effect of redistributive policies on levels of inequality, different econometric methodologies are applied with using as dependent variable the Gini index as indicator of inequality[21] and, in order to capture and measure policies of redistribution, three explanatory policy variables: i) the level of (total) government spending (on all fiscal levels) in a country[22]; ii) the total public social expenditure; iii) the degree of redistribution in the (progressive) income tax system. With the aim of capturing confounding factors, a standard set of control variables which are likely to affect both left-hand-side variable inequality, as well as the explanatory variables of interest has been included as well: i) real GDP per capita (in constant 1990 US dollar prices); ii) openness to trade, measured as exports plus imports as a share of GDP (constant 1990 prices); iii) squared GDP per capita in order to allow for nonlinear effects of GDP on inequality; iv) inflation rate; v) unemployment rate; vi) net union membership as a percentage of all wage earners, in order to control for the power of employees in wage bargaining; vii) levels of higher education; viii) globalisation index[23] as more globalised countries tend to have both higher levels of inequality and less policy measures aiming at reducing

[21] The LIS (Luxembourg Income Study) and the WIID (UN world income inequality database) measure inequality with the Gini coefficient, whereas UTIP University of Texas Inequality Project) provides inequality estimates based on a regression estimation.
[22] From the Penn World Tables (Heston et al., 2009).
[23] As developed and described by Dreher (2006).

inequality. Generally the research question is investigated with a panel dataset of OECD countries for the period 1981-2005.

2.1.3.1. Fixed effects approach

The regression equation estimated reads:

$$Y_{i,t} = \beta_1 x_{i,t-1} + \beta_2 C_{i,t-1} + \gamma_t + \mu_i + \varepsilon_{i,t} \quad (1)$$

where i denotes a country and t the point of time. $x_{i,t-1}$ is one of the lagged policy variables of interest and $C_{i,t-1}$ is a vector of several lagged control variables. Time and country fixed effects are captured by $\gamma_t$and, μ_i respectively. $Y_{i,t}$ indicates the level of inequality. $\varepsilon_{i,t}$ is a SE term and our coefficient of interest is β_1.

As already discussed, policy measures are usually endogenous, requiring to control for any driving variable that shape both the policy of interest itself and the outcome variable. By estimating the model as in Equation 1 several steps to overcome such problems of endogeneity are taken. First, a set of standard control variables that are believed to be confounding factors are included. Omitting these latter would lead to omitted variable bias and load onto the coefficients of our policy variables of interest. Despite the inclusion of these controls, there remains doubt whether all confounding variables are removed from ε. Because of this, second, a set of country fixed effects is included into the estimation. The country fixed effects approach ensures that any mechanism of reverse causality that is systematic within a country is controlled for. Other time invariant confounding factors are controlled for as well. The third step to identify unbiased effects is to include a set of year fixed effects, which account for any year specific effects and help to control for spurious relations stemming from common trends in the variables on the left- and right-side of the equation. Fourth, all right-hand-side variables are lagged 1 year, so that is possible to estimate the effect of redistributive policies in a year t-1 on inequality in year t. Such an approach further mitigates the problem of simultaneity bias caused by the fact that varying inequality levels also affect policies of redistribution.

The results (Table 1) provide hints that within country variation in the expenditure variables can explain varying levels of inequality, whereas progressive taxation seems to be less effective. The obtained coefficients, to be interpreted in terms of elasticities, show that a 1% increase in government spending or social expenditure decreases inequality (as measured by the Gini coefficient) by 0.3% or 0.2%, respectively. The coefficient on tax progressivity is mostly smaller and, as for the significant coefficients, varies between –0.2% and –0.04%. In sum, government expenditures reduce inequality despite potential offsetting second round effects whereas the effects of changes in tax progressivity are smaller and often insignificant implying that indirect behavioural effects play a (bigger) role with tax progressivity. Further to this, estimates and SE differ depending on data source and this raises concerns about the general data quality.

Table 1. **Fixed effect panel estimation**

Dependent Variable: Measure of Inequality					
Panel A: LIS Gini					
Gov't Spending	-0.380***	-0.356***			
(lagged)	(0.120)	(0.108)			
Social Expenditure			-0.232**	-0.270***	
(lagged)			(0.092)	(0.091)	
Progressivity		0.007		-0.132**	-0.015
(lagged)		(0.108)		(0.061)	-0.097
Observations	120	117	116	113	117
R2	0.546	0.545	0.564	0.588	0.515
Panel B: WIID Gini					
Gov't Spending	-0.307**	-0.230**			
(lagged)	(0.113)	(0.104)			
Social Expenditure			-0.051	-0.023	
(lagged)			(0.076)	(0.080)	
Progressivity		0.041		0.049	0.036
(lagged)		(0.046)		(0.045)	-0.05
Observations	368	351	349	338	351
R2	0.314	0.299	0.328	0.339	0.28
Panel C: UTIP Estimate					
Gov't Spending	-0.103	-0.081			
(lagged)	(0.076)	(0.090)			
Social Expenditure			0.001	-0.004	
(lagged)			(0.052)	(0.054)	
Progressivity		-0.025		-0.021	-0.031
(lagged)		(0.025)		(0.026)	-0.025
Observations	437	389	378	353	389
R2	0.493	0.435	0.553	0.518	0.425

Note: Fixed-effects OLS regressions based on Equation 1. Dependent variables are measures of inequality. Panels A–C use different data sources. All right-hand side variables are lagged 1 year. Lagged control variables as well as country and year fixed effects are included but not displayed. SEs in parentheses are cluster adjusted for countries. * < 0.10, ** < 0.05, *** < 0.01.

Another concern is that our identification strategy is not sufficient in order to obtain unbiased effects. The problem of reverse causality is not properly accounted for if the effect of inequality levels on redistribution policies is not systematic within countries. It might, for example, be the case that levels of inequality in a year t-1 affect policies in t in a not systematic way, yielding the necessity to control for lagged levels of inequality. Doing so in the above framework would however not be legitimate.

2.1.3.2. Instrumental variable approach

The regression equation estimated reads similarly to the previous one:

$$Y_{i,t} = \beta_3 x_{i,t-1} + \beta_4 C_{i,t} + \gamma_t + \mu_i + \varepsilon_{i,t} \quad (2)$$

The coefficient of interest is β_3. As discussed above, the concern is that omitted variables in the error term might be correlated with the explanatory variable of interest, biasing the estimates. Thus, instruments $z_{i,t}$ are adopted, which are correlated to the respective measures of interest, but, conditioning on other variables, are not correlated with the dependent variable. The IV model is estimated using two stage least squares (2SLS). The first-stage equation looks such as:

$$x_{i,t} = \delta_1 z_{i,t} + \delta_2 C_{i,t} + \gamma_t + \mu_i + v_{i,t} \quad (3)$$

where are included the same control variables as well as country and year fixed effects as on the second stage, and $v_{i,t}$ is a SE term. The instrument z must not affect ε after conditioning on the confounding variables in vector C and the fixed effects γ and μ. The within country variation is exploited as an instrument to identify the effect of interest, again hoping to control for any country systematic unobservable effects. Finding suitable instruments is generally a difficult task. In this set-up are required IVs that are independent of $\varepsilon_{i,t}$ in Equation 2, but correlated with one of our three respective explanatory variables of interest (represented by $x_{i,t}$). An ideal instrument would be randomly assigned to each observation and therefore generate a quasi-experimental way to estimate the causal effect. Obviously, no such instrument is available in the setting with country-level observations. In this case, we use the initial levels of the policy variables as of 1981 and extrapolate them with the growth rate of GDP – for government spending and social expenditure, and the growth rate of the highest marginal tax rate (MTR) – for the level of progressivity. The extrapolated figures are then used as instruments for the explanatory variables of interest. That is, our IVs take the initial value of the respective regressor in 1981 and then grow with the growth rate of GDP or the growth rate of the highest MTR.

The results (Table 2) are similar to the ones obtained with the fixed effect. The measures of government expenditure seem to have inequality reducing effects, whereas tax progressivity has a smaller impact, mostly not significantly different from zero. Again, not all coefficients are sufficiently precise, but for those that are, we find that government spending compress the income distribution. A 1% increase in this variable is approximately associated with a 0.3% drop in inequality. The effect of social expenditures is again slightly smaller with an elasticity of –0.2% for the precise coefficients. This confirms the pattern that we found in our previous analyses. The results for instrumented tax progressivity are not precisely estimated; thus not allowing any clear interpretation, but providing another hint that behavioural second-round effects play a stronger role with progressivity.

Table 2. **IV estimation**

Dependent Variable: Measure of Inequality					
Panel A: LIS Gini					
Gov't Spending	0.024	0.003			
	(0.218)	(0.226)			
Social Expenditure			-0.216**	-0.295**	
			(0.106)	(0.116)	
Progressivity		0.035		-0.116*	1.252
		(0.070)		(0.069)	(0.789)
Observations	107	106	86	85	79
Panel B: WIID Gini					
Gov't Spending	-0.152	-0.110			
	(0.153)	(0.162)			
Social Expenditure			-0.107	-0.039	
			(0.138)	(0.139)	
Progressivity		0.098*		0.082	-0.223
		(0.053)		(0.053)	(0.854)
Observations	334	331	287	285	288
Panel C: UTIP Estimate					
Gov't Spending	-0.328***	-0.333***			
	(0.096)	(0.101)			
Social Expenditure			-0.026	-0.016	
			(0.076)	(0.082)	
Progressivity		-0.017		-0.048**	0.167
		(0.022)		(0.024)	(0.414)
Observations	414	405	344	337	353

Note: Fixed-effects IV regressions based on Equation 2. Dependent variables are measures of inequality. Panels A–C use different data sources. First stages are based on Equation 3 (see Appendix tables for first-stage statistics). IVs are extrapolated values of the explanatory variables of interest. Control variables as well as country and year fixed effects are included but not displayed. SEs in parentheses are cluster adjusted for countries. * < 0.010, ** < 0.05, *** < 0.01.

The results rest on the assumption of instrument validity. That is, conditional on all control variables as well as the country and year fixed effects, the IVs must affect inequality only through the independent variables of interest. This assumption is untestable and its validity needs to be approached intuitively. Clearly, our instruments are not randomly assigned to each country-year observation. However, we are able to exploit some exogenous variation as the extrapolated values are not directly related to inequality. Of course, the growth rate of the GDP and marginal tax rate, which we use for extrapolation, have some impact on the income distribution, but we control for GDP and tax rate on both the first and second stage and hence condition on these variables. We only exploit within-country variation in our instruments and control for any effects that are specific to the included countries and systematic across time. Although we find negative coefficients in most specifications, the SEs in some cases are large and imprecise. In IV estimations, weak first-stage results can increase the SEs on the second stage, but this is mostly not the reason in our case; first-stage results are sufficiently strong at least for specifications which use government spending and social expenditure.

2.1.3.3. System Generalised Method of Moments (GMM) and other possible alternatives

One commonly used way of dealing with such dynamic problems is to include lagged levels of the dependent variable into the set of explanatory variable and estimate the equation using GMM methods as first suggested by Arellano and Bover (1995) and Blundell and Bond (1998). However, System GMM estimators are not appropriate for models with small N and large T (Roine et al., 2009; Roodman, 2009). Another reason for GMM methods not to be applicable to our setting rests on our scepticism that the required assumption of weak exogeneity is met. This assumption allows the explanatory variables to be correlated with past and current levels of the error term, but not with its future realisations. We have a reverse causality effect at hand, where redistribution does not only decrease inequality, but where inequality also positively affects levels of redistribution. Applying the assumption of weak exogeneity to our case implies that the system-GMM estimator, using internal instruments, would only be valid if future levels of inequality do not affect the current levels of measures of redistribution. However, governments, that expect increasing inequality in the future, could implement redistributive measures to offset the anticipated shock on income inequality. We are therefore sceptical that the assumption of weak exogeneity is likely to hold in our set-up.

The difficulties of identifying a clear and clean causal effect are omnipresent and inherent to this literature. The problem underlying (almost) all country-level studies is that it is impossible to exploit a (quasi-)experimental identification strategy, i.e., to randomly assign redistributive policies to a set of countries. The FE and IV methods used here can certainly mitigate problems of endogeneity, but there remains doubt if they are sufficient.

As possible alternatives, difference-in-difference settings that analyses single policy changes may help to identify a clear effect. However, the required 'common trend' assumption is often difficult to defend in country-level settings. Synthetic control methods overcome this issue by providing case studies of reforms in a single country. Comparing a given country to a weighted control group of other countries ensures a common trend and can help identifying reform effects.24 Another alternative are simulation models which generate exogenous variation by construction.25 Hence, they are immune against endogeneity issues. However, they have to rely on strong structural assumptions.

2.1.4. Conclusions

This contribution uses a panel of industrialised OECD countries over the time period 1981 to 2005 to analyse the effect of redistributive policies on post-tax inequality. After discussing potential sources of endogeneity we employ fixed effects and IV approaches to identify the effect of three policy variables of interest. Despite behavioural feedback effects, we provide some evidence that especially government spending and social expenditure meet their target of reducing post-government inequality as measured by the Gini coefficient. Our results also

[24] Rubolino and Waldenström 2016
[25] See, for example, the paper by Barrios et al. (2016) on linking EUROMOD and QUEST.

show that policies of government expenditure seem to matter more for reducing inequality than the degree of progressivity in the tax system. The insignificant results for the latter might hint into the direction that higher tax progressivity indeed exhibits (stronger) behavioural effects, which tend to increase pre-tax inequality and hence countervail the inequality reducing direct effects. Hence, given the disincentive and distorting effects of progressive taxation, our results might imply that governments should combat inequality through progressive transfers rather than increasing the progressivity of the tax system.

We stressed that identification is crucial, but is problematic in policy relevant (macro) context, thus for policy advice is advisable not to rely on cross country data estimate, but to use alternative methods such as simulation models or synthetic control method. Furthermore, data are relevant and there is need for better ones. Indeed, in the regression analyses coefficients are found to differ both in terms of size and precision depending on which data source for the Gini coefficient is used suggesting that the use of empirical inequality measures may be critical and results might depend on the data source.

2.1.5. References

Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. Journal of Econometrics 68: 29–51.

Barrios, S., Dolls, M., Maftei, A., Peichl, A., Riscado, S., Varga, J. and Wittneben, C. (2016). Dynamic scoring of tax reforms in the European Union. JRC Working Papers on Taxation and Structural Reforms 3/2016.

Besley, T. and Case, A. (2000). Unnatural experiments? Estimating the incidence of endogenous policies. The Economic Journal. 110: 672–94.

Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics. 87: 115–43.

Dreher, A. (2006). Does globalization affect growth? Evidence from a new index of globalization. Applied Economics. 38: 1091–110.

Fuest, C., Niehues, J. and Peichl, A. (2010). The redistributive effects of tax benefit systems in the enlarged EU, Public Finance Review. 38: 473–500.

Garfinkel, I., Rainwater, L. and Smeeding, T. M. (2006). A re-examination of welfare states and inequality in rich nations: How in-kind transfers and indirect taxes change the story, Journal of Policy Analysis and Management. 25: 897–919.

Heston, A., Summers, R. and Aten, B. (2009). Penn World Table version 6.3. Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

Poterba, J. M. (2007) Income inequality and income taxation. Journal of Policy Modeling 29: 623–33.

Roed, K. and Strom, S. (2002) Progressive taxes and the labour market: Is the trade-off between equality and efficiency inevitable?. Journal of Economic Surveys. 16: 77–110.

Roine, J., Vlachos, J. and Waldenström, D. (2009). The long-run determinants of inequality: What can we learn from top income data?. Journal of Public Economics. 93: 974–88.

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system GMM in Stata. Stata journal. 9: 86–136.

Rubolino, E. and Waldenström, D. (2017). Tax Progressivity and Top Incomes: Evidence from Tax Reforms. Iza Discussion Paper No. 10666

Sinn, H. -W. (1995). A theory of the welfare state. The Scandinavian Journal of Economics. 97: 495–526.

2.2. SYNTHETIC CONTROL METHOD: AN EMPIRICAL ANALYSIS OF TAX REFORMS

by Daniel Waldenström*

Daniel Waldenström's contribution is not included in these proceedings as the material related to the presentation is under publication in a peer-reviewed journal. The material of his presentation can be found at the following address https://ec.europa.eu/info/events/economy-finance/inequality-and-structural-reforms-methodological-concerns_en

* Daniel Waldenström is Professor in the Economics Department at Uppsala University. He received his Ph.D. in Economics from the Stockholm School of Economics in 2003 and was thereafter visiting assistant professor at UCLA and Global Fellow at UCLA International Institute 2003-2004. In 2009 Waldenström gained his second Ph.D., in economic history, at Lund University. Waldenström's research concerns income and wealth distribution, intergenerational mobility and taxation. He has published papers on the evolution of top income shares and wealth concentration in several countries. His recent work deals with intergenerational transmission and tax progressivity in Sweden.

2.3. GENERAL DISCUSSION of SESSION II on TAX REFORMS

Introduced by the comments of Elvire Guillaud* and chaired by Salvador Barrios**

Elvire Guillaud underlined that the different results in the empirical literature that tries to understand which is the most effective policy on income inequality are due to the choice of counterfactuals[26]. No pure counterfactual exist in the real world, the problem being of second-order effects, which make the hypothetical pre-government counterfactual to the observed post-government distribution unlikely. She explained that since scholars still need a counterfactual to measure the impact of policies on inequality, various methods are employed in the literature. The choice of the method depends on the policy variables at hand (statutory or effective policy), which has consequences on the way behavioural responses (observable or simulated) are treated. Therefore, the choice of a counterfactual depends on the question at stake (causal / distributional impact, or effective impact of a policy). A summary of the different methods depending on the type of data used (macro or micro data) and the empirical strategy chosen (synthetic control method, panel data techniques, micro-simulation, or observed household data) was proposed.

Another point was about the potential synergies and complementarities across different policies including structural reforms. She maintained[27] that there is an incompatibility between high tax and high progressivity and highlighted that while the economic literature is very much focussed on the tax scheme, governments should implement to foster inequality reduction (and particularly e.g. income tax). Such a trade-off between tax and progressivity calls for more consideration of the political bargaining behind the design of redistributive policies. Furthermore, there is a positive link between market income inequalities, and the level of tax progressivity: the more unequal the market income distribution of a country, the more progressive its tax system (yet without being able to catch up with less unequal countries).What if progressivity (and targeting) were used as a substitute for labour market regulation? Instead of compressing the market income distribution with restrictions on the labour market (e.g. minimum wage), inequality would be (purposely) reduced ex-post by taxing the rich, and giving to the poor. Comparing the United States with Sweden, for instance, such a mechanism could well be at work. More generally, the negative correlation between market income inequality and minimum wage legislation (or active labour market policies) has recently been documented.

She concluded stressing that two useful path for future research are first, the need of a meta-analysis of the impact of tax reforms on income inequalities, depending on the counterfactual chosen. This is done in many other research fields, and would help overcome the difficulty of comparing outcomes from different models. Second, there is the interest of a political economy perspective to analyse such

* Elvire Guillaud is Associate Professor of Economics at Université Paris 1 Panthéon-Sorbonne. Her research focuses mainly on inequalities, redistributive policies, social mobility, preference heterogeneity, institutional change, model of capitalism, econometrics of qualitative variables and econometrics of panel data.

** Salvador Barrios is Team Leader at the Fiscal Policy Analysis team of the Joint Research Centre, European Commission. His research focuses on public finances, taxation and growth. He has previously worked as Fiscal Policy Analyst at the Directorate General for Economic and Financial Affairs of the European Commission. Before joining the European Commission he held teaching and research positions in several universities in the UK, Spain, Ireland and Belgium.

[26] Counterfactual can be defined as the source of identification of the policy impact.

[27] Referring to a recent work comparing the impact of tax-benefit systems on monetary redistribution across 22 OECD countries. Guillaud, E., Olckers, M., Zemmour, M. (2017). Four levers of redistribution: The impact of tax and transfer systems on inequality reduction. LIS working paper series No. 695.

policy issues: governments cannot change redistributive policies in isolation. The mechanisms linking different policies, exemplified with tax and progressivity, or progressivity and labour market policies, seem a promising path for further research.

The discussion was then opened to the floor and chaired by Salvador Barrios. One remark was addressed to **Andreas Peichl**: a policy variable that was used to check for the effect on the Gini coefficient is government spending; however, government employment should be controlled for, since there might be wage compression in public wages which may drive the observed effect. **Peichl** replied that the variables that were used are social expenditure and total government expenditure. There are many factors in these regressions which you might think may change over time and are not included. If government employment is stable, then the country fixed effects would control for it, but if this is not the case then fixed effects are not enough. That is why panel techniques might create issues due to omitted variable bias and potential endogeneity issues that might remain.

Emmanuelle Maincent closed the workshop thanking all speakers and participants as well as the chair. She signalled that the workshop was important in showing the attention that the Commission has now on inequality. During the crisis many reforms were promoted and implemented; due to time pressure and the need to have results it is possible that, in the process, inequality was not in the forefront of decisions. In the post-crisis context, however, the focus can be adjusted. The main conclusion that we can draw from the workshop is that there is no true model and many questions remain open. Something that could not be discussed in the workshop due to lack of time is the data issue, in particular the quality and availability of data, which are crucial for us in terms of cross-country comparability. At the same time, indicators of reforms and policy, are necessary and should be improved, as we lack in some situations indicators that can reflect what needs to be done.

Maincent concluded acknowledging that there are challenges at the same time for academics as well as for policymakers. The take-away messages after the discussions of this workshop are thus (i) the importance of timing, i.e. whether reforms should be done in booms or recessions; (ii) reform sequencing, which is strictly related to timing, should also receive attention and (iii) some structural reforms are more costly than others, and this may affect the ultimate distributional impact.

DG Economic and Financial Affairs (ECFIN)
Centre de Conférences Albert Borschette, Rue Froissart 36 1040 Brussels, Room: 0.B

ECFIN Structural Reforms Workshop
"Inequality and Structural Reforms: Methodological Concerns"

Tuesday 16th May 2017

08:30 - 08:50	Welcome coffee
08:50 - 09:00	**Introduction: What to measure and how: methodological concerns** *Mary Veronica Tovšak Pleterski (DG ECFIN)*
09:00 - 11:00	**Session I – Analysis of labour and product market reforms** Chair: *Jan in't Veld (DG ECFIN)*
09:10 - 09:40	**A general equilibrium (LM and PM reforms) perspective to inequality** *Jean-Olivier Hairault (PSE, Université Paris 1 Panthéon-Sorbonne)*
09:40 - 10:10	**The effects of labour market reforms: an agent-based model approach** *Giovanni Dosi (Institute of Economics, Sant'Anna School of Advanced Studies - Pisa)*
10:10 - 10:40	**Empirical analysis of the distributional impact of structural reforms** *Orsetta Causa and Mikkel Hermansen (OECD Economics Department)*
10:40 - 11:10	**General discussion -** *introductory comments by* Zsolt Darvas *(Bruegel)*
11:10 - 11:30	Coffee Break
11:30 - 13:15	**Session II – Analysis of tax reforms** Chair: *Salvador Barrios (JRC IPTS Seville)*
11:40 - 12:10	**Implications from panel data techniques** *Andreas Peichl (Centre for European Economic Research (ZEW))*
12:10 - 12:40	**Synthetic Control Method: an empirical analysis of tax reforms** *Daniel Waldenstrom (Paris School of Economics, CEPR and IZA)*
12:40 - 13:10	**General discussion** - *introductory comments by Elvire Guillaud (Université Paris 1 Panthéon-Sorbonne)*
13:10 - 13:15	**Conclusions** *Mary Veronica Tovšak Pleterski (DG ECFIN)*
13:20	Lunch Buffet

3. WORKSHOP OF JUNE 19th. SESSION I – INEQUALITY AND STRUCTURAL REFORMS

Introduction

by Kerstin Jorna*

The workshop "*Inequality and Structural Reforms: Lessons from Policy*" was organised with the aim of understanding how the design of growth-enhancing structural reforms can be improved to take into account the impact on distribution.

Inequality has risen over the past decades, starting already well before the crisis. For example, growth in the income of the top 5% of earners accounted for 44% of the increase in global income between 1988 and 2008. At the same time, wealth inequality has also risen in the majority of OECD countries and is generally much higher than income inequality. The EU is no exception in this respect.

These developments in inequality are confirmed by more detailed recent data. Between 2007 and 2014, in the majority of OECD countries, the income of the poorest 10% of the population declined more (or increased less) than the income of the richest 10% of the population.

Widening inequalities do not only raise fairness concerns: they can dampen economic growth and create social unrest. It is now widely acknowledged that excessive inequality can have negative implications for long-term growth and macroeconomic and financial stability. Empirical studies have corroborated the view that highly unequal societies experience shorter periods of growth and that growth in these societies is less effective at lowering poverty.[28] Recent empirical evidence suggests, moreover, that income inequality may increase the likelihood of financial crises and in this sense it could be among the causes of the Great Depression and the Great Recession.[29] In addition, widening income inequalities can limit skills development, due to underinvestment in human capital, and hamper social and occupational mobility. Finally, as pointed out last year by Nobel Peace prize laureate Muhammad Yunus, "the widening gap between the rich and the poor is a ticking time bomb that, if left unchecked, could lead to explosive social and economic unrest".[30]

Skill-biased technological change, which has led to an increase in demand for skilled workers, has been a major contributor to the increase in income inequality since the 1990s. While higher demand has led to an increase in the wages of skilled workers, less-skilled workers have seen their wages stagnate and the availability of job opportunities decline.

