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ABSTRACT

Many western industrialized countries face strong budgetary pressures due to the aging of the baby boom generations and the general trends toward earlier ages of retirement. We use the American PSID and the European Community Household Panel (ECHP) to explain differences in prevalence and dynamics of self-reported work disability and labor force status. To that end we specify a two-equation dynamic panel data model describing the dynamics of labor force status and self-reported work disability. When we apply the U.S. parameters to the equations for the thirteen European countries we consider, the result is generally that work disability is lower and employment is higher. Furthermore, measures of employment protection across the different countries suggest that increased employment protection reduces reentry into the labor force and hence is a major factor explaining employment differences in the pre-retirement years.

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1. Introduction

Increasing labor force participation among older workers is an important issue on the scientific and policy agenda in the U.S. and other industrialized countries. Major categories of individuals who are out of the labor force at later ages consist of persons drawing disability benefits, unemployment benefits, and early retirement benefits. Cross-country differences in the prevalence of early retirement are clearly related to differences in financial incentives (Gruber and Wise, 2003, Börsch-Supan, 2007). The fraction of workers on disability insurance is vastly different across countries with similar levels of economic development and comparable access to modern medical technology and treatment.

Health is also a major determinant of economic inactivity, and those who have a health problem that limits them in their daily activities or in the amount or kind of work they can do (a "work disability") are much less likely to work for pay than others (Stapleton and Burkhauser, 2003). In view of the aging of the work force in developed countries, reducing work disability among the working population and particularly among older workers may have a major impact on the sustainability of social security and health care systems, among other things. Institutional differences in eligibility rules, workplace accommodation of older or sick workers, or generosity of benefits, contribute to explaining the differences in disability rolls (cf., e.g., Bound and Burkhauser, 1999, Autor and Duggan, 2003, and Börsch-Supan, 2007). Recent survey data show, however, that significant differences between countries are also found in self-reports of work limiting disabilities and general health (Banks et al. 2007).

In this paper we use data from the Panel Study of Income Dynamics (PSID) and the European Community Household Panel (ECHP) to study the labor force dynamics in the U.S. and in thirteen European countries. To focus on labor market dynamics in the pre-retirement years and because these dynamics are likely to differ by gender, we concentrate on the age group between 40 and 65 and consider males and females separately. We also investigate the dynamics of work disability (i.e. the extent to which work disability varies over time and its reversibility) and how this varies across countries. One of the questions we address is whether we can explain the prevalence of self-

reported work disability as a function of individual characteristics, including general health.

The remainder of the paper is organized as follows. In Section 2 the details of the data that are used are described. Section 3 discusses some pertinent characteristics of institutions in Europe and the U.S. that relate especially to the incentives and institutions of work disability programs. Section 4 presents the model that is used to describe labor force dynamics in the various countries. The model is estimated for each country separately. Section 5 presents the estimation results. In Section 6, we summarize the implications of these results by showing simulations, where we assign U.S. parameter values to the models for the European countries. The implied differences in outcomes can be seen as a counterfactual simulation of the impact U.S. policies and institutions would have when implemented in European countries. Section 7 concludes.

2. Data

Our data come from two sources: the European Community Household Panel (ECHP) and the Panel Study of Income Dynamics (PSID). Both data sets have reasonably comparable measures of labor force activity and self-assessed work disability for the countries that will be included in our analysis. We discuss some issues related to the comparability of measurement of these key concepts in section 5 below.

The ECHP is an annual longitudinal survey of households in the EU.[1] Data were collected by national statistical agencies under the supervision and coordination of Eurostat (the statistical office of the EU). Table A1, taken from Eurostat (2003, p.15), gives an overview of the waves of ECHP in all fifteen countries that participated in the ECHP project.

The ECHP started in 1994 and was terminated in 2001. The first wave covered some 60,500 households and some 130,000 adults aged 16 and above from all countries except Austria, Finland and Sweden. Austria and Finland were added in the second and third waves. As of the fourth wave, the original ECHP survey was terminated in Germany, Luxembourg and the UK. Comparable data for these countries were obtained from existing national panels. For the UK this was the British Household Panel Survey

[1] See Nicoletti and Peracchi (2002) and Peracchi (2002) for more information on ECHP.

(BHPS), for Germany the Socio-Economic Panel (SOEP) and for Luxembourg the PSELL (Panel socio-économique Liewen zu Lëtzebuerg). For these countries we will use the existing national panels rather than the few waves of the ECHP. As of the 4th wave, data for Sweden were obtained from the Swedish Living Conditions Survey. Since this is not a panel, we will exclude Sweden from our analysis. We will also not use the Luxembourg data, since it provides no information on self-reported disability.

The Panel Study of Income Dynamics (PSID) has gathered almost 30 years of extensive economic and demographic data on a nationally representative sample of approximately 5000 (original) families and 35,000 individuals who live in these families. Details on labor market activity and family income and its components have been gathered in each wave since the inception of PSID in 1968. The PSID has been collecting information on self-reported general health status (the standard five-point scale from excellent to poor) since 1984 and has always collected good information on work-related disabilities. To provide comparability in the time period with the EHCP, our analysis will use the PSID waves between 1995 and 2003. It should be noted that after the 1999 wave the PSID is no longer annual, but bi-annual.

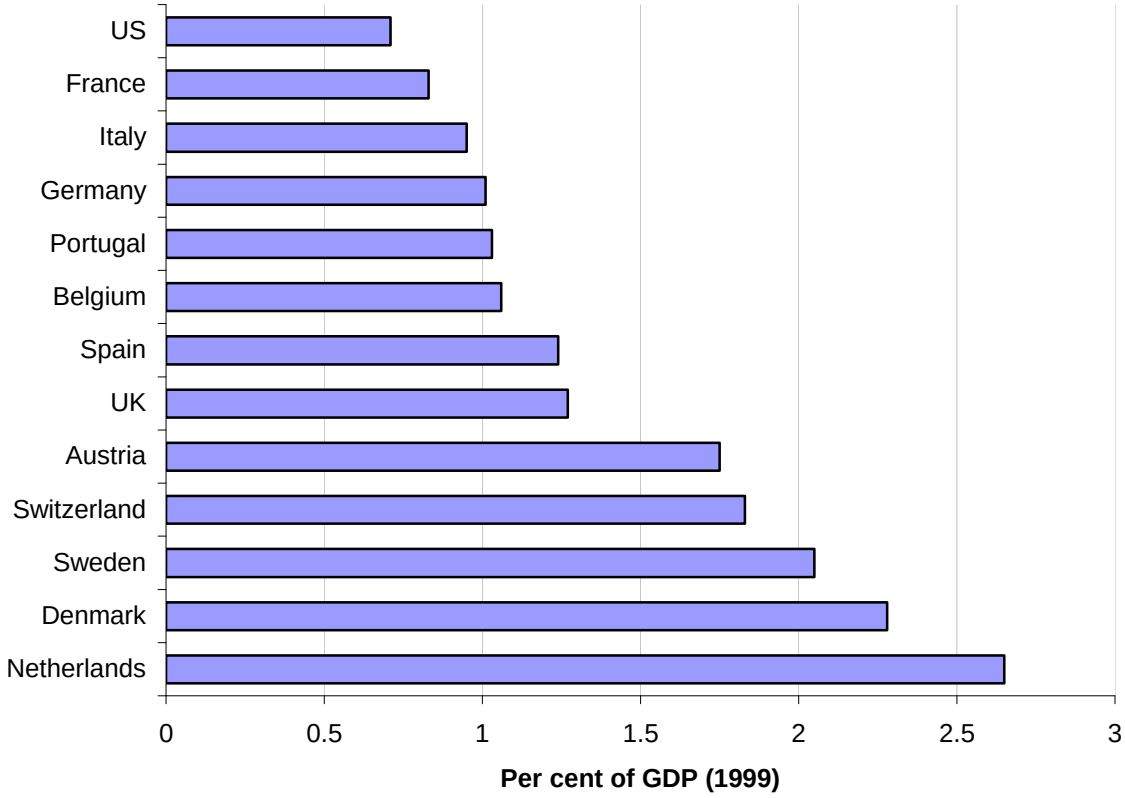
3. Institutions

There exists great variation in labor market institutions across OECD countries; regulations with respect to disability insurance are certainly no exception. To get a very broad overview for a majority of countries in our sample, Figure 1 reports a crude measure of the generosity of disability benefits – the fraction of GDP accounted for by public expenditures on disability benefits. Considerable variation across OECD countries is readily apparent, with France and Italy spending less than 1% of GDP and three countries – Sweden, Denmark and the Netherlands – spending more than twice that level. Using this metric, the U.S. ranks lower than any of the OECD countries listed in Figure 1. The variation spending levels can of course be due to variation in benefit levels or variation in eligibility, or some combination of both.

Looking more deeply into international variation than the simple generosity measure presented above, various dimensions can be distinguished. The main ones are the loss of earnings capacity required to qualify for benefits and the way in which such

loss of earnings capacity is assessed, eligibility requirements based on work or contribution history, and benefit levels in relation to loss of earnings capacity. Table A2 provides an overview of the main features of disability insurance systems in the countries we study in this paper.

Figure 1: Public Expenditure on disability benefits



Source: OECD (2003b), Chapter 2.

Table A2 illustrates the complexity of these disability programs across countries. For example, while many countries have a basic five years minimum period of eligibility (for example, Germany, Austria, Italy, Portugal), basic eligibility is as low as six months in Belgium and one year in France while one is not fully covered unless one has worked for ten years in the United States. Similarly, while the loss of normal earnings capacity is sufficient to qualify for eligibility in Spain, one must have a loss of two-thirds of earnings capacity in France, Belgium, and Portugal.

Not surprisingly, the variation in DI systems identified in Table A2 is correlated with differences in prevalence of DI receipt across countries and in the disability status of individuals receiving DI. Börsch-Supan (2007) showed that in a cross-sectional context variation in incentives and institutional rules across a series of European countries and the United States can account for differences across these countries in the fractions of individuals on work disability programs. In contrast, variation in demographic attributes and health across these countries did little to explain these differences.

In this paper, we do not attempt to analyze being on the disability rolls but instead aim at explaining the cross-sectional and dynamic variation across countries in self-assessed work disability and work. Table 1 shows for 2001 the relation between what is probably the best single measure of the scope of a country's disability program, the fraction of disability benefits as a fraction of GDP, and the fraction of men who self-report that they have a work disability.[2] There appears to be almost no correlation between these two measures.

Table 1: Expenditures on Disability Insurance and Self-reported male work disability, 2001

	DI expenditure as a % of GDP	Self-reported male work disability, 40-65, 2001 (%)
Germany	1.6	40.3
Denmark	2.7	22.0
Netherlands	4	24.5
Belgium	2.2	14.3
France	1.7	20.5
UK	2.2	13.1
Ireland	1.3	15.7
Italy	2	8.0
Greece	1.6	13.3
Spain	2.3	15.5
Portugal	2.4	22.9
Austria	2.3	17.8
Finland	3.1	29.0
U.S.	1.1	19.3

Source: DI expenditures: "Social Safety Nets in the OECD countries", Worldbank, Social Safety Net Primer Notes, (25), 2006.; Self-reported male disability: ECHP and PSID data used in this paper; unbalanced panels, weighted.

[2] The exact question on work disability in ECHP is: "Are you hampered in your daily activities by any physical or mental health problem, illness or disability?" In the PSID, it is: "Do you have any physical or nervous condition that limits the type of work or the amount of work you can do?"

Although the incentives and institutions across countries appear to have a great deal to do with the fraction of workers who are on disability programs, these incentives and institutions appear to be only weakly related to the fraction of men who claim that they are work disabled.

Table A3, taken from a recent OECD study, provides information on some characteristics of DI recipients for most of the countries we are considering in this paper. The first column shows that a substantial fraction of the people on DI declare that they have no work disability. This fraction varies a lot across countries and is particularly large in Sweden (48.9%) and the U.S. (46.7%). Either people are granted DI benefits while not acknowledging disability status, or those who recover from their disability are not able to find a job and instead stay on DI, or some combination of both. The third column of Table A3 shows indeed that exit rates from DI are extremely low. The UK and the Netherlands seem to be the exceptions in this respect, but this might have to do with reforms in the disability insurance system in these countries.

The second column of Table A3 shows the other side of the coin – many people who report to have a (moderate or severe) work disability receive neither earnings nor DI or other benefits. Again, variation across countries is substantial. In Sweden, almost everyone with a work disability has earnings from work or receives benefits, but in Spain and Italy, 28 or 29% receive neither of the two. The U.S. has an intermediate position in this respect.

Column 4 shows that the expected negative relation between disability and the chances of being employed holds in all countries: the relative employment rate is always less than one. Still, there are substantial differences across countries. In Spain, someone with a work disability is 0.41 times as likely to do paid work as someone without a work disability, compared to 0.79 in Switzerland. Again, the U.S. is somewhere in the middle with 0.58. Column 5 shows that there is an earnings differential between workers with and without a work disability, but in most countries, it is not very large. Here the U.S.

and (surprisingly) Sweden are the exceptions – with workers with a disability earning almost 30% less than workers without disability.[3]

On the other hand, for those with a work disability, working seems to be an effective way of increasing income, as is borne out by column 6. This is particularly true in the U.S., where the disabled who work have an average income that is 2.84 times as high as the average income of disabled who do not work. In Europe, the differences are smaller, but even in Sweden and Denmark, the countries with the lowest income differentials between working and non-working disabled persons, the difference is still 37 or 38%. These cross-country differences seem to be in line with the generosity of disability insurance systems (as indicated by Figure 1, for example).

4. The Model

In this section, we outline our model of the interrelated dynamics of self-reported work disability and labor force status (work versus no work). The equation for disability of individual i in time period t is specified as:

$$\begin{aligned} D_{it}^{*} &= X_{it}^{'}\beta^{D} + \gamma_{D}^{D}{}' D_{i,t-1} + \gamma_{W}^{D} W_{i,t-1} + \alpha_{i}^{D} + \varepsilon_{it}^{D} \\ D_{it} &= 1[D_{it}^{*} > 0] \end{aligned} \qquad (1)$$

Here D_{it} indicates the presence of self-reported work disability; 0 means no disability and 1 means disability. Lagged labor force status is denoted by an indicator variable $W_{i,t-1} = 1$ if the respondent worked in the previous period and $W_{i,t-1} = 0$ otherwise. The error terms ε_{it}^{D} are assumed to be independent standard normal; α_{i}^{D} is an individual effect, normally distributed with variance σ_{α}^{2}. The ε_{it}^{D} and α_{i}^{D} are assumed mutually independent and independent of the vector of explanatory variables X_{it}.

