An Evaluation of the International Experience of Minimum Wages in an Economic Downturn

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Summary

This paper reports new estimates of the employment effect of the Minimum Wage (MW) by focussing on the recessionary experiences across countries. Using international data we will exploit: cross-national variation in the timing of the introduction of the MW, the level and timing of its uprating and the exact timing of the recessionary experiences in different countries with a panel data set comprising 33 OECD countries over the period 1976-2008. Our panel data allow us to differentiate the effect of MWs on employment in periods of economic downturn as well as periods of economic growth. We also account for institutional and other policy related differences that might have an impact on employment other than the MW. We find that if account is taken of the size of a country's labour market by weighting then the nature of the estimation results shifts radically. Specifically, we suggest that the firm negative employment effect of the MW found in the international country evidence is not robust and that caution should be exercised in judging the MW as having unemployment consequences.

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I. INTRODUCTION

The purpose of the paper is to obtain new estimates of the employment effect of the Minimum Wage (MW) by focussing on the recessionary experiences across countries. Using international data we will exploit: cross-national variation in the timing of the introduction of the MW, the level and timing of its uprating and the exact timing of the recessionary experiences in different countries with a panel data set comprising 33 OECD and European countries for the period 1976-2008. Our panel data allow us to differentiate the effect of MWs on employment in periods of economic downturn as well as periods of economic growth. We will also be able to account for institutional and other policy related differences that might have an impact on employment other than the MW.

The analysis of MWs inevitably raises theoretical and empirical issues. From a theoretical point of view, in a perfectly competitive labour market, a MW set above the market-clearing level reduces labour demand and thus decreases employment. However, alternative economic models have been put forward that predict insignificant or positive employment effects of MWs, for example theories where firms have some degree of monopsonistic power or where labour market frictions exists.

The earliest empirical studies, based on time-series data, confirmed standard economic theory showing a negative impact of the MW on employment. However, this debate really began in earnest with the findings of Card and Krueger (1995). In quasi experimental settings they found that MW increases can, in some circumstances, result in net job gains rather than the losses predicted by conventional wisdom. The work of Card and Krueger has, in turn, been subject to intensive scrutiny and launched a wave of further empirical work on the impact of MWs on employment. While many assessments of MWs have been carried out on a national basis, there have been few from an international perspective. The large differences across OECD and European countries in the Kaitz index (the MW relative to average wages) are a great potential source of variation in the 'bite' of the MW. In common with the rest of the literature we will evaluate the impact of MWs on employment using the variation in this 'bite'. What distinguishes this study is that we explicitly use the variation in the MW bite across time and countries.

There is a substantial literature that uses cross-country comparisons to investigate the impact of labour market policies generally: for the impact of labour market rigidities on unemployment see Nickel (1997), Blanchard and Wolfers (2000), Nickell, Nunziata and Ochel (2005); for a review of cross-country studies on the impact of Employment Protection Legislation see Addison, J. and Teixieira (2003). However, few studies have used cross-country analysis to estimate the MW effects on employment. Indeed, apart from an older OECD study (1998), Neumark and Wascher (2004) is the only extensive study which looks at how changes in the incidence of the MW across countries are correlated with changes in country specific youth employment rates, using a panel of countries from 1976 to 2000. Our paper extends this analysis up to 2008 in five ways: first, the analysis will be extended up to 2008. Secondly, we will add more than 10 countries to the analysis. Thirdly we consider different age groups, not just youth workers, as is the case in Neumark and Washer (2004). Fourthly, we are fortunate to have richer data on a range of time-varying policies and institutional regressors. Finally, we explicitly consider the importance of macroeconomic shocks in terms of the timing, spacing and duration of economic recessions.

Economic recessions clearly impose aggregate shocks to employment conditions which may affect the working of the MW. So there are good reasons for being concerned about the effect of the economic cycle in an analysis of the effects of the MW on employment. This can easily be seen in a simple elaboration of the standard competitive equilibrium in the labour market. The conventional analysis would suggest the logic in Figure 1.

Here as a MW, $\hat{w}$, is imposed, equilibrium employment falls from e* to e'. Now consider what happens when a recession occurs at the same time. This can be represented in Figure 2. In a recession aggregate labour demand falls shifting D to D'. This means that the competitive labour market would routinely contract and employment would fall from e* to e'. But this is precisely the fall in employment which would have occurred by the imposition of the MW, $\hat{w}$. Hence it is impossible to determine whether the fall in employment (e*-e') is due to the imposition of the MW or to the recession. In the same Figure 2, consider now that we are in a time of economic growth with the aggregate demand for labour rising, moving D to D''. Again assuming that the MW of $\hat{w}$ has been imposed, here we reach a new equilibrium employment level of e''. Now without controlling for rising employment due to economic growth we

could erroneously attribute the growth in employment (e''-e*) to the MW rather than to the effect of the growth in labour demand. Hence it is quite clear that any time series analysis of the MW across countries should control for changing aggregate demand conditions to prevent any mis-attribution of growth in employment to the MW.

The paper is organised as follows. Section II describes the dataset used and the characteristics of the data. Section III outlines the methodology for the analysis. The main results are presented in section IV. Section V concludes.

II. DATA

Data used in this study are drawn from different sources. Most of the data on population, unemployment and employment rates are drawn from the OECD Annual Labour Force Statistics database for OECD members and the European Union Labour Force Statistics for the remaining countries. This allows us to disaggregate our dependent variable by sex and by various age groups: total (15 to 64 years), adults (25 to 64), youth (15 to 24) and teenagers (15 to 19 years). There are a few exceptions in these age groups: Italy, where prior to 1993 the lower age limit was 14. Portugal, where the lower age limit from 1976 to 1991 was 12 years old and from 1992 to 1997 it was 14 years old. Spain, UK, US and Sweden, where the lower age limit in the survey is 16 years. Finally, Hungary, where up to 1994 the adult and total age groups refer to ages 15 to 74.

Data on MWs is again available from the OECD MW database and from the European Union Labour Force Statistics for those countries in which the national MW is set by statute or by a national collective bargaining agreement. For those countries in which no national minimum exists, but in which industry- or occupation-specific minimums are set by legislation or collective bargaining agreement, we use summary estimates constructed by Dolado et al. (1996)[1]. OECD and European Union Labour Force Statistics allow us to use as an indicator of the MW the Kaitz Index, the ratio of the MW to the average wage, as measured in this study by the median wage[2]. Using median

[1] For these 4 countries the panel length is shorter (Italy, from 1976 to 1991; Germany, from 1976 to 1994; Denmark, from 1983 to 1994; and finally Sweden, from 1976 to 1992). However, our main results are robust if we omit these countries from the analysis.

[2] For a subset of 11 countries, we use mean wages in constructing their indices. These countries are: Sweden, Denmark, Germany, Italy, Slovenia, Latvia, Estonia, Bulgaria, Croazia, Turkey and Mexico.

rather than mean wages in the denominator provides a better basis for international comparison because of differences across countries in the dispersion of earnings. The Kaitz Index is one of the standard indicators used in the literature and it is intended to measure the extent to which the MW cuts into the wage distribution, and to capture variation in the relative prices of less-skilled and more skilled labour induced by MWs. The closer the Kaitz index to one the "tougher" the bite of MW legislation in any country and specific year. Appendix C contains a detailed description of the MW variable by country.

Our analysis controls for many other characteristics of the MW systems which might have an influence on the employment effects of the MW. First of all, we include an indicator of whether the MW is a product of a collective bargaining process, with unions, employers and the government all participating in the negotiations or whether MW levels are simply set by statute. Data is drawn from two main sources: the ILO MW database and EUROSTAT. Secondly, we add an indicator of whether countries have youth sub-Minimum Wages or not. Information is taken from ILO MW database and the Low Pay Commission report (2009). We refer to Appendix D for a list of countries included in the analysis and the characteristics of their MW system.

We also add into the analysis controls for the importance of other labour market policies and institutions which might have an influence on the employment effects of the MW. Here our data is superior to that used by Neumark and Washer (2004), as all of our measures are in panel form, whereas those in previous studies have only been cross-sectional.

The first of these measures is the OECD index of employment protection legislation, a synthetic indicator of the strictness of regulation on dismissals and the use of temporary contracts. A second measure is the level of public expenditure on active labour market programs to bring unemployed workers to work as a percentage of GDP. Again this variable is drawn from the OECD. A third measure again constructed from OECD data is trade union density which is measured by the number of wage and salary earners that are trade union members, divided by the total number of wage and salary earners. A fourth measure constructed by OECD is the average of the gross unemployment benefit replacement rates as a percentage of earnings and it is meant to quantify the generosity

of unemployment insurance programs. Finally, we used a World Bank indicator of the rigidity of hours. It looks at whether there are restrictions on night work, workweek and annual paid vacation. For more detailed information about these variables refer to Appendix E.

As a supply side control we use the relative size of each cohort, such as the population of the regression specific age group to the total population of working age. Finally, we include an aggregate demand variable to account for changes in the level of economic activity over the business cycle, using an indicator which distinguishes between periods of recession and periods of economic growth by country. We do that using quarterly GDP growth rates from the OECD and Eurostat datasets. We explored two different definitions of a recession. One is the conventional one of two consecutive quarters of negative growth. The other is when two or more quarters within a year show a negative GDP growth rate (even if not consecutive). Since our results are invariant to which definition is chosen, we present only the results for the second. Figure 3 diagrammatically shows how the dummy variable for a downturn changes over the years across countries in the analysis. This pattern is important as we would like to see a difference across countries and also variation in the timing and duration of recessions. Both are observed in our sample, as this figure shows.

Since recessions over time and across countries could be very different, we also repeat the analysis using two other controls of the economic cycle, which measure the depth of each recession: first, annual economic growth taken from the World Bank database. Secondly, we also use the adult unemployment rate for the youth cohort regressions and the youth unemployment rate for the adult specifications.

Our full sample consists of 33 OECD and European countries, and it is reduced to 23 OECD countries when the full set of controls is added into the analysis. We refer you to Appendix D for a detailed list of the countries in the analysis (and we clearly show beneath the table of results which countries the estimations apply to.)

III. METHODOLOGY

Neumark and Wascher (2004) exploit cross-national variation in the MW to estimate the effects of MWs on employment rates using a pooled cross-section data set comprising several OECD countries for the period 1976-2000.

We re-estimate this model with an enlarged panel of OECD and European countries for the period 1976-2008:

$$E_{jt} = \alpha + T_t + J_j + \beta MW_{jt} + \gamma X_{jt} + \varepsilon_{jt} \qquad (1)$$

Where E_{jt} *is* employment at time *t* in county *j*, MW_{jt} is a measure of the incidence of the MW at time *t* in country *j*, X_{jt} *is* a set of controlling regressors at time *t* in country *j*, T_t is a set of year effects and J_j is a set of country specific fixed effects. The literature has most conveniently used the Kaitz index (namely the ratio of the level of the MW to the average or median wage in the economy) as a measure of the 'bite' of the MW.

The logic of using the Kaitz index (as set out in various papers, for example Dolton et al 2010) is that this variable is an instrumental variable for the level of the MW as this variable is itself endogenous in the sense that the level of the MW is a decision variable subject to change by a government after it observes the employment level and takes this (and other macroeconomic circumstances) into account. We start off with this same premise as the rest of the literature, but clearly an open question, worthy of examination is whether any other IV for the MW would perform equally well and give the same results.

The idea behind using the Kaitz index as an IV for the MW is that the larger the value of this index then the higher up the wage distribution the minimum will bite. Alternative measures, not used here, are the fraction of those people employed who are paid at the MW, the 'Spike', or the fraction of those paid at the MW or less, the 'Share'. We cannot use these measures of the bite of the MW in this study as we do not have data on the whole distribution of earnings in each country. In previous work on the UK alone Dolton et al. (2008) have investigated each of these measures of the bite to see to what extent the measure of the bite may change the conclusion about the effect of the MW on employment. It seems as if the central conclusions vis-à-vis employment may not be too sensitive to how one measures the 'bite'.

The countries in the study have very different patterns of MW changes over time, which helps to separate the influences of MWs from the influences of other macroeconomic events affecting employment in multiple countries.

Most importantly for the purpose of this paper, the long cross-country panel can be exploited in order to estimate a model that takes into account the different effects of the MW on employment in periods of economic downturn as distinct from periods of economic growth.
This can be done by extending the model to analyse the MW effects during economic recessions:

$$E_{jt} = \alpha + T_t + J_j + \beta MW_{jt} + \gamma X_{jt} + \delta C_c + \theta C_c MW_{jt} + \varepsilon_{jt} \quad (2)$$

Where C_c is a dummy equal to one if the economy is facing an economic downturn and zero otherwise. The coefficient of interest will be θ, which measures the differences of the effect of the MW on employment in periods of recession relative to periods of economic growth. Therefore, the hypothesis being tested here is whether the interaction of a downturn with the bite of the MW has an employment effect, over and above, the effect of either the downturn per se (δ) or the imposition of the MW, per se, (β).

In the model country fixed effects will be added to capture country-specific factors that may influence employment rates. An example of such factors might include government policies as well as cultural and institutional differences across countries. Year effects control for global shocks or policies that might influence employment rates in all countries. Some specifications also include country-specific time trends in order to control for incremental changes in the employment rate associated with longer-term developments in labour force participation or labour demand that are unrelated to changes in a country's MW laws. Also, country-level data will be supplemented with information on cross-country differences in MW systems and on other labour market institutions and policies. In all of our reported regressions, standard errors are robust to heteroskedasticity and serial correlation of unknown form (Wooldridge, 2002, p.75).

An important issue with panel data and the validity of fixed effect (FE) results is the extent to which omitted regressors may change over time. To the extent that they could vary over time then the FE results could be biased. Our approach to this problem has

been prompted by precisely this concern with the paper by Neumark and Wascher. It is for this reason that we have sought to use all the available data on other controlling regressors, particularly those relating to labour market institutions. Of course it is still possible that we have not included all the controlling information that one would ideally like (some of which remains unmeasurable or unobserved). To this extent our (FE) results are valid only under the condition that these other sources of unobserved heterogeneity remain fixed over time.

A second area of methodological concern is that since the data are time series for a cross section of countries then we must logically be concerned about the underlying dynamic relationships in the macroeconomic series. Specifically one would be concerned about the stationaity of these variables and, whether, if some of the variables in our model are I(1), we were getting spurious results. Regretably 33 annual observations is not enough to be confident about the validity of stationarity tests. Also, although we find that our reported results are robust to using various lagged regressors, it is inevitable that data limitations effectively prevent a serious study of these issues.

A final, most important area of methodological concern relates to a fundamental issue of how one should run models using cross country data[3]. Clearly, the data on each country is an average for that country, based on labour markets of very different sizes. Hence we should therefore be using estimation methods which are appropriate to grouped data. These methods have been well documented long ago by Kmenta (1997), Deaton (1997) and others. Usually when we consider any estimation where the observation on the variables to be used are themselves sample means, then we would expect to weight these regressions by the number of raw data points used to construct these averages. The logic of weighting these regressions is that they directly allow for the relative size of the labour market in the regressions. If this is not done, then explicitly we are assuming that we should attach as much weight to a small country, like Lithuania, as a large country, such as the US, in deriving our estimates and making our inferences. At worst, this approach could be regarded as an important robustness check on the model estimation. And one would hope that the results found for unweighted data would also be qualitatively similar to those found for weighted data. At best there is an argument to suggest that it is the weighted results which one should consider as the correct ones as

[3] The same consideration is of course true when modelling using data based on States where the states may well be of different sizes. This problem was recognised by Card et al (1994) and Baker et al (1999).

one would not want to base firm conclusions on a sample which consisted of many small countries (with special circumstances). Equally one should be cautious about including a very large country in the weighted regression – like the US – which may then dominate all the results.

On the reverse side, most papers that run cross country regressions do no use weighted estimation. They would argue that the unit of observation is the country and what they seek is a sample of labour markets and it does not matter how large or small the labour market is. By this argument we would wish to attach as much weight in the data to a large country as a small country. We remain agnostic about which is the "correct" procedure, but our dual analysis does help us to establish whether certain countries could have a disproportionate effect in getting certain regression results. Equally we would expect that if the results of N&W (2004) are robust then they would be invariate to whether or not the estimation procedure used involved Weighted Least Squares.

Notwithstanding the above argument, the consensus from this methodological literature is clear: firstly, unless the data has countries of equal population size then one should use weighted regression procedures. Secondly, using these weighted least squares (WLS) estimation methods should not have any effect on the bias of the estimated coefficients. And thirdly, that since the data may be heteroskedastic then appropriate standard errors should be computed. This leads Deaton (1997) to suggest that the best practice is to 'use the weights and correct for the standard errors of the design'. This we do. We also follow the advice of Dumouchel and Duncan (1983) who suggest that a test for rigour and reliability of estimated parameters is to run the regressions using both OLS and WLS and compare them. This we also do. Therefore it seems quite clear that a good robustness check of the validity of the results of N&W (2004) is provided by seeing whether there is a big difference between the OLS results and the WLS results using the same data. This is directly analogous to what Baker et al (1999) did in their paper, where they found that the qualitative conclusions did not change if these two alternative estimation procedures were used[4]. This gave them confidence that the estimated parameters they sought were invariant to the fact that the states in their sample were different sizes. Card et al (1994) have used the reverse logic in their debate

[4] Specifically they found that the significantly negative coefficients on the Minimum Wage variable remained significantly negative but that the standard errors rose slightly using WLS – as is to be expected.

with Neumark and Wascher (1992) regarding results. Here Card et al (1994)[5] find that when the N&W (1992) results for US states are estimated using WLS they change considerably and they use this in their argument to question the validity of the N&W (1992) finding of negative employment effects of the MW.

IV. RESULTS

a. Summary statistics

In Figure 4 countries are ranked by the Kaitz index. As can be seen there is substantial variation in the bite of the MW across countries, with the level of the MW ranging from more than 70% of the average wage in Italy to under 30% in Turkey. Generally, the continental European countries show the highest levels of the MW. Australia is the only non-European country with a Kaitz index of around 60%. In contrast, the US, the UK and Japan are towards the bottom, together with Mexico and some new European accession countries such as Estonia, Croatia, Hungary, Czech Republic and Lithuania (all with a Kaitz index under 40%).

Figure 5 shows changes in the Kaitz index across countries over the period of our analysis. It is interesting to see how some countries like the Netherlands, Belgium, Spain, Australia and Mexico have experienced a decreasing bite of the MW over the years. However, other countries such as France, Slovak Republic, Czech Republic, Turkey and Korea show an increasing Kaitz index especially over the last few years.

Changes in the real level of the MW (as measured in US dollars purchasing power parities) by country are shown in Figure 6. Particularly notable is that over the last 10 years, nearly all countries have allowed the MW to increase in real terms. However, in some countries (e.g. Netherlands, US, Canada) there has been a substantial erosion of the real value of the MW since the mid-1970s to the late 1980s. It is also important to point out how, for some countries, changes in the real level of the MW do not always correspond to changes in the Kaitz index. For example, Australia has experienced an increase in the real level of the MW but a decrease in the Kaitz index. Also, in Japan, Luxembourg and France the increase in real wages is more marked than the rise in the

[5] Card et al (1994), p491 say 'We believe that an argument can be made for weighting…'.

Kaitz index. The same is true for Ireland and the UK from 2000 onwards. These changes could be a result of changes in the distribution of earnings.

b. Estimates of the Minimum Wage model

Adults and all

Table 1.1 presents the estimation results of the effects of the MW on employment for two different age groups: those aged from 15 to 64 years (panel A), and adults aged from 25 to 64 years (panel B). In the first 4 columns regressions are unweighted. In the last 4 columns regressions are weighted by the population of each country. For each specification, the first 2 columns include demand and supply side controls and the sample consists of 33 OECD and European countries. The second 2 columns also include controls for different characteristics of the MW systems across countries and over the years and other labour market policies and institutions that might affect employment. When the full set of controls is added into the analysis the sample is reduced to 23 OECD countries. Results are similar in columns 1 and 2 when the sample is reduced to 23 countries.

Column 1 and 3 of both the weighted and unweighted specifications report estimates from a regression in which we add fixed year effects to control for global shock or policies that might influence employment rates in all countries. We also add fixed country effects to capture persistent country-specific unobserved factors that might influence employment rates. Examples of such factors might include government policies as well as cultural or other institutional differences across countries that lead to cross-sectional variation in the propensity to work.

All of our coefficients are negative and significant when regressions are not weighted. When regressions are weighted by population size and only supply and demand controls are added (column 1) the coefficients are still negative but smaller in absolute size. However, when the full set of controls is added into the analysis (column 3), country and year effects remove the significance of the coefficient, suggesting no overall difference in employment rates between countries where the MW bites most compared to countries where the MW bites the least. Table A.1 panel A column 1 in Appendix A shows that excluding the most populous country (the US) from the weighted analysis confirms the results reported in Table 1.1: when the full set of controls is added into the

analysis, country and year effects remove the significance of the coefficient of the Kaitz index. This is also true no matter which demand side control is used in the analysis (whether it be the dummy for downturn, GDP growth or youth unemployment rate).

In columns 2 and 4 of Table 1.1, we finally add into the analysis country specific time trends, intended to capture factors that might influence employment trends within a country. One should be cautious in interpreting this last set of results because of the loss in terms of degrees of freedom that country-specific time trends might cause. Adding time trends reverses the sign and removes the significance of the coefficients in most specifications, suggesting no overall difference in employment between countries where the MW bites most compared to those where the MW has less impact. The coefficients of the weighted results of adults (panel B column 2 and 4) are positive and significant.

In order to test the robustness of our results, we also repeat the analysis using other demand side controls, which capture the depth of each recession: first, in Table 2.1, annual GDP growth. Secondly, in Table 3.1, we use the youth unemployment rate. This makes very little difference to the estimates confirming the results on Table 1.1. The coefficients of the Kaitz index using GDP growth as a control for the business cycle are very close in size to those in Table 1.1 with the signs pointing in the same direction. The coefficients of the Kaitz index using youth unemployment as a demand side control again point in the same direction to those in Table 1.1 and usually are slightly smaller in absolute size.

Youth and teenagers

One possible concern is a lack of focus on the outcomes of groups thought to be potentially more at risk, or at the margin of adjustment, following any change in labour costs. Therefore, we also assess whether the estimates differ for youth (those aged 16-24) and teenagers (those aged 16 to 19).

Table 1.2 repeats the exercise for these two age groups. In particular, panel A restricts the analysis to young people, aged 15 to 24. Panel B restricts the analysis to teenagers, aged 15 to 19. In the first 4 columns regressions are unweighted. In the last 4 columns regressions are weighted by the size of population of each country. The first 4 columns of each specification include only supply and demand side controls; the second 4

columns also control for different characteristics of the MW systems across countries and other labour market policies and institutions.

