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**The impact of minimum wage on employment in an economic downturn using
data from 17 OECD countries for the period 1985-2008**

Michael Chletsos¹ and Georgios P. Giotis²

Abstract

The impact of minimum wage on employment has been a field of conflicts among economists in labor economics. This divergence of views usually takes the form of conflicting empirical studies. However, in our research we managed to find only one study on the employment effect of minimum wages during economic recessions using cross-country evidence. In this paper we try to investigate this issue using a sample of 17 OECD countries with data for the period 1985-2008. We also try to account for institutional and other policy related differences that might have an impact on employment other than the minimum wage. Our empirical analysis points a positive effect of minimum wage on employment and labor force participation rate for teenagers, young adults and youth, but negative effect for the prime-aged and those who belong in the age group 55-64 years old. Regarding the economic circle, we find that, generally in economic downturns our initial results for all age groups do not change significantly.

JEL Classification: J38, J21, E32, J31, J88.

Keywords: Minimum wage, Employment, Economic downturn, Minimum wage systems, Labor market institutions and policies.

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1. Introduction

In the minimum wage literature there is little agreement about the precise employment effect of minimum wage at either the theoretical or empirical studies. Most studies on a single country find that a statutory minimum wage is likely to reduce employment if set above a certain but not specific level, but there are some studies which find a positive employment impact. However, in our research we managed to find only one study³ that investigates the employment effect of minimum wage during economic recessions using cross-country evidence.

The purpose of this paper is to obtain new estimates of the effect of minimum wage on employment measures by focusing on the recessionary experiences across countries. Using international data from 17 OECD countries for the period 1985-2008 we try to investigate the impact of minimum wages on employment to population ratios and labor force participation rates of all the age groups in periods of economic downturn as well as in periods of economic growth. We also try to account for institutional and other policy related differences that might have an effect on employment other than the minimum wage.

The layout of this paper is as follows: firstly, we present the previous literature which uses cross-section international data, secondly, we refer to the model specification and data sources, and afterwards we present the descriptive statistics of our data. Afterwards, we report the econometric results of our analysis based on our sample using as many as possible methods to define economic downturns, and then we continue with the important issue of the differentiation of the employment effects of minimum wages in periods of economic recessions and growth.

³ See Dolton and Bondibene (2012).

2. Literature review

The majority of studies on minimum wages supports that the rise of minimum wages results in the decrease of employment, while another smaller side argues that there can be a positive impact. This divergence of views usually takes the form of competing theoretical and empirical studies and a researcher can find a great amount of studies on the employment outcomes of minimum wage.

Noticeable is the fact there has been a great number of studies which use data from a single country. Some of these studies use time series variation in the minimum wage policy (or its level) over time to try to identify the impact of the policy. The consensus of these studies is summarized by Brown *et al.* (1982). They suggest that these earliest empirical studies, based on time-series data, confirmed standard economic theory showing a negative impact of minimum wage on employment. However, this debate really began in earnest with the findings of Card and Krueger (1995). In a quasi-experimental setting they found that minimum wage increases, in some circumstances, can result in net job gains rather than the losses predicted by the neoclassical theory. They used data from fast food restaurants in neighboring US states in Pennsylvania and New Jersey, where the latter state uprated its state minimum wage and the former kept it stable. They argued that this exogenous change in the minimum wage in Pennsylvania constituted a quasi-experiment which allowed them to identify a positive causal impact of the minimum wage uprating. The work of Card and Krueger has, in turn, been subject to intensive scrutiny and triggered a wave of further empirical work on the impact of the minimum wages on employment. While many assessments of minimum wages have been carried out on a national basis, there have has been only a few from an international perspective.

During our research, we have found only four studies that use cross country evidence. The four published studies are those of the OECD (1998), Neumark and Wascher (2004), Addison and Ozturk (2012) and finally, Dolton and Bondibene (2012) which is the only paper that we found that takes into account the economic downturn as a factor that can affect the employment impact of minimum wages.

Firstly, the OECD study used a set of pooled regressions with data for seven to nine countries from 1975 to 1996. The results indicated overall negative and statistically significant disemployment effects for teenagers and only marginally significant or insignificant effects for 20-24 years old. In particular the estimated elasticities for teenagers ranged from -0.07 to -0.41. However, the model included only a few variables to account for institutional differences, whereas the three other studies which are presented below, added further controllers to catch these differences.

Secondly, Neumark and Wascher (2004) estimated a model for teens (aged 15-19) and youths (aged 15-24) with data from 17 OECD countries for the period 1975-2000. Their results pointed to negative effects of the minimum wage on employment for the sample as a whole with the estimated elasticities ranging from -0.19 to -0.31 for teenagers and from -0.15 to -0.28 for youths. The dynamic specification of the model with a lagged employment rate provided lower long-run elasticities, with values -0.18 for teenagers and -0.13 for youths, both being statistically significant. Regarding other labor market policies and institutions, they found that higher trade union coverage and more restrictive labor market standards strengthen the disemployment effects, while active labor market policies and employment protection help to offset these effects. Finally, the evidence showed considerable variation across

countries with smaller disemployment effect on countries that have subminimum wage provisions and with the most regulated labor markets.

Thirdly, Addison and Ozturk (2012) investigated the effect of minimum wage regulation on prime-age females (aged 25-54), a group typically neglected in the minimum wage literature, using a sample of 16 OECD countries for the period 1970-2008. Their results indicated strong evidence of adverse employment effects among adult females and lower labor force participation rates. More specifically, their preferred estimates of the elasticity of the employment-to-population ratios with respect to the minimum wage ranged from -0.042 to -0.347 in the basic model and from -0.145 to -0.734 in the augmented one. Lastly, their findings as far as the labor market policies and institutions are concerned, are similar to those of Neumark and Wascher (2004), they did not find stronger disemployment effects in countries with the least regulated markets, though.

The fourth study was conducted by Dolton and Bondibene (2012) who examined whether the minimum wage has any effect on employment using panel data for 33 countries from OECD and Europe over the period 1971-2009. The authors focused on the recessionary experiences across countries, a factor which seems quite interesting to be taken into account during this period of time as it is essential for governments and policy makers to know how to deal with the level of the minimum wage in periods of recessions. In short, their main findings were that the minimum wage has a significant negative impact on youth employment (young people aged 16-24). However, there are less significant negative employment effects for adults (25-64 years old).

Until the end of December of 2014 we have found only four studies that deal with the employment effects of minimum wages with the use of cross-country data.

This limited existing literature with cross-country evidence on the employment effect of minimum wages during economic recessions seemed us as an interesting field of research and based on international data from a sample of OECD countries we tried to see the impact of minimum wage on two employment measures (employment to population ratio and labor force participation rate).

The contribution of our analysis is that we analyze the impact of minimum wage of all age groups and not only youth (15-24) and adults aged (25-64) as we can find in the only paper that takes into account the economic recessions (measured with three ways) and was conducted by Dolton and Bondibene (2012). Moreover, we use five different measures to account for economic downturns and we present the results for all of them for all the age groups (teenagers 15-19, young adults 20-24, youth 15-24, prime age 25-54, older aged 55-59, 60-64, and 55-64 years). Additionally, we investigate whether an economic downturn or growth has an effect on the employment impact of minimum wages. Our data allow us to account for institutional and other labor market policies differences that may have an impact other than the minimum wage. Remarkable and very interesting is the effect of minimum wages on the employment of young ages, as we find a positive relationship for teenagers, young adults and youth, result which is not found in any other of the four studies which use cross country data. This result contradicts to the traditional neoclassical theory.

3. **Econometric model and variables**

The empirical model that is estimated in the minimum wage literature is:

$$Y_t = a_0 + a_1 MW_t + X\beta + \varepsilon_t \quad (1)$$

Where, Y is the dependent variable that concerns the employment measure and is calculated in different ways,

MW is the minimum wage which is calculated in different ways, too, and

X is a set of control variables to capture all the other proxies from the side of labor supply, labor demand and other effects.

In our analysis, we use an extended form of this model, in order to estimate the effect of minimum wages on employment and labor force participation rate across a sample of 17 OECD countries for the time period 1985-2008 for all age groups and, in addition to this, we to account for institutional and other labor market policies differences that may have an impact on employment and labor force participation rate other than the minimum wage. Therefore, the econometric specification that we use for our sample is as follows:

$$Y_{it} = \alpha_i + \beta_t + \gamma_i t + \delta MW_{it-1} + \varepsilon X_{it} + \zeta Z_i + u_{it} \quad (2)$$

Where, i (country) = 1, 2, ..., 17

t (time) = 1, 2, ..., 24 and:

Y_{it} = employment to population ratio and labor force participation rate;

MW_{it-1} = minimum to average wage ratio (lagged);

α_i = country effects;

β_t = year effects;

$\gamma_i t$ = country specific time trends (γ_i captures the time trends in the outcome indicator for country i);

X_{it} = this time-varying vector comprises two base regressors, the relative cohort size and the business cycle indicator (GDP growth, 2 dummies of presence of economic downturn, prime age unemployment rate and prime age male unemployment rate) plus four institutional regressors (employment protection, trade union density, unemployment insurance replacement rate, and active labor market policies);

Z_i = this time-invariant vector captures three measures describing the minimum wage fixing machinery (bargained versus statutorily determined, presence of youth and subnational minimum wages) along with a labor standards index;

u_{it} = error term.

However, the countries in our study have very different patterns of minimum wage changes over time, which helps to separate the influences of minimum wages from the influences of other macroeconomic events affecting employment in multiple countries. For this purpose we use the 24 years panel across the 17 countries in order to estimate a model that takes into account the different effects of the minimum wage on employment in periods of economic downturn respect from periods of economic growth.

This can be done by extending the model to analyze the minimum wage effects during ring economic recessions:

$$Y_{it} = \alpha_i + \beta_t + \gamma_i t + \delta MW_{it-1} + \varepsilon X_{it} + \zeta Z_i + \eta C_c + \theta C_c * MW_{it-1} + u_{it} \quad (3)$$

Where the term in C_c measures the direct effect of the recession on the employment measure and the term $C_c * MW_{it-1}$ measures the interaction effect of any recession and the minimum wage. The coefficient of interest will be θ , which measures the differences of the effect of the minimum wage on employment measures 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 minimum wage has an employment effect, over and above the effect of either the downturn (η) or the imposition of the minimum wage (δ).

Before we continue with the results of our estimations, we describe the variables of our model and the data sources.

- *Employment to population ratio and labor force participation rate.* These are the two employment measures used as dependent variables.
- *Relative cohort size.* It is used as a supply side control and represents the ratio of the population examined to the rest of the population aged 15-64 years old. For example in the study by Neumark and Wascher (2004) the authors investigate the employment effects of minimum wages on youths, using as the relative cohort size the ratio of the youth population (15-24 years old) to the adult population (25-54 years old).
- *Minimum to average wage ratio (lagged).* The minimum wage measure that we use, is defined as the ratio of minimum to average wages. In the case of our OECD data, the average wage is a median wage, while Dolado *et al.* (1996) use a mean wage in constructing their indices.⁴ We follow this way of measurement of minimum wage that Neumark and Wascher (2004) used in their study as well, and we chose to do so because, as Neumark and Wascher (2004) state at the beginning of p. 226: “this form of the variable (i.e. the ratio of minimum to average wages) mitigates potential biases arising from a correlation between the minimum wage and economic events that affect wage levels more generally”. However, they continue “specifying the minimum wage variable in this way potentially leads to a bias associated with a correlation between overall wage levels and economic conditions, and thus we focus on specifications that include fixed country effects, which should mitigate biases stemming from persistent differences in employment and wages that are associated with long-standing characteristics of a country’s labor market (other than the minimum wage);” Therefore we include country fixed effects in our analysis, too.
- Furthermore, we try *five alternative business circle indicators* used in the economic literature to provide more robustness to the model:

⁴ On the superiority of the use of median wage instead of mean wages as a denominator in the minimum wage measure for international comparisons see OECD (1998), p. 38.

1. GDP growth (lagged) (The year has negative growth on average over all four quarters).
2. Dummy (lagged) (=1 when the year contains any two quarters and not necessarily consecutive of negative growth, 0 otherwise).⁵
3. Dummy (lagged) (=1 when the year contains two consecutive quarters of negative growth, 0 otherwise).
4. Prime age unemployment rate (The unemployment rate for persons 25-54 years old).⁶
5. Prime age male unemployment rate (The unemployment rate for male persons aged 25-54 years).⁷

Now, in order to account for institutional and other labor market policies differences which may have an impact on the employment effects of the minimum wage, we add a set of four time-varying controlling regressors and one time-invariant presented below:

- *Employment protection.* It is an indicator of the strictness of regulation on dismissals and the use of temporary contracts and shows the strength of the legal system regulating hiring and firing.⁸ High values are associated with countries having a high degree of employment protection, while low values indicate relative ease in dismissing employees.
- *Trade union density.* Trade union density corresponds to the ratio of workers that are trade union members, divided by the total numbers of wage and salary earners. One

⁵ It is called the rule of thumb in the economics of recession and crisis but it is not used by the NBER (National Bureau of Economic Research).

⁶ We used this fourth business cycle indicator as it is also used by Neumark and Wascher (2004) and by Dolton and Bondibene (2012).

⁷ We tried and this fifth indicator as it is also used by the OECD study (1998) and by Addison and Ozturk (2012) as a basic business cycle regressor.

⁸ For more information and full methodology, see www.oecd.org/employment/protection.

would expect that the stronger the trade unions are, the bigger their ability would be to push wages above market clearing levels and consequently the bigger the employment losses. However, according to Dolton and Bondibene (2012) p. 128, the empirical literature remains inconclusive overall on this subject.

- *Unemployment insurance replacement rate.* This measure is used as a control of the generosity of unemployment insurance programs. This variable was constructed by the OECD and is defined as the average of the gross unemployment benefit replacement rates for two earnings levels, three family situations and three durations of unemployment.⁹ As one could expect, the higher the unemployment benefits, the lower the employment prospects for the unemployed.
- *Active labor market policies.* It is a measure of the extent to which countries use active labor market policies to promote employment and it measures the level of public expenditure in active labor market programs as a percentage of GDP. It is defined as the percentage of GDP spent by the public sector on seven types of labor market programs: public employment services and administration, labor market training, job rotation and job sharing, employment incentives, supported employment and rehabilitation, direct job creation, and start-up incentives. Therefore, a lower value indicates a lower commitment to such policies and programs.
- *Labor standards index.* This variable is an indicator of labor standards in existence in 1993. This index was calculated by Neumark and Wascher (2004, p. 238) and was constructed as the sum of the OECD's assessments of regulation stringency in three areas: working time, fixed-term contracts, and employees' representation rights. The labor standards index is as described by Neumark and Wascher (2004, p. 237); it

⁹ For further details, see OECD (1994) and Martin (1996).

refers to the situation as of 1993 and is taken from the OECD Jobs Study (1994) and specifically excludes the contributions of minimum wages and employment protection policies. The same index is also used by Addison and Ozturk (2012) in their study.

- *Bargained or statutory minimum wage, Subnational minimum wage, and Youth minimum wage.* These three variables are dummies used to account for the differences in the minimum wage rules and systems across countries which may have an impact on the employment effects of minimum wages. The first variable indicates how minimum wages are determined and it takes the value one if minimum wages are negotiated and zero if they are set by statute. The second dummy indicates whether the minimum wage is national (value=1) or varies across industries or regions (value=0) and the third dummy signals whether countries have subminimum wages for the youth (value=1) or not (value=0).

Furthermore, in our analysis, we include:

- *Country (fixed) effects,* in order to lessen the biases stemming from persistent differences in employment measures that are associated with long-standing characteristics of a country's labor market other than the minimum wage¹⁰. The fixed country effects are used to capture the persistent country-specific factors that may influence the dependent variables. (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).
- *Year effects,* to control for global shock or policies that might influence employment rates in all countries, and
- *Country-specific time trends,* in order to control for incremental changes in the dependent variables associated with longer-term developments in labor market that

¹⁰ See Neumark and Wascher (2004), p. 226.

are unrelated to changes in a country's minimum wage laws. These trends are intended to capture factors that might influence employment trends within a country.

4. The dataset and descriptive characteristics

The sources of the data for the variables of our model are as follows:

- Employment to population ratio, unemployment rate, and labor force participation rate → Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age – indicators).
- Relative cohort size → Labor Force Statistics (OECD). (Annual data expressed in thousands of persons from OECD, LFS by sex and age).
- Minimum to median wage ratio → 1) OECD Minimum Wage Database (data are reported in national currency units, at current prices) for countries in which a national minimum wage is set by statute or by national collective bargaining agreement. These countries include Australia, Belgium, Canada, France, Greece, Ireland, Japan, the Netherlands, New Zealand, Portugal, Spain, the United Kingdom (before 1993), and the United States, and 2) Dolado *et al.* (1996) for countries in which no minimum wage exists, but industry-or occupation-specific minimums are set by legislation or collective bargaining agreements. These countries are Denmark, Germany, Italy, Sweden, and the United Kingdom (after 1999).
- GDP growth → World Bank.
- Downturn Dummy when the year contains any two quarters of negative growth → OECD, Eurostat, World Bank.
- Downturn Dummy when the year contains two consecutive quarters of negative growth → OECD, Eurostat, World Bank.

- Prime age unemployment rate → Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age – indicators).
- Prime age male unemployment rate → Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age – indicators).
- Employment protection → 1) OECD.Stat using Version 1 of that indicator: the strictness of employment protection legislation – overall, and 2) Ifo's Database for Institutional Comparisons in Europe (DICE). (Strictness of Employment Protection Legislation: Summary Indicator, 1982 – 2003).
- Trade union density → 1) OECD.Stat – Trade Union Density, and 2) ICTWSS database (Database on Institutional Characteristics of Trade Unions, Wage Setting, State Intervention and Social Pacts in 34 countries between 1960 and 2007).
- Unemployment Insurance replacement rate → OECD database on tax and benefit entitlements. (The measure of unemployment insurance is the average gross benefit replacement rate, as a percentage of earnings, as defined by the OECD i.e. the average of the gross unemployment benefit replacement rates for two earnings levels, three family situations and three durations of unemployment).
- Active labor market policies → OECD database on Social Expenditure.
- Labor standards index → Neumark and Wascher (2004, p. 238). The labor standards index is as described by Neumark and Wascher (2004, p. 237).
- Bargained or statutory minimum wage, Subnational minimum wage, and Youth minimum wage → These three dummies concerning the minimum wage rules are taken from: 1) the ILO Travail Legal database, and 2) Neumark and Wascher (2004, p. 228).

Our data-sample consists of 17 OECD countries for the time period 1985-2008 and the two employment measures that we use as dependent variables (i.e.

employment-population ratios and labor force participation rates) are regressed against the ratio of minimum to average wages for all the age groups, with one control of the total five business cycle indicators each time, a supply side control (relative cohort size), different institutional features (trade union density, the employment protection, active labor market policies, UI replacement rate and labor standards index), other dummies to describe the minimum wage fixing machinery (bargained versus statutorily determined, and presence of youth and subnational minimum wages), and finally, fixed country effects, year effects and country-specific time trends. The countries in our sample are: Australia, Belgium, Canada, Denmark, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Portugal, Spain, Sweden, the United Kingdom and the United States and all the regressions were carried out using data for all of them.

In what follows we present the data characteristics and afterwards we report the estimation results. The preliminary results of our analysis concern: the minimum wage levels ranked across selected countries and years of the sample with their measurement and rules, the employment to population ratios for the age groups of our analysis and the five business cycle indicators that define the periods of economic growth of downturn.

Table 1 provides information on the sample period, the means of the minimum wage ratios and the other characteristics of minimum wage systems for each country of our sample. As we can see, countries differ not only in the levels of their minimum wage but also there is substantial variation in the rules on the minimum wage systems. The first three columns display the countries ordered by the mean value of minimum wage ratios of the sample period. As the table depicts, the minimum to average wage ratios range from 70.6% in Italy to 31.4% in Japan. One commendable point is that

the higher minimum wages ratios are found in Europe and Oceania, whereas the three countries with the lowest values are Canada, United States and Japan.

