



**Work Package 5.3**

# **Evaluation of social exclusion**

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## 1 INTRODUCTION

Sustainable development is characterized, in general, by an economic growth that does not put pressures on presently available resources to such an extent that future possibilities are being constrained. The main part of the MoSus project focuses on the relationship between economic development and available natural resources. This part focuses on a second category of available resources, namely people or human capital. There is a growing concern for the social gap between the majority of the population who take advantage of general economic growth and improved social standards, and the minority with low income opportunities and weak social networks. What is worrying is that the gap seems to increase, and that this minority, the socially excluded part of the population, is growing. Thus, one may suspect that the development is unsustainable at present and that one needs to know what to do in order to avoid it.

When formulating the high and low sustainability scenarios in MoSus, one could ideally include the aspect of social conditions, by including requirements for indicators for social exclusion. Instead, the analysis of social exclusion has been made *ex post* to the three scenario runs from GINFORS. That is, we ask what the possible consequences for social exclusion in the three scenarios are, and comment on what policies could be introduced to achieve sustainable development also with respect to social exclusion. This approach was chosen partly because of the difficulties in including one more aspect of sustainability *ex ante* to the model runs, partly because there is only a limited number of variables and relationships of direct relevance for social exclusion in GINFORS, and partly because it was considered an advantage to distinguish between consequences of policies aiming at avoiding social exclusion and policies to attain environmental sustainability.

The idea is, then, to apply output from the GINFORS model in a framework within which a broader set of indicators for social exclusion is represented, and then derive the consequences for social exclusion in the three alternative scenarios. There are three steps in such an analysis. The first step is to identify variables of relevance for social exclusion, with an attention to what extent they are represented in GINFORS. The second step is to establish a framework for a broader analysis of social exclusion with links to the GINFORS output, and the third step is to analyse the three scenarios in the light of this framework. The first step included an assessment of current and future trends of social exclusion in Europe, and is

documented in Twena and Aaheim (2005). The framework used for a broader analysis of social exclusion partial equilibrium model for LAabour Markets and Earnings with New employees and social Transfers, LAMENT (Aaheim, 2006).

This paper is the documentation of the third step. We start with a discussion of possible social consequences that can be read directly for the three scenarios from the GINFORS model output. Next, we present the main characteristics of the LAMENT model, and apply the relationships of LAMENT to derive a broader set of indicators for social conditions from the GINFORS output. Finally, the results of the LAMENT model is presented, showing how labour market mechanisms may change the labour market participation and income to the different social groups represented in the model.

## **2 INDICATIONS ON SOCIAL EXCLUSION IN THE SCENARIO OUTPUT**

Atkinson et al. (2002) suggest a set of indicators to identify the risk of social exclusion in a country. Most of the indicators are based on statistics of unemployment and alternative measures for absolute and relative poverty. In addition, housing conditions are included, inter alia, to take into account aspects of personal wealth. Only a few indicators for a close study of social exclusion are provided by the GINFORS output. Unemployment is reported, but the estimates are mainly results of technical assumptions, and long-term and short-term unemployment are not distinguished. There are no explicit indicators for poverty, but information about GDP, consumption and wages per capita give useful background for the evaluation, in particular when comparing countries. However, it is emphasised in several occasions that poverty is a relative concept, for example the number of people with income below a given fraction of the average income in a country (Mayes et al., 2001). In some cases, it is nevertheless of relevance to do absolute assessments for a country, such as when comparing countries. The definition of poor people cannot be regarded independent on whether the average income in a country is 30 000 Euro or 3 000 Euro per year.

According to the economic and the environmental evaluations in work packages 5.1 and 5.2, possible conflicts between sustainability criteria for social conditions, environmental targets and economic growth do not seem to occur as a problem. On the contrary, economic growth for the total EU increases from the base scenario to the low sustainability scenario and from

the low to the high sustainability scenario, mainly due to the improvements described as the Aachen scenario. More income is generated, the demand for labour increases and leads to a reduction in unemployment.

The most significant change is, however, how unemployment changes over time. Starting at a level of 6 percent in the EU15 countries, it reaches 8 percent in 2010, but is down to a little less than 7.5 percent in 2020. The development is much more positive in the new member countries, although the initial level of unemployment at 10 percent is relatively high. Moreover, unemployment increases to more than 11 percent in 2005, according to the model output, but then declines significantly towards 2020, when unemployment is approximately 6 percent

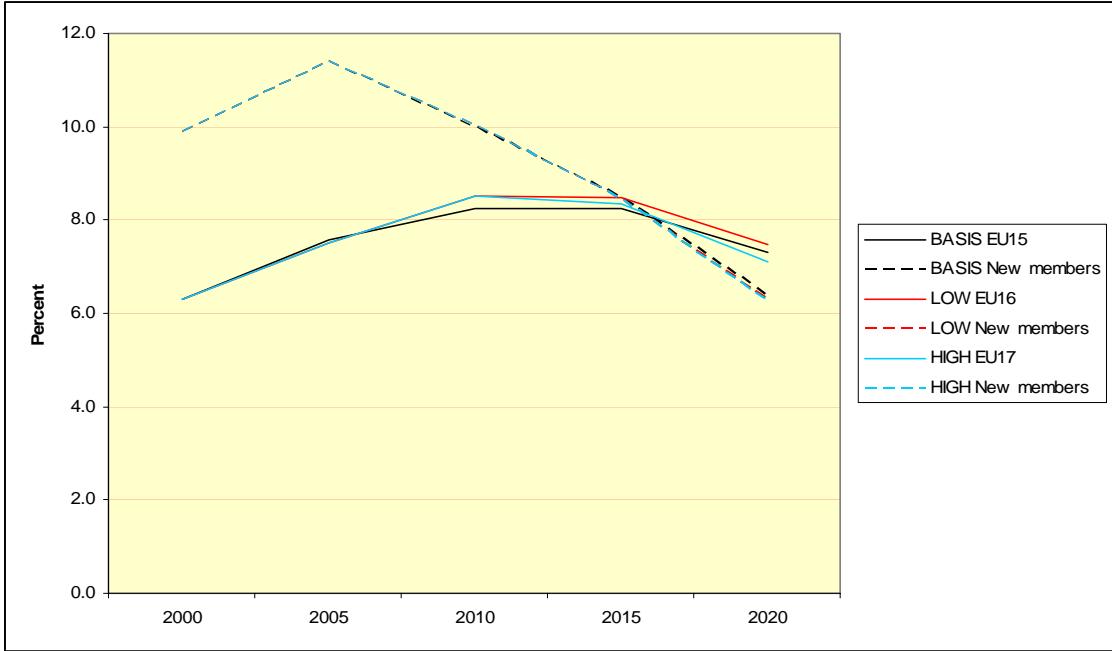


Figure 1. Percent unemployed in EU15 and in the new member countries in all scenarios 2000 – 2020.

The development of the employment in the base scenario is driven by an economic growth at 1.4 percent per year on the average from 2000 to 2020 in EU15 and 2.9 percent per year on the average in the new member countries. Thus, both from the perspective of income earnings and from the perspective of employment, the prospects for social exclusion seems positive for the EU area, and are slightly affected by the low and high sustainability scenarios, when compared with the base scenario. However, social conditions, and the risk of social exclusion, in particular, are not mainly about regional averages. There are large variations

between countries. The average annual growth in GDP within EU15 ranges from 1.9 percent in Germany to 3.4 percent in Spain. Among the new member countries, Latvia exhibits the highest growth rate at 4.7 percent, while in Malta, it is lowest with 3.2 percent.

For unemployment, the differences are even larger, and there are substantial deviations from the average trends, both within the EU15 group and within the new member countries. Figure 2 shows unemployment rates in 2000, in 2020 and the averages for the whole period in the EU 15 group. While the unemployment rate increases in some countries, it decreases in others. The data for Greece were taken out because insufficient data. The unemployment rates in Ireland and the Netherlands increase dramatically. This is, to some extent, because of a low level of unemployment in 2000 in both countries, but again the estimates of unemployment in GINFORS are questionable. For the large countries, it can be noted that while unemployment decreases in France, Italy and Spain, it increases in Germany and the UK.

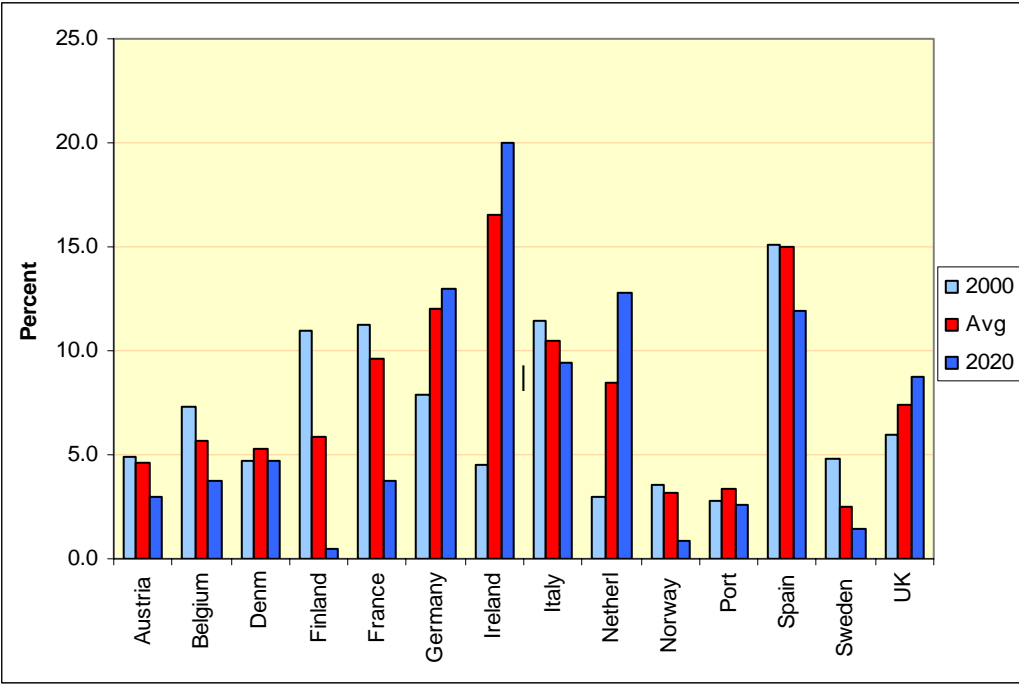


Figure 2. Percent unemployment in the beginning, in the end and on the average for the period 2000 – 2020 for EU15.

The development of unemployment in the new member countries are shown in Figure 3. Except for Latvia, unemployment decreases, and for some countries substantially, over the period. Six of the ten countries within this group have unemployment rates under five percent in 2020. As for the social conditions in the new member countries, these trends are promising,

especially since the welfare of the people in these countries are generally much lower than in the EU15 countries.

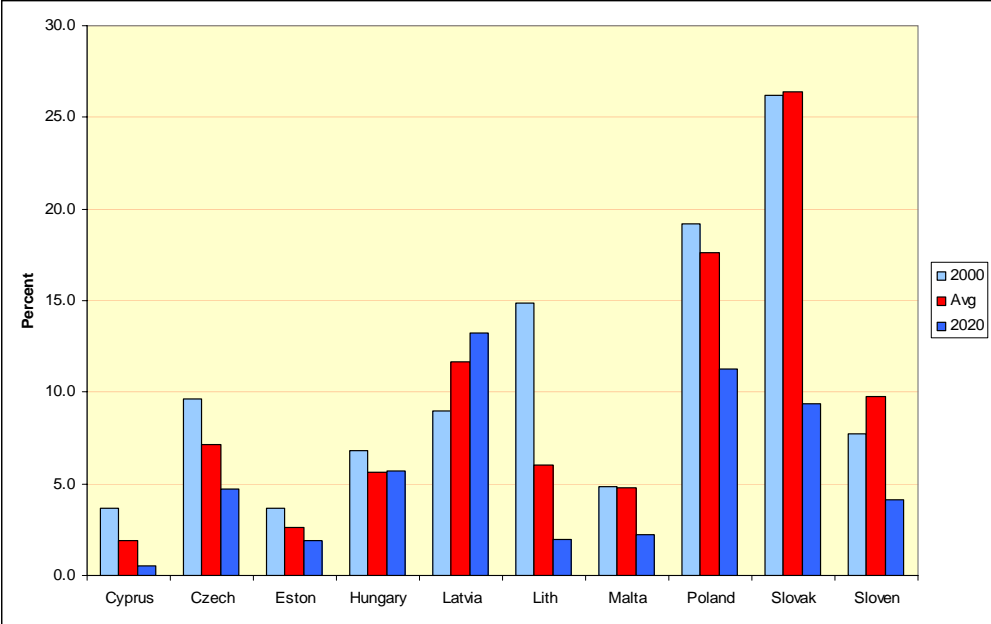


Figure 3. Percent unemployment in the beginning, in the end and on the average for the period 2000 – 2020 for the new member countries.