Columns 1 and 3 of both weighted and unweighted specifications report estimates from a regression in which both country and year effects are added into the analysis. If the regressions are unweighted, we find the coefficients to be negative and significant for both youth and teenagers. However, if regressions are weighted by the size of the population and the full set of controls is added into the analysis (column 3), coefficients on young people in panel A are still negative but they become insignificant, suggesting no overall difference in youth employment growth rates between countries where the MW bites most compared with countries where the MW has less impact. In panel B, where we concentrate on teenagers, the coefficients become positive and significant. However, one should notice that empirical results for teenagers may be more ambiguous because of interactions between MWs, employment and schooling, as Neumark and Wascher (1996) suggest.

Table A.1 panel B and C column 1 in Appendix A shows that excluding the most populous country (the US) from the weighted analysis partially confirm the results reported in Table 1.2: when the full set of controls is added into the analysis, country and year effects reduce the size of the coefficient of the Kaitz index for both age groups, even if it remains negative and significant. This is also true no matter which demand side control is used in the analysis (whether it be the dummy for downturn, GDP growth or youth unemployment rate).

Finally, in column 2 of Table 1.2 we add country specific time trends, intended to capture factors that might influence employment trends within a country. Again, one should be cautious in interpreting this last set of results because of the loss in terms of degrees of freedom that country-specific time trends might cause. When we add time trends the coefficients in the unweighted regressions remain negative and significant for the 15 to 24 age group while they become insignificant for teenagers. Coefficients of the weighted results are generally negative and insignificant for both age groups.

As with the adult specifications, we test the robustness of our results repeating the analysis using two other demand side controls, which capture the depth of each

recession: first, in Table 2.2, annual economic growth. Secondly, in Table 3.2, we use the youth unemployment rate. This makes very little difference to the estimates confirming the results in Table 1.2. Coefficients of the Kaitz index using GDP growth as a control for the business cycle are very close in size to those in Table 1.1 with the signs pointing in the same direction. Coefficients of the Kaitz index using youth unemployment as a demand side control are qualitatively similar, pointing again in the same direction to those in Table 1.1

c. The role of other labour market institutions on employment

In the main analysis we control for labour market policies and institutions that might affect employment other than the MW, therefore in this section we summarize the results for these policies and institutions, concentrating on specifications which include controls and both year and country effects (Tables 1 and 2, column 7).

The first OECD indicator we consider measures the level of public expenditure in active labour market programs to bring unemployed workers to work as a percentage of GDP. A lower value indicates a lower commitment to such policies and institutions.
In particular, such policies could include public employment services, training, employment incentives (such as recruitment and employment maintenance incentives), supported employment and rehabilitation, as well as direct job creation.

By improving the efficiency of the job matching process and by enhancing the work experience and skills of the unemployed, active labour market policies can increase employment. However, the efficacy of active labour market policies has been found to vary significantly between different types of programmes and how these programmes are designed. Furthermore, the positive effects need to be weighted against the costs of taxes necessary to fund them, which may in turn increase unemployment. Also, certain programmes may reduce job search effort amongst the unemployed. In this paper, a high degree of commitment to active labour market policy legislation is found to be associated with lower employment prospects for all employment groups.

The second measure provides information on employment protection regulations across countries. This OECD index of employment protection is an indicator of the strictness of regulation on dismissals and the use of temporary contracts. In particular, it measures the procedures and costs involved in dismissing individuals or groups of workers and

the procedures involved in hiring workers on fixed-term or temporary work agency contracts. High values are associated with countries having a high degree of employment protection, while low values indicate relative ease in dismissing employees.

Basic economic theory relating to employment protection legislation (EPL) would predict that EPL lowers labour turnover (both hiring and layoff) on the one hand, but increases the length of unemployment spells on the other hand, with ambiguous net effects on aggregate employment and unemployment rates. Econometric estimates of the impact of EPL on the unemployment rate do not clearly provide an unambiguous conclusion on this matter. For example, Nickell (1997) and Nunziata (2002) find no significant effect. However, by reducing turnover, the job prospects of those relatively weakly attached to the labour market, such as young workers, have been found to be compromised (OECD 2004).

In this paper, a high degree of EPL is found to be associated with lower employment prospects for young people (15 to 24), but generally the coefficients are insignificant if we exclude Table 3.1 where the demand side control is adult unemployment rate. Regarding the results for teenagers suggests no overall difference in employment rates between countries where the MW bites the most compared with countries where it bites the least. Finally, there is no clear association between EPL and the employment prospects of adult people.

The third measure we use as a control is a measure of the generosity of unemployment insurance programs. The summary measure constructed by OECD is defined as the average of the gross unemployment benefit replacement rates as a percentage of earnings.

Relatively high unemployment benefits that are available for a relatively long duration can have adverse effects on labour market performance, by reducing job-search intensity or by lowering the economic cost of unemployment. In this paper and in accordance with most of the literature, high unemployment benefits are found to be generally associated with lower employment prospects for all groups.

The fourth controlling regressor is a measure of rigidity of hours, which is constructed by the World Bank. If there are no restrictions, the economy receives a score of 0. If the regulations are very strict, the economy receives a score of 100. Thus, high values of the index indicate the presence of substantial rigidities associated with working hours, whereas low values are suggestive of more flexibility. As expected, in this paper, a high degree of labour market regulation in terms of hours is found to be generally associated with lower employment prospects for all employment groups.

The final additional controlling measure we use as a control is union density, again constructed from OECD data. Trade union density corresponds to the ratio of workers that are trade union members, divided by the total numbers in the labour force.

In theory, strong trade unions have the ability to push wages above market clearing levels, at the cost of lower employment. However, it has long been argued that, in practice, union influence on wage formation varies depending on the structure of collective bargaining. The empirical literature, however, remains inconclusive overall.
In this paper, high union density is found to be associated with higher employment prospects for all groups in accordance with some empirical studies (e.g. Boone and Van Ours (2004), using cross-country analysis, find a negative and significant impact of union density on unemployment).

d. Accounting for differences in MW effects in periods of economic downturn and growth

In the second part of the analysis, we add into the model interactions to distinguish between MW effects on employment in periods of economic downturn as distinct from from periods of economic growth. Figure 3 plots the dummy variable we use to distinguish between periods of growth from periods of downturn. It is essential for our identification strategy that there is variation across countries in periods of downturn. Also, it is important that countries are entering and exiting from global recessions at different stages. Figure 3 clearly shows that countries in our sample are facing different periods of economic downturn and it also shows how diverse is the time span of global recessions across countries.

In Table 4 we present results when the sample consists of 33 OECD and European countries and supply and demand side controls are included. However, if we reduce the

sample size to 23 countries and we add the full set of institutional controls results for the interaction effects are qualitatively similar.

If we concentrate on results for adults in panel A, interaction effects between the Kaitz index and the dummy for downturn are generally insignificant in both weighted and unweighted specifications, suggesting no differences in the effect of the MW over the economic cycle[6]. In order to test the robustness of our results, in Table 4 panel A we also repeat the analysis interacting the Kaitz index with GDP growth[7] and the youth unemployment rate[8]. Coefficients for the interaction effects are generally negative and insignificant, again suggesting no differences in the impact of the MW over the economic cycle.

If we concentrate on results for youth in panel B of Table 4 and in particular on specifications with year and country effects, the coefficients of the interactions between the Kaitz index and the dummy for downturn are generally negative and significant suggesting that in periods of downturn the effects of the MW on employment are more detrimental than otherwise. When we interact GDP growth with the bite of the MW we generally find that the lower GDP growth, the larger the disemployment effects of the MW. Finally, in line with the previous results, interaction effects of the Kaitz with the adult unemployment rate suggest that the higher the unemployment rate the bigger impact of the MW.

In panel C of Table 4, we focus on teenagers and we generally find no differences in the impact of the MW over the economic cycle. Only when we interact the Kaitz with the adult unemployment rate do the results suggest a differential impact over the business cycle: the higher the adult unemployment rate the bigger the impact of the MW.

[6] In the specifications in which we investigate the interaction effects of the Kaitz index with the downturn dummy, the coefficient of the Kaitz index can be interpreted as the impact of the MW when the economy is not facing a downturn (dummy for downturn=0). The coefficient for the downturn can be interpreted as the impact of a downturn on employment when the Kaitz index is equal to its sample average.

[7] In the specifications in which we investigate the interaction effects of the Kaitz index with GDP growth, the coefficient of the Kaitz index can be interpreted as the impact of the MW when GDP growth is equal to 0. The coefficient for GDP growth can be interpreted as the impact of GDP growth on employment when the Kaitz index is equal to its sample average.

[8] In the specifications in which we investigate the interaction effect of the Kaitz index with the youth unemployment rate, the coefficient of the Kaitz index can be interpreted as the impact of the MW when youth unemployment is equal to its sample average. The coefficient for youth unemployment can be interpreted as the impact of youth unemployment on adult employment when the Kaitz index is equal to its sample average.

e. Robustness and Benchmarking.

So how does one make sense of these results in the light of the earlier evidence of Neumark and Wascher (N&W)? The best answer to this question is to turn back to the data of N&W and replicate their findings and then move to change their estimation, one stage at a time. The disadvantage of this procedure is that we are not able to comment then on the adult sample as N&W confined their interest to youth and teenagers only. Notwithstanding, this would seem to be the only way of understanding what role is played in our new results by either; extending the time horizon of the estimation; extending the number of countries in the sample, extending the set of regressors, or finally, by weighting the data according to the size of the country's labour market.

We present the results of this exercise in Table 5. In this table column (1) is the reported results of N&W. Column (2) is our replication of their results using their time period and the countries in their sample. Here one sees that our replication is very close to their results. In column (3) we now weight the N&W data by country size. Immediately the size of the coefficient on the Kaitz index falls by 40% in Panel A - although it is still significantly negative. In columns (4) and (5) we run the N&W model with their countries and extend only the time horizon from 1976-2000 up until 2008. In columns (6) and (7) we now use our extended time horizon data but on our extended sample of countries. Finally in column (8) and (9) we now use the full time horizon and the extended set of countries and add our extra controlling regressors. In each paired comparison what can be seen in columns (4) and (5), (6) and (7) and (8) and (9) is the huge difference in the coefficient on the Kaitz index when the weighting of the data is used. Specifically in Panel A for Youths we see that each negatively significant coefficient becomes insignificantly different from zero when the weighting procedure is adopted. Likewise in Panel B for the Teenagers we see insignificantly different from zero coefficients turn to positively significant coefficients when we weight the data.

Reassuringly the results suggest that N&W's results can be found when one extends: the time period of analysis, the number of countries in the data and the set of regressors – but that as soon as one weights the data, to reflect that some countries have larger labour markets than other countries, then the negatively significant employment impact results of N&W disappears.

As partially confirming evidence that this result is disturbing it is worth noting that the sign and significance of the Adult Unemployment Rate regressor never changes across any sample when one weights or does not weight the data.

Our first take on explaining this is that it is possible that the dataset size is simply not big enough to distinguish a clear effect of the MW on employment. As the results above demonstrate that the significantly negative effect on the Kaitz index variable is very sensitive to the data used. What Table 5 shows is that the result is not sensitive to extending the list of countries or the time period considered – but it is sensitive to how one thinks of the sample. If one thinks of the sample as each country in a year as a different draw from the set of all possible labour markets – i.e. the unweighted data - then the negative MW employment effect is clear. If, on the other hand one considers the sample to be all workers in any labour market (and so one weights the evidence by the size of the labour market) – and perforce the number of people affected by any MW law – the weighted data gives the answer that the MW does not affect employment negatively. If one wishes to rely on this finding that the MW has a negative effect on employment, one would like to have the confidence that the finding was robust to weighting the data in this way. It is not.

V. CONCLUSION

The paper had two main purposes. First, to exploit the substantial differences across countries in relative MW levels to obtain new estimates of the employment effects of the MW. Even though an important source of variation is provided by the large differences across countries in the MW relative to average wages, relatively few studies have attempted to test such propositions directly (partial exceptions being OECD (1998) and Neumark and Wascher (2004)). Secondly the aim of this study was to estimate the effect of MWs on employment over the economic cycle. Specifically, the long panel of 33 OECD and European countries from 1976 to 2008 allowed us to differentiate the effect of MWs on employment in periods of economic downturn as well as periods of positive economic growth. We also have been able to account for institutional and other policy-related differences that might have an impact on employment other than the MW.

A number of interesting conclusions can be drawn. Regarding the first part of the analysis where we differentiate the effects of the MW over the economic cycle, in general we do not find significant differences in the effect of MWs over the economic cycle. However, for the youth age group (15 to 24), we usually find that the impact of the MW is more detrimental in the presence of an economic downturn.

With respect to our second objective, the neoclassical view that MWs tend to have a negative effect on employment is mainly valid when the regressions are not weighted by the population size of each country. However, when the regressions are weighted, country and year effects reduce the size of the negative effects or even remove the significance of the coefficients, suggesting no overall difference in employment between countries where the MW bites most compared with countries where the MW has less impact.

In conclusion, it would seem that the weighted regression results would cast doubt on the main Neumark and Wascher thesis that the MW has a negative employment impact. Specifically we would suggest that there is not yet enough evidence to convict the MW of being guilty of the crime of increasing unemployment. Under the circumstances, the verdict must be to acquit the plaintiff. In the light of these results we would suggest there is at present no sound evidence to the negative unemployment consequences of a MW.

Figure 1.

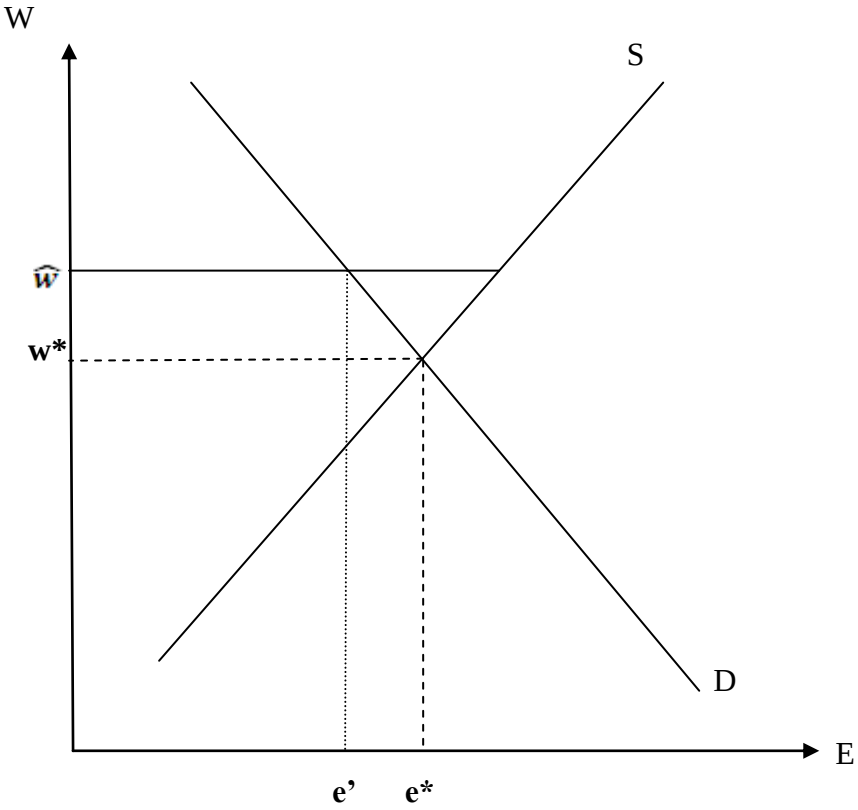


Figure 2.

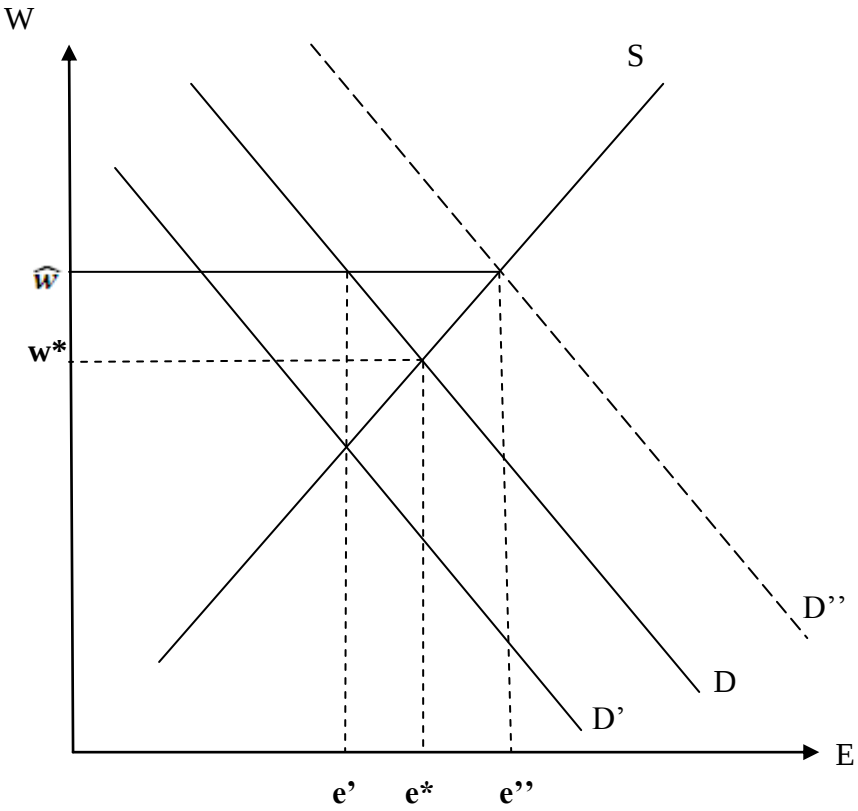
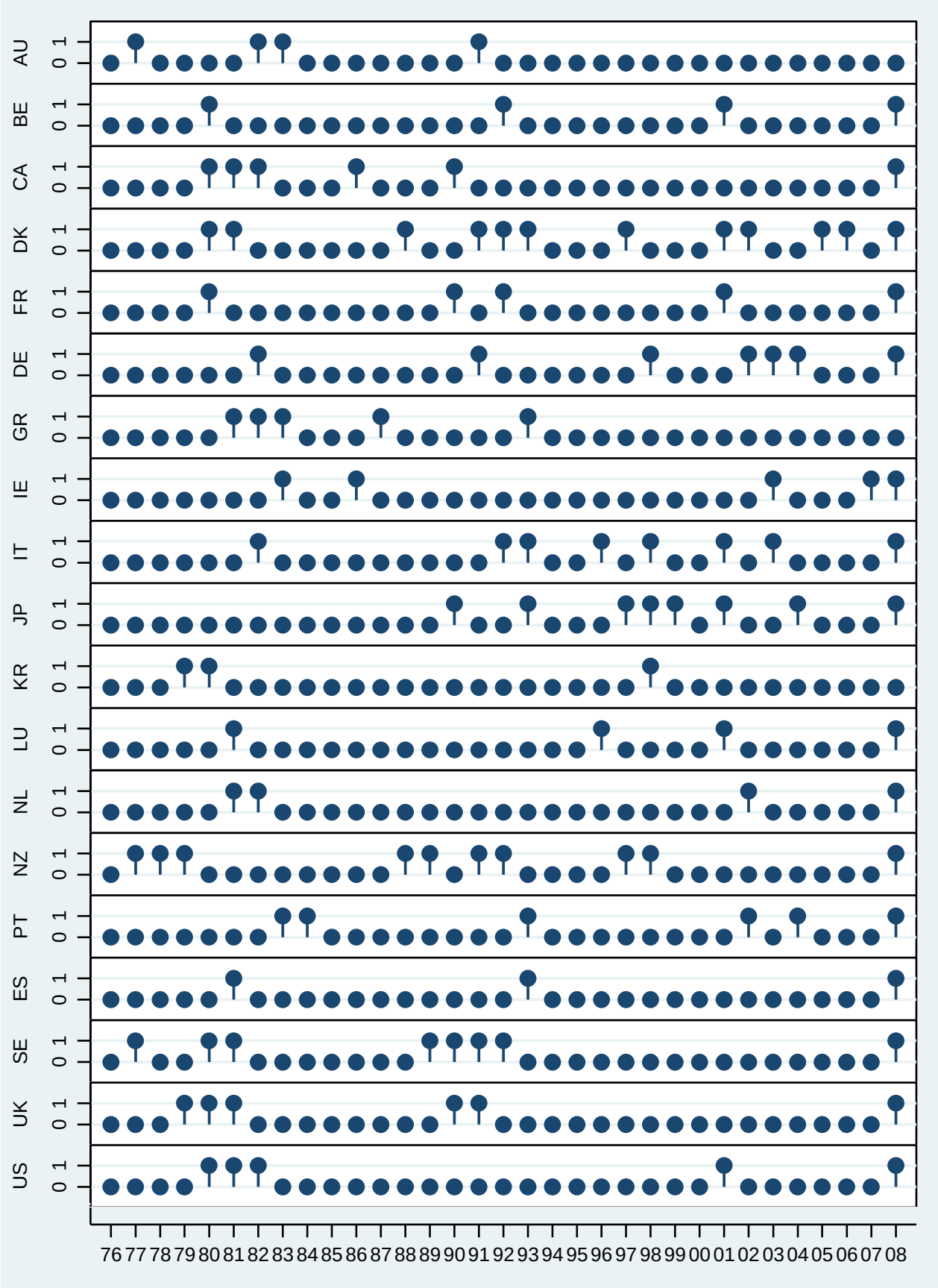
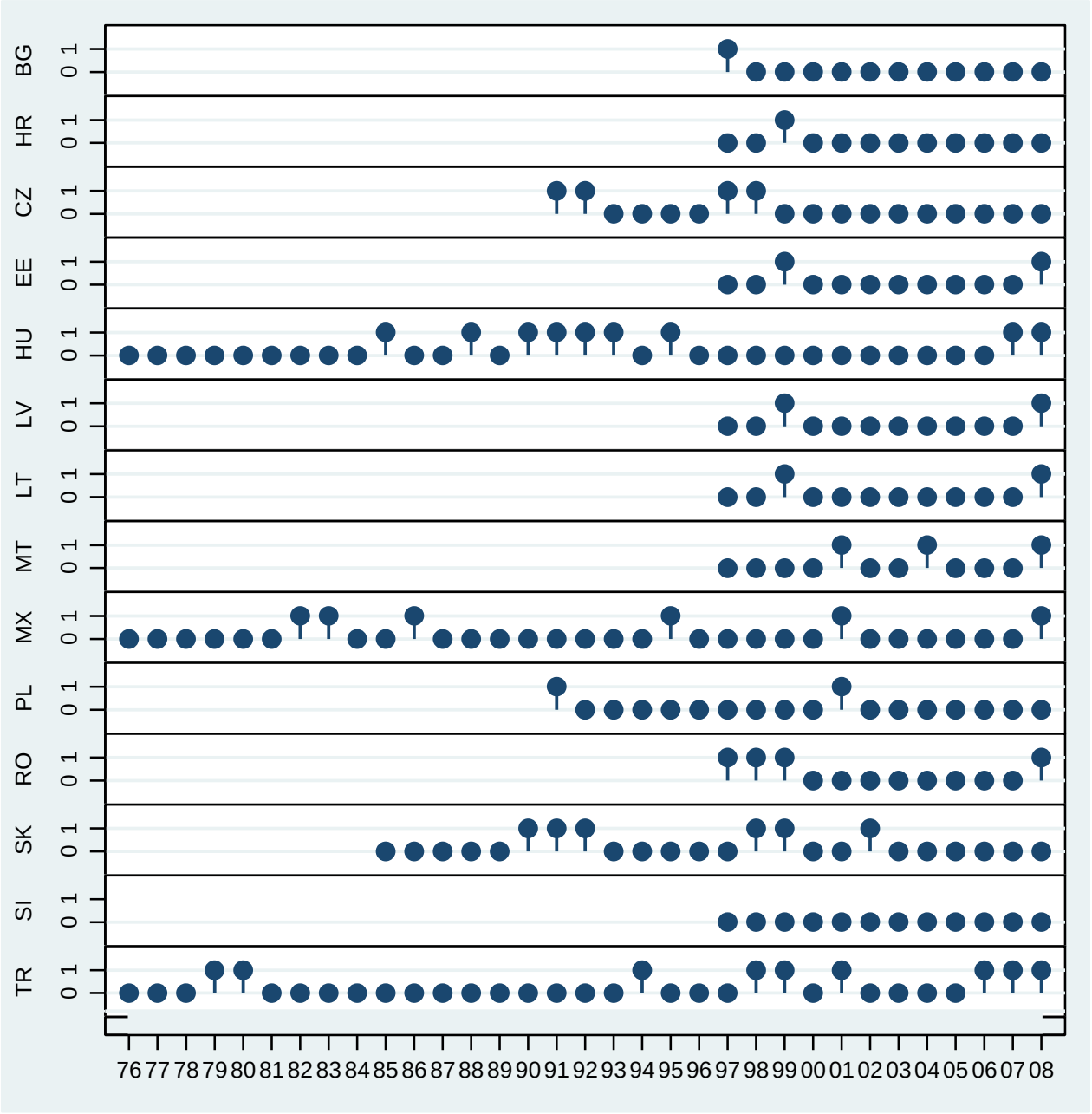