Table 1. Means of the Minimum Wage measurement and rules in selected countries.

Country	Sample period	Mean of Minimum/Average Wage (lagged)	Other Characteristics of Minimum Wage Systems					
			Bargained Minimum Wage		Presence of Subnational Minimum Wages		Presence of Youth Subminimum	
Italy	1990-1992	0.706	Yes	Negotiated	Yes	Industry	No	Some
Australia	1986-2008	0.608	No	Statute	No	National	Yes	<21
Denmark	1986-1993	0.598	Yes	Negotiated	Yes	Industry	Yes	<18
Germany	1985-1995	0.573	Yes	Negotiated	Yes	Industry	No	Some
France	1985-2008	0.546	No	Statute	No	National	No	Limited, <18
Belgium	1985-2008	0.545	Yes	Negotiated	No	National	Yes	<21
Ireland	2001-2008	0.543	No	Labor Committees	No	National	Yes	<18
Netherlands	1985-2008	0.536	No	Statute	No	National	Yes	<23
Sweden	1985-1993	0.528	Yes	Negotiated	Yes	Industry	Yes	<24
Portugal	1985-2008	0.525	No	Statute	No	National	Yes	<18
Greece	1985-2007	0.523	Yes	Negotiated	No	National	No	
New Zealand	1987-2007	0.519	No	Statute	No	National	Yes	<20
Spain	1985-2008	0.453	No	Statute	No	National	Yes	<18
United Kingdom	1985-1993 2000-2008	0.434	Yes /No	Wage Councils (up to 1993) / Statute (after 1999)	Yes/ no	Industry	Yes	<21
Canada	1985-2008	0.401	No	Statute	Yes	Province	No	
United States	1985-2008	0.357	No	Statute	Yes	National, State	No	Limited
Japan	1990-2008	0.314	No	Statute	Yes	Prefecture	No	

Note 1: Because of the fact that we used as a minimum wage measurement the minimum to average wage ratio lagged by one year, we present the means of the lagged minimum wage ratios.

Note 2: Minimum wage ratios are from the OECD online database and Dolado *et al.* (1996). The OECD uses a median wage to calculate the ratios, while Dolado *et al.* (1996) use a mean wage. All the ratios are obtained from OECD for all countries and years apart from Denmark, Germany, Italy, Sweden and the United Kingdom (before 1993). For these countries we use summary estimates constructed by Dolado *et al.* (1996) following Neumark and Wascher (2004, p. 228) and Addison and Ozturk (2012, p. 787).

Note 3: The sources of the other characteristics of minimum wage systems are: a) the ILO Travail Legal database, and b) Neumark and Wascher (2004, p. 228).

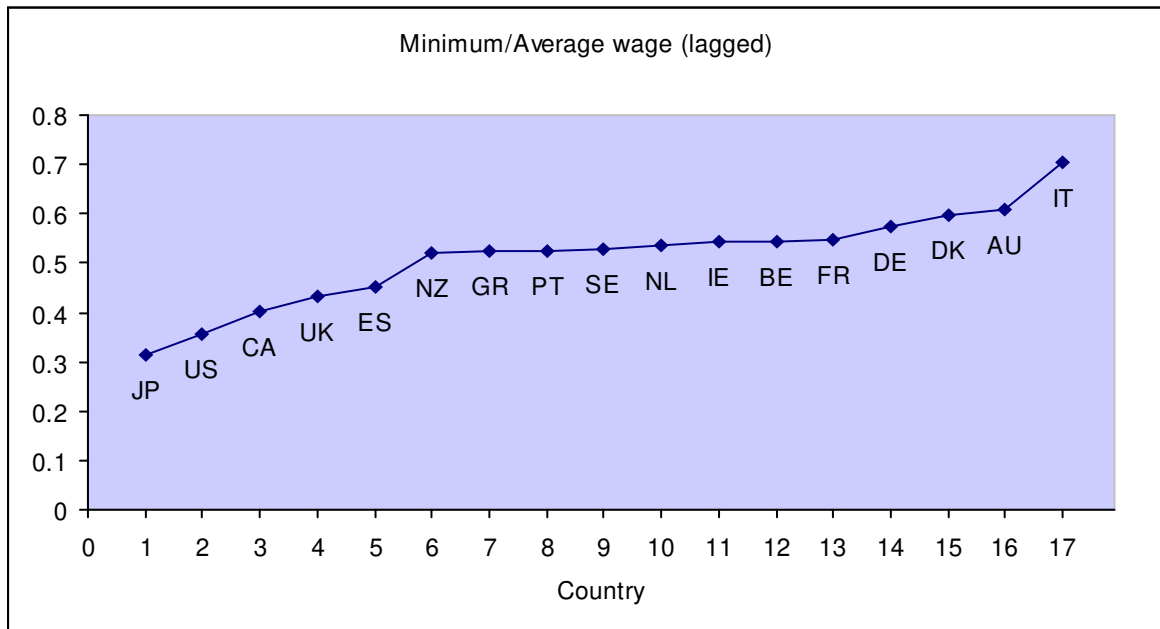
Note 4: We present the countries ordered by the means of the ratios of minimum to average wage (lagged).

The minimum wage levels ranked across selected countries is depicted in figure 1 providing a clearer picture of the minimum wage ratios differences across worldwide countries, while figures 2 and 3 show the diversification between European and Non – European countries.

In figure 1 it is shown that Italy appears to have the highest minimum wage ratios, it follows Australia, Denmark and Germany, and then, the group of France, Belgium, Ireland, Netherlands, Sweden, Portugal, Greece, and New Zealand, report

relatively similar minimum wage ratio levels. The lowest levels are reported for Spain, United Kingdom, Canada, United States, and Japan. However, these results should be treated with caution as they do not refer to minimum wage levels but they are the means of the Kaitz indexes, meaning that they refer to the ratios of minimum to average wages in the countries of our sample. That is the reason why countries such as Canada, United States and Japan appear to have lower minimum wages than Italy, Portugal and Greece.

Figure 1. Minimum Wage ratio levels (means) ranked across selected countries.



Note: Australia AU, Belgium BE, Canada CA, Denmark DK, France FR, Germany DE, Greece GR, Ireland IE, Italy IT, Japan JP, Netherlands NL, New Zealand NZ, Portugal PT, Spain ES, Sweden SE, United Kingdom UK, United States US.

Figure 2. MW Ratios (lagged) across European countries and years of the sample.

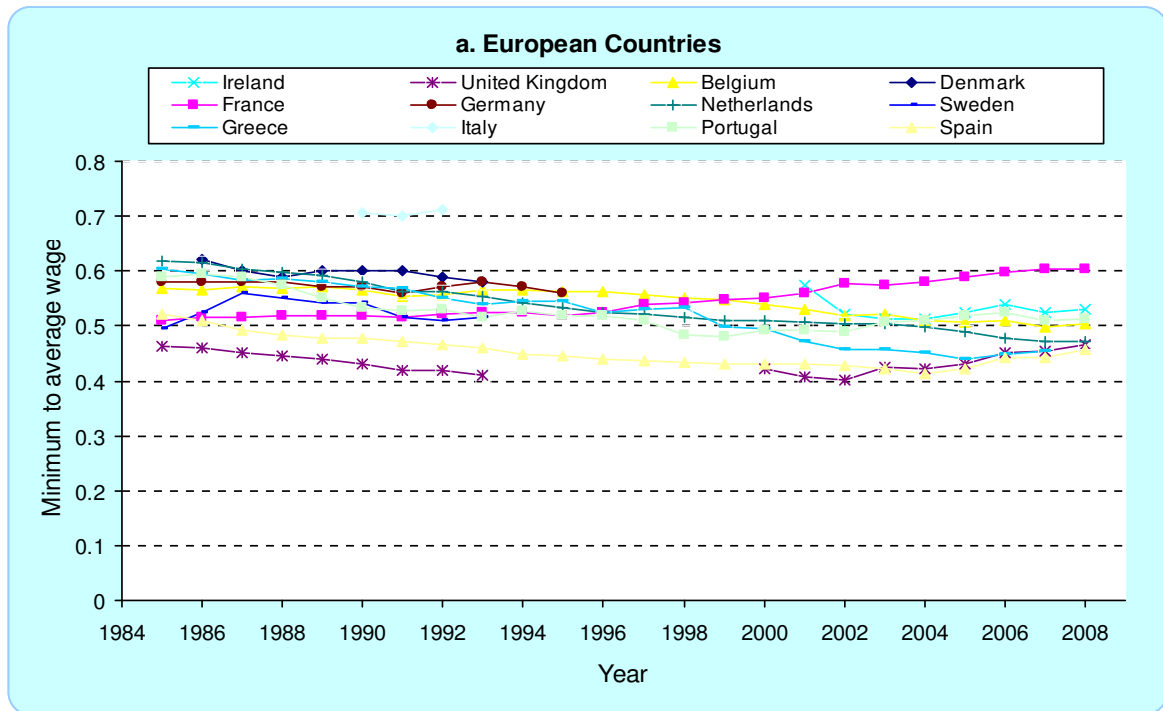
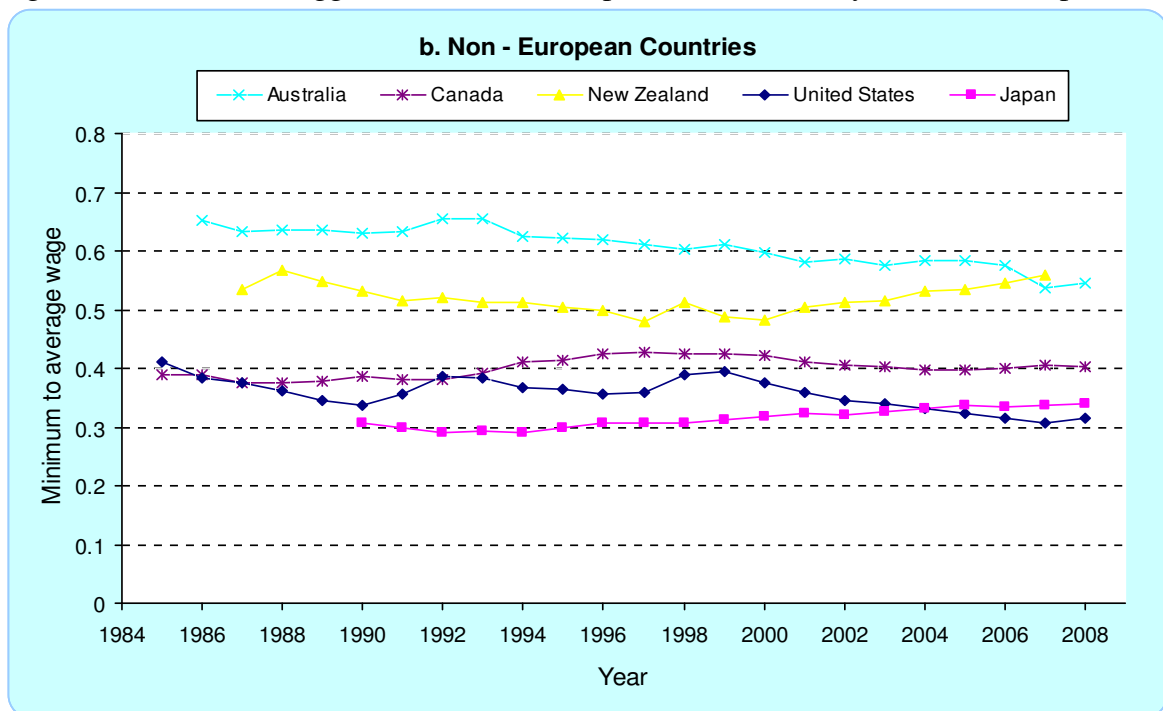


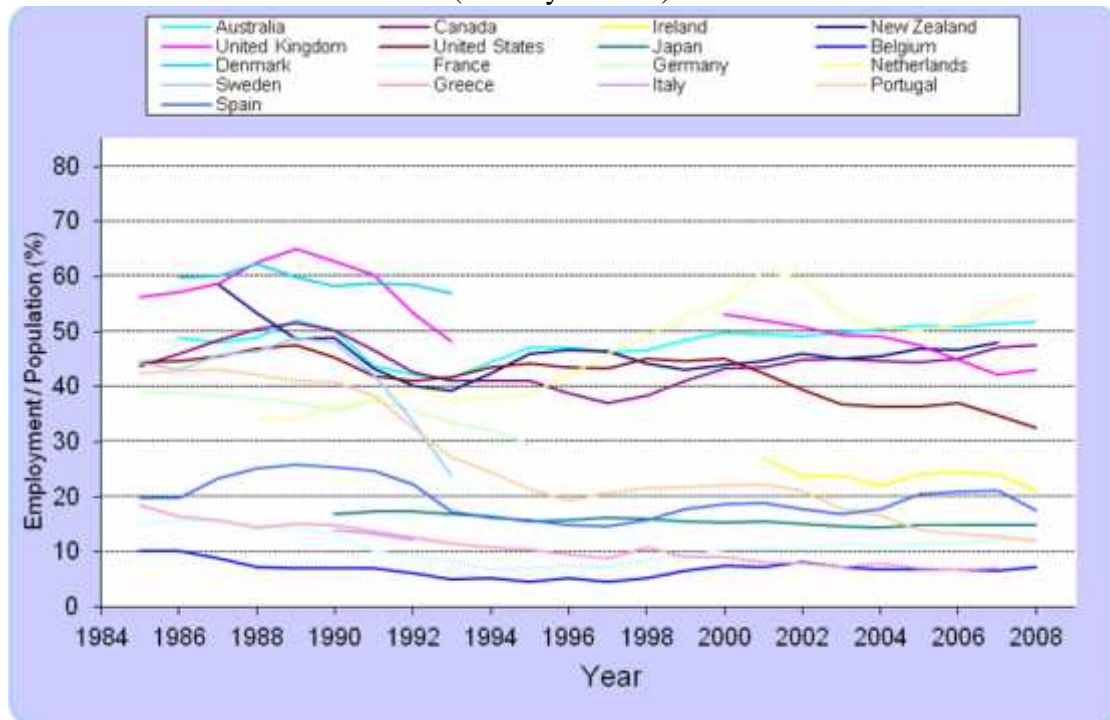
Figure 3. MW Ratios (lagged) across non-European countries and years of the sample.



Sources of figures 2 and 3: Minimum wage ratios are from the OECD online database and Dolado *et al.* (1996). The OECD uses a median wage to calculate the ratios, while Dolado *et al.* (1996) use a mean wage. All the ratios are obtained from OECD for all countries and years apart from Denmark, Germany, Italy, Sweden and the United Kingdom (before 1993). For these countries we use summary estimates constructed by Dolado *et al.* (1996) following Neumark and Wascher (2004, p. 228) and Addison and Ozturk (2012, p. 787).

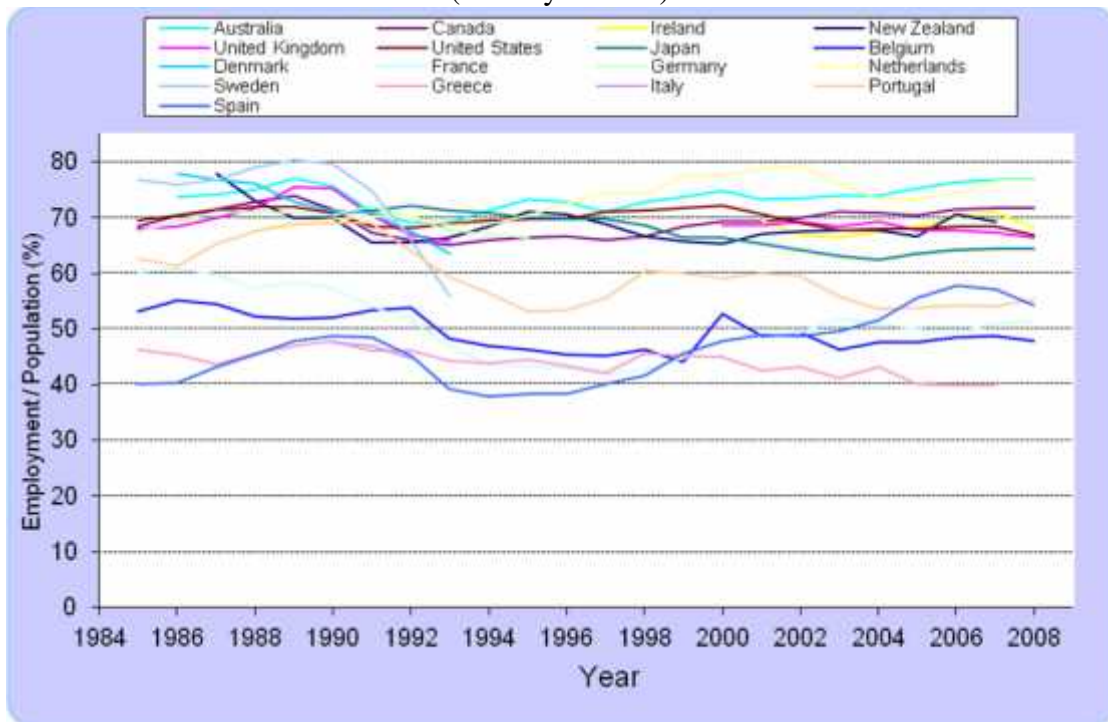
In the following seven figures (figure 4 to 10) we present employment to population ratios for the countries of the sample period which is the main dependent variable of the model. Furthermore, we provide the data of the demand side controls, which are the five business circle indicators of our analysis, in tables 2 to 6. Table 2 reports the data for GDP growth (lagged), table 3 for downturn dummy when at least two quarters of the year have negative growth, table 4 for downturn dummy when at two consecutive quarters of the year have negative growth, table 5 for prime-age unemployment rates and table 6 for prime-age male unemployment rates.

