Modelling of Labour Markets in the European Union

Final Report

Part IV - Illustrative Simulations

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1 Introduction

This fourth part of the Final Report, *Illustrative Simulations*, provides a brief analysis of reform scenarios for the countries modelled in the project *Modelling Labour Markets in the European Union* apart from Germany, which is covered in an extensive country study in Part III of this report. The survey about the situation of labour markets and institutions in the first part reveals highly different conditions of the labour markets in the European Union member states. For this reason, a similar policy reform will imply a diverse impact on the economy depending on the labour market situation in a country. The outcome for different groups of the population will not only depend on the type of the policy reform, but also on the interaction with already existing institutions.

The reform scenarios analysed in this part of the report mainly rely on economic policy recommendations of the European Commission and the OECD. Both institutions argue that *Denmark* should provide stronger incentives to increase labour market participation of older workers. We look at the possible effects of a cut of early retirement benefits on labour market participation of older workers and on the economy. *Italy* suffers from the poor results of its educational system. Even though children in primary school perform pretty well in international comparisons and even though expenditures for the secondary educational system are rather high, the number of graduates is among the lowest in the European Union. We analyse the impact of a higher effectiveness of the educational system on the aggregate economy. Several different reform scenarios have already been performed for *Austria* in the Second Interim Report as already presented at the seminar in Brussels. We focus on a cut of the corporate income tax rate in this Final Report. The analysis indicates that labour market performance not only depends on labour taxation and welfare policies, but also on business taxation which can also be seen as a tax on job creation.

Poland provides a system of generous and rather poorly targeted disability and early retirement benefits. The effects of tightening eligibility for disability benefits are analysed in this report. Apart from labour market effects, this reform has some potential to improve the financial position of the public sector. We study the impact that results if these resources are used for cutting employer's social security contributions of low-income individuals. For the *United Kingdom*, the European Commission and the OECD recommend to continue attempts to bring more people into employment. The recent success of the New Deal for young people suggests that it could be applied more broadly. We analyse the impact of improving labour market incentives for young low-skilled individuals by providing in-work benefits. The effect of the reform scenario crucially depends on its impact on the educational choice of individuals.

It should be mentioned that, similar to the *Country Study for Germany*, the *Illustrative Simulations* are not only intended to analyse the effects of reform policies for the different countries. In fact, they are also intended to provide an overview of possible policy scenarios that can be addressed by the model. In

contrast to the *Country Study for Germany*, we abstract from the analysis of the dynamic impact of the reforms in this part and focus on a comparative static analysis.

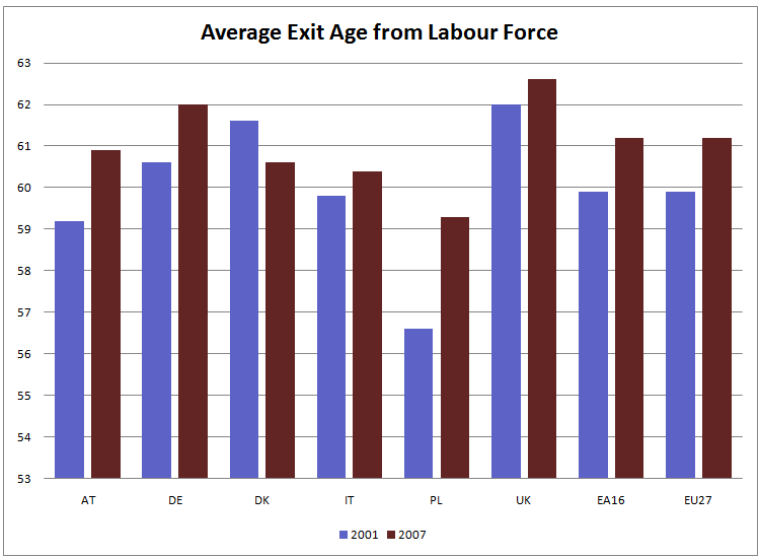
2 Early Retirement Scheme in Denmark

2.1 Introduction and Reform Scenario

The labour market in Denmark is in general in a good shape. Nevertheless, the European Commission and the OECD claim that the voluntary early retirement payment scheme (VERP) provides too strong incentives to leave the labour market and to retire too early. This scheme is used as a very important way out of the labour market. The European Commission (2009) argues that it will be necessary to react to retain older workers in employment as the measures to increase retirement age will only gradually come into effect from 2019 on. The OECD (2008b) states that the VERP is 'acting as a drag on the labour supply of older workers at a high cost to public finances'.

The importance of a reform of the VERP scheme is also reflected in the change of the average exit age from labour force. In contrast to the other countries covered in this project and the EMU and EU average, the average exit age decreased from 2001 to 2007. From a comparably high level in the year 2001, the exit age is below the EU average in 2007.

Figure 1: Average Exit Age from Labour Force 2001 and 2007



Source: Eurostat.

The VERP is available for insured persons aged between 60 and 64 years. It pays benefits amounting to 91 percent of the maximum unemployment benefit, and even 100 percent if take up arises with an age of 62 or older. To be eligible it is necessary to exhibit a minimum contribution period to the unemployment fund of 25 years. In 2006, nearly 160,000 persons received payments from the early retirement scheme,

total expenditures amounted to DKK 22.4 bn[1].

In line with the recommendations to decrease the generosity of the early retirement scheme, we simulate a cut in the replacement benefit amounting to 20 percent. This means that the unemployment system pays only 73 percent or 80 percent (if older than 62) of the maximum unemployment benefit to persons leaving into early retirement. This should provide incentives to postpone retirement.

2.2 Model Results

The cut in the early voluntary retirement benefits reduces pension benefits for persons aged between 60 and 64. Persons retiring later are not affected. The cut makes it more attractive for older workers to stay in the labour market and to postpone retirement. In this case the average retirement age increases by 2.4 months, from 3.1 months for low-skilled workers to 1.4 months for high-skilled workers. Medium-skilled persons postpone retirement by 2.8 months. The increase of participation of older workers leads to additional labour supply inducing firms to increase investment and the capital stock as well as labour demand. The capital stock develops in line with effective employment. Given the low layoff and quit rate of older workers, employment rises notably (0.5 percent) with nearly no effect on the unemployment rate. In the long-run, the rise in the overall participation rate is nearly completely determined by the change of the participation rate of older workers.

The impact on wages is also negligible as they only rise slightly. The small increase is caused by the changing age profile of workers. Older workers, receiving higher wages, have a higher share in the calculation of the average wage after the reform.