Thus there are two direct sources of persistence in the disability equation: the lagged dependent variable $D_{i,t-1}$ and the unobserved heterogeneity term α_{i}^{D}. We allow for a lagged effect of work force status on work disability, but not for a contemporaneous effect. That is, we are effectively assuming no contemporaneous 'justification bias' in

[3] A complete analysis of this effect would need to account additionally for differential selection into the labor market across countries.

self-reported disability (justification bias would imply that people say they have a work disability to justify their non-work status).

The second equation explains whether respondents do paid work or not. Labor force status W_{it} is explained by a Probit equation as follows:

$$\begin{aligned} W_{it}^{*} &= X_{it}^{'}\beta^{W} + \gamma_{D}^{W} D_{i,t-1} + \gamma_{W}^{W} W_{i,t-1} + \delta_{d}^{W} D_{i,t} + \alpha_{i}^{W} + \varepsilon_{it}^{W} \\ W_{it} &= 1[W_{it}^{*} > 0] \end{aligned} \qquad (2)$$

Thus we allow for both a contemporaneous and a lagged effect of work disability on labor force status. The assumptions about individual effects and error terms are the same as before. We do not allow for correlation between the error terms in the two equations, but we do allow for correlated individual effects. Also here, there are two direct sources of persistence, lagged labor force status $W_{i,t-1}$ and the individual effect α_{i}^{W}.

The variance-covariance matrix of the individual effects is unrestricted. For estimation purposes we parameterize it as follows. Let $u_i = (u_i^D, u_i^W) \sim N_2(0, I)$. Then we specify the vector of individual effects $\alpha_i = (\alpha_i^D, \alpha_i^W)$ as $\alpha = \Lambda u,$ with

$$\Lambda = \begin{pmatrix} \lambda_D^D & 0 \\ \lambda_D^W & \lambda_W^W \end{pmatrix}, \qquad (3)$$

a lower triangular matrix. The parameter estimates summarized in the next section include the estimates of the entries in Λ.

To account for the initial conditions problem, we follow Heckman (1981), Hyslop (1999), and Vella and Verbeek (1999) and specify separate equations for wave 1. These equations have the same exogenous regressors and contemporaneous dependent variables on the right hand side as the dynamic equations presented above, but do not include the lagged dependent variables. No restrictions are imposed on the coefficients or their relation to the coefficients in the dynamic equations. These coefficients are estimated jointly with the parameters in the dynamic equations and can be seen as nuisance parameters.

In the initial condition equations, we include arbitrary linear combinations of the individual effects in the two dynamic equations. This is the same as including an arbitrary linear combination of the two entries in u_i. The estimated coefficients of these linear combinations can be seen as nuisance parameters.

The above equations must be slightly adapted for the PSID data. In the PSID, the frequency of interviewing was reduced from once a year to once every two years starting in 1997.[4] As a result, for the more recent years a lagged variable in the PSID model refers to a value two years ago. Hence in the model for the PSID data we include separate coefficients for the lagged variables for the case that the previous wave is one year ago and the case that the previous wave is two years ago.[5]

5. Results

Our focus in this research is on the dynamics of disability and labor force activity during the pre-retirement years. These labor market dynamics are likely to be very different than those that characterize the period of labor market entry when people are first entering the labor market. Therefore, we estimate our models on samples of people who are ages forty and over. Separate models are estimated for men and women given that the dynamics of labor force behavior are potentially very different.

A problem that requires special attention in an exercise like this is the international comparability of variable definitions. For example, if schools are organized in very different ways in different countries (as they are), it would be very difficult to know what it would mean to make comparisons across countries that 'assume' that the schooling levels of workers are the same.

For that reason we have only used a very limited set of covariates: age dummies for the age groups 40-44, 45-49, 50-54, 55-59, 60-64; year dummies; marital status (married or not, where married includes cohabitation) and two health dummies.

International comparability of self reported health is a very difficult problem in itself. Because of this, we have adopted the following simple approach: In the U.S. and European data respectively we find the weighted frequency distributions for ages 40-65 (balanced panel) in the top panel of Table 2. Based on this we collapse the five categories into three; combining the first two and the last two, essentially ignoring the wording

[4] To be precise, we use PSID waves 1994, 1995, 1996, 1997, 1999, 2001 and 2003.
[5] To be precise, for the years 1995, 1996, 1997, only the one year lags are included; for the years 1999, 2001, and 2003, only the two year lags are included.

differences. This leads to the distribution of self-reported health in the bottom panel of Table 2.

Table 2. Self-reported health in the PSID and the ECHP data

Original Classification			
U.S.		**E.U.**	
Excellent	21.3%	Very good	16.2%
Very good	26.6%	Good	43.4%
Good	29.5%	Fair	29.8%
Fair	10.1%	Bad	8.6%
Poor	2.5%	Very bad	2.0%
Combined Classification			
U.S.		**E.U.**	
Excellent	57.8	Excellent	59.6
Good	29.5	Good	29.8
Fair	12.7	Fair	10.6

The health distribution is now similar in the U.S. and the European countries. In the analysis section below, we discuss what the implications for work disability and labor market participation would be if health were 'the same' in all countries.

Table A4 summarizes for men and women separately some of the key dynamic parameters (relating disability and work) estimated from our empirical models. While there are differences between our estimates for men and women, these tend to be concentrated in the 'off-diagonal' terms – the effects of disability on work status or vice versa. In most countries (but not all), the effects of lagged disability on current disability is similar for men and women within each country. To the extent that the effect of lagged disability on current disability measures the pure transitions of work related health between the waves, the similarity between men and women may not be that surprising. In most countries, the effects of lagged employment on current employment are higher for men than for women. The traditionally more transitory nature of employment for women would imply a smaller estimated impact of lagged employment.

With the exception of Belgium and Finland, the estimated effects of disability on employment are somewhat larger (in absolute value) for men than for women. Disability programs whose generosity depends on a past series of contributions would imply greater generosity for men compared to women and this is what we find. Finally, the effects of lagged employment on disability may reflect in part the health effects of work. More likely this is picking up the unobserved effects of health, which is very incompletely captured in this data. Better health increases the likelihood of work and makes disability less likely.

Both disability and work status are highly persistent, and significantly so, across all countries. Current disability is negatively associated with current work status in most countries, and the relationship is particularly strong in the U.S. (and for women in Belgium). The evidence for lagged disability affecting current work status over and above the contemporaneous effect is weaker. There is evidence of lagged employment status affecting current work disability however.

As one would probably expect, the parameter estimates for the effects of lagged work status on current work status tend to be relatively low in the U.S., reflecting a higher turnover than in the European countries (both from working to not working and from not working to working). At the low end of the European scale in this respect are the UK and Spain with the other European countries demonstrating somewhat larger effects.

6. Discussion

To gain a better understanding of the differences between the countries, we carry out four simulations. The first simulation simply generates values of work and self-reported disability over the sample period in each country, using the estimated models. The second simulation replaces the country specific parameter estimates for the disability equation by the corresponding U.S. coefficients, but retains the own country work parameters. Conversely, the third simulation replaces the country specific parameter estimates of the work equation by U.S. coefficients, but retains the own country disability equation. Finally, the fourth simulation replaces the country specific parameters in both

equations by U.S. coefficients. In all simulations the initial conditions are generated according to the country specific estimates.

The figures in Appendix B present time paths of two variables: the percentage of individuals with a work disability and the percentage of individuals working. For each of these variables we produce four values, according to the four scenarios sketched above.

Let us first concentrate on work disability. The yellow and light blue lines represent the scenarios where the U.S. disability parameters are used (the yellow line) or where both the disability parameters and the work parameters come from the U.S. (the light blue line). The graphs suggest that the initial conditions only have an effect during the first couple of years of the simulations. The path of disability moves away from its initial position very quickly.

In countries where self-reported disability tends to be low, moving to U.S. parameters will lead to an increase in self-reported work disability. This is the case for female disability in Belgium, U.K., and the Southern European countries, and for disability among malesin the UK, Italy and Spain. In some other cases the simulations with U.S. parameters do not lead to very different time paths of disability, like for Belgian, Greek, and Portuguese males. In a number of countries, adopting U.S. parameters leads to a dramatic fall in disability. These cases include males and females in Germany and Finland, and females in Denmark and the Netherlands.

Another noteworthy aspect of the graphs is that the light blue and yellow lines tend to be on top of each other for most countries. This suggests that the feedback from work to disability is quantitatively similar to that in the U.S. (since the yellow line uses country specific work parameters this should generate deviations from the all U.S. light blue line if work had an appreciably different effect on disability in Europe compared to the U.S.). Cases where the feedback from work to disability appears to make a difference include females in The Netherlands, Belgium, Ireland, Italy, Greece, Spain and Austria. For males the difference in feedback from work to disability seems to be essentially immaterial, with the possible exception of Belgium. Inspecting the second column of Table A4, suggests that the cases with the biggest differences between the yellow and light blue lines are indeed the cases where the estimated values of γ_W^D, the effect of lagged work on disability, deviate most from the U.S. estimate.

Now consider the bottom part of the graphs, i.e. the simulation of employment under the different scenarios. The simulations with all U.S. coefficients lead to final values that are quite similar across countries: from 0.66 (Portugal) to 0.75 (Belgium, Ireland) for women, and from 0.76 (Germany) to 0.86 (several countries) for men. The main sources of differences are initial conditions and demographic and health differences. A second observation is that the simulation with all U.S. coefficients leads to the highest employment rate in almost all countries, although often it makes only a negligible difference whether European or US coefficients are used for the work disability equation. Exceptions are Italy and the UK where replacing EU disability coefficients by US coefficients leads to higher work disability and thus lowers employment. As a consequence, the highest employment rate is attained with US work and EU disability coefficients.

This argument, however, does not always work: to further isolate the effect of labor market institutions from the effect of disability, it is of interest to consider the difference between the yellow line (only disability parameters from the U.S.) and the light blue line (all parameters from the U.S.) in more countries. It is instructive to take The Netherlands as an example. When looking at females, we note that the simulation with U.S. disability coefficients but Dutch work coefficients yields essentially the same employment rate, despite the fact that disability is much lower with U.S. disability coefficients. Table A4 tells us immediately why this is so. The parameter γ_D^W is close to zero for Dutch females. We also note however that the light blue line (all U.S. parameters) is about 25 percentage points higher than the yellow line. This suggests that independent of the disability status of Dutch women, American institutions would generate a much higher employment rate. The story for Dutch males is qualitatively similar, but since the employment rate is already high, adopting U.S. coefficients can only have a limited effect. With this example in mind we observe that in all countries, with the possible exception of Denmark, the U.K. and Ireland, labor market institutions, rather than disability, cause the employment rate to be low relative to the U.S.

One can further investigate this by looking at the pink lines (EU disability parameters, but U.S. work parameters). The relevant comparison now is between the pink line and the dark blue line (all E.U. parameters). Once again we find that labor market

institutions explain the differences in employment rates, rather than differences in disability.

A different way to obtain insight into the different dynamics across the various countries is to consider transition matrices. These are given in Table A5 (for disability) and Table A6 (for work). These key dynamics relate to the transitions between work and non-work and disability and non-disability. Each can be summarized by two off- diagonal transitions. For work, the two transitions are the transition from work to non-work and the transition from non-work to work. Similarly for disability the off-diagonal transitions are from not disabled to disabled and from disabled to not disabled. Since our interest concerns how all these transition patterns vary across our set of countries, Tables A7 (for disability) and A8 (for work) summarize the key parameters by organizing them by the magnitude of the transitions with the country names attached. Finally, since the U.S. will be the benchmark for all countries in our simulations we list the U.S. parameter at the bottom of each list.

Consider first the disability transitions. We observe considerable variation in the inflow rates into disability (the transition from being not disabled in one period to being disabled the next period). For men these rates vary from 18% in Germany to 4% in the U.S., U.K., and Italy. For women the rates vary from 21% in Germany to 5% in Ireland, Italy, and Belgium. The U.S. is near the bottom with 6%. On the other hand outflow rates out of disability (the transition from being disabled in one period and not disabled in the next period) vary less, at least in relative terms. For men the rates vary from 42% in Italy to 23% in Germany and Denmark, while for women the rates vary from 49% in Italy to 22% in Germany.

There are a number of salient patterns to these disability transitions. First, while the levels differ between men and women, the country rankings are remarkably similar by gender suggesting that the variation across countries is at least partly due to institutional variation affecting men and women in a similar way. To illustrate, Germany ranks highest on the transition into disability for both sexes while Italy ranks highest in the transition from work disability into non-work disability. Second, for almost all the countries listed there exists considerable churning between work and non-work disability indicating that work disability is far from a permanent condition even at these older ages

(cf. Kapteyn, Smith and Van Soest, 2007). Consequently, cross-sectional analysis of work disability status will not be able to capture some of the main features of work disabilities during the pre-retirement years. Third, compared to the European countries, the U.S. ranks very low on the transition into work disability while it ranks in the middle of the pack in the transitions out of work disability.

Work disability will tend to be high when the transition into work disability is high while the transition out of work disability is low. Germany, Denmark, and Finland would be the best prototypes of such behavior. On the other hand, other countries have a relatively low transition into disability matched with a relatively high transition out of disability. Italy, Greece, and Spain would be good illustrations of that behavior and in those countries the steady state levels of work disability will be low.

Consider next the ranking of the transitions between work and non-work for countries listed in Table A8. First, we note that the variation in transitions from work to non-work varies less across countries than the transitions from non-work to work. Thus most of the variation across countries in labor market dynamics relates to whether persons who are out of the labor force are likely to transit back into the labor force. To illustrate, for men, transition rates from non-work to work vary from 31% in the U.K. to as low as 3% in Austria and Belgium. Indeed the countries where moving back into the labor force appears to be least likely, are very similar for men and women alike. These countries would include Italy, France, Belgium, and Austria.

In contrast, the U.S. has a relatively high rate of transition back into the labor force for both sexes compared to all countries. It is in comparisons between the U.S. and Italy, France, Belgium, and Austria, that the effects on employment are quite dramatic. For example, the chart for Austria in Appendix B shows a very low employment rate towards the end of the observation period. For women, among the European countries the U.K. has the highest inflow into employment (16%), while Belgium has the lowest inflow (3%). The chart for Belgium in Appendix B confirms that female employment in Belgium is very low in comparison with other countries.

In sharp contrast, Table A8 shows much less variation in transitions from work to non-work especially for men. The full range of values for men in Table A8 is only from 0.03 (Denmark) to 0.08 (Germany) with the U.S. at a value of 0.07. In fact, eight of the

thirteen European countries in Table A8 for men lie within two percentage points of the U.S. transition value from work to not work. Thus, the source of the labor market dynamic differences amongst these countries appears not to lie in the ease or difficulty of the transition from work to not-work. Instead, it is the relative rigidity of some European countries in discouraging re-entry into the labor force that appears to be the major issue.