Figure 4. Employment to Population Ratios across OECD countries in the sample period.
(15-19 years old)



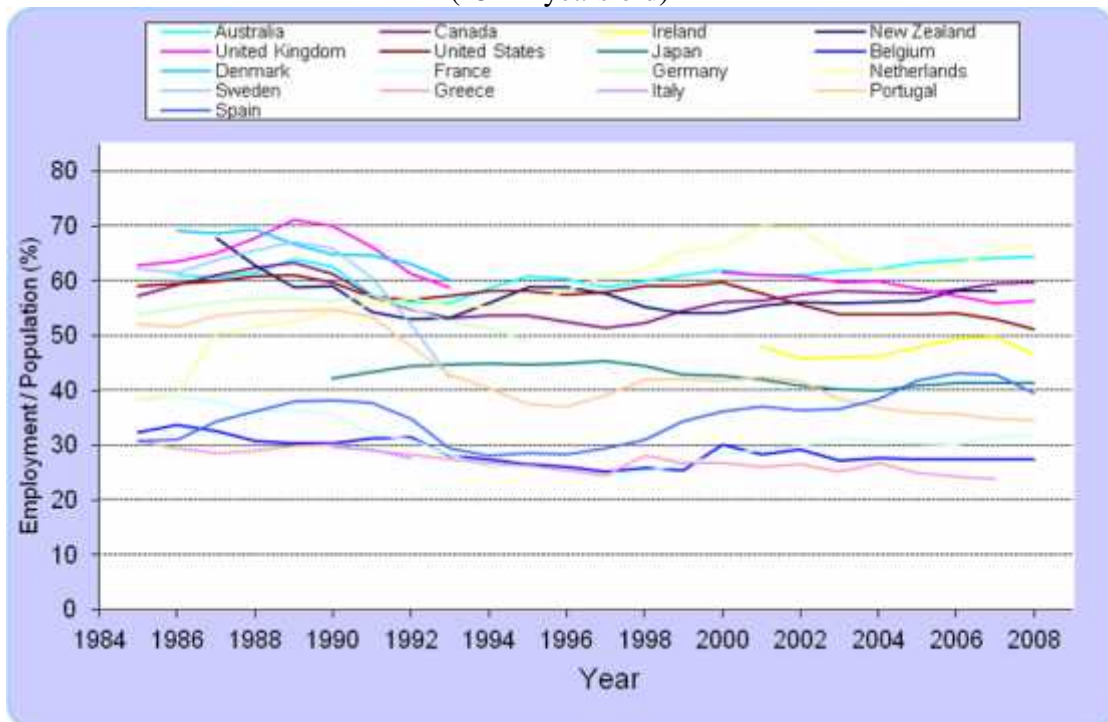
Source: Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age - indicators)

Figure 5. Employment to Population Ratios across countries in the sample period.
(20-24 years old)



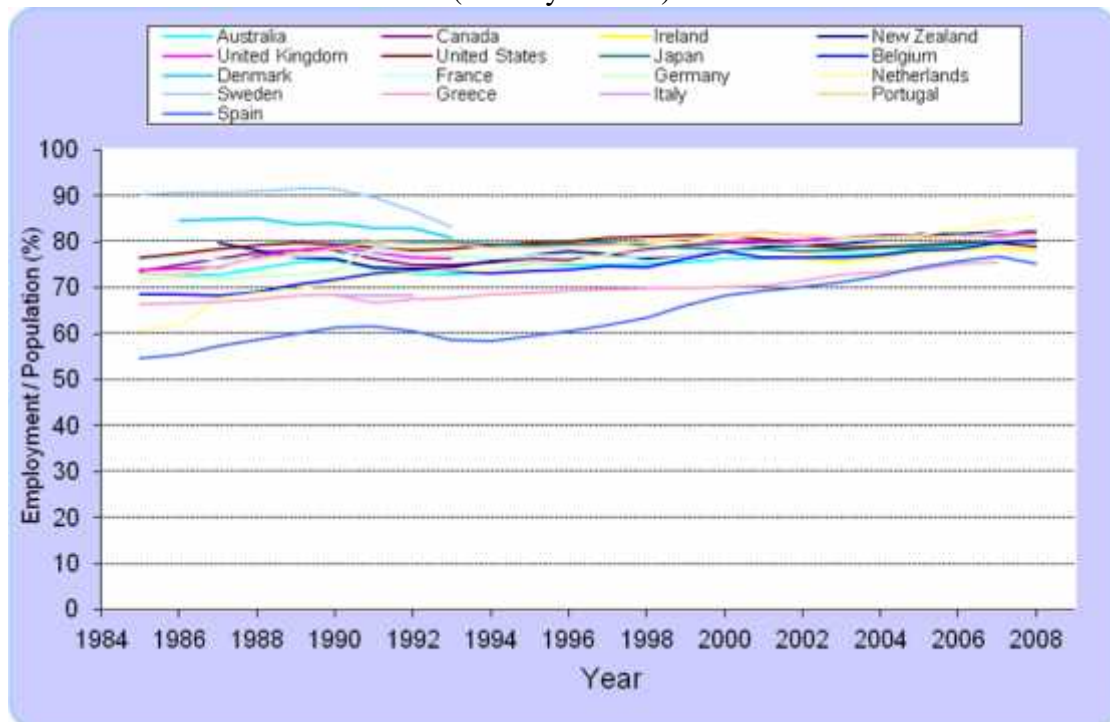
Source: Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age - indicators)

Figure 6. Employment to Population Ratios across countries in the sample period.
(15-24 years old)



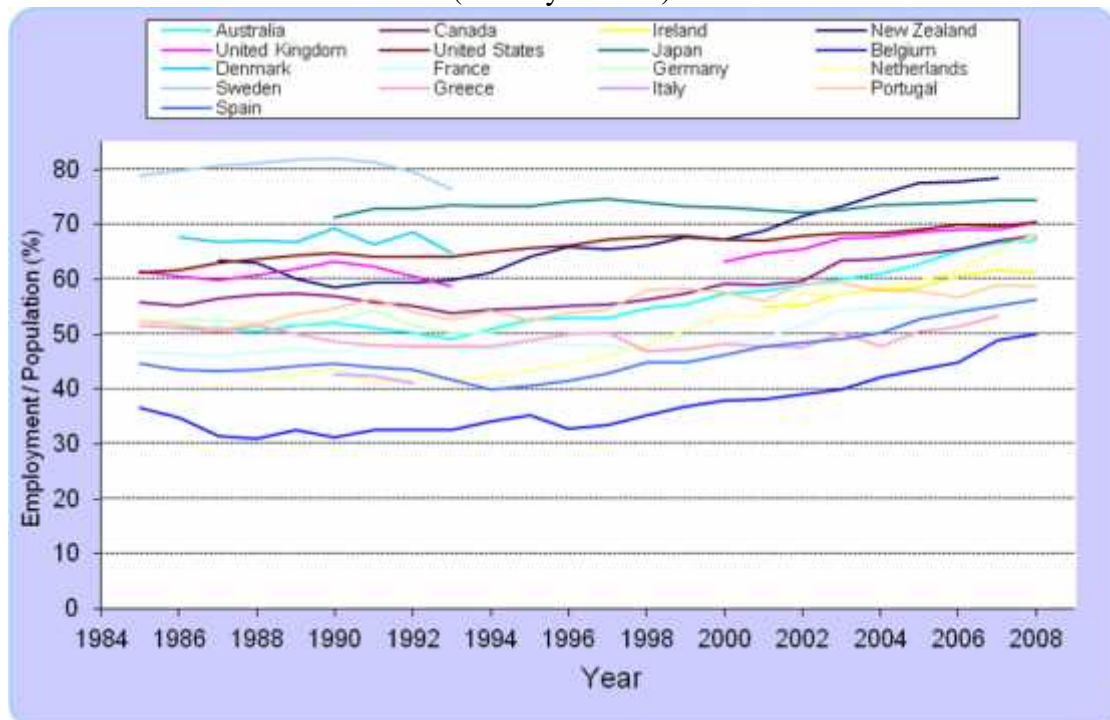
Source: Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age - indicators)

Figure 7. Employment to Population Ratios across countries in the sample period.
(25-54 years old)



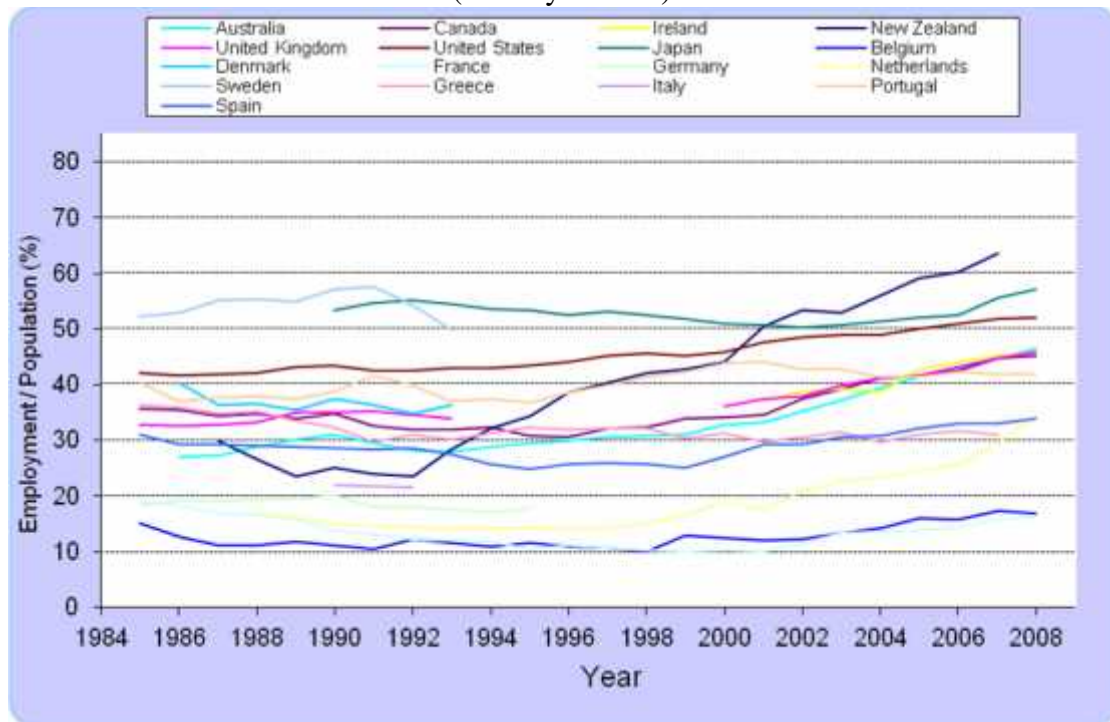
Source: Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age - indicators)

Figure 8. Employment to Population Ratios across countries in the sample period.
(55-59 years old)



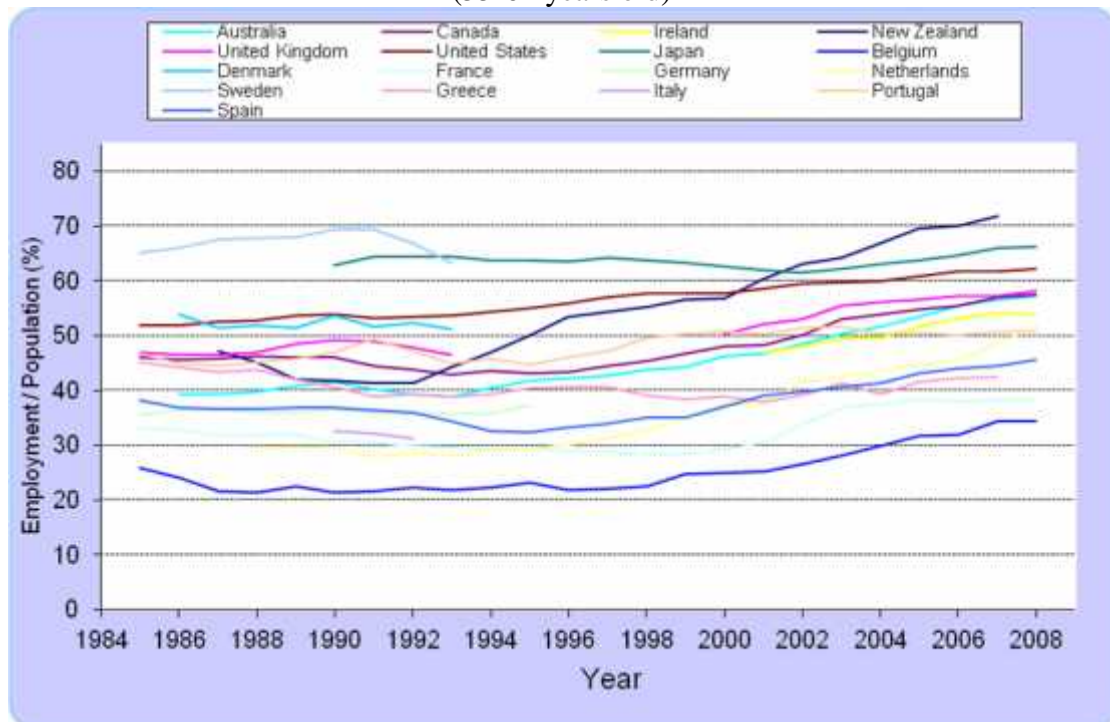
Source: Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age - indicators)

Figure 9. Employment to Population Ratios across countries in the sample period.
(60-64 years old)



Source: Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age - indicators)

Figure 10. Employment to Population Ratios across countries in the sample period.
(55-64 years old)



Source: Labor Force Statistics (OECD). (Annual data from OECD, LFS by sex and age - indicators)

Table 2. Economic downturn across countries in the sample period. First business circle indicator: value of GDP growth (lagged).

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia		5.13	4.55	2.55	5.87	3.94	3.57	-0.2	0.45	4.09	3.97	3.94	4.18	3.97	4.59	5.16	3.95	2.07	3.9	3.27	4.16	2.96	3.08	3.56
Belgium	2.47	1.65	1.82	2.31	4.72	3.47	3.14	1.83	1.53	-1	3.23	2.38	1.42	3.74	1.93	3.54	3.67	0.81	1.36	0.81	3.27	1.73	2.7	2.9
Canada	5.81	4.78	2.42	4.25	4.97	2.62	0.19	-2.1	0.88	2.34	4.8	2.81	1.62	4.23	4.1	5.53	5.23	1.78	2.92	1.88	3.12	3.02	2.82	2.2
Denmark		4.02	4.95	0.29	-0.1	0.57	1.61	1.3	1.98															
France	1.49	1.61	2.26	2.39	4.67	4.19	2.62	1.04	1.48	-0.7	2.25	2.05	1.07	2.18	3.38	3.29	3.68	1.84	0.93	0.9	2.54	1.83	2.47	2.29
Germany	2.82	2.33	2.29	1.4	3.71	3.9	5.26	5.11	1.91	-1	2.47													
Greece	2.01	2.51	0.52	-2.3	4.29	3.8	0	3.1	0.7	-1.6	2	2.1	2.36	3.64	3.36	3.42	4.48	4.2	3.44	5.94	4.37	2.28	5.54	
Ireland																	9.24	4.79	5.87	4.16	4.51	5.34	5.31	5.18
Italy						3.39	2.05	1.53																
Japan					5.29	5.2	3.32	0.82	0.17	0.86	1.88	2.64	1.56	-2	-0.1	2.86	0.18	0.26	1.41	2.74	1.93	2.04	2.36	
Netherlands	3.06	2.58	2.79	1.93	3.44	4.42	4.18	2.44	1.71	1.26	2.96	3.12	3.41	4.28	3.92	4.68	3.94	1.93	0.08	0.34	2.24	2.05	3.39	3.92
New Zealand			1.52	-0.2	0.54	0.04	-1.3	1.12	6.37	5.29	4.33	3.6	1.77	0.43	5.17	2.62	3.59	4.91	4.35	3.76	3.3	0.77	2.98	
Portugal	-1.9	2.81	4.14	6.38	7.49	6.44	3.95	4.37	1.09	-2	0.96	4.28	3.69	4.41	5.14	4.07	3.92	1.97	0.76	-0.9	1.56	0.78	1.45	2.37
Spain	1.78	2.32	3.25	5.55	5.09	4.83	3.78	2.55	0.93	-1	2.38	2.76	2.42	3.87	4.47	4.75	5.05	3.65	2.7	3.1	3.27	3.61	4.02	3.57
Sweden	4.27	2.19	2.86	3.46	2.67	2.78	1.01	-1.1	-1.2															
United Kingdom	2.69	3.62	4.01	4.56	5.03	2.28	0.78	-1.4	0.15							3.66	4.46	3.15	2.66	3.52	2.96	2.09	2.61	3.47
United States	7.19	4.11	3.43	3.17	4.1	3.56	1.86	-0.3	3.4	2.87	4.11	2.55	3.79	4.51	4.49	4.87	4.17	1.09	1.83	2.5	3.59	3.06	2.67	1.94

Table 3. Economic downturn across countries in the sample period. Second business circle indicator: dummy (lagged) takes the value 1 if the year contains any two quarters of negative growth, 0 otherwise.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia		0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Canada	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark		0	0	0	1	0	0	1	1															
France	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Germany	0	0	0	0	0	0	0	1	0	0	0													
Greece	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	
Ireland																	0	0	0	1	0	0	0	1
Italy						0	0	0																
Japan						0	1	0	0	1	0	0	0	1	1	1	0	1	0	0	1	0	0	0
Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
New Zealand			0	0	1	1	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	
Portugal	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0	0
Spain	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	1	1	1	1															
United Kingdom	0	0	0	0	0	0	1	1	0							0	0	0	0	0	0	0	0	0
United States	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0

Table 4. Economic downturn across countries in the sample period. Second business circle indicator: dummy (lagged) takes the value 1 if the year contains two consecutive quarters of negative growth, 0 otherwise.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia		0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Belgium	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Canada	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Denmark		0	0	0	1	0	0	0	0															
France	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Germany	0	0	0	0	0	0	0	0	0	1	0													
Greece	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ireland																	0	0	0	0	0	0	0	0
Italy						0	0	0																
Japan					0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	0	0	0	0	0
Netherlands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Zealand			0	0	0	0	1	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Spain	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sweden	0	0	0	0	0	0	0	1	1															
United Kingdom	0	0	0	0	0	0	0	1	0							0	0	0	0	0	0	0	0	0
United States	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 5. Economic downturn across countries in the sample period. Third business circle indicator: value of Prime Age Unempl. Rate.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia		5.84	5.96	5.26	4.59	5.09	7.31	8.33	8.63	7.62	6.62	6.67	6.59	6.08	5.48	5.05	5.3	5.04	4.73	4.14	3.87	3.69	3.38	3.37
Belgium	9.47	9.8	9.79	9.1	7.5	6.47	6.29	6.09	7.07	8.41	8.26	8.56	7.88	8.37	7.38	5.83	5.39	6.6	7.07	7.36	7.39	7.24	6.59	6.1
Canada	9.22	8.36	7.74	6.91	6.82	7.35	9.25	10	10.3	9.35	8.5	8.64	7.83	7.06	6.43	5.75	6.19	6.57	6.45	6.02	5.76	5.29	5.06	5.07
Denmark		5.71	5.37	6.1	7.47	7.95	8.67	8.46	10.2															
France	7.3	7.68	8.49	8.22	8.13	7.83	7.77	8.81	9.76	11.1	10.5	11	11.2	10.8	10.7	9.28	7.74	7.76	7.57	7.79	7.81	7.56	6.95	6.32
Germany	6.35	5.98	5.83	5.71	5.26	4.61	5.41	6.45	7.6	8.07	7.65													
Greece	6	5.56	5.48	5.72	5.47	5.15	5.74	6.01	6.65	6.99	7.3	7.7	7.69	8.99	9.84	9.61	8.79	9.1	8.71	9.46	9.11	8.14	7.76	
Ireland																	3.13	3.64	3.87	3.79	3.92	3.82	3.92	4.81
Italy						7.7	7.47	8.04																
Japan					1.64	1.59	1.7	2.03	2.37	2.57	2.74	2.8	3.41	3.96	4.07	4.39	4.91	4.7	4.36	4.17	3.86	3.72	3.89	
Netherlands	10.9	10.4	8.31	8.12	7.54	6.68	6.25	5.09	5.49	6.26	6.1	5.48	4.84	3.66	2.85	2.5	2.06	2.62	3.59	4.38	4.51	3.67	2.76	2.2
New Zealand			2.88	4.14	5.3	6.05	8.42	8.55	7.92	6.77	5.21	5.06	5.48	6.34	5.68	4.68	4.22	4.11	3.63	2.98	2.78	2.71	2.58	
Portugal	6.31	6.39	5.42	4.38	4.06	3.82	3.47	3.25	4.54	6.05	6.37	6.38	5.99	4.46	4.07	3.5	3.49	4.48	5.78	6.06	7.26	7.33	7.77	7.26
Spain	15.6	15.2	15	14.7	13.7	13.1	13.7	15.7	19.4	20.9	20	19.4	18.3	16.6	14	12.3	9.26	10.2	10.2	9.82	7.99	7.55	7.24	10.2
Sweden	2.01	1.92	1.65	1.38	1.16	1.27	2.51	4.77	7.88															
United Kingdom	9.52	9.37	9.37	7.52	6.21	5.8	7.06	8.49	8.71							4.43	3.85	4.13	3.75	3.61	3.41	4.07	3.72	3.9
United States	5.84	5.72	5.04	4.46	4.22	4.58	5.7	6.36	5.84	4.97	4.45	4.28	3.89	3.5	3.2	3.06	3.77	4.81	5.02	4.55	4.14	3.76	3.74	4.82

Table 6. Economic downturn across countries in the sample period. Fourth business circle indicator: value of Prime Age Male Unempl. Rate.