To level out the country differences is clearly one important issue in achieving sustainable development. There are, however, challenges also in this respect. To the extent that the unemployment in Greece reflects a real trend, one might suspect that the least prosperous countries in the EU15 group loose over time. Within the new member states, unemployment also increases in Latvia, which is one of the poorest among all EU countries. On the other hand, it was noted that the GDP growth is higher in Latvia than in any other country.

In Latvia, at least, it might be that a part of the unemployment is a result of a radical enhancement of the effectiveness of the economy. Enhancement of the effectiveness is often followed by a change in the sectoral structure of the economy, although this need not be the case. To achieve the advantages of enhanced effectiveness a certain degree of flexibility is required, particularly in the labour market. People must be able to change and adapt to new jobs, and they may have to move to other places. Normally, such changes contribute enhanced risk of social exclusion, particularly for those who move to urban areas.

Figure 4 shows the change in each sectors’ percentage share of total employment from 2000 to 2020, and indicates the speed of structural change by the twist of sectoral composition in

the EU15 group and in the new member states,. The pattern of the structural change is as expected: a reduction in employment within the primary sectors and industries, and a substantial increase in various service sectors. The main difference between the EU15 countries and the new member states is that the reduction of employment within the primary sectors, first and foremost in agriculture, and construction is much more vigorous in the new member states than in EU15, and that the employment in other service sectors increases. This is not necessarily a reflection of a twist in the economic output, but is more likely a result of modernization and a change towards more labour intensive industries.

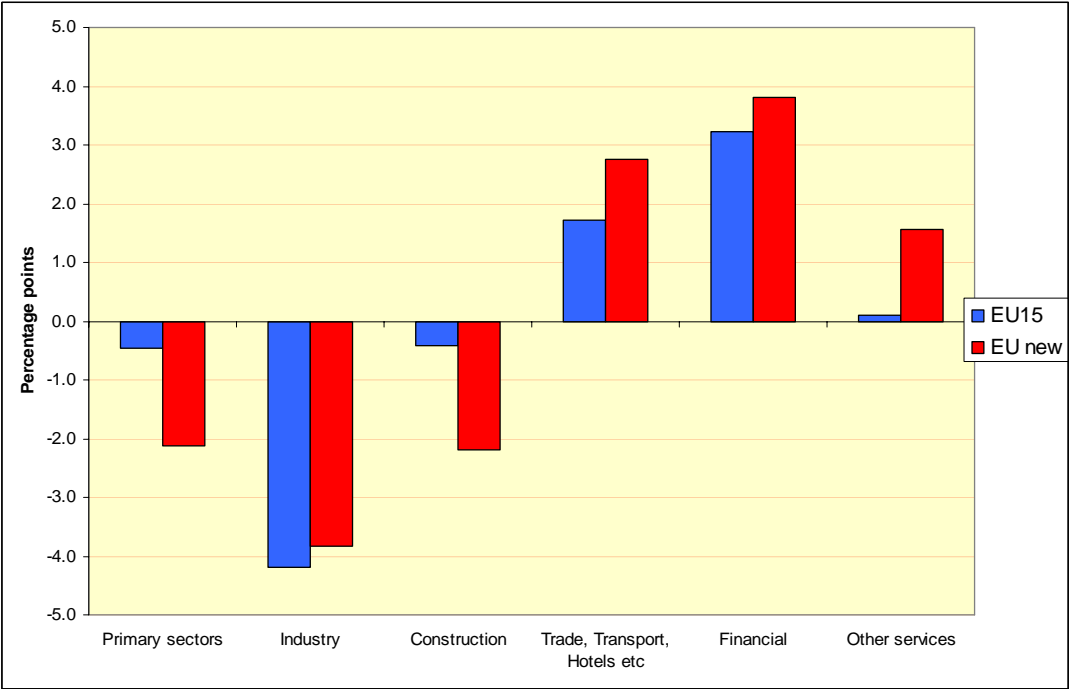


Figure 4. Change in the sectors' use of labour in percent of total employment for the EU15 group and the new member states over the period 2000 – 2020.

Economic growth is conditioned upon these structural changes, which is why a high economic growth in itself may lead to unemployment among those who adapt slowly. Thus, high unemployment and high growth, as in Latvia, may be due to a high tempo of structural change. Unfortunately, information about the sectoral composition is missing for most of the new member countries. Figure 5 indicates the extent of change in sectoral composition in all three scenarios among the countries for which such data are available, that is, EU15 except Ireland plus Hungary, the Czech Republic and Norway. The indicator applied is the sum of square deviation in each sector's share of the labour force between 2000 and 2020.

The figures exhibit large variations in structural change also within the EU15 group of countries, with moderate changes in Denmark and Italy, and relatively large changes in UK, Germany and France. This puts a stronger pressure on adaptation and flexibility in these latter countries, and may enhance the number of people at risk of social exclusion. It may also be noted that the two new member countries represented in the figure exhibit modest changes. In this connection it is also observed that the high and low sustainability scenarios lead to a notable increase in the rates of structural change in most countries, with the Netherlands as the only exception. In terms of social conditions, this may counteract positive consequences of a lower rate of unemployment, because it is likely to contribute more time to search for the right people, a lower match between vacancies and unemployment and thereby a higher friction in the labour markets. This will be further investigated in the next to sections.

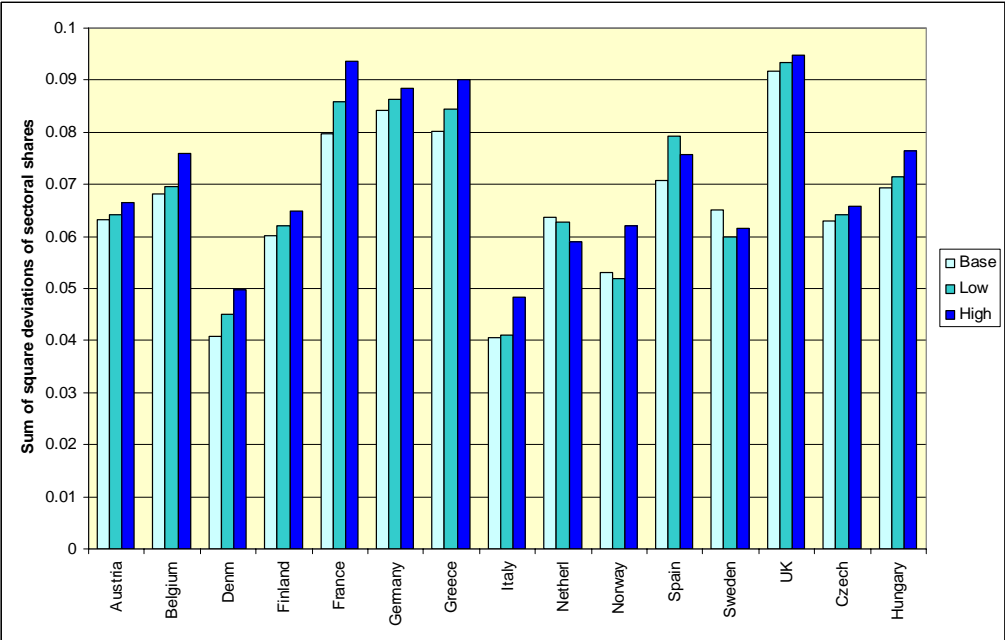


Figure 5. Indication of structural change by country: The sum of square deviation in each sector’s share of the labour force between 2000 and 2020. Base, low and high sustainability scenario

Although the data commented on so far is, of course, of relevance for evaluating social conditions, it is difficult to do a more comprehensive analysis of social exclusion based directly on the GINFORS data, in particular when it comes to comparing the three alternative scenarios, which do not differ radically. There is no information about the income distribution, and the estimated unemployment, which is perhaps the most interesting variable when it comes to social exclusion, is subject to weaknesses. Unemployment in GINFORS is the gap between the input of labour in economic sectors required to achieve the assumed

economic growth, on the one hand, and an exogenous assumption about the growth in the labour force on the other. This gap is subject to a negative relation between unemployment and inflation (the Phillips curve), which tend to dampen changes in unemployment under economic fluctuations or in periods with high growth. For example, this may explain the combination of high growth and sustained level of unemployment in Latvia. People are hired and fired, but firms hire persons at no extra cost on the micro level once they need to increase output, without considering the ability of the persons they hire. The workers enter and leave their positions without question, take any job they are offered, and stay there till someone tells them to leave. Moreover, those who are defined outside the labour force never apply for a job. Considering the importance unemployment plays for social exclusion, the unemployment figures reported above are, therefore, insufficient. They may be regarded as an underlying trend, that is, how the need for labour in the economy relates to the population growth in the future, but in order to derive social consequences, one needs to be more specific about how people in the labour force behave and how firms make their decisions about hiring and firing people.

### **3 THE LABOUR MARKET AND DERIVATION OF INDICATORS FOR SOCIAL EXCLUSION**

In order to extend the analysis to include a broader background for analysing social conditions, the output from GINFORS has been supported by data for the member countries and put into a model framework essentially describing the functioning of labour markets, LAMENT. The model is heavily based on Broadway et al (2003), and a closer presentation of it is given in Aaheim (2006). LAMENT is, basically, a model for the supply of labour from individuals and the firms' demand for labour. In this section, we provide only a brief description of the main relations and variables in the model. Instead, the calibration of the supply side and the demand side is emphasised. The calibration can be interpreted as a derivation of the results from the three scenarios, when put into the LAMENT framework and coupled with other data for the EU countries. To further analyse the consequences of bringing the labour markets in each country into equilibrium, the model has to be run. The results of these runs are discussed in Section 4.

### 3.1 Supply of labour and distribution of income

The able working force is defined as people between 25 and 65 years of age, who are not categorised as disabled. They are all considered potential suppliers of labour, but they are divided into *established* workers and *newcomers*. Established workers receive an unemployment grant if they want to work but cannot get a job, whereas newcomers in the same situation do not receive unemployment grant. Established workers and newcomers may also differ with respect to their preferences for leisure. Leisure is interpreted in a very broad sense, namely as time spent on anything else than paid work, such as studying or non-paid housework.

There are no statistics for potential receivers of unemployment grants. Instead, established workers and newcomers were separated according to an estimated distribution of the worked hours per week, based on data for the average hours per week for part-time workers. People who work more than 33 hours per week were considered established. All others were grouped as newcomers. Between 65 and 70 percent of the able working force in the total of EU were categorised as established, and this share increases only slightly towards 2020. There are large variations between countries, but no systematic pattern when comparing EU15 and the new member countries. In the Netherlands, only 40 percent were categorized as established in 2000, and nearly 50 percent in 2020. The highest share of established workers is found in the Czech Republic, with 77 percent.

People are assumed to apply for job if the utility they expect to attain by applying exceeds their individual utility for leisure. The expected utility of applying for work depends on the wage they receive, the probability of failing to get the job they apply for, and a probability of being fired if the employers find that they are not fit for the job. Each person evaluates leisure individually, but it is assumed that the utility of leisure is subject to a known statistical distribution for the established workers and the newcomers, respectively. Figure 6 shows the calibrated supply functions for leisure for established workers and newcomers. The curves show the threshold utility at which people switch from preferring leisure to apply for work for established and newcomers, respectively. They can, in other words, be regarded as supply functions for labour.