The reform exerts an effect on the educational decision of young persons. As low-skilled persons retire earlier than persons of the other skill-groups the loss of benefits in this group is comparably larger. Part of this loss is retrieved by the increase of the retirement age, but this leads to additional disutility of work. Nevertheless, the cut in the benefit replacement rate leads to a higher level of education, thus the number of high-skilled persons rises by 0.2 percent.

The increase in the retirement age leads to additional revenues and less expenditures for the government. Keeping public consumption on the same level in real terms allows for additional lump-sum transfers to private households amounting to 0.4 percent of GDP. Higher employment and therefore labour income as well as profits together with the increase of lump-sum payments to households lead to a strong increase of private consumption (0.9 percent).

The discussed reform shows that it is possible to increase the retirement age by cutting retirement benefits without any remarked effects on the unemployment rate. The positive effect on the government

[1] See Vidlund (2009).

budget, induced by lower expenditures and higher revenues as a result of the increase of the economic activity, allows to redistribute a significant amount to households to compensate them for the cut in early retirement benefits.

Table 1: Long-Run Simulation Results of Early Retirement Scheme

	Lump-Sum
GDP	0.49%
Investment	0.50%
Capital	0.50%
Consumption	0.91%
Gross wage rate (labour costs per hour)	0.06%
-low	0.12%
-medium	0.07%
-high	0.02%
Net wage rate	0.06%
-low	0.11%
-medium	0.07%
-high	0.02%
Effective Employment	0.48%
-low	0.38%
-medium	0.49%
-high	0.50%
Average number of hours worked per worker	-0.02%
-low	-0.02%
-medium	-0.02%
-high	-0.01%
Participation rate - 15-69 yrs. (change in pp)	0.31
-low	0.42
-medium	0.37
-high	0.18
Participation Rate - 55-69 yrs. (change in pp)	1.35
-low	1.75
-medium	1.58
-high	0.79
Employment (no. of workers)	0.45%
-low	0.37%
-medium	0.46%
-high	0.47%
Unemployment rate (change in pp)	0.00
-low	-0.03
-medium	0.01
-high	0.00
new persons - low	-0.30%
new persons - medium	-0.04%
new persons - high	0.21%
Transfers to households (change in % of GDP)	0.38%
Welfare Change newborns (expressed in % of total wealth)	0.74%
-low	0.72%
-medium	0.75%
-high	0.74%
Labour Productivity	0.01%
-low	0.09%
-medium	0.02%
-high	-0.02%

3 Efficiency in the Education System in Italy

3.1 Introduction and Reform Scenario

High educational attainment of the population is one of the main challenges of European economies to remain competitive in a more and more international environment. In Italy one can find a comparatively very low share of the population which attained at least upper secondary education. In the population group aged between 25 and 64 the share was 51 percent in 2006 (OECD 2008a), compared to an average of 68 percent in the OECD. For older workers the difference is even more pronounced compared to the OECD average.

In general participation and employment rates increase with the level of education and unemployment is negatively correlated with the level of human capital. The participation rate (employment rate) of the working age population is especially low with 62.5 (58.7) percent in 2007 compared to 70.4 (65.4) percent for the whole European Union[2], which can be attributed to the low level of education in Italy. Unemployment, on the other hand, was high in the 1990s and decreased sequentially to a level below the EU-average.

The low share of persons with upper secondary education in Italy cannot be justified by low public expenditures for education. Compared to the OECD- and EU19 average Italy spends at least as much for upper secondary education (measured in percent of GDP) as most other countries within the OECD and the EU19, as Table 2 shows. The expenditures in percent of GDP are in range of those in Germany. However, the share of persons with at least upper secondary education is much lower than in most comparable countries.

For this reason the OECD (2009a) criticises that 'the compulsory school education produces poor results at secondary school level, although international comparisons of children in primary education often show a better performance in Italy'. They emphasise the lack of objective information on standards as well as of accountability, as there are no consequences for teachers missing objectives. An availability of information on performance should lead to better outcomes and improve graduation rates of the upper secondary school system. Furthermore, a higher level of autonomy could also lead to higher efficiency.

In general there are several ways to increase incentives of pupils to invest in the accumulation of human capital. One way could be to increase the internal rate of return of human capital investment, e.g. by changes in the tax- and social security system. Another way could be to grant scholarships. As it should be possible to increase the performance level of the secondary schooling sector in Italy without any or only low costs for the public budget, we decided to simulate the impact of an increase of the

[2]See Tables 1 and 3 in the Appendix in Part I of the report.

Table 2: Expenditure on Educational Institutions as a Percentage of GDP (2005)

Expenditures for	Primary and Lower Secondary Education	Upper Secondary Education	Post-Secondary, Non Tertiary, Education	All Tertiary Education
Austria	2.4	1.3	n	1.3
Belgium[1]	1.5	2.6		1.2
Denmark	3.1	1.4		1.7
France	2.6	1.4	n	1.3
Germany	2	1.2	0.2	1.1
Italy	**2**	**1.3**	**0.1**	**0.9**
Japan	2	0.9		1.4
Poland	2.6	1.1	n	1.6
United Kingdom	2.5	1.4	0.8	1.3
United States	2.9	1		2.9
OECD average	2.5	1.2	0.1	1.5
EU19 average	2.3	1.3	0.1	1.3

[1] Column one refers to primary education and column two to all secondary education.

n... magnitude is negligible or zero.

Source: OECD (2008a).

performance of public schooling which comes as free lunch. We assume that the public reform would lead to a decrease in the *educational costs* for pupils. We translate this reform into the model by changing the parameter ξ^D of medium-skilled persons. The value is changed in such a way as to replicate the resulting value arising from a repeated calibration, in which the share of medium-skilled persons is assumed to be 5 percentage points higher. This ceteris paribus change corresponds approximately to half of the difference to the OECD average of persons aged between 25 and 34. Considering the low level of skilled persons, this reform is pronounced. Taking into account general equilibrium effects, this would lead to a different change in the population structure in the simulation.

3.2 Model Results

In general an increase of the average level of education should boost government revenues due to several effects. First the increase of the average wage level in the economy should stimulate revenues from income taxes[3], as well as, by the higher level of consumption, revenues from taxes on consumption. Additionally, a higher participation and lower unemployment rate of persons with a higher level of education leads to a higher employment rate and therefore to additional revenues. For this reason, one has to think about how to adjust the government budget balance. In this section we assume three possible scenarios. The first one returns the higher revenues in a lump-sum fashion to private households, the same amount to every

[3]Revenues from social security contributions should also rise, however, in the long-run this leads also to additional costs. Whether net revenues increase or fall depends on the degree of self-financing of the social security system.

person in the country. A second scenario assumes a cut in consumption taxes and a third scenario assumes a cut of the income-tax and social security contributions. In the last case, tax rates for the different age- and skill-groups are adjusted by a cut by the same percentage points for all age- and skill-groups.