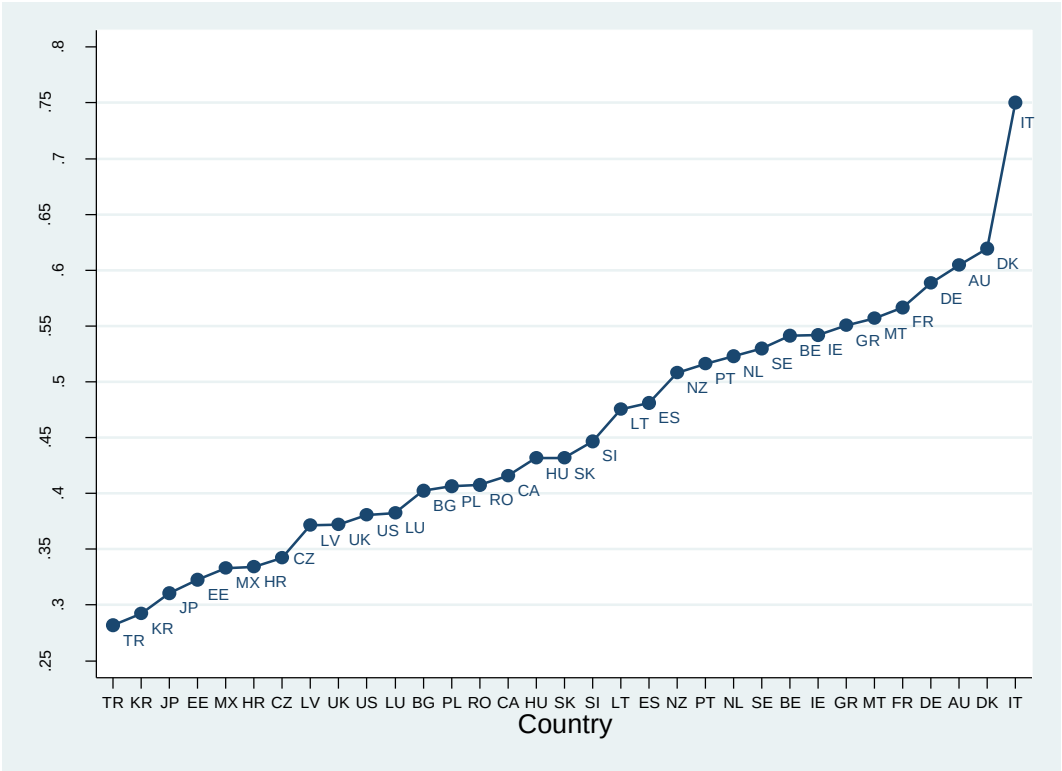
Figure 3. Periods of economic downturn across countries
(1=at least two quarters of downturn par year, 0 otherwise)





Sources: OECD, EUROSTAT, WORLD BANK.
Note: Australia AU, Belgium BE, Bulgaria BG, Canada CA, Croatia HR, Czech Republic CZ, Denmark DK, Estonia EE, France FR, Germany DE, Greece GR, Hungary HU, Ireland IE, Italy IT, Japan JP, Korea KR, Latvia LV, Lithuania LT, Luxembourg LU, Malta MT, Mexico MX, Netherlands NL, New Zealand NZ, Poland PL, Portugal PT, Romania RO, Slovak Republic SK, Slovenia SI, Spain ES, Sweden SE, Turkey TR, United Kingdom UK, United States US.

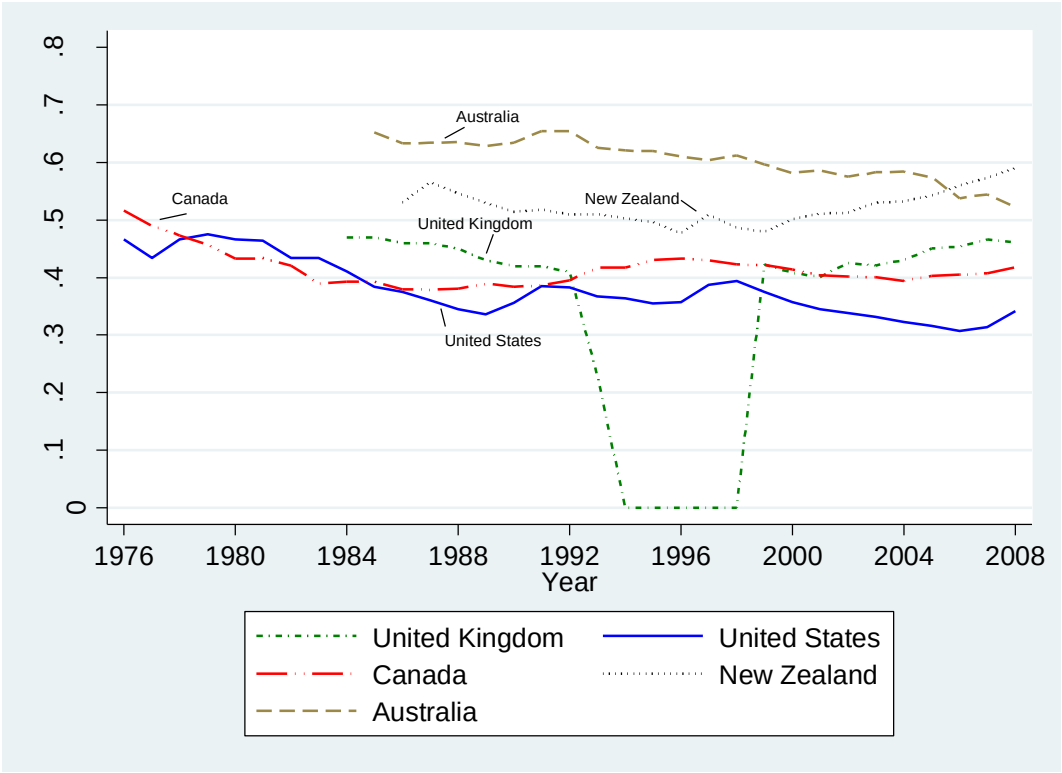
Figure 4. Kaitz index ranked across countries
(for each country, mean of the Kaitz index across years in the panel)



Sources: OECD MW database and EUROSTAT.
Note: see Figure 1.

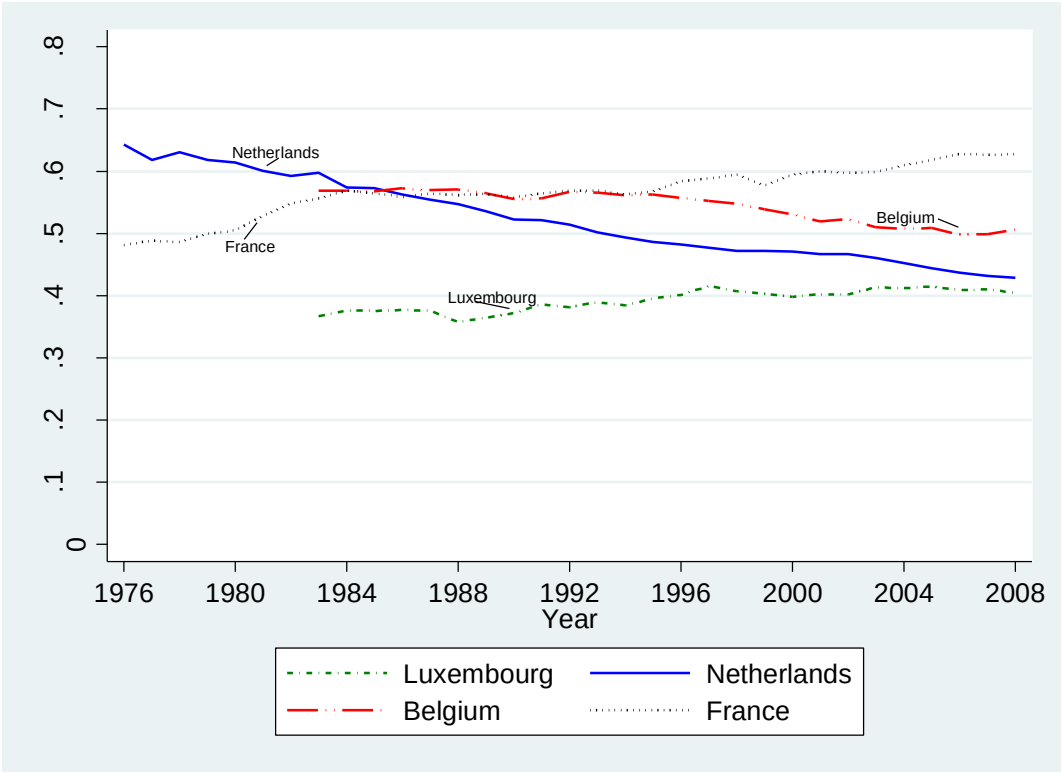
Figure 5. Kaitz Index across countries and years

a. Anglo-Saxon Countries



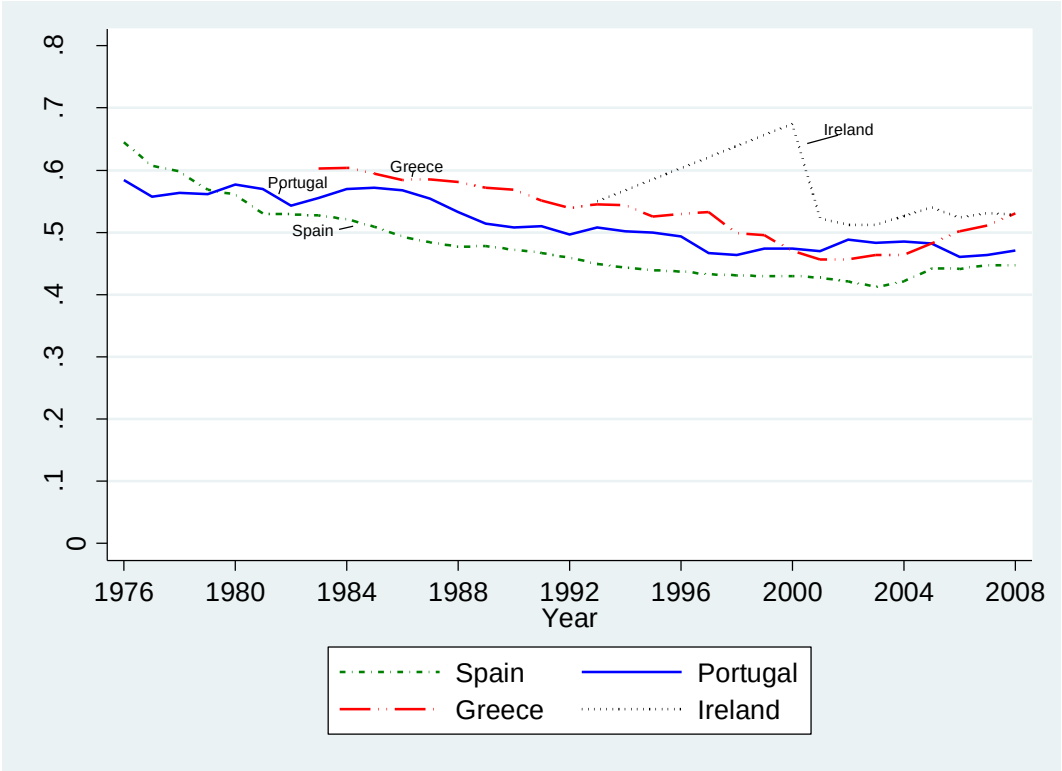
Source: OECD, MW database. Kaitz index relative to the median earnings.
For UK before 1994, source: Dolado et al. (1996), Kaitz index relative to average earnings.

b. Central European Countries



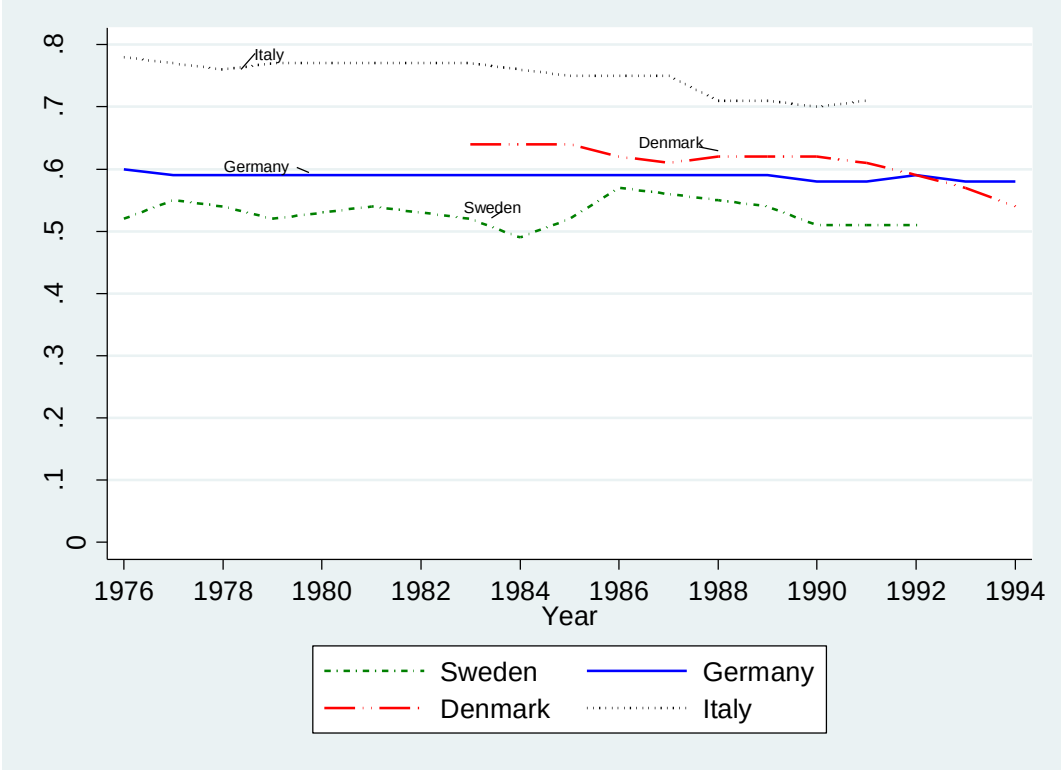
Source: OECD, MW database. Kaitz index relative to the median earning

c. Mediterranean Countries



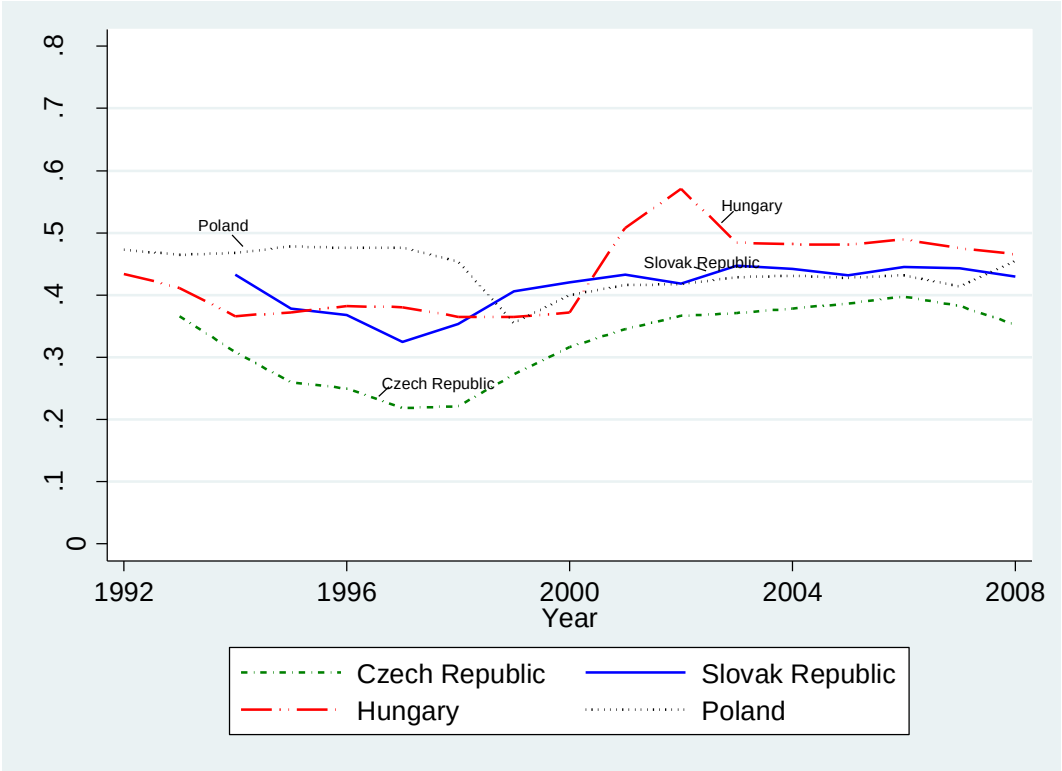
Source: OECD, MW database. Kaitz index relative to the median earnings.
For Ireland before 2000, source: Dolado et al. (1996), Kaitz index relative to average earnings.

d. Collective Agreement Countries



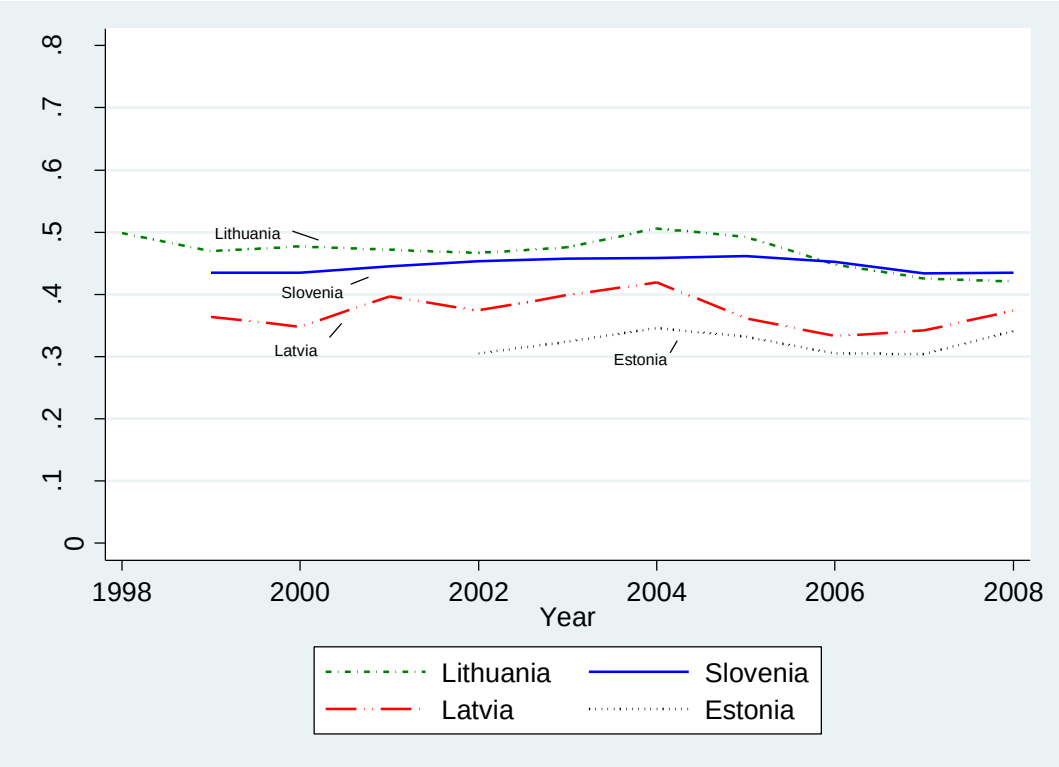
Source: Dolado et al. (1996), Kaitz index relative to average earnings.