In a context of rising income inequality, it is important that distributional effects are fully taken into account when designing structural reforms that aim at boosting economic growth, employment and competitiveness or enhancing the sustainability of public finances. While structural reforms certainly

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[28] See, for example, A.G. Berg and J.D. Ostry (2011) "Inequality and Unsustainable Growth: Two Sides of the Same Coin?", IMF Staff Discussion Note 11/08

[29] Stiglitz, J. (2016). Inequality and Economic Growth. In Jacobs, M. and Mazzucato, M. "Rethinking Capitalism: Economics and Policy for Sustainable and Inclusive Growth". Political Quarterly Monograph Series, WILEY Blackwell.

[30] https://www.cnbc.com/2016/12/02/worlds-growing-inequality-is-ticking-time-bomb-nobel-laureate-yunus.html

have the potential to affect inequality, whether the final result is an increase or a decrease in inequality ultimately depends on the type of reform considered, the time horizon as well as the way the reform is designed.

A number of reforms unambiguously reduce inequality while promoting GDP and productivity growth. Increasing the progressivity of tax and transfer systems can reduce income inequality and have positive growth and employment effects. The same can be said for well-designed labour and product market reforms. For example, vocational training, as well as lifelong re-training opportunities, helps to mitigate the negative effect of skill-biased technical change, because they improve the skill endowment of workers while increasing growth and productivity, although the effects might take longer to materialise.

Some structural reforms may involve a trade-off between higher growth and higher inequality, or between higher employment and wage inequality. For example, the creation of job opportunities by flexibility-enhancing reforms reduces income disparities between the employed and the unemployed. However, they also reduce the reservation wage and tend to contribute to the creation of new low-wage jobs.

Against this background, the first session of the workshop was devoted to the major empirical results derived from modelling and from econometric exercises of the effect of reforms on product markets, labour markets and taxation systems on income inequality. In the second session, policy experts from Latvia, Portugal and Ireland shared their experience and presented the structural reforms implemented or planned in their country, highlighting the effects – either observed or expected – in terms of income distribution.

3.1. A GENERAL EQUILIBRIUM (LM AND PM REFORMS) PERSPECTIVE TO INEQUALITY

by Alain De Serres (Speaker) Cyrille Schwellnus *

3.1.1. Introduction

This paper provides an overview of some of the main findings from the empirical research conducted at the OECD over the past few years on the impact of product and labour market reforms on income distribution. This is with a view to identifying areas where clearer conclusions can be drawn versus those where it is difficult to find consistency. Even in the areas where a clearer picture appears to emerge, caution is needed in drawing firm conclusions, given the difficulties often faced in uncovering robust estimates of the impact of policies and non-policy structural determinants on various measures of income distribution. Aside from the strict empirical robustness issue, the difficulty in identifying clear patterns owes to a large extent to the wide range of potential income inequality measures, which can differ according to the income measure used (wages, market income, disposable income), and the part of the income distribution that is emphasised (bottom, lower-half, around the median, upper-half or top income).

One of the main findings is that the respective impacts of pro-competition product market reforms, technological progress and globalisation are difficult to disentangle empirically as they tend to reinforce each other in various ways. For instance, only measures of technology or innovation have been found to impact household disposable income inequality according to one recent study reviewed here, while results reported below show a significant impact of trade on wage dispersion, albeit only in specific cases. Aside from the difficulties in measuring variables such as technological progress and globalisation, these structural factors often interact in ways that are not easy to capture and thus to disentangle. Likewise, there is little clear evidence of adverse disposable income inequality effects of increased product market competition at the macro level, possibly reflecting many offsetting channels. One study looking at sector-level outcomes shows no evidence of adverse employment impacts even in industries directly affected by pro-competition reforms, but workers in such industries do face a higher risk of losing jobs.

In contrast, more cases of synergies and trade-offs between growth and equity objectives are found in the case of labour market reforms, especially if the focus is on the lower-end of the income distribution. First, collective bargaining arrangements that tend to be more favourable to employment are also found to help reduce or mitigate income inequality, a clear case of synergy. Other areas of synergies include some transfers such as spending on active labour market policies or family-related programmes, as well as increases in the retirement age. On the other hand, reductions in the labour tax wedge have been found to widen disposable income inequality (at the low end of the distribution), despite the favourable impact on employment (in particular low-skilled workers). Another case of potential growth-equity trade-off arises is the case of reductions in the replacement rate of unemployment benefits. Finally, reforms of labour market regulation appear to induce largely offsetting effects between wage dispersion and employment, resulting in no clear or significant impact on disposable income inequality.

The paper is structured as follows. The next section briefly reviews the different metrics of income and coverage of population over which income inequality can be measured. Section 3 discusses the main findings from two related empirical studies looking at the determinants of household real disposable

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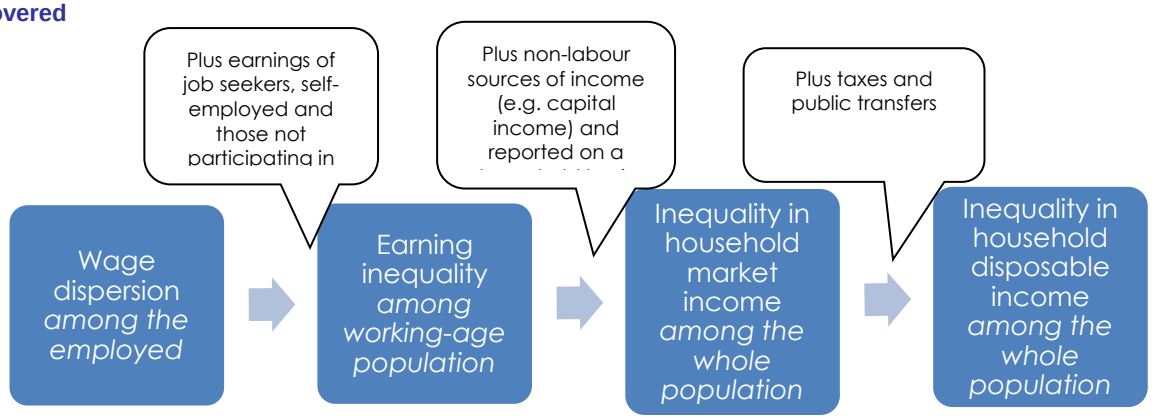
income. Section 4 presents new evidence on the policy and non-policy determinants of two factors contributing to growing market income inequality: i) the decline in the labour share of total income and ii) the rise in the dispersion of wages. The last section reviews some evidence from recent studies on the impact of pro-competition product market reforms on employment, both at the aggregate level and in specific sectors.

3.1.2. The empirical evidence is blurred by the various definitions and measures of inequality

One reason why it is often difficult to get a clear picture of the impact of reforms on inequality is that there can be as many measures as there are policy and non-policy determinants. Measures of inequality can be compared to a food chain where the narrowest concept can be sequentially enlarged to cover a broader measure of income and/or a wider segment of the population. The least comprehensive concept is the dispersion of wages among individuals currently in employment (Figure 1). The next concept in the chain - referred to as earnings inequality - keeps wages as the income measure but extends the coverage of population by including the income of all individuals in the working-age population, which comprises not only the employed but also the self-employed, job-seekers and those not participating in the labour market. Thus, in addition to the impact on wage dispersion, this concept takes into account the employment effect of specific reforms, in particular the potential employment gains among lower-skilled workers, which on aggregate may more than offset the widening of the wage distribution that some reforms may entail. In contrast to the other concept shown on Figure 1, this one cannot be directly obtained from the database but needs to be estimated (OECD 2011).

The third concept is inequality in household market income, which is wider both in terms of population and income, for it extends the coverage to the non-working age population (such as retirees) and also includes non-labour market income such as capital income and private transfers. Even though data on household market income are available from databases such as the Income Distribution Database (IDD), surprisingly few studies report empirical evidence on the impact of reforms on the basis of that measure of income.

Figure 1. **The impact of policies on inequality may differ across measures of income and population covered**



Source: OECD (2015) Going for Growth, Chapter 2

The final concept of inequality shown in Figure 1 – household disposable income inequality – is based on the same (whole) population but extends the measure of household income to include the net of

public cash transfers (such as pension benefits) and taxes. Taking taxes and transfers into account makes a huge difference for the measure of income at the low end of the distribution. On average across OECD countries, households in the bottom decile receive cash transfers worth more than half of their disposable income, with many of them receiving no market income at all. Since household disposable income is the most comprehensive measure of income, it is a concept widely used in empirical analysis, along with wage dispersion. In contrast, intermediate measures such as earnings among the working-age population and market income are rarely the object of empirical assessment.

Yet, structural policies are likely to influence income through different components and to have an impact that varies across segments of the population, insofar as they target different age or gender groups. Furthermore, some structural reforms, such as measures to liberalise foreign trade and investment, are likely to affect the entire population, because they would operate not only via the earnings channel for those within the working age, but also via the price channel for all age groups (for instance, by lowering the price of available goods and services) and the increase in product variety.

Aside from the concept of income, empirical studies also differ in terms of the measure of inequality (ratio of deciles or Gini coefficient) and whether the focus is on the lower half of the distribution, the upper half, around the middle (such as is the case when the Gini coefficient is used) or on the distribution as a whole (ratio of top and bottom deciles). Hence, the comparability of results across studies looking at the impact of structural policies on income distribution is often limited by the differences in the concept of income used and the measure of inequality. The next sections will review the evidence according to measures that can be related directly or indirectly to each of the four income concepts shown in Figure 1.

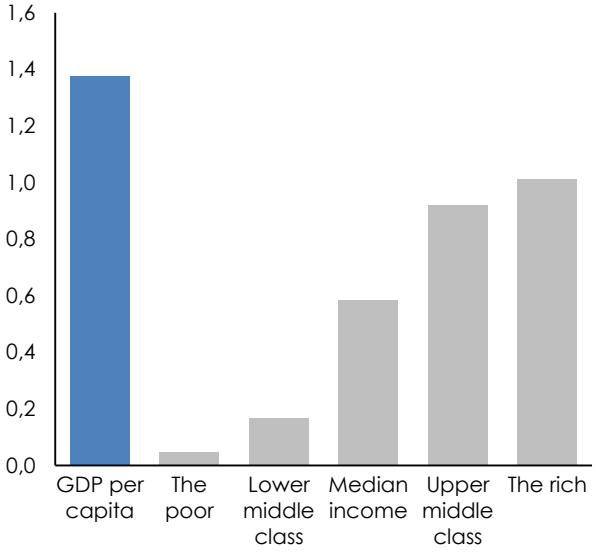
3.1.3. Evidence based on household disposable income

Looking first at the evidence on the basis of the most comprehensive concept of income, namely household disposable income, it is clear that on average across OECD countries GDP growth has been associated with rising income inequality (Figure 2). This has not been the reality in every country – Figure 2 is based on a weighted average – but a majority of them have seen income rising significantly faster at the top end of the distribution than the bottom end over the past two decades, even if the difference was not everywhere as marked as that shown on Figure 2. This raises the question of whether some of the forces driving GDP growth – including policy changes – may have also fuelled inequalities, and if so which ones.

As a first step in addressing this question, one study (Hermansen, Ruiz and Causa, 2016) has looked at the relationship between household real disposable income at different points of the distribution and the two proximate determinants of GDP, namely labour productivity and employment. The results shown in Figure 3 indicate that while higher productivity has been associated with growing inequality, the opposite has been observed in the case of employment. On the one hand, these results underscore that in devising structural reform strategies to revive productivity growth, governments need to ensure that the gains are more broadly shared than has been the case in the past. On the other hand, they also illustrate that even when some policies contribute to widening the dispersion of wages, they may nevertheless contribute to lower household income inequality if they successfully boost job creation and employment.

Figure 2. **Growth has on average been associated with rising income inequality**

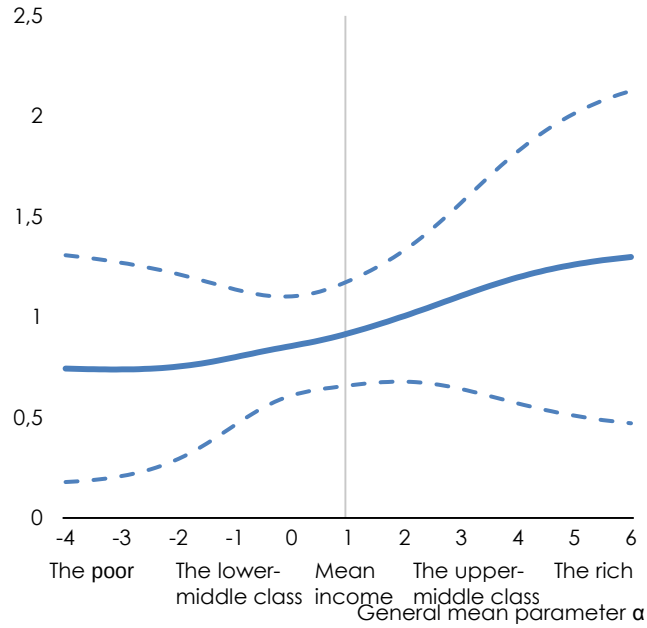
Average annual growth of GDP per capita and household disposable income (1995-2011): Weighted average over 26 countries



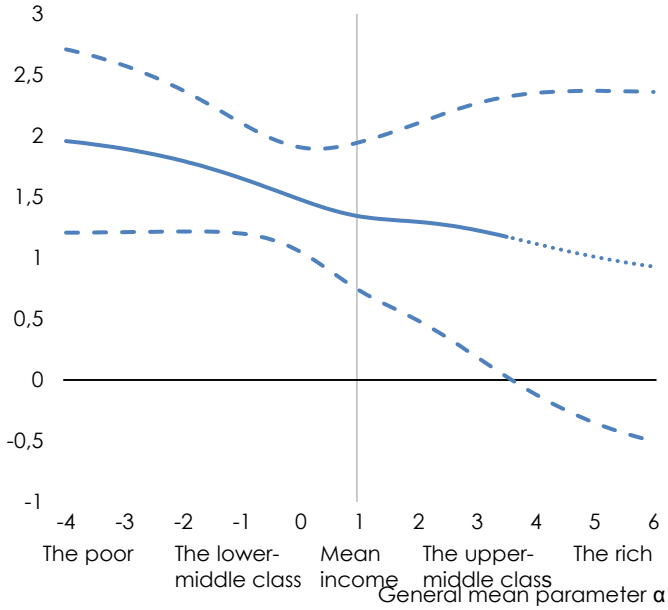
Note: The average income of the 26 OECD countries is calculated from income data expressed on a per consumption basis in USD 2011 constant prices and 2011 constant PPPs with Purchasing Power Parities for private consumption. The OECD average is calculated using population weights. *Source*: OECD (2015) and OECD Income Distribution Database.

Figure 3. **The contrasting impact of productivity and employment on household disposable income**

Panel A. Effect on household disposable at different points of the distribution of an increase in productivity



Panel B. Effect on household disposable at different points of the distribution of an increase in employment



Note: Elasticities estimated by System GMM. Dashed lines represent 90% confidence intervals. *Source:* Hermansen, Ruiz and Causa (2016).

Going a step further, a related study (Causa, Hermansen and Ruiz, 2016) has looked at the impact of a broad range of policies on household disposable income at different points of the distribution, while controlling for labour productivity and employment. The latter approach has allowed for estimating distinctively the direct effect of policies on household disposable income and the indirect effect through productivity and employment. Also, since the approach looks at the impact of policies across

the distribution, it allows for assessing the effect on inequality at different points of the distribution. The main results are reported in a stylised manner in Table 1, which shows the impact of pro-growth reforms in specific policy areas on inequality at the low-end of the distribution (strong inequality aversion) and around the middle of the distribution (weak inequality aversion).

Table 1. **Policy synergies and trade-offs between growth and income distribution**

Structural reforms	***Effect on equity objectives***	
	Under weak inequality aversion (1)	***Under strong inequality aversion* (2)**
Labour market and welfare policies		
Reducing UB replacement rates for all unemployed	Bad	Bad
Increasing spending on ALMPs	Good	Neutral
Increasing the legal retirement age	Neutral	Good
Increasing public spending on families with children (in kind family benefits)	Neutral	Good
Reducing the legal extension of collective agreements	Neutral	Good
Encouraging a higher degree of wage bargaining coordination	Neutral	Good
Reducing minimum relative to median wage	Neutral	Neutral
Tax policy		
Lowering labour tax wedges (unfinanced)	Neutral	Bad
Education		
Increasing public spending on education	Neutral	Good
Innovation and Technology		
Increasing incentives for R&D spending	Neutral	Neutral
Increasing incentives for patent application	Neutral	Bad
Product market regulation		
Reducing barriers to competition	Neutral	Neutral

(1) Weak inequality aversion corresponds to assessing changes in inequality based on the Atkinson index with a choice of parameter that emphasises the middle of the income distribution. The assessment corresponds to that delivered by the Gini coefficient. (2) Strong inequality aversion corresponds to assessing changes in inequality based on the Atkinson index with a choice of parameter that emphasises the bottom end of the distribution. *Note:* The effect on equity objectives is identified as "good" when policy reforms reduce inequality; as "bad" when policy reforms increase inequality; and "neutral" when policy reforms have no impact on inequality. Source: Causa, Hermansen and Ruiz (2016)

The key highlights can be summarised as follows:

- More occurrences of both trade-offs (bad) and synergies (good) are found between growth and equity outcomes when inequality is assessed at the bottom of the distribution rather than around

the middle. The general absence of significant impact of pro-growth reforms on inequality around the middle of the distribution is largely consistent with earlier studies looking also at household disposable income and using the Gini as a measure of inequality (Koske et al., 2012; OECD 2011).

- Most synergies between growth and equity objectives are found in the areas of labour market institutions and social protection, more specifically reforms of collective bargaining arrangements, increases in family-related benefits and in the legal age of retirement. Outside these areas, higher spending on education is also found to be favourable to both growth and equity.

- Conversely, a tightening of unemployment benefits to raise work incentives, or reducing the tax wedge to promote job creation are found to increase disposable income inequality, despite their positive impact on employment.

- While there are some indications that innovation may result in higher income inequality (again, at the low end of the distribution), no such evidence can be uncovered in the case of pro-competition product market reforms. Finally, although not reported in Table 1, none of the standard measures of globalisation turned out to have significant effects on disposable income inequality.

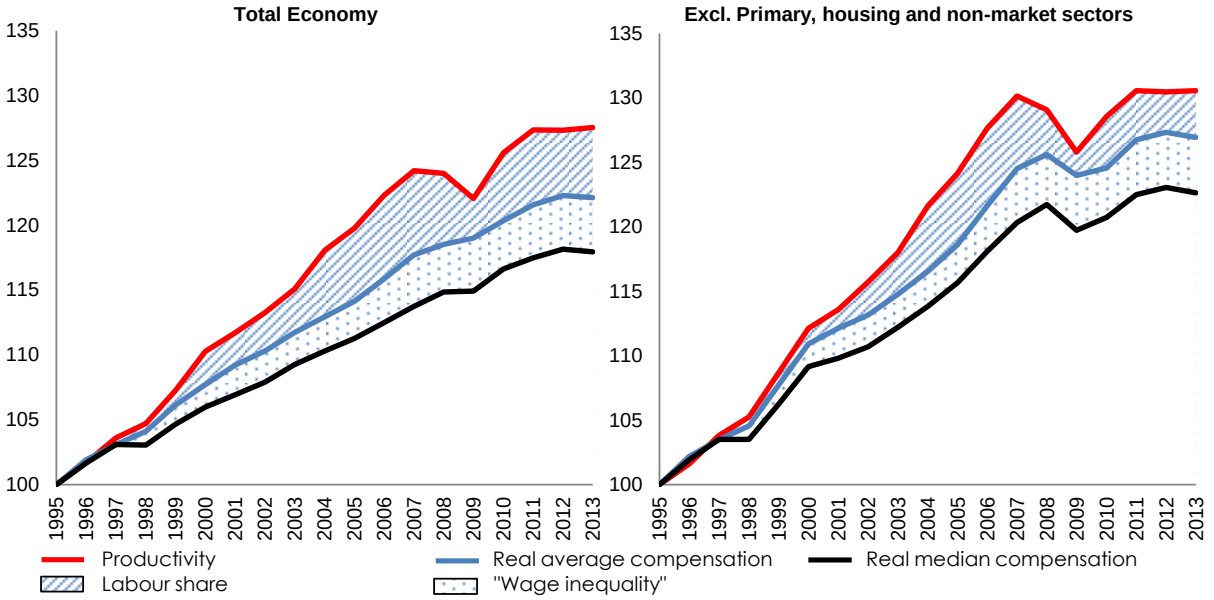
The impact of product and labour market reforms on household disposable income reported in Table 1 is partly influenced by the simultaneous adjustment in taxes and transfers. Abstracting from the latter by moving up the chain and considering looking at gross measures of income can help to shed light on the consistency of the relationships between policies and inequality.

3.1.4. Evidence based on pre-tax-and-transfer income (or market income)

One measure of gross income widely used in the income distribution literature is market income. In addition to labour income (i.e. salaries), it includes non-labour market income such as capital income and private transfers among the whole population. As mentioned earlier, few studies have looked directly at the impact of policies on market income inequality. However, to shed some light on these relationships, changes in market income inequality can be split into three sources: i) changes in the dispersion of labour income, ii) changes in the dispersion of capital income and iii) shifts in the relative shares of labour and capital in total incomes. Since capital income tends to be more concentrated among better-off individuals and households, an increase in the capital income share (and correspondingly a decline in the wage share) will tend to raise market income inequality.

A look at the evolution of both the average and median wage in comparison to productivity on average across OECD countries since the mid-1990s shows that the growing market income inequality over the period has in many countries reflected both an increase in wage dispersion and a decline in the wage share (Figure 4). This phenomenon is described as the decoupling of the wage of the typical (or median) worker from productivity. The decoupling at the macro-level reflects both a shift in the distribution of overall income from labour to capital and a growing gap between the median and mean wages. This holds as an average situation across 24 OECD countries but the picture is far from being uniform across these countries. In particular, the wage share has risen over the same period in about half of the 24 countries included in the sample (Figure 5, panel A). On the other hand, the rise in the wage dispersion has been more widespread, with a decline in the ratio of the median to average wage being observed in all but a few countries (e.g. Chile and Spain) over the period 1995-2013 (Figure 5, Panel B).

Graph 4. **Growing market income inequality reflects both falling wage share and wage dispersion**



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

1. "Wage inequality" refers to total economy due to data limitations. Source: OECD National Accounts Database, OECD Earnings Database.

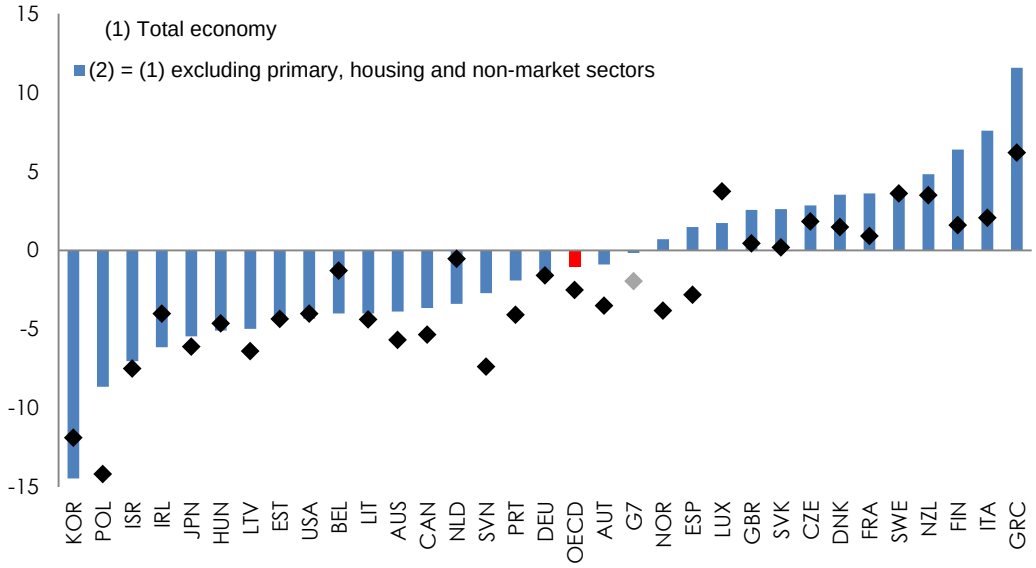
3.1.4.1. The factors behind the macro-level decoupling

Previous studies on the determinants of labour shares and wage inequality suggest that technological change, trade integration and reforms in product and labour markets are the main determinants of decoupling. While a number of previous studies suggest that labour share developments are mainly driven by technological change (Karabarbounis and Neiman, 2014a; OECD, 2012), others point to the importance of international trade integration (Elsby et al., 2013; Harrison, 2005) and reforms in product and labour markets, such as privatisation (Azmat et al., 2012) or changes to collective bargaining (Machin, 2016).