The long-run effect of a higher level of efficiency in the public schooling system in Italy leads to a pronounced increase of medium-skilled persons by nearly 8 percent and a decrease of low-skilled by 7.5 percent, corresponding to about 3.6 percentage points in the population, notably less than the derived ceteris paribus change of 5 percentage points. The general equilibrium effects also lead to a notable increase of high-skilled persons with a university or comparable degree by 4.4 percent. Given the higher employment rate and participation rate of medium- and high-skilled persons in Italy the unemployment rate decreases (-0.3 percentage points). The effect of the reform on wages depends on the considered skill-group. As one would expect, the stronger supply of skills and the implied decrease of marginal productivity depresses the wage growth of medium- and high-skilled persons by 3.1 percent and 0.8 percent in the long-run. Wages of low-skilled, on the other hand, rise sharply by 4.5 percent as an effect of the decrease of low-skilled labour supply.

The wage effect exerts an additional impact on labour supply of the different skill-groups. In the model higher wages ceteris paribus imply an increase of the number of hours worked and participation. The effect on effective employment for a certain skill-group therefore differs from the change of the number of persons of the same skill-group. Whereas the number of low-skilled persons drops by 7.5 percent, effective employment drops by only 4.9 percent. The difference is the result of the boost of the number of hours worked by 0.4 percent and the participation by 0.9 percentage points and the drop of the unemployment rate by 0.6 percentage points. For the other two skill-groups, featuring an increase of the share in the population, the inverse result holds.

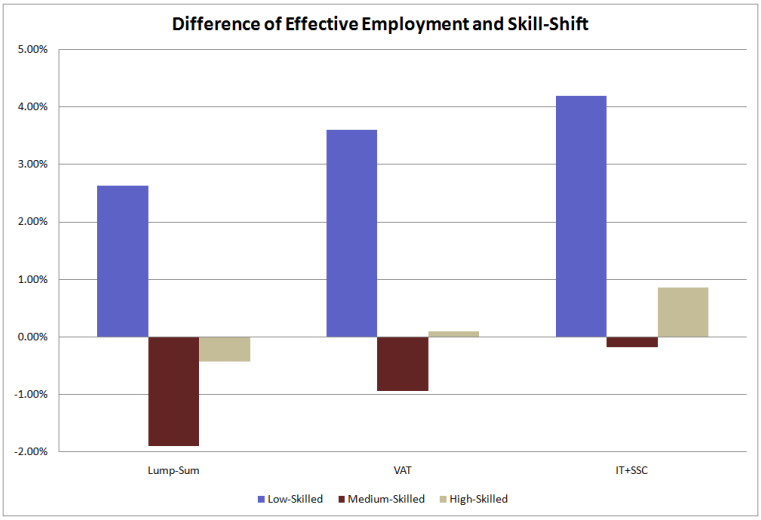
The rise of aggregate effective employment and the skill-shift lead to a pronounced enlargement of the capital stock, which rises by 3.7 percent in the long-run, much more than effective employment. The higher share of skilled workers induces firms to increase investment by more than employment. The effect on average labour productivity is rather modest, it increases by 0.6 percent. Labour productivity of low-skilled workers rises by more than 5 percent, whereas the productivity of medium- and high-skilled workers decreases by 3.4 percent and 0.8 percent.

An efficiency increase in public schooling would also imply a remarkable effect on the public budget. Higher revenues from labour, profit and consumption taxes allow the government to increase lump-sum transfers to the households by nearly 1 percent of GDP in the long-run, leading to a positive change in the welfare of 'newborns' of all groups, not only low-skilled persons, although the welfare of low-skilled rises more pronouncedly. There are several other ways to balance the public budget. We investigate two other forms, first by adjusting the tax rate on consumption and second by adjusting the income and

social security tax rates.

A decrease of the value added tax in the model diminishes distortions in the labour market, leading to a tougher reaction of the output level in the economy. GDP rises by 3.4 percent in the long-run instead of 2.4 percent in case of balancing the budget by adjusting lump-sum transfers. As lump-sum transfers are assumed to be the same in absolute values the reduction of the value added tax favours persons with higher life-time income more in absolute values, implying an additional skill-shift towards the high-skilled (5.1 percent instead of 4.4 percent). With the exception of high-skilled workers, the change in the wage rate is nearly unaffected compared to the lump-sum case[4]. The wage depression for the high-skilled is the result of the stronger skill-shift. Taking into account the notable reduction of the value added tax rate wages are higher in real terms leading to a boost in participation, which rises by 0.7 percentage points. The effect on the number of hours worked is now positive, but the difference is only minor. In the aggregate, effective employment, however, jumps up by 1.6 percent compared to 'only' 0.7 percent in the lump-sum case. The effect on investment is also stronger as a result of the more pronounced increase of high-skilled persons in the economy. The welfare of newborns rises, but less than in the lump-sum case. The reason for this result is that the lump-sum transfers are the same for all persons, whereas due to the lower level of consumption of younger persons gains of the tax-cut are more heavily discounted, leading to a lower welfare increase of 'newborns'.

Figure 2: Difference of Effective Employment and Skill-Shift



The third possibility, a cut of the income tax and social security contributions, decreases distortions in the labour market to a larger extent than the reduction in the value added tax, implying stronger effects on participation, hours worked and investment. GDP rises by more than 4 percent, effective employment by 2.3 percent and the capital stock by 5.5 percent.

[4]The effect of the VAT cut is neglected in this representation.

Figure 2 shows the difference between the percentage change in effective employment and the percentage change of the size of the corresponding skill group, which can be seen as a net effective employment effect corrected by the change in the skill-shift. The Figure reveals that the 'net' employment effect rises for all skill-groups from the lump-sum case to the income tax/social security contributions case. Furthermore, it is positive in all three scenarios for low-skilled persons and negative for the medium-skilled. For the high-skilled, the net effect is rather modest, but positive if one of the two considered distorting taxes is adjusted to balance the budget. Concerning employment, low-skilled individuals would gain more than the other groups. However, on average the welfare effect is positive for all skill-groups in all three scenarios.