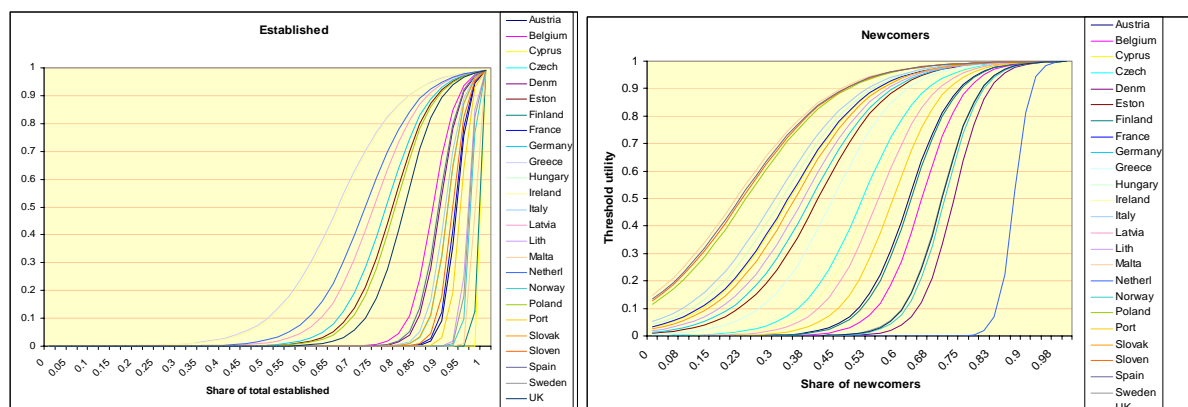


Figure 6. Supply functions for labour from established workers and newcomers. Supply as share of total stock of labour

Note that the supply curves are calibrated by one observation only, namely the number of applying newcomers and established people. This explains why the supply curves for the different groups in different countries cross a given level of utility at different points. The steepness of the curve is then determined by the total available stock of workers in each group. If a large share of established workers or newcomers is employed, the supply curve for this group becomes “steep”, which again reflects inflexibility in the supply of labour for the group. Correspondingly, the supply of labour from groups with a low share of employment is inherently more flexible. Note also that the model do not distinguish between full-time and part-time workers, but consider the group as an aggregate, where some are employed full time and some do not work. For example, the model treats two persons who work fifty percent as one working full time and one not working. The fourth group is the disabled, who also receive transfers.

As mentioned, the expected utility of applying for work is subject to a comparison of the income possibilities achieved by applying and the income achieved by choosing full-time leisure. Three possible income opportunities can then be pointed out, which are measured in terms of the resulting level of consumption. First, people who are employed earn wages less income tax. Both are provided in the GINFORS output. Involuntarily unemployed established workers earn an unemployment grant. Data on the unemployment grant are based on Eurostat for 2000. It is assumed constant per unemployed over the entire period. Also the transfers to disabled were given only for 2000 from Eurostat. For the future periods, it is assumed to constitute a constant share of total income and employees taxes. Voluntary unemployed people have, in principle, a zero income, but then nevertheless consume. In practice, this consumption may be derived from private transfers, e.g. from relatives, but the amounts are

impossible to measure. Instead, we assume a basic consumption level, enjoyed by everyone, which is the discrepancy between aggregate consumption and aggregate net income, divided by the workable population.

The consumption level for the four groups is partly determined by the earnings net of taxes. In addition everybody have what will be called a basic level of consumption, which is the difference between total consumption and total earnings net of taxes. The basic consumption level may, for example, stem from the return on savings or other transfers to disabled and unemployed. The consumption level for voluntary unemployed is set equal to the basic consumption level. All countries, except the Netherlands, exhibit positive basic consumption in 2000. In 2005, Spain and Netherlands exhibit a negative level of basic consumption, and the same applies for Belgium, France, Germany and Ireland in 2020. One explanation for negative basic consumption may be high rates of savings. To attain a positive level of basic consumption, the tax rates were increased. This has the same effect in LAMENT as a higher saving ratio. A result of the increased tax rates is that the rates become unrealistically high in some cases, such as the Netherlands, where the tax rate reaches 65 percent in 2020.

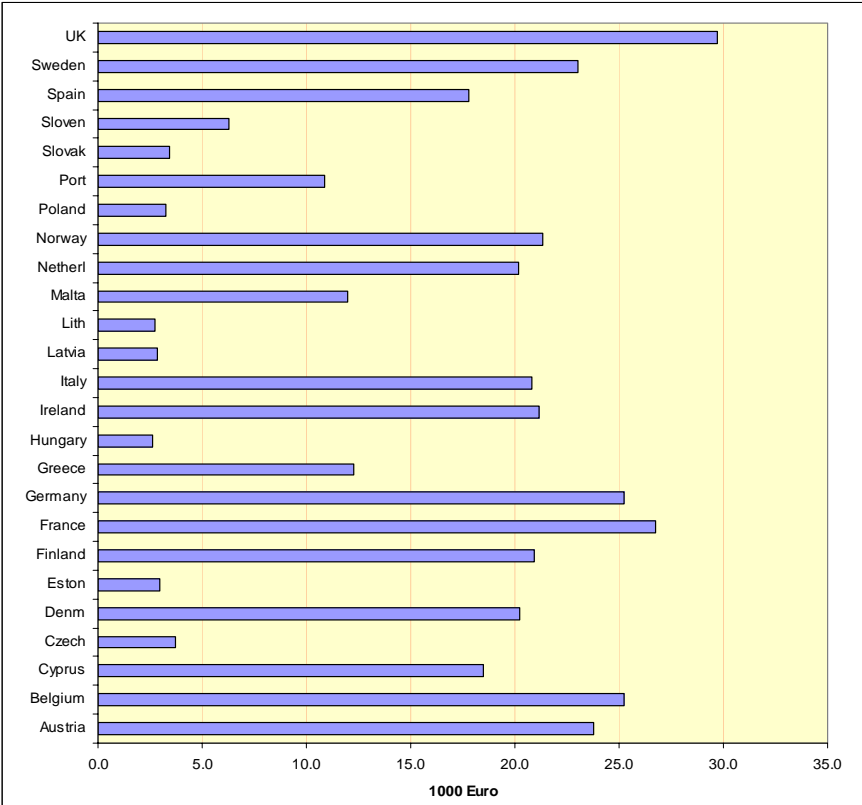


Figure 7. Average private consumption for employees per year per employee by country in 2000. 1000 Euros.

Figure 7 shows the average private consumption level for employees by country. As is well known, the level varies greatly among EU countries, and especially between the EU15 group of countries and the new members. This reflects mainly differences in the wage levels, but consumption levels exhibit somewhat smaller differences because direct taxes are, in general, lower in the new member states. Public consumption may, by consequence, be relatively lower in the new member states. Also differences within the EU15 group and the new members are notable, and some calls for closer investigation. The high level in Cyprus when compared with all the other new members may be due to data errors. Also the level in the UK is surprising when compared with other countries. Some of the explanation may be that only private consumption is included in the figure.

Figure 8 shows the estimated consumption level for the other three social groups defined above: involuntary unemployed, voluntary unemployed and disabled in percent of the consumption level for employees in 2000. That is, it shows the distribution of income on the different groups. Recall that the basic consumption level is the lowest by definition. Its share of employees' consumption varies, however, between 3 percent in the Netherlands and 42 percent in Denmark. This variation is largely due to the number of voluntary unemployed, which is very high in the Netherlands.

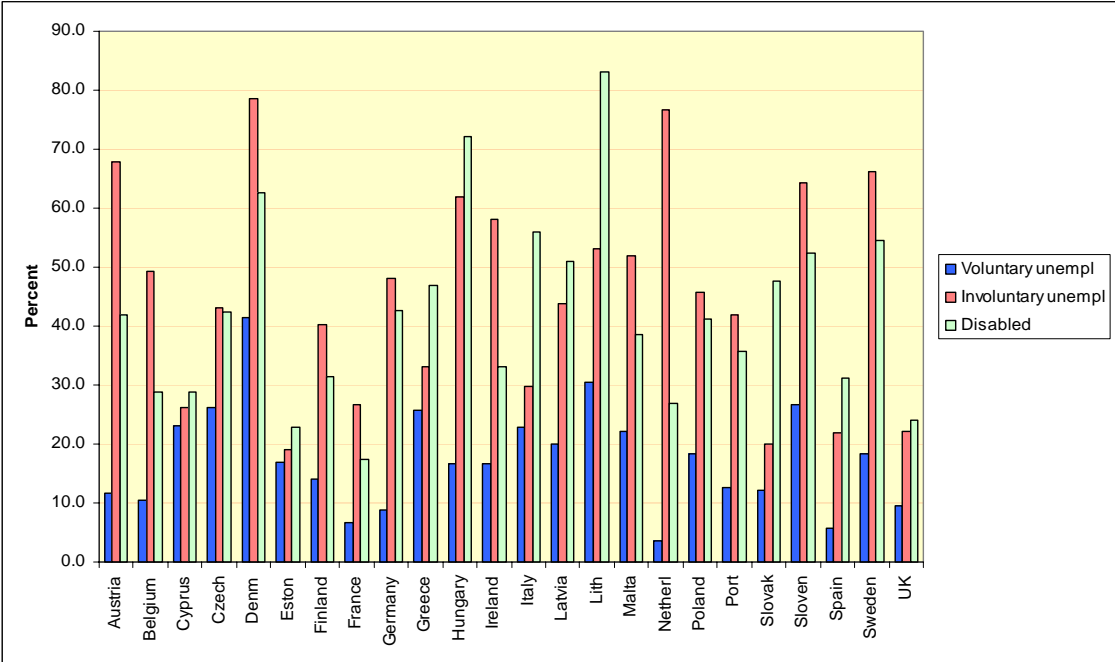


Figure 8. Consumption for unemployed, disabled and voluntary unemployed in percent of employee's level of consumption in 2000

In some counties, the consumption level for involuntary unemployed are higher than for the disabled, while the opposite is true in other countries. In most of the new member states the average level of consumption for disabled exceeds that of involuntary unemployed. The opposite can be observed within the group of EU15, but in the southern and western countries, the disabled have a higher estimated level of consumption that involuntary unemployed. This geographical distinction was also observed in Twena and Aaheim (2005), who point out that the number of people at risk of poverty is significantly higher in the southern and western countries of the EU15 group. That is, the consumption level for disabled seems to correlate with the number of people at risk of poverty.

An impression of how the consumption of the different social groups develops is given in Figure 9. It shows the ranges for the growth rates of the consumption by group for the EU15 and the new member countries, respectively, in all the three scenarios. The ranges are calculated as the standard deviation of the growth rates for the respective groups. As expected, the least stable variable is the basic consumption level. This is not only because this variable will grow at very different rates in the different countries, but also because of the many uncertain factors behind the estimate of the basic consumption level, and consequently large differences across countries.