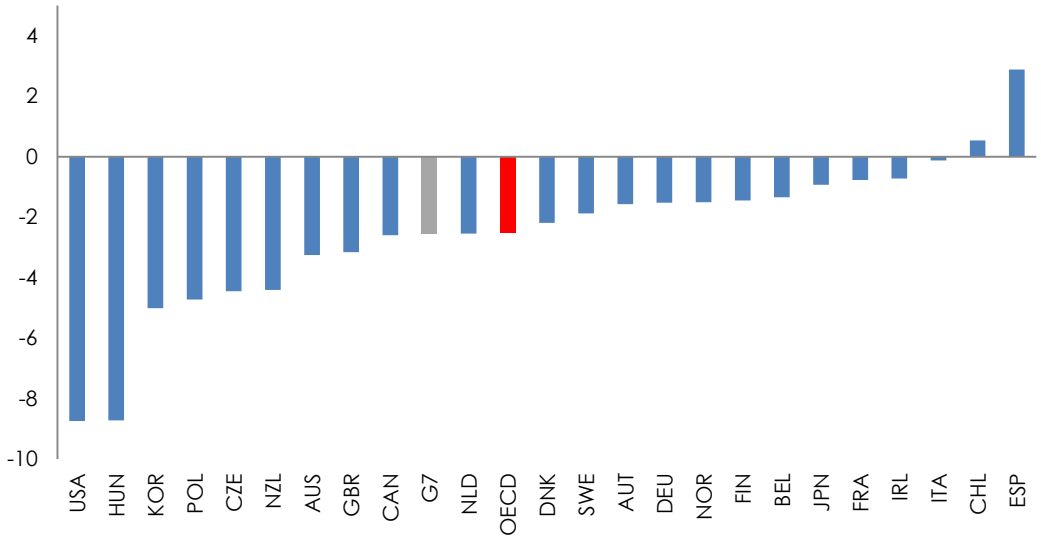
Capital-augmenting technological change or technology-driven declines in equipment prices may reduce the labour share by raising capital intensity measured in efficiency terms. If factor prices are determined competitively, the labour share declines with capital intensity so long as the elasticity of substitution is larger than unity (Elsby et al., 2013). Karabarbounis and Neiman (2014a) estimate an elasticity of substitution of around 1.25 and document large declines in equipment prices across a broad range of high-income and emerging economies, which would be consistent with this explanation.

Figure 5. **The decline in the labour share is less widespread than the rise in wage dispersion**

Panel A. Change in total-economy and non-housing labour shares, percentage points, 1995-2014



Panel B. The ratio of median to average wages, percentage points, 1995-2013



Note: Panel A: Three-year averages starting and ending in indicated years. OECD and G7 refer to unweighted averages for the relevant countries included in the figure. 1995-2013 for Australia, France, Korea and Portugal; 1995-2012 for New Zealand; 1997-2012 for Canada; 1997-2014 for United Kingdom; 1998-2014 for Ireland and United States. Panel B: Three-year averages starting and ending in indicated years. OECD and G7 refer to unweighted averages for the relevant countries included in the Figure. 1996-2013 for Chile, Czech Republic, Denmark; 1995-2012 for Australia, Spain, France, Italy, Poland, Sweden; 1997-2013 for Norway, New Zealand; 1998-2013 for Canada; 1995-2010 for Netherlands. Source: OECD National Accounts Database and OECD Earnings Database.

Technological change may also raise wage inequality by raising the demand for high-skilled workers. With given endowments of low- and high-skilled labour (whose stock can only be adjusted slowly over time), technological change raises wage inequality if it complements high-skilled workers but substitutes for low-skilled workers (Katz and Murphy, 1992; Braconier et al., 2014). While skill-biased technical change can account reasonably well for changes in skill premia over time and for

differences across countries,[31] it cannot account for the disproportionate wage growth at the very top of the wage distribution documented in the previous section. Brynjolfsson and McAfee (2014) argue that digitalisation leads to "winner-takes-most" dynamics, with innovators reaping outsize rewards as digital innovations are replicable at very low cost and have a global scale.

Globalisation in the form of increased trade integration may have similar effects on the labour share as increases in capital intensity (Acemoglu and Autor, 2010). For instance, offshoring of the most labour-intensive stages of production or increased import competition may lead to worker displacement and an increase in capital intensity. If the aggregate elasticity of substitution between capital and labour is larger than 1, this would reduce the labour share. The cross-country evidence in Harrison (2005) and the cross-industry evidence for the United States in Elsby et al. (2013) are consistent with this hypothesis.

Globalisation may also raise wage inequality by disproportionately reducing the demand for low-skilled workers and by raising it for the highest-skilled workers. For instance, offshoring the least skill-intensive stages of production raises the relative demand for high-skilled workers and puts upward pressure on their wages (Feenstra, 2007) while increased import competition from emerging countries that are abundant in low-skill labour may put downward pressure on low-skill wages (Ebenstein et al. 2014). Moreover, globalisation may lead to the divergence of top wages if increased market access amplifies the effects of small differences in skills on revenues (Frank and Cook, 1995).[32]

In an imperfectly-competitive economy, the labour share does not only reflect the marginal products of the factors of production but also the distribution of monopoly rents. These rents may reflect the creation of new products and services or regulations that limit competition in product markets. Regardless of the source of these rents, workers and capital owners bargain over their distribution formally or informally (Solow, 2015). Labour market policies such as minimum wages or collective bargaining institutions directly influence the distribution of rents between workers and capital-owners (Blanchard and Giavazzi, 2003). Product market reforms may not only reduce the level of rents – which typically raises both long-run productivity and wages with no direct effect on factor shares – but also their distribution. For instance, the evidence suggests that privatisation in network industries reduces the share of rents distributed to workers because privately-owned firms have a stronger preference for profits over employment than publicly-owned firms (Azmat et al, 2012; Jean and Nicoletti, 2015).

Institutional and policy changes may also have a direct effect on wage inequality. The weakening of labour unions may reduce the wages of low- and middle-wage workers. Moreover, the weakening of labour unions may contribute to the divergence of top wages by reducing workers' influence on corporate boards, which may give top executives greater discretion in setting their own salaries (Jaumotte and Buitron, 2015; Machin, 2016). The erosion of minimum wages reforms may raise wage inequality by reducing low- and middle-wage workers' reservation wages. Wage inequality developments may further be related to changes in collective bargaining institutions, as in a number of OECD countries an increasing number of firms may opt out of traditional contracting systems (Visser, 2013).

[31] Subsequent empirical studies based on the approach of Katz and Murphy (1992) include Autor et al. (1998), Katz and Autor (1999), Acemoglu (2002), Goldin and Katz (2007) and Acemoglu and Autor (2010).

[32] For instance, small differences in skills of CEOs only have a small impact on firms' revenues when the market is local but a large impact when the market is global.

Beyond directly influencing labour shares and wage inequality, public policies may shape the labour market response to longer-term structural trends such as technological change and globalisation. For instance, product and labour market institutions that efficiently match workers to jobs may help displaced workers find jobs at wages corresponding to their skills. Labour market policies and institutions may also offset the erosion of workers' bargaining position implied by technological change and globalisation.

3.1.4.2. The empirical set-up and results

The analysis in this section is based on a unified empirical framework for labour shares and wage inequality. Cross-country data on labour shares are available at the industry level, but cross-country data on wage inequality are available only at the country level. Consequently, the regression analysis of both labour shares and wage inequality is based on aggregate country-level data. Given the difficulties of identifying causal effects using aggregate cross-country data, the scope of this analysis is exploratory and the estimated results should be viewed as associations between labour shares and wage inequality on the one hand and a number of possible determinants on the other. Further research at a finer level of disaggregation will be needed to uncover causal effects. The empirical approach used to investigate the determinants of the wage share and wage dispersion is reported in the Appendix.

Value added imports from low- and middle-income countries are negatively associated with labour shares (Table 2). When measures of imported value added are included separately in the regressions, both value added imports from low- and middle income countries excluding China and value added imports from China are negatively associated with labour shares.[33] However, the coefficient on value added imports from low- and middle income countries is only about $^1/_8$ of the coefficient on value added imports from China. This suggests that over the sample period labour shares co-move significantly more strongly with value added imports from China than with value added imports from low- and middle-income countries more generally.

The ratio of R&D spending to GDP is negatively associated with labour shares when it is included separately in the regressions, but it becomes statistically insignificant when it is included jointly with value added imports from China.[34] This is consistent with the hypothesis that the rapid trade integration of OECD countries with China has induced technological change so that the co-movement of labour shares with the R&D ratio is not identifiable separately from the co-movement with value added imports from China. The proxies for public policies are not significantly associated with labour shares over the sample period, which may partly reflect limited time variation in these indicators.[35]

[33] This result is robust to using nominal imports rather than value added imports as measures of globalisation.

[34] The results are similar when the ratio of ICT to total value added is used as a measure of technological change emphasising technology adoption.

[35] The output gap is generally negatively associated with labour shares but the statistical significance of the association is not robust. The reported results are robust to excluding the output gap from the regressions.

Table 2. **The association between labour shares and their possible determinants (1995-2013)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Non-agriculture, non-mining, non-housing business labour share									
R&D ratio	-5.78***									0.42
	(2.04)									(1.63)
Value added imports (high-income countries)		-0.15								
		(0.12)								
Value added imports (low-/middle-income ex. China)			-0.35***							
			(0.08)							
Value added imports (China)				-2.97***						-3.34***
				(0.89)						(0.88)
Strictness of product market regulation					0.00					
					(0.00)					
Union density						-0.01				
						(0.02)				
Collective bargaining coverage							-0.01			
							(0.02)			
Minimum wage ratio								-0.05		
								(0.05)		
Strictness of employment protection									-0.00	
									(0.00)	
Output gap	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Share of high-skilled in population	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
Country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	386	455	455	455	498	507	490	336	463	338
Number of countries	29	29	29	29	29	29	29	22	29	29
Adjusted R^2	0.91	0.90	0.90	0.91	0.90	0.90	0.90	0.92	0.90	0.93
Within R^2	0.20	0.13	0.14	0.20	0.11	0.11	0.14	0.17	0.09	0.28

Notes: Driscoll and Kraay (1998) standard errors in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels. Value added imports denote the ratio of value added imports to final domestic demand.

Table 3. **The association between wage inequality and its possible determinants (1995-2013)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dependent variable	Ratio of median to average wages									
R&D ratio	-1.24***									-0.64
	(0.35)									(0.47)
Value added imports (high-income countries)		0.14***								
		(0.04)								
Value added imports (low-/middle-income ex. China)			0.04							
			(0.11)							
Value added imports (China)				-0.62***						-0.73***
				(0.20)						(0.25)
Strictness of product market regulation					0.00					
					(0.00)					
Union density						0.12***				
						(0.02)				
Collective bargaining coverage							-0.00			
							(0.02)			
Minimum wage ratio								-0.01		
								(0.02)		
Strictness of employment protection									-0.01**	
									(0.00)	
Output gap	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Share of high-skilled in population	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO
Country fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	339	412	412	412	439	454	439	270	411	306
Number of countries	25	26	26	26	26	26	26	18	25	25
Adjusted R^2	0.94	0.97	0.97	0.97	0.97	0.96	0.96	0.92	0.93	0.94
Within R^2	0.36	0.37	0.36	0.37	0.34	0.40	0.35	0.41	0.41	0.37

Notes: Driscoll and Kraay (1998) standard errors in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels. Value added imports denote the ratio of value added imports to final domestic demand.

The ratio of median to average wages is also more robustly associated with value added imports from China than with the ratio of R&D spending to GDP (Table 3).[36] When the ratio of R&D spending and measures of imported value added are included separately in the regressions, only the ratio of R&D spending to GDP and value added imports from China are negatively correlated with the ratio of median to average wages.[37] However, the ratio of R&D spending to GDP becomes statistically insignificant when it is included jointly with value added imports from China in the regressions. While this suggests that import competition from China may be a more plausible explanation for increasing wage inequality than "superstar-biased" technological change, import competition and technological change cannot be viewed as unrelated exogenous developments. Recent empirical evidence for European countries, for instance, suggests that import competition from China induces technological change (Bloom et al., 2016). Moreover, the ratio of median to average wages does not directly measure winner-takes-most dynamics.

In contrast, the ratio of median to top wages – a direct measure of winner-take-all dynamics – is more robustly associated with technological change than with the share of value added imports from China. Empirical evidence based on a reduced sample of countries suggests that only the ratio of R&D spending to GDP is associated with the ratio of median to top wages when it is included jointly with value added imports from China (Table 4). This suggests that both import competition from China and "superstar-biased" technological change are associated with rising wage inequality although the empirical framework here based on macro data does not allow for fully disentangling these two hypotheses.

Table 4. **The association between income inequality at the top and its possible determinants (1995-2013)**

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable	Median wage / average top 1% wage			Median wage / average wage		
R&D ratio	-6.43***		-8.70**	-1.00		2.97
	(0.91)		(2.78)	(2.38)		(3.25)
Value added imports (China)		-1.65***	0.54		-1.51***	-2.09*
		(0.32)	(1.09)		(0.35)	(0.89)
Output gap	YES	YES	YES	YES	YES	YES
Share of high-skilled in population	NO	NO	NO	YES	YES	YES
Country fixed effects	YES	YES	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES	YES	YES
Observations	104	117	100	104	117	100
Number of countries	8	9	8	8	9	8
Adjusted R^2	0.98	0.98	0.98	0.92	0.94	0.94
Within R^2	0.65	0.59	0.65	0.50	0.45	0.54

Note: Driscoll and Kraay (1998) standard errors in parentheses. *, **, *** denote statistical significance at the 10%, 5% and 1% levels. Value added imports denote the ratio of value added imports to final domestic demand.

[36] The results are similar when the ratio of ICT to total value added is used as a measure of technological change emphasising technology adoption.

[37] This result is robust to using nominal imports rather than value added imports as measures of globalisation.

Turning to more direct policy determinants, the estimates suggest that the ratio of median to average wages is positively associated with union density and negatively associated with the strictness of employment protection (though less strongly in the latter case) (Table 3). The positive association of union density with the ratio of median to average wages is consistent with previous studies that have established that in the United States and the United Kingdom declines in union density are related to increases in wage inequality.[38] To some extent, the negative association of union density with wage inequality may reflect indirect effects of technological change and globalisation, which cannot be included jointly in the regressions with the institutional variables because of collinearity issues. Stricter employment protection is associated with a lower ratio of median to average wages, which may reflect the fact that the incidence of low-wage temporary work is positively correlated with stricter overall employment protection.

3.1.4.3. Taking stock of the results so far

To sum-up, the survey of evidence reported so far provides fairly consistent support support for the notion that progress in technology, however measured, tends to be associated with growing inequality. Both ICT and R&D intensity turned out positively correlated with wage dispersion while a measure of patent application is associated with higher dispersion of household disposable income (Table 5). In the case of globalisation, consistent evidence of a positive association between trade openness and inequality is more difficult to find, although more disaggregated measures of trade, in particular with respect to the level of development of the trading partner, points to some effects on wage dispersion. Finally, there is little evidence that pro-competition reforms in product market regulation contribute to income inequality beyond the impact on wage dispersion. It is difficult to identify significant correlations with the wage share or household disposable income. The same is true with labour market regulation (employment protection legislation and statutory minimum wage) where a significant effect is only found in the case of wage dispersion (Table 6).

In the case of other labour market policies, more consistent results across the various measures of inequality are found in the case of tax and transfer policies, at least for tax wedges and family benefits. While a reduction in the tax wedge is associated with a higher dispersion of both wages and household income, the reverse is true in the case of an increase in spending on family benefits. Finally, broadly consistent results are found also in the case of wage bargaining institutions: arrangements that tend to be favourable to employment are also conducive to less income inequality. So, among the labour market policies covered in Table 6, only the reduction of the tax wedge is found to be associated with an increase in inequality as measured both by wage and household income dispersion. A tightening of unemployment benefits is also associated with higher income inequality, but with a significant correlation uncovered only in the case of household disposable income.

[38] Studies for the United States include Card (1996, 2001) and Machin (2016). Studies for the United Kingdom include Gosling and Machin (1995) and Machin (1997).

Table 5. **The impact of product market drivers on wage dispersion, wage share and disposable income**

A pro-growth change in:	Wage dispersion	Labour share	HDI dispersion
Technology		BAD	
ICT intensity	+		
Trend R&D intensity	+	-	
Patent applications			+
Globalisation		NEUTRAL / BAD	
Trade integration / openness	=	=	
Trade in VA with EMEs	+	-	
FDI openness (index)	-		
Product market competition		NEUTRAL	
Regulatory barriers to entry	+	=	=
Education / Human capital		GOOD	
High-to-low skill ratio	-		
Public spending on education			-

Table 6. **The impact of labour market policies on wage dispersion, wage share and disposable income**

A pro-employment change in:	Wage dispersion	Labour share	HHDI dispersion
LM Policies: regulation		BAD / NEUTRAL	
Easing EPL (overall protection)	+	=	=
(Lower) minimum wage	+	=	=
LM Policies: taxes and transfers		GOOD and BAD (depends on policy)	
Lower UI benefit RR			+
Higher ALMPs			-
Lower tax wedges	+		+
Higher family benefits (in-kind)	-		-
Higher legal retirement age			-
LM Policies: institutions		(MOSTLY) GOOD	
(lower) union density	+	=	
Lower legal extension of col. ag.			-
Stronger wage coordination	-	=	-

3.1.4. Evidence on the impact on income distribution through employment

Some of the inconsistencies observed in Tables 5 and 6 -- in particular as one moves from wage dispersion to market income or disposable income inequality -- could to some extent be explained by the impact of reforms on the employment rate, especially on the job prospects of lower-skilled workers who may have been out of the labour market over a prolonged period. Wage dispersion is typically measured among the people employed. A broader measure of earnings inequality would consider wage

dispersion among the working-age population, hence taking into account the movement in and out of employment. As mentioned above, such a measure of inequality is not directly observed and can only be inferred using a number of assumptions of income gains of those who have moved from a situation of non-employment into having a paid job.

Updating such a measure is beyond the scope of this paper, but evidence of the impact of policies on employment can provide some indication of the cases where the effect of growing wage dispersion on earnings inequality over a broader population can be at least partly offset by an increase in employment. Not surprisingly, all of the (pro-employment) labour market and social policies listed in Table 1 have been found to have a favourable impact on employment rates in recent empirical work (Gal and Theising, 2016). For some policy variables, a positive impact has been found specifically on low-skilled or youth employment rates. This is notably the case of the tax wedge, the legal extension of collective agreement, employment protection legislation and the minimum wage.[39]

More controversial is the impact on employment of pro-competition reforms of product market regulation. At the aggregate level, most of the evidence indicates that over the medium run, competition-friendly regulations are associated with higher employment rates. Such a relationship is sometimes visible even from a simple scatterplot (De Serres and Gal, 2017). One question, however, is the effect of such reforms in the short run, in particular in the industries more directly affected by greater openness to domestic or foreign competition. Recent analysis based on firm-level data aggregated by industry finds no evidence of employment losses on average from a reduction in regulatory barriers to competition, even in sectors most directly affected by the increase in competition exposure (Gal and Hijzen, 2016). The results shown in the latter paper indicate very slow gains in employment, compared to the increase in investment and production (Figure 6).

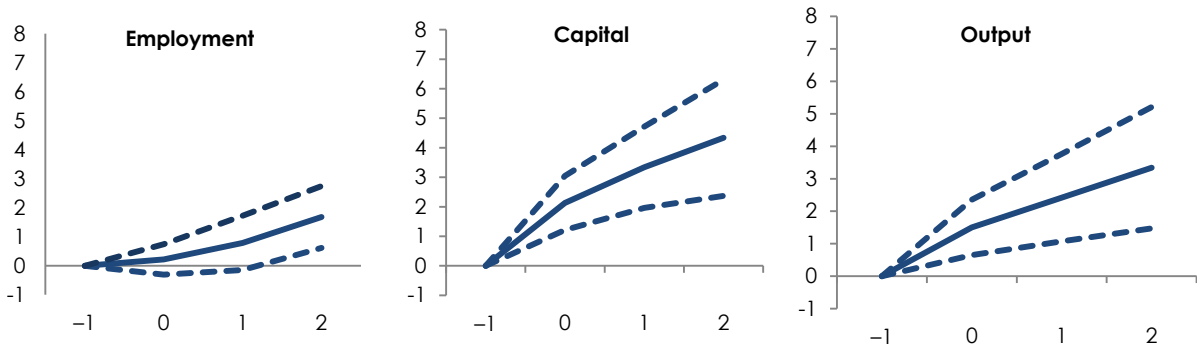
However, the same study also shows that the impact on employment also varies greatly across firm size. In network industries (e.g. energy, telecommunications and transport) employees from larger firms (over 20 employees) tend to get hit hardest with significant short-term job losses, whereas no such losses are observed among small firms (Figure 7). Note that the reverse is found in the retail distribution sector where large firms enjoy rapid gains following pro-competition reforms whereas smaller firms see no gains, suggesting that regulatory barriers to competition in this sector is more often designed to protect smaller outlets.

The impact of job losses following industry restructuring on longer-term inequality also depends to some extent on the speed with which affected workers can find a new job. Two recent OECD studies have looked at these issues from slightly different angles and in both cases found that pro-competition product market reforms tend to increase the probability for an unemployed worker to find a new job and exit unemployment. In one case, the evidence shows that pro-competition reforms lead to more frequent transitions out of a job, especially for low-income workers (Figure 8). In the other case, the results show that higher public spending on active labour market policies (job-search assistance, wage subsidies, training) will be more effective in helping workers to cope with job losses in countries where regulatory barriers to new firm entry are lower (Figure 9).

[39] In the case of employment protection legislation, a significant impact on employment is only found for sub-categories, not for the aggregate employment. It tends to benefit the employment rate of high-skilled workers at the expense of low- and medium-skilled ones.

Figure 6. **No short-term employment effect following pro-competition reforms in specific industries**

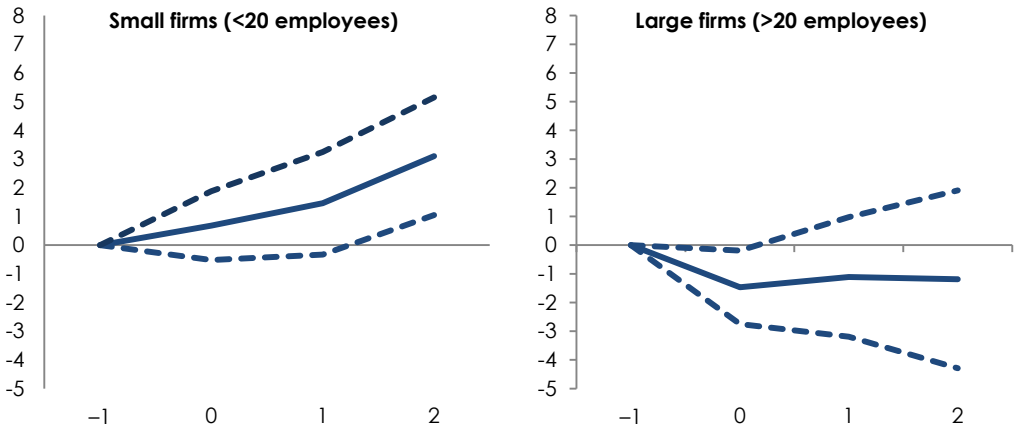
Percentage change in the outcome variable of interest after a reduction in the overall restrictiveness of PMR



Source: Gal and Hijzen (2016)

Figure 7. **But the employment impact varies greatly across firm size**

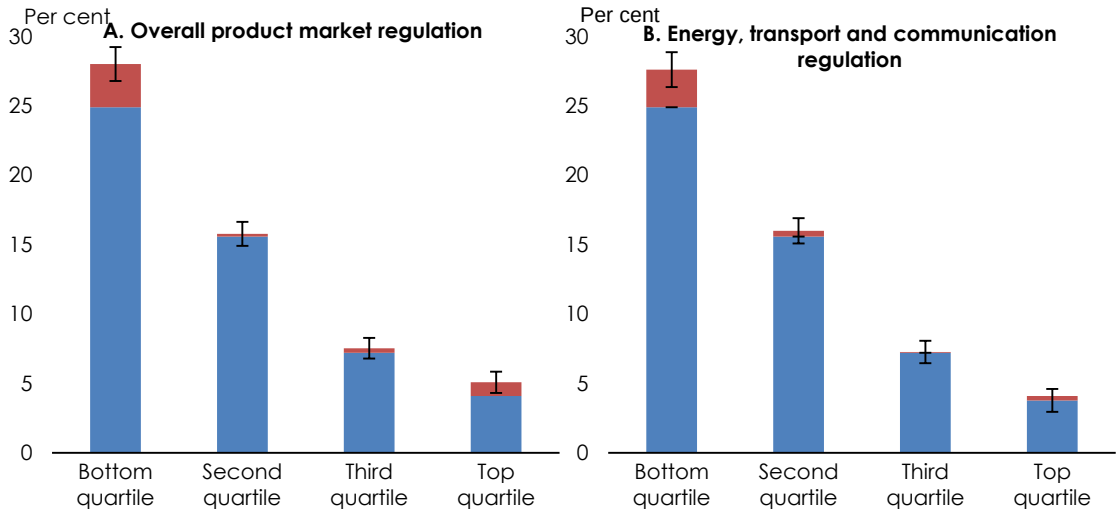
Panel A. Network



Source: Gal and Hijzen (2016)

Figure 8. **Pro-competition reforms also imply more frequent transitions out of a job for low-income workers**

Transition probabilities out of employment into unemployment or economic inactivity, percentages

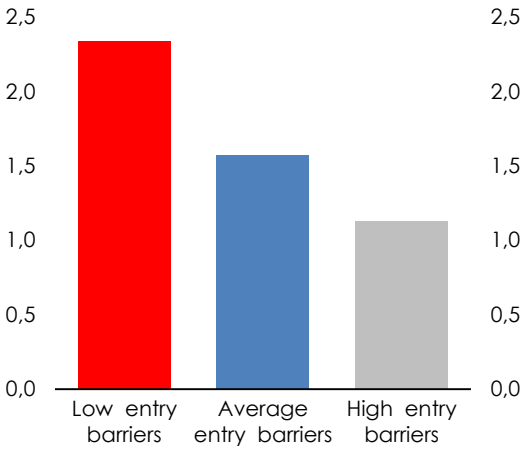


Note: A typical reform is defined as the average 5-year policy change over reform episodes in the OECD indicator of regulation in product markets (PMR, left panel) or energy, transport and communication (ETCR, right panel). Hatched areas indicate negative effects.