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Australia		5.48	5.66	4.76	4.17	4.87	7.55	8.78	9.09	7.83	6.97	6.82	6.65	6.34	5.6	5.19	5.41	5.07	4.6	3.96	3.66	3.44	2.95	2.92
Belgium	5.97	5.91	6.33	6.19	4.62	3.99	3.95	4.25	5.09	6.44	6.23	6.57	6.17	6.62	6.14	4.62	4.83	5.71	6.48	6.56	6.57	6.52	5.95	5.68
Canada	8.86	7.96	7.18	6.29	6.31	7.18	9.42	10.7	10.5	9.62	8.66	8.78	7.94	7.17	6.51	5.73	6.31	6.85	6.56	6.12	5.8	5.34	5.33	5.33
Denmark		3.99	4.32	5.33	7	7.51	7.92	7.75	10.1															
France	5.98	6.43	6.73	6.44	5.96	5.75	5.95	6.79	8.09	9.51	8.72	9.22	9.59	9.12	8.91	7.48	6.04	6.72	6.54	6.78	6.8	6.69	6.29	5.62
Germany	5.69	5.23	5.1	4.85	4.37	3.7	4.16	4.92	6.03	6.54	6.46													
Greece	4.56	4.16	4.03	3.78	3.34	3.16	3.6	3.71	4.36	4.77	5.09	4.77	4.93	5.72	6.17	6.12	5.52	5.77	5.38	5.66	5.41	4.99	4.73	
Ireland																	3.28	4	4.32	4.41	4.29	4.07	4.16	5.78
Italy						4.76	4.44	5.09																
Japan						1.36	1.28	1.44	1.74	2.05	2.23	2.45	2.52	3.13	3.7	3.87	4.19	4.7	4.58	4.29	4	3.86	3.62	3.81
Netherlands	11.6	10.7	5.93	5.79	5.49	4.48	4.35	3.71	4.37	5.2	4.98	4.23	3.78	2.82	2.22	1.89	1.55	2.18	3.44	4.2	4.04	3.19	2.29	1.83
New Zealand			2.64	4.11	5.39	6.57	9.02	9.14	8.58	7.31	5.27	4.98	5.49	6.32	5.81	4.58	4.21	3.94	3.28	2.55	2.5	2.46	2.25	
Portugal	4.58	4.7	3.84	2.83	2.47	2.25	2.12	2.58	3.7	5.05	5.46	5.57	5.38	3.44	3.5	2.7	2.64	3.53	4.93	5.15	6.18	5.85	6.12	6.02
Spain	15.4	14.5	12.6	11.4	10	9.26	9.74	11.7	15.4	16.4	15.3	15	13.7	11.6	9.23	7.97	6.3	6.8	6.9	6.94	5.89	5.35	5.42	8.9
Sweden	2.08	1.93	1.61	1.41	1.09	1.3	2.82	5.73	9.33															
United Kingdom	9.52	9.45	9.44	7.35	6.03	5.65	7.57	9.94	10.4							4.8	4.09	4.41	4.14	3.79	3.55	4.23	3.7	4.09
United States	5.58	5.62	5.03	4.36	4.06	4.57	5.94	6.66	5.99	4.9	4.37	4.18	3.72	3.26	3.01	2.87	3.68	4.85	5.19	4.55	3.94	3.62	3.69	4.98

*Data for table 2 was taken from World Bank, for tables 3 and 4 from OECD, Eurostat and World Bank and for tables 5 and 6 from OECD.

5. Econometric results

The estimation results of our analysis are presented in this section, but before we do so we have to mention that we use one year lag of the minimum wage ratio in our specifications because this measure (together with the inclusion of fixed effects) has the advantage that it reduces the potential endogeneity of the minimum wage variable arising from correlations of either the minimum wage or the average wage with overall labor market conditions or the productivity of workers. Furthermore, the effects of minimum wages on employment according to Neumark and Wascher (1992) and Baker *et al.* (1999) take at least one year to be fully shown, thus we preferred to use the lagged minimum wage measure in our analysis.

Now, we divide the results into two parts. In the first part (tables 7 to 13) we display the results taking into account the characteristics of the minimum wage systems across countries and other labor market policies and institutions and using the GDP growth as a demand side control. In the second part (tables 14 to 20) we provide extra robustness to the model by testing the results using all the alternative demand side controls i.e. testing if the results stand if we use the other four business cycle indicators.

Tables 7 to 20 display 6 different specifications for employment to population ratios and labor force participation rates. Column (1) excludes fixed country effects, year effects, and country-specific time trends, and in columns (2) and (3) we add country specific time trends and year effects, respectively. Column (4) includes both year effects and country specific time trends. In column (5), we include all three sets of effects (fixed country effects, year effects, and country specific time trends), finally, in column (6) we estimate a dynamic version of the model by including the lagged employment ratios in the model. Nickell (1981) has shown that including the

lagged employment rate introduces a bias in standard panel estimation techniques. Although the length of our panel (up to 24 years) suggests that the size of this bias may be relatively small, we employ the Blundell and Bond (1998) estimator.

In tables 7 to 13, where we use the GDP growth (lagged) as a business cycle indicator, the general picture is that there is a positive and in most cases statistically significant relationship between minimum wages and employment measures of all age categories until 24 years old. Additionally, the rise of the GDP growth level seems to affect positively employment and labor force participation rates of both teenagers and youth. However, for those aged 25-54 years old the impact of minimum wages on both employment ratios and labor force participation rates begins to alter, and despite not being in most case statistically significant there is evidence of adverse employment effects.

For those belonging to the age group of 55-64 the effect clearly now is negative and in most specifications statistically significant. This means that the minimum wage does not have the same effect on all age groups as for the younger population it seems to affect them positive, for the older it appears to cause negative employment effects. Lastly, the effect in all ages is insignificant when we estimate a dynamic version of the model.

Table 7. Estimates of the model using international evidence for those aged 15-19 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
Lagged Y1						0.807*** (0.039)						
Lagged Y2												0.795*** (0.043)
Relative Cohort Size	85.998* (48.913)	72.546 (51.903)	-28.735 (60.903)	54.114 (49.298)	-58.196*** (31.127)	-52.543*** (19.264)	119.900** (54.347)	43.461 (52.688)	-61.213 (61.975)	27.691 (49.469)	-104.949*** (27.803)	-66.003*** (19.104)
MW ratio (Lagged)	41.116*** (15.333)	49.442*** (15.090)	44.271*** (13.869)	51.386*** (14.567)	7.373 (9.257)	4.579 (6.402)	48.113*** (16.452)	64.802*** (16.314)	52.698*** (14.059)	64.208*** (15.363)	26.047*** (8.959)	9.467 (6.308)
GDP growth (lagged)	0.502 (0.358)	0.466** (0.186)	0.264 (0.388)	0.168 (0.196)	0.237** (0.104)	0.459*** (0.063)	0.326 (0.397)	0.141 (0.194)	0.100 (0.420)	-0.168 (0.207)	0.032 (0.098)	0.259*** (0.062)
Labor Standards Index	5.037*** (0.869)	1.794** (0.769)	4.985*** (0.864)	1.291 (0.807)	-7.419*** (2.225)	-2.437 (2.134)	5.595*** (0.907)	2.370*** (0.785)	5.609*** (0.880)	1.836** (0.843)	-8.066*** (1.926)	-1.833 (1.646)
Employment Protection	-8.028*** (0.850)	-3.433*** (0.802)	-8.509*** (0.838)	-3.112*** (0.743)	2.802** (1.126)	1.031* (0.595)	-8.897*** (0.890)	-4.407*** (0.800)	-9.696*** (0.831)	-4.232*** (0.724)	2.875*** (0.953)	1.299** (0.589)
Active Labor Market Policies	-7.354*** (2.487)	-7.528*** (2.084)	-8.050*** (2.661)	-5.271** (2.102)	-3.374** (1.389)	-1.925** (0.811)	-8.452*** (2.497)	-8.461*** (2.153)	-10.165*** (2.658)	-6.402*** (2.222)	-3.633*** (1.191)	-1.886** (0.802)
Union Density	-0.106 (0.076)	0.111* (0.059)	-0.096 (0.074)	0.099* (0.057)	0.103 (0.082)	0.012 (0.046)	-0.209** (0.082)	-0.066 (0.062)	-0.184** (0.075)	-0.081 (0.059)	0.058 (0.077)	0.050 (0.047)
UI Replacement Rate	0.056 (0.106)	-0.110 (0.067)	0.034 (0.102)	-0.172** (0.066)	0.410*** (0.113)	0.090 (0.055)	-0.024 (0.109)	-0.262*** (0.069)	-0.045 (0.102)	-0.309*** (0.069)	0.449*** (0.102)	0.077 (0.056)
Bargained minimum wage	-5.716** (2.453)	-11.687*** (2.220)	-7.683*** (2.427)	-13.238*** (2.164)	4.807** (1.921)	0.277 (8.105)	-5.909** (2.735)	-14.246*** (2.245)	-8.964*** (2.572)	-15.708*** (2.199)	3.952** (1.701)	-1.568 (3.469)
Subnational minimum	29.729*** (2.570)	31.258*** (2.370)	26.486*** (2.599)	30.503*** (2.631)	-6.048 (5.245)	-1.957 (6.335)	32.470*** (2.717)	33.617*** (2.417)	27.512*** (2.620)	32.236*** (2.722)	-6.347 (4.472)	-4.412 (4.695)
Youth subminimum	23.878*** (1.639)	17.775*** (1.923)	23.079*** (1.671)	17.795*** (1.934)	25.885*** (4.150)	5.041 (4.522)	29.376*** (1.737)	25.890*** (1.838)	28.168*** (1.617)	26.022*** (1.867)	31.165*** (3.483)	6.760 (4.210)
Constant	-11.204 (7.474)	-12.017 (8.023)	9.942 (9.927)	-8.656 (8.665)	27.106*** (9.033)	11.705 (7.636)	-8.724 (7.930)	0.574 (8.350)	25.420*** (9.540)	7.505 (8.761)	35.543*** (7.302)	9.123 (6.601)
MW elasticity	0.648***	0.779***	0.697***	0.809***	0.116	0.072	0.624***	0.841***	0.684***	0.833***	0.338***	0.123
Country Effects	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CS Time Trends	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
R-squared	0.691	0.935	0.716	0.944	0.984	0.984	0.698	0.943	0.738	0.949	0.989	0.989
Prob>F/Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman/Sargan test					0.000	0.037					0.000	0.144
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is from 1985-2008 for Belgium, Canada, France, Portugal, Spain and the United States and for the following countries it is referred in the parenthesis: Australia (1986-2008), Denmark (1986-1993), Germany (1985-1995), Greece (1985-2007), Ireland (2001-2008), Italy (1990-1992), Japan (1990-2008), Netherlands (1988-2008), New Zealand (1987-2007), Sweden (1985-1993), United Kingdom (1985-1993 and 2000-2008).

Note 2: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level. Hubert-White robust standard errors are given in parenthesis. The Hausman specification test is for the exclusion of fixed country effects. The Sargan test indicates whether the over-identifying restrictions should be excluded in the GMM regression.

Table 8. Estimates of the model using international evidence for those aged 20-24 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
Lagged Y1						0.680*** (0.045)						
Lagged Y2												0.717*** (0.054)
Relative Cohort Size	-88.094*** (27.935)	-46.312 (37.974)	-228.643*** (40.963)	-55.035 (37.258)	-23.065 (24.297)	3.158 (16.895)	38.918** (17.162)	-22.909 (21.220)	-126.923*** (25.166)	-36.929 (23.444)	-5.978 (22.298)	5.676 (14.802)
MW ratio (Lagged)	27.980*** (10.402)	17.788* (9.868)	22.906** (9.417)	19.343** (9.419)	14.385* (7.358)	0.908 (7.272)	22.924*** (6.304)	12.476** (6.225)	17.106*** (4.745)	10.768* (5.716)	23.348*** (6.236)	8.904 (6.471)
GDP growth (lagged)	0.819*** (0.212)	0.810*** (0.139)	0.895*** (0.217)	0.742*** (0.152)	0.401*** (0.091)	0.488*** (0.070)	0.256* (0.138)	0.210** (0.080)	0.368*** (0.122)	0.148 (0.090)	0.024 (0.087)	0.107* (0.062)
Labor Standards Index	2.650*** (0.531)	1.114* (0.617)	2.623 (0.481)	0.809 (0.586)	-1.801 (1.376)	0.677 (2.642)	2.603*** (0.376)	1.728*** (0.435)	2.644*** (0.310)	1.469*** (0.409)	-1.323 (1.105)	-0.233 (2.534)
Employment Protection	-4.203*** (0.519)	-1.700*** (0.550)	-4.440*** (0.511)	-1.559*** (0.552)	4.681*** (1.044)	0.584 (0.694)	-3.516*** (0.336)	-1.947*** (0.338)	-3.817*** (0.274)	-1.934*** (0.337)	3.101*** (0.848)	1.093* (0.588)
Active Labor Market Policies	-1.902 (1.914)	-5.469*** (2.014)	-2.135 (1.734)	-3.688* (1.914)	-4.704*** (1.456)	-1.959** (0.925)	-2.852** (1.099)	-4.613*** (1.151)	-3.601*** (0.877)	-3.474*** (1.032)	-2.954*** (1.069)	-1.435* (0.843)
Union Density	0.128*** (0.042)	0.384*** (0.054)	0.069 (0.044)	0.369*** (0.054)	-0.231*** (0.082)	-0.077 (0.054)	0.066*** (0.023)	0.113*** (0.026)	0.002 (0.020)	0.098*** (0.028)	-0.218*** (0.068)	-0.072 (0.050)
UI Replacement Rate	0.010 (0.070)	0.227*** (0.065)	0.014 (0.063)	0.199*** (0.064)	0.514*** (0.088)	0.208*** (0.064)	0.006 (0.041)	0.104** (0.041)	0.017 (0.030)	0.097** (0.039)	0.448*** (0.076)	0.158*** (0.058)
Bargained minimum wage	-12.238*** (1.279)	-11.660*** (1.572)	-12.617*** (1.220)	-12.242*** (1.552)	-16.269*** (2.039)	-6.221 (6.596)	-8.214*** (0.886)	-8.354*** (1.123)	-8.642*** (0.789)	-8.831*** (1.087)	-10.121*** (1.503)	-1.805 (2.839)
Subnational minimum	19.160*** (1.482)	18.425*** (2.047)	19.095*** (1.372)	18.201*** (1.907)	18.757*** (3.815)	4.284 (9.413)	14.412*** (0.973)	13.941*** (1.357)	14.516*** (0.817)	13.301*** (1.311)	14.026*** (2.816)	5.730 (6.312)
Youth subminimum	9.974*** (1.249)	0.337 (2.200)	12.239*** (1.262)	0.158 (2.113)	12.503*** (3.767)	-2.393 (6.643)	7.890*** (0.912)	5.981*** (1.163)	10.704*** (0.758)	6.142*** (1.244)	12.201*** (2.612)	1.852 (5.980)
Constant	47.488*** (4.268)	39.756*** (5.551)	72.591*** (7.289)	39.551*** (6.249)	51.655*** (6.260)	19.517* (11.642)	48.887*** (2.753)	62.048*** (3.743)	78.925*** (4.295)	66.037*** (4.830)	58.401*** (5.491)	14.381 (11.217)
MW elasticity	0.221***	0.140*	0.181**	0.153**	0.113*	0.007	0.156***	0.085**	0.117***	0.073*	0.159***	0.060
Country Effects	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CS Time Trends	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
R-squared	0.721	0.898	0.758	0.912	0.970		0.778	0.920	0.843	0.930	0.960	
Prob>F/Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman/Sargan test					0.000	0.372					-	0.597
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note: Same notes as in table 7.

Table 9. Estimates of the model using international evidence for those aged 15-24 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
Lagged Y1						0.790*** (0.042)						
Lagged Y2												0.847*** (0.048)
Relative Cohort Size	-15.425 (13.783)	-2.567 (17.735)	-92.785*** (20.510)	-8.370 (16.294)	-41.088*** (13.104)	2.740 (8.447)	22.215 (13.495)	-7.831 (13.668)	-86.009*** (18.236)	-14.918 (13.214)	-42.970*** (12.649)	3.237 (7.836)
<u>MW ratio</u> (Lagged)	33.893*** (11.734)	29.718*** (11.312)	36.953*** (9.861)	31.926*** (10.832)	4.568 (7.854)	1.716 (6.235)	30.253*** (10.382)	31.824*** (10.550)	34.520*** (7.813)	30.375*** (9.669)	15.990** (6.905)	4.560 (6.018)
GDP growth (lagged)	0.683*** (0.254)	0.645*** (0.144)	0.667*** (0.251)	0.485*** (0.152)	0.335*** (0.096)	0.467*** (0.063)	0.319 (0.243)	0.175 (0.126)	0.378 (0.232)	0.029 (0.137)	0.048 (0.090)	0.210*** (0.061)
Labor Standards Index	3.870*** (0.638)	1.325** (0.625)	3.795*** (0.596)	0.949 (0.620)	-3.957** (1.604)	0.303 (2.560)	4.198*** (0.585)	1.964*** (0.514)	4.186*** (0.514)	1.597*** (0.521)	-3.757*** (1.299)	-1.997 (2.025)
Employment Protection	-5.841*** (0.649)	-2.470*** (0.636)	-6.129*** (0.648)	-2.220*** (0.618)	4.286*** (1.036)	0.347 (0.623)	-5.919*** (0.585)	-3.089*** (0.529)	-6.347*** (0.531)	-2.957*** (0.505)	3.270*** (0.779)	0.673 (0.577)
Active Labor Market Policies	-5.084*** (1.918)	-6.812*** (1.905)	-6.503*** (1.816)	-4.778*** (1.768)	-4.312*** (1.345)	-1.546* (0.822)	-5.811*** (1.587)	-7.046*** (1.478)	-8.383*** (1.464)	-5.630*** (1.427)	-3.621*** (1.030)	-1.430* (0.792)
Union Density	0.035 (0.049)	0.281*** (0.048)	0.035 (0.046)	0.265*** (0.044)	-0.064 (0.080)	-0.073 (0.046)	-0.072 (0.045)	0.049 (0.041)	-0.064* (0.038)	0.039 (0.038)	-0.071 (0.071)	-0.019 (0.045)
UI Replacement Rate	0.019 (0.078)	0.063 (0.060)	0.007 (0.067)	0.019 (0.058)	0.529*** (0.094)	0.128** (0.056)	-0.014 (0.069)	-0.066 (0.049)	-0.020 (0.056)	-0.095* (0.049)	0.500*** (0.083)	0.070 (0.055)
Bargained minimum wage	-9.847*** (1.618)	-11.874*** (1.741)	-12.270*** (1.633)	-12.918*** (1.729)	-6.788*** (2.278)	-0.635 (6.073)	-7.149*** (1.584)	-11.436*** (1.461)	-10.513*** (1.570)	-12.323*** (1.440)	-3.864** (1.915)	-4.215 (2.851)
Subnational minimum	24.553*** (1.750)	24.407*** (1.901)	22.593*** (1.575)	24.165*** (1.888)	8.655** (4.182)	0.695 (7.421)	24.136*** (1.627)	23.634*** (1.545)	21.621*** (1.343)	22.711*** (1.564)	6.772** (3.343)	-6.472 (6.529)
Youth subminimum	17.033*** (1.250)	8.575*** (1.825)	17.756*** (1.223)	8.532*** (1.721)	22.842*** (3.967)	9.093 (6.766)	19.535*** (1.074)	16.162*** (1.304)	20.652*** (0.922)	16.280*** (1.256)	26.219*** (3.067)	2.796 (4.293)
Constant	21.894*** (5.470)	17.760*** (6.762)	48.671*** (8.005)	18.211** (7.105)	43.237*** (6.843)	4.156 (11.158)	25.132*** (5.114)	37.674*** (6.127)	63.474*** (6.447)	42.363*** (6.217)	49.370*** (5.667)	12.996 (8.731)
MW elasticity	0.352***	0.309***	0.384***	0.332***	0.047	0.017	0.267***	0.281***	0.305***	0.268***	0.141**	0.040
Country Effects	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CS Time Trends	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
R-squared	0.747	0.931	0.783	0.942	0.978		0.756	0.945	0.812	0.951	0.982	
Prob>F/Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman/Sargan test					0.000	0.427					0.000	0.916
Obs	308	308	308	308	308	293	308	308	308	308	308	293
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is from 1985-2008 for Belgium, Canada, France, Netherlands, Portugal, Spain and the United States and for the following countries: Australia (1986-2008), Denmark (1986-1993), Germany (1985-1995), Greece (1985-2007), Ireland (2001-2008), Italy (1990-1992), Japan (1990-2008), New Zealand (1987-2007), Sweden (1985-1993), United Kingdom (1985-1993 and 2000-2008).