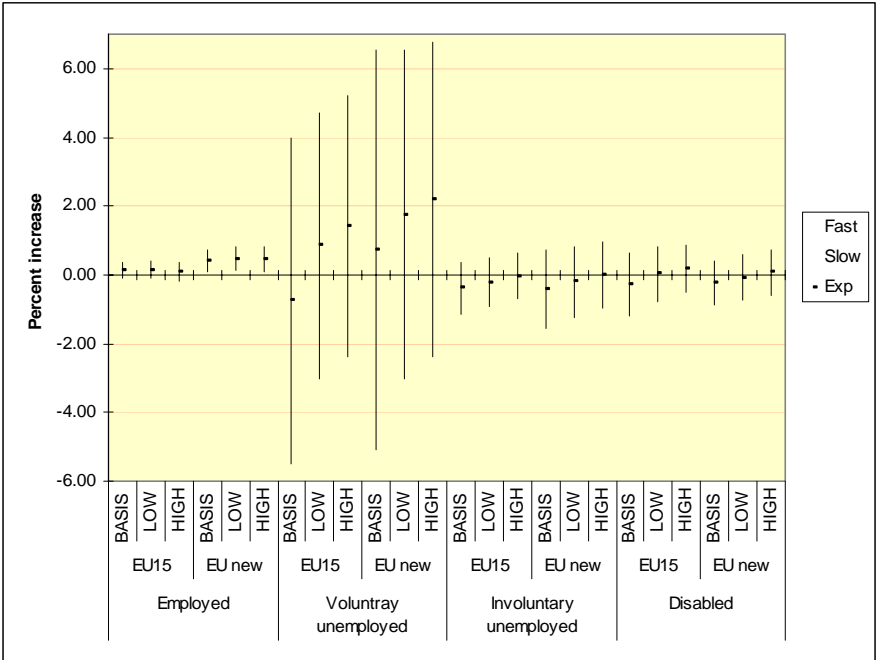


Figure 9. Ranges of increase in consumption per capita by social group in alternative scenarios. Percent per year.

The consumption per capita in the new member states increases more, or decreases less in the new member states than in the group of EU15 countries for all social categories, except for the disabled, for whom the development is similar across Europe. Since employees receive the highest income, the inequalities also increase slightly across the social groups compared with the present inequalities. The average consumption per capita increases at approximately 0.5 percent in the new member states, and even lower in EU 15. In the basis scenario, the average consumption of involuntary unemployed and disabled is declining, although at a low rate. The low and high sustainability scenarios give a nearly constant level of consumption for these groups. This can be interpreted as an increase in the inequalities between social groups over time, but a levelling out between the EU15 group of countries and the new member states. However, when comparing the three scenarios, the inequalities between social groups do not increase as much as in the basis scenario.

It must be added that, despite a relatively clear pattern when considering the groups of countries, the development in single countries may deviate from this pattern, and moreover, that the changes are very small. What may seem more surprising is that the growth rates over time are as low as they are. Economic growth, the growth in the wage level, as well as the growth in aggregate consumption in all three scenarios indicates a much higher increase in consumption for the different social groups. The main explanations are, firstly, population growth which contributes a reduction in the per capita consumption. Second, consumption is calculated net of taxes which increase, in some cases substantially, in many countries. On the average, the sum of employee's tax and employer's tax increase from a level at 35 percent of the wage in 2000 to 45 percent in 2020. Recall that for some countries an additional tax, which could be interpreted as a higher savings ratio, had to be imposed because net wages and transfers exceed total consumption level. Thus, the slow increase in consumption could be explained by both higher taxation and higher savings. Note also that the major tax/savings increase can be found in the EU15 group of countries.

The consumption figures displayed so far are a result of a mere calibration of output from GINFORS within the frames of the LAMENT model, coupled with data from Eurostat. They are, thus, based directly on the reported consumption, wages as well as number of people within each social group, but do not reflect behaviour for the members within the groups. This will be taken into account in Section 4.

### **3.2 Demand for labour**

The analysis of the demand for labour in this section assumes that the individual suppliers of labour are heterogenous. The firms want to hire those best fit for the job, and need time to find the right person. Hiring people is, therefore, costly, and the search process results in frictions in the labour market, meaning that vacant positions are not filled immediately. Moreover, when decision to make an appointment is made, the employer is partly unaware of the capabilities of the one they hire. Therefore, they are not willing to offer a “full” wage from the first day. The applicants accept this, but assume that they will get a wage rise in due time.

Labour market theory has developed rapidly over the past decades, and new insights have improved the understanding of processes and vital determinants of labour supply and demand. The statistics over many of these determinants are, therefore poor, and in some cases missing. For example, only a handful of countries publish the number of vacant positions, but there are no statistics of the ability to match vacant positions to unemployed. The turn-over rate in the economy is also unknown for most countries. Petrangolo and Pissarides (2001) survey studies with attempts to estimate so-called matching functions, but comparable estimates for all the EU countries are, as far as we know, not available. However, studies and statistical information about labour market conditions usually address short-term issues, such as to reduce peaks in unemployment. In this study, we are mainly interested in underlying long-term patterns, such as the long-term trends in unemployment in European countries since the 1970ies, and the tendencies towards more rapid structural changes, and thereby a possible higher turn-over in the economy. For all the scenarios, the firms’ demand for labour were calibrated under the assumption that the turn-over rate for the labour stock is 7.5 percent and that the 65 percent of vacant positions are filled with new employees. In the model runs, the turn-over rate is determined endogenously, assuming that the first order condition for labour demand applies.

The demand for labour is determined by two optimum conditions for a profit maximising firm (see Aaheim, 2006). First, the marginal productivity of labour has to be equal to the expected expenditures to the last employee hired. These expenditures include the wage to an average worker, overheads connected to having labour and the employer’s tax per employee. Second, the rate offered to the new employees is determined at the point where the expenditures to a new employee equal the marginal expenditures on the search process.

The annual average wages are given in the output set of GINFORS. The two first order conditions were used to calibrate the number of vacant positions and the beginners' wage rate. Figure 10 shows the offered wage for new employees relative to the average wage in the economy. A low wage rate reflects low costs of hiring new people, and a high rate reflects a high appointment cost. The estimated costs vary considerably between countries. One explanation is that some of the variables assumed to be the same across all countries, such as turn-over rate or the probability of hiring people unfit for the job, in fact vary. This may also explain why the beginners' wage exceeds the average wage level in some countries. Being higher than 1, the calibrated beginner's wage rates in these countries indicates that the turn-over rate or the risk of being fired is lower, or that the match or number of vacant positions is higher than assumed.

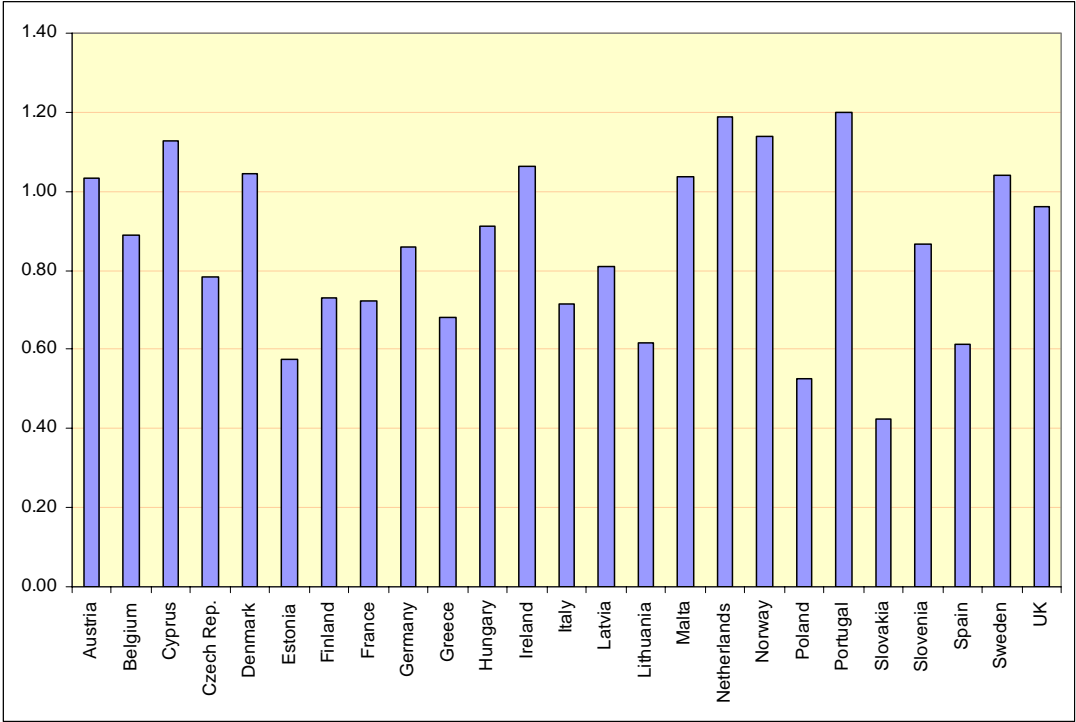


Figure 10. Wage offered to new employees relative to the average wage by country in 2000.

On the average, the new member countries offer new employees 79 percent of the average prevailing wage level, while the group of EU15 offers 91 percent on the average. Since the beginner's wage depends strongly on unemployment, the paths for the rate are largely a mirror of the unemployment rate shown in Figure 1. Over time, the beginners' rate increases at a much faster rate in EU15, such that in 2020, the rate in the new member countries is approximately 103 percent, whereas in EU15 it has increased only slightly to 92 percent. The

level and the development of the beginners' wage range do not change significantly across the three scenarios.

The second calibrated variable is the number of vacancies. Again, the number is based on fixed assumptions about turn-over rate, and derived from the optimum conditions for the demand for labour in firms. Similar to the beginners' wage, the figures should not, therefore, be taken as an attempt to create data, but is rather an indication of constraints in the labour market. In 2000, there number of vacant positions was estimated to 23 million in the EU15 and to 7 million in the new member states. The number increases to 2005 in both areas, levels out in EU15 and starts to decline in the new member states to 2015, and declines in both areas between 2015 and 2020. Again, the pattern is similar with the unemployment rate, but the sensitivity to the alternative scenarios is less than for unemployment. In the new member states, the number of vacancies is more or less invariant to scenario.

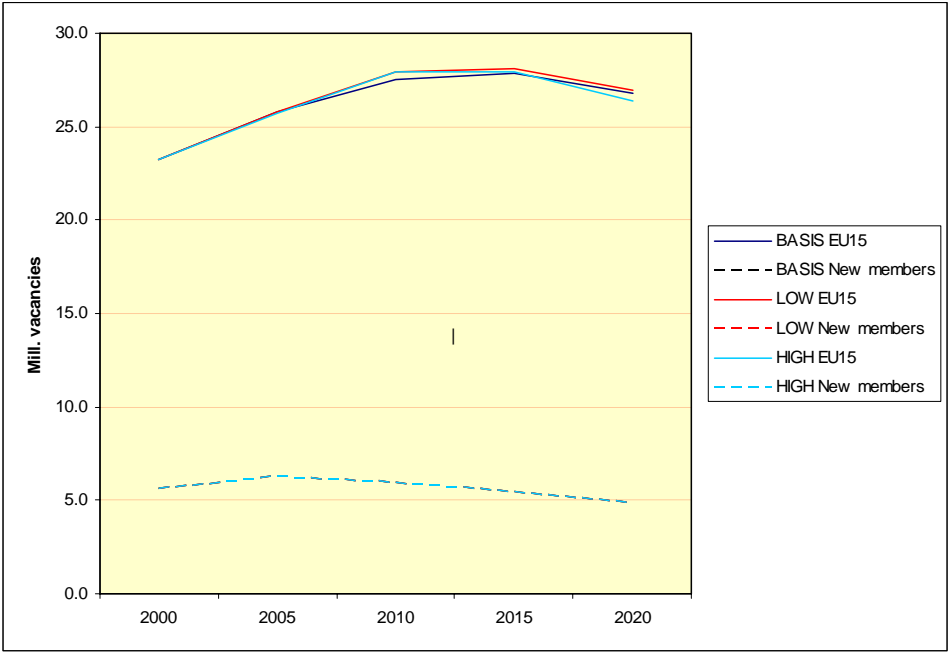


Figure 11. Number of vacancies in EU15 and the new member states 2000 – 2020, all scenarios

This far, indicators related to social conditions are derived from GINFORS output set. Four factors seem to be worth paying attention to in a social evaluation of the three scenarios. First, unemployment declines in all three scenarios. To get people employed is considered to be one of the most important preconditions to avoid social exclusion. In this sense, the prospects are, therefore, highly positive. They, moreover, become more positive in the low sustainability

scenario and even more positive in the high sustainability scenario. When looking at the development of the income and the income distribution, the picture is more complex. There are signs of a slight worsening of the distribution of income, although the estimated basic consumption level represents a substantial factor of uncertainty. The low and the high sustainability scenarios exhibit, however, a somewhat better development than the basis scenario.