Source: Cournède et al., 2016

Figure 9. **Job-search support helps workers coping with firm exit, especially where firm entry is easier**

Effect of a 0.1% of GDP increase in ALMP spending on the re-employment probability (percentage points)



Note: The bars show the percentage point impact on the re-employment probability of a 1% increase in spending on ALMPs (as a share of GDP) for three levels of entry barriers: i) the level corresponding to the average of the two best performing countries over the sample period (red bar); ii) the average level observed over the sample period (blue bar); and iii) the level corresponding to the average of the two worst performing countries over the sample period (grey bar).

Source: Andrews and Saia, 2017.

3.1.5. References

Acemoglu D. (2002). Technical Change, Inequality, and the Labour Market. Journal of Economic Literature 40 (1): 7-72.

Acemoglu D. and Autor, D. (2010). Skills, Tasks and Technologies: Implications for Employment and Earnings. NBER Working Paper No. 16082, The National Bureau of Economic Research.

Andrews, D. and Saia, A. (2017). Coping with creative destruction: Reducing the costs of firm exit. OECD Economics Department Working Papers, No. 1353.

Azmat G., Manning, A. and Van Reenen, J. (2012). Privatization and the Decline of Labour's Share: International Evidence from Network Industries. Economica 79/315: 470–92.

Bloom, N., Draca, M. and Van Reenen, J. (2016). Trade Induced Technical Change? The Impact of Chinese Imports on Innovation, IT and Productivity. Review of Economic Studies 83: 87-117.

Braconier, H. and Ruiz-Valenzuela, J. (2014). Gross Earning Inequalities in OECD Countries and Major Non-member Economies: Determinants and Future Scenarios. OECD Economics Department Working Papers, No. 1139.

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

Card, D. (1996). The Effect of Unions on the Structure of Wages: A Longitudinal Analysis. Econometrica 64(4): 957-979.

Card, D. (2001). The Effect of Unions on Wage Inequality in the U.S. Labor Market. Industrial and Labor Relations Review 54(2): 296-315.

Causa, O., Hermansen, M. and Ruiz, N. (2016). The Distributional Impact of Structural Reforms. OECD Economics Department Working Papers No. 1342.

Causa, O., Hermansen, M. and Ruiz, N. (2016), "The Distribution of the Growth Dividends", OECD Economics Department Working Papers No. 1343.

Cournède, B., Denk, O., Garda, P. and Hoeller, P. (2016). Enhancing Economic Flexibility: What is in it for Workers? OECD Economic Policy Papers No. 19.

De Serres, A. and Gal, P. (2017). Evidence on the Macro Effect of Product Market Reforms on Employment Rates: Which Type of Regulation Matters Most? OECD Economics Department Working Papers No. 1342.

Ebenstein A., Harrison, A., McMillan, M. and Phillips, S. (2014). Estimating the Impact of Trade and Offshoring on American Workers Using the Current Population Surveys. The Review of Economics and Statistics 96(4): 581-595.

Elsby M., Hobijn, B. and Sahin, A. (2013). The Decline of the U.S. Labor Share. Brookings Papers on Economic Activity 44(2): 1-63.

Feenstra, R. (2007). Globalization and its Impact on Labor. Wiiw Working Paper No. 44.

Frank, R.H. and Cook, P.J. (1995). The Winner-Take-All Society. New York: The Free Press.

Gal, P. N. and Hijzen, A. (2016). The Short-Term Impact of Product Market Reforms: A Cross-Country Firm-level Analysis. OECD Economics Department Working Papers No. 1311.

Goldin, C. and Katz, L.F. (2007). Long-Run Changes in the Wage Structure: Narrowing, Widening, Polarizing. Brookings Papers on Economic Activity 2: 135–65.

Gosling, A. and Machin, S. (1995). Trade Unions and the Dispersion of Earnings in British Establishments, 1980-90. Oxford Bulletin of Economics & Statistics 57: 167-184.

Harrison, A. (2005). Has Globalization Eroded Labor's Share? Some Cross-Country Evidence. MPRA Papers No. 39649.

Jaumotte, F. and Buitron, C.O. (2015). Inequality and Labour Market Institutions. IMF Staff Discussion Note No. 15/14.

Jean, S. and Nicoletti, G. (2015). Product Market Regulation and Wage Premia in Europe and North America: an Empirical Investigation. International Economics 144: 1-28.

Karabarbounis, L. and Neiman, B. (2014). The Global Decline of the Labour Share. Quarterly Journal of Economics 129(1): 61–103.

Katz, L. and Murphy, K. M. (1992). Changes in Relative Wages, 1963-1987: Supply and Demand Factors. The Quarterly Journal of Economics 107(1): 35-78.

Katz, L. and Autor, D. (1999). Changes in the Wage Structure and Earnings Inequality. Handbook of Labor Economics Vol. 3A: 1463-1555.

Koske, I., Fournier, J. and Wanner, I. (2012). Less Income Inequality and More Growth – Are They Compatible? Part 2. The Distribution of Labour Income. OECD Economics Department Working Papers No. 925.

Machin, S. (1997). The decline of labour market institutions and the rise in wage inequality in Britain. European Economic Review 41: 647–657.

Machin, S. (2016). Rising Wage Inequality, Real Wage Stagnation and Union. Research in Labour Economics 43: 329-354.

OECD (2011). Divided We Stand: Why Inequality Keeps Rising. Paris: OECD Publishing.

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

OECD (2015). Economic Policy Reforms 2015: Going for Growth. Paris: OECD Publishing.

Visser, J. (2013). Wage Bargaining Institutions – from crisis to crisis. European Economy Economic Papers No. 488. European Commission.

3.2. A QUEST MODEL-BASED ASSESSMENT OF THE FUNCTIONAL INCOME DISTRIBUTION OF STRUCTURAL REFORMS

by Jan in't Veld (Speaker), Werner Roeger; Janos Varga and Lukas Vogel *

3.2.1. Introduction

The prolonged slowdown of GDP growth after financial crises has reinforced the need for structural reforms in the European Union. In order to boost growth and employment, the EU has embarked on a strategy of structural reforms in product and labour markets. Traditionally, structural reform proposals have been assessed based on their potential to increase productivity and GDP per capita. According to European Commission's model simulations, reforms that close half the gaps with best performers could lift GDP by 6% on average after 10 years, and even more for Member States that are further lagging behind (Varga and in 't Veld, 2014). But the distributional impact of structural reforms is rarely addressed in the literature (see Causa et al. 2016). In recent years, concerns have grown about rising inequality and the focus has shifted to the distributional impact of policies. In particular, the question arises: what is the impact of structural reform measures on the income distribution? And is there complementarity between growth and equity or there exists a trade-off between the two?

This paper contributes to the emerging literature on the distributional impact of structural reforms. It studies the effects of structural reforms on the functional distribution of income in the EU. The analysis uses a DSGE model (Roeger et al. 2008) in which households supply three types of labour, i.e. low-, medium- and high-skilled. We assume that households receive income from labour, tangible capital, intangible capital, financial wealth and transfers, and we trace how structural reforms affect these types of incomes.

In order to use a realistic quantification of structural reforms we rely on Varga and in 't Veld (2014), which applies a distance-to-frontier approach to measure the potential for reforms by assuming a gradual and partial closure of the gap in labour and product market indicators vis-à-vis the average of the three best EU performers. The simulated structural reforms focus on decreasing mark-ups and entry barriers in services and manufacturing, increasing the labour market participation rate for the elderly, the low-skilled and female workers, raising the share of medium- and high-skilled labour force, tax and unemployment benefit reforms and innovation.

Our findings can be summarised as follows. There is a trade-off between employment and relative incomes. In general, reforms which aim at increasing the employment rate of low skilled workers are associated with a fall of wages relative to income per capita. This effect can be decomposed into wage distribution effects across skill groups, with a relative decline in wages for low skilled workers, but the overall increase in the supply of labour also affects the distribution between wage earners and other income categories, especially capital owners. Capital owners generally benefit from labour market reforms, not only in the form of an absolute increase in capital income but also in the form of an increasing share of total income. While there can be a trade-off between growth and equity for labour

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market reforms, there is generally complementarity for product markets reforms and human capital investment.

We start with a brief description of the quantification of structural reform measures in Section 2. Section 3 then shows the impact of different types of reforms in product markets, labour markets, and human capital formation on the functional income distribution. The last section concludes.

The paper focuses on the effect of structural reforms on (functional) income inequality. It does not discuss the dimension inequality in the distribution of wealth. Inequality in wealth (stock) is at the same time one of the drivers and one of the consequences of the inequality in household income (flow). Wealth generates income to its owner in the form of returns to assets, and higher income facilitates the accumulation of wealth.

3.2.2. Quantification of structural reform measures

In order to use a realistic quantification of structural reforms and at the same time have a comparable quantification across different reform measures, we use the methodology outlined in Varga and in 't Veld (2014). This applies a distance-to-frontier approach to measure the potential for reforms by assuming a gradual and partial closure of the gap in labour and product market indicators vis-à-vis the average of the three best EU performers. The simulated structural reforms focused on decreasing mark-ups and entry barriers in services and manufacturing, increasing the labour market participation rate for the elderly, the low-skilled and female workers, raising the share of medium- and high-skilled labour force, tax and unemployment benefit reforms and innovation.

The model used in this exercise is the semi-endogenous growth version of the QUEST model, specifically adapted for the analysis of structural reforms, which includes an R&D production sector. The model follows the QUEST3(RD) model structure of Roeger et al. (2008) in a multi-country setting (Varga et al., 2014) and includes the EU Member States individually and the rest of the world as a single separate region. Previous exercises using this model have shown that structural reforms can have sizeable macroeconomic effects. Similar conclusions have been reached in other studies which have quantified the potential gains from EU structural reforms through regression analysis and/or model simulations of exogenous productivity or aggregate mark-up shocks.

Our model economy is populated by households, final and intermediate goods-producing firms, a research industry, a monetary authority and a fiscal authority. In the final goods sector, firms produce differentiated goods which are imperfect substitutes for goods produced abroad. Final good producers use a composite of intermediate goods and three types of labour - low-, medium-, and high-skilled. Non-liquidity constrained households buy the patents of designs produced by the R&D sector and license them to the intermediate goods producing firms. The intermediate sector is composed of monopolistically competitive firms which produce intermediate goods from rented capital input, using the designs licensed from the household sector. The production of new designs takes place in research labs, employing high-skilled labour and making use of the existing stock of domestic and foreign ideas. Technological change is modelled as increasing product variety in the tradition of Dixit and Stiglitz (1977). Roeger et al (2017) gives a more comprehensive description of the model and its calibration.

3.2.3. Labour market reforms

3.2.3.1. Low-skilled participation

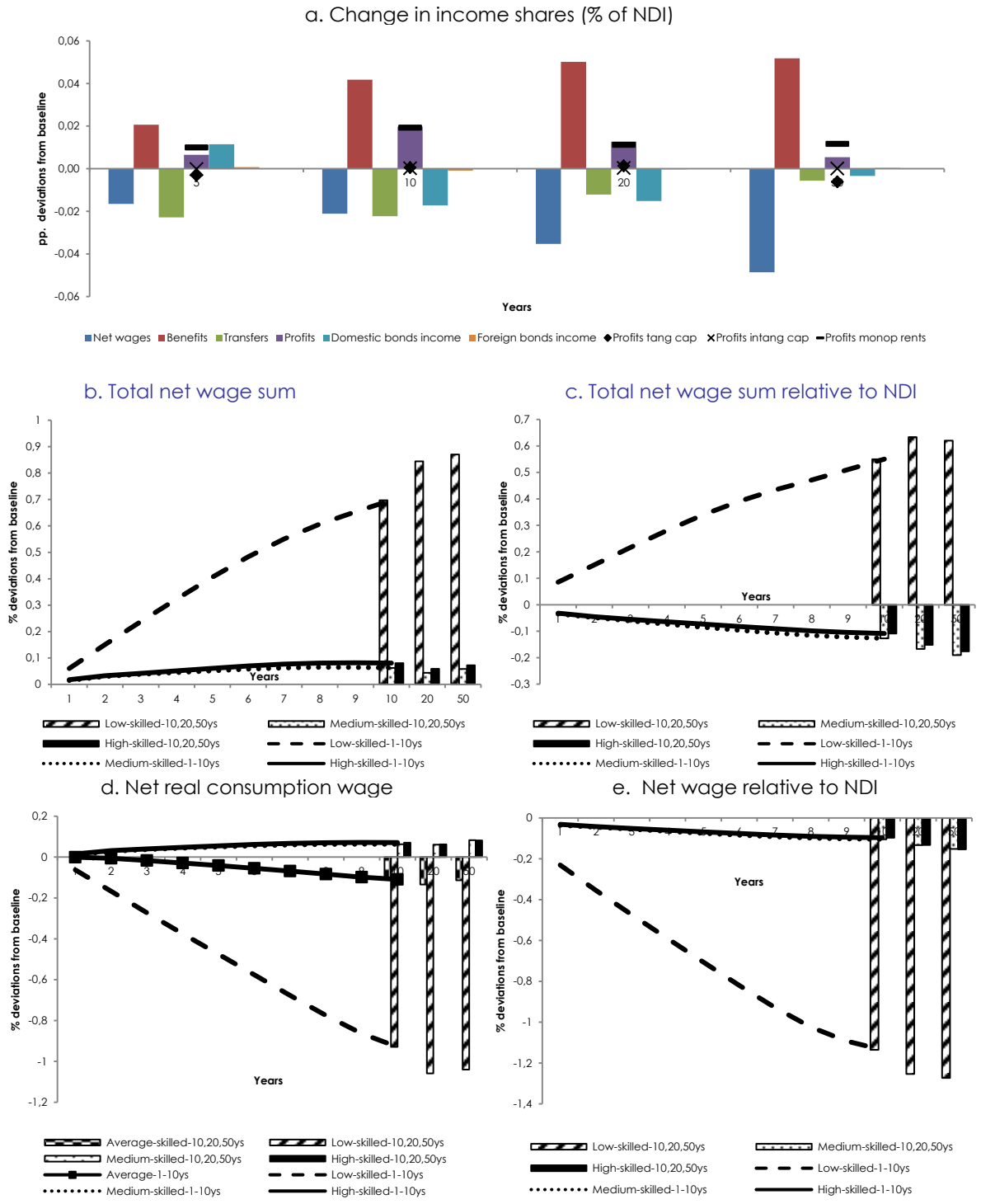
As an example of labour market reforms, Figure 1 shows the impact on the functional income distribution of an increase of the low-skilled (male) labour force participation rate by around 4.2 pp. at the aggregate EU-level. The figure shows the impact on net wages, benefit income, transfer income,

profits and financial income from both domestic and foreign bonds after 5, 10, 20 and 50 years. Income from profits is subdivided into profits on tangible capital, intangible capital and monopoly rents. There is a clear trade-off between higher employment and lower relative plus absolute wages. Figures 1.b-e show the impact on wages and the wage sum (product of wages and employment effects). For the low skilled, the relative wage falls but the increase in employment more than compensates this drop, thus the wage sum increases. This depends crucially on the elasticity of substitution between skills, which at 1.7 exceeds one, and yields a higher employment effect. The income of medium and high skilled workers is not affected much by this participation change. Wage income as a share of total income is reduced, while other income categories increase. In particular, the share of benefit income increases, since an increase in low skilled employment raises entitlements to benefits because of a higher risk of unemployment. The capital share increases mostly because of a scale effect (as output increases, the share of fixed costs in total output declines) in combination with limited entry into the final goods production sector. The relative increase in the capital income share associated with labour market reforms can only be substantially reduced if we allow for entry in the goods market. This suggests that labour market reforms combined with existing goods market rigidities can lead to suboptimal distributional effects.

3.2.3.2. Benefit reforms

Benefit reform shifts income from benefits to wages (Figure 2). The initial policy impulse is a reduction in the unemployment benefit replacement rate by 3.5 pp. at the EU level. The main effect is an increase in employment generated by lower wage claims, as can be seen by a temporary reduction of the share of wages in total income (between 3(H) and 9 (L) years). (Note this happens despite the fact that the share of benefits is also falling). However, in the long run, the share of wage income is increasing. This happens entirely because of a decline in benefit income. Income from financial wealth and capital income slightly increases as well, because increased labour supply (lower wages) increases investment in physical capital and intangible assets (entry of new firms). The capital income share rises mostly because of an increase in monopoly rents. This is mostly due to a scale effect, an expansion of output (higher labour input) which reduces the share of fixed costs in production (the model does not assume an increase in the mark-up).

Figure 1. **Distributional impact of increase in participation low skilled workers**

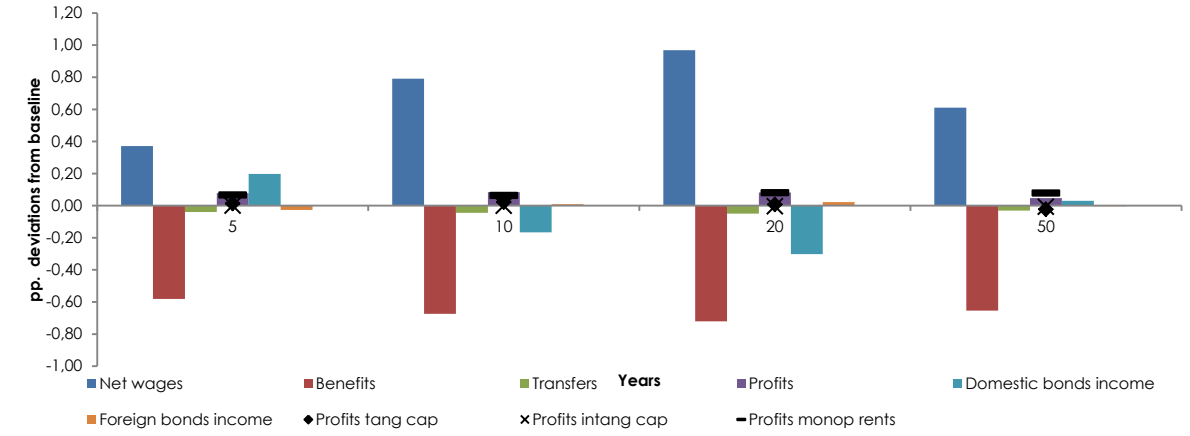


Note: The first graph shows the change of income shares in pp. deviation, the second and third graphs shows the deviation of total net wages alone and in % of net disposable income respectively (GDP deflated). The fourth graph shows the consumption price deflated net wages while the last graph presents the GDP deflated net wages relative to net disposable income. Deviations from baselines.

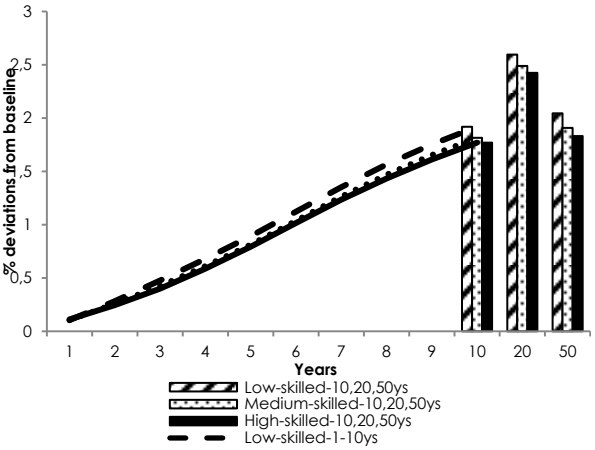
Source: Commission services

Figure 2. **Distributional impact of unemployment benefit reforms**

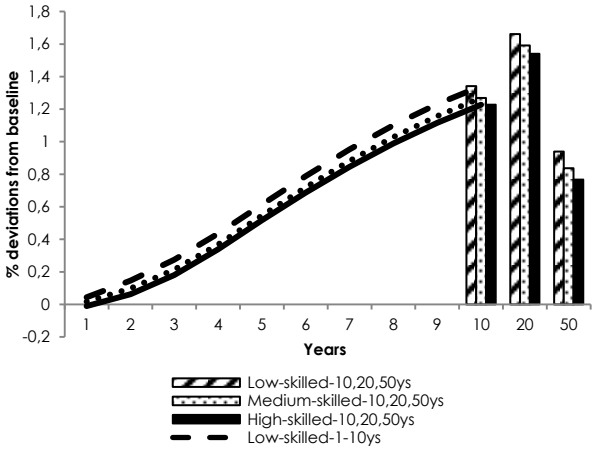
a. Change in income shares (% of NDI)



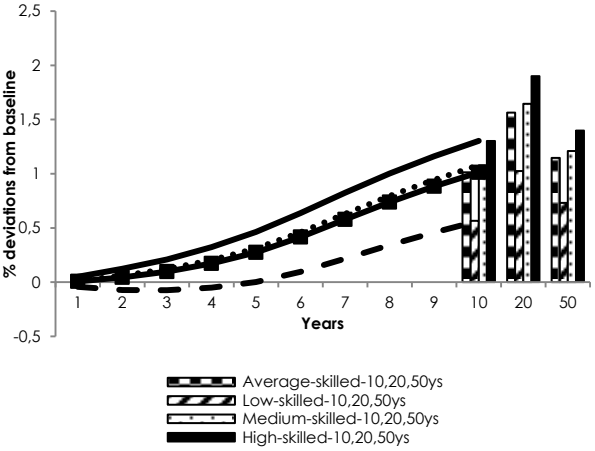
b. Total net wage sum



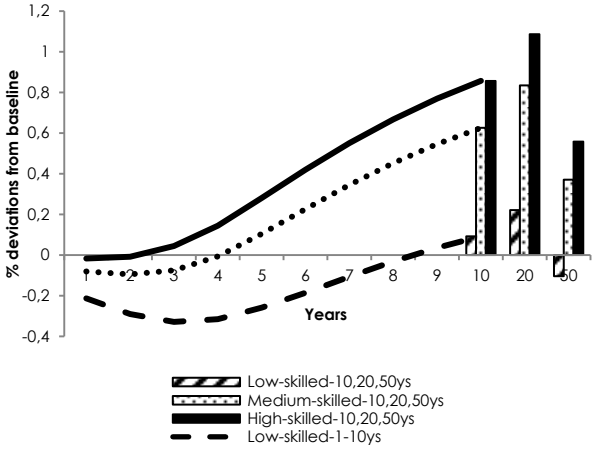
c. Total net wage sum relative to NDI



d. Net real consumption wage



e. Net wage relative to NDI



Note: The first graph shows the change of income shares in pp. deviation after 5, 10, 20 and 50 years, the second and third graphs shows the deviation of total net wages alone and in % of net disposable income respectively (GDP deflated). The fourth graph shows the consumption price deflated net wages while the last graph presents the GDP deflated net wages relative to net disposable income. Deviations from baselines.

Source: Commission services

3.2.4. Product market reforms: competition in services

Product market reforms aim to increase competition, which puts pressure on firms to reduce prices by lowering mark-ups. This, in turn, raises output and increases demand for all factors of production (tangible capital, intangible capital and labour) in the medium term. The simulated mark-up shock corresponded to 1.5 pp. lower services mark-ups at the EU level. The combination of price declines and increased factor demand raise wage income due to higher employment and real wages, while the share of profit income is shrinking (see Figure 3 below). However, this scenario does not take into account that, in the short run, increased competition also reduces the profitability of less productive firms and induces lay-offs. While the destruction of existing jobs is immediate, job creation is only gradual; therefore, the unemployment rate first increases before declining gradually as new jobs are created (see Cacciatore and Fiori, 2016). In order to address this element of the reform we run a slightly modified version of this simulation scenario by proportionally decreasing overhead labour costs to account for the job losses in the services sector. The corresponding simulation results of Graphs 4 show that product market reforms can be less favourable in terms of wage income.

3.2.5. Human capital reforms

Changes in education and their effects on the quality of the labour force can be captured in the model as changes in the skill composition. Thus, in this exercise human capital investment is modelled as changing the relative weights of the different skill categories (in this case from low to medium skilled). The increase of the average skill level in the economy (e.g. reducing the proportion of low-skilled) is modelled as a gradual change, accounting for the substantial lags in achieving that objective, including lags in reforming the education system and the gradual passing through of new cohorts onto the labour market. The reform cost is modelled as an increase in education-related expenditure. The reform was simulated as a 12.4 pp. increase in the share of medium-skilled. Also in this case we see a trade-off between employment expansion and wage decline (for the medium skilled), while the reform increases the capital share in total income.

3.2.6. Comparison across reforms and concluding remarks

How do reforms compare in their impact on the functional income distribution? Figure 6 shows the impact on income shares after 10 years. Labour participation reforms lead to an increase in the wage share, as employment increases, and to a higher profit share. Product market reforms raise the wage share and lead to a lower profit share, while human capital reforms lead to an increase in the profit share.