Note 2: Same as note 2 in table 7.

Table 10. Estimates of the model using international evidence for those aged 25-54 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
Lagged Y1						0.805*** (0.046)						
Lagged Y2												0.594*** (0.063)
Relative Cohort Size	8.964*** (1.910)	3.770** (1.512)	2.896* (1.717)	5.601*** (1.789)	2.888*** (0.895)	0.653 (0.618)	9.299*** (1.506)	2.806** (1.081)	4.679*** (1.305)	3.992*** (1.275)	1.220** (0.614)	0.370 (0.488)
<u>MW ratio</u> (Lagged)	-0.122 (5.372)	-11.130* 6.093	7.995 (5.691)	-12.495* (6.361)	-0.491 (4.045)	-2.659 (3.555)	-1.944 (3.713)	-15.833*** (4.659)	3.944 (3.910)	-17.493*** (5.294)	-3.392 (2.686)	-1.655 (2.857)
GDP growth (lagged)	0.077 (0.158)	0.448*** (0.109)	0.042 (0.150)	0.422*** (0.120)	0.158*** (0.057)	0.238*** (0.035)	-0.134 (0.111)	0.154* (0.080)	-0.111 (0.118)	0.175* (0.091)	0.013 (0.036)	0.031 (0.029)
Labor Standards Index	-0.294 (0.389)	0.256 (0.476)	-0.357 (0.338)	0.143 (0.476)	-1.430** (0.559)	-1.702 (2.498)	-0.333 (0.283)	0.239 (0.369)	-0.361 (0.244)	0.212 (0.372)	-1.208*** (0.333)	-2.460 (1.633)
Employment Protection	-0.093 (0.423)	0.245 (0.440)	0.021 (0.383)	0.455 (0.442)	1.890*** (0.586)	0.210 (0.346)	0.150 (0.314)	-0.456 (0.332)	0.226 (0.292)	-0.360 (0.342)	-0.132 (0.281)	0.224 (0.278)
Active Labor Market Policies	2.698** (1.179)	-0.827 (1.324)	3.375*** (1.033)	-0.248 (1.314)	-0.461 (0.704)	-0.712 (0.460)	1.610* (0.886)	-0.098 (1.006)	1.984** (0.788)	-0.020 (1.048)	0.095 (0.359)	-0.110 (0.380)
Union Density	0.188*** (0.035)	0.354*** (0.037)	0.225*** (0.033)	0.348*** (0.039)	-0.050 (0.047)	-0.028 (0.026)	0.142*** (0.027)	0.233*** (0.029)	0.172*** (0.028)	0.231*** (0.031)	0.032 (0.027)	0.010 (0.021)
UI Replacement Rate	-0.050 (0.044)	0.011 (0.050)	-0.018 (0.042)	-0.009 (0.053)	0.102** (0.045)	0.032 (0.029)	0.036 (0.035)	0.043 (0.043)	0.064* (0.033)	0.037 (0.045)	0.015 (0.025)	0.013 (0.024)
Bargained minimum wage	-5.595*** (0.781)	-5.003*** (1.146)	-6.380*** (0.819)	-5.027*** (1.177)	-5.275*** (1.282)	2.556 (2.149)	-3.956*** (0.644)	-3.578*** (0.878)	-4.523*** (0.745)	-3.422*** (0.933)	-3.826*** (0.710)	4.892 (6.296)
Subnational minimum	1.687* (0.867)	5.374*** (1.280)	3.865*** (0.851)	4.798*** (1.410)	5.335*** (1.950)	-3.047 (8.352)	1.701** (0.773)	4.289*** (1.117)	3.353*** (0.761)	3.857*** (1.213)	4.324*** (0.999)	2.271 (3.119)
Youth subminimum	-1.884 (1.204)	-4.748*** (1.661)	-2.814*** (1.060)	-4.539*** (1.678)	2.650* (1.377)	-0.341 (3.375)	-2.057** (0.900)	-2.167* (1.282)	-2.774*** (0.856)	-2.012 (1.331)	2.850*** (0.774)	5.464 (4.553)
Constant	57.441*** (4.215)	59.058*** (4.526)	56.201*** (4.207)	56.496*** (4.940)	66.051*** (3.036)	18.090* (10.746)	62.548*** (3.075)	72.796*** (3.291)	61.548*** (3.212)	71.455*** (3.611)	76.107*** (1.554)	31.016*** (6.798)
MW elasticity	-0.001	-0.072*	0.052	-0.081**	-0.003	-0.017	-0.012	-0.096***	0.024	-0.106***	-0.021	-0.010
Country Effects	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CS Time Trends	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
R-squared	0.370	0.805	0.559	0.815	0.969		0.418	0.824	0.579	0.829	0.982	
Prob>F/Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman/Sargan test					-	0.896					-	0.960
Obs	311	311	311	311	311	293	311	311	311	311	311	293
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is from 1985-2008 for Belgium, Canada, France, Netherlands, Portugal, Spain and the United States and for the following countries: Australia (1986-2008), Denmark (1986-1993), Germany (1985-1995), Greece (1985-2007), Ireland (2001-2008), Italy (1990-1992), Japan (1990-2008), New Zealand (1987-2007), Sweden (1985-1993), United Kingdom (1985-1993 and 2000-2008).

Note 2: Same as note 2 in table 7.

Table 11. Estimates of the model using international evidence for those aged 55-59 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
Lagged Y1						0.644*** (0.053)						
Lagged Y2												0.617*** (0.054)
Relative Cohort Size	260.133*** (32.145)	161.249*** (27.042)	134.180*** (37.992)	146.818*** (35.486)	10.467 (22.048)	6.601 (21.194)	239.608*** (30.800)	157.089*** (25.595)	122.862*** (37.691)	140.790*** (35.336)	-12.567 (18.777)	3.346 (19.774)
MW ratio (Lagged)	-30.291*** (7.654)	-23.578*** (7.074)	-23.550** (9.038)	-24.411*** (7.334)	-0.545 (6.481)	-4.283 (5.292)	-28.915*** (8.000)	-25.051*** (6.086)	-22.906** (9.541)	-27.041*** (6.412)	1.166 (5.729)	-3.057 (4.937)
GDP growth (lagged)	-0.027 (0.203)	0.219** (0.109)	-0.311 (0.213)	0.072 (0.120)	-0.072 (0.064)	0.073 (0.053)	-0.199 (0.186)	0.061 (0.091)	-0.433** (0.203)	-0.056 (0.106)	-0.152*** (0.055)	-0.038 (0.050)
Labor Standards Index	4.357*** (0.547)	4.077*** (0.468)	4.020*** (0.543)	3.852*** (0.472)	-4.146*** (0.837)	-1.719 (1.943)	4.576*** (0.544)	4.667*** (0.423)	4.287*** (0.553)	4.490*** (0.424)	-4.317*** (0.668)	-1.257 (1.812)
Employment Protection	-2.912*** (0.518)	-0.577 (0.437)	-1.577*** (0.579)	-0.408 (0.427)	1.636** (0.660)	0.244 (0.503)	-3.008*** (0.503)	-1.421*** (0.390)	-1.777*** (0.602)	-1.290*** (0.396)	0.513 (0.585)	-0.007 (0.464)
Active Labor Market Policies	-4.507** (1.951)	-2.665* (1.414)	-3.848** (1.888)	-1.732 (1.495)	0.006 (0.743)	-1.016 (0.693)	-5.529*** (2.012)	-2.578* (1.338)	-5.050** (1.995)	-1.992 (1.429)	0.508 (0.596)	-0.396 (0.643)
Union Density	0.238*** (0.043)	0.262*** (0.042)	0.251*** (0.044)	0.252*** (0.043)	-0.184*** (0.049)	-0.079** (0.039)	0.187*** (0.042)	0.175*** (0.039)	0.201*** (0.045)	0.166*** (0.040)	-0.203*** (0.042)	-0.087** (0.037)
UI Replacement Rate	-0.173** (0.072)	-0.345*** (0.060)	-0.244*** (0.077)	-0.376*** (0.065)	0.065 (0.058)	0.052 (0.045)	-0.116 (0.078)	-0.349*** (0.064)	-0.178** (0.085)	-0.371*** (0.069)	0.042 (0.052)	0.030 (0.042)
Bargained minimum wage	-13.102*** (1.042)	-11.966*** (1.369)	-12.925*** (1.092)	-12.150*** (1.418)	-7.608*** (1.366)	-2.366 (3.211)	-12.149*** (1.000)	-10.914*** (1.222)	-11.971*** (1.084)	-10.920*** (1.302)	-5.412*** (1.107)	-2.920 (2.108)
Subnational minimum	15.013*** (1.359)	20.479*** (1.609)	16.426*** (1.483)	19.864*** (1.787)	7.408*** (2.288)	-1.736 (5.186)	17.387*** (1.432)	21.777*** (1.565)	18.711*** (1.590)	21.009*** (1.734)	6.526*** (1.763)	0.617 (5.687)
Youth subminimum	9.068*** (1.421)	5.301*** (1.424)	8.740*** (1.362)	5.439*** (1.436)	-8.923*** (2.464)	-4.948 (3.991)	10.002*** (1.320)	7.748*** (1.278)	9.689*** (1.301)	7.922*** (1.268)	-7.480*** (1.970)	-4.158 (3.720)
Constant	37.324*** (4.963)	35.248*** (4.783)	41.857*** (5.391)	38.497*** (6.197)	75.641*** (5.003)	31.579*** (9.404)	40.740*** (4.749)	41.490*** (4.667)	45.106*** (5.304)	45.652*** (6.238)	82.059*** (4.116)	32.738*** (8.774)
MW elasticity	-0.265***	-0.206***	-0.206***	-0.213***	-0.005	-0.037	-0.240***	-0.208***	-0.190**	-0.224***	0.010	-0.025
Country Effects	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CS Time Trends	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
R-squared	0.679	0.936	0.714	0.940	0.986		0.696	0.948	0.726	0.952	0.989	
Prob>F/Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman/Sargan test					0.000	0.749					0.000	0.651
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note: Same notes as in table 7.

Table 12. Estimates of the model using international evidence for those aged 60-64 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
Lagged Y1						0.677*** (0.050)						
Lagged Y2												0.682*** (0.048)
Relative Cohort Size	69.483 (42.086)	136.012*** (39.328)	5.341 (49.742)	112.231** (45.151)	64.976*** (20.675)	17.091 (17.144)	82.119** (41.141)	147.825*** (39.500)	21.539 (49.015)	129.335*** (45.519)	71.382*** (20.886)	20.207 (17.084)
MW ratio (Lagged)	-54.041*** (8.855)	-12.542 (7.995)	-45.425*** (9.824)	-17.017** (8.440)	-3.327 (6.086)	-3.762 (5.231)	-57.041*** (9.096)	-13.933* (8.169)	-48.271*** (10.087)	-18.302** (8.740)	-3.514 (6.175)	-4.682 (5.187)
GDP growth (lagged)	0.143 (0.258)	0.240** (0.108)	0.117 (0.252)	0.209 (0.135)	-0.0002 (0.066)	0.104** (0.052)	0.067 (0.259)	0.160 (0.114)	0.046 (0.255)	0.131 (0.147)	-0.087 (0.071)	0.057 (0.051)
Labor Standards Index	3.305*** (0.566)	0.969 (0.597)	3.135*** (0.529)	0.762 (0.579)	0.122 (0.817)	-0.435 (2.362)	3.531*** (0.567)	1.222** (0.618)	3.379*** (0.534)	1.041* (0.599)	0.612 (0.898)	0.826 (2.137)
Employment Protection	1.563** (0.675)	4.025*** (0.407)	2.852*** (0.672)	4.057*** (0.435)	2.020*** (0.767)	0.363 (0.504)	1.491** (0.679)	3.731*** (0.419)	2.749*** (0.685)	3.724*** (0.458)	1.422** (0.706)	0.224 (0.495)
Active Labor Market Policies	-11.071*** (2.180)	-6.007*** (1.443)	-11.354*** (1.924)	-5.261*** (1.566)	-2.673*** (0.807)	-1.663** (0.679)	-11.633*** (2.216)	-5.963*** (1.537)	-11.990*** (1.961)	-5.408*** (1.638)	-2.105** (0.838)	-1.655** (0.674)
Union Density	0.271*** (0.049)	0.220*** (0.040)	0.336*** (0.041)	0.209*** (0.040)	-0.150*** (0.057)	-0.144*** (0.039)	0.268*** (0.048)	0.198*** (0.042)	0.333*** (0.040)	0.190*** (0.040)	-0.164*** (0.057)	-0.146*** (0.038)
UI Replacement Rate	-0.490*** (0.084)	-0.519*** (0.069)	-0.509*** (0.080)	-0.528*** (0.069)	0.008 (0.055)	0.031 (0.042)	-0.505*** (0.086)	-0.558*** (0.071)	-0.522*** (0.082)	-0.563*** (0.070)	0.003 (0.056)	0.024 (0.042)
Bargained minimum wage	-13.685*** (1.288)	-13.341*** (1.709)	-14.317*** (1.218)	-13.005*** (1.744)	-10.857*** (1.136)	-1.864 (7.628)	-14.235*** (1.263)	-13.718*** (1.752)	-14.904*** (1.204)	-13.478*** (1.800)	-11.707*** (1.208)	-1.634 (4.689)
Subnational minimum	13.426*** (1.396)	18.219*** (2.437)	15.679*** (1.491)	16.695*** (2.415)	15.886*** (2.065)	1.468 (6.374)	15.014*** (1.416)	19.999*** (2.513)	17.317*** (1.526)	18.565*** (2.488)	18.076*** (2.201)	6.395 (6.527)
Youth subminimum	15.432*** (1.524)	6.145*** (1.247)	14.570*** (1.301)	6.104*** (1.119)	-11.067*** (2.402)	-5.345 (3.492)	16.678*** (1.480)	8.006*** (1.302)	15.843*** (1.270)	8.009*** (1.118)	-10.066*** (2.446)	-3.796 (3.220)
Constant	45.061*** (5.784)	15.086** (6.285)	39.501*** (7.086)	22.117*** (6.982)	41.652*** (4.128)	21.525*** (7.382)	46.580*** (5.708)	16.815*** (6.338)	40.951*** (7.055)	23.598*** (7.036)	43.446*** (4.289)	18.532** (7.257)
MW elasticity	-0.817***	-0.190	-0.686***	-0.257**	-0.050	-0.057	-0.825***	-0.201*	-0.698***	-0.265**	-0.051	-0.067
Country Effects	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CS Time Trends	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
R-squared	0.715	0.953	0.772	0.957	0.989		0.744	0.956	0.795	0.960	0.990	
Prob>F/Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman/Sargan test					0.000	0.397					0.000	0.391
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note: Same notes as in table 7.

Table 13. Estimates of the model using international evidence for those aged 55-64 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
Lagged Y1						0.706*** (0.043)						
Lagged Y2												0.693*** (0.043)
Relative Cohort Size	110.707*** (15.877)	96.272*** (14.800)	40.167** (18.473)	80.636*** (20.664)	19.341* (10.528)	-2.807 (8.420)	108.439*** (15.528)	101.392*** (14.358)	41.096** (18.065)	89.062*** (20.047)	17.038* (9.996)	-0.978 (7.947)
MW ratio (Lagged)	-35.570*** (8.246)	-15.032** (6.844)	-28.952*** (9.297)	-17.823** (7.399)	1.473 (5.716)	-1.749 (4.188)	-36.278*** (8.505)	-16.023** (6.281)	-29.934*** (9.669)	-18.873*** (6.878)	2.591 (5.319)	-0.953 (3.977)
GDP growth (lagged)	0.113 (0.224)	0.230** (0.099)	-0.092 (0.217)	0.146 (0.109)	-0.039 (0.060)	0.105** (0.041)	-0.011 (0.213)	0.110 (0.089)	-0.186 (0.208)	0.041 (0.101)	-0.125** (0.057)	0.024 (0.040)
Labor Standards Index	3.910*** (0.549)	2.428*** (0.470)	3.543*** (0.513)	2.235*** (0.457)	-2.431*** (0.830)	-1.396 (2.603)	4.134*** (0.538)	2.846*** (0.443)	3.801*** (0.511)	2.699*** (0.428)	-2.213*** (0.808)	-2.400 (5.139)
Employment Protection	-1.586*** (0.588)	1.292*** (0.392)	0.334 (0.619)	1.498*** (0.404)	1.704*** (0.643)	0.139 (0.405)	-1.655*** (0.578)	0.665* (0.350)	0.182 (0.632)	0.803** (0.380)	0.869 (0.561)	0.073 (0.375)
Active Labor Market Policies	-7.624*** (2.067)	-4.590*** (1.264)	-7.196*** (1.820)	-3.882*** (1.392)	-1.847** (0.736)	-1.405*** (0.540)	-8.406*** (2.091)	-4.441*** (1.213)	-8.109*** (1.866)	-4.004*** (1.339)	-1.293* (0.669)	-1.014** (0.509)
Union Density	0.240*** (0.043)	0.247*** (0.035)	0.280*** (0.040)	0.235*** (0.036)	-0.210*** (0.048)	-0.126*** (0.031)	0.213*** (0.042)	0.192*** (0.033)	0.253*** (0.039)	0.184*** (0.033)	-0.229*** (0.043)	-0.139*** (0.029)
UI Replacement Rate	-0.285*** (0.077)	-0.406*** (0.061)	-0.364*** (0.077)	-0.436*** (0.064)	0.085* (0.051)	0.084** (0.035)	-0.264*** (0.080)	-0.426*** (0.062)	-0.336*** (0.081)	-0.447*** (0.063)	0.067 (0.049)	0.072** (0.033)
Bargained minimum wage	-14.539*** (1.105)	-14.378*** (1.522)	-14.154*** (1.058)	-13.923*** (1.718)	-9.291*** (1.223)	-4.303 (4.715)	-14.294*** (1.052)	-14.235*** (1.448)	-13.934*** (1.033)	-13.874*** (1.648)	-8.752*** (1.138)	-3.408 (8.096)
Subnational minimum	14.793*** (1.267)	20.117*** (1.878)	16.648*** (1.383)	18.883*** (2.045)	11.397*** (2.239)	-3.556 (6.803)	16.799*** (1.298)	21.766*** (1.845)	18.628*** (1.436)	20.659*** (1.980)	12.306*** (2.066)	-3.307 (11.680)
Youth subminimum	12.093*** (1.444)	5.803*** (1.200)	11.447*** (1.261)	5.872*** (1.163)	-11.348*** (2.179)	-5.987 (3.994)	13.171*** (1.349)	7.983*** (1.115)	12.553*** (1.203)	8.101*** (1.034)	-9.817*** (1.953)	-6.461 (4.549)
Constant	33.112*** (5.291)	19.280*** (5.359)	37.532*** (5.820)	25.887*** (7.163)	60.118*** (4.598)	27.349** (10.576)	35.506*** (5.184)	22.509*** (5.256)	39.794*** (5.736)	28.660*** (6.971)	63.490*** (4.153)	31.422** (15.784)
MW elasticity	-0.389***	-0.164**	-0.316***	-0.195**	0.016	-0.019	-0.377***	-0.167**	-0.311***	-0.196***	0.027	-0.010
Country Effects	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CS Time Trends	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
R-squared	0.695	0.951	0.756	0.954	0.989		0.724	0.960	0.779	0.963	0.991	
Prob>F/Prob>chi2	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Hausman/Sargan test					0.000	0.420					0.000	0.318
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note: Same notes as in table 7.