There are, moreover, some factors worth mentioning in relation to the unemployment figures in the GINFORS data set. First, if the underlying unemployment rate in the EU economies is to decline in the coming years, the present trend, which has been significant over the past 30 years, will have to be broken. There is, of course, a possibility that this will happen, but it is unlikely to happen as a result of a smaller gap between the number of people in working age and the economy's "need for labour to achieve a certain economic growth", which is why the GINFORS model predicts unemployment to decline in the EU. The labour market is a complex one, where a large number of people could apply for work if they would, but still don't. The unemployment, income and vacancy figures presented above will be affected if we require equilibrium in this market.

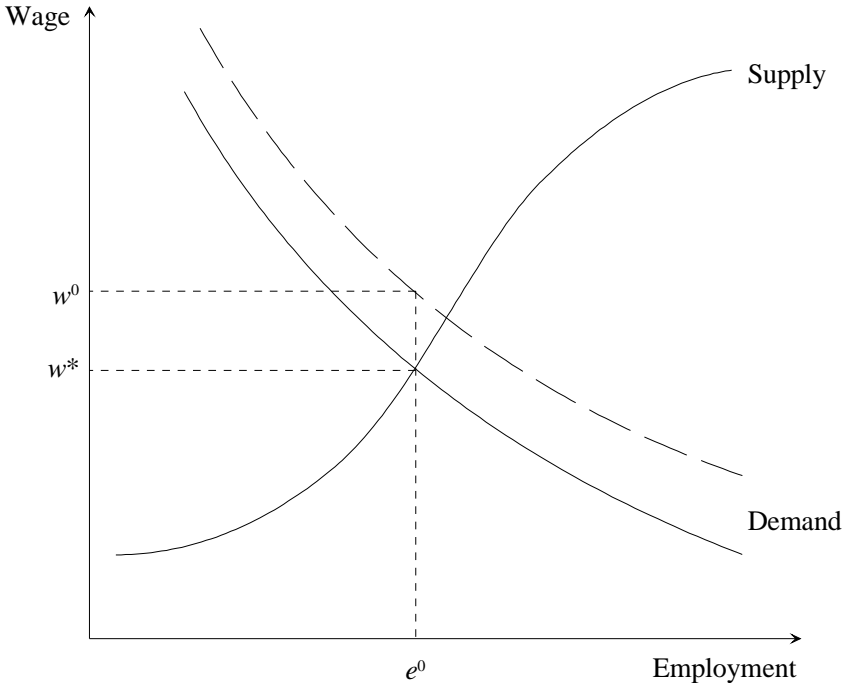
#### **4 EQUILIBRIUM IN THE LABOUR MARKETS AND SOCIAL POLICIES**

The fixed point of the model runs is the gross domestic product of each country. The economy is represented by one sector alone in LAMENT. As a result, the total number employed people in equilibrium becomes equal in to total employment in the GINFORS output. What differs is how the population divides into employed people, involuntary unemployed and voluntary unemployed people, as well as the disposable income for these groups. The number of disabled people is, in principle, the same, but the income to disabled depends on the total tax revenues of the government, which is proportional to the total expenses to wages in the country, and therefore endogenous in LAMENT. The main variables determined in the LAMENT model are total employment, labour supply for established workers and newcomers, number of involuntary unemployed, number of voluntary unemployed, average market wage, beginners wage rate, the basic consumption level, the consumption per disabled and the turn-over rate. In this section we first use LAMENT to do a partial study of the labour market, to see how equilibrium in the labour market affects employment and income levels

compared with the reported and derived estimates from the GINFORS output. Next, we discuss how the trends in the three scenarios, in particular a more rapid structural change, may affect the exogenously chosen variables of LAMENT, and what consequences of such changes. We also consider possible policy options to reduce negative social impacts.

**4.1 Consequences of equilibrium in the labour markets**

Enforcing equilibrium in the labour market can be considered as the last step of the calibration. In the former section, supply and demand were calibrated independently of each other. In this section, we add the assumption that the supply of labour must be equal to the demand. This allows for an additional variable to be determined endogenously. The chosen variable is the turn-over rate, which is important for the explanation of the frictions in the labour market. In addition, a set of other variables change in order to enforce equilibrium. In particular, the cost of hiring new employees by the beginner’s wage rate, and the average wage per year itself changes. The interpretation of the changes presented in this section is that the demand functions for labour in general and for hiring new employees shift, when compared with the calibrations of Section 3.



*Figure 12. Enforcement of equilibrium in the labour market*

Figure 12 illustrates the adjustment of the demand function following the enforcement of labour market equilibrium. As a result of a fixed labour market equilibrium employment represents a fixed point, and the parameters of the supply function for both established and newcomers are unchanged. The demand functions for labour depends on a set of variables, including the turn-over rate which is determined endogenously by enforcing equilibrium. In addition the wages for both beginners and the average wage are allowed to be adjusted to equilibrium. This has implications for the consumption and the distribution of income, as well as for unemployment.

As illustrated, a downward shift of the demand function implies that the wage level is reduced. This means that the turn-over rate applied in the calibrations of Section 3 overestimates the demand for labour if labour market equilibrium is enforced. The required downward shift of the demand curve implies a reduction in the wage level from  $w^A$  to  $w^*$ .

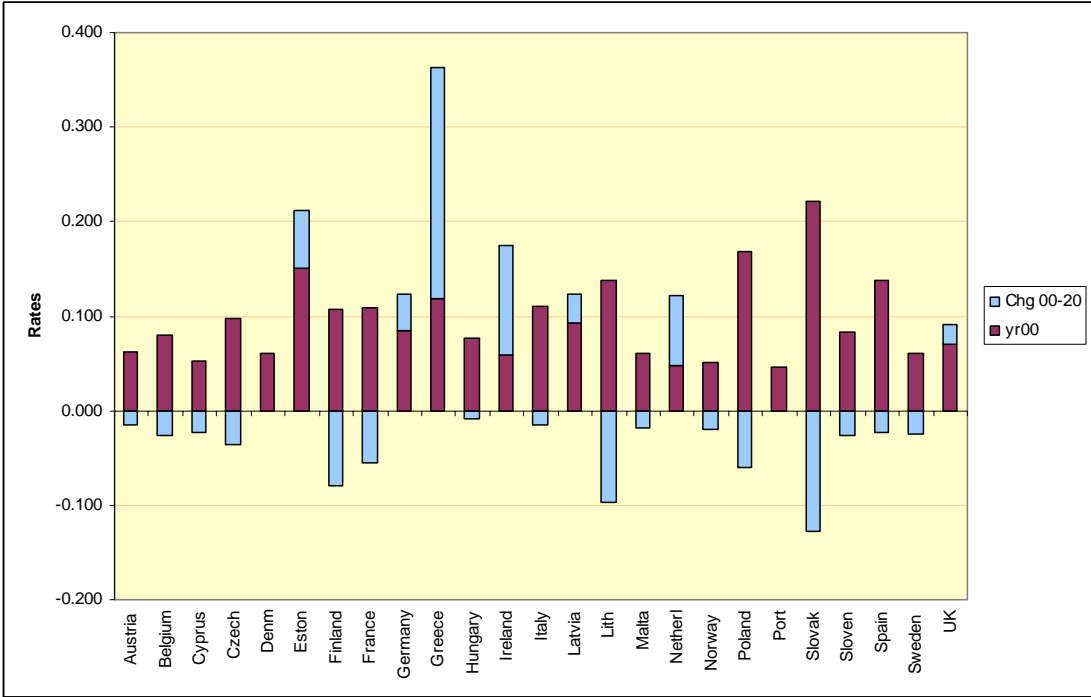


Figure 13. Endogenous turn-over rates in 2000 and change in rates from 2000 to 2020 by country.

The exogenous turn-over rate on which the calibrations in Section 3 are based is 7.5 percent for all countries. Figure 13 shows the endogenous rates based on labour market equilibrium. The rates vary significantly across countries. What may seem surprising is that the turn-over rate for most of the countries goes down from 2000 to 2020, although a few exhibit large

increases. It must therefore be emphasised that these estimates should not be interpreted too literally. These estimates also reflect of the quality of data, which is likely to be poor in general. The countries with the highest turn-over rates, and with the largest changes from 2000 to 2020, are also the countries for which the largest data problems were encountered.

The turn-over rates are not dramatically affected in the low and high sustainability scenarios, although, especially in the group of EU15 countries, for which that data are of a better quality than for the new member states, there is a tendency to a somewhat higher rate towards the end of the period. From Figure 14 we may also note that the variations across countries increase over time in both EU15 and in the new member states, and that the variations also tend to increase as stronger requirements to sustainability is imposed. This can be understood as a result of the stronger structural change, commented on earlier.

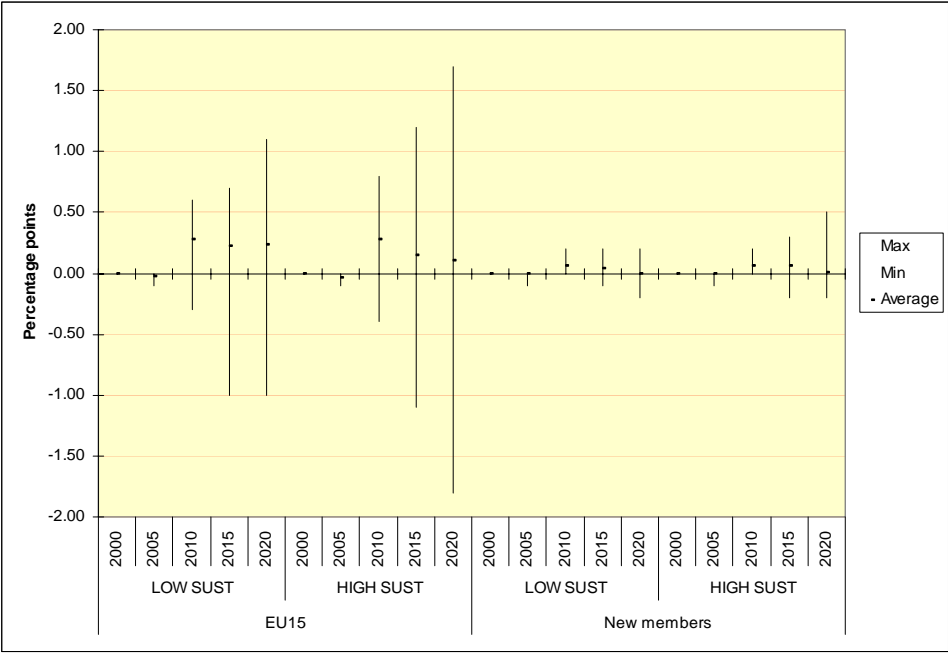


Figure 14. Deviations in turn-over rates relative to basis scenario

A change in the turn-over rates results in changes of the market wages, which are displayed in Figure 15. Negative figures means that market equilibrium generates a lower wage than the wages reported by GINFORS. This reflects downward shift in the demand for labour, and results in both a change and a reallocation of applicants to the labour market between newcomers and established. Recall, however, that the total employment is implicitly fixed by the fixed GDP.