This is further illustrated by Table A9. The last four columns of Table A9 contain the same transition rates as Table A8, but in addition the first two columns contain measures of employment protection and replacement rates at retirement. The employment protection measure is taken from OECD (2004) and is the sum of three main components reflecting respectively (1) difficulty of dismissal, (2) procedural inconveniences an employer faces in the dismissal process, (3) severance pay provisions (OECD, 2004, p. 65). The measure presented here is "version 2, late 1990s" (see Table 2.A2.4 in OECD, 2004). The replacement rate shown in the table is the replacement rate of a worker with average earnings in a country, as calculated in OECD (2005). The countries in Table A9 have been ranked according to the employment protection measure. Somewhat remarkably it is particularly the transitions from non-work to work that are affected by the employment protection index: for both women and men, more employment protection implies a smaller transition rate back into employment. A similar finding is reported in OECD (2004). On the other hand the protective effect seems to be limited; transition rates out of employment do not correlate significantly with the employment protection measure.

In view of the age range we are considering, a measure of a retirement replacement rate has been included, since one would expect that some workers who are temporarily out of the labor force will transit into retirement rather than back into employment if that alternative is sufficiently attractive. Table A9 indeed shows the expected negative correlation. However, when regressing the transition rates on both the employment protection measure and the replacement rate measure we find the former to be significant, but not the latter.

7. Conclusion

In this paper, we have investigated the dynamics of labor force and work disability behavior among individuals between 40 and 65 in several Western European countries and the United States. We estimated the dynamics of labor force and disability behavior separately for men and women using high quality panel data in 13 European countries and the United States. We find substantial differences in labor force dynamics between the countries. Adopting U.S. parameters (i.e. U.S. institutions and norms) often leads to considerable reductions in self-reported disability. Although this has some effect on employment rates, most of the action is in the labor market institutions themselves, where adopting U.S. coefficients may generate substantially higher employment rates. Comparison of transition rates with aggregate measures of employment protection suggests that these play a major role in generating the observed differences across countries.

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Appendix A: Tables

Table A1. Overview of ECHP waves

	Sub-sample																	
	B	DK	D		EL	E	F	Irl	I	L		NL	A	P	Fin	S	UK	
			Echp	Soep						Echp	Psell						Echp	Bhps
1994											■		■		■	■		
1995															■	■		
1996																■		
1997			■							■							■	
1998			■							■							■	
1999			■							■							■	
2000			■							■							■	
2001			■							■							■	

Table A2. Selected characteristics of disability pension policies across countries

	Qualifiying conditions		Benefits
	Loss of earning capacity	**Minimum period of contributions**	**Permanent disability**
Austria	>= 50% compared to person with the same education	60 months +1 month for each month from age 50) in the last 10 years (plus 2 months for each month from age 50)	60% of assessment base (=average earnings in the best 16 years, up to an annual maximum of €3,013)
Belgium	2/3 in the usual occupation	6 months, incl. 120 days of actual/credited work	65% of lost earnings (s.t. ceiling) for an insured w/ dependents; 40% if no dependents; 50% if no dependents but living w/ others with no income. Payable >1 year disability (1st year-sickness benefit)
Denmark	Reduced working capacity & inability to assure subsistence	Disability pension & supplement (both income-tested) payable age 18 64 w/ >=3 years' residence from age 15	13,895 kroner monthly for single, 11,810 kroner if not living alone; disability supplement (income test): 6,000 kroner a year
Finland	60% if earnings-related disability pension	Universal disability pension (income-tested) - oermanent incapacity for suitable work	Universal dis.- Income tested €11.21 to €496.38 a month; earnings-related disability: 1.5% of wage for each year of service up to disability onset
France	2/3 of earning capacity in any occupation under age 60	12 months insurance before disability onset and 800 hrs employment in lats 12 months	50% of average earnings in the best paid 10 years if incapable of any professional activity, up to a maximum of €1,238 a month. Partial disability 30% of average earnings in best ys, min pension €241/month
Germany	Full reduction (can't work >3 hours/day in any form of employment) or partial reduction (can't work >6 hours/day in any form of employment)	5 years of contributions and 36 months of compulsory contributions in the last 5 years	Total of individual earnings points (individual annual earnings divided by the average earnings of all contributors multiplied by the entry factor) multiplied by pension factor and pension value.
Greece	at least 80% disabled	max 4,500 days of contributions (1,500 days if the insured began working after 1993); 300 days if younger than 21	For an assessed degree of disability of 80% or more (severe), 100% of the pension is paid; for an assessed degree of disability of 67% to 79.9% (ordinary), 75% of the pension paid; min pension €392.16/month.

Ireland	invalidity pension - permanent incapacity for work; disability allowance (means-tested): aged 16-66, physically/mentally disabled	260 weeks of paid contributions with 48 weeks paid or credited in the last tax year.	invalidity pension: €140.30 a week; €167.30 a week if aged 65 or older; disability allowance (means-tested): up to €134.80 a week, + €89.40 a week for a qualified adult and €16.80 for each dependent child
Italy	Total and permanent inability to perform any work.	5 years of contributions, including 3 in the 5 years before the claim. No other forms of income, including earnings from self-employment and unemployment benefits	Pension based on a progressive percentage (0.9% to 2%) of salary multiplied by the number of years of contributions, up to a maximum of 40
Netherlands	at least 80% of earning capacity in the current occupation for full pension	Partial pension: The loss of 15% to 80% of earning capacity for employed workers	Up to 70% of earnings for loss of earning capacity of at least 80%; 14% to 50.75% of earnings for a loss of earning capacity of 15% to 80%. €167.70 a day max
Portugal	2/3 of earning capacity	5 years of contributions (120 days of registered pay)	2% of average adjusted lifetime salary for each year of contributions
Spain	Loss of normal earning capacity	1/4 of period from age 20 to the onset of disability, with at least 5 years of contributions and at least 1/5 of the required contributions in the last 10 years	Permanent total disability, pension 100% of the benefit base (min €411.76). For permanent occupational disability, award 55% of benefit base, plus 20% if aged 55+ & not employed (min €411.76).
Sweden	Work capacity reduced by at least one quarter	Earnings-related sickness compensation independent of insurance periods	94,320 kronor for an insured person with 40 years of residence and without an earnings-related benefit
Switzerland	at least 40% disabled	contributions in all years from age 21. Special pension for nationals not meeting required min contribution period for disability base pension	9,146 francs a year plus a variable amount calculated by multiplying annual income by 13/600 if income <37080
UK	Long-term incapacity benefit & disability living allowance (noncontributory, no means test)	3 years before the claim, age before 65	Long-term incapacity benefit £72.15 a week, plus £43.15 a week for a dependent adult. Allowance £57.20, £38.30, or £15.15 a week according to needs
US	Disability pension: Incapable of permanent substantial gainful activity; Disability supplemental income benefit (means-tested): disabled & blind persons age <65 low income	Quarter of coverage for each year since age 21 up to the year of the onset of disability, up to a maximum of 40 quarters of coverage, 20 quarters of coverage in the 10-year period	pension based on the average covered earnings since 1950 (or age 21, if later) and indexed for past wage inflation, up to the onset of disability, excluding up to 5 years with the lowest earnings. max monthly pension $2,036 (certain conditions)

Source: SSA, Social Security Programs Throughout the World: Europe, 2004
http://www.ssa.gov/policy/docs/progdesc/ssptw/2004-2005/europe/

Table A3. Disability benefits in OECD countries: Men, Late 1990s

	% of disability benefit recipients declaring that they are not disabled	% of disabled persons ages 20-64 with neither income from work nor income from benefits	Annual rates of outflow from disability benefits	Relative employment rate of disabled persons age 20-64 vs. non-disabled ages 20-64	Relative income from work of disabled over non-disabled persons working	Relative average personal income of disabled persons working over disabled persons not working
Austria	27,7	14,2	1,04	0,60	0,97	1,96
Germany	n/a	11,9	1,25	0,67	0,92	1,79
Sweden	48,9	1,1	n/a	0,69	0,70	1,37
Netherlands	30,6	19,5	3,34	0,60	0,87	1,45
Spain	18,3	28,0	0,57	0,41	0,86	2,07
Italy	43,9	28,8	n/a	0,60	0,94	1,94
Portugal	28,6	20,9	0,97	0,59	n/a	1,81
France	33,3	11,7	n/a	0,72	n/a	1,83
Denmark	26,2	6,3	n/a	0,61	0,88	1,38
UK	43,3	9,1	5,64	0,53	0,84	1,61
US	46,7	18,8	1,16	0,58	0,71	2,84
Switzerland	29,8	14,2	n/a	0,79	0,98	n/a
Belgium	43,4	16,2	n/a	0,54	0,90	1,91

n/a - data not available

Source: ***OECD (2003a, Chapter 3, Tables 3.7 and 3.8)***

These tables are summaries of more detailed information in OECD (2003b).

The underlying data sources are ECHP 1996 or 1997 for the European countries and SIPP for the U.S.

Table A4. Work disability and employment dynamics: Key parameter estimates

		Disability Equation		Work Equation		
		Lagged Disability	Lagged Employment	Lagged Disability	Lagged Employment	Current Disability
		γ_D^D	γ_W^D	γ_D^W	γ_W^W	δ_D^W
Germany	Men	0.725	-0.422	-0.432	1.973	-0.200
	Women	0.572	-0.244	-0.285	1.356	-0.143
Denmark	Men	1.011	-0.763	-0.587	1.841	-0.575
	Women	0.780	-0.743	-0.559	1.826	-0.497
Netherlands	Men	0.842	-0.789	-0.236	2.007	-0.762
	Women	0.854	0.041	-0.068	1.516	-0.095
Belgium	Men	1.225	0.231	-0.193	3.105	-0.211
	Women	0.983	-1.344	-0.500	2.452	-1.221
France	Men	0.814	-0.348	-0.234	2.541	-0.306
	Women	0.875	-0.446	-0.184	2.495	-0.139
UK	Men	1.153	-0.249	-0.037	1.541	-0.157
	Women	0.835	-0.244	-0.075	1.418	0.037
Ireland	Men	0.948	-0.728	-0.197	2.034	-0.670
	Women	1.133	-0.03	-0.073	1.723	-0.532
Italy	Men	1.023	-0.315	-0.198	2.093	-0.403
	Women	0.683	0.011	0.012	1.725	-0.076
Greece	Men	0.935	-0.255	0.165	2.063	-0.411
	Women	0.931	-0.122	-0.021	1.510	-0.161
Spain	Men	0.738	-0.665	-0.650	1.701	-0.541
	Women	0.749	-0.147	-0.239	1.175	-0.416
Portugal	Men	1.021	-0.104	0.127	2.316	-0.459
	Women	0.958	-0.097	-0.108	1.920	-0.110
Austria	Men	0.758	-0.437	-0.375	2.863	-0.444
	Women	0.936	-0.266	-0.413	2.213	-0.199
Finland	Men	0.977	-0.348	-0.284	1.765	-0.284
	Women	0.978	-0.038	-0.363	1.403	-0.524
U.S.	Men	1.064	-0.643	-0.308	1.643	-0.995
	Women	0.841	-0.558	-0.202	1.447	-0.778

Notes to table A4:
Results for the U.S. are coefficients on one-year lagged variables although two-year lags are also included to control for the varying periodicity of PSID data. All specifications also include year dummies, controls for education, age group, marital status, self-reported general health status, and (in the U.S. case) ethnicity. Equations for the initial conditions use the same variable.

Table A5. Transition Probabilities for Disability Status Actual

	Men		Women	
	Not Disabled	Disabled	Not Disabled	Disabled
Germany				
Not Disabled	0.82	0.18	0.79	0.21
Disabled	0.23	0.77	0.22	0.78
Prevalence Equilibrium				
Denmark				
Not Disabled	0.82	0.12	0.88	0.12
Disabled	0.23	0.77	0.28	0.72
Netherlands				
Not Disabled	0.92	0.08	0.89	0.11
Disabled	0.29	0.71	0.26	0.74
Belgium				
Not Disabled	0.95	0.05	0.95	0.05
Disabled	0.34	0.66	0.29	0.71
France				
Not Disabled	0.91	0.09	0.90	0.10
Disabled	0.31	0.69	0.30	0.70
UK				
Not Disabled	0.96	0.04	0.93	0.07
Disabled	0.26	0.74	0.31	0.69
Ireland				
Not Disabled	0.93	0.07	0.95	0.05
Disabled	0.31	0.69	0.34	0.65
Italy				
Not Disabled	0.96	0.04	0.95	0.05
Disabled	0.42	0.58	0.49	0.51
Greece				
Not Disabled	0.94	0.06	0.93	0.07
Disabled	0.37	0.63	0.37	0.63
Spain				
Not Disabled	0.93	0.07	0.91	0.09
Disabled	0.37	0.63	0.40	0.60
Portugal				
Not Disabled	0.92	0.08	0.90	0.10
Disabled	0.28	0.72	0.27	0.74

Austria				
Not Disabled	0.91	0.09	0.91	0.09
Disabled	0.35	0.65	0.36	0.64
Finland				
Not Disabled	0.88	0.12	0.87	0.13
Disabled	0.25	0.75	0.26	0.74
United States				
Not Disabled	0.96	0.04	0.94	0.06
Disabled	0.26	0.74	0.29	0.71

Table A6. Transition Probabilities for Labor Force Status Actual

	Men		Women	
	Doesn't work	Works	Doesn't work	Works
Germany				
Doesn't work	0.89	0.11	0.91	0.09
Works	0.08	0.92	0.10	0.90
Denmark				
Doesn't work	0.84	0.16	0.86	0.14
Works	0.03	0.97	0.06	0.94
Netherlands				
Doesn't work	0.86	0.14	0.92	0.08
Works	0.04	0.96	0.09	0.91
Belgium				
Doesn't work	0.97	0.03	0.97	0.03
Works	0.04	0.96	0.07	0.93
France				
Doesn't work	0.92	0.08	0.94	0.05
Works	0.05	0.95	0.06	0.93
UK				
Doesn't work	0.69	0.31	0.84	0.16
Works	0.06	0.94	0.10	0.90
Ireland				
Doesn't work	0.87	0.13	0.93	0.07
Works	0.04	0.96	0.11	0.89
Italy				
Doesn't work	0.91	0.09	0.97	0.03
Works	0.07	0.93	0.10	0.90
Greece				
Doesn't work	0.88	0.12	0.94	0.07
Works	0.05	0.95	0.15	0.85
Spain				
Doesn't work	0.85	0.15	0.94	0.06
Works	0.07	0.93	0.14	0.86
Portugal				
Doesn't work	0.89	0.12	0.92	0.08
Works	0.04	0.96	0.09	0.91

Austria				
Doesn't work	0.97	0.03	0.96	0.04
Works	0.07	0.93	0.09	0.91
Finland				
Doesn't work	0.87	0.13	0.87	0.13
Works	0.06	0.94	0.07	0.93
United States				
Doesn't work	0.80	0.20	0.74	0.2603
Works	0.07	0.93	0.037	0.97

Table A7.