e. EU Recent Accession Countries



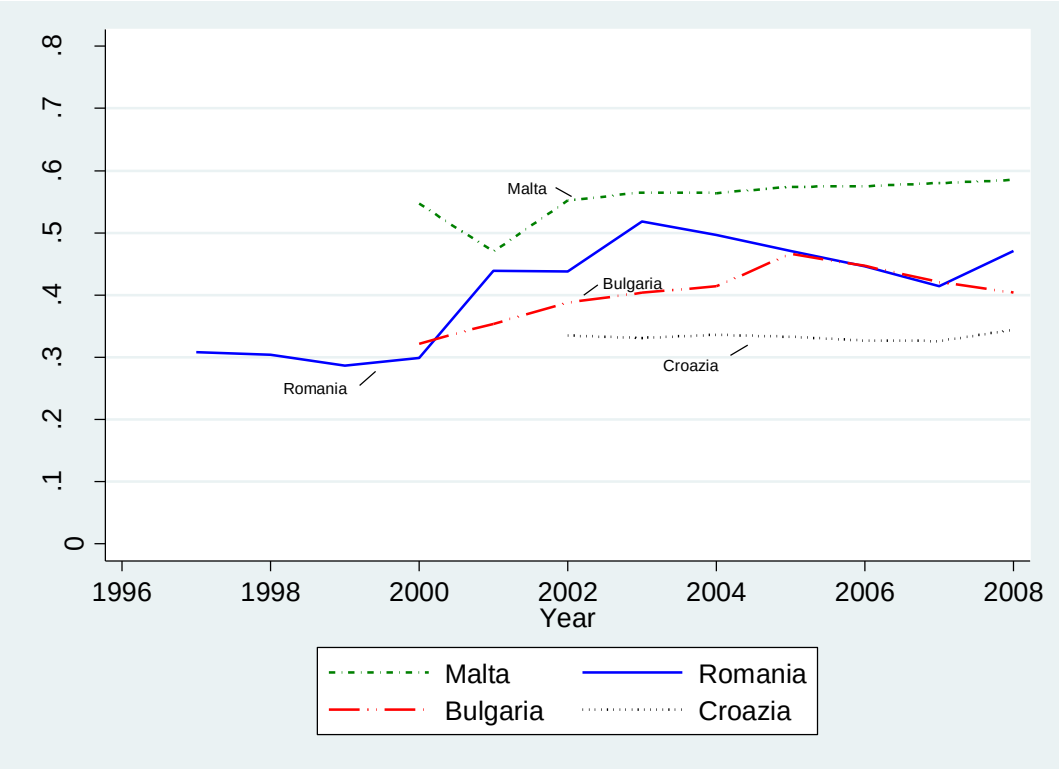
Source: OECD, MW database. Kaitz index relative to the median earnings.

f. EU Recent Accession Countries



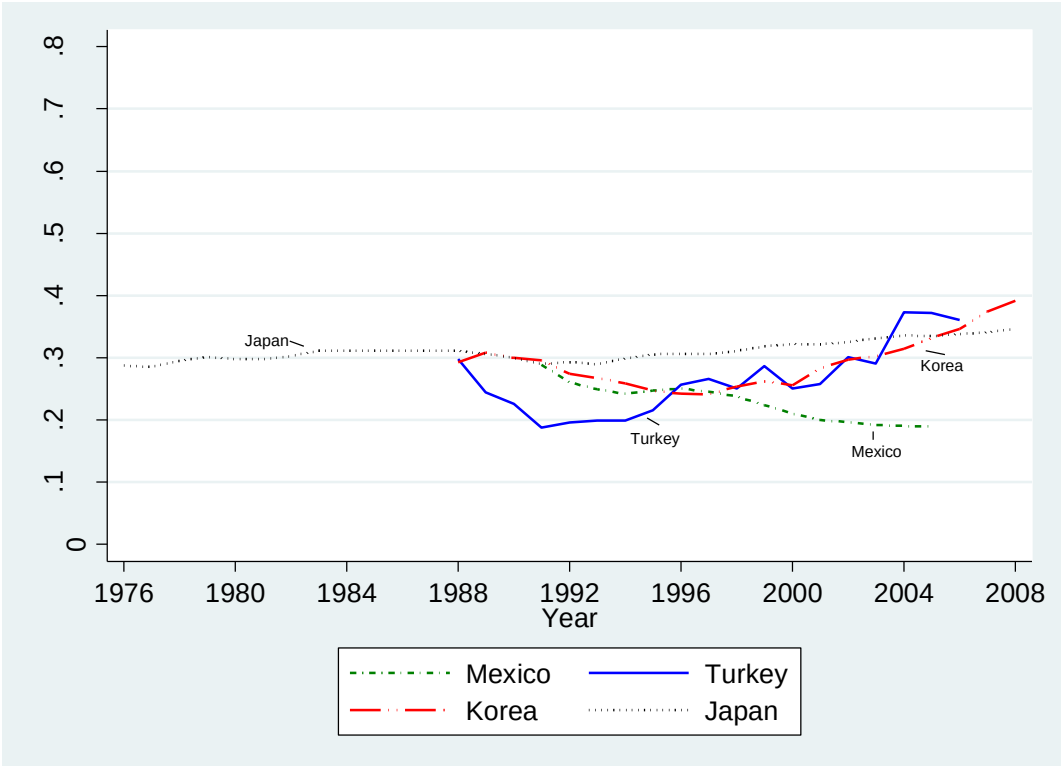
Source: EUROSTAT. Kaitz index relative to the mean earnings.
For Lithuania, Kaitz Index relative to median earnings.

g. EU Recent Accession Countries



Source: EUROSTAT. Kaitz index relative to the median earnings.
For Bulgaria and Croazia, Kaitz index relative to mean earnings

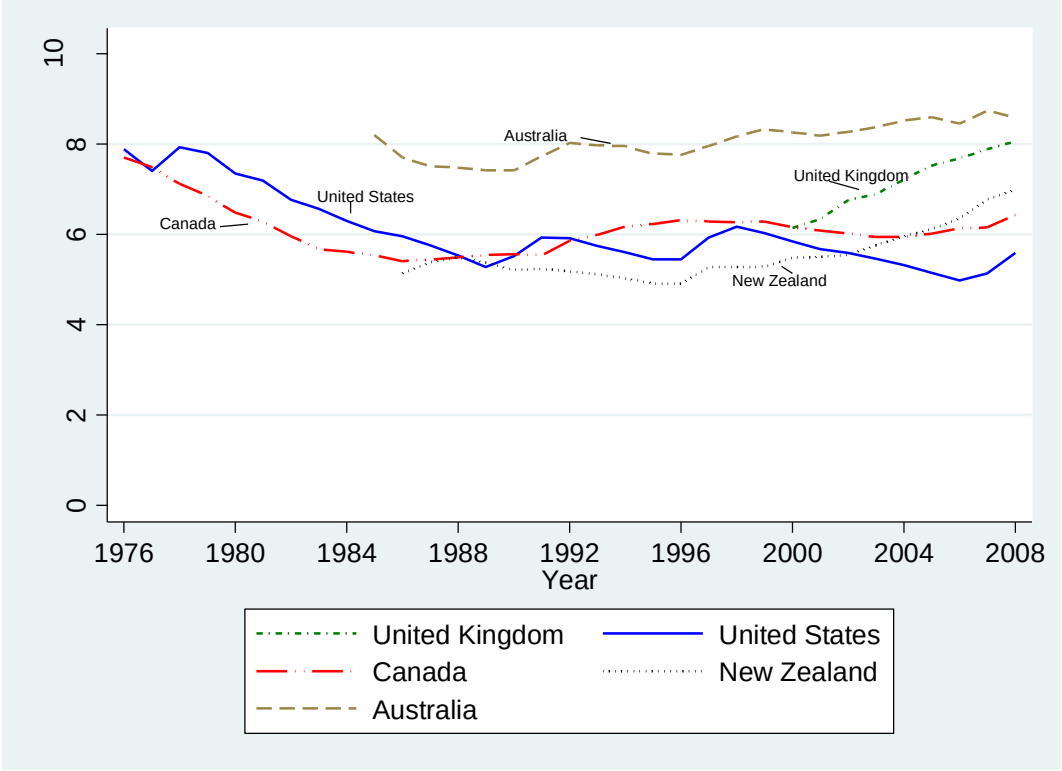
h. Developing and Asian Countries



Source: OECD, MW database. For Japan and Korea, Kaitz index relative to the median earnings. For Turkey and Mexico, Kaitz index relative to the mean earnings.

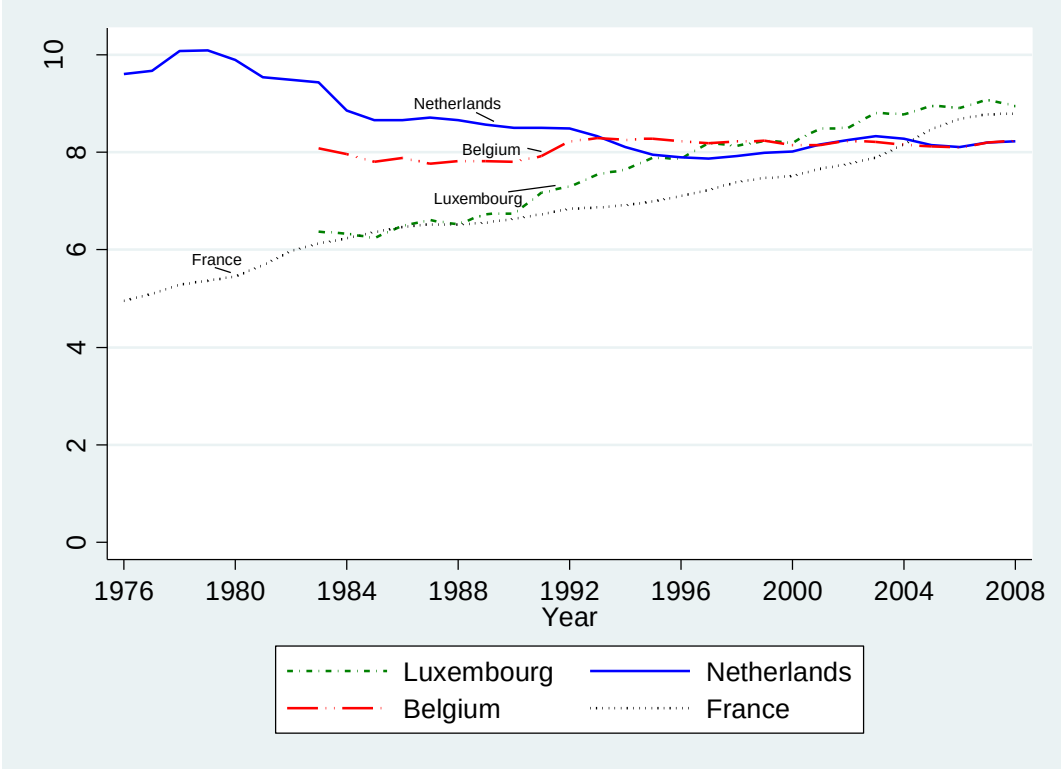
Figure 6. Real Hourly MW (US$PPP)

a. Anglo-Saxon Countries



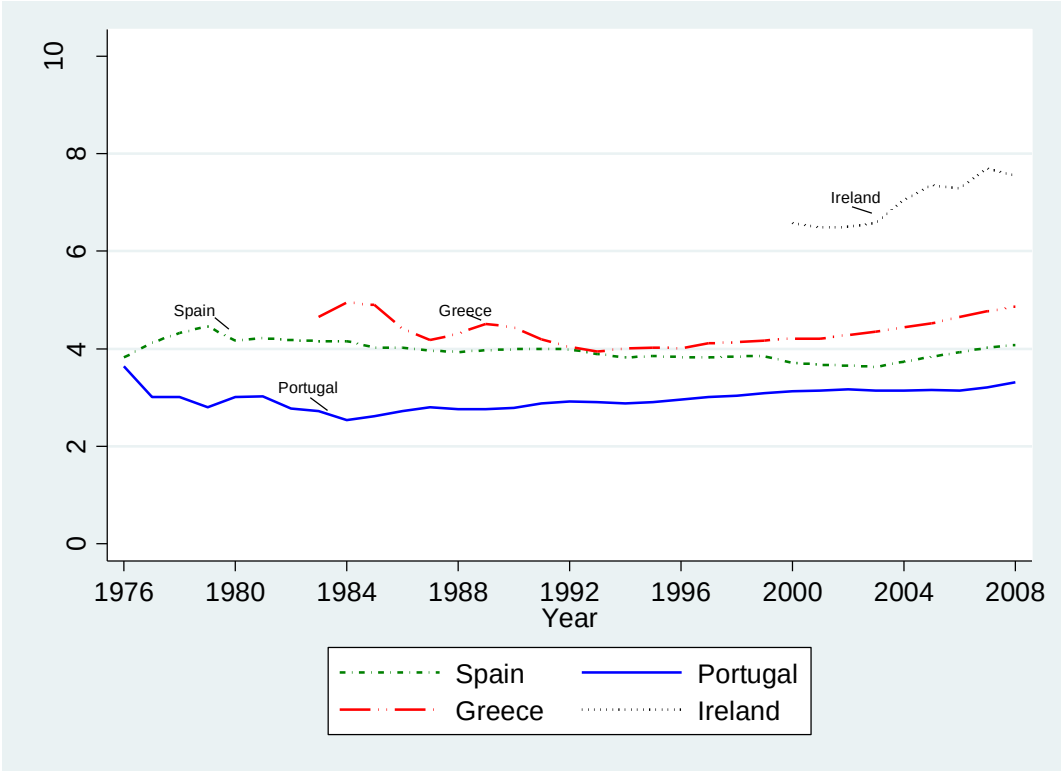
Source: OECD, MW database

b. Central European Countries



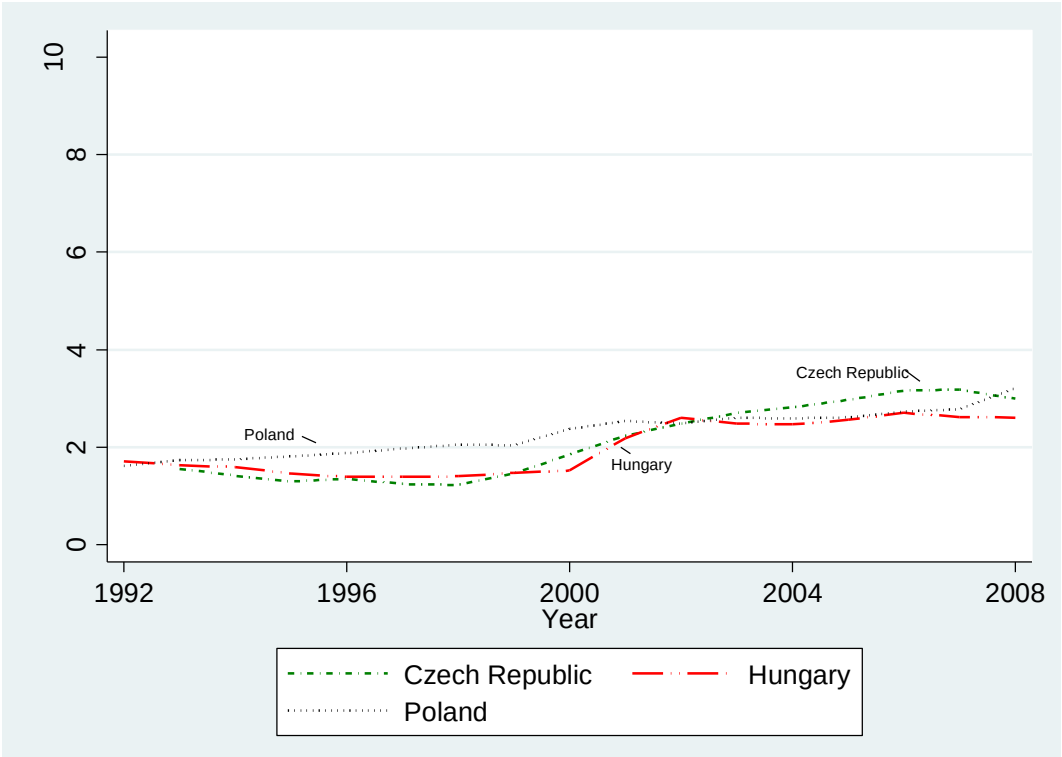
Source: OECD, MW database.

c. Mediterranean Countries



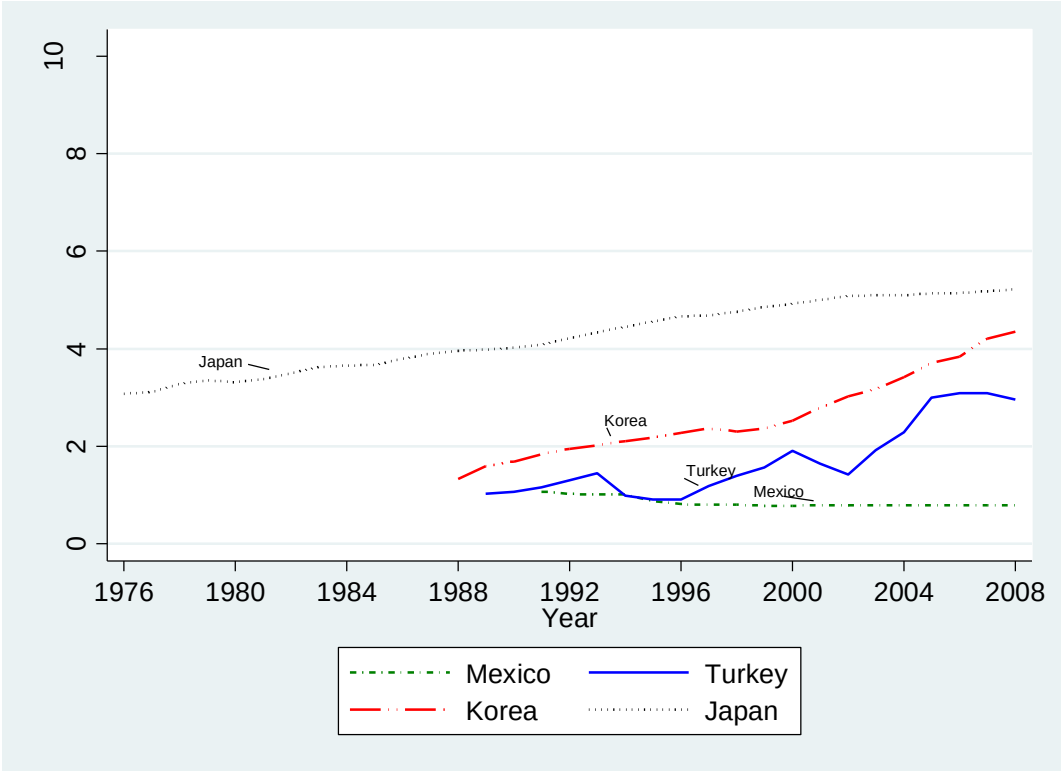
Source: OECD, MW database.

d. Eastern European Countries



Source: OECD, MW database.

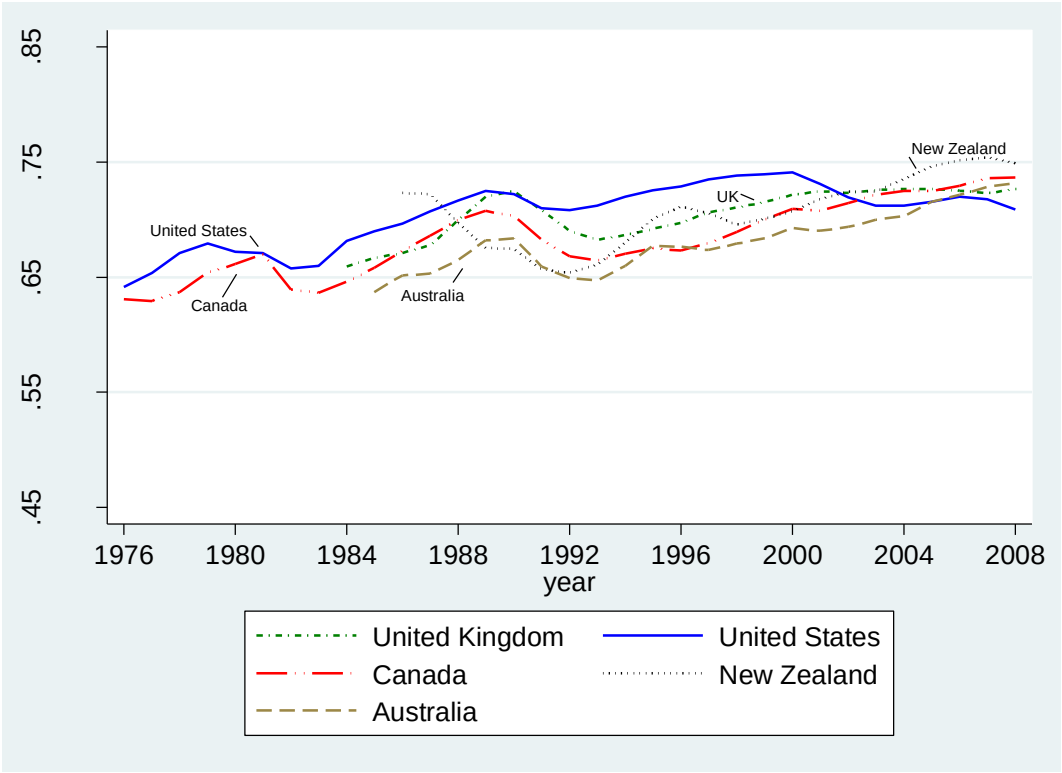
e. Developing and Asian Countries



Source: OECD, MW database.