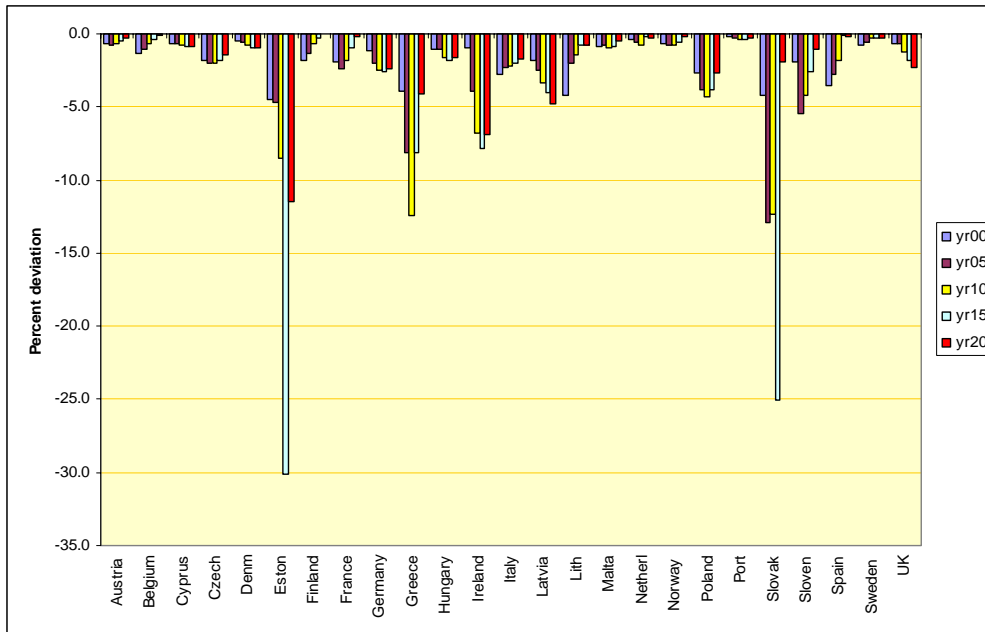


Figure 15. Percent increase in annual average market wage in the LAMENT model from GINFORS output. Basis scenario

Introduction of equilibrium implies that the market wage goes down in all countries. Although this may seem strange at a first glance, the result is rather obvious. Equilibrium is, in general, a means to enforce effectiveness, that is, to attain a given quantity at a lowest possible cost. The quantity, employment, is fixed, and all the variable costs to firms are proportional to the average wage in the model, including the beginner's wage rate. Hence, the wage cannot increase as a result of introducing the market equilibrium. The deviations in Figure 15 can, therefore, also be regarded as an indication of the effectiveness of the labour market, however, with caution. Again, the quality of the data has to be kept in mind. Thus, the countries with the largest deviations are also the countries for which the data are the most uncertain. There are no systematic patterns in the time trends with respect to the deviations. For some countries, the deviation increases over time, whereas it decreases for others.

A reduction in the average wage level implies that less people will apply for work. Since total employment is fixed, the firms will have to do something to make people apply to fill the vacancies. The only way firms can attract more labour is, then, to bid up the beginners' wage rate. The deviations in the wage rate offered to new employees between the calibrated rate displayed in Figure 10 and the market based rate are shown in Figure 16.

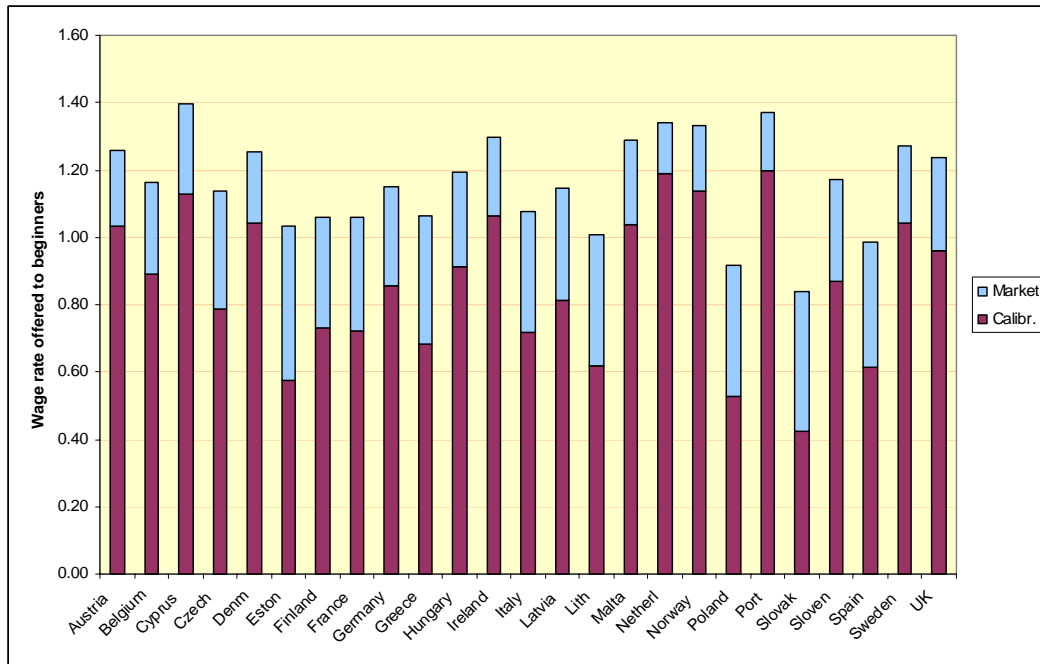


Figure 16. Deviations in the wage rate offered to new employees between the calibrated demand and the market based rate in 2000. Basis scenario.

As expected the beginners' wage rate increases for all countries. In most cases, the beginners' wage rate is exceeds 1 in the case of market equilibrium, which means that beginners are offered a higher wage than the average wage. As for the bars in figure 10, the rate should, therefore, not be interpreted as reflecting the real wage offered, since it is influenced by variables on which we have had to guess, such as the matching of hiring and vacancies. It may also be noted that the variations in the adjustments across countries is somewhat lower for the beginners' wage rate than for the average wage. The market based beginners' wage is also more or less invariant across the sustainability scenarios.

Lower average wage implies a reduction of income, a change in the distribution of income and in unemployment. Figure 17 shows the percentage change in the number of involuntarily unemployed people when labour market equilibrium is imposed. In most cases involuntary unemployment goes down, and in some countries – once again countries for which data are poor – the reductions are substantial. All the countries for which involuntary unemployment increases belong to the EU15 group, except for a slight increase in Poland in 2020. In other words, the reductions in unemployment underlying the GINFORS results are further strengthened when market equilibrium is imposed. Since total employment is unchanged, this is because some people withdraw from the labour market.

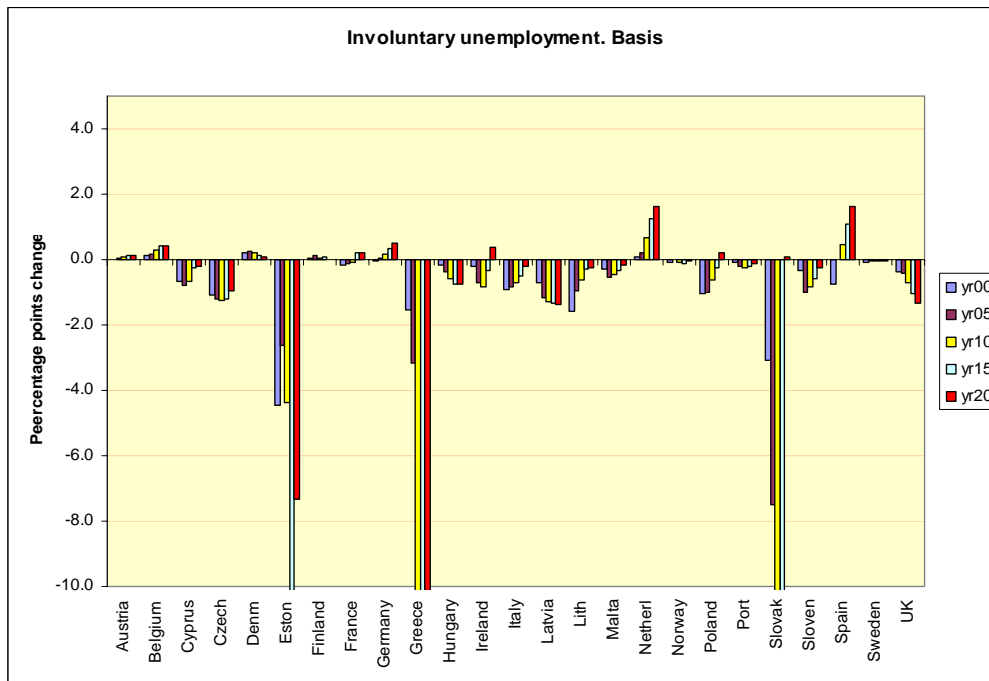


Figure 17. Percent increase in involuntary unemployment in LAMENT model compared with the GINFORS output. Basis scenario

The development of involuntary unemployment in three scenarios is shown in Figure 18. The most notable change when compared with the unemployment rates in Figure 1 is the initial reduction of involuntary unemployment in the new member states. Apart from that, the differences are relatively small. Unemployment develops similar to the initial case, but the paths are somewhat more sensitive to the sustainability scenarios. In particular, the positive effects of the low and high sustainability scenarios are less uniform. In the high sustainability scenario, unemployment increases in half of the countries, and decreases in the remaining half in 2020, when compared with the basis scenario. The sensitivity of the sustainability scenarios on unemployment is small in the new member countries,. For the EU15 countries, the basis scenario has a lower rate of involuntary unemployment in 2010 and in 2020.

The changes in unemployment are brought about by the reduction in the wage levels. Nearly all the countries exhibit a lower wage in the sustainability scenarios than in the basis scenario. This has implications for the consumption levels of the different social groups. Consumption for the employees follows the wages, although adjusted for taxes. Thus, the development of employees' consumption is in many countries weaker than in wages, because of tax increments. It is also assumed that the grants to involuntary unemployed remain unaltered. The basic consumption level is, on the other hand, endogenously determined in LAMENT.

The model determines this level as the consumption required to make a sufficient number of people abstain from applying for job in the labour market.



Figure 18. Unemployment rates in the EU15 group and in new member states in all scenarios.

A reduction in the wage level means that it becomes less attractive to apply for a job. To sustain the number of employees, it is therefore necessary also to reduce the incentives to stay voluntarily unemployed. This may be achieved by reducing the basic level of consumption. Since the basic consumption level is relatively small from the outset, one may expect the relative change of this level to become quite substantial if it is to cope with the reductions in the wage level. When comparing the first order calibration in section 3 with the equilibrium level of basic consumption this is also the case. For most countries the basic consumption level declines by 50 to 100 percent. That is, in some countries the basic consumption level drops to nil. This is possible for countries where newcomers have a strictly positive utility from zero income, which is, in fact, true for some countries, as shown in Figure 6. Since the basic consumption level cannot be negative, the labour markets are not clarified in these countries unless labour is imported. A basic consumption of zero occurred in some or all years in Estonia, Greece, Slovakia and Spain

The basic consumption level is also relatively sensitive to sustainability scenarios. Figure 19 shows the basic consumption level in 2000 and the amendments to this level in the three scenarios by country. The dark (burgundy) part of the bars shows the basic consumption level

in 2000. The light parts show the change from 2000 to 2020 in the basis scenario, and the two medium parts the respective changes of the low sustainability and the high sustainability scenarios in 2020.