Table 3: Long-Run Simulation Results of Efficiency in the Education System

	Lump-Sum	**VAT**	**IT+SSC**
GDP	2.42%	3.45%	4.11%
Investment	3.68%	4.82%	5.48%
Capital	3.68%	4.82%	5.48%
Consumption	3.35%	3.72%	5.27%
Gross wage rate (labour costs per hour)	0.78%	0.65%	0.53%
-low	4.54%	4.52%	4.35%
-medium	-3.12%	-3.17%	-3.24%
-high	-0.76%	-1.36%	-1.43%
Net wage rate	0.70%	0.57%	3.78%
-low	4.53%	4.51%	7.61%
-medium	-3.09%	-3.16%	-0.02%
-high	-0.75%	-1.36%	2.09%
Effective Employment	0.72%	1.63%	2.31%
-low	-4.85%	-4.14%	-3.43%
-medium	5.90%	6.94%	7.59%
-high	3.92%	5.22%	5.87%
Average number of hours worked per worker	-0.06%	0.09%	0.20%
-low	0.43%	0.60%	0.71%
-medium	-0.27%	-0.12%	0.00%
-high	-0.05%	0.04%	0.16%
Participation rate - 15-69 yrs. (change in pp)	0.40	0.73	0.97
-low	0.93	1.27	1.48
-medium	-0.66	-0.31	-0.04
-high	-0.14	0.04	0.30
Employment (no. of workers)	0.94%	1.70%	2.22%
-low	-5.28%	-4.74%	-4.14%
-medium	6.31%	7.15%	7.62%
-high	4.04%	5.20%	5.64%
Unemployment rate (change in pp)	-0.26	-0.43	-0.55
-low	-0.64	-0.86	-0.98
-medium	0.33	0.17	0.06
-high	0.07	-0.01	-0.13
Unemployment rate (in pp) 15+	-0.58	-1.02	-1.27
Unemployment rate (in pp) 25+	-0.15	-0.33	-0.46
Unemployment rate (in pp) 40+	-0.15	-0.24	-0.30
Unemployment rate (in pp) 55+	-0.03	-0.07	-0.10
new persons - low	-7.48%	-7.75%	-7.63%
new persons - medium	7.81%	7.88%	7.77%
new persons - high	4.35%	5.12%	5.02%
Transfers to households (change in % of GDP)	0.95%	0.00%	0.00%
Increase of income tax rate (in pp)	0.00%	0.00%	-2.53%
Increase of value added tax rate (in %)	0.00%	-13.79%	0.00%
Increase of social security contributions (in pp)	0.00%	0.00%	-0.11%
Welfare Change newborns (expressed in % of total wealth)	2.19%	1.83%	2.90%
-low	4.44%	3.86%	5.17%
-medium	0.62%	0.34%	1.33%
-high	1.21%	1.12%	1.88%
Labour Productivity	0.64%	0.70%	0.71%
-low	5.05%	5.24%	5.18%
-medium	-3.42%	-3.30%	-3.25%
-high	-0.83%	-1.31%	-1.24%

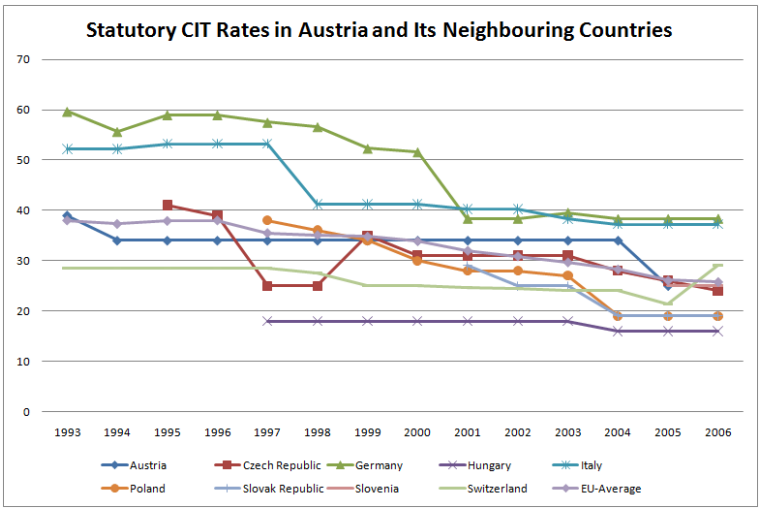
4 Corporate Income Tax in Austria

4.1 Introduction and Reform Scenario

As already discussed in Part III of the report, corporate income taxation has an important impact on the labour market. On the one hand, it erodes investment and therefore the capital stock, and either employment or the capital-labour ratio or both are negatively affected. On the other hand, the corporate income tax (CIT) generates revenues which must be financed by taxation of another tax base, like wages, if there is a cut in the tax rate. The net effect, taking into account the necessity to balance the budget, is not clear a priori.

The CIT rate in Austria was rather stable over a longer horizon. The eastern enlargement of the European Union and lower CIT rates in the neighbouring countries increased the pressure for a reform also in Austria. In 2004, the government reacted and decided to decrease the rate from 34 percent to 25 percent. Figure 3 shows the development of the statutory CIT rates in Austria and its neighbouring countries.

Figure 3: Statutory CIT Rates in Austria and Its Neighbouring Countries



Source: KPMG(2006).

In the last years, the tax rate on profits of corporations in these countries seems to be more stable. However, the questions of a further decrease might be discussed also in Austria, if further tax rate cuts will happen in the region. For this reason, we simulate the impact of such a reform. It assumes that the CIT is reduced and the arising gap in the revenues is financed either by a rise of lump-sum taxes, the value added tax or by adjusting the income tax and social security contributions. The economic policy of other countries is taken as given and not influenced by the cut in the CIT-rate in Austria. The CIT rate in this reform scenario is cut in such a way that the effective marginal tax rate would amount to

10 percent afterwards, implying a change of the statutory tax rate from 25 percent to about 15 percent, corresponding to the tax rate in Germany[5]. The costs of the reform amount to 0.9 percent of GDP, 0.1 percentage points more than the reform in Part III of the report for Germany[6].

4.2 Model Results

The direct impact of the reform is a cut of the user costs of capital, implying higher rates of return given profits before taxes. In the lump-sum case this leads to a boost of investment and an increase of the capital stock (2 percent in the long-run), and therefore ceteris paribus also to a higher capital-labour ratio. The rise of the capital-labour ratio leads to a higher labour productivity (1.4 percent) of labour input and also to higher wages, as workers can claim the higher productivity in the wage bargaining. Net wages rise by 1.4 percent in the long-run.