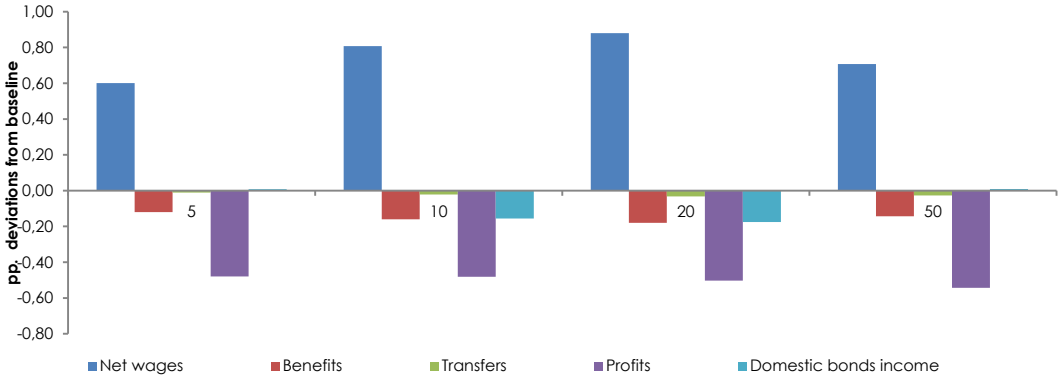
For inequality, the important question is what happens to relative wages. Figure 6b and 6c show the wage sum and relative wages after 10 years for each of these groups of reforms. For labour participation reforms, we notice a trade-off between growth and equity, a widening of wage dispersion, but income enhancing through higher employment (i.e. increase in the wage sum). There is a general trade-off between an increase in employment of a particular group and the income of the average group member compared to income per capita. For product market reforms, total wage income increases and there is complementarity between growth and equity. Similarly, for human capital reforms there is complementarity.

In general, reforms which aim at increasing the employment rate of low skilled workers are associated with a fall of wages relative to income per capita. This effect can be decomposed into wage distribution effects across skill groups but the overall increase in the supply of labour also affects the distribution between wage earners and other income categories, especially capital owners. Capital owners generally benefit from labour market reforms, not only in the form of an absolute increase in capital income but also in the form of an increasing share in total income. The reason why this is happening is a scale effect in combination with limited entry into the final goods production sector. The relative increase in the capital income share associated with labour market reforms can be only substantially reduced if we allow for entry in the goods market. This suggests that labour market

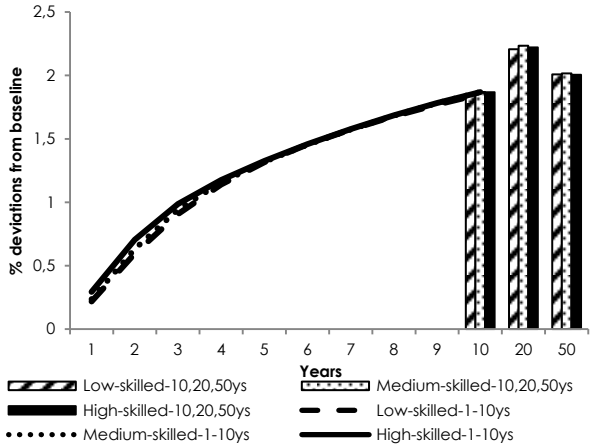
reforms combined with existing goods market rigidities can lead to suboptimal distributional effects and to overcome this should be combined with product market reforms and human capital reforms.

Figure 3. **Distributional impact of product market reforms**

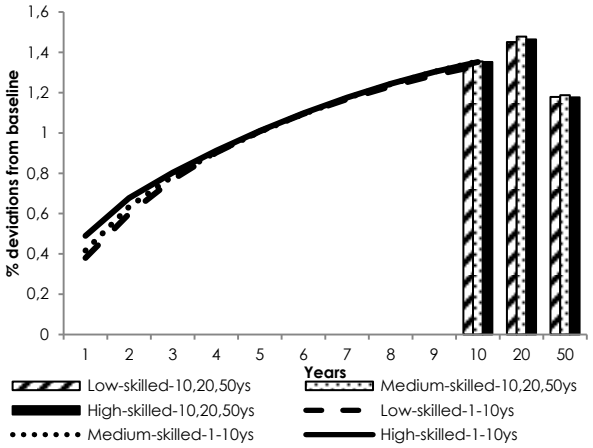
a. Change in income shares (% of NDI)



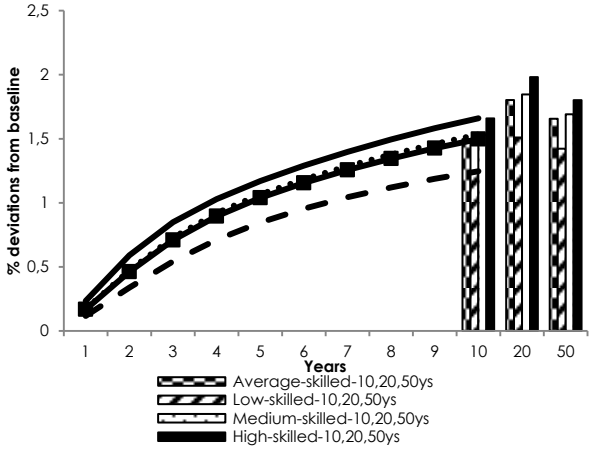
b. Total net wage sum



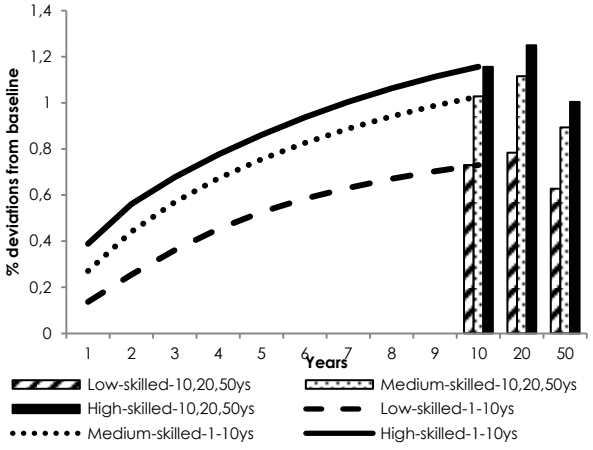
c. Total net wage sum relative to NDI



d. Net real consumption wage



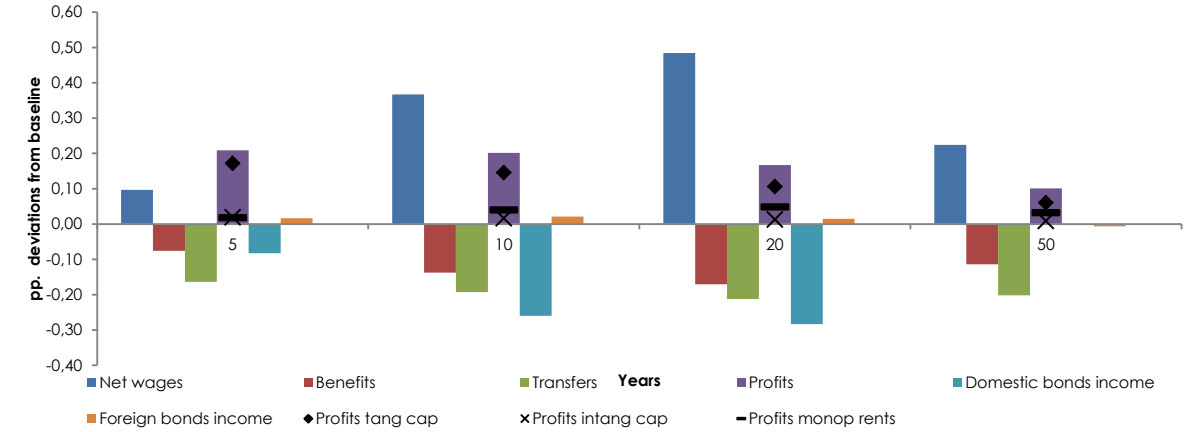
e. Net wage relative to NDI



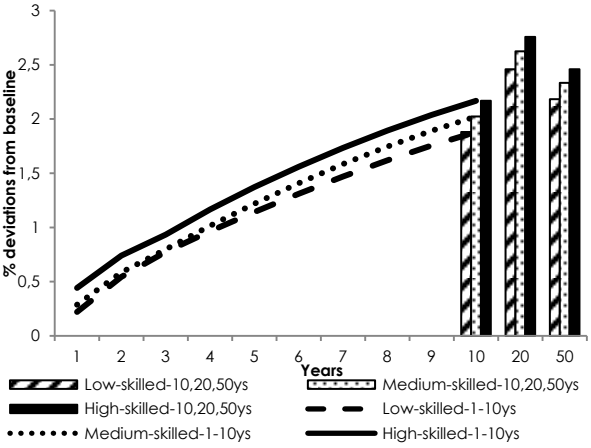
Note: The first graph shows the change of income shares in pp. deviation after 5, 10, 20 and 50 years. The second and third graphs show the deviation of total net wages alone and in % of net disposable income respectively (GDP deflated). The fourth graph shows the consumption price deflated net wages while the last graph presents the GDP deflated net wages relative to net disposable income. Deviations from baselines.
Source: Commission services

Figure 4. **Distributional impact of product market reforms: with job destruction**

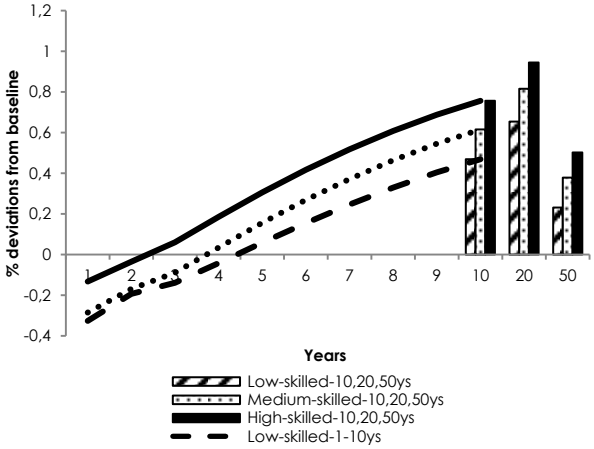
a. Change in income shares (% of NDI)



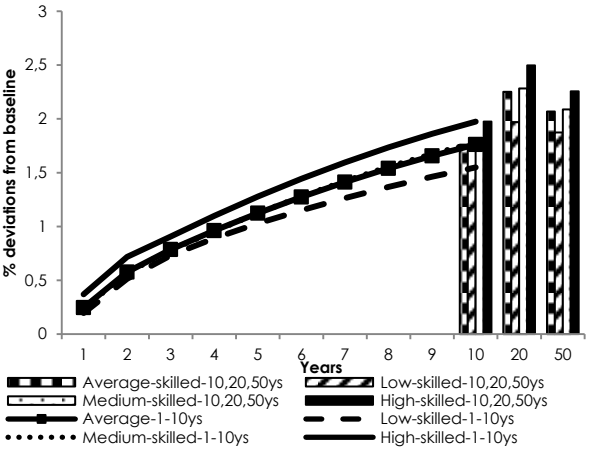
b. Total net wage sum



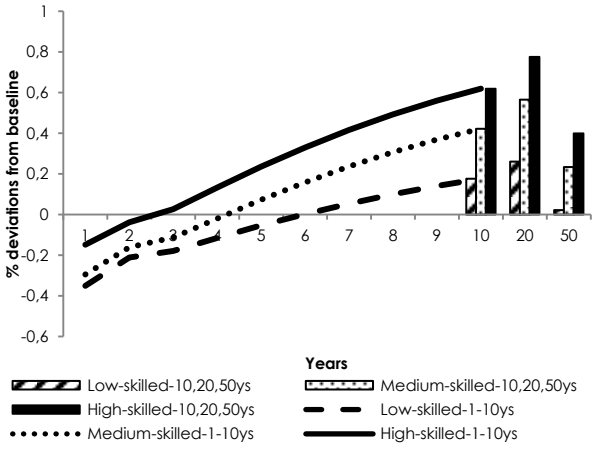
c. Total net wage sum relative to NDI



d. Net real consumption wage



e. Net wage relative to NDI

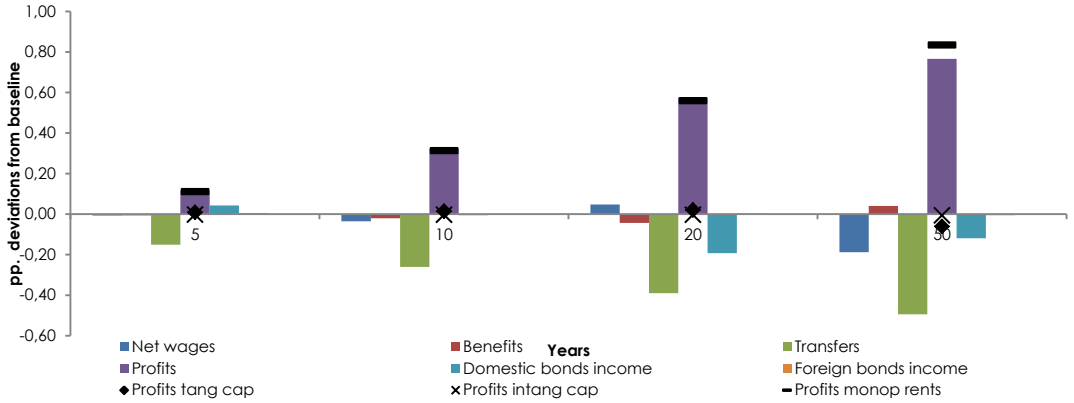


Note: The first graph shows the change of income shares in pp. deviation after 5, 10, 20 and 50 years, the second and third graphs show the deviation of total net wages alone and in % of net disposable income respectively (GDP deflated). The fourth graph shows the consumption price deflated net wages while the last graph presents the GDP deflated net wages relative to net disposable income. Deviations from baselines.

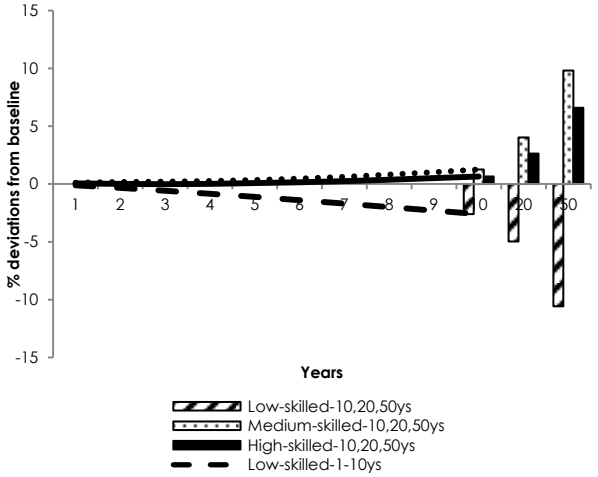
Source: Commission services

Figure 5. **Distributional impact of human capital reforms: raising share of medium skilled**

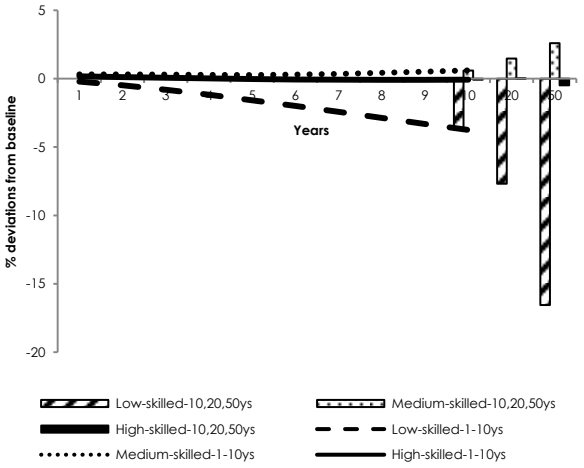
a. Change in income shares (% of NDI)



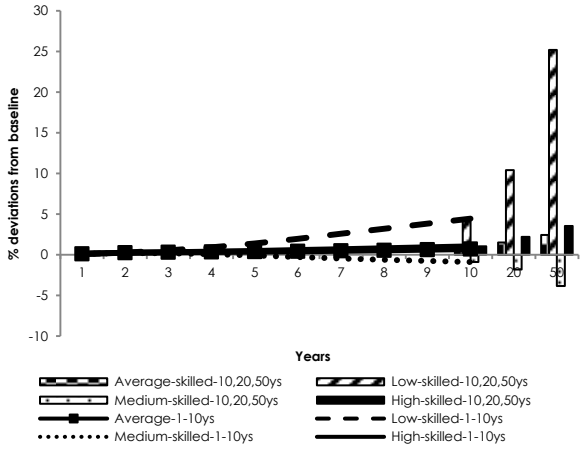
b. Total net wage sum



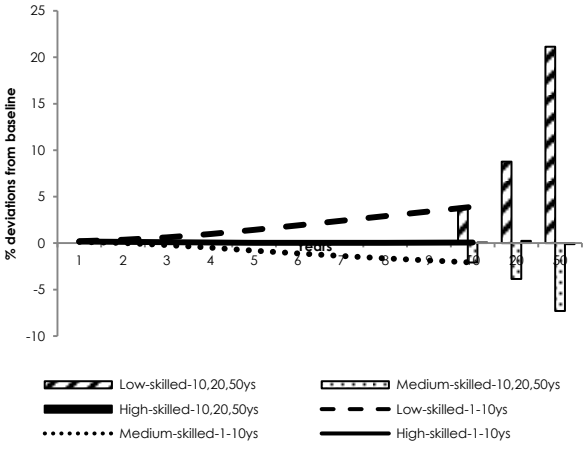
c. Total net wage sum relative to NDI



d. Net real consumption wage



e. Net wage relative to NDI

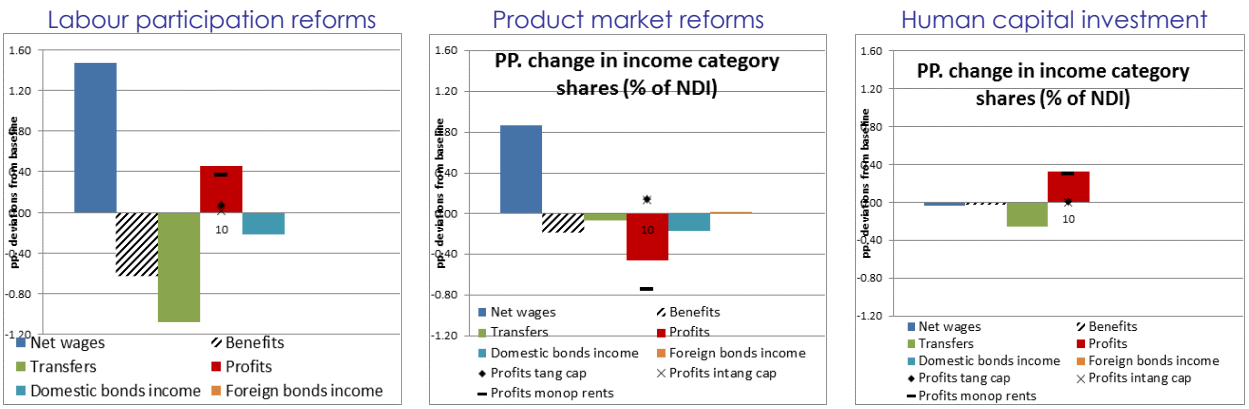


Note: The first graph shows the change of income shares in pp. deviation, the second and third graph show the deviation of total net wages alone and in % of net disposable income respectively (GDP deflated). The fourth graph shows the consumption price deflated net wages while the last graph presents the GDP deflated net wages relative to net disposable income. Deviations from baselines.

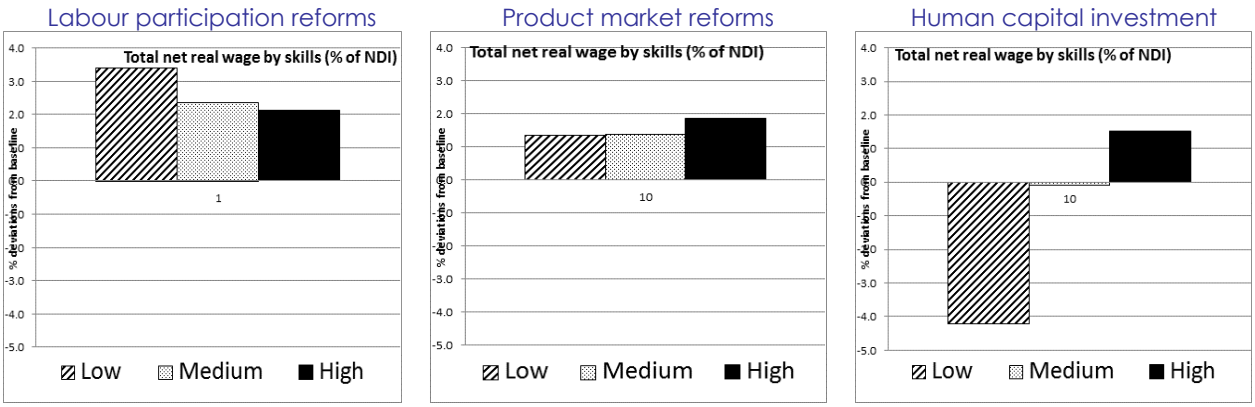
Source: Commission services

Figure 6. **Distribution impact after 10 years: labour market, product market, human capital reforms**

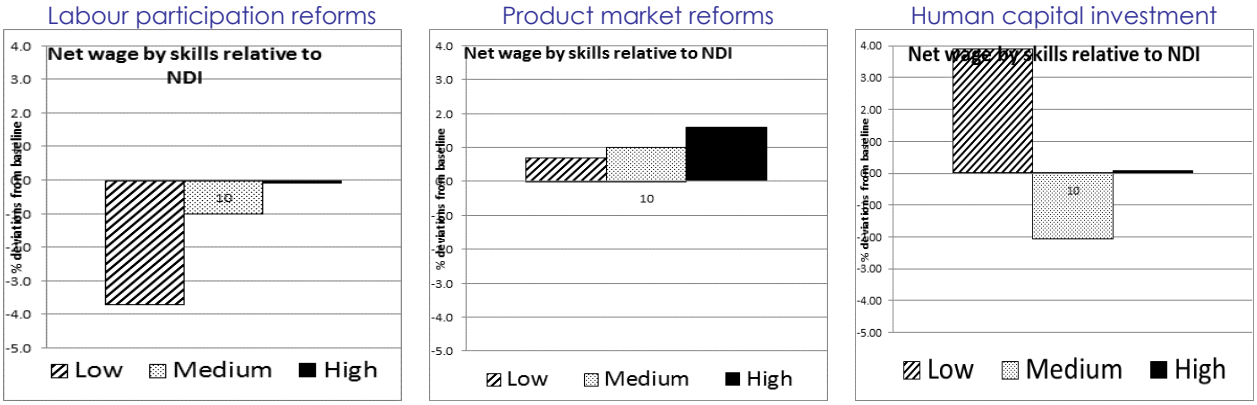
a. Income shares



b. Total net wage sum



c. Relative wages



3.2.7. References

Cacciatore, M. and Fiori, G. (2016). The macroeconomic effects of goods and labor markets deregulation. Review of Economic Dynamics 20: 1-24.

Causa, O., Hermansen, M. and Ruiz, N. (2016). The distributional impact of structural reforms. OECD Economics Department Working Paper 1342.

Dixit, A.K. and Stiglitz, J.E. (1977). Monopolistic Competition and Optimum Product Diversity. The American Economic Review 67(3): 297-308.

Roeger W., Varga, J. and in ’t Veld, J. (2008). Structural reforms in the EU: a simulation-based analysis using the QUEST model with endogenous growth. European Economy Economic Paper 351.

Roeger, W., Varga, J. and in ’t Veld, J. (2014). Growth effects of structural reforms in Southern Europe: the case of Greece, Italy, Spain and Portugal. Empirica 41(2): 323-363.

Varga, J. and in 't Veld, J. (2014). The potential growth impact of structural reforms in the EU. A benchmarking exercise. European Economy Economic Paper no. 541.

3.3. TAXATION AND SKILLS: HOW TAX SYSTEM IMPACT SKILLS DEVRLOPMENTS IN OECD COUNTRIES

by Bert Brys*

3.3.1. Introduction

Better skills are crucial for fostering inclusive economic growth and boosting social cohesion (OECD, 2016b). With growth increasingly driven by productivity improvements, the future economic and social well-being of OECD countries will depend upon providing people with the right skills to succeed in the 21st century job market. Some proven benefits of better skills include higher wages and better employment prospects for individuals, higher productivity and profits for businesses, and higher growth rates and tax revenues for governments.

Policymakers must therefore step up their efforts to find equitable and efficient ways to share the costs and the returns of skills investments between governments, individuals, and businesses. The OECD's Tax Policy Study on *Taxation and Skills* (OECD, 2017)[1] analyses how tax policy can encourage skills development in OECD countries and highlights the financial incentives for individuals and governments to invest in education to improve productivity levels.

The main findings of the Taxation and Skills (OECD, 2017) study are:

- **For a typical 17-year-old individual in OECD countries, tertiary level education is one of the best investments available.** A tertiary degree more than pays for itself in terms of future expected after-tax income, even before accounting for additional employment, health, and well-being benefits. The study suggests that a student's earnings after education need to rise by 15% to cover the costs of a tertiary degree. Labour force data suggests that earnings actually rise by 48% on average over a student's lifetime: a significant return to students on their education investment.