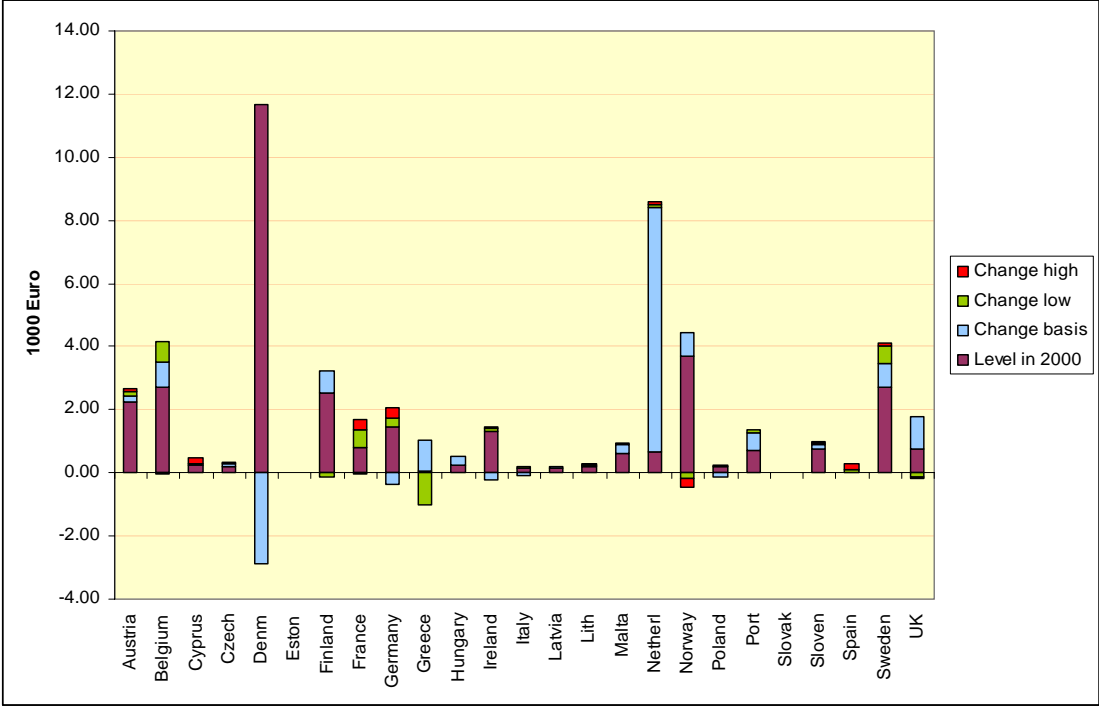


Figure 19. Basic consumption level and changes from 2000 to 2020 in the basic, the low sustainability and the high sustainability scenarios.

The main change is the increase in the basic consumption level from 2000 to 2020 for most of the countries. The exceptions are Denmark and Germany, where the basic consumption level decreases. Comparing the low and the high sustainability scenarios, it may be noted that the most substantial difference is between the basis scenario and the low sustainability scenario, and that the sustainability scenarios contribute an increase in the basic level of consumption, except in Greece, Ireland, Italy, Norway, Poland and the UK.

The basic consumption level may seem like a rather artificial construction. It plays an important role for the interpretation of the model results, however, because it represents incentives for people to joint or to withdraw from the labour market. Such incentives play an important part in labour market policies in most countries, although it is seldom being expressed directly in terms of consumption units. Early pensioning, expansion of educational programs can, however, be understood as means to change the basic level of consumption. It may also be of interest to note that the equilibrium level of basic consumption in 2000

correlates to a certain degree with the estimated share of population at risk of poverty. The reduction in the basic consumption level resulting from labour market equilibrium might therefore be worth a closer examination.

One explanation for the reduction of people applying for work may be that the taxes increase, especially in the EU15 group of countries. This may be an advantage for those depending on transfers. The transfers to disabled are assumed to follow the governmental income from taxes related to labour, whereas the number of disabled was assumed proportional to the population. Figure 20 shows the level of consumption for disabled in 2000 and the changes to 2020 in the three scenarios. Lowering the wages means that taxes to the government are reduced compared to the GINFORS output. A reduction of basic consumption level in most countries adds to the decline of the consumption of transfers. Except for the Netherlands, the consumption level for disabled will not increase substantially from 2000 to 2020. This is also the picture from the direct derivations of the GINFORS results. Notable reductions will, in fact, occur in Austria, Belgium and Denmark. The two sustainability scenarios do not add much to this picture. A slight increase occurs in Belgium, France and Sweden, whereas in Greece, Poland and the UK, the consumption level for disabled will be reduced little as a result of the sustainability policies. The gap between the EU15 group of countries and the new members is hardly affected at all over time.

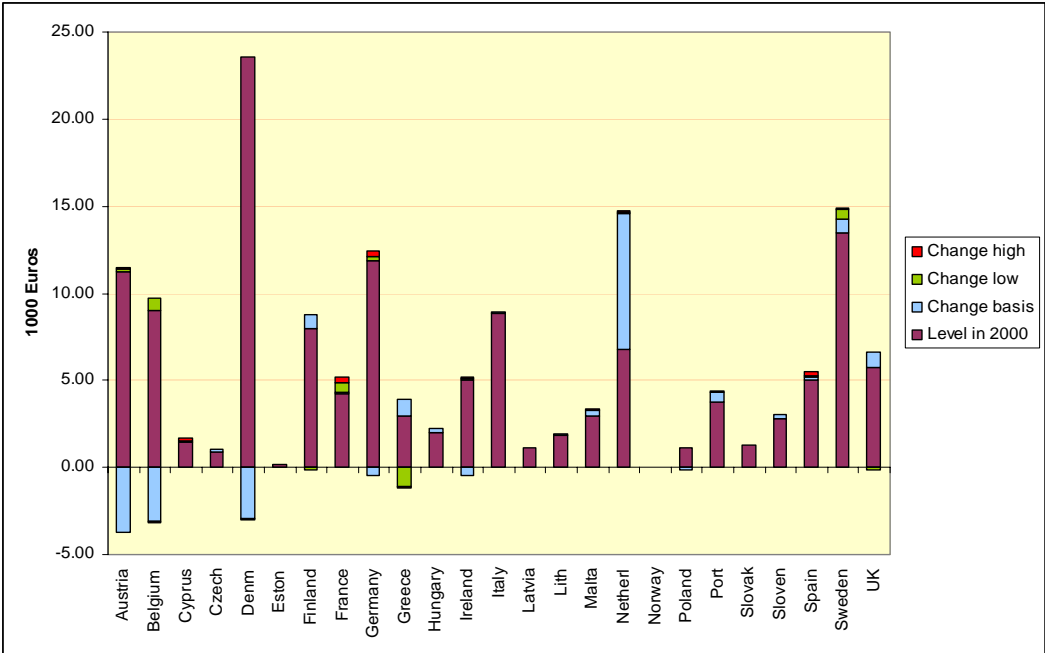


Figure 20 Consumption level for disabled in 2000 and in 2020 in the basis scenario and in the low and high sustainability scenarios

The positive prospects for the social evaluation that follows from the reduction in unemployment in the GINFORS results are changed somewhat after a closer examination of the impacts in the labour market: Unemployment is reduced substantially in the new member countries from the outset, whereas it remains the same in the EU15 group of countries. The main impact of enforcing labour market equilibrium relates to the requirement that total employment from the GINFORS output is sustained. The market enforces a lowering of the wages, which has to be compensated by an enhancement of the wages offered to new employees from the demand side. On the supply side, a reduction in wages means that less people finds it attractive to apply for work. To sustain the level of employment, a reduction in the incentives to stay out of work, represented by the basic consumption level, has to be enforced. This affects the income distribution, particularly for those out of work, who do not apply for work. An enhanced risk of social exclusion may follow as a result, but it must be emphasised that the LAMENT model does not link income and labour market conditions to further indicators of social exclusion, such as poverty. Moreover, the reduction in unemployment over time still applies for the market based scenarios, although the positive impacts on unemployment in the low and high sustainability scenarios are not as clear as in the GINFORS output. In addition, a higher speed of structural changes required to achieve high and low sustainability is likely to enhance the frictions in the labour market by a lower match between vacancies and unemployment. This may further complicate the situation for people at risk of social exclusion.

#### **4.2 Impact on the risk of social exclusion from future changes in the labour markets**

So far, the social indicators have been analysed under the assumption that the underlying determinants of the labour markets are stable, and insensitive to the ambitions of achieving sustainable development with respect to the environment and utilisation of natural resources. However, there are several linkages that might be pointed out. Structural change, for example, usually implies stronger requirements to the ability of individual workers to adapt to new jobs, the need for educating adults may increase, and people who are willing to move to other locations may be higher appreciated. The matching between unemployed and vacancies may thereby decline. A different implication of the scenarios presented above is that the development in the labour market itself may generate policies to affect social exclusion. For example, tax policy or transfers to involuntary unemployed people may be affected by the

development of unemployment. In this section we briefly present how the baseline scenario is affected by a lower match, supposed to reflect the increased speed in structural change shown in Figure 4 in Chapter 2. We also investigate how a reduction in direct taxes affect the labour market in isolation, but emphasise that a change of taxes will, in principle, affect the GINFORS output significantly. These feed-backs are not taken into account here. For the countries where sectoral information is unavailable, which are some countries in EU15 and most of the new member states, the respective averages for the EU15 and new member states have been used.

The impact on the matching function is assumed proportional to the structural change of each economy. For most countries the matching is lower in 2020 than in 2000, when it was assumed that 65 percent of the vacant positions are filled. The reduction is generally more affected in the new member states than in the EU15 group of countries. In order to avoid a comparison of too many cases, the analysis here is limited the baseline scenario assuming two underlying structural patterns, one reflected in the baseline with constant match, and one reflected in the strong sustainability scenario with a rate-dependent match. Lower match means that firms have to increase their efforts to fill vacant positions. The cost of a given employment thereby increases, which in turn results in a lower supply of output. Since the output in this analysis is a fixed point, the reduced supply of output has to be “compensated” by a reduction in wages. Figure 21 shows the resulting percent change in market wage.

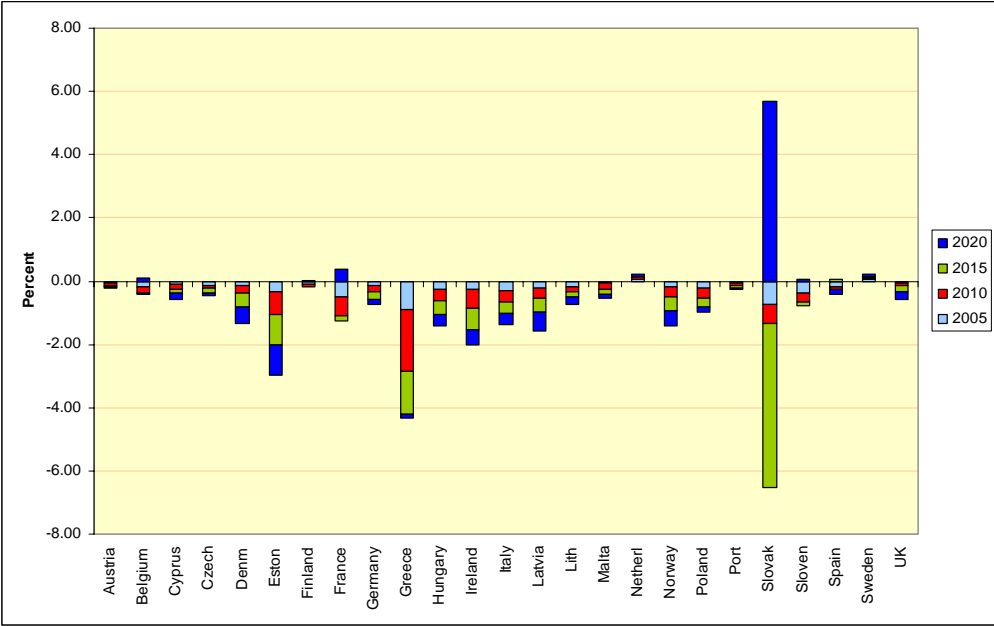


Figure 21. Percent change in market wage when matching depends on structural change

Most countries exhibit reductions in market wages between zero and four percent when the matching depends on the speed of structural change. The exceptions are the Netherlands and Spain, where the rate of structural change declines in the strong sustainability scenario. As in the cases discussed previously, lower wages has to be compensated by higher beginner's wage, but changes in the distribution of income are related to the average wage level. Tax revenues to the government declines and reduce the transfers to both disabled and involuntary unemployed. Transfers to disabled change according to a similar pattern, and within the same range as the reductions in wages. Wages reductions leave people with lower incentives to apply for work, but in order to meet the requirement of fixed total employment, the basic consumption level can be adjusted downwards to make people apply for work. How the basic consumption level is affected depends on which effect is the strongest: The reduction in the supply of labour caused by lower wages, or the reduction in the demand for labour due to a higher costs of hiring. In most of the countries, the basic consumption level declines, indicating a stronger effect on the supply than on the demand for labour.