The larger job rent as result of the higher productivity and the division between firms and workers induce an increase of labour supply as well as labour demand. The wage rise exerts a positive impact on the number of hours worked (0.1 percent) and the participation on the labour market (0.2 percent), as well as a postponement of retirement. The better labour market perspectives also lead to an increase of the intensity of job search of unemployed persons, thereby reducing costs for firms to fill open vacancies. The higher job rent for firms expands labour demand leading, together with the rise in labour supply, to higher employment. The effect on unemployment is a priori not clear as employment and labour supply increase. The simulation result implies a drop in the unemployment rate by 0.2 percentage points.

The reform reveals further that the tax cut exerts a different impact on the skill groups. Given capital-skill complementarity, a corporate tax reform is more beneficial for high-skilled persons than for low-skilled workers. Wages and employment, even if controlled for the skill-shift, rise with the skill-level. However, the participation and unemployment rate evolve very similarly across the skill-levels. As the reform favours high-skilled persons and the skill premium rises, net wages of high-skilled persons rise by 1.6 percent compared to 0.7 percent of low-skilled persons and 1.3 percent of medium-skilled and it gets more attractive to invest in education, implying additional high-skilled persons amounting to 0.9 percent.

As the reform is by far not self-financing, it is necessary to adjust taxes or transfers to households to balance the public budget. In the first scenario, the adjustment is assumed to happen by an adjustment of lump-sum transfers to private households. The simulation reveals that lump-sum transfers decrease by 0.4 percent of GDP. Balancing the budget also has important welfare consequences. The reform increases welfare of high- and medium-skilled persons, but lowers welfare of 'newborn' low-skilled persons.

[5] In Germany additional taxes are applied to profits, like the 'Gewerbesteuer' or the solidarity surcharge.

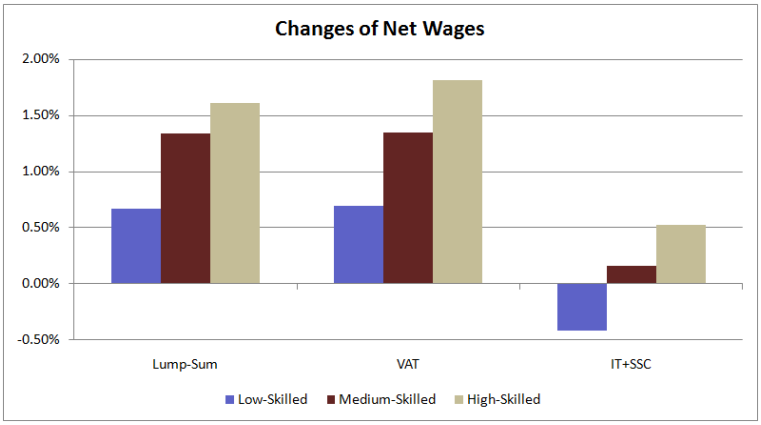
[6] One should abstain from comparing the results, as the calibration for Germany has changed until the finalisation of the project.

Balancing the budget lowers the financial resources of private households and therefore leads to a lower increase of the level of private consumption (0.6 percent) compared to the GDP rise (1 percent).

Another possibility to balance the budget is to adjust consumption tax rates. In this case consumption taxes have to increase by 5.6 percent. As this tax exerts distortionary effects, the impact of the corporate tax reform will be 'lower' measured in terms of GDP growth (0.8 percent compared to 1 percent). The qualitative impact is not influenced by this choice for balancing the budget. However, in contrast to the lump-sum adjustment, for which the contribution of every person is the same, the contribution in the consumption tax case depends on the level of consumption and is therefore lower for low-skilled persons, implying a more moderate skill-shift towards high-skilled persons. This in turn leads to a larger rise of the labour productivity and the skill premium of the latter group, as labour supply of high-skilled persons extends by less. The welfare loss of low-skilled 'newborns' is smaller compared to the lump-sum scenario.

The last scenario assumes that the budget is balanced by adjusting income taxes and the social security rates. By inspecting the results, one can see that the growth effect diminishes further, as the impact on effective employment gets smaller. However, the change of labour productivity is nearly the same in all three scenarios as the decrease in user costs leads to a large increase in the capital-labour ratio. The skill-shift is the lowest of the three cases. The change of net wages for the different skill-groups can be found in Figure 4. One has to keep in mind that in the VAT-scenario net wages increase by much more than in the income tax scenario, as the higher consumption taxes are shifted to wages to a large part.

Figure 4: Changes of Net Wages



All in all, the effect of a reduction of the corporate income tax in Austria shows notable effects if lump-sum taxes can be applied. Although the skill shift towards the high-skilled favours low-skilled, welfare of the latter group decreases. Financing by an income tax adjustment also leads to growth effects, but to more moderate ones. Nevertheless, as can be shown the lower the effective corporate tax rate, the less likely positive effects will arise as long as other distorting taxes will have to rise.