Ordering of Transitions in Disability States by Country

A. Not Disabled to Disabled

Men		*Women*	
Transition	Countries	Transition	Countries
.18	Germany	.21	Germany
.12	Denmark, Finland	.13	Finland
.09	France, Austria	.12	Denmark
.08	Netherlands, Portugal	.11	Netherlands
.07	Ireland, Spain	.10	France, Portugal
.06	Greece	.09	Austria, Spain
.05	Belgium	.07	Greece, UK
.04	Italy, UK	.05	Belgium, Ireland, Italy
	U.S. = .04		U.S. = .06

B. Disabled to Not Disabled

Men		*Women*	
Transition	Countries	Transition	Countries
.42	Italy	.49	Italy
.37	Greece, Spain	.40	Spain
.35	Austria	.37	Greece
.34	Belgium	.36	Austria
.31	France, Ireland	.34	Ireland
.29	Netherlands	.31	UK
.28	Portugal	.30	France
.26	UK	.29	Belgium
.25	Finland	.28	Denmark
.23	Germany, Denmark	.27	Portugal
		.26	Netherlands, Finland
		.22	Germany
	U.S. = .26		U.S. = .29

Table A8

Ordering of Work Transitions by Country

A. Work to Not Work

Men		*Women*	
Transition	Countries	Transition	Countries
.08	Germany	.15	Greece
.07	Italy, Spain, Austria	.14	Spain
.06	UK, Finland	.11	Ireland
.05	France, Greece	.10	Germany, UK, Italy
.04	Netherlands, Belgium	.09	Netherlands, Portugal, Austria
	Ireland, Portugal	.07	Belgium, Finland
.03	Denmark	.06	Denmark, France
	U.S. = .07		U.S. = .04

B. Not Work to Work

Men		*Women*	
Transition	Countries	Transition	Countries
.31	UK		
.16	Denmark	.16	UK
.15	Spain	.14	Denmark
.14	Netherlands	.13	Finland
.13	Ireland, Finland	.09	Germany
.12	Greece, Portugal	.08	Portugal, Netherlands
.11	Germany	.07	Ireland, Greece
.09	Italy	.06	Spain
.08	France	.05	France
.03	Belgium, Austria	.04	Austria
		.03	Belgium, Italy
	U.S. = .20		U.S. = .26

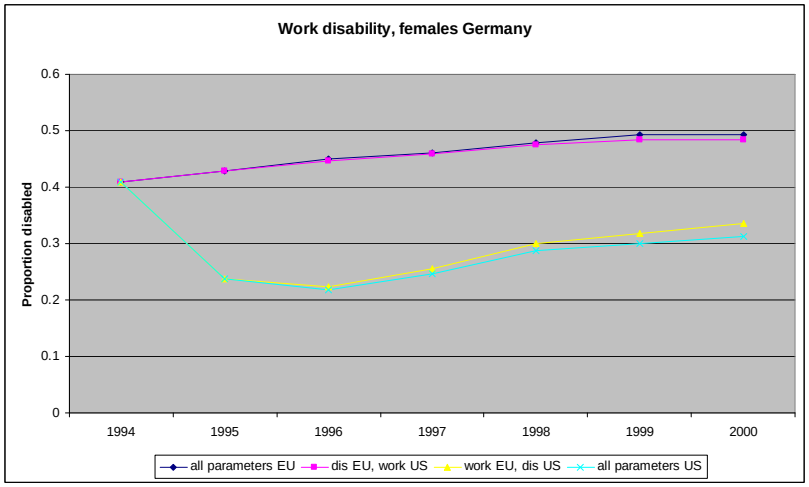
Table A9: Transition rates, employment protection, and retirement replacement rates

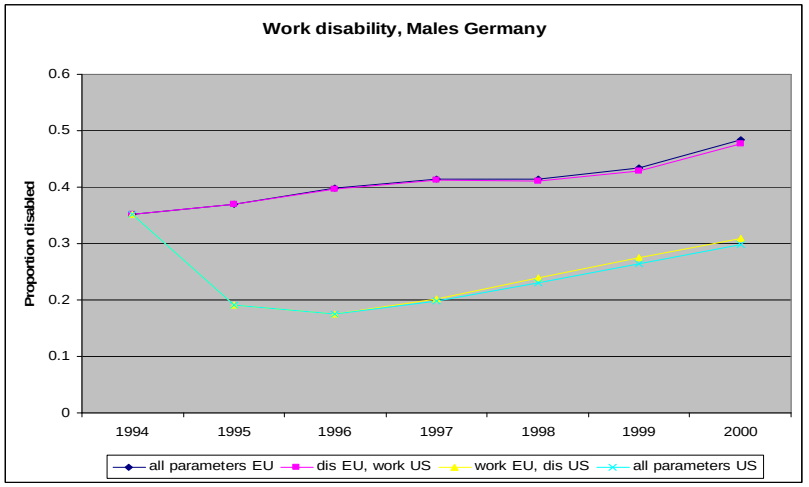
			Men		Women	
	OECD employment protection measure	replacement rate at median	work to not work	not work to work	work to not work	not work to work
Portugal	3.7	79.8	0.04	0.12	0.09	0.08
Greece	3.5	99.9	0.05	0.12	0.15	0.07
Italy	3.1	88.8	0.07	0.09	0.1	0.03
Spain	3	88.3	0.07	0.15	0.14	0.06
France	2.8	68.8	0.05	0.08	0.06	0.05
Germany	2.6	71.8	0.08	0.11	0.1	0.09
Belgium	2.5	63.1	0.04	0.03	0.07	0.03
Austria	2.4	93.2	0.07	0.03	0.09	0.04
Netherlands	2.3	84.1	0.04	0.14	0.09	0.08
Finland	2.2	78.8	0.06	0.13	0.07	0.13
Denmark	1.8	54.1	0.03	0.16	0.06	0.14
Ireland	1.2	36.6	0.04	0.13	0.11	0.07
UK	1	47.6	0.06	0.31	0.1	0.16
U.S.	0.7	51	0.07	0.2	0.04	0.26
correlation with OECD measure*		0.81 [.001]	-0.02 [.96]	-0.57 [.03]	0.45 [.10]	-0.7 [.005]
correlation with replacement rate*			0.28 [.32]	-0.46 [.09]	0.46 [.10]	-0.5 [.07]

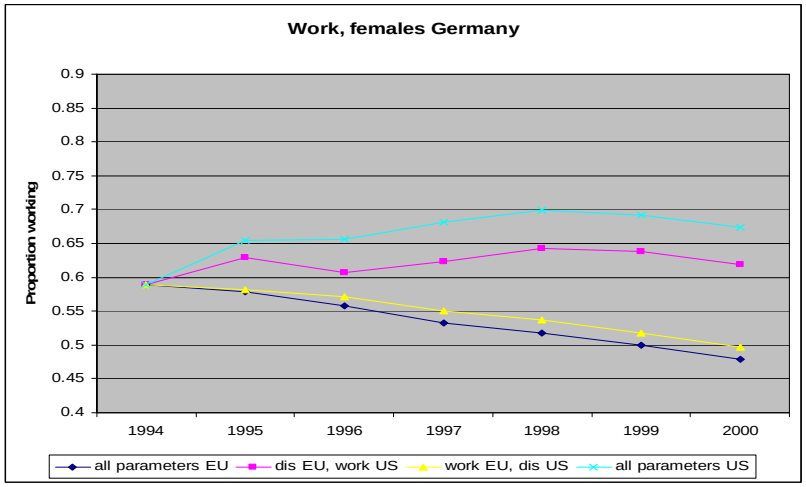
* Significance level in square brackets

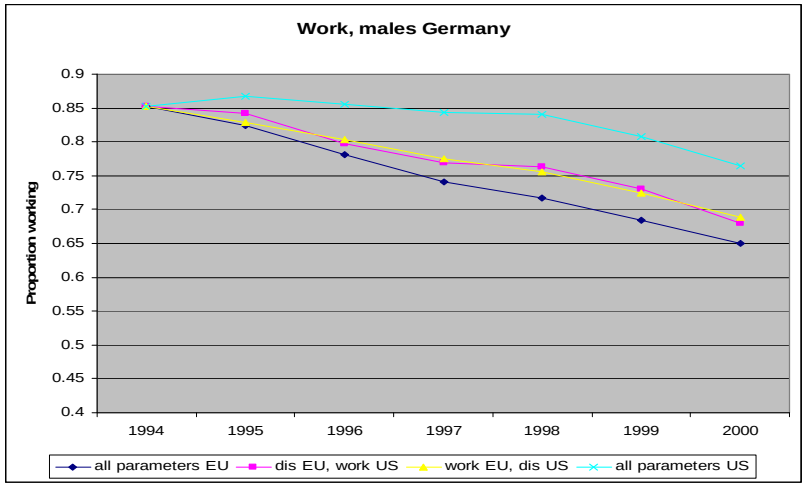
Explanation: See text

Appendix B: Simulated Time Paths of Mild and Severe Disability and of Labor Force Status