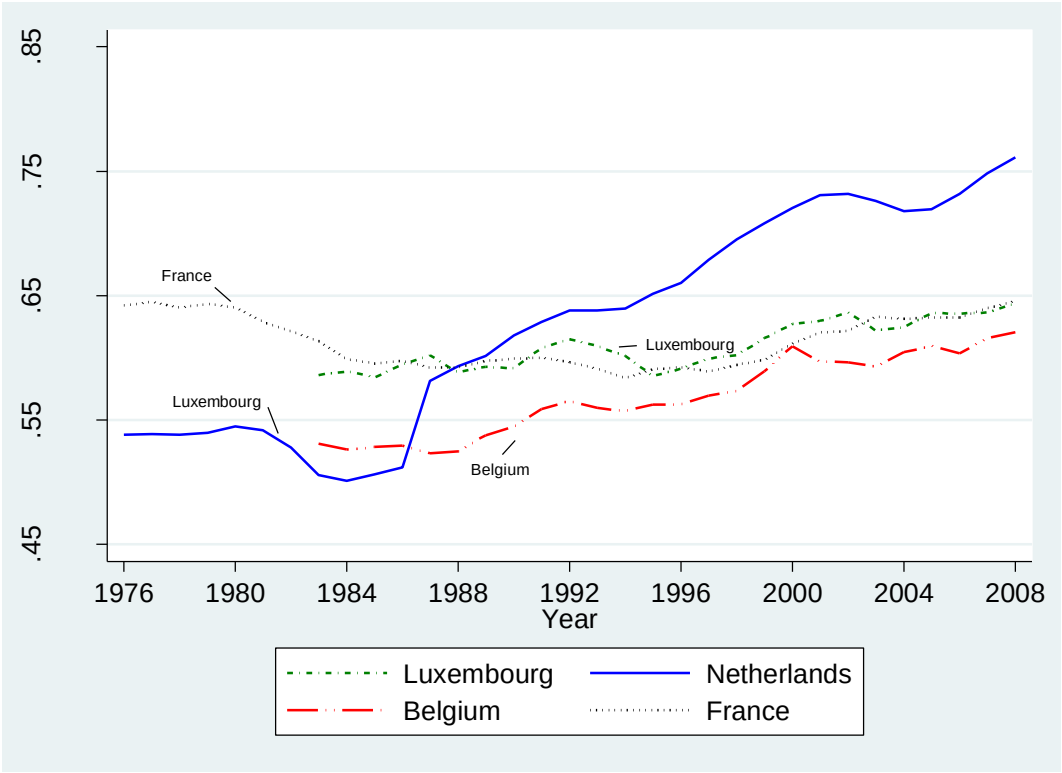
Figure 7. Employment to population ratio (total population)

a. Anglo-Saxon Countries



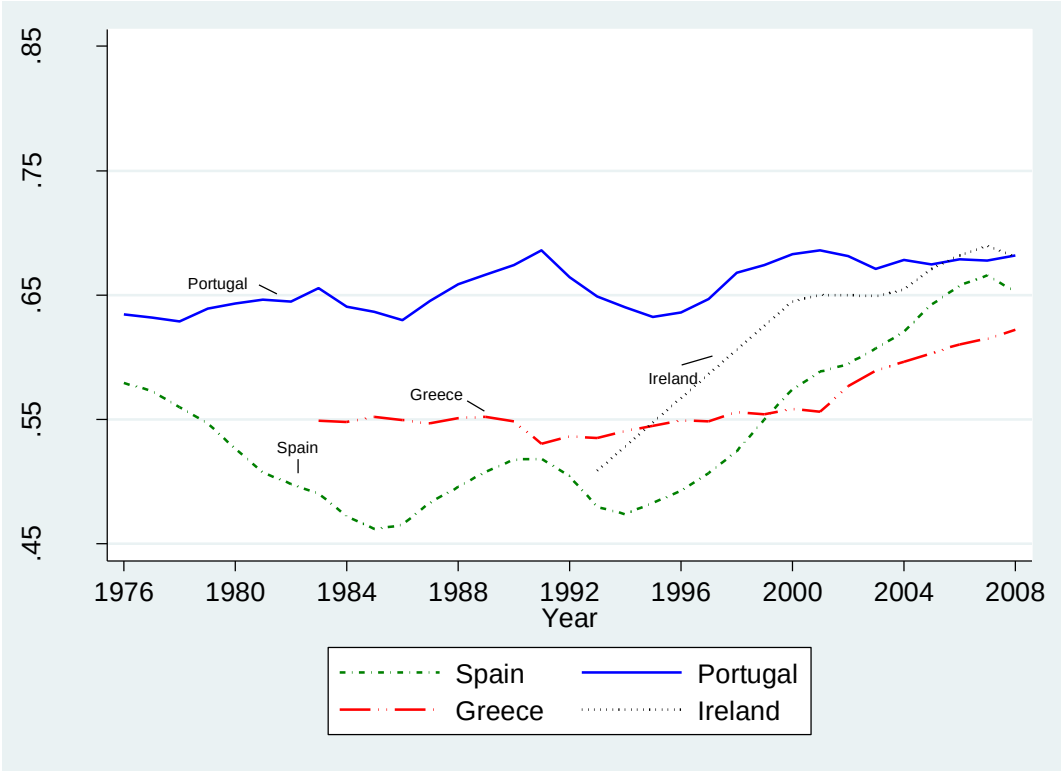
Source: OECD.

b. Central European Countries



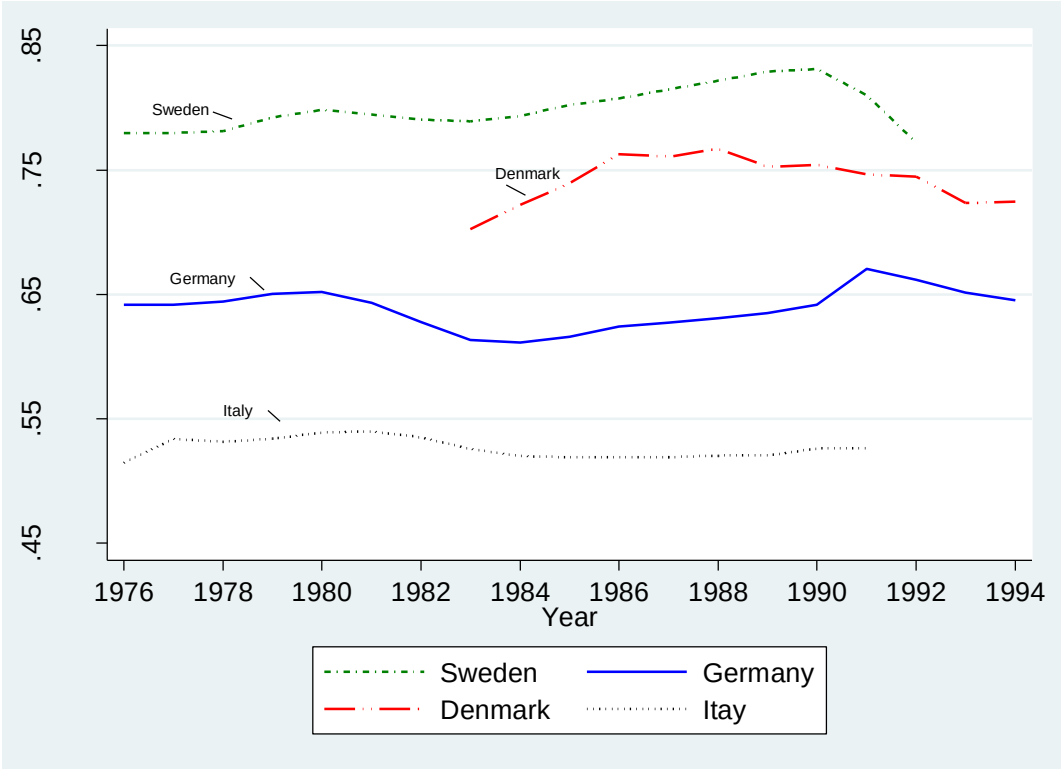
Source: OECD.

c. Mediterranean Countries



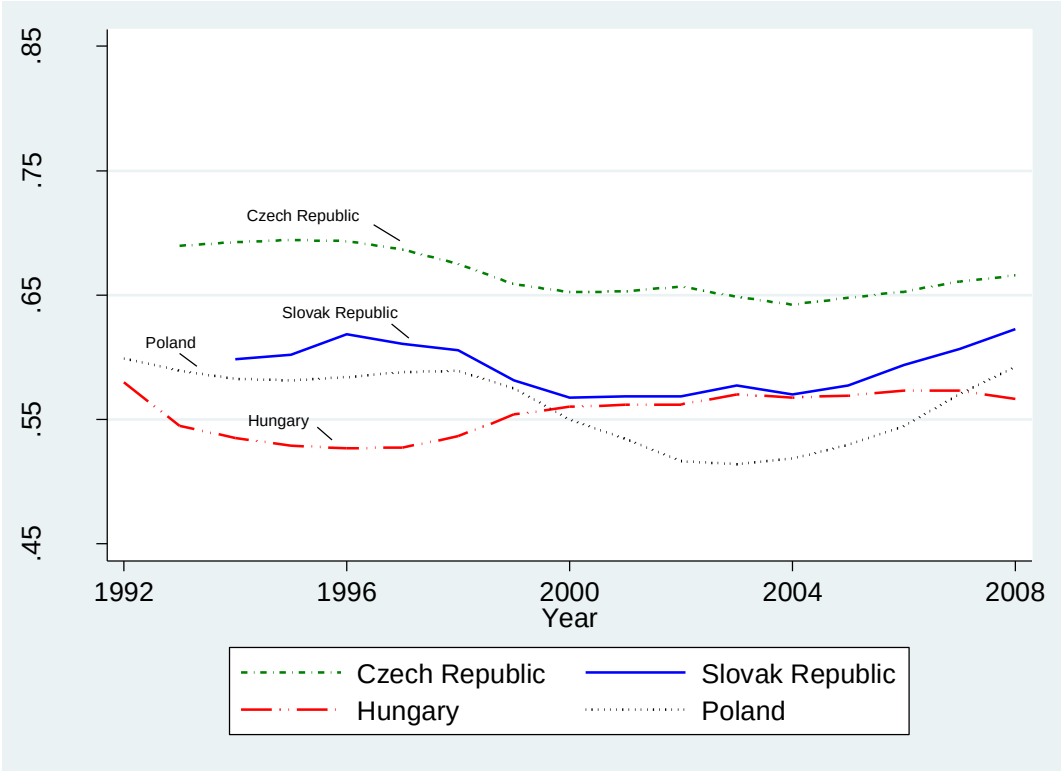
Source: OECD.

d. Collective Agreement Countries



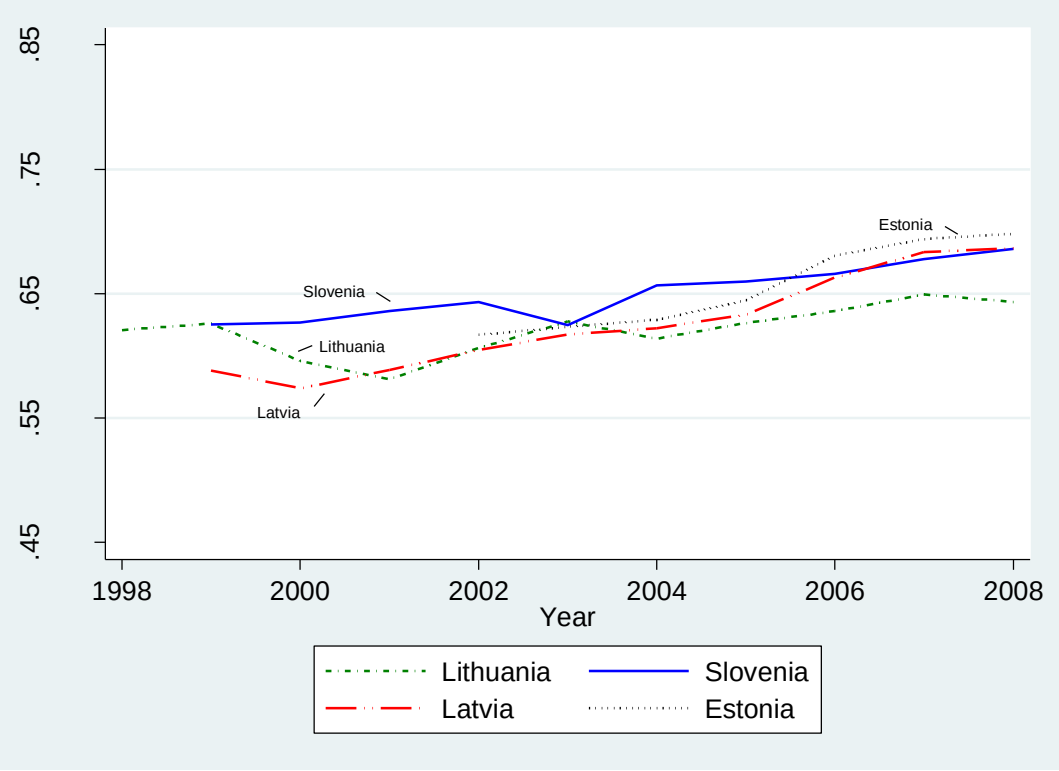
Source: OECD.

e. EU Recent Accession Countries



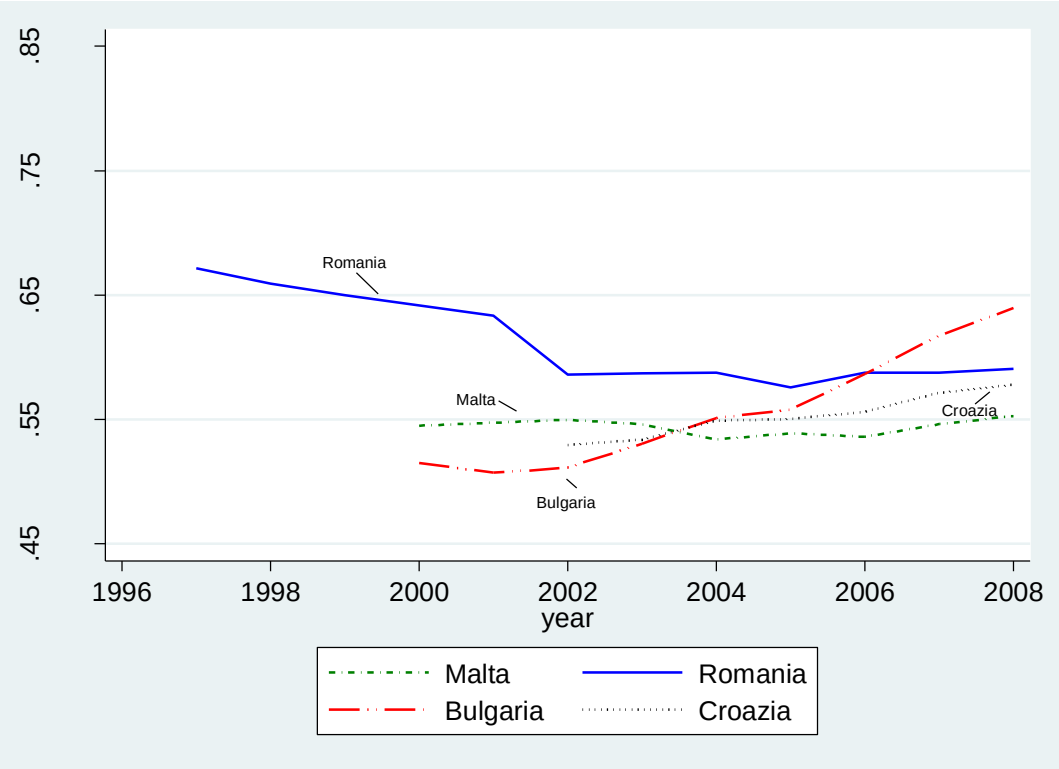
Source: OECD.

f. EU Recent Accession Countries



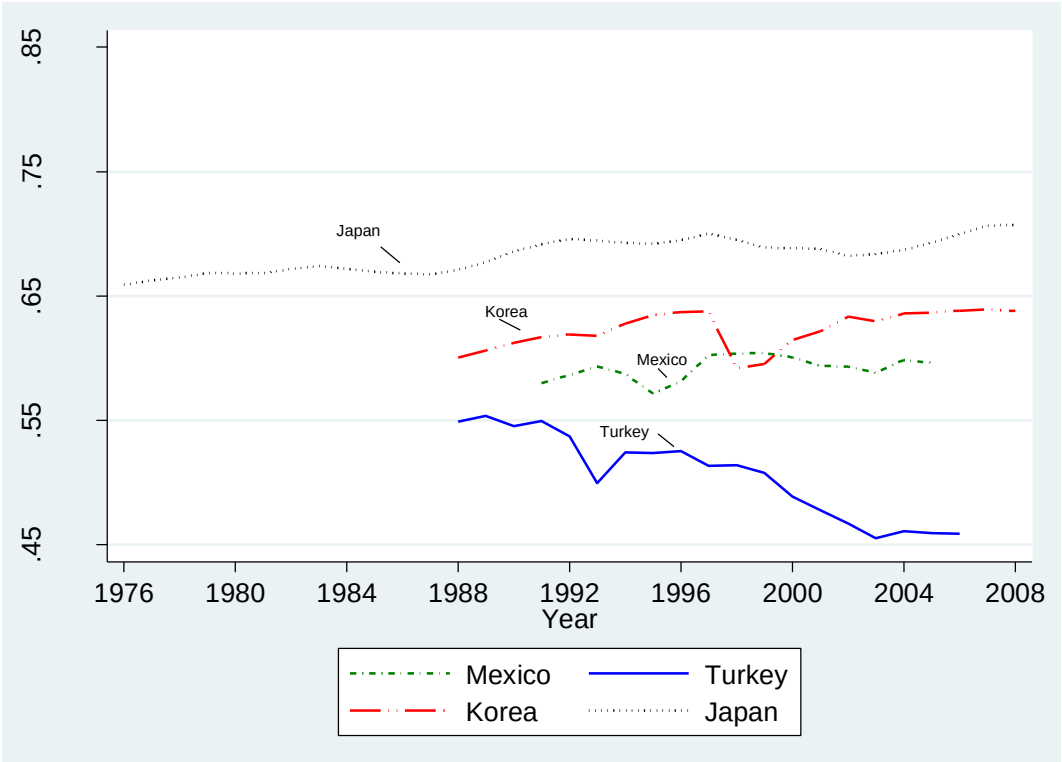
Source: EUROSTAT.

g. EU Recent Accession Countries



Source: EUROSTAT.

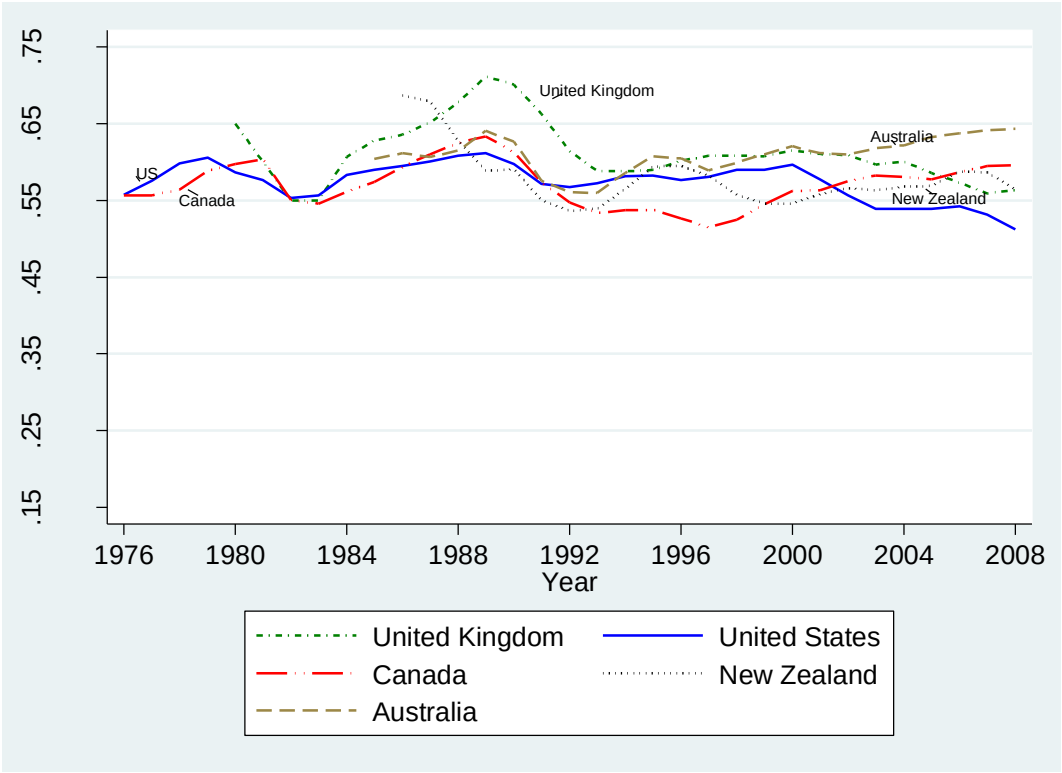
h. Developing and Asian Countries



Source: OECD.