In tables 14 to 20, we use the alternative business circle indicators and we present only the estimation results of our interest, i.e. the minimum wage coefficients and elasticities, and it has to be noted that the regressions have been conducted for the full set of controls. As we can see from these seven tables, the previous results when we use all the possible business circle indicators stand.

More specifically, for teenagers, young adults and youth the positive impact of minimum wages on employment measures still exists which provides robustness to the model. In most cases the estimations of the minimum wage coefficients together with their elasticities are positive and statistically significant. Moreover, the R-squares are very high which is a good sign of the reliability of the model as the variability of the dependent variables used can be explained by the independent to a very high degree.

For those belonging to the prime-age part of the total population, we can see some weak evidence of negative employment effects of minimum wages. However, when country fixed effects are included or the dynamic version of the model is estimated, then statistically insignificant results are provided.

On the other hand, for the older group being over 55 years old, we have stronger evidence of adverse employment effects but, once again, the inclusion of country fixed effects and dynamic estimations turn the estimation results into insignificant ones.

Finishing this section we have to report that in all tables in this section (table 7 to 20) the values of R-squares are very high, which is a very positive sign of the good specification of the model and our results that minimum wages have positive effect on the young population but negative for the older seem to be robust in almost all specifications.

Table 14. Robustness checks using alternative demand side controls (four different business cycle indicators) for 15-19 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
1. Using value of GDP growth (lagged)												
MW Ratio (Lagged)	41.116*** (15.333)	49.442*** (15.090)	44.271*** (13.869)	51.386*** (14.567)	7.373 (9.257)	5.092 (6.393)	48.113*** (16.452)	64.802*** (16.314)	52.698*** (14.059)	64.208*** (15.363)	26.047*** (8.959)	9.804 (6.379)
MW elasticity	0.648***	0.779***	0.697***	0.809***	0.116	0.080	0.624***	0.841***	0.684***	0.833***	0.338***	0.127
R²	0.691	0.935	0.716	0.944	0.984		0.698	0.943	0.738	0.949	0.989	
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	38.275** (15.331)	52.041*** (14.714)	41.325*** (13.966)	51.933*** (14.350)	9.079 (9.499)	6.084 (6.364)	44.706*** (16.404)	65.484*** (16.118)	49.244*** (14.234)	63.128*** (15.475)	26.400*** (8.945)	11.359 (8.610)
MW elasticity	0.603**	0.820***	0.651***	0.818***	0.143	0.096	0.580***	0.850***	0.639***	0.819***	0.342***	0.148
R²	0.694	0.934	0.720	0.943	0.984		0.703	0.943	0.742	0.949	0.989	
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	41.115*** (15.349)	52.958*** (14.498)	43.809*** (13.938)	52.438*** (14.188)	7.985 (9.462)	4.778 (6.357)	48.094*** (16.474)	65.906*** (16.063)	52.169*** (14.186)	62.931*** (15.387)	26.002*** (8.985)	10.411* (6.285)
MW elasticity	0.648***	0.834***	0.690***	0.826***	0.125	0.075	0.624***	0.855***	0.677***	0.817***	0.337***	0.135*
R²	0.691	0.934	0.719	0.944	0.984		0.699	0.943	0.739	0.949	0.989	
4. Using Prime age unemployment rate												
MW Ratio (Lagged)	36.626** (15.250)	43.975*** (14.651)	39.044*** (13.376)	44.424*** (14.237)	1.478 (8.774)	2.536 (5.732)	47.779*** (16.782)	62.195*** (16.618)	50.443*** (14.352)	60.524*** (15.910)	22.229** (8.859)	9.887 (6.160)
MW elasticity	0.577**	0.693***	0.615***	0.700***	0.023	0.040	0.620***	0.807***	0.654***	0.785***	0.288**	0.129
R²	0.707	0.944	0.744	0.949	0.988		0.698	0.944	0.742	0.950	0.990	
5. Using Prime age male unemployment rate												
MW Ratio (Lagged)	40.467*** (15.405)	47.730*** (14.755)	43.749*** (13.564)	47.860*** (14.409)	8.210 (8.097)	7.460 (5.414)	48.467*** (16.537)	62.682*** (15.748)	52.520*** (14.162)	25.932*** (8.813)	25.932*** (8.813)	12.256** (6.024)
MW elasticity	0.637***	0.752***	0.689***	0.754***	0.129	0.118	0.629***	0.813***	0.681***	0.336***	0.336***	0.159**
R²	0.706	0.943	0.739	0.948	0.990		0.698	0.949	0.740	0.990	0.990	
CE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
YE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CSTT	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is the same as it is noted in table 7.

Note 2: Hubert-White robust standard errors are given in parenthesis.

Note 3: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Table 15. Robustness checks using alternative demand side controls (four different business cycle indicators) for 20-24 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
1. Using value of GDP growth (lagged)												
MW Ratio (Lagged)	27.980*** (10.402)	17.788* (9.868)	22.906** (9.417)	19.343** (9.419)	14.385* (7.358)	2.173 (7.271)	22.924*** (6.304)	12.476** (6.225)	17.106*** (4.745)	10.768* (5.716)	23.348*** (6.236)	9.202 (6.516)
MW elasticity	0.221***	0.140*	0.181**	0.153**	0.113*	0.017	0.156***	0.085**	0.117***	0.073*	0.159***	0.062
R²	0.721	0.898	0.758	0.912	0.970		0.778	0.920	0.843	0.930	0.960	
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	27.369** (10.602)	22.690** (10.160)	23.336** (9.784)	23.506** (9.604)	17.475** (7.919)	2.475 (7.452)	22.322*** (6.342)	13.867** (6.167)	17.161*** (4.835)	11.819** (5.684)	23.600*** (6.241)	9.587 (6.544)
MW elasticity	0.216**	0.179**	0.184**	0.186**	0.138**	0.019	0.152***	0.094***	0.117***	0.080**	0.161***	0.065
R²	0.710	0.887	0.746	0.905	0.969		0.777	0.918	0.839	0.930	0.960	
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	27.876*** (10.568)	23.500** (9.682)	22.916** (9.760)	24.386*** (9.049)	15.738** (7.763)	0.275 (7.334)	22.860*** (6.318)	13.990** (6.024)	17.209*** (4.827)	11.790** (5.616)	23.534*** (6.228)	9.080 (6.484)
MW elasticity	0.220***	0.186**	0.181**	0.193***	0.124**	0.002	0.156***	0.095**	0.117***	0.080**	0.160***	0.061
R²	0.717	0.893	0.755	0.913	0.970		0.777	0.919	0.841	0.930	0.960	
4. Using Prime age unemployment rate												
MW Ratio (Lagged)	14.164** (6.963)	7.520* (3.944)	9.865* (5.951)	7.377* (3.994)	11.731** (5.775)	3.796 (6.270)	18.712*** (5.382)	9.276* (5.215)	13.397*** (3.948)	7.060 (5.004)	22.801*** (6.193)	9.426 (6.555)
MW elasticity	0.112**	0.059*	0.078*	0.058*	0.092*	0.029	0.127***	0.063*	0.091***	0.048	0.155***	0.064
R²	0.892	0.972	0.915	0.974	0.983		0.807	0.932	0.866	0.939	0.961	
5. Using Prime age male unemployment rate												
MW Ratio (Lagged)	23.113*** (8.608)	13.786** (5.668)	18.459** (7.527)	13.198** (5.326)	16.822*** (5.440)	8.543 (6.068)	21.472*** (5.859)	11.313** (5.721)	15.996*** (4.336)	8.991* (5.342)	23.460*** (6.213)	10.182 (6.529)
MW elasticity	0.182***	0.109**	0.146**	0.104**	0.133***	0.067	0.146***	0.077**	0.109***	0.061*	0.160***	0.069
R²	0.886	0.968	0.910	0.971	0.985		0.805	0.929	0.865	0.937	0.961	
CE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
YE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CSTT	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is the same as it is noted in table 7.

Note 2: Hubert-White robust standard errors are given in parenthesis.

Note 3: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Table 16. Robustness checks using alternative demand side controls (four different business cycle indicators) for 15-24 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
1. Using value of GDP growth (lagged)												
MW Ratio (Lagged)	33.893*** (11.734)	29.718*** (11.312)	36.953*** (9.861)	31.926*** (10.832)	4.568 (7.854)	2.139 (6.336)	30.253*** (10.382)	31.824*** (10.550)	34.520*** (7.813)	30.375*** (9.669)	15.990** (6.905)	4.829 (6.128)
MW elasticity	0.352***	0.309***	0.384***	0.332***	0.047	0.022	0.267***	0.281***	0.305***	0.268***	0.141**	0.042
R²	0.747	0.931	0.783	0.942	0.978		0.756	0.945	0.812	0.951	0.982	
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	32.048*** (11.842)	33.223*** (11.115)	35.283*** (10.034)	34.160*** (10.582)	6.831 (8.357)	2.179 (6.384)	22.322*** (6.342)	28.327*** (10.379)	32.888*** (7.892)	30.541*** (9.516)	16.387** (6.944)	5.029 (6.070)
MW elasticity	0.333***	0.345***	0.367***	0.355***	0.071	0.022	0.152***	0.250***	0.291***	0.270***	0.145**	0.044
R²	0.745	0.926	0.780	0.940	0.977		0.777	0.759	0.813	0.951	0.982	
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	33.497*** (11.817)	34.086*** (10.779)	36.219*** (9.994)	35.044*** (10.305)	5.364 (8.274)	-0.763 (6.267)	30.084*** (10.401)	33.057*** (10.249)	34.161*** (7.880)	30.539*** (9.449)	16.153** (6.954)	4.197 (6.012)
MW elasticity	0.348***	0.354***	0.376***	0.364***	0.055	-0.007	0.266***	0.292***	0.302***	0.270***	0.143**	0.037
R²	0.746	0.929	0.784	0.942	0.978		0.756	0.944	0.812	0.951	0.982	
4. Using Prime age unemployment rate												
MW Ratio (Lagged)	21.588** (10.521)	20.466** (8.922)	24.705*** (8.278)	21.125** (8.445)	0.868 (6.708)	-0.999 (5.427)	27.535*** (10.476)	28.700*** (10.420)	30.967*** (7.924)	26.894*** (9.612)	14.294** (6.871)	4.343 (7.327)
MW elasticity	0.224**	0.212**	0.257***	0.219**	0.009	-0.010	0.243***	0.254***	0.274***	0.238***	0.126**	0.038
R²	0.810	0.962	0.851	0.966	0.987		0.759	0.948	0.818	0.953	0.983	
5. Using Prime age male unemployment rate												
MW Ratio (Lagged)	28.174** (11.262)	26.881*** (9.314)	31.527*** (8.921)	26.660*** (8.946)	7.256 (5.932)	4.032 (4.893)	29.046*** (10.445)	30.904*** (10.440)	33.072*** (7.899)	28.702*** (9.650)	16.570** (6.726)	6.910 (6.898)
MW elasticity	0.293**	0.279***	0.328***	0.277***	0.075	0.041	0.257***	0.273***	0.292***	0.254***	0.146**	0.061
R²	0.809	0.961	0.849	0.964	0.989		0.759	0.947	0.817	0.952	0.984	
CE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
YE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CSTT	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is the same as it is noted in table 9.

Note 2: Hubert-White robust standard errors are given in parenthesis.

Note 3: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Table 17. Robustness checks using alternative demand side controls (four different business cycle indicators) for 25-54 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	FE	GMM	OLS	OLS	OLS	OLS	FE	GMM
1. Using value of GDP growth (lagged)												
MW Ratio (Lagged)	-0.122 (5.372)	-11.130* (6.093)	7.995 (5.691)	-12.495* (6.361)	-0.491 (4.045)	-2.659 (3.555)	-1.944 (3.713)	-15.833*** (4.659)	3.944 (3.910)	-17.493*** (5.294)	-3.392 (2.686)	-1.655 (2.857)
MW elasticity	-0.001	-0.072*	0.052	-0.081**	-0.003	-0.017	-0.012	-0.096***	0.024	-0.106***	-0.021	-0.010
R²	0.370	0.805	0.559	0.815	0.969		0.418	0.824	0.579	0.829	0.982	
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	0.141 (5.429)	-9.329 (6.542)	8.270 (5.739)	-10.481 (6.685)	0.605 (4.197)	-2.153 (3.549)	-1.819 (3.711)	-15.522*** (4.700)	4.150 (3.927)	-16.748*** (5.344)	-3.279 (2.634)	-1.621 (2.855)
MW elasticity	0.0009	-0.060	0.053	-0.067	0.003	-0.013	-0.011	-0.093***	0.025	-0.101***	-0.019	-0.009
R²	0.369	0.794	0.558	0.808	0.968		0.416	0.822	0.578	0.827	0.982	
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	-0.415 (5.301)	-8.405 (6.318)	7.583 (5.701)	-9.743 (6.492)	-0.228 (4.070)	-2.783 (3.568)	-2.364 (3.628)	-14.881*** (4.620)	3.747 (3.904)	-16.329*** (5.312)	-3.401 (2.638)	-1.631 (2.863)
MW elasticity	-0.002	-0.054	0.049	-0.063	-0.001	-0.017	-0.014	-0.090***	0.022	-0.098***	-0.020	-0.009
R²	0.378	0.800	0.561	0.814	0.970		0.415	0.822	0.577	0.827	0.982	
4. Using Prime age unemployment rate												
MW Ratio (Lagged)	-4.934 (3.071)	-17.813*** (4.431)	0.268 (3.396)	-19.703*** (5.076)	-2.594 (2.492)	-3.277 (2.478)	-4.307 (3.272)	-17.897*** (4.719)	1.245 (3.649)	-19.711*** (5.388)	-3.450 (2.647)	-2.173 (2.852)
MW elasticity	-0.031	-0.115***	0.001	-0.127***	-0.016	-0.021	-0.026	-0.108***	0.007	-0.119***	-0.020	-0.013
R²	0.725	0.911	0.784	0.914	0.989		0.506	0.840	0.610	0.845	0.982	
5. Using Prime age male unemployment rate												
MW Ratio (Lagged)	0.539 (3.845)	-13.246*** (4.280)	5.456 (4.303)	-15.972*** (4.708)	1.071 (2.257)	0.064 (2.306)	-2.096 (3.480)	-16.602*** (4.580)	2.955 (3.817)	-18.671*** (5.188)	-3.213 (2.572)	-1.845 (2.786)
MW elasticity	0.003	-0.085***	0.035	-0.103***	0.006	0.0004	-0.012	-0.100***	0.017	-0.113***	-0.019	-0.011
R²	0.675	0.911	0.749	0.915	0.991		0.482	0.844	0.599	0.850	0.983	
CE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
YE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CSTT	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Obs	311	311	311	311	311	293	311	311	311	311	311	293
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is the same as it is noted in table 9.

Note 2: Hubert-White robust standard errors are given in parenthesis.

Note 3: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Table 18. Robustness checks using alternative demand side controls (four different business cycle indicators) for 55-59 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
1. Using value of GDP growth (lagged)												
MW Ratio (Lagged)	-30.291*** (7.654)	-23.578*** (7.074)	-23.550** (9.038)	-24.411*** (7.334)	-0.545 (6.481)	-4.283 (5.292)	-28.915*** (8.000)	-25.051*** (6.086)	-22.906** (9.541)	-27.041*** (6.412)	1.166 (5.729)	-3.057 (4.937)
MW elasticity	-0.265***	-0.206***	-0.206***	-0.213***	-0.005	-0.037	-0.240***	-0.208***	-0.190**	-0.224***	0.010	-0.025
R²	0.679	0.936	0.714	0.940	0.986		0.696	0.948	0.726	0.952	0.989	
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	-28.725*** (7.696)	-22.499*** (7.347)	-21.768** (8.821)	-23.988*** (7.402)	-0.964 (6.401)	-3.947 (5.282)	-27.187*** (7.954)	-24.716*** (6.203)	-20.977** (9.232)	-27.258*** (6.410)	0.197 (5.638)	-2.652 (4.964)
MW elasticity	-0.251***	-0.196***	-0.190**	-0.209***	-0.008	-0.034	-0.225***	-0.204***	-0.173**	-0.225***	0.001	-0.021
R²	0.683	0.935	0.720	0.940	0.986		0.702	0.947	0.732	0.951	0.988	
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	-30.264*** (7.624)	-22.113*** (7.242)	-23.665*** (8.852)	-23.931*** (7.324)	-1.171 (6.378)	-4.175 (5.252)	-28.833*** (7.874)	-24.632*** (6.169)	-22.833** (9.233)	-27.528*** (6.422)	0.347 (5.611)	-2.617 (4.965)
MW elasticity	-0.264***	-0.193***	-0.206***	-0.209***	-0.010	-0.036	-0.238***	-0.204***	-0.189**	-0.228***	0.002	-0.021
R²	0.679	0.935	0.713	0.940	0.986		0.696	0.947	0.725	0.951	0.988	
4. Using Prime age unemployment rate												
MW Ratio (Lagged)	-38.349*** (6.195)	-31.848*** (5.234)	-34.264*** (7.256)	-35.909*** (5.501)	-4.616 (5.714)	-5.008 (4.942)	-34.760*** (7.153)	-30.471*** (5.392)	-30.708*** (8.490)	-34.922*** (5.720)	-0.817 (5.591)	-3.048 (4.935)
MW elasticity	-0.335***	-0.278***	-0.299***	-0.314***	-0.040	-0.043	-0.288***	-0.252***	-0.254***	-0.289***	-0.006	-0.025
R²	0.769	0.960	0.789	0.964	0.989		0.739	0.956	0.759	0.960	0.989	
5. Using Prime age male unemployment rate												
MW Ratio (Lagged)	-32.172*** (7.037)	-28.345*** (5.559)	-27.802*** (8.233)	-32.308*** (5.526)	-1.447 (5.703)	-2.480 (4.942)	-30.310*** (7.707)	-28.189*** (5.625)	-25.892*** (9.089)	-32.410*** (5.761)	0.113 (5.539)	-2.294 (4.935)
MW elasticity	-0.281***	-0.247***	-0.243***	-0.282***	-0.012	-0.021	-0.251***	-0.233***	-0.214***	-0.268***	0.0009	-0.018
R²	0.741	0.957	0.764	0.961	0.989		0.718	0.954	0.741	0.958	0.989	
CE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
YE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CSTT	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is the same as it is noted in table 7.

Note 2: Hubert-White robust standard errors are given in parenthesis.