Work disability, females Germany
Proportion disabled
0.6
0.5
0.4
0.3
0.2
0.1
0
1994
1995
1996
1997
1998
1999
2000
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work disability, Males Germany
Proportion disabled
0.6
0.5
0.4
0.3
0.2
0.1
0
1994
1995
1996
1997
1998
1999
2000
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work, females Germany
Proportion working
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.55
0.5
0.45
0.4
1994
1995
1996
1997
1998
1999
2000
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work, males Germany
Proportion working
0.9
0.85
0.8
0.75
0.7
0.65
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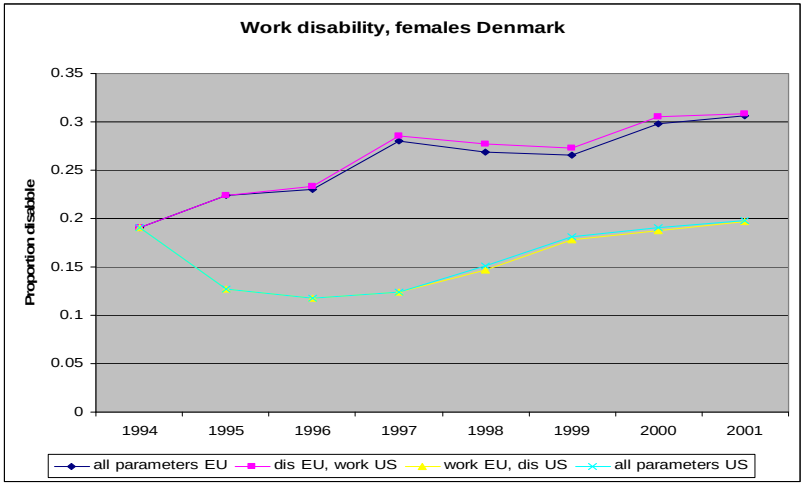
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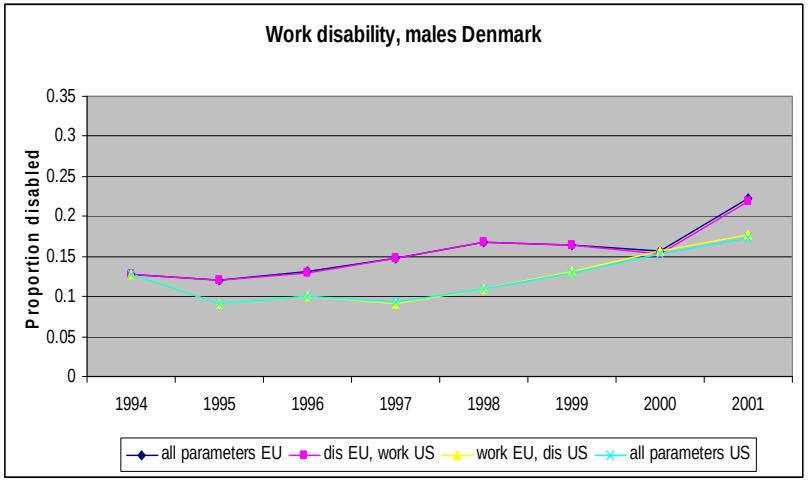
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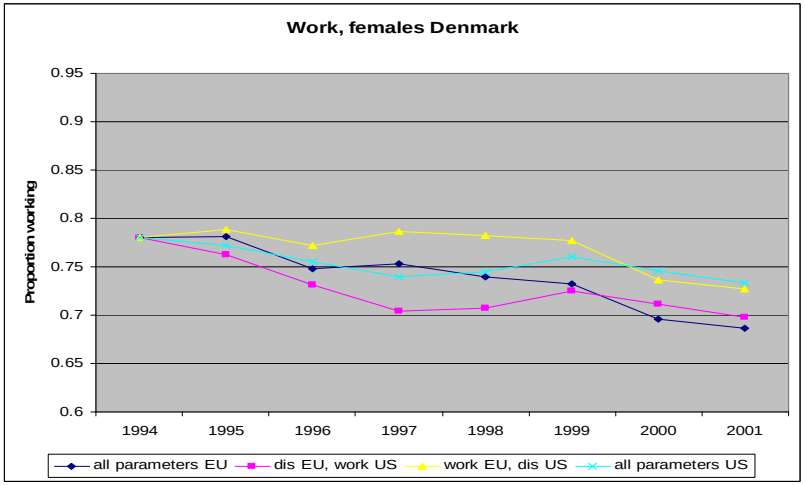
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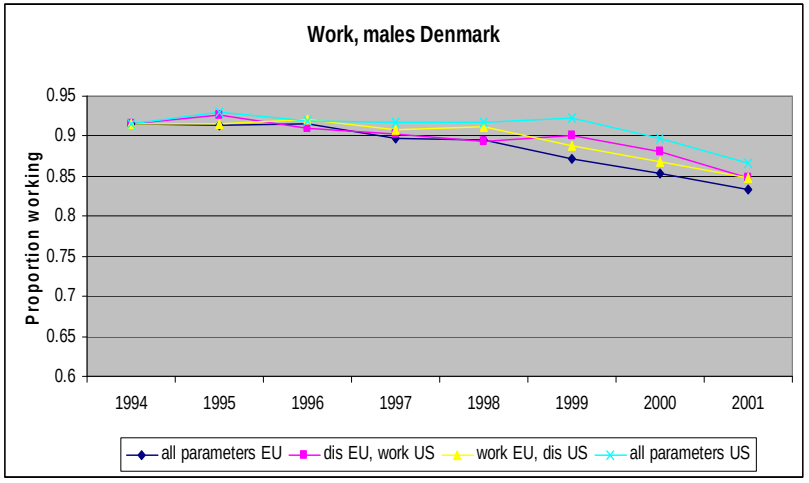
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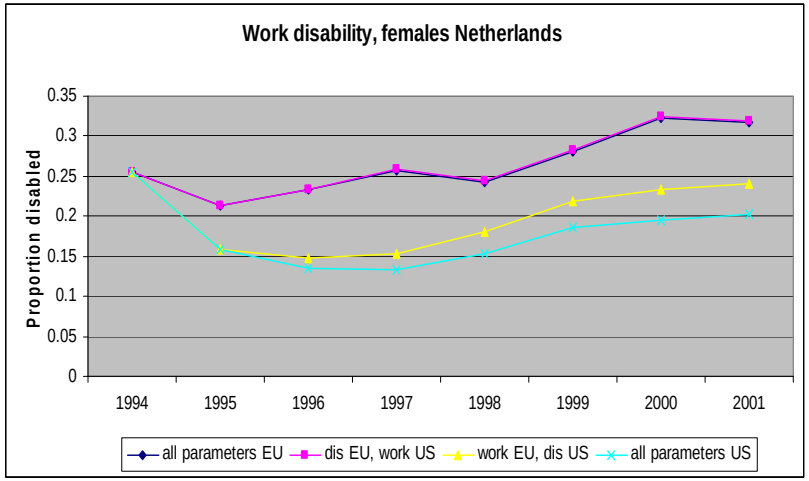
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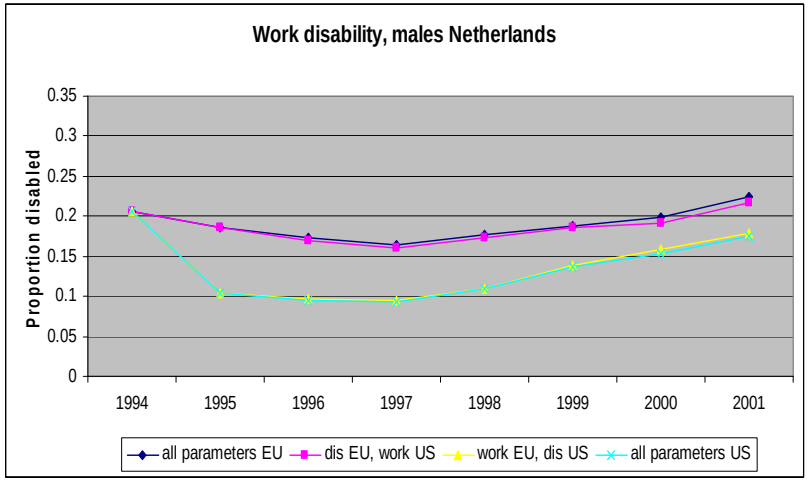
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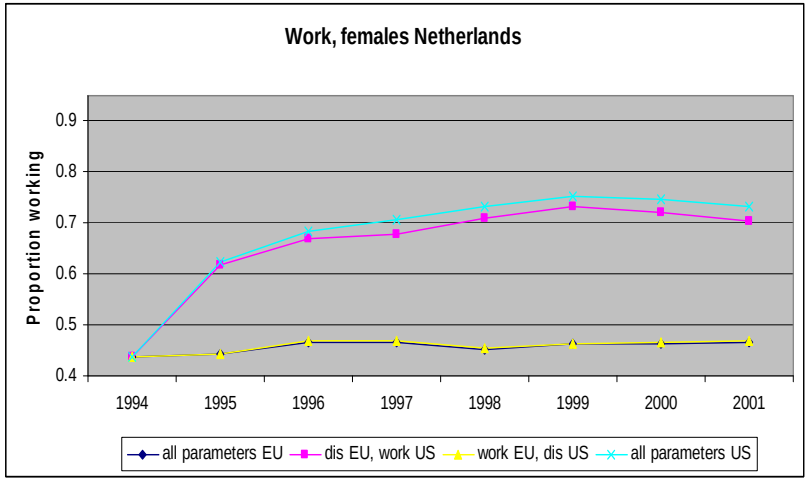
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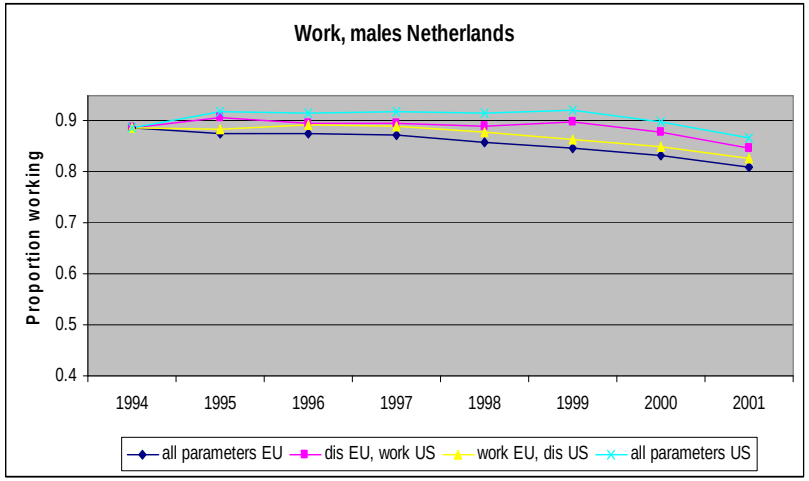
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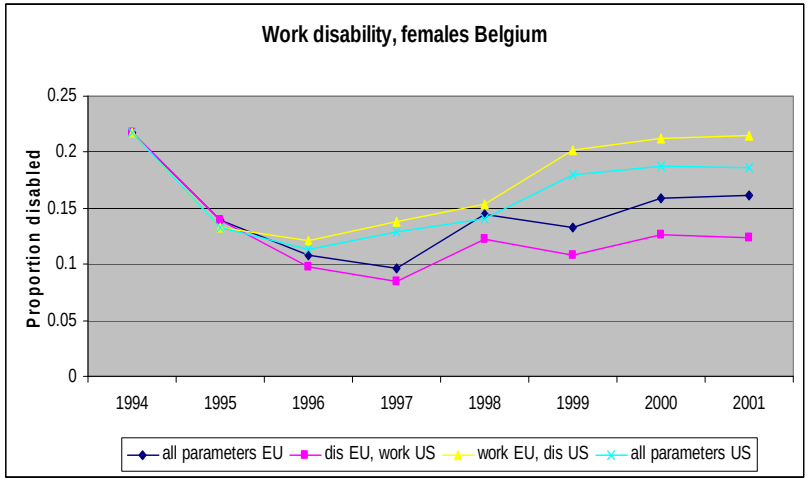
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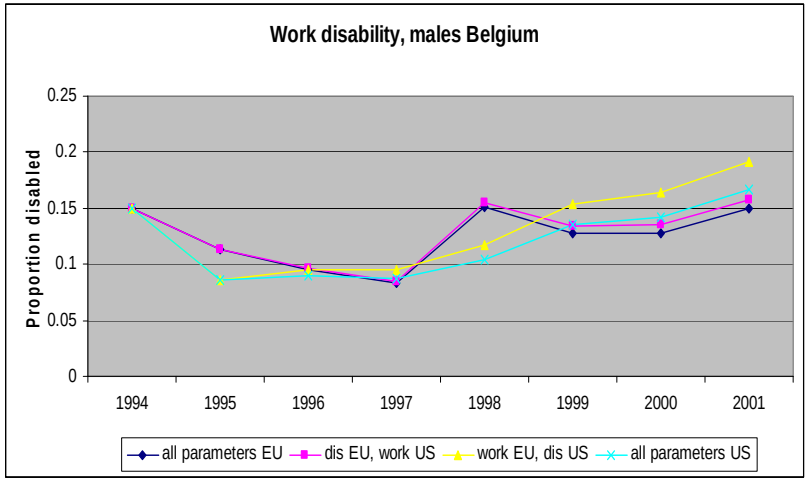
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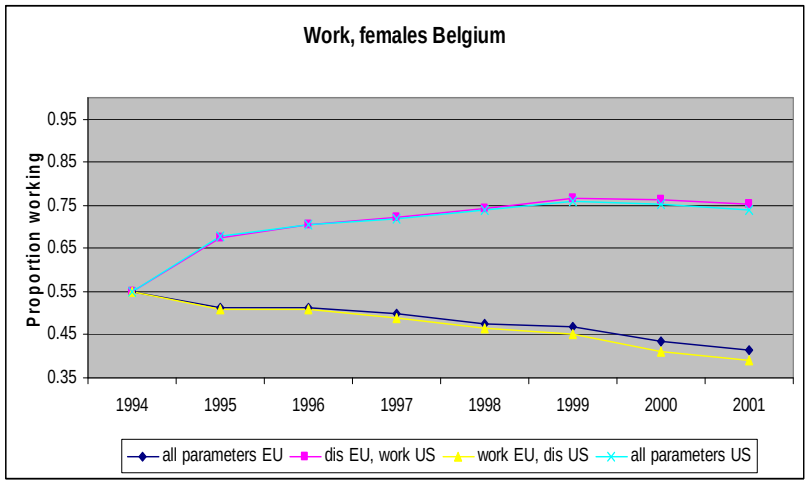
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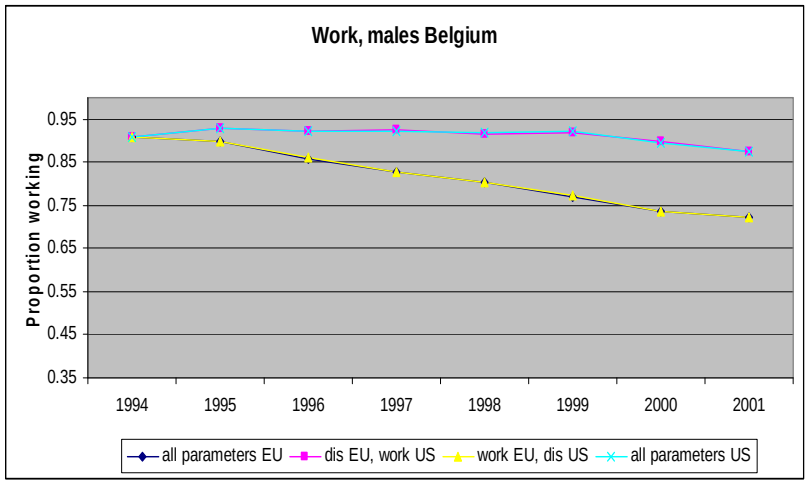
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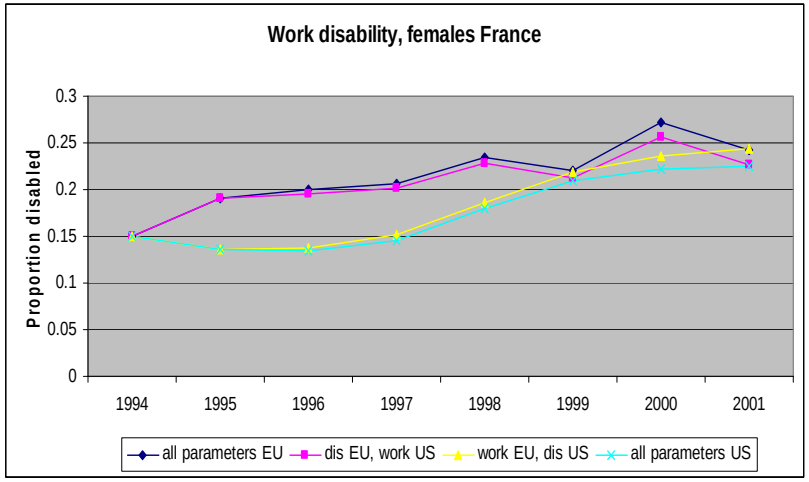
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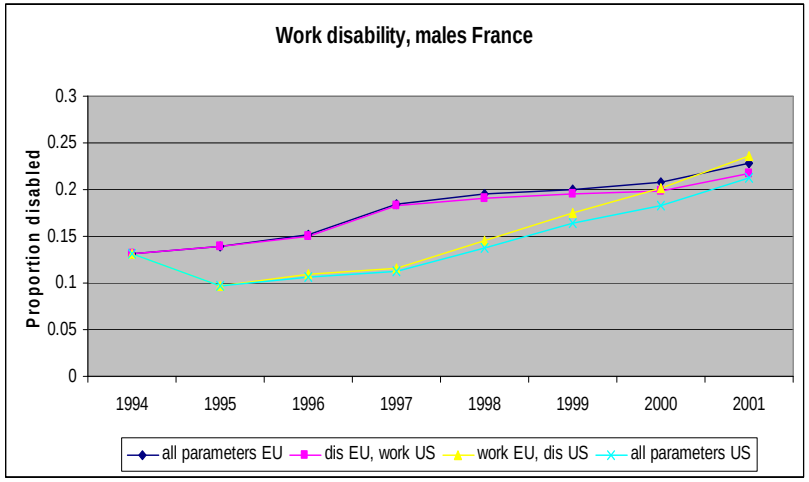
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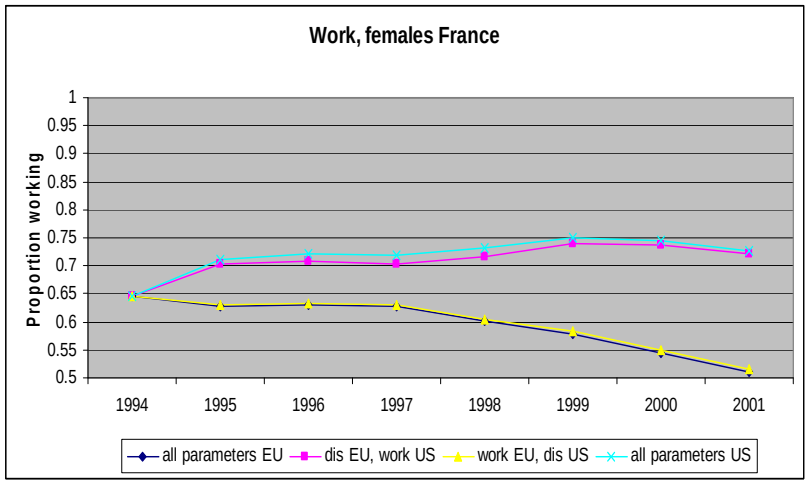
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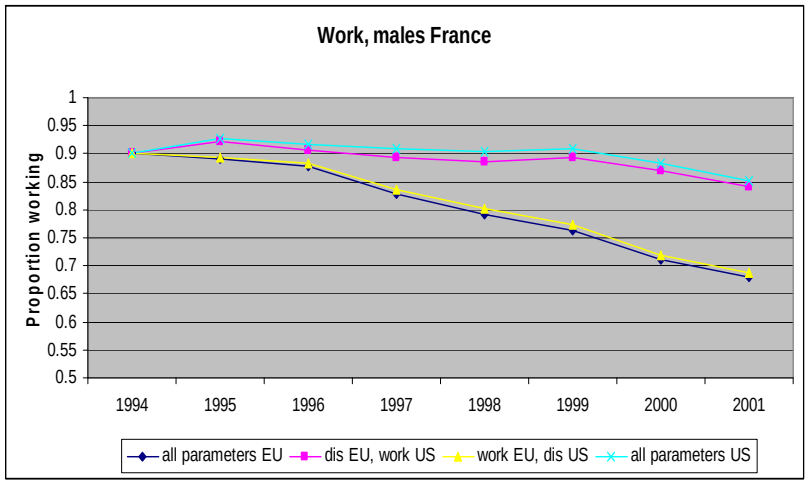