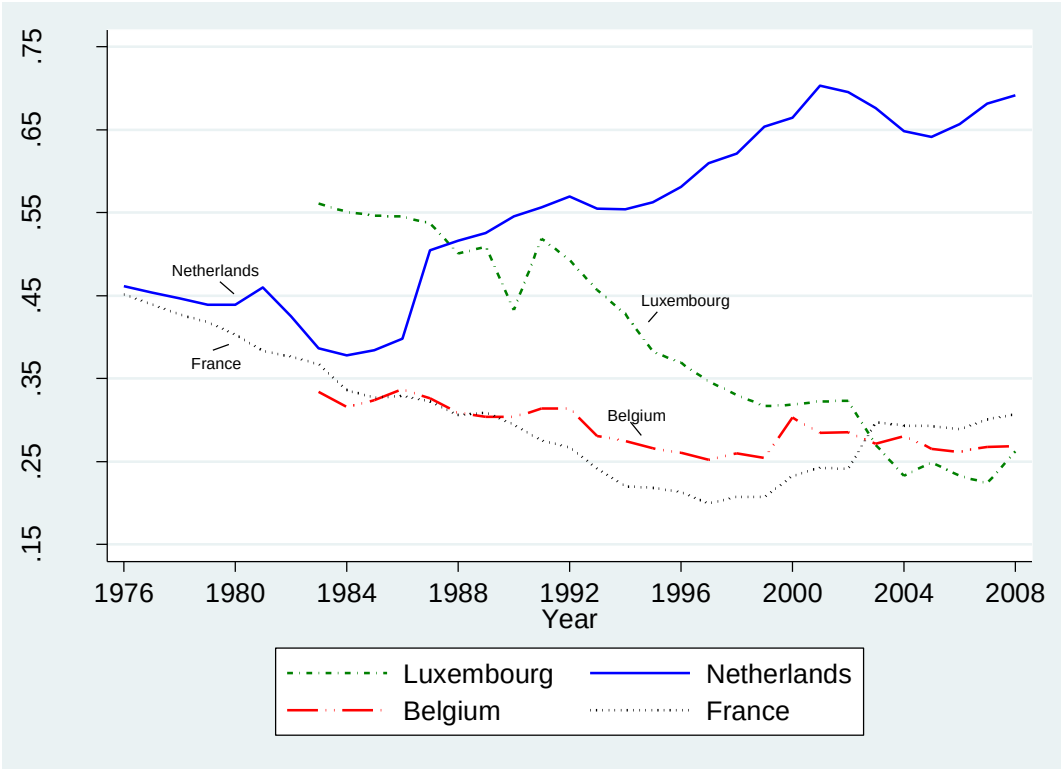
Figure 8. Employment to population ratio (from 15 to 24 years old)

a. Anglo-Saxon Countries



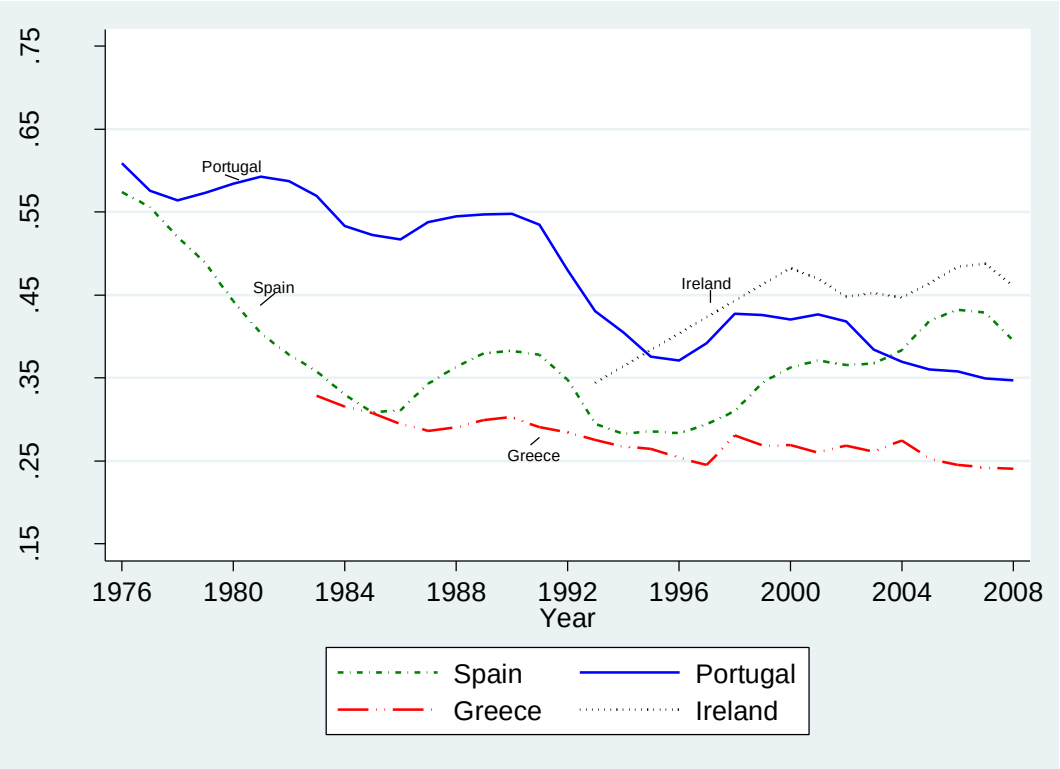
Source: OECD.

b. Central European Countries



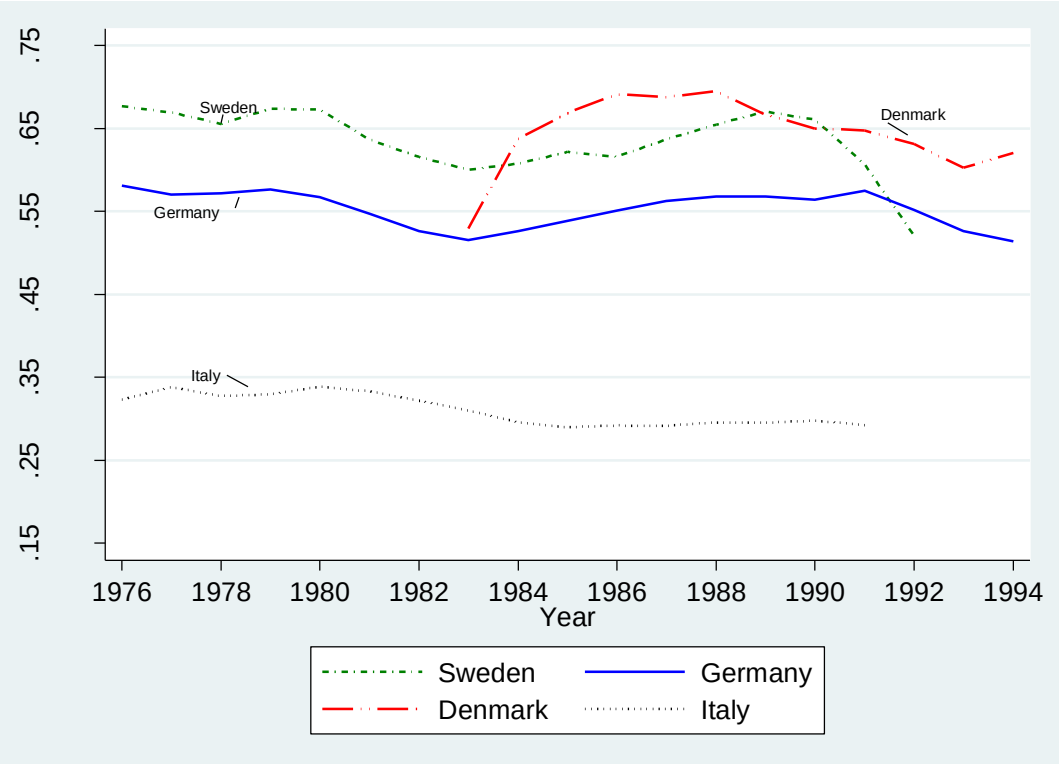
Source: OECD.

c. Mediterranean Countries



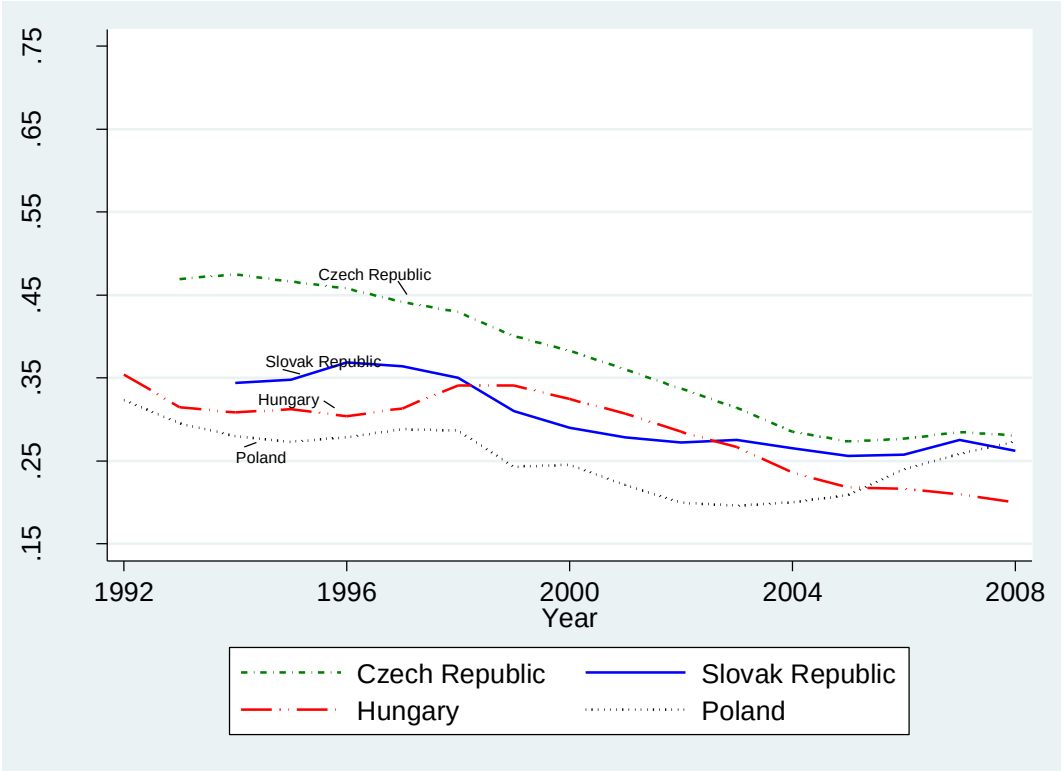
Source: OECD.

d. Collective Agreement Countries



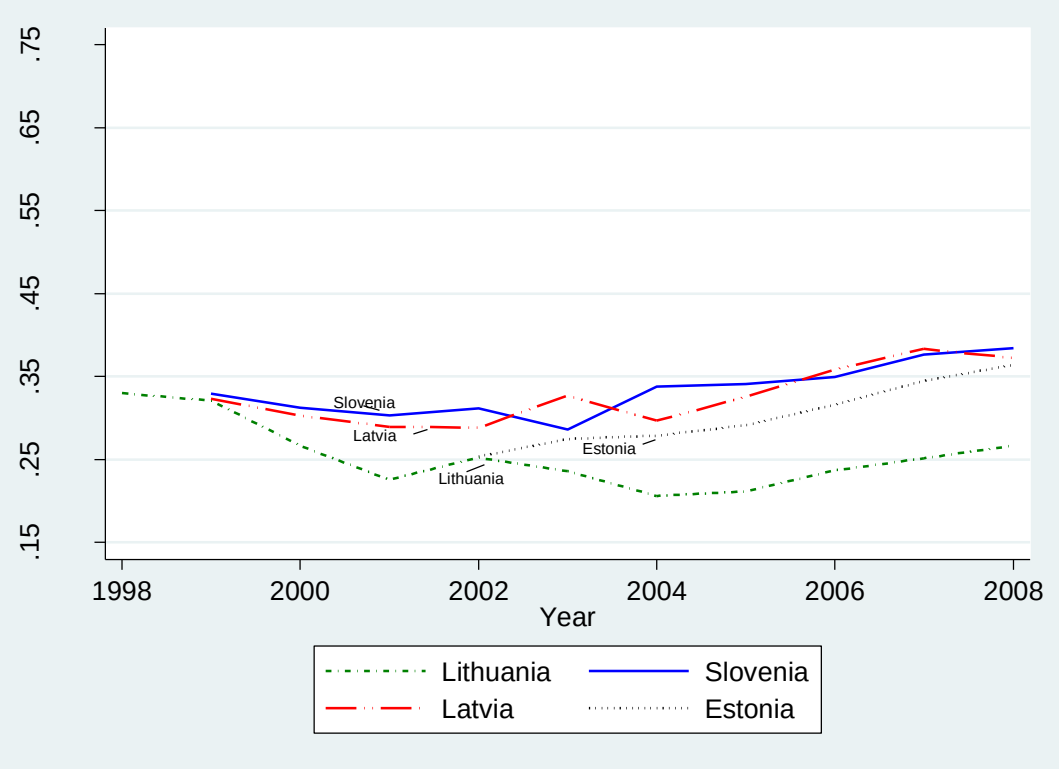
Source: OECD.

e. EU Recent Accession Countries



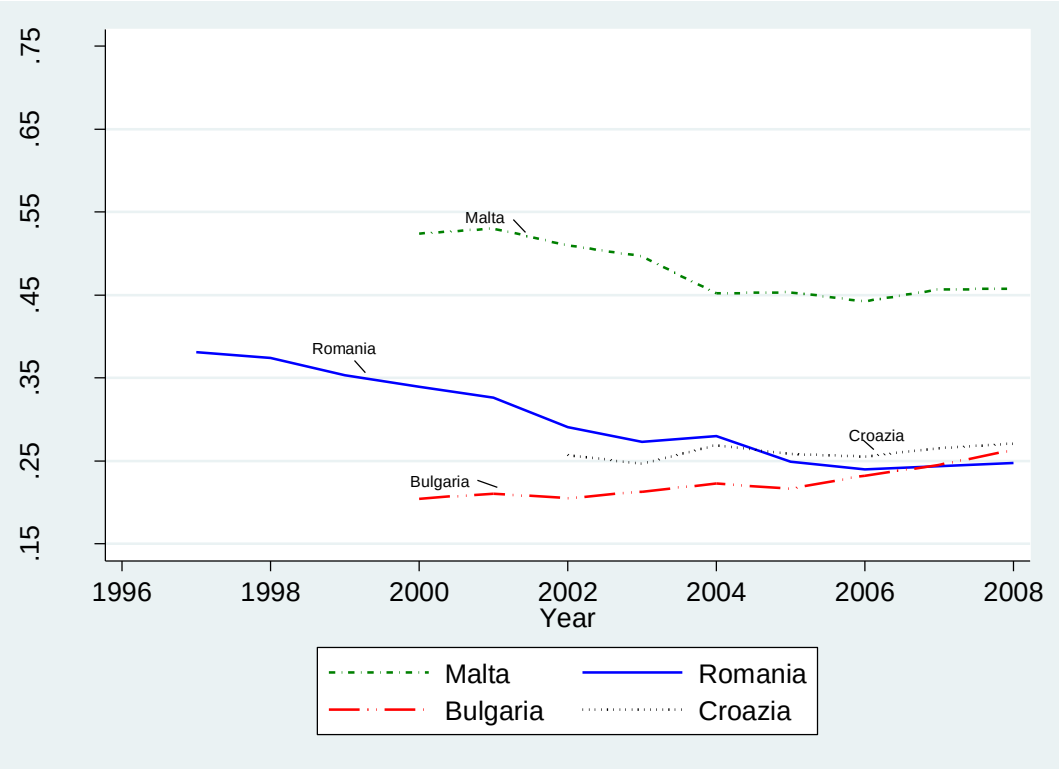
Source: OECD.

f. EU Recent Accession Countries



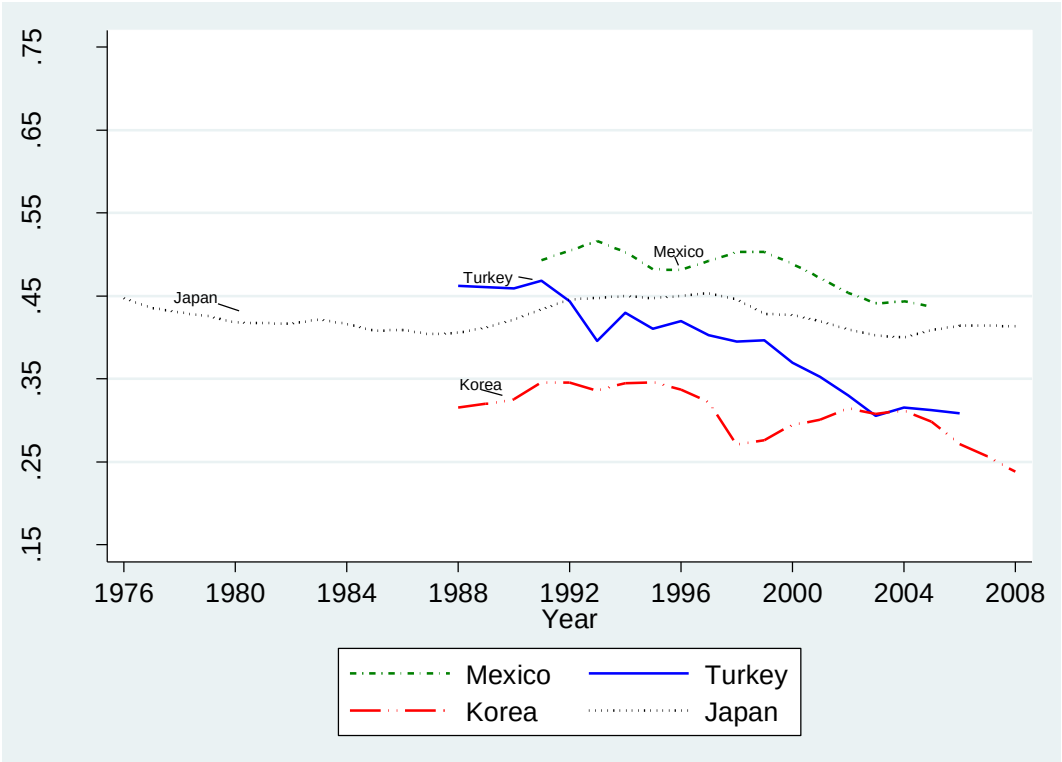
Source: EUROSTAT.

g. EU Recent Accession Countries



Source: EUROSTAT.

h. Developing and Asian Countries



Source: OECD.

Table 1.1 All and adults Estimates of the MW Model
Dummy for downturn as a demand side control

Variable	*(1) FE*	*(2) FE*	*(3) FE*	*(4) FE*	*(1) FE*	*(2) FE*	*(3) FE*	*(4) FE*
	Panel A: All (15-64)				***Panel A: All (15-64)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.132**	-0.001	-0.089**	0.006	-0.122**	0.022*	-0.016	0.028
	(0.029)	(0.011)	(0.023)	(0.017)	(0.026)	(0.013)	(0.018)	(0.020)
Downturn (L.)	-0.004	-0.004**	-0.004	-0.004*	-0.009	-0.008**	-0.009**	-0.006**
	(0.003)	(0.002)	(0.003)	(0.002)	(0.010)	(0.003)	(0.003)	(0.003)
Bargained Min.			0.023**	-0.001			0.007	0.004
			(0.008)	(0.012)			(0.006)	(0.012)
Youth Submin.			-0.043**	-0.085**			-0.074**	-0.082**
			(0.015)	(0.022)			(0.015)	(0.024)
Act. Policies			-0.027**	-0.017**			-0.014**	-0.004
			(0.006)	(0.006)			(0.005)	(0.007)
Empl. Prot.			-0.012*	0.025**			-0.006	0.039**
			(0.006)	(0.008)			(0.006)	(0.009)
Repl. Rate			-0.014**	-0.011**			-0.037**	-0.045**
			(0.005)	(0.005)			(0.005)	(0.008)
Rig. of Hours			-0.008**	-0.003			-0.014**	-0.010**
			(0.003)	(0.003)			(0.004)	(0.004)
Union Density			0.019**	-0.004			0.013**	-0.008
			(0.005)	(0.007)			(0.006)	(0.013)
Observations	636	636	531	531	636	636	531	531
R-squared	0.881	0.952	0.912	0.953	0.071	0.951	0.925	0.951
	Panel B: Adults (25-64)				***Panel B: Adults (25-64)***			
Kaitz Index (L.)	-0.116**	0.013	-0.059**	0.022	-0.078**	0.040**	-0.005	0.042**
	(0.028)	(0.010)	(0.021)	(0.014)	(0.028)	(0.011)	(0.018)	(0.015)
Downuturn (L.)	-0.004	-0.003*	-0.004*	-0.003*	-0.007**	-0.004*	-0.005**	-0.003*
	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)	(0.002)
Rel. Cohort size	0.216**	0.315**	0.453**	0.400**	0.354**	0.433**	0.478**	0.406**
	(0.087)	(0.085)	(0.082)	(0.091)	(0.085)	(0.094)	(0.074)	(0.086)
Bargained Min.			0.013*	0.006			-0.003	0.006
			(0.007)	(0.010)			(0.006)	(0.011)
Youth Submin.			-0.039**	-0.063**			-0.077**	-0.067**
			(0.011)	(0.016)			(0.011)	(0.017)
Act. Policies			-0.027**	-0.016**			-0.023**	-0.009
			(0.004)	(0.005)			(0.005)	(0.006)
Empl. Prot.			-0.005	0.024**			0.013**	0.047**
			(0.005)	(0.006)			(0.006)	(0.008)
Repl. Rate			0.003	-0.006			-0.014**	-0.028**
			(0.004)	(0.004)			(0.005)	(0.006)
Rig. of Hours			-0.012**	-0.008**			-0.020**	-0.014**
			(0.003)	(0.003)			(0.003)	(0.004)
Union Density			0.018**	-0.007			0.015**	-0.004
			(0.004)	(0.006)			(0.005)	(0.009)
Observations	636	636	531	531	636	636	531	531
R-squared	0.887	0.960	0.913	0.959	0.907	0.960	0.926	0.960
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y

Notes: HAC robust fixed effect estimates in brackets. * significant at 10% level, ** significant at 5% level.
Countries included in the analysis: Australia, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, France. Germany, Greece, Hungary, Ireland, Italy, Japan, Korea, Latvia, Lithuania. Luxemburg, Malta, Mexico, Netherlands, New Zealand, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Turkey, United Kingdom, United States.
For specifications in column (3) to (4) the sample is restricted to 23 countries: for data limitation Mexico, Turkey, Lithuania, Romania, Slovenia, Malta, Bulgaria, Latvia, Estonia and Croatia are omitted from the analysis. However, results in specifications (1) to (2) are qualitatively similar omitting those countries.
The sample period is from 1976 to 2008, except for the following countries: Belgium, Greece and Luxembourg (1983-2008), UK (1984-2008), Australia (1985-2008), New Zealand (1986-2008), Italy(1976-1991), Sweden (1976-1992) Germany (1976-1994), Denmark (1983-1994), Korea (1988-2008), Turkey (1988-2006), Mexico (1991-2005), Hungary and Poland (1992-2008), Czech Rep. (1993-2008), Slovak Rep. (1994-2008), Romania (1997-2008), Lithuania (1998-2008), Latvia and Slovenia (1999- 2008), Malta, Bulgaria and Ireland (2000-2008), Estonia and Croatia (2002-2008).