Note 3: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Table 19. Robustness checks using alternative demand side controls (four different business circle indicators) for 60-64 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) FE	(6) GMM
1. Using value of GDP growth (lagged)												
MW Ratio (Lagged)	-54.041*** (8.855)	-12.542 (7.995)	-45.425*** (9.824)	-17.017** (8.440)	-3.327 (6.086)	-3.762 (5.231)	-57.041*** (9.096)	-13.933* (8.169)	-48.271*** (10.087)	-18.302** (8.740)	-3.514 (6.175)	-4.682 (5.187)
MW elasticity	-0.817***	-0.190	-0.686***	-0.257**	-0.050	-0.057	-0.825***	-0.201*	-0.698***	-0.265**	-0.051	-0.067
R²	0.715	0.953	0.772	0.957	0.989		0.744	0.956	0.795	0.960	0.990	
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	-52.706*** (8.942)	-12.393 (8.147)	-43.659*** (9.683)	-16.516* (8.513)	-3.171 (5.998)	-4.600 (5.215)	-55.569*** (9.130)	-14.106* (8.260)	-46.361*** (9.895)	-18.150** (8.735)	-3.895 (6.111)	-5.240 (5.185)
MW elasticity	-0.796***	-0.187	-0.659***	-0.249*	-0.047	-0.069	-0.803***	-0.203*	-0.670***	-0.262**	-0.056	-0.075
R²	0.717	0.953	0.776	0.957	0.989		0.746	0.956	0.800	0.959	0.989	
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	-54.016*** (8.915)	-10.948 (7.987)	-45.062*** (9.795)	-15.674* (8.353)	-3.795 (6.057)	-4.668 (5.142)	-56.944*** (9.106)	-12.866 (8.103)	-47.733*** (10.002)	-17.445** (8.613)	-4.259 (6.182)	-5.141 (5.147)
MW elasticity	-0.816***	-0.165	-0.680***	-0.236*	-0.057	-0.070	-0.823***	-0.186	-0.690***	-0.252**	-0.061	-0.073
R²	0.714	0.953	0.772	0.957	0.989		0.743	0.956	0.796	0.959	0.989	
4. Using Prime age unemployment rate												
MW Ratio (Lagged)	-61.555*** (7.152)	-16.357** (7.015)	-56.124*** (8.039)	-21.472*** (7.542)	-5.877 (5.833)	-5.515 (5.027)	-63.931*** (7.617)	-17.362** (7.515)	-57.856*** (8.569)	-22.333*** (8.151)	-6.072 (6.191)	-5.649 (5.108)
MW elasticity	-0.930***	-0.247**	-0.848***	-0.324***	-0.088	-0.082	-0.924***	-0.250**	-0.836***	-0.322***	-0.087	-0.081
R²	0.798	0.964	0.827	0.968	0.991		0.807	0.962	0.835	0.966	0.990	
5. Using Prime age male unemployment rate												
MW Ratio (Lagged)	-55.591*** (8.083)	-14.265** (6.913)	-50.376*** (8.888)	-19.722*** (7.290)	-3.245 (5.632)	-3.329 (5.045)	-58.454*** (8.486)	-15.595** (7.462)	-52.577*** (9.323)	-20.822** (7.987)	-3.944 (6.035)	-4.224 (5.138)
MW elasticity	-0.840***	-0.215**	-0.761***	-0.298***	-0.049	-0.050	-0.845***	-0.225**	-0.760***	-0.301***	-0.057	-0.060
R²	0.781	0.964	0.816	0.968	0.991		0.791	0.962	0.826	0.966	0.990	
CE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
YE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CSTT	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is the same as it is noted in table 7.

Note 2: Hubert-White robust standard errors are given in parenthesis.

Note 3: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

Table 20. Robustness checks using alternative demand side controls (four different business cycle indicators) for 55-64 years old.

	Y1 = Employment to Population ratio						Y2 = Labor Force Participation Rate					
	(1)	(2)	(3)	(4)	(5)	(6)	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	FE	GMM	OLS	OLS	OLS	OLS	FE	GMM
1. Using value of GDP growth (lagged)												
MW Ratio (Lagged)	-35.570*** (8.246)	-15.032** (6.844)	-28.952*** (9.297)	-17.823** (7.399)	1.473 (5.716)	-1.749 (4.188)	-36.278*** (8.505)	-16.023** (6.281)	-29.934*** (9.669)	-18.873*** (6.878)	2.591 (5.319)	-0.953 (3.977)
MW elasticity	-0.389***	-0.164**	-0.316***	-0.195**	0.016	-0.019	-0.377***	-0.167**	-0.311***	-0.196***	0.027	-0.010
R²	0.695	0.951	0.756	0.954	0.989		0.724	0.960	0.779	0.963	0.991	
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	-34.131*** (8.353)	-14.242** (7.118)	-27.047*** (9.139)	-17.148** (7.484)	1.313 (5.677)	-1.651 (4.162)	-34.644*** (8.536)	-15.746** (6.441)	-27.864*** (9.442)	-18.691*** (6.907)	1.856 (5.296)	-0.680 (3.979)
MW elasticity	-0.373***	-0.155**	-0.295***	-0.187**	0.014	-0.017	-0.360***	-0.163**	-0.289***	-0.194***	0.019	-0.007
R²	0.697	0.950	0.761	0.954	0.989		0.728	0.959	0.785	0.963	0.990	
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)												
MW Ratio (Lagged)	-35.549*** (8.286)	-13.542* (6.954)	-28.649*** (9.197)	-16.831** (7.334)	0.917 (5.681)	-1.958 (4.114)	-36.130*** (8.473)	-15.311** (6.336)	-29.427*** (9.487)	-18.609*** (6.836)	1.774 (5.299)	-0.797 (3.959)
MW elasticity	-0.388***	-0.148*	-0.313***	-0.183**	0.010	-0.021	-0.375***	-0.159**	-0.305***	-0.193***	0.018	-0.008
R²	0.694	0.950	0.756	0.954	0.989		0.724	0.959	0.780	0.963	0.990	
4. Using Prime age unemployment rate												
MW Ratio (Lagged)	-45.563*** (6.485)	-21.429*** (5.003)	-40.989*** (7.408)	-24.907*** (5.722)	-2.520 (5.170)	-2.967 (3.863)	-44.488*** (7.220)	-21.047*** (5.293)	-39.627*** (8.327)	-24.595*** (5.987)	-0.377 (5.242)	-1.372 (3.905)
MW elasticity	-0.497***	-0.234***	-0.447***	-0.272***	-0.027	-0.032	-0.462***	-0.218***	-0.411***	-0.255***	-0.003	-0.014
R²	0.794	0.970	0.830	0.974	0.991		0.788	0.969	0.824	0.973	0.991	
5. Using Prime age male unemployment rate												
MW Ratio (Lagged)	-38.713*** (7.418)	-18.498*** (5.176)	-34.299*** (8.390)	-22.465*** (5.682)	0.485 (5.102)	-0.605 (3.891)	-38.757*** (7.979)	-18.809*** (5.464)	-34.001*** (9.059)	-22.656*** (6.016)	1.415 (5.191)	-0.191 (3.926)
MW elasticity	-0.423***	-0.202***	-0.374***	-0.245***	0.005	-0.006	-0.402***	-0.195***	-0.353***	-0.235***	0.014	-0.001
R²	0.768	0.969	0.810	0.972	0.992		0.766	0.968	0.807	0.972	0.991	
CE	No	No	No	No	Yes	Yes	No	No	No	No	Yes	Yes
YE	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
CSTT	No	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	Yes
Obs	308	308	308	308	308	290	308	308	308	308	308	290
Countries	17	17	17	17	17	17	17	17	17	17	17	17

Note 1: The sample period is the same as it is noted in table 7.

Note 2: Hubert-White robust standard errors are given in parenthesis.

Note 3: *Statistically significant at the 0.10 level, ** at the 0.05 level, *** at the 0.01 level.

6. Accounting for differences in minimum wage effects in periods of economic downturn and growth

In this section we add into the model interactions to distinguish between minimum wage effects on employment in periods of economic downturn respect from periods of economic growth. It is essential in our analysis to take into account that there is variation across countries in periods of downturn and that countries are entering and exiting from global recessions in different stages as countries are facing different periods of economic downturn and there is differentiation in the time span of global recessions across countries.

Tables 21 to 27 present the results of the impact of minimum wages on employment to population ratios and labor force participation rates for all age groups using different specifications. In column (1) we present the OLS results of our analysis and in columns (2) we add into the analysis country specific time trends. In column (3) we also add year effects and in column (4) we further include fixed country effect to use all three effects. In column (5) we present the dynamic version of the model and again in all specifications, controls for other labor market institutions and the different characteristics of minimum wage systems are included.

Results for teenagers, young adults and youth are presented in tables 21, 22 and 23, respectively, where it is shown that the estimated coefficients of minimum wage ratios are positive. Moreover, all the Hausman tests indicate that fixed effects should be used in the model specifications and all GMM estimations provide statistically insignificant results. Concerning the downturn variable, for teenagers when we employ the first three measures of business cycle indicators we generally have insignificant coefficients of the interaction terms, showing that we do not have strong evidence that the employment effects of minimum wage vary in the periods of

economic growth or downturn of the economy. For young adults, when we use the first three business cycle indicators, the interaction coefficients are rarely significant and the same goes for the youth. However, when prime-age unemployment rates and prime-age male unemployment rates are used as business cycle controllers, the interaction coefficients of them and the minimum wage ratios are clearly negative and statistically significant for both teenagers and youth, suggesting that an increase in the minimum wage in a period of economic downturn decreases the employment effect of minimum wages for these two age groups.

For those aged 25-54 the results are presented in table 24. It can be derived that only poor evidence of negative minimum wage effects exist and the phase the economy is going through does not affect the minimum wage impact when we employ the first three measures of economic status. Nevertheless, when we use the two unemployment measures we see that the interaction terms provide negative and in most cases statistical results indicating that the effect of minimum wages on employment measures decreases when the unemployment rates increase.

For the older part of the population aged over 55 years, tables 25 to 27 show that the negative minimum wage effects hold, but generally, the economic phase of the economy does alter the magnitude of the impact. The only exception is when we employ the prime-age male unemployment rate as a business cycle indicator when the coefficient of the interaction term seems to be positive. This implies that the negative effects of minimum wages on employment measures strengthen for the older in periods of economic downturn.

Table 21. Differences in employment measures impact of minimum wages by periods of economic downturn for teenagers (15-19 years).

	Y1 = Employment to Population ratio					Y2 = Labor Force Participation Rate				
	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)
1. Using value of GDP growth (lagged)										
MW Ratio (Lagged)	74.072*** (18.884)	54.934*** (14.448)	55.760*** (13.421)	5.576 (10.274)	5.502 (6.431)	90.637*** (20.212)	71.242*** (15.030)	68.120*** (13.550)	22.969** (9.668)	10.119 (6.361)
MW ratio*GDP growth (Lagged)	-11.664*** (3.665)	-1.691 (2.551)	-1.295 (2.729)	0.599 (0.846)	-0.718 (0.618)	-15.051*** (4.337)	-1.983 (2.922)	-1.158 (3.018)	1.027 (0.736)	-0.636 (0.613)
R-squared	0.704	0.935	0.944	0.984		0.716	0.943	0.949	0.989	
Hausman/Sargan test				0.000	0.030				0.000	0.152
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	31.285** (15.700)	50.154*** (15.061)	49.457*** (14.535)	9.955 (9.418)	5.202 (6.407)	35.006** (16.939)	62.999*** (16.565)	60.106*** (15.723)	27.258*** (8.929)	10.171 (6.273)
MW ratio*Downturn (Lagged)	42.482*** (15.531)	9.760 (11.256)	13.806 (10.505)	-4.931 (3.859)	0.127 (2.704)	58.953*** (18.309)	12.845 (12.938)	16.849 (11.780)	-4.829 (3.158)	1.190 (2.667)
R-squared	0.701	0.934	0.944	0.984		0.713	0.943	0.950	0.989	
Hausman/Sargan test				0.000	0.000				0.000	0.054
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	39.092** (15.543)	53.510*** (14.551)	52.772*** (14.253)	8.611 (9.387)	4.869 (6.378)	45.318*** (16.749)	66.357*** (16.213)	63.153*** (15.534)	26.493*** (8.966)	10.092 (6.310)
MW ratio*Downturn (Lagged)	29.311 (22.895)	-8.084 (9.602)	-5.464 (9.868)	-8.092** (3.935)	-1.336 (3.376)	40.229 (27.266)	-6.598 (10.120)	-3.636 (10.547)	-6.348* (3.397)	1.896 (3.369)
R-squared	0.693	0.934	0.944	0.984		0.701	0.943	0.949	0.989	
Hausman/Sargan test				0.000	0.001				0.000	0.064
4. Using Prime age unemployment rate										
MW Ratio (Lagged)	138.905*** (27.129)	122.575*** (23.881)	117.051*** (23.241)	15.088 (11.216)	7.301 (8.626)	155.791*** (31.933)	135.450*** (28.213)	128.642*** (26.818)	18.220 (11.726)	3.551 (9.394)
MW ratio (lagged)*Prime age un. rate	-16.721*** (3.524)	-14.695*** (2.252)	-13.829*** (2.259)	-2.110 (1.285)	-0.638 (0.877)	-17.658*** (4.088)	-13.695*** (2.674)	-12.970*** (2.593)	0.621 (1.314)	0.832 (0.949)
R-squared	0.737	0.958	0.961	0.988		0.725	0.954	0.958	0.990	
Hausman/Sargan test				0.000	0.000				0.000	0.055
5. Using Prime age male unemployment rate										
MW Ratio (Lagged)	122.057*** (23.506)	111.181*** (21.607)	105.702*** (21.637)	18.176* (10.042)	10.127 (7.536)	139.857*** (26.143)	125.229*** (24.738)	117.787*** (24.135)	27.044** (11.421)	8.895 (8.477)
MW ratio (lagged)*Prime age male un. rate	-15.864*** (2.940)	-13.244*** (2.177)	-12.231*** (2.260)	-1.669 (1.058)	-0.401 (0.789)	-17.769*** (3.329)	-12.696*** (2.451)	-11.652*** (2.471)	-0.186 (1.178)	0.492 (0.877)
R-squared	0.732	0.954	0.957	0.990		0.725	0.952	0.956	0.990	
Hausman/Sargan test				0.000	0.000				0.000	0.046
Country Effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
CS Time Trends	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Obs	308	308	308	308	290	308	308	308	308	290

Note 1: See notes of table 7.

Note 2: Regressions include the full set of controls.

Table 22. Differences in employment measures impact of minimum wages by periods of economic downturn for teenagers (20-24 years).

	Y1 = Employment to Population ratio					Y2 = Labor Force Participation Rate				
	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)
1. Using value of GDP growth (lagged)										
MW Ratio (Lagged)	22.714* (12.169)	17.289 (11.170)	17.803 (11.336)	12.285 (8.170)	0.897 (7.327)	23.135*** (7.161)	10.509* (6.302)	6.420 (6.410)	19.527*** (6.871)	9.031 (6.499)
MW ratio*GDP growth (Lagged)	1.875 (2.082)	0.153 (1.271)	0.454 (1.417)	0.722 (0.867)	-0.017 (0.709)	-0.075 (1.476)	0.604 (0.802)	1.283 (0.843)	1.314** (0.663)	-0.156 (0.629)
R-squared	0.722	0.898	0.912	0.970		0.778	0.920	0.931	0.961	
Hausman/Sargan test				0.000	0.389				0.000	0.616
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	29.791*** (10.945)	23.256** (10.310)	23.952** (9.732)	17.717** (7.922)	0.660 (7.506)	22.935*** (6.538)	14.185** (6.299)	12.136** (5.802)	24.266*** (6.266)	9.225 (6.543)
MW ratio*Downturn (Lagged)	-18.112** (8.438)	-2.959 (5.854)	-2.531 (7.427)	-1.355 (4.259)	1.385 (3.179)	-4.581 (4.449)	-1.660 (2.571)	-1.798 (3.384)	-3.740 (3.248)	1.449 (2.723)
R-squared	0.713	0.887	0.906	0.969		0.777	0.918	0.930	0.960	
Hausman/Sargan test				0.000	0.097				0.000	0.651
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	27.988** (10.734)	23.463** (9.706)	24.283*** (9.076)	16.177** (7.771)	0.327 (7.377)	22.664*** (6.396)	13.895** (6.038)	11.706** (5.643)	23.884*** (6.254)	8.966 (6.529)
MW ratio*Downturn (Lagged)	-1.756 (10.462)	0.509 (6.319)	1.601 (7.192)	-4.634 (3.219)	-0.728 (3.878)	3.070 (5.568)	1.311 (2.740)	1.310 (3.241)	-3.690 (2.508)	0.680 (3.416)
R-squared	0.717	0.893	0.913	0.970		0.777	0.919	0.930	0.960	
Hausman/Sargan test				0.000	0.053				0.000	0.558
4. Using Prime age unemployment rate										
MW Ratio (Lagged)	29.820*** (8.761)	8.906 (5.904)	7.439 (6.415)	20.734*** (7.825)	6.859 (9.449)	18.279** (8.030)	5.298 (7.186)	2.621 (7.196)	12.189 (8.724)	-6.077 (9.698)
MW ratio (lagged)*Prime age un. rate	-2.432** (1.186)	-0.259 (0.909)	-0.011 (0.964)	-1.436 (1.014)	-0.534 (0.965)	0.067 (1.069)	0.743 (1.015)	0.845 (1.097)	1.692 (1.139)	2.092** (0.983)
R-squared	0.894	0.972	0.974	0.983		0.807	0.932	0.940	0.961	
Hausman/Sargan test				0.000	0.014				0.000	0.687
5. Using Prime age male unemployment rate										
MW Ratio (Lagged)	30.539*** (11.013)	11.182* (6.399)	8.937 (6.492)	17.902** (7.110)	9.405 (8.456)	25.217*** (7.962)	8.769 (7.013)	4.303 (7.065)	19.614** (8.164)	3.954 (8.971)
MW ratio (lagged)*Prime age male un. rate	-1.412 (1.063)	0.542 (0.813)	0.899 (0.886)	-0.182 (0.774)	-0.243 (0.876)	-0.712 (0.917)	0.530 (0.869)	0.989 (0.980)	0.651 (0.966)	0.924 (0.924)
R-squared	0.887	0.968	0.971	0.985		0.805	0.930	0.937	0.961	
Hausman/Sargan test				0.000	0.011				0.000	0.632
Country Effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
CS Time Trends	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Obs	308	308	308	308	290	308	308	308	308	290

Note 1: See notes of table 7.

Note 2: Regressions include the full set of controls.

Table 23. Differences in employment measures impact of minimum wages by periods of economic downturn for youth (15-24 years).

	Y1 = Employment to Population ratio					Y2 = Labor Force Participation Rate				
	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)
1. Using value of GDP growth (lagged)										
MW Ratio (Lagged)	46.897*** (13.907)	31.114*** (11.071)	32.510*** (10.410)	2.228 (8.991)	2.326 (6.269)	50.662*** (12.573)	32.771*** (9.438)	29.082*** (8.398)	12.056 (7.794)	5.117 (6.065)
MW ratio*GDP growth (Lagged)	-4.589* (2.395)	-0.436 (1.598)	-0.173 (1.786)	0.801 (0.985)	-0.455 (0.638)	-7.202*** (2.663)	-0.295 (1.831)	0.383 (1.897)	1.347 (0.815)	-0.658 (0.620)
R-squared	0.750	0.931	0.942	0.978		0.765	0.945	0.951	0.982	
Hausman/Sargan test				0.000	0.418				0.000	0.935
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	30.124** (12.061)	32.385*** (11.309)	33.015*** (10.719)	7.480 (8.287)	0.270 (6.340)	24.036** (10.555)	31.465*** (10.550)	29.008*** (9.690)	17.211** (6.890)	4.224 (5.992)
MW ratio*Downturn (Lagged)	13.136 (9.300)	4.625 (5.695)	6.729 (6.402)	-3.624 (4.719)	1.591 (2.809)	29.284*** (10.114)	7.378 (7.326)	9.007 (6.945)	-4.603 (4.093)	1.882 (2.626)
R-squared	0.746	0.926	0.940	0.977		0.764	0.944	0.951	0.982	
Hausman/Sargan test				0.000	0.074				0.000	0.858
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	32.564*** (11.926)	34.340*** (10.808)	35.202*** (10.347)	5.879 (8.237)	-0.698 (6.287)	28.620*** (10.505)	33.215*** (10.367)	30.646*** (9.580)	16.534** (6.948)	3.807 (6.050)
MW ratio*Downturn (Lagged)	14.630 (12.740)	-3.844 (5.344)	-2.605 (5.637)	-6.040* (3.238)	0.491 (3.469)	22.960 (14.463)	-2.407 (4.826)	-1.759 (4.969)	-4.478 (2.763)	2.836 (3.322)
R-squared	0.746	0.929	0.943	0.978		0.758	0.944	0.951	0.982	
Hausman/Sargan test				0.000	0.058				0.000	0.804
4. Using Prime age unemployment rate										
MW Ratio (Lagged)	87.763*** (15.516)	68.988*** (15.021)	66.193*** (14.263)	21.692** (8.771)	9.377 (8.042)	90.248*** (18.043)	73.788*** (17.949)	70.171*** (16.454)	20.688** (9.778)	1.762 (9.067)
MW ratio (lagged)*Prime age un. rate	-10.471*** (1.982)	-8.533*** (1.556)	-8.166*** (1.597)	-3.221*** (1.058)	-1.286 (0.806)	-9.924*** (2.289)	-7.929*** (1.892)	-7.842*** (1.928)	-0.989 (1.169)	0.450 (0.903)
R-squared	0.831	0.970	0.973	0.987		0.778	0.955	0.960	0.983	
Hausman/Sargan test				0.000	0.000				0.000	0.761
5. Using Prime age male unemployment rate										
MW Ratio (Lagged)	75.248*** (15.292)	61.609*** (14.303)	58.525*** (14.057)	13.674* (7.394)	9.376 (6.548)	81.441*** (15.397)	68.628*** (15.946)	63.940*** (15.126)	23.202** (8.995)	10.478 (7.774)
MW ratio (lagged)*Prime age male un. rate	-8.961*** (1.583)	-6.686*** (1.422)	-6.295*** (1.535)	-1.072 (0.742)	-0.701 (0.672)	-9.974*** (1.809)	-7.263*** (1.689)	-6.961*** (1.838)	-1.107 (1.020)	-0.382 (0.792)
R-squared	0.825	0.967	0.969	0.989		0.779	0.954	0.958	0.984	
Hausman/Sargan test				0.000	0.000				0.000	0.433
Country Effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
CS Time Trends	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Obs	311	311	311	311	293	311	311	311	311	293

Note 1: See notes of table 9.