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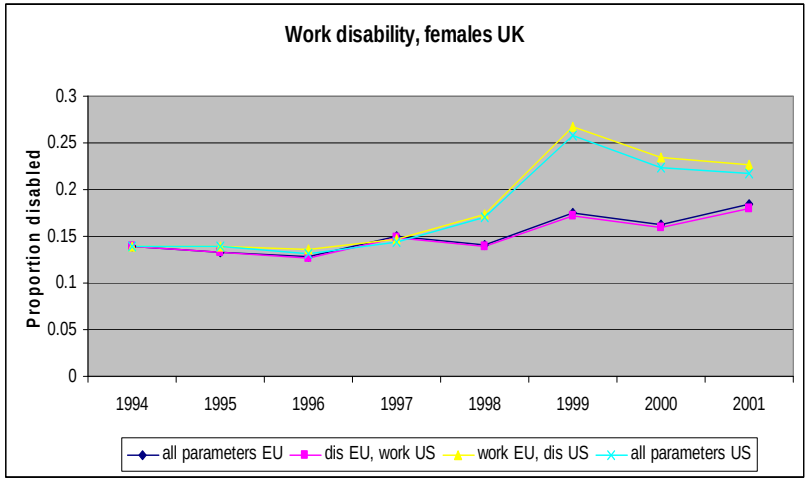
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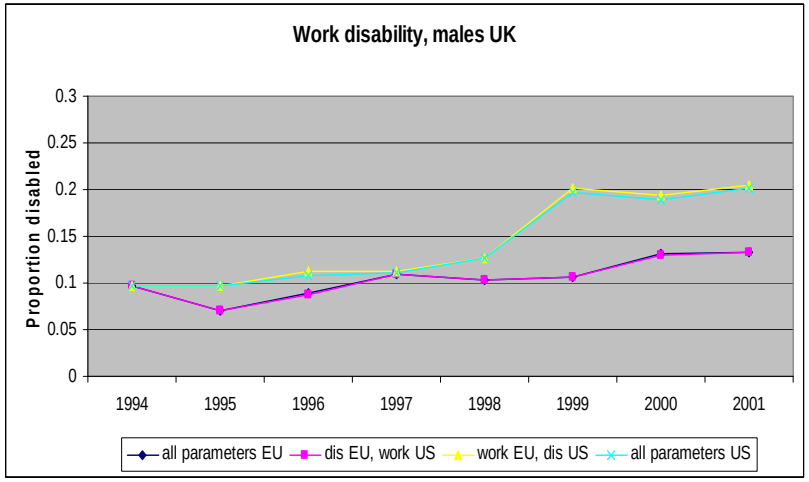
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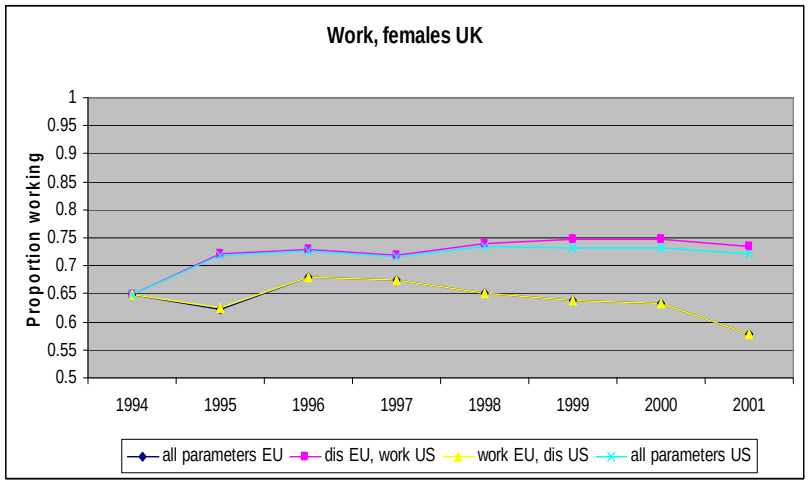
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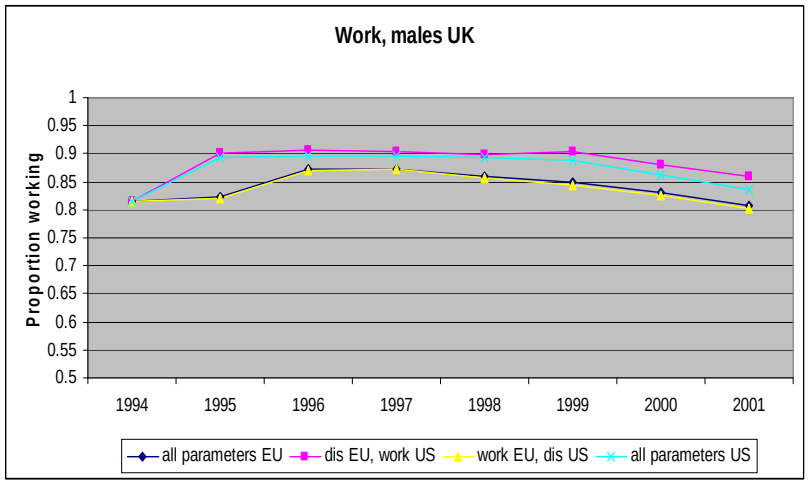
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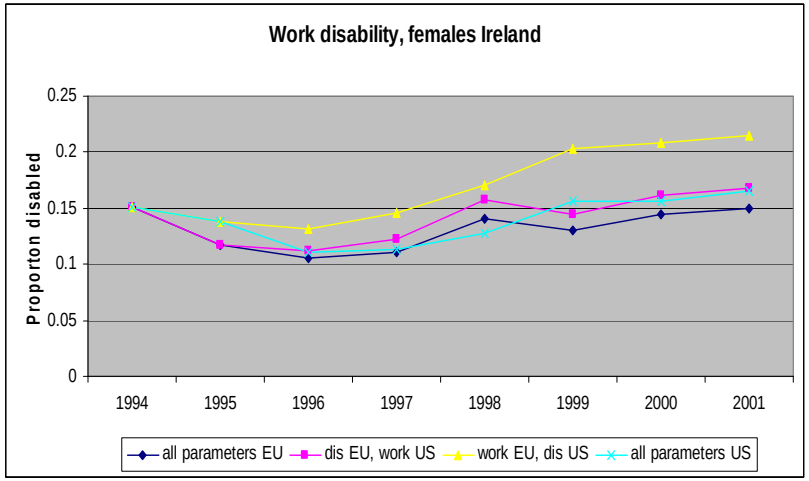
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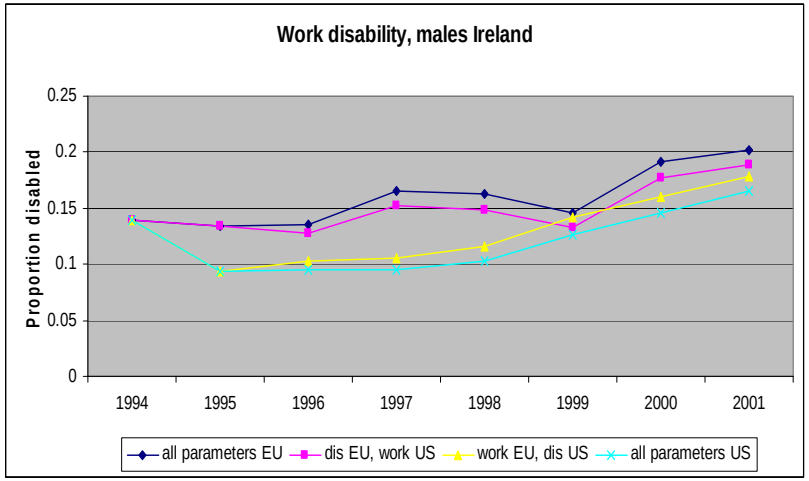
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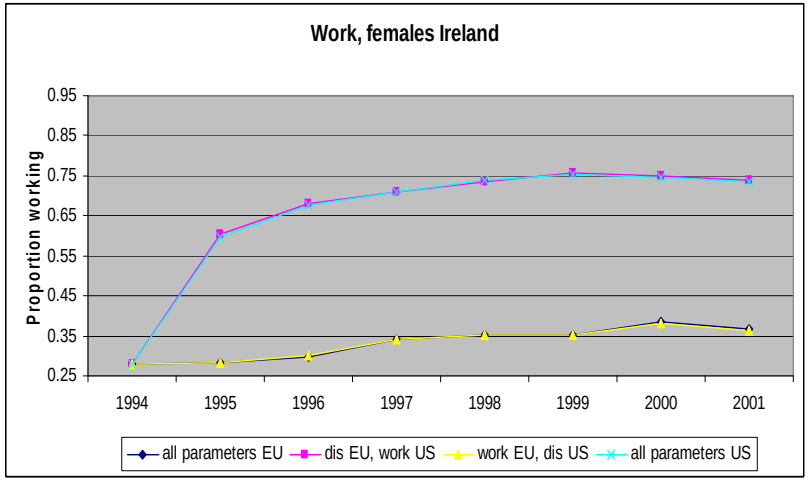
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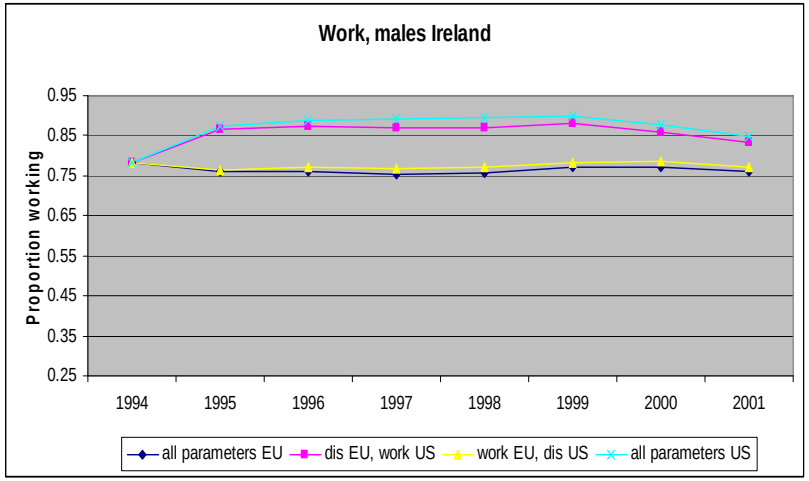
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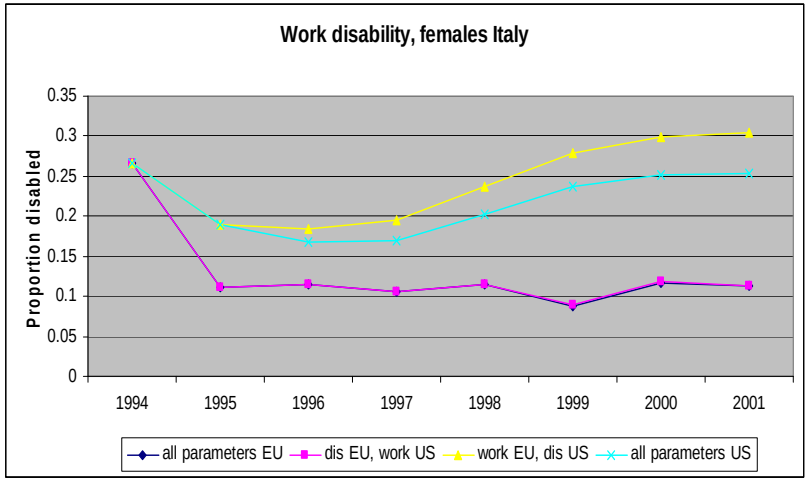
Work disability, females Italy
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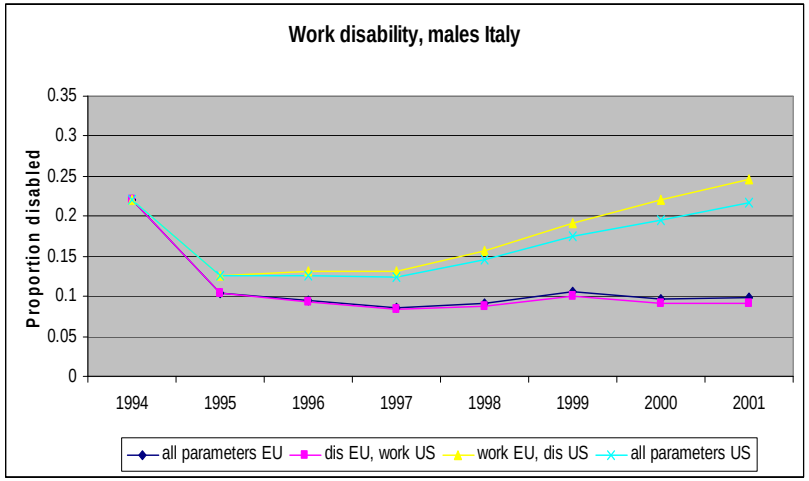
Work disability, males Italy
Proportion disabled
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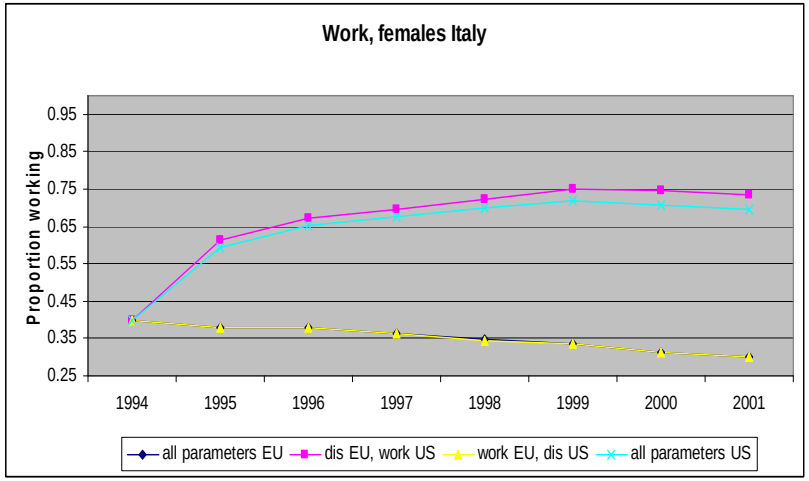
Work, females Italy
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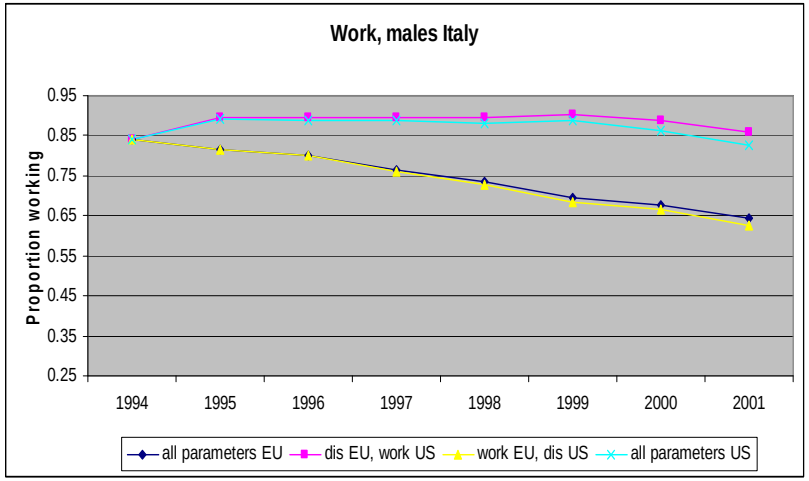
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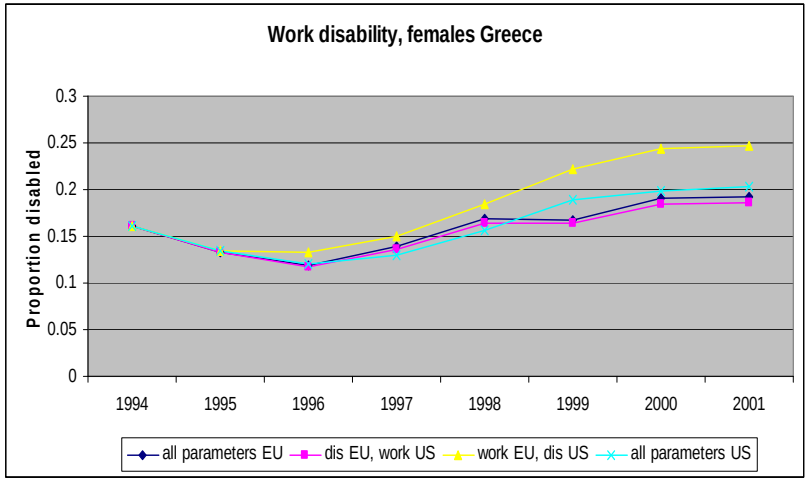
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Proportion disabled
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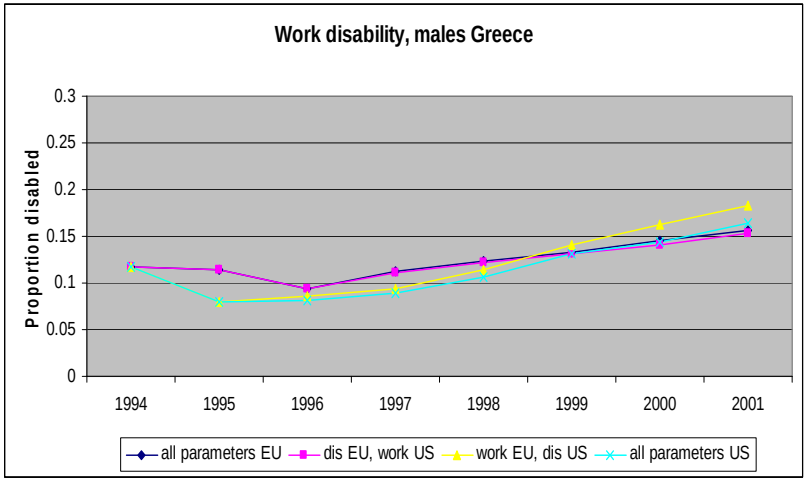
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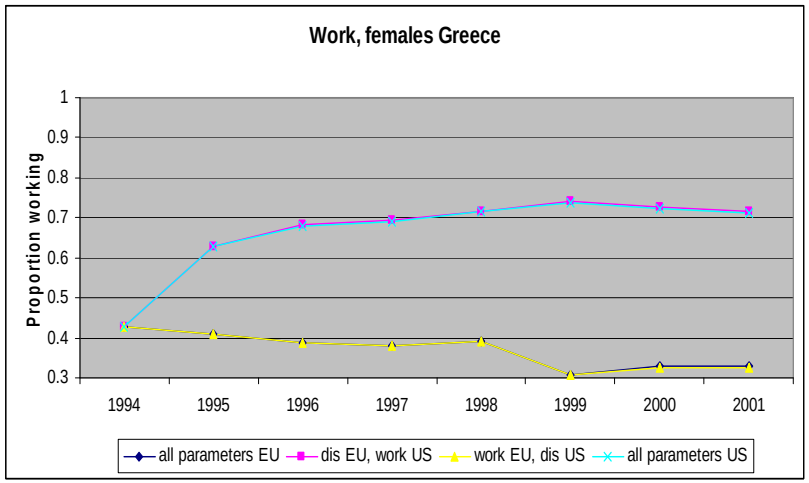
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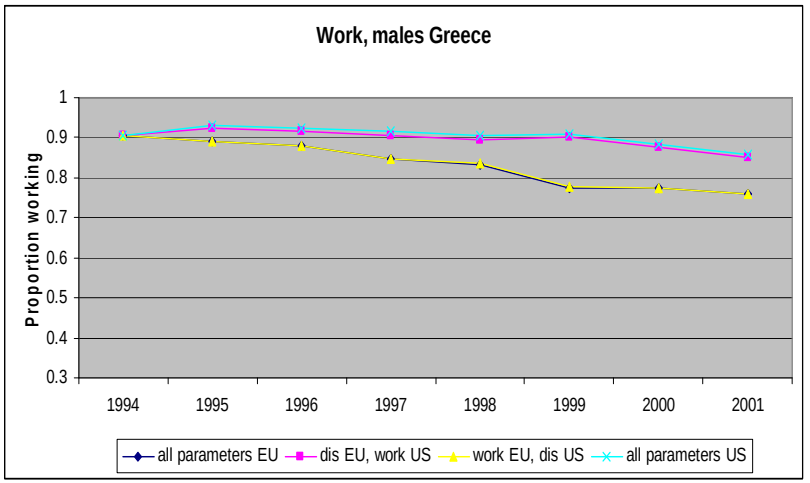
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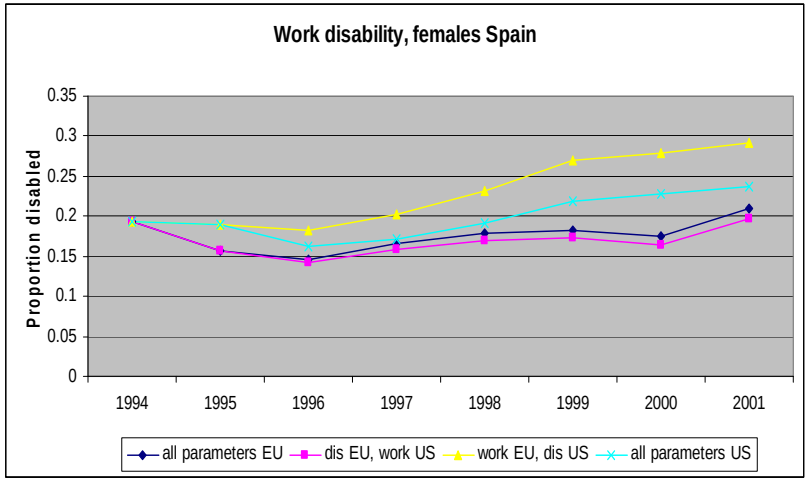
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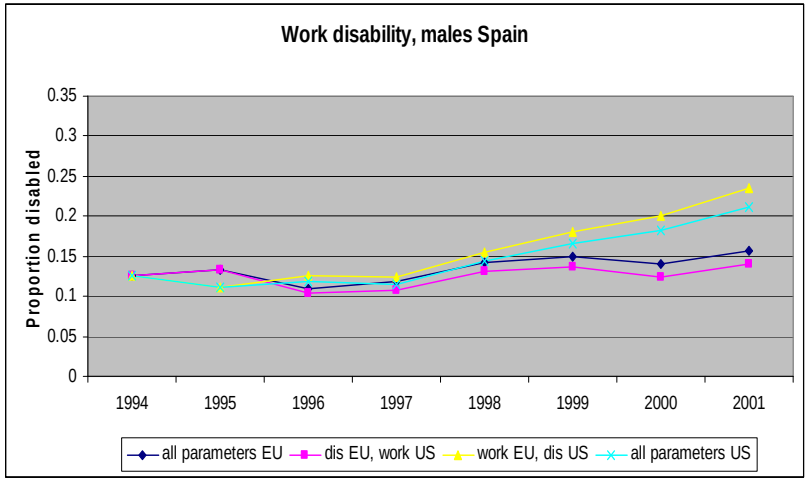
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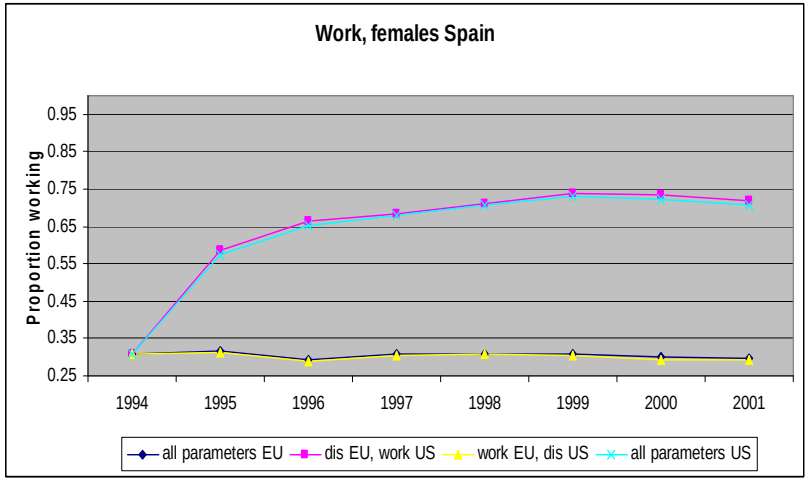
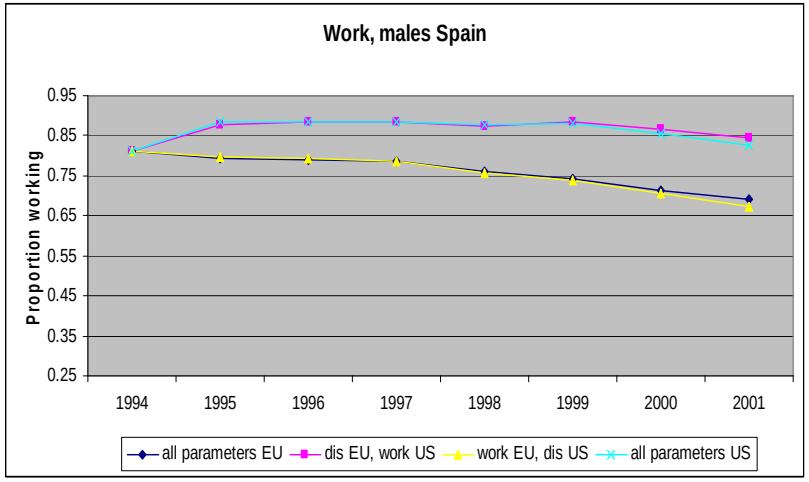
work EU, dis US
all parameters US