Table 4: Long-Run Simulation Results of Corporate Tax Reform

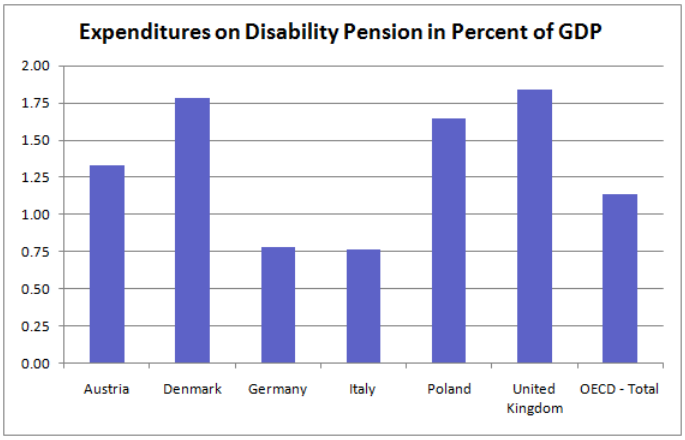
	Lump-Sum	**VAT**	**IT+SSC**
GDP	1.06%	0.75%	0.60%
Investment	2.00%	1.66%	1.50%
Capital	2.00%	1.66%	1.50%
Consumption	0.63%	0.47%	0.22%
Gross wage rate (labour costs per hour)	1.42%	1.47%	1.50%
-low	0.67%	0.70%	0.71%
-medium	1.34%	1.35%	1.37%
-high	1.61%	1.82%	1.88%
Net wage rate	1.40%	1.45%	0.24%
-low	0.67%	0.70%	-0.41%
-medium	1.34%	1.35%	0.16%
-high	1.61%	1.82%	0.53%
Effective Employment	0.55%	0.25%	0.10%
-low	-0.03%	-0.26%	-0.40%
-medium	0.45%	0.16%	0.01%
-high	1.40%	1.04%	0.87%
Average number of hours worked per worker	0.12%	0.06%	0.02%
-low	0.06%	-0.01%	-0.04%
-medium	0.11%	0.04%	0.01%
-high	0.12%	0.07%	0.04%
Participation rate - 15-69 yrs. (change in pp)	0.15	0.07	0.02
-low	0.10	-0.01	-0.05
-medium	0.17	0.08	0.03
-high	0.12	0.08	0.05
Employment (no. of workers)	0.42%	0.19%	0.08%
-low	-0.09%	-0.25%	-0.36%
-medium	0.31%	0.10%	-0.02%
-high	1.24%	0.93%	0.81%
Unemployment rate (change in pp)	-0.17	-0.08	-0.04
-low	-0.13	0.00	0.04
-medium	-0.17	-0.09	-0.05
-high	-0.15	-0.11	-0.08
Unemployment rate (in pp) 15+	-0.36	-0.14	-0.06
Unemployment rate (in pp) 25+	-0.20	-0.10	-0.06
Unemployment rate (in pp) 40+	-0.09	-0.05	-0.03
Unemployment rate (in pp) 55+	-0.06	-0.04	-0.02
new persons - low	-0.40%	-0.25%	-0.23%
new persons - medium	-0.13%	-0.12%	-0.11%
new persons - high	0.89%	0.68%	0.65%
Transfers to households (change in % of GDP)	-0.41%	0.00%	0.00%
Increase of income tax rate (in pp)	0.00%	0.00%	1.27%
Increase of value added tax rate (in %)	0.00%	5.55%	0.00%
Increase of social security contributions (in pp)	0.00%	0.00%	-0.17%
Welfare Change newborns (expressed in % of total wealth)	0.07%	0.12%	0.07%
-low	-0.46%	-0.19%	-0.23%
-medium	0.09%	0.12%	0.07%
-high	0.32%	0.28%	0.24%
Labour Productivity	1.42%	1.39%	1.38%
-low	0.75%	0.69%	0.67%
-medium	1.48%	1.41%	1.39%
-high	1.78%	1.93%	1.95%

5 Disability Pension in Poland

5.1 Introduction and Reform Scenario

Compared to other countries, public expenditures on disability pensions are rather high in Poland. As shown in Figure 5, Poland ranges among the countries with the highest expenditures for disability pensions and is well above the OECD average. The European Commission and the OECD advise Poland to tackle this issue. The European Commission states that 'generous and poorly targeted disability and early retirement benefits cause a large and persistent budget deficit' (European Commission 2009) and the OECD argues that 'on the benefit side, a substantial share of older workers can withdraw from the labour force on favourable conditions well before statutory retirement age' (OECD 2008c). Eligibility for disability pensions is probably one of the pathways for early retirement. Using EU-SILC data, we derive the share of disabled individuals (who we define as persons receiving disability pensions and not working) for the different countries in the labour market model. Table 5 lists the share of disabled individuals on total population of an according age- and skill group. It is obvious that the share is much higher for low-skilled individuals than for individuals with higher education.

Figure 5: Public Expenditures on Disability Pensions in Poland in Percent of GDP



Source: OECD Social Expenditures Database.

As a reform scenario, we assume that the number of disabled individuals in the population can be reduced, either by better health conditions or by tightening eligibility for disability benefits. Lacking information on the possible magnitude of the policy scenario, we follow Barrel et al. (2003), who assume that the number of people claiming disability pensions can be reduced by 5 percent. In the absence of more precise information, and as a rough approximation, we assume that workers claiming disability benefits have the same individual characteristics as employees not being eligible for a disability pension. In particular, they have the same productivity and employability. This assumption is justified if access

to the disability pension *at the margin* is independent of these characteristics, reflecting a possible misuse of the system that can be detected. Nevertheless, a careful interpretation should take our results as an upper bound of the effects of tightening access to disability pensions.

Table 5: Share of Disabled Individuals in the Population

	Low-Skilled	Medium-Skilled	High-Skilled
15+	1.6%		
20+	7.6%	1.6%	
25+	11.4%	3.0%	0.4%
40+	17.8%	10.1%	2.0%
55+	23.8%	16.5%	4.9%

Source: own calculations based on EU-SILC.

Given higher labour supply, higher output and lower disability benefits as a result of the policy scenario, public revenues and expenditures should benefit from this policy reform. We follow a reform suggestion of the OECD (2008c) to cut social security contributions at the bottom end of the wage distribution. They suggest that the cut should be highest at the minimum wage level and should be gradually withdrawn so as to be zero at around 70 percent of average earnings.

5.2 Model Results

The major effect of the reform, of course, is the direct effect of an expanding labour force, as less individuals become eligible for disability benefits and thus remain in the labour market. Ceteris paribus, the cut of the share of disabled individuals by 5 percent increases the number of participants in the labour market by 0.35 percent. As the share of disabled persons is much higher for low-skilled individuals, the increase is much more pronounced for this group (0.8 percent for low-skilled, 0.35 percent for medium skilled and 0.1 percent for high-skilled).

Firms adjust their investment decision such that the capital stock rises and thus there is no adverse average effect of the increase of labour supply. As can be seen in Table 7, the capital stock rises by 0.3 percent in the long-run. However, as low-skilled labour supply increases more pronouncedly, labour productivity of low-skilled workers declines slightly, which also implies a decline of wages by 0.2 percent for this group. The effect is reversed for high-skilled individuals, who benefit from a wage increase. The long-run effect on the number of hours worked and unemployment is negligible for all groups and the increase of the participation rate is mainly caused by the decline of individuals eligible for disability benefits. Taking into account all these adjustments and a slight skill shift, effective employment increases by 0.4 percent on average (and by 0.7 percent for low-skilled individuals). The reform results in an

increase of GDP by 0.3 percent. Barrel et al. (2003) find a GDP effect of 0.16 percent for the United Kingdom. However, given the higher share of disabled individuals in Poland, the absolute reform 'volume' is higher in our simulation. Furthermore, we present long-run effects, whereas Barrel et al. state effects after 5 years. Given a gradual adjustment to a policy shock, our effects seem to be in line with their results.

As labour income exceeds disability benefits, disposable income of households rises such that private consumption increases. Due to higher income- and consumption tax revenues and lower expenditures for disability pensions, the situation of the public sector improves. In the first simulation, we assume that lump-sum transfers to households rise to achieve a balanced budget and, according to the labour market model, they can be increased by 0.1 percent of GDP. This further increases disposable income and private consumption, so that private consumption increases by 0.4 percent in the long-run.