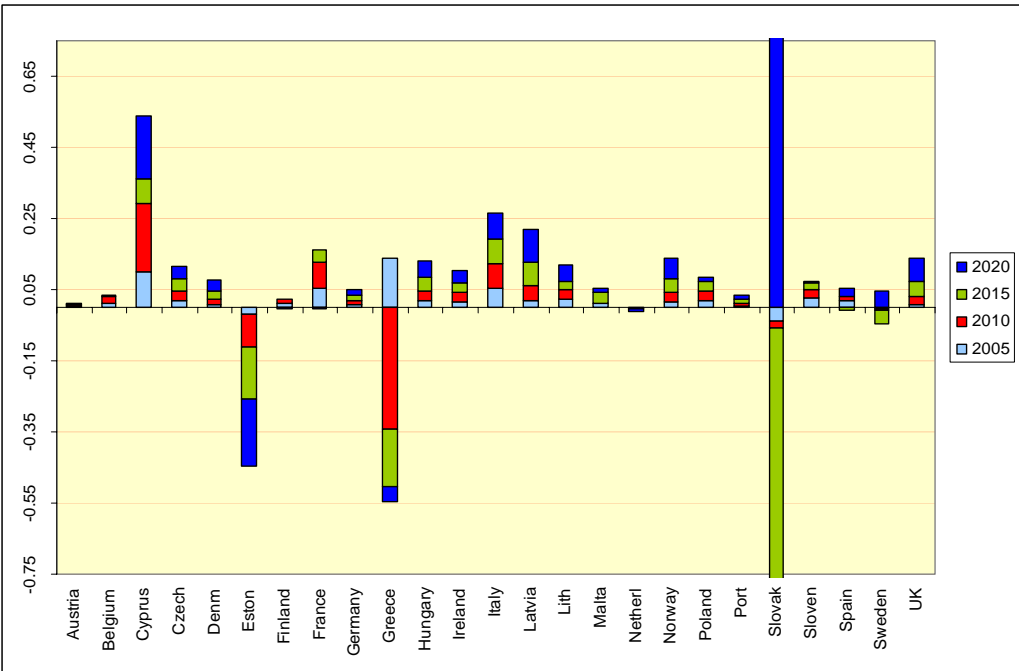


Figure 22. Percent change in involuntary unemployment, total and by period, when matching depends on structural change

The effects on unemployment are also subject to the determinants of the supply and the demand for labour. Figure 22 shows how dependencies between match and structural change affect the number of involuntary unemployed. Unemployment increases in every period for

most countries, but the impact is small, and less than 0.5 percent in most cases. Recall that the countries that exhibit large changes are countries for which structural data are unavailable.

As pointed out earlier, the development of private consumption per capita over time is, indeed, moderate in all the scenarios. This is partly due to the fact that most countries exhibit an increase in direct taxes from 2000 to 2020. Changes in taxation have impacts throughout the economy, and a full examination of such a change would require new runs on GINFORS. However, direct impacts on the labour market of a change in taxation will also occur. It affects the incentives to apply for work by increasing the allowed consumption level to be retrieved from a given wage. The income distribution will also be affected by reducing the space for transfers to disabled. It is, therefore, of interest to see how a slower rate of change in income taxes may affect the income distribution in the LAMENT model, taken in isolation.

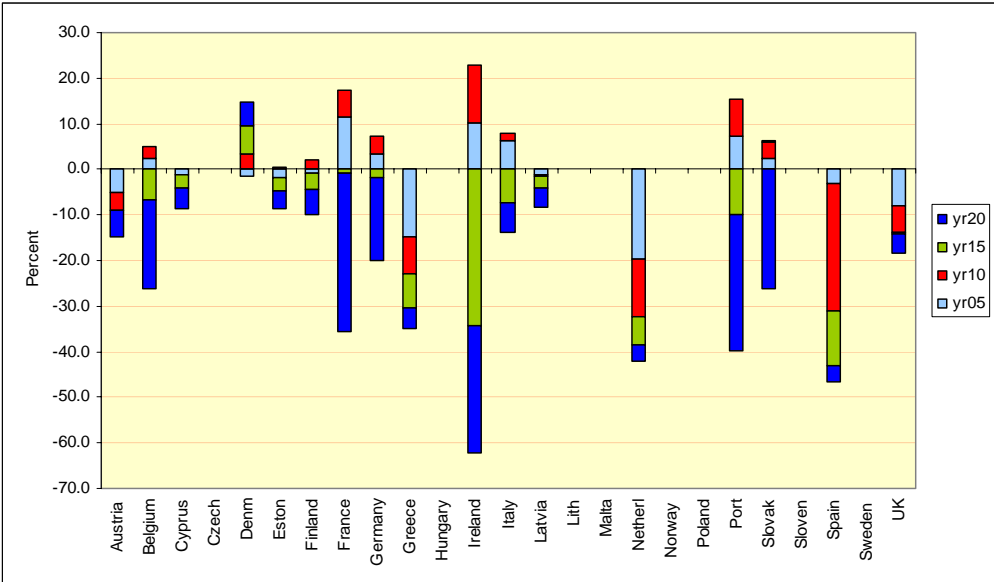


Figure 23. Percent change of tax rates relative to tax rates in the basis scenario.

The change of tax rates from one period to the next were therefore reduced by half for all countries. Figure 23 shows the percent change of the tax rates by country and by period. Note that reductions, particularly in the period 2015 – 2020, are partly subject to the adjustments that were made in order to apply the GINFORS output to LAMENT. In most countries, and most periods, tax rates are reduced. The result is that the incentives to apply for a job increases, and a higher supply of labour, which leads to lower wages. The impact on wages is, however, small in the model. This is because of the competition between established workers and the newcomers in the labour market: Established workers respond more quickly to

changes in the tax rates. To “compensate” this, the incentives for newcomers will have to be changed, which is done by the basic consumption level. Thus, the basic consumption level therefore tends to increase, in some cases significantly. This dampens the incentives to apply for work, and involuntary unemployment is reduced as a consequence. The pattern of changes in involuntary unemployment is similar to the pattern of tax changes, but for most countries, the reductions are between zero and two percent over the entire period.

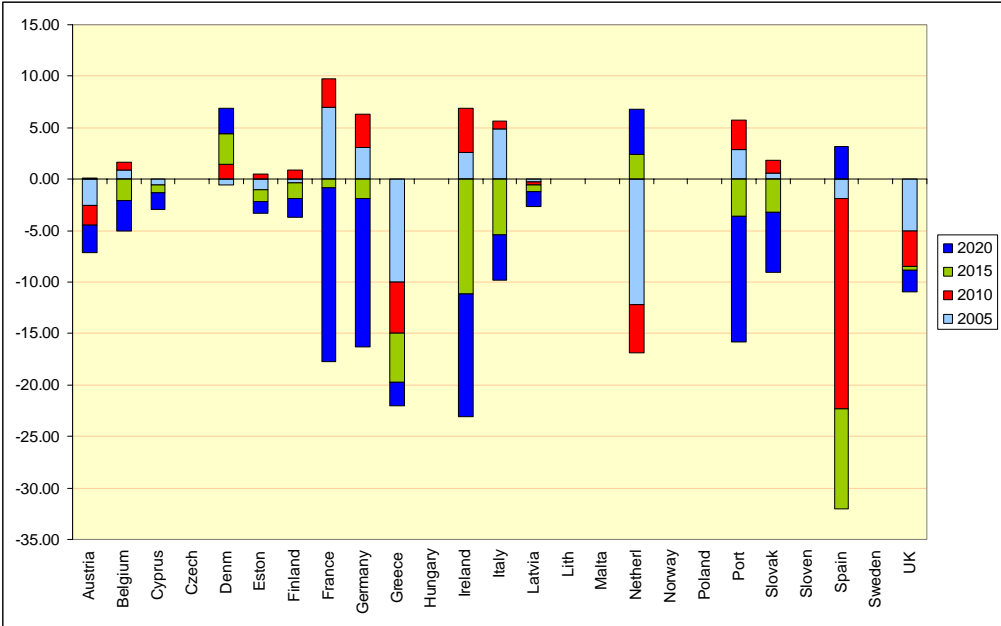


Figure 24. Percent change of tax transfers to disabled at lower income taxes per person

Lower taxes imply that the space for transfers to disabled shrinks. Figure 24 shows the percentage reductions in transfers to disabled persons if the transfers are to constitute a constant share of tax revenues to the government. The transfers go down quite substantially, especially in the two last periods. The exceptions are the countries, and the periods for which taxes goes up. Thus, possible increase in the basic consumption level is far from being sufficient to compensate possible cuts resulting from lower governmental budgets.

**5 CONCLUSIONS**

There is a growing concern for the social gap between the majority of the population who takes advantage of general economic growth and improved social standards and the minority with low income opportunities and weak social networks. What is worrying is that the gap seems to increase as the economies grow richer, and that this minority, the socially excluded part of the population, is growing. Thus, it may seem as if societies demand more from individuals as the economy grows richer, the that the risk of social exclusion thereby

increases. To achieve economic growth without harmful interference with the nature generally requires policies aiming higher effectiveness of the economy. This may put pressures on individuals as well, with a resulting increase of people at risk of social exclusion.

Viewed in this context, the results of the scenarios studied in this project are promising. One of the most important indicators of social exclusion, unemployment, increases in the first coming years, but goes down in the long run, also in the basis scenario. Thus, the underlying trend of increasing unemployment in Europe over the past 30 years is assumed to turn around 2010. The direct impact of the sustainability scenarios is even more positive. As described by the so-called Aachen scenario, sustainability is achieved by increasing the resource effectiveness of the European economies. This enhances the demand for labour, and drives unemployment further down.

The labour market is, however, complex and subject to a variety of factors. When the scenarios were adjusted for transactions in the labour market, such as the supply of labour from different social groups, expected demographic changes, and frictions related to the costs of hiring new people, the positive impacts on unemployment caused by the Aachen scenario vanish. Unemployment still goes down in the long run in all the three scenarios, but the high and the low sustainability scenario are no longer advantageous when compared with the basis scenario.

Social exclusion is, of course, not only about unemployment, but is also subject to the distribution of income. We were not able to derive explicit indicators for the number of people at risk of poverty, but have worked out indicators for average income and consumption for separate social groups, which are differently exposed to social exclusion, namely people in active work, voluntarily unemployed, involuntarily unemployed and disabled. The results exhibit two general characteristics.

First, the development of private consumption is weak for all the groups in most countries. This can be explained partly by a substantial increase in taxes, or alternatively in private savings, in many countries. For involuntary unemployed, average consumption goes down on the average, although the changes are small. However, the sustainability scenarios exhibit a slightly higher growth in private consumption than the basis scenario for involuntary

unemployed, for voluntary unemployed and for disabled. Labour market transactions tend to weaken the development of private consumption further, for all the social groups.

The second characteristic is that the income differences between member states, and between the group of EU15 countries and the new member states declines only slightly over the period 2000 - 2020. There are nevertheless large variations across countries within each of these two groups of countries, but it is difficult to trace a systematic pattern of development towards equality across countries in any of the scenarios.

The sustainability scenarios require a higher speed of structural change than the basis scenario. This may be considered as a reflection of a higher economic efficiency needed to achieve sustainability, and is likely to increase the frictions in labour markets, for example by lowering the ability to match vacant positions and unemployed people. If so, the sustainability scenarios will lead to a reduction in wages and an increase in involuntary unemployment. Reduced wages spreads to the consumption levels also to the non working parts of the population, thereby enhancing the risk of social exclusion. Since the sustainability scenarios do not perform better or worse than the basis scenario when the effect of a higher rate of structural change was not taken into account, the effect of the sustainability scenarios on social exclusion is therefore likely to be negative.

This conclusion is, however, partly based on the implications for private consumption. Public consumption will increase in most countries because the tax rates increases. A lower tax rate may mitigate the increase in unemployment and still contribute an increase in governmental expenditures. The governments may then use a higher share of their income to support people at risk of social exclusion. Thus, the lessons that can be read out of the past seem to be appropriate also for the future: The question of avoiding social exclusion is, first and foremost, a political question.

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