- **Governments recover the costs of their investment in tertiary education on average through higher income tax revenue.** The estimates in the study suggest that, on average, the extra personal income tax revenue gained from educating a typical student at the tertiary level amounts to 119% of government education costs across the OECD. This is true even without accounting for the wide variety of other returns to skills investments for governments, which likely increase governments' returns further.

- **There is, however, significant variation in the returns to skills across countries.** In some OECD countries high earnings premia, skills shortages and low current skills spending suggest that there are significant benefits to further educational spending for governments. This is not always the case, however.

Tax deductions and credits for skills spending are probably not the best way to encourage skills investments; loans, grants, and direct spending are likely more effective and more progressive. Tax expenditures to encourage skills investments exist in different forms in most OECD countries. However, existing evidence suggests that they often create significant deadweight losses and are often

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[1] For more information: http://www.oecd.org/tax/taxation-and-skills-9789264269385-en.htm. The Taxation and Skills report has been prepared jointly with Pierce O'Reilly (Pierce.OReilly@oecd.org), Tax Economist at the OECD.

(though not always) regressive. Direct government spending on skills investments and financing through student loans are usually better options.

3.3.2. How taxes impact skills

Taxes impact the financial incentives of individuals to develop skills and to activate them in the labour market. Taxes are thus a key lever for policymakers seeking to increase inclusive growth, raise productivity and reduce income inequality. The tax system impacts incentives to invest in skills in a variety of ways.

Key channels between taxation and skills investments:

- **Taxing returns:** Progressive income taxation reduces the returns to skills investments for individuals by taxing away higher wages at higher rates as well as by reducing the incentives to work.

- **Reducing lost earnings:** A key cost of education is an individual's time and particularly the income foregone during periods of study. Lost earnings mean that even where no tuition fees are charged for education, the costs to individuals from skills investment can be significant. The tax system offsets these costs, because when income falls, tax liability usually falls as well.

- **Offsetting fees and other costs:** The tax system can also reduce the costs of skills investments through tax expenditures which provide targeted tax relief to students, often based on education costs.

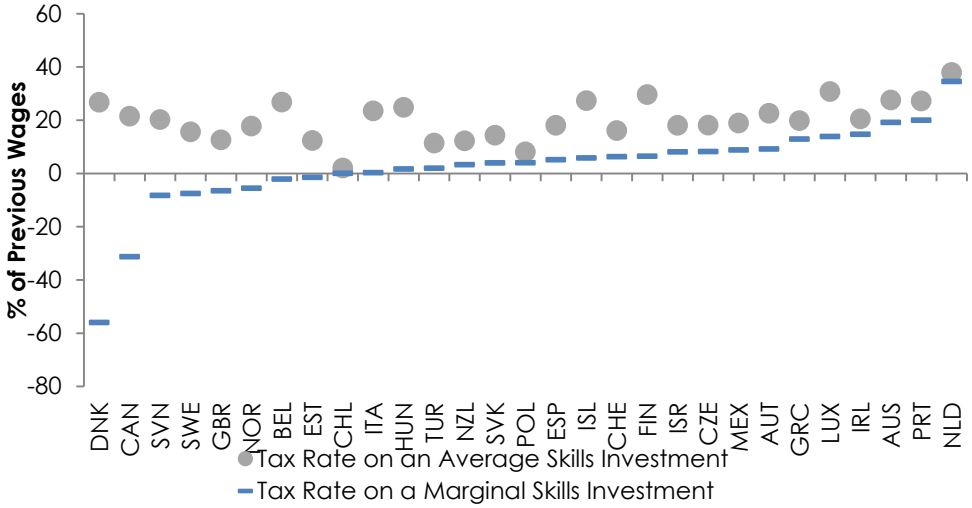
- **Financing government expenditures:** Tax revenues can be used to finance direct investments in education and to provide scholarship support for skills investments.

These different impacts are summarised by the Effective Tax Rate on Skills, a key output of the OECD's *Taxation and Skills* study. The study analyses the impact of the tax system in taxing returns, reducing lost earnings, and through skills tax expenditures, focusing on a typical tertiary education scenario (see Box 1 for details). Both debt and equity-financed skills investments are analysed. For an average rate of return on a tertiary education in the OECD, the overall impact of the tax system reduces the return to skills by 20% on average.

3.3.3. The tax burden on skills varies with income

The effective tax rate on skills depends on how much an individual's wage rises after the skills investment (see Figure 1). High-return skills investments are taxed more heavily than low-return skills investments. While for a tertiary-level student earning an average return on their education the tax rate on skills is estimated at 20%, for a tertiary-level student who just breaks even (i.e. a "marginal" skills investment) on the costs of their investment over their lifetime, the tax burden on skills investment is lower, at about 4%.

Figure 1. **Effective Tax Rates on a Tertiary-Level Skills Investment**



3.3.4. Skills tax expenditures may be ineffective

Governments provide many tax expenditures to support investment in skills, such as tax deductions or credits for skills expenses, tax exemptions for scholarship income, and reduced tax rates on student income. These measures do increase incentives to invest in skills, but also have drawbacks:

- They often provide larger benefits to those with larger taxable incomes.
- They may provide less assistance to those who are credit constrained and to those from lower income households.
- They are often only available for training connected to a workers' current employment, and so may be ineffective in assisting workers who need or want to change careers. 20 of 29 OECD countries studied provide tax support for lifelong learning; in 13 of these countries, tax support is not available for new careers, only for a worker's current job.
- The evidence of their impact on wages and employment outcomes is mixed.

Alternative forms of support exist. For example, governments can provide support to skills investments through income-contingent or subsidised loans. Income-contingent loans can help address credit constraints and can target support to those who need it most, while at the same time mitigating the risk of skills investments by providing a form of insurance against such earnings risk.

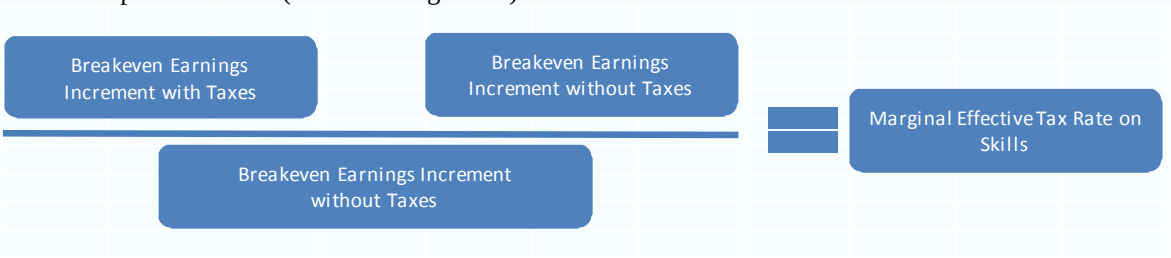
Box 1. HOW TAX AND SKILLS INDICATORS ARE CALCULATED

Building on earlier OECD work (Brys and Torres, 2013), the *Taxation and Skills* study constructs three types of indicators that measure the impact of public policies on individuals' incentives to invest in skills. They take into account the various financial costs of skills investments borne by the students and governments. Student education costs are defined as:

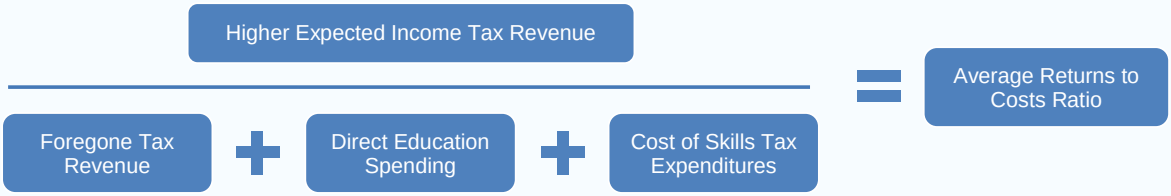
The indicators also incorporate the returns to skills investments for individuals and governments in the form of higher after-tax wages and higher tax revenues. The three indicators are:

(1) Breakeven Earnings Increment (BEI): The BEI measures how much an individual's earnings need to increase before they earn back the costs of a skills investment over their remaining years in the workforce. These costs are:

(2) Effective Tax Rate on Skills (ETR): The ETR on skills measures the amount by which taxes raise or reduce an individual's net returns to skills investments (i.e., whether after-tax returns to skills are higher or lower compared to a world with no taxes). These effective tax rates are developed for two groups: individuals who will exactly break even on a skills investment (i.e. a Marginal ETR) and individuals who will earn a positive return (i.e. an Average ETR). The formula for the METR is:



(3) Returns to Costs Ratio (RCR): The RCR measures the returns to skills investments for governments, comparing the government's costs of educating an individual to the government's expected returns in the form of higher income tax revenues. As with the ETR, both marginal and average RCRs are modelled, with different returns to skills in each case. The RCR formula is:



Scenarios and Data

The study focuses on a typical tertiary education scenario, though other education scenarios such as in-work training are explored as well. The study incorporates income taxes but not social security contributions (these are discussed further in *Taxing Wages 2017*).

In the typical tertiary scenario, the model considers a 17-year-old student undertaking a four-year college degree. In the absence of a skills investment, a student earns earn 70% of the average wage until retirement. With a skills investment, they earn a premium for their higher skills. Data on scholarship income levels, direct educational costs, and earnings premiums are taken from OECD *Education at a Glance* (2016). Tax models are taken from OECD *Taxing Wages.*

3.3.5. Lower taxes on skills can mean better employment outcomes too

Tax policies that encourage education investments and skills activation in the labour market are closely linked.

- Those who have better skills are more likely to (continue to) be active in the labour market.
- Those who work more and plan to work longer will have higher incentives to invest in skills.

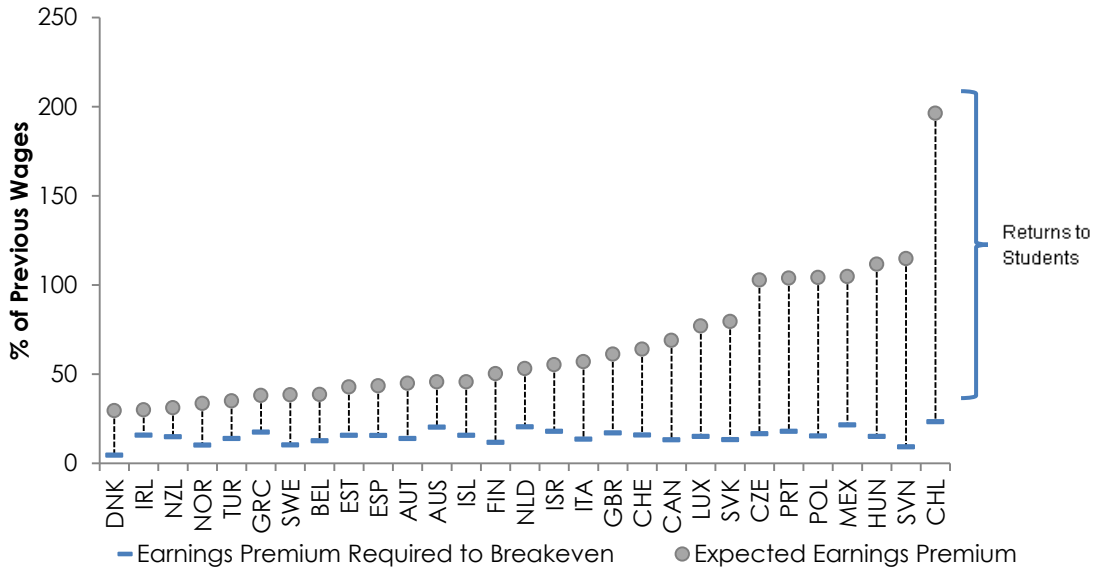
Tax policies aimed at both increasing skills investments and encouraging labour market participation can thus pay double dividends. This is particularly true for groups with lower levels of labour market participation, such as migrants, women, and older workers.

3.3.6. Skills investments are positive investments for students across the OECD

The study uses data on taxes, spending levels of education, and wages across education levels to calculate the returns to education for students and governments. The results suggest that tertiary education is a financially attractive investment for individuals. Based on the current tax, scholarship, and tuition policies, the wage premium earned by a university student is estimated to be above – often well above – what is required to break even on the costs of tertiary education. The typical student earns a profit on their education investment (see Figure 2).

Even though skills investments are profitable, credit constraints can deter students from undertaking them. Ensuring access to skills for those who are credit constrained is crucial. Income-contingent loans can be an efficient and equitable policy instrument to address these issues.

Figure 2. **College Labour Market Premium versus Breakeven Earnings Premium**

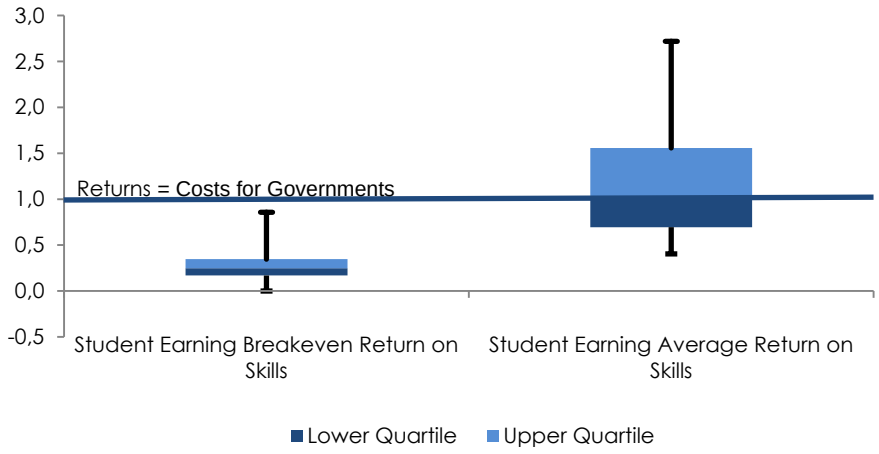


3.3.7. Skills investments offer healthy returns to governments too

Governments generally recover the costs of their investment in tertiary education through higher tax revenues on higher wages from more highly-skilled workers. The study focuses only on income taxes, but nonetheless the results suggest that the current tertiary education spending mix pays for itself for the government for a typical student at current wage levels and tax rates in the OECD. Governments earn 119% of the costs of educating a typical student following a four-year degree in the form of future income tax revenue over that individual's lifetime; though there is significant variation across countries (see Figure 3). This does not account for the wide variety of other benefits that accrue from having a better-educated population, such as lower unemployment levels, better health outcomes and other well-being improvements, so these results are probably a lower bound of the true returns to skills.

For individuals whose returns to skills are lower, future expected income tax revenue may not cover governments' costs of tertiary education. This is especially true where government spending on tertiary education is currently high. Figure 3 also shows the ratio of returns to costs for students whose returns are so low they just break even on a skills investment. In this case, the expected future personal income tax stream of revenues does not cover the costs of governments' education spending on average. Public policies should not just incentivise skills investments overall, but also ensure that that students make the right skills investments for the future. Governments may therefore want to spend more resources on informing students about the financial impacts of their education and skills investment decisions.

Figure 3. **Ratio of Government Income Tax Returns to Costs, Average and Marginal Student**



3.3.8. Conclusion

Creating incentives to invest in skills in the society is a key component in lifting wage and productivity levels across OECD countries and in ensuring that growth in the coming years is inclusive and sustainable. The Taxation and Skills (OECD, 2017) report demonstrates that tax and spending policies need to be designed in a coherent manner in order to encourage skills investments.

- Where high labour taxes reduce the returns to skills, it is important that public expenditure in support of skills is sufficiently high in order to make skills investments financially attractive.

- Where spending on skills by governments is lower, it is important that high taxes do not dis-incentivise skills investment.

In all cases, the burden of the tax system on skills investments should be considered by both tax and skills policymakers. The impact of the tax system on physical capital is extensively studied and is a significant factor in shaping tax policy reform. Similar consideration should be given to the impact of taxes on human capital.

The costs of failing to invest in skills will have consequences in the years ahead. A failure to invest in skills today will not only impede the economic participation of individuals and restrain productivity growth, but will reduce future expected tax revenues, increase future expected levels of social expenditure and jeopardise future inclusive economic growth prospects.

3.3.9. References

Brys, B., Perret, S., Thomas, A. and O'Reilly, P. (2016). Tax Design for Inclusive Economic Growth. OECD Tax Policy Working Papers, No. 26.

Brys, B. and Torres, C. (2013). Effective Personal Tax Rates on Marginal Skills Investments in OECD Countries: A New Methodology. OECD Taxation Working Papers, No. 16.

OECD (2017). Taxation and Skills, OECD Tax Policy Studies, No. 24. Paris: OECD Publishing.

OECD. (2012). Better Skills, Better Jobs, Better Lives: The OECD Skills Strategy. Paris: OECD Publishing.

OECD (2016a). Taxing Wages 2016. Paris: OECD Publishing.

OECD (2016b). The Productivity-Inclusiveness Nexus. Paris: OECD Publishing.

Torres, C. (2012). Taxes and Investment in Skills. OECD Taxation Working Papers, No. 13.

3.4. EVIDENCE FROM THE EUROMOD MICROSIMULATION MODEL

by Salvador Barrios*

3.4.1. Introduction

Tax and social benefits systems contribute to the three main objectives of governments' economic policy which, following Richard Musgrave´s taxonomy, concern income redistribution, stabilisation and resources allocation. These objectives are closely interconnected such that tax reforms may have wide ranging effect both on economic activity and inequality. For instance tax reforms lowering tax rates on low income will benefit low income workers, who will likely increase their consumption level and their participation in the labour market. These changes will also impact on governments´ budget and spread throughout the economy and potentially influence investment and growth. Assessing the way tax policy plays through these different channels and ultimately impact on inequalities is a non-trivial task, however. Tax-benefits systems are complex, not least because they are designed according to individual and households characteristics and therefore they impact them differently. Individuals may in turn anticipate the effect on tax policy changes and alter their behaviour. They can do so for instance by changing their consumption level, working effort or savings such that the expected impact of tax reforms can differ from the observed one. The broad macroeconomic context needs to be considered as well given tax-benefit policies may also entail prices and wages adjustments which will ultimately affect households' disposable income.

Unsurprisingly, there is no single model or analytical tool capable of considering these dimensions altogether. The analysis of the redistributive impact of tax-benefit reforms is usually done either with macro or micro models. Macro models represent the functioning of the economy as a whole and are useful to capture the mechanisms and interactions through which tax reforms impact on macro variables such as employment, prices, GDP and households´ disposable income. But macro-models are by definition aggregated and cannot be used to mimic changes in tax legislation with sufficient precision in order to capture their equity impact in a satisfactory way. Alternatively micro-models can be used to overcome the aggregation issue using individual or household data. One type of such micro-model is represented by microeconometric models which are useful to identify causality links between policy variables and outcome variables (such as household disposable income or the Gini index). However, microeconometric models are also limited to the extent that they are contingent to a given tax-benefit system and do not provide a framework for counterfactual tax policy. Microsimulation models represent another type of micro-models. Microsimulation models codify the tax law using information at individual and household level in order to simulate the impact of actual or hypothetical tax-benefit reforms, see Figari et al. (2014). Microsimulation models are therefore particularly adapted to analyse the ex-ante and ex-post impact of tax-benefit reforms in the "real world". Their main drawback however is that they do not consider behavioural changes nor economy-wide interactions between agents. However microsimulation models are usually flexible enough in order to be adapted and complemented with other macro and micro models in order to consider these other aspects of tax-benefit policies.

This presentation reviews the advantages of microsimulation models and more specifically of the EUROMOD model, the European microsimulation model for Europe used by the European Commission to analyse the fiscal and redistributive impact of tax-benefit policies in the EU, see Picos and Schmitz (2016). Recent evidence on the equity impact of tax-benefit reforms and examples of recent analyses combining EUROMOD with macro-models are also presented.

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* Fiscal Policy Analysis unit, Joint Research Centre, European Commission. The views expressed in this paper are those of the author and should not be attributed to the European Commission. The author wishes to thank Alberto Tumino and Anamaria Maftei for providing some of the results reported in the presentation. Any errors or omissions are the author's.

3.4.2. What can microsimulation models bring for the analysis of the inequality and structural reforms?

There are at least four important reasons warranting the use of microsimulation models for the analysis of the redistributive impact of tax-benefit reforms.

First, reforms can be simulated with high precision, mimicking the change in tax law and/or social benefits entitlement. Microsimulation models make use of micro-data, be it survey or administrative data such as social security records or tax returns. A wealth of information can be gathered from these databases, including individual characteristics and household composition, income components, work status, etc. These different datasets can in some instance be combined either directly when common individual identifiers are available or indirectly through statistical matching procedures. Microsimulation analysis can therefore cover direct taxation and social benefits, consumption or wealth taxation (including housing taxation), see in particular Capéau et al. (2014), Kuypers et al. (2016) and De Agostini et al. (2017). Microsimulation models can be eventually combined with both macro and microeconometric models. For instance microeconometric models can be used in combination with microsimulation models order to investigate the behavioural reactions to tax policy changes in terms of labour supply, see in particular Bargain et al. (2014).

Second, tax-benefit policies can lead to significant fiscal interactions. For instance a reduction in personal income rates affecting low tax brackets could be automatically compensated by a reduction in some social benefits (such as for instance child benefits) if these were calculated with reference to after-tax income. These aspects are often over-looked in macroeconomic models although they might have non-negligible impact on certain categories of households. Alternative tax and social benefit instruments can also be compared and possibly combined in order to inform about the most appropriate policy mix, accounting for complementarity and possibly, the countervailing effects that each instrument might have on disposable income and work-incentives.

A third important aspect which is better captured in microsimulation models concerns tax expenditures, i.e., tax credit and tax allowances affecting the tax rate and tax bases. Tax expenditures are often targeted to certain categories of households in order to promote social objectives, including redistribution. In certain cases these tax expenditures may be refundable, i.e., leading to a direct cash transfer by the government. For instance mortgage interest tax rebates, family-related deductions or in-work benefits are often encountered in EU Member States and can have non negligible impact on income inequality, see in particular Barrios et al. (2016). The existence of tax expenditures and social benefits linked to taxes imply that any change in tax policy might trigger interactions within the entire tax-benefit systems.

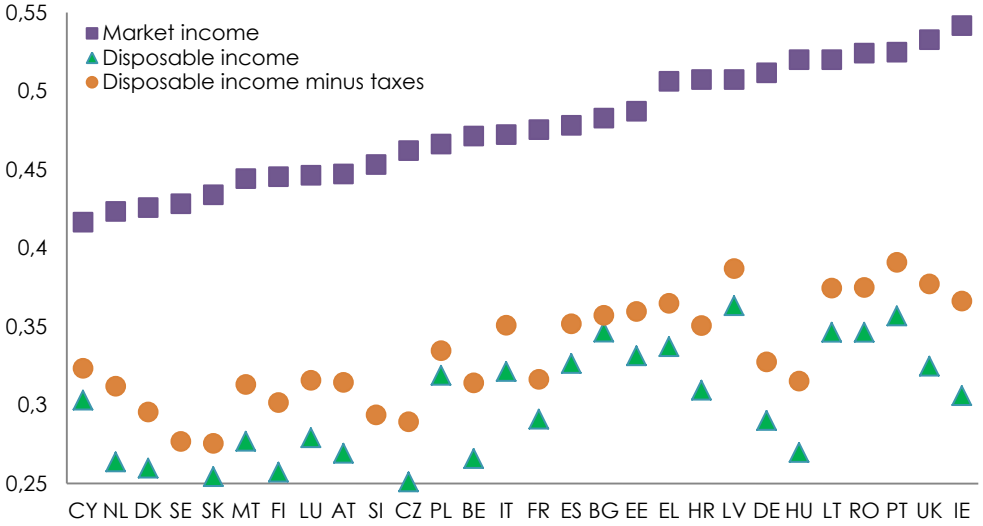
A fourth distinctive advantage of microsimulation models is that they can be used to calculate indicators that cannot otherwise be estimated using micro-data alone only such as measures of work incentives and automatic income stabilisers, see Figari et al. (2014). These indicators can in turn be used to identify the winners and losers of a specific reform or for benchmarking and identifying best practices which is particularly relevant in the EU context.

3.4.3. Recent evidence on the impact of tax-benefit reforms on inequality in the EU

The evidence suggests that tax-benefit systems tend to reduce income inequality in a significant way in the EU. Figure 1 shows that on average this reduction is of 37.5% in the EU. In countries such as Hungary, Slovenia, the Czech Republic, Belgium, Sweden, Ireland, Germany, Finland and Slovakia the effect of tax-benefit systems on inequality is above 40%. Even in countries where the redistributive effect of tax-benefit system is the least pronounced, such as Cyprus, Bulgaria and

Latvia, the reduction in inequality through tax and social benefits stands close to 30%. Figure 1 also suggests that taxes and social security contributions appear to be the main policy tool for reducing inequalities in the EU.