In a second simulation, we assume that the government uses additional resources to cut social security contributions as proposed by the OECD. In particular, we use a small Tax-Benefit-Microsimulation model described in Part II of this report to calculate the group specific impact of reducing employer's contribution rates for low-income workers (according to the proposal of the OECD). Subsequently, we run the labour market model to see by how much social security contributions can be cut to achieve a balanced budget in the long-run general equilibrium. As can be seen in Table 6, the cut is much more pronounced for low-skilled individuals.

Compared to the previous policy scenario, labour demand increases. As workers share a part of the tax cut via wage bargaining, they benefit from higher net wages, which increase by 0.3 percent on average. In contrast to the former scenario, low-skilled individuals benefit most in terms of higher wages. In the labour market model, higher net wages increase labour supply incentives of the households. The increase of effective employment and GDP is around 0.2 percentage points higher than in the previous policy scenario. Furthermore, as the tax cut is much more pronounced for low-skilled individuals, the increase of low-skilled employment is much more noticeable than the increase for the other educational groups.

Table 6: Cut of Employer's Social Security Contributions

	Low-Skilled	Medium-Skilled	High-Skilled
15+	1.96%		
20+	1.24%	1.21%	
25+	1.06%	0.54%	0.16%
40+	0.91%	0.38%	0.05%
55+	0.88%	0.37%	0.09%

Table 7: Long-Run Simulation Results of Disability Pension

	Lump-Sum	**SSC**
GDP	0.30%	0.45%
Investment	0.26%	0.39%
Capital	0.26%	0.39%
Consumption	0.42%	0.62%
Gross wage rate (labour costs per hour)	0.02%	-0.05%
-low	-0.19%	-0.51%
-medium	-0.04%	-0.17%
-high	0.20%	0.34%
Net wage rate	0.01%	0.30%
-low	-0.19%	0.41%
-medium	-0.04%	0.28%
-high	0.20%	0.43%
Effective Employment	0.36%	0.56%
-low	0.69%	1.14%
-medium	0.33%	0.51%
-high	0.26%	0.39%
Average number of hours worked per worker	-0.01%	0.02%
-low	-0.02%	0.02%
-medium	-0.01%	0.02%
-high	0.01%	0.03%
Participation rate - 15-69 yrs. (change in pp)	0.20	0.27
-low	0.35	0.51
-medium	0.20	0.26
-high	0.08	0.11
Participation Rate - 55-69 yrs. (change in pp)	0.18	0.27
-low	0.12	0.33
-medium	0.19	0.26
-high	0.17	0.24
Employment (no. of workers)	0.32%	0.50%
-low	0.67%	1.10%
-medium	0.30%	0.46%
-high	0.22%	0.31%
Unemployment rate (change in pp)	0.01	-0.04
-low	0.00	-0.09
-medium	0.00	-0.05
-high	-0.02	-0.04
Unemployment rate (in pp) 15+	0.04	-0.16
Unemployment rate (in pp) 25+	0.02	-0.03
Unemployment rate (in pp) 40+	0.02	0.00
Unemployment rate (in pp) 55+	0.00	0.00
new persons - low	0.04%	0.05%
new persons - medium	-0.03%	-0.03%
new persons - high	0.07%	0.09%
Transfers to households (change in % of GDP)	0.10%	0.00%
Welfare Change newborns (expressed in % of total wealth)	0.42%	0.50%
-low	0.77%	0.92%
-medium	0.45%	0.54%
-high	0.26%	0.32%
Labour Productivity	-0.04%	-0.06%
-low	-0.26%	-0.45%
-medium	-0.08%	-0.14%
-high	0.21%	0.38%

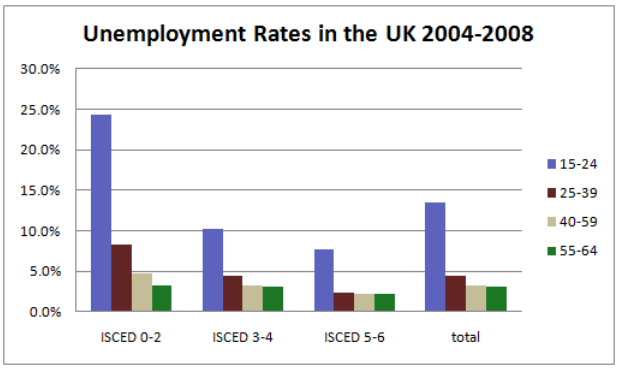
6 In-Work Benefits in the United Kingdom

6.1 Introduction and Reform Scenario

Despite recent efforts to bring more young individuals into work, unemployment for this group still seems to be one of the economic problems in the United Kingdom. Figure 6 shows average unemployment rates for the years 2004-2008 according to age and highest level of education attained. Unemployment seems to be no major problem for medium- and high-skilled individuals and is also fairly low for older low-skilled workers. However, with an average of nearly 25 percent, the unemployment rate is high for low-skilled individuals below 25. Even more so, it has risen quite pronouncedly in previous years, and this development has started even before the outset of the financial and economic crisis.

In its evaluation of UK's National Reform Programme, the European Commission states that the major employment related challenges are raising the skill levels of the population, ensuring opportunities for progression and moving more people into work (European Commission 2009). The OECD suggests increasing active labour market programmes. In particular, it states that 'as unemployment has risen significantly, the government's further policy initiatives in this area are warranted, particularly those focused on the younger unemployed' (OECD 2009b). Following the suggestions of the two institutions of moving more people into work, we simulate in-work benefits for low-skilled individuals aged below 25, which could complement efforts of the *New Deal for Young People* (NDYP).

Figure 6: Unemployment Rates in the UK 2004-2008



Source: Eurostat, own calculations.

The NDYP started in April 1998 and is an extensive programme of assistance to young people who have been unemployed for six months or more. It is the largest labour market programme in the UK. It provides young unemployed persons with an intensive support process to find a job, known as the 'Gateway', which usually lasts up to four months. If individuals remain in the programme beyond this period, they are required to choose between four options. According to evaluations of the NIESR, NDYP

led to a reduction of young long-term unemployed individuals of 45,000. Total youth unemployment was reduced by around 35,000 people (see White and Riley (2002)).

The UK already runs a system of in-work benefits that tries to support income of low income groups and to give incentives to participate in the labour market. The Working Tax Credit is a non-wastable tax credit given to low income families with or without children and to disabled individuals. The amount depends upon the number of hours worked, the age of children, eligible childcare costs, and gross income. The Child Tax Credit is a non-wastable tax credit available to low and middle income families with children and the amount is dependent on gross income and the number and age of children.