Work, females Spain
Proportion working
0.95
0.85
0.75
0.65
0.55
0.45
0.35
0.25
1994
1995
1996
1997
1998
1999
2000
2001
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work, males Spain
Proportion working
0.95
0.85
0.75
0.65
0.55
0.45
0.35
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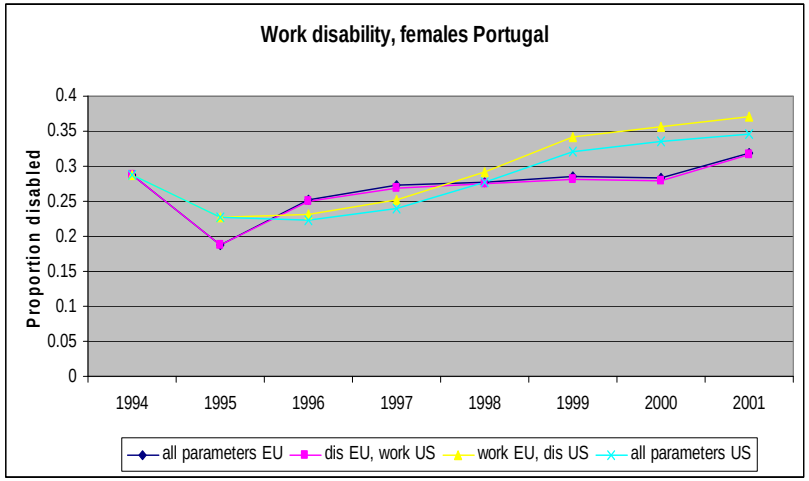
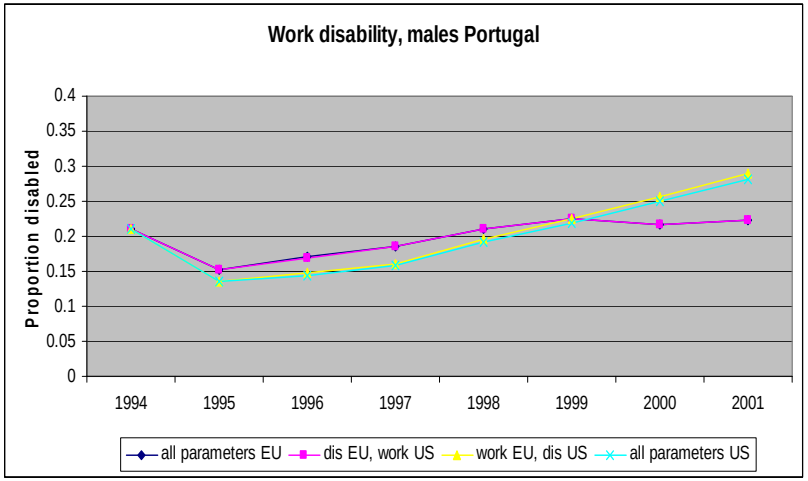
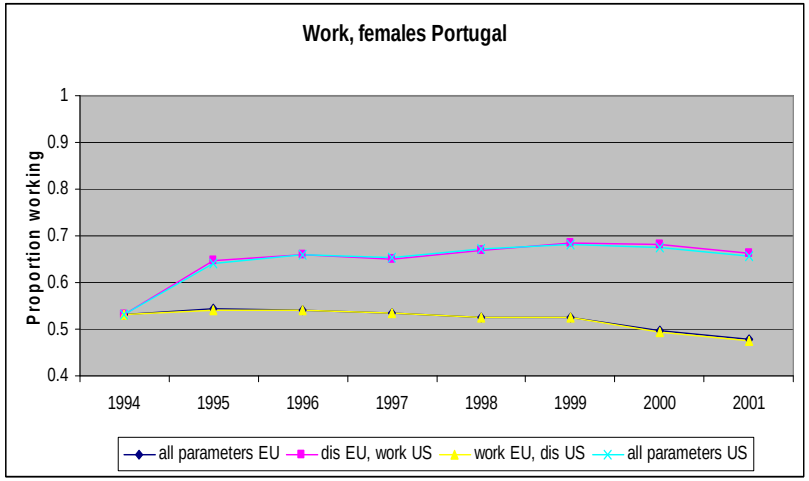
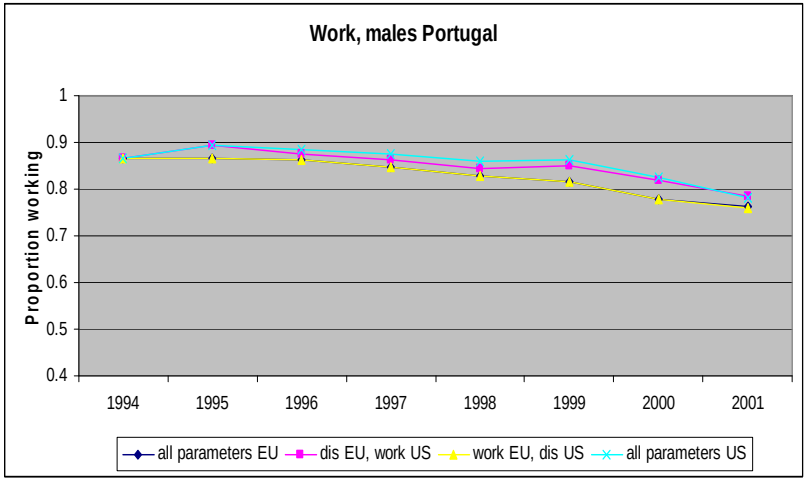
1994
1995
1996
1997
1998
1999
2000
2001
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work disability, females Portugal
Proportion disabled
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1994
1995
1996
1997
1998
1999
2000
2001
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work disability, males Portugal
Proportion disabled
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
1994
1995
1996
1997
1998
1999
2000
2001
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work, females Portugal
Proportion working
1
0.9
0.8
0.7
0.6
0.5
0.4
1994
1995
1996
1997
1998
1999
2000
2001
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work, males Portugal
Proportion working
1
0.9
0.8
0.7
0.6
0.5
0.4
1994
1995
1996
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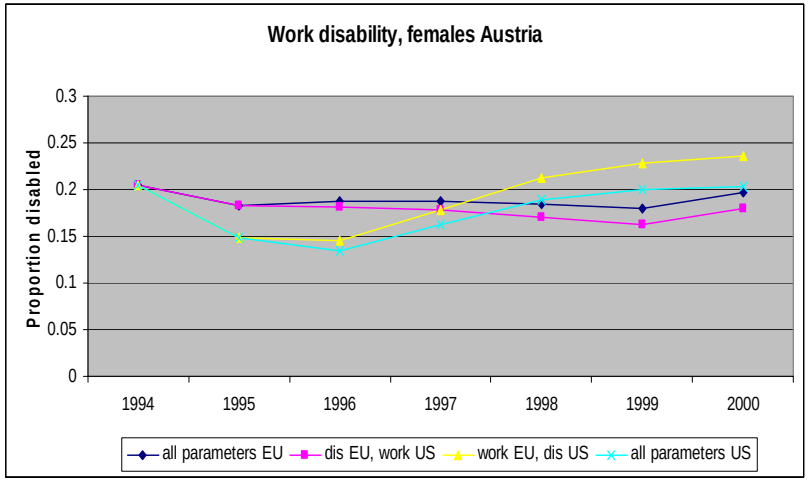
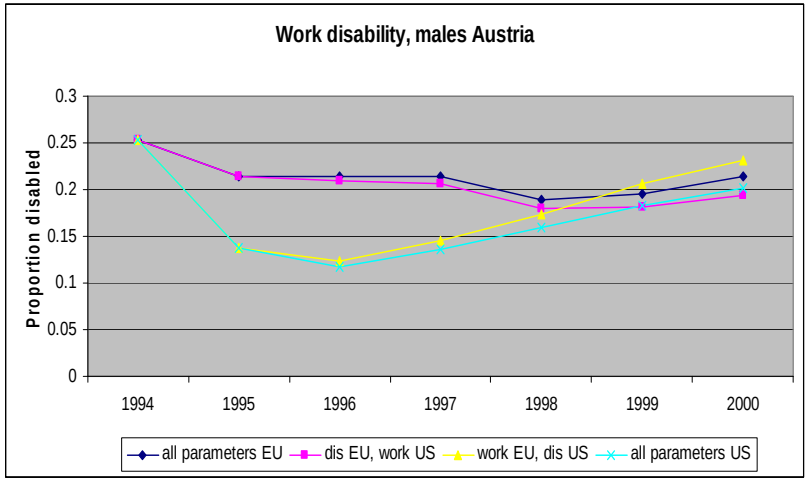
1998
1999
2000
2001
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work disability, females Austria
Proportion disabled
0.3
0.25
0.2
0.15
0.1
0.05
0
1994
1995
1996
1997
1998
1999
2000
all parameters EU
dis EU, work US
work EU, dis US
all parameters US