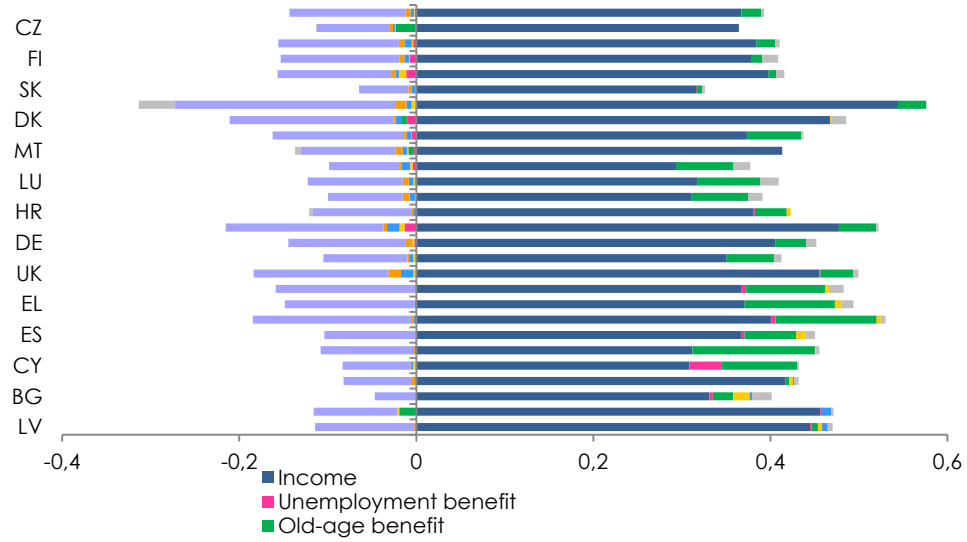
Figure 1. **The redistributive impact of tax-benefit systems in the EU**



Note: averages for 2004-14, Source: Joint Research Centre, European Commission

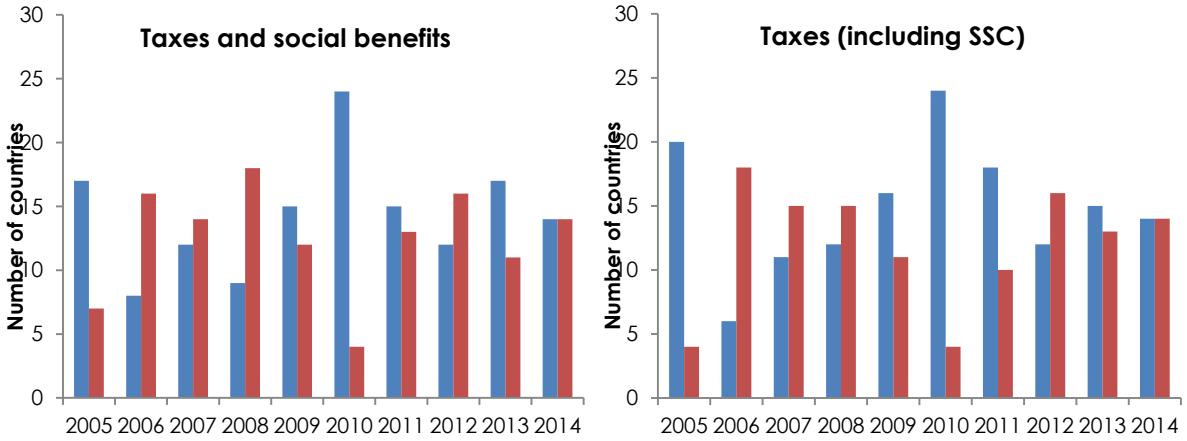
Figure 2 further decomposes the Gini index into market income and the various components of disposable income represented by policy intervention using the EU-SILC survey data in 2014. The contribution of each policy component varies across countries, however. For instance pensions are especially relevant in Southern European countries (including Portugal, Italy, Greece, Romania, Cyprus and Spain) and Lithuania. On the contrary, taxes and social security contributions have a larger redistributive impact in the Netherlands, Denmark, the UK and Portugal.

Figure 2. **Decomposition of the Gini index by income sources (2014)**



Source: Eurostat and Joint Research Centre, European Commission.

Figure 3. **Progressive vs. regressive tax-benefit policies in the EU**



Note: Progressive (in blue) and regressive (in red) tax-benefit policies are defined on the basis of the difference between the annual change in the Gini index calculated using market income and the Gini index calculated using the disposable income. When this difference is positive (negative) the policy change is considered as being progressive (regressive).

Source: Joint Research Centre, European Commission.

Tax-benefit policies have also significantly affected inequalities in the EU since the onset of the financial crisis although not always in the same direction. Figure 3 provides evidence on this by reporting the number of countries where tax-benefit policies have tended to reduce the Gini index (progressive policies) or to increase it (regressive policies). The left-hand panel provides results considering taxes and social benefit together while the right-hand panel highlight the role of taxes (including social security contribution) alone.

The evidence provided in Figure 3 suggests that policies have been rather regressive in a majority of EU countries in the run-up to the crisis (i.e. in 2006-2008) while turning more progressive after 2009 with the exception of 2012 where policies were regressive in a majority of EU countries.

The results reported in Figure 3 do not account for the possible influence of changes in population characteristics and market income dynamics which during a crisis can be rather significant. The approach proposed by Bargain and Callan (2010) provides a decomposition framework in order to isolate the impact of policy changes from changes in market incomes and population characteristics using the EUROMOD microsimulation model. Importantly the use of EUROMOD ensures that this approach is applied consistently across European countries allowing cross-country analysis. Following this method the actual distribution of household disposable incomes in a given year is compared with a counterfactual income distribution replacing the tax-benefit policies with the policies of the initial period, while keeping population characteristics and market incomes constant. This approach requires building a counterfactual scenario for the evolution of market incomes in order to adjust monetary parameters of the tax-benefit system such as the tax brackets and benefits in cash. One can alternatively use average market income or consumption prices for this purpose. Both options have their pros and cons. When using average market income one assumes that the tax-benefit system remains neutral from a distributional perspective between households relying primarily on market incomes or social benefits. This implies the absence of a fiscal drag as tax brackets are adjusted in line with the evolution of market incomes. However in this case the position of the most vulnerable households could be further weakened in time of decreasing market incomes, especially given that they are most likely to be hit either by the fall in market income or by unemployment. Alternatively, the use of the CPI to index tax brackets and benefits would avoid this pitfall, although it would

possibly not reflect appropriately the distributional impact of tax-benefit policy changes when market income rise faster than CPI.

Agostini et al. (2016) use the Bargain and Callan (2010) approach to analyse the impact of tax-benefit policy changes on income distribution and poverty during the 2008-2015 period in the EU. Overall they find that on average tax policy increased household disposable incomes in 2008-11 and decreased in 2011-14 although in both periods tax-benefit policies have tended to reduce inequalities in the EU. Generally speaking tax-benefit policies have been pro-cyclical, excepting in countries such as Belgium, Sweden, Poland, Denmark and Bulgaria where they have tended to be counter-cyclical. By contrast tax policies in countries such as Greece, Italy, Portugal, Spain, Ireland and Hungary have been clearly marked by fiscal consolidation needs and have been detrimental to households' disposable income. However, such evolutions must be considered against the background of falling market income during these periods. Agostini et al. (2016) suggest indeed that once the fall in market income is accounted for, then the evidence suggests that the negative impact of fiscal consolidation programmes on disposable income is far less pronounced in the aforementioned countries. These authors also show that the reduction in inequalities through tax-benefit policy reforms during the 2008-11 period was also substituted by inequality-increasing policies in the 2011-14 period. During the years 2014-15 some countries have tended to revert the contractionary effect of tax-benefit policies on disposable income, with the most notable examples being Estonia, Spain, Latvia and Portugal. Agostini et al. (2016) also show that the impact of the different policy instruments, i.e. tax, social security, social benefits and pensions, depends on whether the benchmark scenario for disposable income is obtained through indexation with cpi index or with market income. Some significant policy impacts are relatively unaltered by this indexation, however. For instance reforms affecting public pensions have had a particularly relevant role in Belgium, Bulgaria and Sweden over the period 2011-2014. Changes in taxes and social security contributions have had the most pronounced effects in France, Ireland, Portugal, Slovakia and Finland while reforms affecting non-pension benefits in Greece, Hungary, Lithuania and the UK over the same period.

3.4.4. Accounting for the macroeconomic impact and automatic stabilisation of tax-benefit reforms.

Microsimulation models can be combined with other economic models in order to assess the impact of policy change while considering their second-round effects, including behavioural reaction, e.g. through changes in working effort, in labour market participation or in consumption. It is also important to consider the overall macroeconomic effect of tax reforms to account for the many impacts and interactions that tax reforms can potentially trigger. It is necessary to consider all these interactions given that tax-benefit reforms should also aim at promoting both growth and employment in addition to reducing income redistribution. Dynamic scoring techniques provide a useful tool for this type of analysis, see Adam and Bozio (2009). This approach is now well established in the US where it is a legal requirement before any significant changes in tax legislation can be enacted, see Gravelle (2015). Barrios et al. (2017) provide a first attempt to apply dynamic scoring techniques to analyse tax-benefit reforms in the European case. In order to do so they combine EUROMOD with QUEST, the European Commission's DSGE model used for the analysis of structural reforms (including fiscal reforms). Barrios et al. (2017) illustrate their approach with an analysis of hypothetical reforms in Belgium, Italy and Poland. Their results suggest that in general the second-round effect of tax-benefit reforms remains generally modest. However they also show that the design of tax-benefit reforms matters from both from a fiscal and equity perspectives, especially when second-round effects are accounted for. Their results suggest in particular that tax-benefit reforms leading to a direct increase in disposable income tend to be compensated by wages adjustment. In contrast, reforms lowering labour cost for employers can trigger a positive change in wages and employment thanks to their expansionary labour demand effect which might lead to lower inequalities.

Tax-benefit systems also play an important role in cushioning against adverse economic shocks, another key function of government according to Musgrave's classification. During crisis market incomes tend to decrease, especially for those most exposed to unemployment risks such as unskilled workers or second earners, see Izquierdo et al. (2017). When market incomes fall the tax burden tend to decrease automatically, the more so if this fall concerns primarily low income workers as the evidence shows. Social benefits, in particular unemployment subsidies, tend to increase also during crises. During expansions the opposite occurs as taxes tend to increase and social benefits tend to decrease with growing incomes and employment.

Dolls et al. (2012) have developed a simple indicator using microsimulation models to analyse the automatic stabilisation properties of tax-benefit systems using microsimulation models. This indicator measures the relative value of the change in disposable and market incomes of households (indexed by *h*) in a given country *i* following the formula below:

$$\tau_i = 1 - \frac{\Delta Y_{h,i}^D}{\Delta Y_{h,i}^M}$$

Accordingly, a higher value of *T* would indicate a higher automatic stabilisation effect of tax-benefit system in country *i*. EUROMOD can be used to calculate this indicator. Considering the year 2014 for instance, the results suggest that in countries such as Austria, Ireland and Denmark on average that 43% of market income shocks are absorbed through the interplay of the tax-benefit system. On the other end, in countries with the lowest stabilisation coefficients such as Spain, Estonia and Bulgaria, income shocks are absorbed by as much as 23%. Therefore tax-benefit systems have a large effect on income stabilisation in the EU, the more so in presence of progressive tax systems, see Buti and Gaspar (2015) for a discussion. Recent evidence suggests also that automatic stabilisation has effectively played a key role in terms of demand stabilisation in the aftermath of the financial crisis in the EU. Table 1 support this contention by comparing the level of household final consumption in 2014 with its value in the first year of the crisis, i.e., 2007 for three groups of EU countries classified according to the degree of automatic stabilisation of their tax-benefit system. These results show that while most countries have experienced an absolute fall in household final consumption between 2007 and 2014, countries with high automatic stabilisation have also managed to keep their consumption level afloat and even to increase it slightly by contrast with countries where automatic stabilisation was lower.

Table 1: **Household final consumption index and automatic stabilisation through tax and social benefits: 2014 v 2007.**

year	Low automatic stabilisation	Medium automatic stabilisation	High automatic stabilisation
2007	100	100	100
2014	98.0	98.0	104.3

Source: Joint Research Centre, European Commission

3.4.5. Conclusion

This presentation has illustrated the usefulness of the EUROMOD microsimulation model for the analysis of the equity impact of tax reforms in the EU. In particular studies conducted by the European Commission Joint Research Centre (JRC) suggest that this type of model brings a significant value added for monitoring of the equity impact of tax-benefit systems and reforms. The EUROMOD model has therefore become an essential part of the Commission toolkit for assessing the fiscal and equity impact of tax-benefit reforms, in particular in the European Semester framework.

EUROMOD is currently being extended by the JRC to cover wealth and capital-related income as well as consumption taxes in order to broaden the scope of its modelling activities in support of EU economic policy objectives.

3.4.6. References

De Agostini, P., A. Paulus and Tasseva, I.V. (2016). The effect of changes in tax-benefit policies on the income distribution in 2008-2015. EUROMOD Working Paper 6/16, Institute for Social and Economic Research, University of Essex.

De Agostini, P., Capéau, B., Decoster, A., Figari, F., Kneeshaw, J., Leventi, C. Manios, K., Paulus, A. Sutherland, H. and Vanheukelom, T. (2017). EUROMOD Extension to indirect Taxation. EUROMOD Technical Note 3.

Bargain, O. and Callan, T. (2010). Analysing the effects of tax-benefit reforms on income distribution: a decomposition approach. Journal of Economic Inequality 8(1): 1-21.

Bargain, O., Orsini, K. and Peichl, A. (2014). Comparing labour supply elasticities in Europe and the United States new results. Journal of Human Resources 49(3): 723-838.

Barrios, S., Figari, F., Gandullia, L., and Riscado, S. (2016). The fiscal and equity impact of tax expenditures in the European Union. JRC Working Papers on Taxation and Structural Reforms 1/2016.

Barrios, S., Dolls, M., Maftei, A., Peichl, A., Riscado, S., Varga, J. and Wittneben, C. (2016). Dynamic scoring of tax reforms in the European Union. JRC Working Papers on Taxation and Structural Reforms 3/2016.

Buti, M. and Gaspar, V. (2015). Designing fiscal policy for steady, enduring growth. VoxEU, December 2015.

Capéau, B., Decoster, A. and Phillips, D. (2014). Consumption and Indirect Tax Models. In: O'Donoghue, C., (ed.), Handbook of Microsimulation Modelling: 223-273. Contributions to Economic Analysis Vol. 293, Emerald.

Dolls, M., Fuest, C. and Peichl, A. (2012). Automatic stabilizers and economic crisis: US vs. Europe. Journal of Public Economics 96(3): 279-294.

Figari, F., Paulus, A. and Sutherland, H. (2014). Microsimulation and policy analysis. In: Atkinson, A. B. and Bourguignon, F. (Eds.), Handbook of income distribution, Vol.2. Elsevier-North Holland.

Gravelle, J. (2015). Dynamic Scoring. Journal of Policy Analysis and Management 34(4): 970-977.

Izquierdo, M., Jimeno, J.F., Kosma, T., Lamo, A., Millard, S., Rööm, T. and Viviano, E. (2017). Labour market adjustment in Europe during the crisis: microeconomic evidence from the Wage Dynamics Network Survey. Occasional Papers 1704, Banco de España.

Kuypers, S., Figari, F. and Verbist, G. (2016). The Eurosystem Household Finance and Consumption Survey: a new underlying database for EUROMOD. International Journal of Microsimulation 9(3): 35-65.

Musgrave, R. A. (1959). The theory of public finance: a study in public economy. New York: McGraw-Hill.

Picos, F. and Schmitz, M.L., (2016). In-depth analysis of tax reforms using the EUROMOD microsimulation model. JRC Working Papers on Taxation & Structural Reforms 2016-06.

3.5. GENERAL DISCUSSION OF SESSION I ON INEQUALITY AND STRUCTURAL REFORMS

*Introduced by the comments of Manfred Bergmann**

Manfred Bergmann opened the workshop highlighting that both structural reforms and inequality are broad topics and they can be analysed from different angles or understood in different ways.

As far as structural reforms are concerned, they encompass product market, labour market as well as taxation systems reforms. In this context, the question is: do we focus on reforms that aim at reducing inequality, improving equality of opportunities, or actually on reforms that have other primary objectives, such as efficiency and job creation, and then, as a secondary or side effect, impact on inequality? It is clear that, when economists talk about labour market reforms, in general the focus is on flexibility or reforms increasing the participation rates, rather than, for example, increasing labour market regulation or introducing minimum wages. Similarly, the discussion on product market reforms tends to revolve on higher flexibility, market entry and more competition rather than more regulation. Last but not least, as far as taxation is concerned, the objective is generally broadening the tax base and not necessarily a more progressive tax system *per se*.

Inequality has many dimensions as well. This workshop does not touch upon the issue of wealth inequality, but rather focuses on income inequality. Income inequality means, more specifically, inequality in wage income. But still, the question arises what are we comparing when we talk about income inequality? Are we comparing countries or regions? Are we talking about inequality across sectors, across labour market qualifications, across family statuses, across age cohorts or even about gender inequality? These are all issues that come to one's mind when facing the concept of inequality.

The topic is therefore very broad and there are many angles from which it can be studied. This workshop aims at building a bridge between policy and results, perhaps identifying a causal link between a policy or reform that has been adopted and, in particular, inequality developments.

Regarding the presentation by Alain De Serres, **Manfred Bergmann** highlighted five key messages:

1) Inequality has been rising over the past 25-30 years. The natural question is then, how much of this widening in inequality can the society afford before it becomes destabilising?

2) An increase in employment is, in principle, good for the wage earners and reduces inequality, while a productivity increase is good for capital earners and tends to increase inequality because typically capital is held by richer people.

3) Reducing the tax wedge might have a negative effect on inequality, i.e. can increase income inequality, but only when it is done without co-financing, that is, increasing the budget deficit.

4) Increasing trade with higher-income countries tends to decrease inequality, while trade with lower-income countries increase inequality in the richer ones, because it typically replaces, or "crowds out", low-skilled work.

5) On liberalisations, a distinction is necessary between sectors that have been characterised by large incumbents, like natural monopolies such as network industries, and other sectors. In the former,

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liberalisation has a negative job effect on the large incumbent and a positive one on the smaller and new competitors. When liberalisations are fostered in other sectors, instead, the study shows that the employment effect will be positive for small as well as larger companies. While the former type of sectors (with large incumbents and natural monopolies) have been gradually liberalised in recent years, in the latter ones resistance is still strong and tends to slow down the liberalisation process, e.g. in retail and other services and regulated professions. These results suggest that the employment and inequality effects would be positive in these sectors and are therefore encouraging.

Jan in't Veld made two remarks on his presentation following two questions. First of all, when workers are shifted from low- to medium-skilled, they experience an increase in productivity which is also reflected in an aggregate productivity increase (due to less low-skilled workers); at the same time, this will determine a shortage of low-skilled workers. As a result, the relative wage of low-skilled workers would increase.

The second remark followed a question from the audience on the appropriate sequencing of product and labour market reforms. The author answered that, from QUEST simulations it appears that reforms should be simultaneous; since, as the model shows, labour market reforms might increase wage dispersion, this would call for having simultaneous product and labour market reforms. However, the effects of product market reforms take longer to materialise. On the basis of this, it might be argued that they should precede reforms of the labour market. Looking at the recent experience of the EU, significant progress was made on the kind of labour market reforms that are analysed in the paper (i.e., reforms that increase the participation rates) while more has to be done on product market reforms.

Alain De Serres agreed on these remarks, also adding that the benefits of active labour market policies is higher in countries where barriers to entry for firms are lower, thus confirming the complementarity between these different types of reforms. Nevertheless, the overall impact will also depend on the macroeconomic context in which reforms are adopted.

Manfred Bergmann highlighted three key messages from Bert Brys' presentation. First, tax expenditures are regressive in general: therefore, from the point of view of progressivity, subsidies might be preferable. Second, direct and indirect costs of studying are high; tuition fees are one of the elements defining these direct and indirect costs, and in this respect they should encourage quick studying, for example fees should be higher for those who stay at university longer. Last but not least, for older workers, studying for up-skilling is less convenient or even not worthwhile if they are too close to retirement age, because the period in which they could enjoy the wage premium of studying is short.

The session chair also concluded on the presentation by Barrios with two take-home messages: (i) reforms where mildly progressive after the crisis but they were regressive before the crisis; (ii) automatic stabilisers are good for efficiency and growth because they reduce volatility and thus also labour shedding, hysteresis etc.

4. WORKSHOP OF JUNE 19th. SESSION II – REDISTRIBUTIVE STRUCTURAL REFORMS: POLICY EVIDENCE FROM MEMBER STATES

4.1. Policy evidence from Latvia, Portugal and Ireland

4.1.1. Minimum income scheme reform in Latvia – quo vadis? *

4.1.1.1. Background: the Latvian social security system before the reform

Since 1995, the Latvian social security system was established in three pillars: (1) a social insurance system, which is based on social contributions and covers the majority of income loss risks (i.e. sickness, unemployment, accident at work or occupational disease, pre- and post-natal period); (2) a system of universal social benefits, which covers people belonging to specific social groups which, due to objective reasons, have extra expenses or cannot get an income; (3) municipal social assistance, providing material support to families in need and with low income to satisfy their basic needs. In this occasion, I will focus mostly on the state social insurance and on municipal social assistance.

It must be acknowledged that payments provided by the State Social Insurance budget and municipal budgets as social assistance differ significantly - about EUR 2 billion from the first one and EUR 47 million from the latter in 2013.2

By 2012-2013, in the aftermath of the global economic and financial crisis, the situation in terms of poverty and inequality had seriously worsened in Latvia. The number of persons applying for social assistance raised tremendously, the unemployment rate reached over 11% and the number of persons in need was skyrocketing. Furthermore, the Latvian society experienced the new phenomenon of the "working poor" and municipalities faced people in working age eager to work but without any type of income.3

Since regaining independence in 1991, Latvia focused on economic performance, increase in income, the rise of productivity and reduction of the income gap between Latvia and EU member states. So far, a policy for addressing inequality was not a matter for discussion at government level until 2012. While it is true that 2012 was also the aftermath of the crisis, it must be acknowledged that some inequality figures in 2008 were even worse than in 2012, when the income quintile ratio between the 80th and the 20th percentile was 6.5 and one of the highest in the EU-28. Another indicator of inequality, the Gini index, is also much higher in Latvia compared to the EU-28 average.

As a response to the situation, the Government of Latvia decided to prepare and carry out evidence-based reform for assuring greater impact of state money spending on inequality and poverty. The

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Government commissioned the World Bank to provide the in-depth study "Latvia: who is unemployed, economically inactive or needy?"

A simulation model was used in order to identify the correlation between assistance provided to certain groups and changes in income and the willingness to take up a low-paid job. It is worth mentioning that at the monument when the reform was envisaged, Latvia still had a social safety net strategy because it was under the programme of the Commission and the IMF. Before the start of the program, the provision of social assistance was an autonomous task of local governments, this was the first time that the Government provided a subsidy to municipalities for housing benefits and for minimum income benefits.

At a later stage, an analysis of the social security system was made by KPMG Baltics providing an ex-ante assessment of intended structural reforms in the policy field of social assistance.

4.1.1.2. Poverty and minimum income thresholds in Latvia

Since the establishment of the system, several income thresholds have been defined to ensure the rights of persons to social assistance.

The thresholds were and are laid down in legal acts and a gradual increase can be observed since their first introduction. The first threshold applied by all municipalities is an income threshold for a needy household (EUR 128); the second one, which different across municipalities, is the income threshold for a low-income household (EUR 128-360 depending on the municipality). The level of guaranteed minimum income is equal to EUR 50 in 2016 and could be granted for the households having needy status. The actual amount payed is calculated subtracting the income received by members of the household from EUR 50. In addition, the EU-defined at-risk-of-poverty threshold was equal to EUR 291 in 2015 and the subsistence minimum threshold maintained by State statistical bureau using outdated methodology until end 2013 was EUR 253.

Thresholds are neither related to the any reference value nor to the poverty line or median income. In other words, the thresholds were set arbitrarily and reflect budget available at the moment. Moreover, most of these thresholds have not changed since 2005, apart from the threshold for needy household. This threshold before 2009 was changed once. The situation became serious because the amount of state social security benefit serves as reference level for the basic pension.

Since the amounts of support do not correlate with the economic situation and income level determining market prices, the persons receiving support are still in deep poverty. Besides that, one of the major findings of the World Bank was that if you were to accept a low-pay job you would lose the benefit (the pay is 100% of the benefit if you accept a job): therefore, social assistance recipients do not have the incentive to accept those jobs and, thus, the decrease in the unemployment rate is very slow.

4.1.1.3. The proposed reform of minimum income scheme

The rationale of the reform was to make a solidarity-based poverty and income inequality reduction system, with the goal of setting up a methodologically substantiated and socio-economically adequate minimum income level that may serve as a reference point for all the social security system (i.e. state social benefits, social insurance, and social assistance). In parallel, this reform should be linked to the tax reform so that, for example, someone who is in the third quintile of the distribution would stay at least in the third quintile after paying taxes. In other words, the tax wedge for low-wage earners should be reduced.

The target groups of the reform are (i) low-income earners; (ii) people with very low or no income; (iii) retired persons with minimum pension and (v) unemployed.

The first step of the reform was the concept paper defining the minimum income level accepted by the Government in 2014. This was followed by three years of silence. A major issue was the cost of the reform, but in 2017 the reform was evoked again and the Baltic Centre for Economic Policy Studies presented a feasibility study for the Action Plan of the minimum income support. The Action Plan is in stand-by mode since March 2017.

What is the scheme about? First, it establishes that the minimum income level should be set up at 40% of the median disposable income adjusted to the equivalent consumer. The second and completely new element is a minimum budget of goods and services for different types of households depending on the territorial dimension. In this respect, the experience of the UK was very helpful. The action plan for minimum income support envisages a revision of existing minimum income levels and the harmonisation of the minimum income support system and the social assistance system. It would imply a quite sharp increase in figures, with the threshold for needy person/ family increasing from EUR 128 to EUR 188 and the guaranteed minimum income from EUR 38 to EUR 94.