Table 1.2. Youth Estimates of the MW Model
Dummy for downturn as a demand side control

Variable	(1) FE	(2) FE	(3) FE	(4) FE	(1) FE	(2) FE	(3) FE	(4) FE
	Panel A: Young (15-24)				***Panel A: Young (15-24)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.231**	-0.036*	-0.226**	-0.064**	-0.083**	0.013	-0.014	-0.020
	(0.054)	(0.021)	(0.049)	(0.031)	(0.040)	(0.024)	(0.027)	(0.036)
Downuturn (L.)	-0.006	-0.007**	-0.002	-0.004	-0.006	-0.010**	-0.002	-0.005
	(0.006)	(0.003)	(0.005)	(0.003)	(0.005)	(0.004)	(0.005)	(0.005)
Rel. Cohort size	-0.344**	-0.158	-0.428**	-0.468**	-0.024	-0.301*	-0.089	-0.462**
	(0.169)	(0.147)	(0.177)	(0.161)	(0.127)	(0.156)	(0.133)	(0.159)
Bargained Min.			0.065**	0.063**			0.054**	0.063*
			(0.017)	(0.028)			(0.012)	(0.032)
Youth Submin.			-0.020	-0.089**			-0.040**	-0.097**
			(0.021)	(0.028)			(0.020)	(0.029)
Act. Policies			-0.060**	-0.064**			-0.046**	-0.060**
			(0.011)	(0.008)			(0.010)	(0.013)
Empl. Prot.			-0.005	0.054**			-0.004	0.082**
			(0.012)	(0.011)			(0.011)	(0.014)
Repl. Rate			-0.043**	-0.002			-0.072**	-0.040**
			(0.009)	(0.008)			(0.009)	(0.010)
Rig. of Hours			-0.033**	-0.006			-0.029**	-0.018**
			(0.007)	(0.005)			(0.006)	(0.006)
Union Density			0.038**	-0.009			0.024**	0.018
			(0.008)	(0.010)			(0.009)	(0.016)
Observations	636	636	531	531	636	636	531	531
R-squared	0.884	0.964	0.910	0.969	0.920	0.959	0.947	0.966
	Panel B: Teenagers (15-19)				***Panel B: Teenagers (15-19)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.089**	-0.018	-0.128**	-0.040	0.012	0.027	0.084**	0.014
	(0.037)	(0.024)	(0.036)	(0.037)	(0.035)	(0.027)	(0.039)	(0.044)
Downuturn (L.)	0.003	-0.002	0.004	-0.001	-0.002	-0.010***	0.001	-0.008**
	(0.006)	(0.003)	(0.005)	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)
Rel. Cohort size	1.372**	0.091	0.463*	-0.004	0.925***	-0.329	0.019	-0.384**
	(0.296)	(0.226)	(0.271)	(0.244)	(0.212)	(0.202)	(0.207)	(0.192)
Bargained Min.			0.072**	0.018			0.060**	0.028
			(0.016)	(0.032)			(0.016)	(0.037)
Youth Submin.			0.023	-0.065**			0.012	-0.057**
			(0.017)	(0.026)			(0.015)	(0.026)
Act. Policies			-0.035**	-0.036**			-0.042**	-0.033**
			(0.011)	(0.009)			(0.009)	(0.012)
Empl. Prot.			0.010	0.029**			0.012	0.041**
			(0.011)	(0.011)			(0.010)	(0.012)
Repl. Rate			-0.064**	0.001			-0.073**	-0.045**
			(0.009)	(0.010)			(0.009)	(0.011)
Rig. of Hours			-0.031**	0.003			-0.043**	-0.015**
			(0.007)	(0.004)			(0.009)	(0.007)
Union Density			0.056**	0.024*			0.039**	0.043**
			(0.010)	(0.012)			(0.009)	(0.015)
Observations	626	626	521	521	626	626	521	521
R-squared	0.926	0.978	0.948	0.978	0.949	0.978	0.970	0.981
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y

Notes: See table 1.1. The sample of teenagers is 10 observations smaller than for the other age groups because of 10 years of missing data on employment for the Netherlands.

Table 2.1 All and adults Estimates of the MW Model
GDP growth as a demand side control

Variable	(1) FE	(2) FE	(3) FE	(4) FE	(1) FE	(2) FE	(3) FE	(4) FE
	Panel A: All (15-64)				***Panel A: All (15-64)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.133**	-0.001	-0.089**	0.006	-0.083**	0.019	-0.016	0.022
	(0.029)	(0.012)	(0.023)	(0.018)	(0.027)	(0.014)	(0.018)	(0.019)
GDP growth (L.)	0.076	0.132**	0.111*	0.169**	0.129**	0.149**	0.277**	0.222**
	(0.055)	(0.034)	(0.064)	(0.044)	(0.059)	(0.036)	(0.061)	(0.046)
Bargained Min.			0.023**	0.001			0.008	0.010
			(0.008)	(0.013)			(0.007)	(0.012)
Youth Submin.			-0.041**	-0.085**			-0.068**	-0.081**
			(0.015)	(0.022)			(0.016)	(0.024)
Act. Policies			-0.026**	-0.015**			-0.015**	-0.004
			(0.005)	(0.006)			(0.005)	(0.007)
Empl. Prot.			-0.013*	0.023**			-0.010	0.033**
			(0.006)	(0.008)			(0.006)	(0.009)
Repl. Rate			-0.014**	-0.012**			-0.038**	-0.047**
			(0.005)	(0.005)			(0.005)	(0.008)
Rig. of Hours			-0.008**	-0.003			-0.015**	-0.010**
			(0.003)	(0.003)			(0.004)	(0.004)
Union Density			0.020**	-0.004			0.014**	-0.007
			(0.005)	(0.007)			(0.007)	(0.013)
Observations	636	636	531	531	636	636	531	531
R-squared	0.881	0.953	0.912	0.954	0.906	0.951	0.927	0.953
	Panel B: Adults (25-64)				***Panel B: Adults (25-64)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.117**	0.012	-0.057**	0.021	-0.081**	0.038**	-0.005	0.035**
	(0.028)	(0.010)	(0.021)	(0.014)	(0.028)	(0.011)	(0.018)	(0.014)
GDP growth (L.)	0.088	0.110**	0.133**	0.150**	0.143**	0.125**	0.260**	0.191**
	(0.054)	(0.033)	(0.059)	(0.039)	(0.056)	(0.036)	(0.050)	(0.036)
Rel. Cohort size	0.221**	0.318**	0.459**	0.399**	0.359**	0.438**	0.473**	0.400**
	(0.087)	(0.085)	(0.082)	(0.090)	(0.084)	(0.092)	(0.072)	(0.084)
Bargained Min.			0.012*	0.007			-0.002	0.013
			(0.007)	(0.010)			(0.006)	(0.010)
Youth Submin.			-0.037**	-0.063**			-0.070**	-0.066**
			(0.011)	(0.015)			(0.011)	(0.017)
Act. Policies			-0.026**	-0.014**			-0.022**	-0.008
			(0.004)	(0.005)			(0.004)	(0.006)
Empl. Prot.			-0.005	0.023**			0.008	0.041**
			(0.005)	(0.006)			(0.006)	(0.008)
Repl. Rate			0.003	-0.006*			-0.015**	-0.029**
			(0.005)	(0.004)			(0.005)	(0.005)
Rig. of Hours			-0.013**	-0.008**			-0.020**	-0.014**
			(0.003)	(0.003)			(0.003)	(0.004)
Union Density			0.019**	-0.007			0.016**	-0.003
			(0.004)	(0.006)			(0.005)	(0.009)
Observations	636	636	531	531	636	636	531	531
R-squared	0.887	0.961	0.914	0.960	0.907	0.961	0.929	0.962
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y

Notes: See table 1.1

Table 2.2. Youth Estimates of the MW Model
GDP growth as a demand side control

Variable	(1) FE	(2) FE	(3) FE	(4) FE	(1) FE	(2) FE	(3) FE	(4) FE
	Panel A: Young (15-24)				***Panel A: Young (15-24)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.232**	-0.038*	-0.225**	-0.065**	-0.087**	0.008	-0.013	-0.028
	(0.055)	(0.022)	(0.049)	(0.030)	(0.040)	(0.024)	(0.027)	(0.035)
GDP growth (L.)	0.098	0.225**	0.038	0.223**	0.073	0.177**	0.200**	0.233**
	(0.077)	(0.048)	(0.102)	(0.060)	(0.073)	(0.052)	(0.099)	(0.075)
Rel. Cohort size	-0.350**	-0.164	-0.431**	-0.467**	-0.031	-0.315**	-0.076	-0.460**
	(0.169)	(0.147)	(0.177)	(0.160)	(0.127)	(0.156)	(0.132)	(0.159)
Bargained Min.			0.065**	0.066**			0.054**	0.070**
			(0.017)	(0.027)			(0.012)	(0.031)
Youth Submin.			-0.020	-0.088**			-0.033	-0.096**
			(0.021)	(0.027)			(0.021)	(0.030)
Act. Policies			-0.060**	-0.061**			-0.045**	-0.060**
			(0.011)	(0.008)			(0.009)	(0.012)
Empl. Prot.			-0.006	0.051**			-0.009	0.075**
			(0.012)	(0.011)			(0.011)	(0.014)
Repl. Rate			-0.043**	-0.002			-0.072**	-0.041**
			(0.009)	(0.008)			(0.009)	(0.010)
Rig. of Hours			-0.033**	-0.006			-0.029**	-0.018**
			(0.007)	(0.005)			(0.006)	(0.006)
Union Density			0.039**	-0.009			0.024**	0.019
			(0.009)	(0.010)			(0.009)	(0.016)
Observations	636	636	531	531	636	636	531	531
R-squared	0.884	0.965	0.910	0.969	0.920	0.959	0.948	0.967
	Panel B: Teenagers (15-19)				***Panel B: Teenagers (15-19)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.088**	-0.020	-0.128**	-0.041	0.011	0.023	0.085**	0.010
	(0.037)	(0.025)	(0.036)	(0.037)	(0.035)	(0.028)	(0.039)	(0.043)
GDP growth (L.)	-0.047	0.122**	-0.068	0.096	-0.009	0.148**	0.076	0.206**
	(0.077)	(0.048)	(0.094)	(0.065)	(0.072)	(0.048)	(0.082)	(0.075)
Rel. Cohort size	1.370**	0.090	0.462*	0.006	0.926**	-0.349*	0.030	-0.394**
	(0.296)	(0.226)	(0.269)	(0.243)	(0.212)	(0.201)	(0.205)	(0.190)
Bargained Min.			0.073**	0.020			0.060**	0.032
			(0.016)	(0.032)			(0.016)	(0.036)
Youth Submin.			0.022	-0.065**			0.015	-0.056**
			(0.017)	(0.025)			(0.016)	(0.026)
Act. Policies			-0.035**	-0.034**			-0.042**	-0.034**
			(0.011)	(0.009)			(0.009)	(0.011)
Empl. Prot.			0.011	0.028**			0.009	0.035**
			(0.011)	(0.011)			(0.010)	(0.012)
Repl. Rate			-0.064**	0.001			-0.073**	-0.046**
			(0.009)	(0.010)			(0.009)	(0.011)
Rig. of Hours			-0.031**	0.003			-0.043**	-0.014**
			(0.007)	(0.004)			(0.009)	(0.006)
Union Density			0.056**	0.024**			0.040**	0.044**
			(0.010)	(0.012)			(0.009)	(0.015)
Observations	626	626	521	521	626	626	521	521
R-squared	0.926	0.978	0.948	0.978	0.949	0.978	0.971	0.981
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y

Notes: See table 1.1. The sample of teenagers is 10 observations smaller than for the other age groups because of 10 years of missing data on employment for the Netherlands.

Table 3.1 All and adults Estimates of the MW Model
Youth unempl. rt. as a demand side control

	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Variable	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*
	Panel A: Adults (25-64)				***Panel A: Adults (25-64)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.076**	0.007	-0.041**	0.009	-0.039**	0.032**	0.010	0.027**
	(0.020)	(0.007)	(0.015)	(0.010)	(0.018)	(0.007)	(0.013)	(0.010)
Youth Unempl.	-0.391**	-0.327**	-0.334**	-0.332**	-0.482**	-0.389**	-0.420**	-0.374**
	(0.022)	(0.012)	(0.023)	(0.012)	(0.025)	(0.015)	(0.024)	(0.015)
Rel. Cohort size	0.099	0.167**	0.247**	0.167**	0.143**	0.265**	0.220**	0.194**
	(0.065)	(0.049)	(0.064)	(0.052)	(0.055)	(0.046)	(0.048)	(0.050)
Bargained Min.			0.013**	0.008			-0.007	0.011
			(0.005)	(0.006)			(0.005)	(0.007)
Youth Submin.			-0.011*	-0.010*			-0.030**	-0.004
			(0.006)	(0.006)			(0.008)	(0.008)
Act. Policies			-0.017**	0.006*			-0.013**	0.009**
			(0.003)	(0.004)			(0.003)	(0.004)
Empl. Prot.			-0.007*	0.008**			-0.012**	0.010**
			(0.004)	(0.004)			(0.004)	(0.004)
Repl. Rate			0.001	-0.004*			-0.007**	-0.018**
			(0.003)	(0.002)			(0.003)	(0.003)
Rig. of Hours			-0.005	-0.006**			-0.012**	-0.008**
			(0.003)	(0.002)			(0.003)	(0.002)
Union Density			0.014**	-0.005*			0.006*	-0.013**
			(0.003)	(0.003)			(0.003)	(0.005)
Observations	636	636	531	531	636	636	531	531
R-squared	0.933	0.983	0.944	0.982	0.956	0.986	0.964	0.985
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y

Notes: See table 1.1

Table 3.2. Youth Estimates of the MW Model
Adult unempl. rt. as a demand side control

Variable	(1) FE	(2) FE	(3) FE	(4) FE	(1) FE	(2) FE	(3) FE	(4) FE
	Panel A: Young (15-24)				***Panel A: Young (15-24)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.197**	-0.065**	-0.246**	-0.109**	-0.019	-0.011	-0.024	-0.083**
	(0.046)	(0.019)	(0.037)	(0.025)	(0.027)	(0.017)	(0.021)	(0.028)
Adult unempl.	-1.537**	-1.330**	-1.566**	-1.298**	-1.356**	-1.449**	-1.343**	-1.546**
	(0.095)	(0.063)	(0.098)	(0.063)	(0.079)	(0.069)	(0.082)	(0.081)
Rel. Cohort size	-0.259**	0.066	-0.041	-0.098	0.086	-0.138*	0.220**	-0.167*
	(0.127)	(0.091)	(0.136)	(0.107)	(0.084)	(0.083)	(0.093)	(0.096)
Bargained Min.			0.107**	0.078**			0.076**	0.083**
			(0.013)	(0.021)			(0.010)	(0.025)
Youth Submin.			0.016	0.008			0.013	0.032**
			(0.011)	(0.013)			(0.011)	(0.013)
Act. Policies			-0.030**	-0.026**			-0.018**	-0.021**
			(0.009)	(0.006)			(0.008)	(0.008)
Empl. Prot.			-0.024**	0.015*			-0.055**	-0.006
			(0.010)	(0.008)			(0.009)	(0.010)
Repl. Rate			-0.038**	0.003			-0.048**	-0.008
			(0.006)	(0.006)			(0.006)	(0.006)
Rig. of Hours			-0.016**	-0.001			-0.021**	-0.008**
			(0.006)	(0.004)			(0.005)	(0.003)
Union Density			0.025**	-0.006			0.012**	0.014
			(0.005)	(0.007)			(0.005)	(0.010)
Observations	636	636	531	531	636	636	531	531
R-squared	0.921	0.982	0.940	0.983	0.950	0.983	0.967	0.985
	Panel B: Teenagers (15-19)				***Panel B: Teenagers (15-19)***			
	Unweighted				***Weighted***			
Kaitz Index (L.)	-0.067**	-0.041**	-0.145**	-0.080**	0.070**	0.015	0.089**	-0.030
	(0.033)	(0.019)	(0.032)	(0.032)	(0.030)	(0.019)	(0.039)	(0.031)
Adult unempl.	-1.120**	-0.987**	-1.132**	-1.014**	-1.057**	-1.152**	-0.833**	-1.293**
	(0.109)	(0.081)	(0.114)	(0.086)	(0.096)	(0.083)	(0.093)	(0.109)
Rel. Cohort size	1.014**	0.278	0.522**	0.195	0.511**	-0.442**	-0.049	-0.449**
	(0.259)	(0.194)	(0.240)	(0.209)	(0.183)	(0.143)	(0.190)	(0.150)
Bargained Min.			0.106**	0.040			0.076**	0.048*
			(0.014)	(0.026)			(0.015)	(0.029)
Youth Submin.			0.055**	0.018			0.047**	0.061**
			(0.013)	(0.015)			(0.011)	(0.018)
Act. Policies			-0.018*	-0.011			-0.029**	-0.008
			(0.010)	(0.008)			(0.008)	(0.009)
Empl. Prot.			-0.004	-0.001			-0.016*	-0.026**
			(0.010)	(0.010)			(0.010)	(0.012)
Repl. Rate			-0.058**	0.002			-0.055**	-0.018**
			(0.008)	(0.009)			(0.008)	(0.007)
Rig. of Hours			-0.021**	0.005			-0.040**	-0.008*
			(0.006)	(0.004)			(0.008)	(0.004)
Union Density			0.049**	0.027**			0.034**	0.043**
			(0.008)	(0.010)			(0.007)	(0.013)
Observations	626	626	521	521	626	626	521	521
R-squared	0.938	0.984	0.958	0.984	0.960	0.987	0.975	0.989
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y

Notes: See table 1.1. The sample of teenagers is 10 observations smaller than for the other age groups because of 10 years of missing data on employment for the Netherlands.

Table 4. Differences in MW effects by periods of economic downturn and growth

Variable	(1) FE	(2) FE	(1) FE	(2) FE	(1) FE	(2) FE	(1) FE	(2) FE	(1) FE	(2) FE	(1) FE	(2) FE
	Panel A: Adult (25-64)				***Panel B: Young (15-24)***				***Panel C: Teenagers (15-19)***			
	Unweighted		***Weighted***		***Unweighted***		***Weighted***		***Unweighted***		***Weighted***	
Kaitz Index(Lagged)	-0.113**	0.013	-0.077**	0.040**	-0.222**	-0.034	-0.078**	0.015	-0.090**	-0.018	0.012	0.028
	(0.027)	(0.010)	(0.027)	(0.010)	(0.054)	(0.021)	(0.039)	(0.023)	(0.037)	(0.024)	(0.035)	(0.027)
Downturn (lagged)	-0.004	-0.003*	-0.007**	-0.004*	-0.006	-0.007**	-0.008	-0.011**	0.003	-0.002	-0.003	-0.011**
	(0.003)	(0.002)	(0.003)	(0.002)	(0.006)	(0.003)	(0.005)	(0.004)	(0.006)	(0.003)	(0.005)	(0.004)
MW Downturn*	-0.019	0.001	-0.012	0.001	-0.073*	-0.028	-0.059*	-0.041	0.010	-0.004	-0.005	-0.014
	(0.021)	(0.013)	(0.021)	(0.016)	(0.039)	(0.025)	(0.035)	(0.027)	(0.037)	(0.023)	(0.027)	(0.021)
Observations	636	636	636	636	636	636	636	636	626	626	626	626
R-squared	0.887	0.960	0.907	0.960	0.884	0.964	0.920	0.959	0.926	0.978	0.949	0.978
	Panel A: Adult (25-64)				***Panel B: Young (15-24)***				***Panel C: Teenagers (15-19)***			
	Unweighted		***Weighted***		***Unweighted***		***Weighted***		***Unweighted***		***Weighted***	
Kaitz Index(Lagged)	-0.127**	0.009	-0.090**	0.033**	-0.277**	-0.065**	-0.114**	-0.015	-0.104**	-0.033	0.012	0.018
	(0.030)	(0.013)	(0.031)	(0.014)	(0.058)	(0.025)	(0.046)	(0.028)	(0.043)	(0.028)	(0.040)	(0.030)
GDP growth (lagged)	0.106**	0.116**	0.171**	0.144**	0.181*	0.278**	0.175*	0.268**	-0.017	0.149**	-0.012	0.167**
	(0.053)	(0.035)	(0.057)	(0.040)	(0.093)	(0.055)	(0.099)	(0.072)	(0.096)	(0.055)	(0.097)	(0.070)
MW GDP growth*	0.307	0.106	0.274	0.169	1.388**	0.813**	0.845	0.725*	0.495	0.407	-0.024	0.143
	(0.342)	(0.222)	(0.360)	(0.258)	(0.595)	(0.351)	(0.554)	(0.401)	(0.606)	(0.335)	(0.546)	(0.364)
Observations	636	636	636	636	636	636	636	636	626	626	626	626
R-squared	0.888	0.961	0.907	0.961	0.884	0.965	0.920	0.959	0.926	0.978	0.949	0.978
	Panel A: Adult (25-64)				***Panel B: Young (15-24)***				***Panel C: Teenagers (15-19)***			
	Unweighted		***Weighted***		***Unweighted***		***Weighted***		***Unweighted***		***Weighted***	
Kaitz Index(Lagged)	-0.076**	0.006	-0.039**	0.038**	-0.203**	-0.064**	-0.049*	-0.016	-0.075**	-0.042*	0.039	0.009
	(0.019)	(0.007)	(0.018)	(0.007)	(0.046)	(0.020)	(0.028)	(0.020)	(0.033)	(0.023)	(0.028)	(0.023)
Youth unempl.	-0.391**	-0.326**	-0.482**	-0.390**	-1.557**	-1.319**	-1.432**	-1.494**	-1.165**	-1.003**	-1.130**	-1.200**
	(0.022)	(0.012)	(0.025)	(0.015)	(0.092)	(0.055)	(0.072)	(0.059)	(0.108)	(0.072)	(0.088)	(0.075)
*MW*youth unempl.*	-0.056	-0.083	-0.004	0.322**	-2.697**	-3.177**	-4.326**	-3.704**	-3.501**	-3.243**	-4.138**	-2.993**
	(0.148)	(0.093)	(0.125)	(0.116)	(0.841)	(0.511)	(0.581)	(0.572)	(0.737)	(0.678)	(0.515)	(0.583)
Observations	636	636	636	636	636	636	636	636	626	626	626	626
R-squared	0.933	0.983	0.956	0.986	0.923	0.983	0.954	0.984	0.940	0.985	0.963	0.988
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

Notes: see table 1.1. In this table the sample includes 33 countries and supply side control as in columns 1 and 2 of table 1.1. However, if we include the full set of institutional controls reducing the sample to 23 countries results for the interactions are qualitatively similar. The sample of teenagers is 10 observations smaller than for the other age groups because of 10 years of missing data on employment for the Netherlands.

Table 5 Benchmarking and Robustness.