Note 2: Regressions include the full set of controls.

Table 24. Differences in employment measures impact of minimum wages by periods of economic downturn for youth (25-54 years).

	Y1 = Employment to Population ratio					Y2 = Labor Force Participation Rate				
	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)
1. Using value of GDP growth (lagged)										
MW Ratio (Lagged)	-1.743 (6.399)	-10.440 (7.161)	-12.871 (7.937)	1.334 (4.620)	-2.210 (3.570)	-1.400 (4.537)	-17.163*** (5.457)	-19.970*** (6.460)	-2.970 (2.873)	-1.432 (2.872)
MW ratio*GDP growth (Lagged)	0.597 (1.273)	-0.217 (0.840)	0.109 (0.952)	-0.622 (0.441)	-0.380 (0.353)	-0.199 (0.866)	0.419 (0.643)	0.720 (0.751)	-0.143 (0.241)	-0.217 (0.290)
R-squared	0.370	0.805	0.815	0.969		0.417	0.824	0.829	0.982	
Hausman/Sargan test				-	0.902				-	0.960
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	0.225 (5.639)	-9.768 (6.680)	-10.997 (6.763)	0.366 (4.205)	-2.662 (3.565)	-2.750 (3.820)	-16.114*** (4.815)	-17.352*** (5.442)	-3.345 (2.641)	-2.045 (2.869)
MW ratio*Downturn (Lagged)	-0.559 (5.869)	2.428 (3.484)	3.279 (4.423)	1.379 (1.905)	2.705* (1.536)	6.155 (4.356)	3.273 (2.691)	3.841 (3.358)	0.381 (1.040)	1.243 (1.250)
R-squared	0.369	0.794	0.808	0.968		0.418	0.823	0.827	0.982	
Hausman/Sargan test				-	0.428				-	0.957
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	-0.638 (5.362)	-8.755 (6.345)	-10.118 (6.519)	-0.276 (4.082)	-2.928 (3.586)	-2.761 (3.677)	-15.129*** (4.658)	-16.522*** (5.351)	-3.454 (2.648)	-1.809 (2.880)
MW ratio*Downturn (Lagged)	3.210 (9.199)	4.582 (5.251)	5.250 (5.719)	0.561 (1.951)	1.703 (1.936)	5.728 (6.212)	3.244 (3.641)	2.713 (3.972)	0.624 (1.073)	0.832 (1.576)
R-squared	0.378	0.800	0.815	0.970		0.416	0.823	0.828	0.982	
Hausman/Sargan test				-	0.543				-	0.959
4. Using Prime age unemployment rate										
MW Ratio (Lagged)	10.566 (7.448)	-2.545 (4.553)	-1.801 (4.753)	5.009 (3.427)	3.989 (3.619)	12.436 (8.151)	-1.188 (4.925)	-0.110 (5.118)	5.863 (3.667)	3.128 (4.319)
MW ratio (lagged)*Prime age un. rate	-2.460** (1.081)	-2.671*** (0.846)	-3.234*** (0.936)	-1.179** (0.484)	-0.879 (0.363)	-2.657** (1.193)	-2.924*** (0.922)	-3.542*** (1.009)	-1.445*** (0.534)	-0.619 (0.431)
R-squared	0.731	0.915	0.920	0.990		0.516	0.848	0.856	0.983	
Hausman/Sargan test				-	0.162				-	0.806
5. Using Prime age male unemployment rate										
MW Ratio (Lagged)	-0.736 (6.731)	-7.004 (4.975)	-7.316 (5.191)	-1.771 (2.873)	0.552 (3.079)	0.940 (7.183)	-4.571 (4.911)	-4.420 (5.274)	3.717 (3.546)	3.026 (3.760)
MW ratio (lagged)*Prime age male un. rate	0.246 (1.067)	-1.192* (0.713)	-1.688** (0.818)	0.475 (0.310)	0.019 (0.314)	-0.587 (1.242)	-2.299 (0.850)	-2.780*** (0.951)	-1.158** (0.518)	-0.645* (0.380)
R-squared	0.675	0.912	0.917	0.991		0.483	0.849	0.857	0.983	
Hausman/Sargan test				-	0.208				0.000	0.577
Country Effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
CS Time Trends	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Obs	311	311	311	311	293	311	311	311	311	293

Note 1: See notes of table 9.

Note 2: Regressions include the full set of controls.

Table 25. Differences in employment measures impact of minimum wages by periods of economic downturn for teenagers (55-59 years).

	Y1 = Employment to Population ratio					Y2 = Labor Force Participation Rate				
	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)
1. Using value of GDP growth (lagged)										
MW Ratio (Lagged)	-23.419** (9.753)	-22.451*** (8.122)	-24.090*** (8.379)	-2.510 (7.058)	-3.823 (5.337)	-22.081** (9.798)	-25.653*** (6.649)	-28.771*** (7.014)	-1.848 (6.074)	-2.843 (4.982)
MW ratio*GDP growth (Lagged)	-2.433 (1.902)	-0.359 (1.056)	-0.095 (1.046)	0.666 (0.545)	-0.417 (0.526)	-2.420 (1.765)	0.192 (0.879)	0.516 (0.883)	1.023** (0.449)	-0.203 (0.496)
R-squared	0.680	0.936	0.940	0.986		0.697	0.947	0.951	0.989	
Hausman/Sargan test				0.000	0.775				0.000	0.678
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	-31.397*** (7.729)	-22.522*** (7.428)	-24.323*** (7.454)	-0.581 (6.441)	-4.169 (5.305)	-30.407*** (7.974)	-24.736*** (6.285)	-27.502*** (6.471)	0.846 (5.644)	-2.563 (4.995)
MW ratio*Downturn (Lagged)	21.112** (9.920)	0.119 (5.050)	2.122 (5.447)	-2.216 (2.836)	0.882 (2.268)	25.445*** (9.562)	0.107 (4.197)	1.547 (4.542)	-3.755 (2.601)	-0.415 (2.156)
R-squared	0.687	0.935	0.940	0.986		0.707	0.947	0.951	0.988	
Hausman/Sargan test				0.000	0.753				0.000	0.743
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	-31.294*** (7.638)	-22.464*** (7.283)	-24.449*** (7.385)	-0.821 (6.396)	-4.146 (5.273)	-30.025*** (7.898)	-24.892*** (6.204)	-27.919*** (6.479)	0.804 (5.615)	-2.550 (4.986)
MW ratio*Downturn (Lagged)	15.887 (13.789)	4.458 (6.768)	6.673 (6.602)	-4.441 (2.739)	0.214 (2.833)	18.380 (12.614)	3.301 (5.334)	5.048 (5.277)	-5.800** (2.687)	-0.122 (2.707)
R-squared	0.680	0.935	0.940	0.986		0.697	0.947	0.951	0.988	
Hausman/Sargan test				0.000	0.721				0.000	0.733
4. Using Prime age unemployment rate										
MW Ratio (Lagged)	-49.556*** (11.570)	-37.144*** (6.348)	-38.751*** (6.773)	-3.723 (7.177)	-4.903 (7.589)	-44.988*** (11.974)	-37.280*** (6.642)	-39.083*** (7.186)	-2.038 (7.066)	-6.463 (7.628)
MW ratio (lagged)*Prime age un. rate	1.731 (1.660)	0.989 (0.934)	0.541 (0.934)	-0.138 (0.750)	-0.090 (0.780)	1.579 (1.775)	1.272 (0.964)	0.792 (0.989)	0.189 (0.742)	0.403 (0.782)
R-squared	0.770	0.960	0.964	0.989		0.739	0.956	0.960	0.989	
Hausman/Sargan test				0.000	0.723				0.000	0.740
5. Using Prime age male unemployment rate										
MW Ratio (Lagged)	-60.388*** (11.836)	-36.121*** (6.645)	-38.153*** (6.779)	-0.994 (6.988)	-3.174 (6.922)	-60.516*** (12.573)	-36.991*** (6.763)	-39.457*** (7.123)	1.726 (6.825)	-4.535 (6.939)
MW ratio (lagged)*Prime age male un. rate	5.343*** (1.835)	1.630* (0.922)	1.231 (0.916)	-0.076 (0.694)	0.020 (0.736)	5.720*** (1.880)	1.845** (0.908)	1.484 (0.927)	-0.271 (0.692)	0.271 (0.738)
R-squared	0.748	0.958	0.962	0.989		0.726	0.955	0.959	0.989	
Hausman/Sargan test				0.000	0.745				0.000	0.731
Country Effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
CS Time Trends	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Obs	308	308	308	308	290	308	308	308	308	290

Note 1: See notes of table 7.

Note 2: Regressions include the full set of controls.

Table 26. Differences in employment measures impact of minimum wages by periods of economic downturn for teenagers (60-64 years).

	Y1 = Employment to Population ratio					Y2 = Labor Force Participation Rate				
	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)
1. Using value of GDP growth (lagged)										
MW Ratio (Lagged)	-53.087*** (10.335)	-7.530 (9.046)	-14.659 (9.646)	-3.338 (6.376)	-3.249 (5.290)	-57.802*** (10.428)	-10.571 (9.494)	-17.667* (10.503)	-4.718 (6.785)	-4.487 (5.242)
MW ratio*GDP growth (Lagged)	-0.319 (2.599)	-1.521 (1.011)	-0.667 (1.138)	0.003 (0.519)	0.432* (0.258)	0.252 (2.547)	-1.020 (1.068)	-0.179 (1.248)	0.392 (0.612)	-0.471 (0.510)
R-squared	0.715	0.953	0.957	0.989		0.743	0.956	0.959	0.989	
Hausman/Sargan test				0.000	0.392				0.000	0.388
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	-54.806*** (9.168)	-11.374 (8.117)	-15.623* (8.505)	-2.995 (6.041)	-4.809 (5.231)	-57.511*** (9.365)	-12.735 (8.212)	-16.884* (8.704)	-3.500 (6.096)	-5.555 (5.199)
MW ratio*Downturn (Lagged)	18.757* (9.736)	-5.042 (5.520)	-4.888 (6.035)	-1.049 (2.614)	-1.357 (1.090)	17.349* (9.174)	-6.785 (6.076)	-6.923 (6.625)	-2.367 (3.279)	2.226 (2.218)
R-squared	0.719	0.953	0.957	0.989		0.747	0.956	0.960	0.989	
Hausman/Sargan test				0.000	0.233				0.000	0.269
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	-55.088*** (9.021)	-11.416 (7.987)	-16.122* (8.374)	-3.599 (6.051)	-4.737 (5.167)	-57.912*** (9.224)	-13.217* (8.064)	-17.803** (8.589)	-3.934 (6.143)	-5.350 (5.173)
MW ratio*Downturn (Lagged)	19.079 (12.803)	6.228 (7.052)	7.046 (7.367)	-2.599 (4.155)	0.487 (2.724)	17.218 (12.028)	4.666 (8.247)	5.628 (8.858)	-4.326 (5.485)	0.126 (2.748)
R-squared	0.716	0.953	0.957	0.989		0.744	0.956	0.959	0.989	
Hausman/Sargan test				0.000	0.283				0.000	0.325
4. Using Prime age unemployment rate										
MW Ratio (Lagged)	-60.092*** (15.598)	-25.759*** (6.714)	-29.228*** (7.411)	-7.273 (8.035)	-10.358 (7.541)	-65.128*** (15.923)	-31.319*** (7.093)	-35.011*** (7.543)	-12.187 (8.691)	-13.114* (7.652)
MW ratio (lagged)*Prime age un. rate	-0.221 (1.959)	1.766 (1.096)	1.503 (1.252)	0.220 (1.009)	0.660 (0.774)	0.181 (2.017)	2.622** (1.222)	2.457* (1.376)	0.966 (1.163)	1.016 (0.781)
R-squared	0.798	0.964	0.968	0.991		0.807	0.963	0.967	0.990	
Hausman/Sargan test				0.000	0.289				0.000	0.424
5. Using Prime age male unemployment rate										
MW Ratio (Lagged)	-72.982*** (14.803)	-22.675*** (6.511)	-26.278*** (6.785)	-7.512 (7.594)	-9.871 (6.929)	-79.622*** (15.223)	-28.101*** (6.860)	-31.788*** (7.083)	-11.007 (8.316)	-11.449 (7.062)
MW ratio (lagged)*Prime age male un. rate	3.246* (1.920)	1.785 (1.140)	1.427 (1.299)	0.738 (0.947)	0.988 (0.740)	3.951** (1.939)	2.655** (1.299)	2.387 (1.472)	1.223 (1.170)	1.086 (0.751)
R-squared	0.783	0.964	0.968	0.991		0.794	0.963	0.967	0.990	
Hausman/Sargan test				0.000	0.365				0.000	0.451
Country Effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
CS Time Trends	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Obs	308	308	308	308	290	308	308	308	308	290

Note 1: See notes of table 7.

Note 2: Regressions include the full set of controls.

Table 27. Differences in employment measures impact of minimum wages by periods of economic downturn for teenagers (55-64 years).

	Y1 = Employment to Population ratio					Y2 = Labor Force Participation Rate				
	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)	OLS (1)	OLS (2)	OLS (3)	FE (4)	GMM (5)
1. Using value of GDP growth (lagged)										
MW Ratio (Lagged)	-27.823*** (10.204)	-11.392 (7.936)	-15.403* (8.515)	1.022 (6.175)	-1.065 (4.232)	-29.337*** (10.176)	-14.083* (7.197)	-18.309** (7.977)	1.017 (5.776)	-0.559 (4.019)
MW ratio*GDP growth (Lagged)	-2.670 (2.264)	-1.149 (1.000)	-0.696 (1.038)	0.151 (0.492)	-0.639 (0.411)	-2.392 (2.153)	-0.612 (0.900)	-0.162 (0.973)	0.528 (0.482)	-0.443 (0.394)
R-squared	0.696	0.950	0.954	0.989		0.725	0.959	0.963	0.990	
Hausman/Sargan test				0.000	0.488				0.000	0.361
2. Using Dummy downturn (=1 if the year contains any two quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	-36.780*** (8.468)	-13.510* (7.160)	-16.793** (7.514)	1.600 (5.705)	-1.993 (4.170)	-37.490*** (8.645)	-14.828** (6.473)	-18.120*** (6.927)	2.372 (5.288)	-0.910 (3.994)
MW ratio*Downturn (Lagged)	22.462** (10.279)	-3.639 (5.113)	-2.047 (5.567)	-1.739 (2.519)	2.256 (1.780)	24.123** (9.598)	-4.567 (4.838)	-3.292 (5.197)	-3.130 (2.763)	1.341 (1.709)
R-squared	0.701	0.950	0.954	0.989		0.732	0.959	0.963	0.990	
Hausman/Sargan test				0.000	0.263				0.000	0.309
3. Using Dummy downturn (=1 if the year contains two consecutive quarters of negative growth, 0 otherwise)										
MW Ratio (Lagged)	-36.781*** (8.344)	-13.908** (6.976)	-17.329** (7.386)	1.195 (5.696)	-2.031 (4.131)	-37.391*** (8.538)	-15.558** (6.330)	-18.991*** (6.856)	2.170 (5.299)	-0.838 (3.971)
MW ratio*Downturn (Lagged)	20.210 (13.397)	4.506 (6.733)	6.817 (6.467)	-3.552 (3.458)	0.291 (2.196)	20.684* (11.995)	3.055 (6.403)	5.209 (6.244)	-5.062 (4.003)	-0.257 (2.125)
R-squared	0.696	0.950	0.954	0.989		0.725	0.959	0.963	0.990	
Hausman/Sargan test				0.000	0.291				0.000	0.322
4. Using Prime age unemployment rate										
MW Ratio (Lagged)	-47.291*** (12.661)	-29.850*** (4.896)	-31.973*** (5.461)	-3.841 (6.819)	-7.295 (5.874)	-46.748*** (12.857)	-32.619*** (5.350)	-34.883*** (5.664)	-5.521 (7.094)	-8.163 (5.900)
MW ratio (lagged)*Prime age un. rate	0.263 (1.686)	1.581* (0.825)	1.373 (0.913)	0.206 (0.762)	0.527 (0.603)	0.344 (1.746)	2.173** (0.897)	1.999** (0.987)	0.804 (0.817)	0.872 (0.600)
R-squared	0.794	0.971	0.974	0.991		0.788	0.970	0.974	0.991	
Hausman/Sargan test				0.000	0.301				0.000	0.429
5. Using Prime age male unemployment rate										
MW Ratio (Lagged)	-60.614*** (12.841)	-28.640*** (5.076)	-30.582*** (5.355)	-2.858 (6.441)	-6.001 (5.392)	-63.469*** (13.338)	-31.648*** (5.386)	-33.678*** (5.575)	-3.172 (6.729)	-5.990 (5.428)
MW ratio (lagged)*Prime age male un. rate	4.098** (1.804)	2.152** (0.843)	1.767* (0.914)	0.569 (0.674)	0.757 (0.571)	4.624** (1.804)	2.725*** (0.902)	2.399** (0.993)	0.780 (0.783)	0.825 (0.571)
R-squared	0.771	0.969	0.973	0.992		0.770	0.969	0.973	0.991	
Hausman/Sargan test				0.000	0.418				0.000	0.443
Country Effects	No	No	No	Yes	Yes	No	No	No	Yes	Yes
Year Effects	No	No	Yes	Yes	Yes	No	No	Yes	Yes	Yes
CS Time Trends	No	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
Obs	308	308	308	308	290	308	308	308	308	290

Note 1: See notes of table 7.

Note 2: Regressions include the full set of controls.

7. Conclusions

In our research we managed to find only one study that deals with the employment effect of minimum wage with during periods of economic downturn and growth using cross-country data and was conducted by Dolton and Bondibene (2012). In this paper we investigate this issue for all groups and our results indicate that minimum wage has a positive impact on the employment of teenagers, young adults and youth, but negative for the older ones. Regarding the economic circle, we generally find that in economic downturns the impact of minimum wages does not change significantly from the cases where we use unemployment rates as business circle indicators, and if do so the positive effects of minimum wages on employment measures of the young weaken, while for the older ones, when unemployment rates increase then the negative minimum wage effects are strengthened.

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