A simulation to examine the impact of this reform on inequality was made and it shows indeed a reduction of the S80/S20 ratio, albeit limited, with respect to the baseline scenario (i.e. no reform). As mentioned, the simulation suggests that this reduction would be limited: this is also because it is often hard to identify who really is in need and who is in the grey area, for example working in the shadow economy. This challenge also explains existing opposition to this reform, whereby opponents do not want to subsidise those who are not really in need or not willing to work.

The estimated cost of the reform is approximately EUR 200 million. Compared to 2013, nowadays the number of people in need, according to official statistics, is lower. Economy and wages are rising, but the poverty figures might worsen again in the next few years especially for those with fixed income and families with children. This explains why passing this reform is very important in the current circumstances.

4.1.2. Trade-offs between employment and wages in recessions: evidence from labour market reforms in Portugal*

4.1.2.1. Introduction

This contribution discusses the impact of labour market reforms both from policy and academic perspectives. While the evidence presented here is based on the recent labor market reforms in Portugal, the lessons drawn may be valuable also for other Member States, both in the present and in the near future. Particular focus will be placed on policy evaluation methodologies, in particular the counterfactual evaluation approach.

A first point to highlight is the idiosyncratic nature of labour market reforms: a reform that is appropriate in a given Member State in a given moment might not be appropriate in another Member State or in the same one but at a different point in time. While a country may be better off with a reduction of the extent of its employment protection legislation, another country may be better off with an increase of the same variable.

The specificity of the circumstances of each country is an important aspect to take into account when conducting evaluations, in particular when seeking to extrapolate from a reform conducted in a country to a different country or time period. In other words, an open-mindedness towards rigorous studies and serene discussions of research findings together the promotion of evidence-based policies are critical drivers of successful reforms. This is particularly true in the case of labour market reforms, an area which can sometimes be regarded in a more emotional way, given the importance of work.

The main recent labour market reforms in Portugal were conducted in 2011-12, in the context of an adjustment programme established with the European Union and the International Monetary Fund. These reforms were designed following an analysis of the situation of and the challenged faced by the Portuguese economy. The reforms sought to promote 'flexicurity', shifting protection from the job to the worker, thus increasing individual security while promoting economic efficiency given the high levels of segmentation then prevalent in the Portuguese labour market.

For example, the OECD EPL indicator highlighted the anomalous situation of the country with respect to the stringency of protection of individual contracts. Therefore, this area received attention in the reform process so to increase the flexibility on permanent contracts and simultaneously reduce the high level of segmentation with respect of other types of labour contracts at that time. In fact, over 20% of private-sector employees were in fixed-term contracts and typically faced considerable challenges in moving to open-ended positions, a situation which had negative effects both on their own well-being as well as the economy's productivity.

Additional reforms concerned severance pay and unemployment benefits. While the former were reduced, the latter were generally made more generous. Overall, these reforms ensured greater protection of individuals in a spell of unemployment while also promoting mobility from contracting to expanding sectors or firms. Another important area of reform was that of Public Employment Services, the public agencies that support jobseekers through active labour market policies (training, hiring subsidies, traineeships, etc.). These agencies were significantly modernised in several dimensions of their activities, such as through more regular interactions with jobseekers, new active labour market policies, and greater engagement with employers, leading to high growth rates in the number of vacancies and placements.

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* Presentation by Pedro S. Martins, Queen Mary University of London.

This report is focused on a different but complementary area of reform, collective bargaining, i.e. the social dialogue between employers and employees, in particular when the latter are represented by unions or workers' councils, namely in terms of the definition of wages and other working conditions applicable in a firm or in an industry. Collective bargaining can therefore play an important role in promoting well-being. However, collective bargaining can also be subject to a number of institutional provisions that can negatively affect firm performance and employment, which may need to be subject to reform.

4.1.2.2. Motivation and background

Collective bargaining can have large impact on the labour market and the economy as a whole; it affects directly or indirectly wages and working conditions both at the micro level and from an aggregate perspective and it may therefore have important effects on consumption and aggregate demand. For instance, back in the Great Depression many proposed the growth of collective bargaining as a way to overcome the challenges of stagnation. From a policy perspective, collective bargaining has been mostly examined by focusing on the dichotomy between centralised and decentralised approaches. For instance, recent evidence has found that the major achievements of the German labor market can be to a large extent attributed to the decentralisation of collective bargaining.

Several OECD countries exhibit a large discrepancy between union density (the share of workers that are affiliated to a trade union) and collective bargaining coverage (the percentage of the workforce that is subject to the provisions of collective agreements). The most striking example is that of France where less than 10% of the workforce is affiliated to a union while almost 100% is subject to the provisions of collective agreements. In other words, nearly 90% of workers are subject to working conditions that will not have been negotiated by those individuals nor their representatives.

This gap is driven by the practice of 'extensions', government decisions that widen the coverage of a collective agreement beyond workers that are affiliated with unions (and firms that are members of employer associations) to all firms and workers in the sector in which collective bargaining took place. These extensions are an important labour market practice which had not received significant research attention until recently despite its potential important implications in terms of key outcomes such as economic growth, productivity, employment, wage inequality and even the participation in social dialogue itself.

For instance, extensions can reduce transaction costs and promote a level-playing field and greater equality. On the other hand, extensions can reduce competition and create obstacles to the emergence of new firms and job opportunities for the unemployed. Extensions can also reduce the incentives for workers to become members of unions (as all workers will be subject to collective agreements, regardless of their affiliation), contributing towards the trend of lower union membership across most countries in the European Union. This paper summarises our recent research that seeks to understand better the impact of collective bargaining focusing on the case of extensions and its multiple trade-offs.[2]

[2] The main part of this paper is based on the paper "No extension without representation? Evidence from a natural experiment in collective bargaining", by P. S. Martins and A. Hijzen (2016), IMF WP 16/143.

In the specific case of collective bargaining in Portugal, the situation before the reform evaluated here was very similar to that of other Member Countries such as Spain and France - the nearly automatic extension of all collective agreements. The reform involved first a suspension of extensions and then the introduction of a representativeness criterion. The latter required that employer associations represented at least half of all workers in their industry for extensions to be issued, a similar criterion to the one in place in Member States such as Germany or the Netherlands.

4.1.2.3. Counterfactual evaluation approach

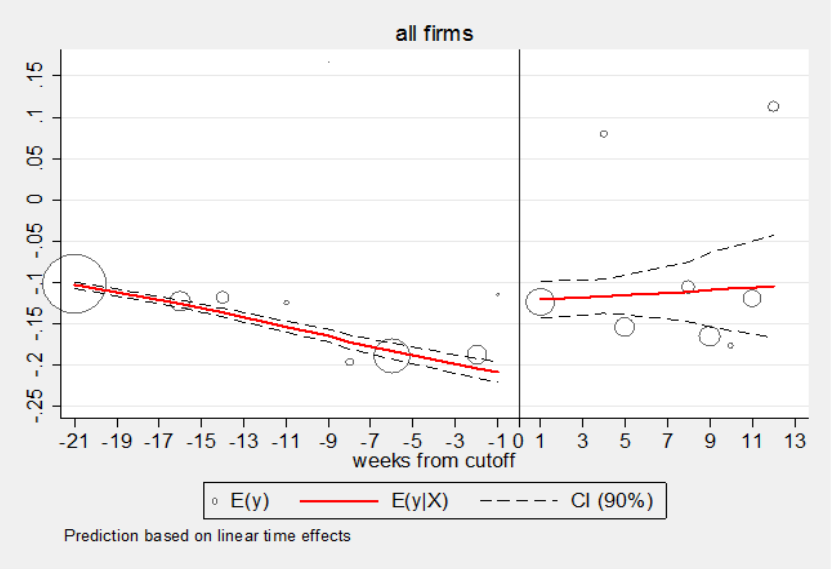
The goal of the evaluation presented is to understand the impact of the reform described above. This was developed using a counterfactual perspective, i.e. by comparing a number of observed outcomes (in particular the employment levels in sectors where collective agreements were signed during the period studied) with the outcomes that would have happened if the reform had not been implemented.

Of course, this evaluation is, in general, very challenging, as such a counterfactual does not exist. However, under some conditions, such as the one we present here, one is able to obtain a rigorous and persuasive estimate. In summary, the introduction of the reform implied a sharp change in the likelihood that a collective agreement was subject to an extension. In particular, agreements published up to March 2011 were always extended, while agreements published from March 2011 were never extended. This allows one to consider the subsequent outcomes of the industries of the agreements published up to March 2011 as a counterfactual (under the case of extension) to the outcomes of the industries of the agreements published after March 2011.

The programme evaluation econometric methodology used here, 'Regression Discontinuity' (RD), draws precisely on such (sharp) policy changes, in particular when driven by a 'running variable' – a variable that determines whether a new policy or intervention is in place or not. In this case, such variable is the timing of the publication of the collective agreement.

Our empirical analysis draws on worker- and firm-level labour market data, including information on the applicable collective agreements. We focus on the effects of extensions on employment growth and on wage inequality. Our findings are that extensions tend to hurt employment growth, by at least 5% on average, as indicated in Figure 1.

Figure 1. **Change in employment growth, 2010-2011.**



While employment is generally falling across the board, given the contraction of the economy, there is a positive step change precisely at the timing when extensions were no longer issued. In other words, sectors that were not subject to these extensions exhibit greater employment resilience.

Moreover, when comparing the employment effect for firms that were affiliated with employers' associations (i.e. firms that participated to the collective bargaining process) and firms that were not affiliated and therefore which did not participate in the bargaining, we find that extensions are particularly harmful for the latter. On the other hand, when considering the role of extensions on wages, using a similar RD approach as the one presented above, we find that, as expected, extensions have a positive effect in pushing up low wages, while having no effect of average and high wages.

4.1.2.4. Conclusions

This presentation illustrated the counterfactual perspective in the context of the evaluation of structural reforms. As indicated above, the findings of this and other exercises should be regarded as potentially conditional on the specific setting in which the reforms took place. For instance, our collective bargaining reform evaluation was conducted in a period of crisis and in an institutional context in which most of the social partners were not very representative. The latter aspect may imply that their interests are not sufficiently aligned to those of most firms and workers in the sector, which do not participate in collective bargaining even if they may be subject to its extensions.

Structural reforms are, to a large extent, precisely about promoting a stronger alignment between the incentives faced by individuals and the interests of society as a whole. The labour market is a domain in which such alignment can be very fruitful, especially as the self-interested decisions of firms and workers also lead to better outcomes for everyone. Evidence-based policy can contribute enormously towards such alignments and the resulting improvements in well-being.

4.1.3. Structural Reforms – an Irish case study 2008-2016*

4.1.3.1. Introduction

Irish unemployment more than trebled in the five years to mid-2012, peaking at 15.1% from 4.5% in Q1 2007. The seasonally-adjusted monthly unemployment rate for May 2017 was 6.4%. As with all figures, however, discrepancies and diverging performances can be covered. Ireland's Central Statistics Office published preliminary figures recently which showed that there are 79 unemployment blackspots in Ireland.[3]

In Ireland, equality proofing is mainstreamed into Government policy: thus, any draft Government decision must consider effect on equality. The Department of Public Expenditure and Reform has developed a new ex-post Social Impact Assessment (SIA) Framework as a first step towards supporting a more comprehensive assessment of the impacts of certain budgetary measures on household outcomes. This Framework has been designed to complement the current distributive analysis of the proposed tax and social welfare measures set out in the Budget each year.

The Programme for a Partnership Government published in May 2016 set out a commitment to developing a process of budget and policy proofing as a means of advancing equality, reducing poverty and strengthening economic and social rights.

4.1.3.2. The Irish economy 2008 – 2016

Over the last decade, the performance of the Irish economy was divided into two clear phases. One phase, the period 2008-2014, included a substantial fiscal consolidation exercise, including an EU/IMF programme of financial support. During this period significant reforms in Government expenditure, pensions, healthcare and the public sector took place.

The second phase can be seen as a recovery and growth phase (post 2014) where policy actions focused on addressing the legacy issues from the economic and banking collapse and on improving the resilience of the economy. This is happening in the context of the Irish economy growing at one of the fastest rates among developed economies and with one of the fastest rates of job creation in Europe, but where there are significant investment gaps and where population increases have added to the strain on service delivery.

The financial crisis and subsequent collapse of the banking system, following the bank guarantee, meant that a significant fiscal consolidation exercise was required. This was compounded by an overreliance on windfall revenue sources and uncontrolled expenditure increases which left Ireland's open economy extremely exposed to financial shocks. Successive bank recapitalisations and financial market pressures underscored the need for an unprecedented adjustment, supported by an EU/IMF programme, in order to bring debt and deficit levels down to sustainable levels.

Between 2008 and 2014 nine 'budgetary events' worth €30bn of consolidation measures were announced by Government and enacted by the Oireachtas (Parliament). To put that in context, that is about 17% of Irish 2013 GDP.

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* Presentation by Pat Casey – Department of Finance, Republic of Ireland. The views and opinions expressed in this talk are those of the author and do not necessarily represent those of the Department of Finance or the Minister for Finance and Public Expenditure and Reform.

[3] A blackspot refers to an area with at least 200 people in the labour force where the unemployment rate is 27% or higher.

Two-thirds of the adjustment burden fell on expenditure with the remainder on tax measures. Public sector pay was reduced; capital expenditure was reduced. A number of measures were introduced to provide the government a more sustainable revenue stream: a health levy in 2008; an income levy in 2009; a carbon tax in 2010. A Universal Social Charge (USC) was implemented in 2011 to replace both the income and health levies; changes were made to social insurance contributions (PRSI), to tax bands and credits to widen the tax base; excise duties have been increased; the top rate of VAT has risen by 2%; and property taxation was reintroduced in 2013.

Three indicators in 2016 illustrate the dramatic change in that period. The general government balance was -0.5% of GDP in 2016 compared to an underlying deficit of 11.5% in 2009. General Government gross debt reduced to 75.4% of GDP compared to 120% at its peak in 2012. Finally, Irish unemployment more than trebled in the five years to mid- 2012 peaking at 15.1% from 4.5% in Q1 2007. The seasonally-adjusted monthly unemployment rate for May 2017 was 6.4%. Overall, the policy context has changed from managing a severe downturn with a focus on expenditure control to managing an economy with strong levels of growth.

Not only do policy makers need to be able to develop structural reforms and appropriate measures that address the challenges that face them at that time, but these responses need to be capable of adapting, to take account of how the situation has changed – as in our case, where the economy began to improve; but also where the policy response is not delivering structural reform at a fast enough pace to be effective overall.

4.1.3.3. Unemployment and pension reforms

The Country-Specific Recommendations for Ireland have called for improvements in active labour market policies and a number of initiatives to tackle unemployment were undertaken.

A major reform was introduced in 2011 to develop an integrated one-stop system to administer working age benefits and employment services. This was followed by the wider Pathways to Work Strategy that combined reforms to the benefit system, employment programmes and services for jobseekers and employers. Pathways to Work 2012-2015 had five strands: (1) More regular and on-going engagement with people who are unemployed; (2) greater targeting of activation places and opportunities; (3) incentivising the take-up of opportunities; (4) incentivising employers to provide more jobs for people who are unemployed, and in particular long-term unemployed; and also (5) to extend the approach of activation to other people who, although not classified as unemployed jobseekers, have the potential and the desire to play a more active role in the labour force.

The Action Plan for Jobs (APJ) initiative was launched in 2012 with the aim of creating the conditions to support private sector-led, export-oriented economic growth and job creation. Hallmarks of the first APJ were the high-level political buy-in and oversight, whole-of-government engagement and the establishment of quarterly targets underpinned by a robust monitoring system.

Furthermore, the JobBridge initiative was introduced. JobBridge acted as both a recruitment aid and a work experience programme. It provided work experience opportunities for unemployed people. It was aimed at people who have been getting certain social welfare payments for at least 3 months. Participants in the scheme were offered an internship of 6 or 9 months with a host organisation. If they took up an internship they kept their social welfare payment and got an extra €50 per week. The initiative was closed in October 2016.

Finally, the National Skills Strategy 2025 published in January 2016 aims to improve the skill levels of those with the lowest levels of qualifications and to provide 50,000 Apprenticeship and Traineeship places to be supported over the period to 2020. This strategy aims to address skill shortages over the medium term.

As far as the pensions system is concerned, similar to most European countries, there are a number of challenges currently facing the Irish pensions system, including its sustainability over the longer term in light of demographic change, rising life expectancy and the adequacy of contribution levels and benefits. The National Pensions Framework was published in 2010 and sets out the agenda for pension reform in relation to social welfare, occupational, personal and public service pensions.

During the period of the EU/IMF Programme of Financial Support 2010-2013, managing social welfare expenditure was a key objective as social spending as a share of government expenditure went from 25.8% in 2008 to 31% at its peak in 2012. As unemployment increased, the total social welfare cost also increased as the Government decided that the least well-off should be protected from the burdens of the EU/IMF programme. But it also meant that reforming the Social Welfare System was a key objective as expenditure in Social Welfare was targeted to those who were most in need and to those who had contributed to the social insurance system. This meant that reform measures would be an important part of this.

Spending on public pensions was projected to increase from approximately 5.5% of GDP in 2008 to almost 15% by 2050. In order to mitigate this risk, the Social Welfare and Pensions Act was enacted in 2011 to provide for the gradual increase of State pension age, starting in 2014 with the standardisation of State pension age at 66 and rising to 67 years in 2021 and to 68 in 2028.

Other reforms related to public sector pay and pensions. Before 2004, public sector employees received a defined benefit scheme but paid a very low contribution for it. Most public servants had a minimum pension age of 60. Since then, the minimum pension age has increased to 65. In the years 2009-2010, a number of significant reforms were made to public sector pay. In essence, the effect of these was to increase the amount civil servants paid for their pension contributions. Recent public service pay deals have also introduced numerous productivity measures - including additional working hours - while the sick leave scheme has been significantly reformed.

4.1.3.4. Insolvency reforms

In the field of insolvency, the aim was to accelerate the process whereby individuals (often small entrepreneurs) who were trapped in insolvency could exit more quickly as the economy was turning the corner. The aim was to get the productive side of the economy moving again.

Ireland has significantly altered its personal insolvency procedures in recent years. The Personal Insolvency Act of 2012 represented a radical and comprehensive reform of the Irish insolvency and bankruptcy law and practice. It modernised Ireland's insolvency laws, established the Insolvency Service of Ireland (ISI) and put in place new debt resolution mechanisms.

Reforms since 2012 have been designed to facilitate and improve a return to solvency and to avoid unsustainable levels of stress for debtors. These included a debt relief notice (DRN) which allows for the write-off of debt up to €35,000 subject to a three-year supervision period; a debt settlement arrangement (DSA) for the agreed settlement of unsecured debt, with no limit involved, normally over five years; and a personal insolvency arrangement (PIA) for the agreed settlement of secured debt (e.g. a mortgage on a family home) up to €3 million and unsecured debt with no limit involved.

Further steps in 2013 led to the establishment of the ISI which is an independent government body to help tackle personal debt problems. Note that up to these reforms in 2013, the bankruptcy discharge period was 12 years. The reform of the bankruptcy regime under the Personal Insolvency Act 2012 reduced automatic discharge from bankruptcy from 12 years to 3 years.

A series of measures in 2015 included further changes to the personal insolvency system, namely further reduction of the normal duration of bankruptcy from 3 years to 1 year; the possibility of a court review where a mortgage lender rejects the borrower's personal insolvency proposal; and the establishment of the national Mortgage Arrears Resolution Service, an aid and advice scheme for people in serious mortgage arrears covering free legal representation for eligible borrowers.

4.1.3.5. Concluding remarks

There is no "one-size-fits-all" in successfully enacting structural reforms. But there are a number of common elements in Ireland:

1) **Political buy-in**: there was broad support among the mainstream political parties to the necessary changes introduced as part of EU/IMF programme. Even when there was a general election in February 2011 (a number of months after the start of the programme) which led to a change of coalition government, the main elements and policy approach remained in place.

2) **Underlying need to reform in certain sectors**: policies were significantly out of line with International comparisons. For example, the UK enacted bankruptcy reforms long before Ireland did and this led to "bankruptcy tourism"; longer-term pension reform and public sector pay deductions were also needed.

3) **The ability to adapt policy to improve outcomes**: Ireland reformed its bankruptcy regimes twice in three years to ensure it was fit for purpose and working; unemployment policy was also reformed to adapt to emerging economic growth conditions; the focus is now on unemployment blackspots.

Overall, it must be remembered that Ireland is a small and open economy and that there are international concerns regarding the global economy. The current low level of interest rates cannot continue indefinitely and there is uncertainty as a result of the decision of the UK to leave the EU.

The ability of policy makers to adapt and put in place effective policy choices and measures to address structural reforms will be important. Ensuring that they do not lead to increased inequality is an important part of this.

4.2. GENERAL DISCUSSION OF SESSION II ON POLICY EVIDENCE FROM MEMBER STATES

The discussion of the second Session of the Workshop was chaired by **Mary Veronica Tovšak Pleterski**, Director at DG ECFIN.

The first question from the audience was targeted at the Latvian case presented by Ieva Janzaume, and asked whether there is a provision in the Latvian legislation linking the minimum income scheme to the level of the minimum wage, or some sort of labour market discount is present, in order to reduce the disincentive to work. **Janzaume** explained that the main problem is that the threshold is not related to income levels nor to the minimum wage, it is just fixed in monetary terms. It is a purpose of the reform to link the threshold to some economic value. The minimum wage might be one, but the minimum wage itself is set as a result of negotiations between the government and unions, and therefore it is also, in some way, arbitrary. This is why the preferred reference would rather be 40% of the median income, not the minimum wage, and this has been a source of discussion with municipalities.

The second question was directed to Pedro Da Silva Martins. The question concerned the rationale behind the results suggesting that firms not participating to the bargaining but affected by the extension have the most positive impact of the duration of the extension. **Da Silva Martins** replied that the firms that do not conduct the bargaining are typically the younger, smaller and less productive ones, while the ones that do tend to be the most established firms. Therefore, the outcome of the collective agreements will reflect their needs, establishing therefore higher minimum wages for each job level than the rest of the firms would establish.

The third question was posed from the Chairperson Mary Veronica Tovšak Pleterski to Pat Casey, asking whether there was anything, in his opinion, that Ireland should have done differently. **Casey** answered that there have been several reviews in relation to policies adopted and what could have been done, in particular in two areas: expenditure management and the banking sector. As far as expenditure management is concerned, in the run-up to the 2000s governments made decisions that led to a higher pathway of expenditure which was not based on a sustainable revenue model, but rather on transactional taxes, sales and various other transactions. Regarding the whole banking issue, in the 2000s in Ireland there was a general feeling that the banking sector was sustainable, but weaknesses were present. Overall, what Ireland has now is a more sustainable fiscal model, because of the compliance with the SGP and the discipline it brings, as well as the financial market reforms. Whether there could be a systemic shock along the way, that is always a possibility; some would argue that, given the interconnectedness of financial markets the safeguards that are in place should, nevertheless, make the system able to withstand them.

Mary Veronica Tovšak Pleterski concluded the discussion by asking panellists to express, in a short sentence, what they would suggest to a policymaker after what has been said during the workshop. **Pedro Da Silva Martins** said "Plan, evaluate, establish dialogue, support ownership". **Ieva Janzaume** from her side said that "inequality matters". Finally, **Pat Casey** proposed "Be clear on long-term goals, try and get buy-in at the political level, then be flexible in adapting".

DG Economic and Financial Affairs (ECFIN)
Brussels, Rue de la Loi 170, B-1049, Charlemagne building, Room: Durieux

ECFIN Structural Reforms Workshop

'Inequality and Structural Reforms: Lessons from Policy'

Monday 19th June 2017

14:00 - 14:15	Registration and welcome coffee
14:15 - 14:25	**Introduction** – *Kerstin Jorna (DG ECFIN - Deputy Director General)*
14:25 - 16:10	**Session I – Inequality and Structural Reforms** Chair: *Manfred Bergman (DG ECFIN – Director)*
14:35 - 14:50	**The role of labour and product market reforms** – *Alain De Serres (OECD)*
14:50 - 15:05	**A QUEST model based assessment of the functional income distribution of structural reforms** – *Jan in't Veld (DG ECFIN)*
15:05 - 15:20	**Discussion**
15:20 - 15:35	**How do taxes redistribute income?** – *Bert Brys (OECD)*
15:35 - 15:50	**Evidence from the EUROMOD microsimulation model –** *Salvador Barrios (JRC–IPTS)*
15:50 - 16:00	**Discussion**
16:00 - 16:20	Coffee break
16:20 - 17:35	**Session II – Redistributive structural reforms: policy evidences from MSs** Chair: *Mary Veronica Tovšak Pleterski (DG ECFIN- Director)*
16:30 - 16:45	**Trade-offs between employment and wages in recessions: evidence from labour market reforms -** *Pedro Da Silva Martins (Previous Portuguese Secretary of State and currently Professor at Queen Mary University of London)*
16:45 – 17.00	**Structural Reforms – an Irish case study 2008-2016 –** *Pat Casey (Department of Finance of Ireland and Member of EPC)*
17.00 - 17:15	**Minimum income scheme reform in Latvia - quo vadis?** - *Ieva Jaunzeme (Head of the administration at the Ministry of Economics of Latvia)*
17:15 - 17:30	**Discussion**
17:30 – 17:35	**Conclusions** - Mary Veronica Tovšak Pleterski (DG ECFIN, Director)

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