	N&W results	***Our results, N&W data (1976-2000)***		***Our results, N&W countries only (1976-2008)***		***Our results (1976-2008)***		***Our results (1976-2008) - full set of controls***	
	(1976-2000)	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*	*(9)*
				Panel A: Youths (15-24)					
Minimum Wage Ratio (L.)	-0.27**	-0.25**	-0.15*	-0.16**	0.024	-0.20**	-0.02	-0.25**	-0.02
	(0.07)	(0.08)	(0.08)	(0.05)	(0.031)	(0.05)	(0.03)	(0.04)	(0.02)
Adult Unemployment Rate	-1.36**	-1.41**	-1.60**	-1.85**	-1.369**	-1.54**	-1.36**	-1.57**	-1.34**
	(0.12)	(0.12)	-0.11	(0.14)	(0.109)	(0.10)	(0.08)	(0.10)	(0.08)
Relative Cohort Size	-0.04	-0.04	0.14**	-0.30*	-0.097	-0.26**	0.09	-0.04	0.22**
	(0.07)	(0.08)	(0.05)	(0.17)	(0.123)	(0.13)	(0.08)	(0.14)	(0.09)
Observations	???	320	320	438	438	636	636	531	531
Years effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time trends	N	N	N	N	N	N	N	N	N
				Panel B: Teenagers (15-19)					
Minimum Wage Ratio (L.)	-0.15	-0.15	0.03	-0.03	0.14**	-0.07**	0.07**	-015**	0.09**
	(0.10)	(0.11)	(0.070)	(0.04)	(0.04)	(0.03)	(0.03)	(0.03)	(0.04)
Adult Unemployment Rate	-1.13**	-1.13**	-1.34**	-1.44**	-1.13**	-1.12**	-1.06**	-1.13**	-0.83**
	(0.15)	(0.15)	(0.10)	(0.15)	(0.11)	(0.11)	(0.10)	(0.11)	(0.09)
Relative Cohort Size	-0.26**	-0.25**	-0.02	0.65*	-0.30	1.01**	0.51**	0.52**	-0.05
	(0.09)	(0.09)	(0.049)	(0.35)	(0.23)	(0.26)	(0.18)	(0.24)	(0.19)
Observations	???	320	320	428	428	626	626	521	521
Years effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country effects	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time trends	N	N	N	N	N	N	N	N	N

APPENDIX A

Table A. Estimates of the MW Model excluding the US

	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
Variable	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*
	Panel A: Adults (25-64)				***Panel B: Young (15-24)***				***Panel B: Teenagers (15-19)***			
	Downturn (L.) as demand side control				***Downturn (L.) as demand side control***				***Downturn (L.) as demand side control***			
	Unweighted		*Weighted*		*Unweighted*		*Weighted*		*Unweighted*		*Weighted*	
Kaitz Index (L.)	-0.073**	0.018	-0.025	0.019	-0.244**	-0.074**	-0.103**	-0.070*	-0.159**	-0.059	-0.078**	-0.080*
	(0.023)	(0.014)	(0.021)	(0.015)	(0.053)	(0.031)	(0.038)	(0.038)	(0.039)	(0.038)	(0.039)	(0.043)
Observations	499	499	499	499	499	499	499	499	489	489	489	489
R-squared	0.912	0.961	0.916	0.960	0.906	0.969	0.930	0.959	0.947	0.980	0.968	0.981
	GDP growth as a demand side control				***GDP growth as a demand side control***				***GDP growth as a demand side control***			
	Unweighted		*Weighted*		*Unweighted*		*Weighted*		*Unweighted*		*Weighted*	
Kaitz Index (L.)	-0.071**	0.017	-0.019	0.014	-0.245**	-0.076**	-0.102**	-0.072*	-0.160**	-0.061	-0.080**	-0.081*
	(0.023)	(0.014)	(0.020)	(0.014)	(0.053)	(0.031)	(0.038)	(0.038)	(0.039)	(0.038)	(0.039)	(0.042)
Observations	499	499	499	499	499	499	499	499	489	489	489	489
R-squared	0.913	0.962	0.919	0.961	0.906	0.969	0.930	0.959	0.947	0.980	0.968	0.981
	Youth unempl. rt. as demand side control				***Adult unempl.as a demand side control***				***Adult unempl. as a demand side control***			
	Unweighted		*Weighted*		*Unweighted*		*Weighted*		*Unweighted*		*Weighted*	
Kaitz Index (L.)	-0.058**	0.006	-0.021	0.003	-0.278**	-0.119**	-0.164**	-0.124**	-0.189**	-0.097**	-0.109**	-0.110**
	(0.016)	(0.010)	(0.016)	(0.007)	(0.041)	(0.027)	(0.026)	(0.031)	(0.033)	(0.033)	(0.031)	(0.036)
	499	499	499	499	499	499	499	499	489	489	489	489
	0.945	0.983	0.945	0.983	0.938	0.983	0.961	0.981	0.958	0.984	0.975	0.988
Years Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Time Trends	N	Y	N	Y	N	Y	N	Y	N	Y	N	Y

Notes: See table 1.1. Analysis includes the full set of controls as in columns 3 and 4 of table 1.1. The sample of teenagers is 10 observations smaller than for the other age groups because of 10 years of missing data on employment for the Netherlands.

Table B. Estimates of the MW Model excluding Korea

	(1)	(2)	(1)	(2)	(1)	(2)
Variable	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*
	Panel A: Adult (25-64)		***Panel B: Young (15-24)***		***Panel C: Teenagers (15-19)***	
	Downturn (L.) as demand side control		***Downturn (L.) as demand side control***		***Downturn (L.) as demand side control***	
	Unweighted	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
Kaitz Index(Lagged)	-0.038*	0.006	-0.212**	0.001	-0.128**	0.086**
Downturn (Lagged)	(0.020)	(0.018)	(0.049)	(0.027)	(0.037)	(0.039)
Observations	511	511	511	511	501	501
R-squared	0.923	0.931	0.908	0.945	0.946	0.968
	GDP growth as a demand side control		***GDP growth as a demand side control***		***GDP growth as a demand side control***	
	Unweighted	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
Kaitz Index(Lagged)	-0.038*	0.006	-0.212**	0.001	-0.128**	0.087**
GDP growth(Lagged)	(0.020)	(0.018)	(0.049)	(0.026)	(0.037)	(0.039)
Observations	511	511	511	511	501	501
R-squared	0.923	0.934	0.908	0.945	0.946	0.968
	Youth unempl. rt. as demand side control		***Adult unempl.as a demand side control***		***Adult unempl.as a demand side control***	
	Unweighted	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
Kaitz Index(Lagged)	-0.026*	0.019	-0.246**	-0.013	-0.152**	0.094**
Unemplrt.	(0.014)	(0.013)	(0.038)	(0.022)	(0.033)	(0.040)
Observations	511	511	511	511	501	501
R-squared	0.950	0.967	0.938	0.965	0.956	0.973
Years Effects	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y
Time Trends	N	N	N	N	N	N

Notes: See table 1.1. Analysis includes the full set of controls as in columns 3 and 4 of table 1.1. The sample of teenagers is 10 observations smaller than for the other age groups because of 10 years of missing data on employment for the Netherlands.

Table C. Estimates of the MW Model excluding non-European countries

	(1)	(2)	(1)	(2)	(1)	(2)
Variable	*FE*	*FE*	*FE*	*FE*	*FE*	*FE*
	Panel A: Adult (25-64)		***Panel B: Young (15-24)***		***Panel C: Teenagers (15-19)***	
	Downturn (L.) as demand side control		***Downturn (L.) as demand side control***		***Downturn (L.) as demand side control***	
	Unweighted	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
Kaitz Index(Lagged)	-0.072**	-0.040*	-0.243**	-0.106**	-0.084**	0.014
	(0.027)	(0.024)	(0.065)	(0.044)	(0.037)	(0.033)
Observations	431	431	431	431	421	421
R-squared	0.887	0.881	0.860	0.909	0.916	0.944
	GDP growth as a demand side control		***GDP growth as a demand side control***		***GDP growth as a demand side control***	
	Unweighted	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
Kaitz Index(Lagged)	-0.072**	-0.039*	-0.245**	-0.106**	-0.084**	0.014
	(0.027)	(0.024)	(0.065)	(0.044)	(0.037)	(0.033)
Observations	431	431	431	431	421	421
R-squared	0.887	0.881	0.860	0.909	0.916	0.944
	Youth unempl. rt. as demand side control		***Adult unempl.as a demand side control***		***Adult unempl.as a demand side control***	
	Unweighted	*Weighted*	*Unweighted*	*Weighted*	*Unweighted*	*Weighted*
Kaitz Index(Lagged)	-0.049**	-0.031*	-0.242**	-0.105**	-0.091**	0.013
	(0.020)	(0.019)	(0.060)	(0.038)	(0.037)	(0.029)
Observations	431	431	431	431	421	421
R-squared	0.935	0.937	0.904	0.939	0.927	0.951
Years Effects	Y	Y	Y	Y	Y	Y
Country Effects	Y	Y	Y	Y	Y	Y
Time Trends	N	N	N	N	N	N

Notes: See table 1.1. The sample includes all European countries where the Kaitz index is available, including eastern European and recent accession countries.
Regressions for this reason control only for demand and supply shocks. Countries included in the analysis: Belgium, Bulgaria, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, United Kingdom.
The sample of teenagers is 10 observations smaller than for the other age groups because of 10 years of missing data on employment for the Netherlands.

APPENDIX B

Table A. Means of the main variables by country

	Employment to population ratio				*Labour Market Institutions*						*IVs*	
	All	*Adults*	*Young*	*Teenagers*	*Kaitz_median*	*Active measures*	*EPL*	*Repl. Rate*	*Rigidity hours*	*Union density*	*Schmidt Index*	*Prop. out*
Australia	0.67	0.68	0.61	0.49	0.60	0.40	1.07	24.3	24	0.36	2.73	_
Belgium	0.57	0.64	0.29	0.07	0.54	1.18	2.66	41.9	40	0.53	2.48	0.52
Bulgaria	0.56	0.64	0.22	0.05	0.40	_	_	_	40	_	2.00	0.07
Canada	0.68	0.71	0.57	0.44	0.42	0.47	0.75	17.1	0	0.32	1.00	_
Croatia	0.55	0.62	0.26	0.08	0.33	_	_	_	40	_	_	_
Czech Republic	0.67	0.75	0.37	0.13	0.34	0.19	1.93	6.0	0	0.60	2.47	0.10
Denmark	0.75	0.78	0.65	0.57	0.62	4.93	1.88	53.0	20	0.75	2.52	0.54
Estonia	0.64	0.74	0.31	0.09	0.32	_	2.10	_	60	_	2.33	0.28
France	0.61	0.70	0.30	0.11	0.57	2.49	2.95	35.4	60	0.12	2.73	0.52
Germany	0.65	0.68	0.51	0.34	0.59	2.95	2.68	27.7	53	0.30	2.64	0.52
Greece	0.56	0.63	0.28	0.12	0.55	0.60	3.32	10.8	67	0.33	3.18	0.47
Hungary	0.56	0.62	0.29	0.08	0.43	1.18	1.36	13.0	67	0.36	2.89	0.10
Ireland	0.57	0.62	0.44	0.23	0.54	2.91	0.98	29.7	0	0.50	1.56	0.53
Italy	0.54	0.60	0.29	0.14	0.75	1.30	2.88	14.4	40	0.40	2.33	0.52
Japan	0.68	0.75	0.42	0.16	0.31	0.70	1.64	9.5	7	0.25	1.12	_
Korea	0.61	0.71	0.32	0.13	0.29	0.36	2.32	9.5	40	0.13	_	_
Latvia	0.62	0.71	0.33	0.10	0.37	_	_	_	40	_	2.08	0.28
Lithuania	0.62	0.72	0.25	0.06	0.48	_	_	_	60	_	2.58	0.28
Luxembourg	0.61	0.66	0.39	0.17	0.38	0.92	3.25	27.0	60	0.46	2.39	0.52
Malta	0.54	0.56	0.48	0.26	0.56	_	_	_	_	_	1.58	0.39
Mexico	0.60	0.65	0.47	0.39	0.33	0.04	3.13	_	20	0.21	_	_
Netherlands	0.63	0.65	0.55	0.47	0.52	3.78	2.47	49.6	40	0.27	2.06	0.52
New Zealand	0.71	0.74	0.58	0.47	0.51	1.81	1.15	29.1	0	0.41	2.85	_
Poland	0.56	0.65	0.25	0.07	0.41	1.48	1.53	11.0	33	0.41	2.72	0.10
Portugal	0.66	0.71	0.48	0.33	0.52	1.27	3.77	28.8	47	0.32	2.36	0.41
Romania	0.61	0.70	0.30	0.14	0.41	_	_	_	40	_	2.92	0.07
Slovak Republic	0.59	0.68	0.30	0.08	0.43	1.00	1.63	10.0	20	0.43	2.13	0.10
Slovenia	0.65	0.72	0.34	0.13	0.45	_	2.51	_	53	_	3.25	0.26
Spain	0.54	0.58	0.38	0.23	0.48	0.64	3.30	32.9	40	0.13	3.24	0.41
Sweden	0.77	0.82	0.54	0.36	0.53	1.95	2.68	29.6	40	0.79	3.64	0.33
Turkey	0.50	0.55	0.38	0.32	0.28	_	3.74	9.5	40	0.16	_	_
United Kingdom	0.71	0.73	0.61	0.53	0.37	0.47	0.65	19.2	0	0.38	2.82	0.53
United States	0.70	0.74	0.57	0.43	0.38	0.19	0.21	13.2	0	0.16	1.00	_

APPENDIX C

Definition of the Kaitz Index

Australia

MW: Federal minimum weekly wage (August each year) -- extrapolated from 1997 back to 1985 in line with Metals Industry Award C14 wages and National Wage Case decisions.

Median wage: Median gross weekly earnings of full-time workers in main job (August each year).

Source: OECD MW Database.

Belgium

MW: Minimum monthly wage (annual averages) -- Revenu Minimum Mensuel Moyen Garantie (RMMMG) -- for experienced workers aged 22 and over (21 and over prior to 1992).

Median wage: Median gross monthly earnings of full-time workers.

Source: OECD MW Database.

Bulgaria

MW: Monthly MW

Mean wage: Mean value of the average gross monthly earnings of full-time workers including overtime earnings, regular and irregular bonuses and payments for time not worked. Only enterprises with at least 1 employee are covered (industry and services excluding public administration).

Source: EUROSTAT.

Canada

MW: Weighted (by labour force) average of provincial minimum hourly wage (Can$).

Median wage: Median gross hourly earnings of full-time workers.

Source: OECD MW Database.

Croatia

MW: Monthly MW

Mean wage: Mean value of the average gross monthly earnings of full-time and part-time workers, only enterprises with at least 10 employees are covered (industry and services excluding public administration).

Source: EUROSTAT.

Czech Republic

MW: Minimum gross monthly wage (annual average).

Median wage: Median monthly earnings of employees who worked at least 1 700 hours during the year.

Source: OECD MW Database.

Denmark

The average hourly MW divided by an average hourly wage.

Source: Dolado et al. (1996).

Estonia

MW: Monthly MW

Mean wage: Mean value of the October gross monthly earnings of full-time workers (industry and services excluding public administration).

Source: EUROSTAT.

France

MW: Gross monthly equivalent of the hourly MW -- Salaire Minimum Interprofessionnel de Croissance (SMIC) -- and the Garantie Mensuelle de Rémunération (GMR) for 2000-2005.

Median wage: Median gross annual earnings of full-time workers in the private and semi-private sector.

Source: OECD MW Database.

Germany

Average monthly MW divided by an average monthly wage.

Source: Dolado et al. (1996).

Greece

MW: Minimum monthly wage for an unqualified, single, worker with no work experience (annual average and assuming paid for 14 months).

Median wage: Median gross annual earnings of full-time workers.

Source: OECD MW Database.

Hungary

MW: Minimum gross monthly wage (May each year).

Median wage: Median monthly earnings of full-time employees (May each year).

Source: OECD MW Database.

Ireland

Before 2000:

The average hourly MW divided by an average hourly wage.

Source: Dolado et al. (1996).

From 2000:

MW: minimum gross hourly wage (March each year).

Median wage: median hourly earnings of full-time employees.

Source: OECD MW Database.

Italy

Average minimum monthly wage divided by an average wage.

Source: Dolado et al. (1996).

Japan

MW: Weighted average of prefectural hourly MWs (June each year and weighted by employment).

Median wage: Median gross monthly earnings, including overtime and all special payments, for June of each year (estimated by applying the ratio of mean total to mean scheduled earnings to median scheduled earnings).

Source: OECD MW Database.

Korea

MW: minimum hourly wage (June each year).

Median wage: median gross monthly earnings, including overtime and all special payments, for June of each year.

Source: OECD MW Database.

Latvia

MW: Monthly MW

Mean wage: Mean value of the average gross monthly earnings of full-time workers (industry and services excluding public administration).

Source: EUROSTAT.

Lithuania

MW: Monthly MW

Median wage: Median value of the average gross monthly earnings of full-time workers (industry and services excluding public administration).

Source: EUROSTAT.

Luxembourg

MW: minimum monthly wage -- Salaire Social Minimum (SSM) -- (October each year).

Median wage: median gross monthly earnings of full-time, full-year workers (annual earnings divided by 12).

Source: OECD MW Database.

Malta

MW: Monthly MW (in Malta the MW is fixed at a weekly rate. These hourly or weekly rates have been converted to a monthly rate).

Median wage: Median value of the average gross monthly earnings of full-time workers (industry and services excluding public administration).

Source: EUROSTAT.

Mexico

MW: Weighted average of regional daily MWs (annual average and weighted by employment).

Mean wage: Mean hourly wages of manual workers in manufacturing.

Source: OECD MW Database.

Netherlands

MW: Minimum weekly earnings -- Minimumloon -- for persons aged 23 to 64 (annual average).

Median wage: Median gross annual earnings of full-time employees (including overtime payments).

Source: OECD MW Database.

New Zealand

MW: minimum weekly wage for workers aged 20 and over (February each year).

Median wage: median usual weekly earnings of full-time employees (February each year).

Source: OECD MW Database.

Poland

MW: Minimum monthly wage (September of each year) (Zl).

Median wage: Median gross monthly earnings of full-time workers.

Source: OECD MW Database.

Portugal

MW: Minimum monthly wage -- Salário Mínimo Nacional (SMN) -- for non-agricultural workers aged 20 and over (annual average).

Median wage: Median gross annual earnings of full-time workers.

Source: OECD MW Database.

Romania

MW: Monthly MW

Median wage: Median value of the average gross monthly earnings including non-standard payments (industry and services excluding public administration).

Source: EUROSTAT.

Slovak Republic

MW: minimum monthly wage.

Median wage: median gross monthly earnings of full-time workers.

Source: OECD MW Database.

Slovenia

MW: Monthly MW

Mean wage: Mean value of the average gross monthly earnings of full-time and part-time workers, including 13th month payments (industry and services excluding public administration).

Source: EUROSTAT.

Spain

MW: Salario minimo interprofesional per month (Ptas) for workers aged 18 and over.

Median wage: Median gross annual earnings of full-time workers.

Source: OECD MW Database.

Sweden

The average hourly MW divided by an average hourly wage.

Source: Dolado et al. (1996).

Turkey

MW: Minimum daily wage (TL) for workers aged 16 and over.

Mean wage: Mean daily earnings of manufacturing workers.

Source: OECD MW Database.

United Kingdom

Before 1994:

The average hourly MW divided by an average hourly wage.

Source: Dolado et al. (1996).

From 1999:

MW: national minimum hourly wage.

Median wage: median hourly earnings of full-time adult employees.

Source: OECD MW Database.

United States

MW: Federal minimum hourly wage rate (US$).

Median wage: Median usual weekly earnings of full-time employees.

Source: OECD MW Database.

APPENDIX D

Characteristics of the MW Systems

Country	*Method of setting*	*System*	*Youth subminimum*
Australia	statute	national-state	yes
Belgium	negotiated	national	yes
Canada	statute	provincial	limited
Czech Republic	statute	national	yes
Denmark	negotiated	sectoral collective agreements	yes
France	statute	national	limited
Germany	negotiated	sectoral collective agreements	some
Greece	negotiated	national	no
Hungary	statute	national	no
Ireland before 2000	Labour Committees	sectoral collective agreements	yes
Ireland from 2000	statute	national	yes
Italy	negotiated	sectoral collective agreements	some
Japan	statute	regional	no
Korea	statute	national	limited
Luxemburg	statute	national	yes
Mexico	statute	regional	no
Netherlands	statute	national	yes
New Zealand	statute	national	yes
Poland	statute	national	no
Portugal	statute	national	no
Slovak Republic	statute	national	yes
Spain	statute	national	no
Sweden	negotiated	sectoral collective agreements	yes
Turkey	statute	national	yes
UK before 1994	Wage Councils	sectoral collective agreements	yes
UK from 1999	statute	national	yes
US	statute	national-state	limited
Lithuania	statute	national	no
Romania	statute	national	no
Slovenia	statute	national	no
Malta	statute	national	yes
Latvia	statute	national	yes
Estonia	statute	national	no
Bulgaria	statute	national	no
Croazia	statute	national	no

Sources "Method of Setting": ILO, MW Database; Eurostat, "MWs in January 2009".
Sources "System": The MW Revisited in the Enlarged EU, table 1.1 pg.2; for extra-European countries: ILO, MW data base.
Sources "Youth minimum": ILO, MW database; Low Pay Commission Report 2009.

APPENDIX E

Institutional control variables

Employment Protection Legislation

Synthetic indicator of the strictness of regulation on dismissals and the use of temporary contracts[9]. High values are associated with countries having a high degree of employment protection, while low values indicate relative ease in dismissing employees.

Source: OECD. The measure is available for 28 of the countries included in the analysis from 1985. We use 1985 values for previous years.

Active labour market programs

Level of public expenditure in active labour market programs to bring unemployed workers to work as a percentage of GDP.

Source: OECD. The measure is available for 24 of the countries in the analysis from 1985. We use 1985 values for previous years.

Union density

Ratio of wage and salary earners that are trade union members, divided by the total number of wage and salary earners[10].

Source: OECD. This measure is available for 24 of the countries in the analysis.

Replacement rate

Average of the gross unemployment benefit replacement rates as a percentage of earnings and it is meant to quantify the generosity of unemployment insurance programs[11].

Source: OECD. This measure is available for 24 of the countries in the analysis and it is drawn every two years for the entire length of our panel.

Rigidity of hours

It looks at whether there are restrictions in night work, week holiday work, workweek and annual paid vacation. The rigidity of hours index has 5 components: (i) whether there are restrictions on night work; (ii) whether there are restriction on weekly holiday work; (iii) whether the workweek can consist of 5.5 days; (iv) whether the workweek can extend to 50 hours or more (including overtime) for two months a year to respond to a seasonal increase

[9] See *www.oecd.org/employment/protection* for details on the methodology and weights used to compiled the indicators.

[10] For more information and full methodology, see http://www.oecd.org/dataoecd/37/2/35695665.pdf.

[11] For further details, see OECD (1994), The OECD Jobs Study (chapter 8) and Martin J. (1996), "Measures of Replacement Rates for the Purpose of International Comparisons: A Note", OECD Economic Studies, No. 26. Pre-2003 data have been revised.

in production; and (v) whether paid annual vacation is 21 working days or fewer. If there are no restrictions, the economy receives a score of 0. If the regulations are very strict, the economy receives a score of 100. Thus, high values of the index indicate the presence of substantial rigidities associated with working hours, whereas low values are suggestive of more flexibility.

Source: World Bank. The measure is available from 2004. We use 2004 values for previous years.

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