6.2 Model Results

The policy analysis considers an increase of in-work benefits that is intended to bring more young low-skilled into employment. In our simulation, each low-skilled individual younger than 25 years receives an additional benefit amounting to 5 percent of average economy wide labour costs. In the model, this amounts to slightly below 10 percent of average net labour income of the targeted group.

We start the discussion of the policy reform with a simulation that assumes that there is no endogenous skill choice in the model. The policy reform induces quite pronounced labour supply incentives for younger low-skilled individuals, as their net labour income increases by nearly 10 percent ceteris paribus. Since the transfer is only granted to employed individuals, the reform induces higher search intensity for a job and a higher activity rate in the labour market model. The number of hours worked is not affected directly, as the reform does not increase the hourly wage.

In the wage bargaining process, firms share some of the additional rent of young low-skilled employees via lower wage costs so that they increase labour demand for this group. Gross wages of low-skilled individuals decline by around 0.8 percent. The effect on net wages is rather similar (The in-work benefit is not included in the net wage rate presented in Table 8). The analysis shows that total low-skilled effective employment increases by 0.8 percent. This is caused by an increase of participation by 0.2 percentage points and a decrease of unemployment by 0.5 percentage points, and slightly lessened by the decrease of the number of hours worked due to the decline of the wage rate. The unemployment rate for younger workers declines by 0.8 percent. Given that employment in the other groups remains virtually unchanged, this decreases marginal labour productivity of low-skilled individuals (by 0.4 percent), but slightly increases labour productivity of the other educational groups, which causes a small wage increase.

As the share of low-skilled individuals is comparatively low in the United Kingdom, the considerable increase of effective employment of this group causes only a moderate increase of total effective employment by 0.1 percent. The capital stock increases marginally such that GDP increases by less than 0.1

percent. We assume that expenditures for the additional in-work benefit are financed by a decrease of lump-sum transfers. However, given slightly higher employment and lower unemployment, the reform is self-financing by around 50 percent. Even though lump-sum transfers to households have to decline to balance the budget, the increase of disposable income of low-skilled individuals is sufficient to increase private consumption. Concerning welfare effects, we recognize a clear distributional effect. Low-skilled individuals that enter the economy clearly gain from the reform due to higher disposable income. This effect is even more pronounced as the gains of the reform happen early in a lifetime such that they are not discounted very much. People of higher educational groups gain from slightly higher wages, but face the decrease of lump-sum transfers such that they slightly lose.

Taking into account the educational decision at the beginning of the lifetime has a strong impact on the results of the policy reform. As welfare of low-skilled individuals increases, it does not pay for some individuals to invest time into education such that they remain low-skilled. According to our simulation, the number of low-skilled people increases by 2.8 percent in the long-run, whereas the number of medium- and high-skilled decreases (by 0.5 and 0.3 percent). For a low-skilled individual, this has the adverse effect of higher competition and lower marginal labour productivity. Compared to the previous simulation, wages decrease by more than 1 percent. Due to the higher competition, there are adverse effects on the unemployment rate (+0.2 percentage points compared to the previous reform), the participation rate (-0.3 percentage points) and the number of hours worked (-0.1 percent). The effects on medium- and high-skilled individuals are qualitatively reversed, but smaller. Due to the pronounced shift of the skill structure, aggregate low-skilled effective employment increases rather pronouncedly (+1.9 percent compared to the previous reform), despite of the negative effects just mentioned. As low-skilled labour is less productive and as the production function features capital-skill complementarity to some extent, the skill shift has negative effects on investment (-0.3 percent) and GDP (-0.2 percent). Furthermore, private consumption declines. Of course, these adverse effects also have an impact on the public sector, such that lump-sum transfers have to be decreased further.

To conclude, the analysis of an increase of in-work benefits for younger low-skilled individuals shows negative aggregate effects if the negative impact on the educational decision is taken into account. However, our simulations indicate that such a policy reform should bring young low-skilled individuals into work and that there is a distributional impact of the reform towards low-skilled persons.

Table 8: Long-Run Simulation Results of In-Work Benefits

	In-Work Benefit Endogenous Education	**In-Work Benefit Exogenous Education**
GDP	-0.15%	0.06%
Investment	-0.29%	0.03%
Capital	-0.29%	0.03%
Consumption	-0.09%	0.17%
Gross wage rate (labour costs per hour)	-0.15%	-0.07%
-low	-2.04%	-0.80%
-medium	0.25%	0.04%
-high	0.06%	0.05%
Net wage rate	-0.14%	-0.06%
-low	-2.00%	-0.75%
-medium	0.25%	0.04%
-high	0.06%	0.05%
Effective Employment	0.00%	0.11%
-low	2.63%	0.75%
-medium	-0.40%	0.02%
-high	-0.29%	0.02%
Average number of hours worked per worker	-0.05%	-0.02%
-low	-0.22%	-0.08%
-medium	0.02%	0.00%
-high	0.00%	0.00%
Participation rate - 15-69 yrs. (change in pp)	-0.01	0.03
-low	-0.10	0.18
-medium	0.04	0.01
-high	0.00	0.00
Participation Rate - 55-69 yrs. (change in pp)	-0.06	-0.01
-low	-0.27	-0.07
-medium	0.04	0.01
-high	0.01	0.00
Employment (no. of workers)	0.04%	0.12%
-low	2.93%	0.86%
-medium	-0.43%	0.01%
-high	-0.30%	0.01%
Unemployment rate (change in pp)	-0.05	-0.08
-low	-0.29	-0.53
-medium	-0.04	-0.01
-high	-0.01	-0.01
Unemployment rate (in pp) 15+	-0.66	-0.80
Unemployment rate (in pp) 25+	0.02	0.00
Unemployment rate (in pp) 40+	0.01	0.00
Unemployment rate (in pp) 55+	0.00	0.00
new persons - low	2.76%	0.00%
new persons - medium	-0.53%	0.00%
new persons - high	-0.31%	0.00%
Transfers to households (change in % of GDP)	-0.15%	-0.04%
Welfare Change newborns (expressed in % of total wealth)	-0.03%	0.15%
-low	0.49%	1.43%
-medium	-0.08%	-0.04%
-high	-0.17%	-0.02%
Labour Productivity	-0.05%	-0.01%
-low	-1.76%	-0.35%
-medium	0.28%	0.04%
-high	0.06%	0.06%

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Final Report - Part IV

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