Work disability, males Austria
Proportion disabled
0.3
0.25
0.2
0.15
0.1
0.05
0
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1999
2000
all parameters EU
dis EU, work US
work EU, dis US
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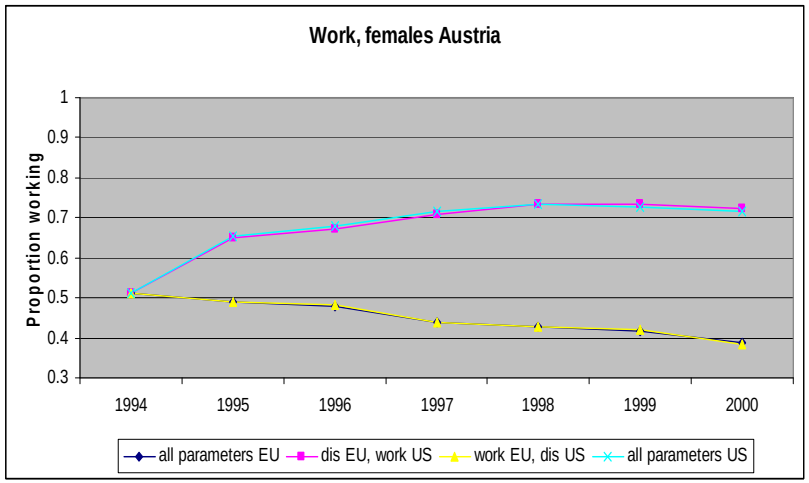
Work, females Austria
Proportion working
1
0.9
0.8
0.7
0.6
0.5
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1994
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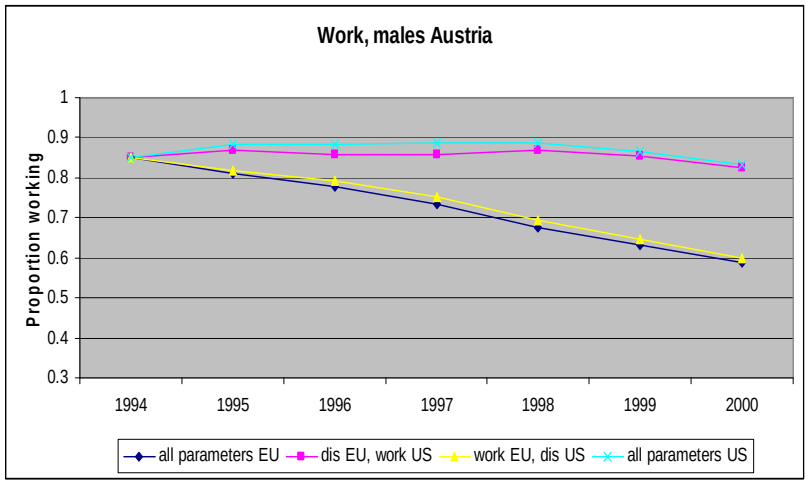
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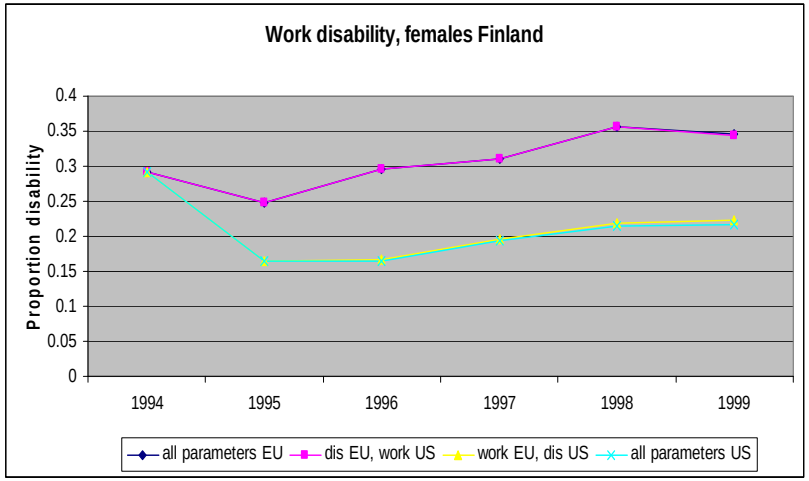
Work disability, females Finland
Proportion disability
0.4
0.35
0.3
0.25
0.2
0.15
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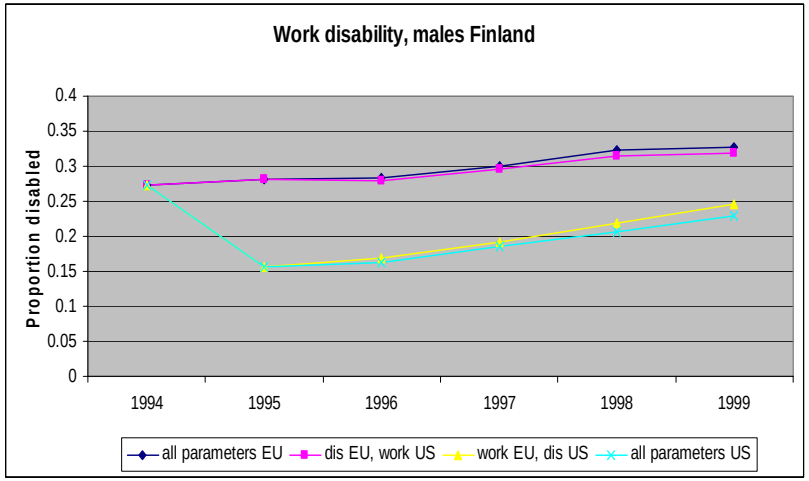
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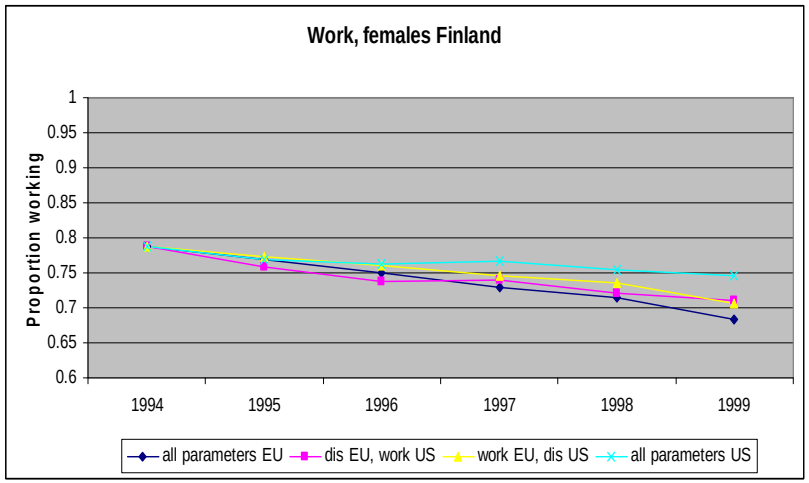
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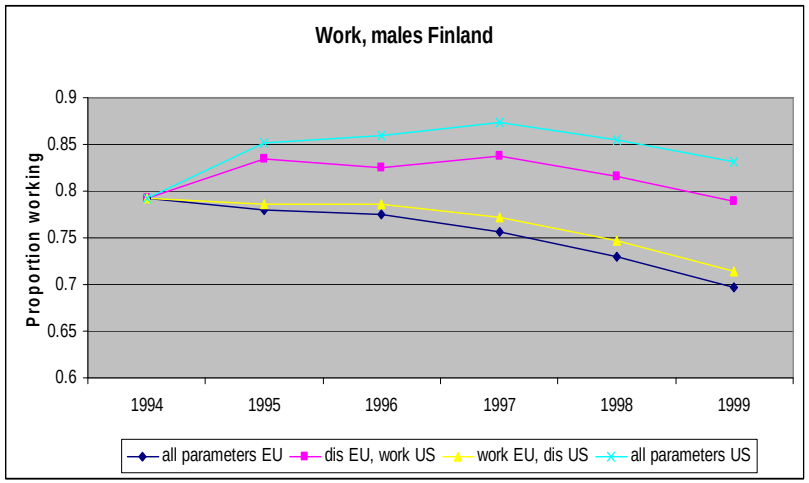
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all parameters US