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Early Retirement and Employment of the Young

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Abstract

Policy makers have often argued that an additional benefit of facilitating early retirement is that it creates employment for the young. This may happen if older and younger workers are substitutes. Nowadays policy makers' goals are to discourage early retirement to counter the economic consequences of an aging population and, interestingly, the consequences for youth employment appear to play no role in this. This paper studies the nexus between employment of older and younger workers in more depth, if only to put any concerns for adverse effects of later retirement to rest. To empirically investigate this issue we estimate a dynamic model of employment of the young, prime age and old people using panel data of 22 OECD countries over the time period 1960-2004. Our empirical analysis does not support the hypothesis that employment of the young and old are substitutes and finds some minor complementarities. This suggests that discouraging early retirement will have no adverse effect on youth employment.

1. Introduction

Social security programs create disincentives for continued work at older ages in many OECD countries (Gruber and Wise, 2004). During the 1980s and early 1990s increasingly more generous early retirement schemes were in place and, arguably, attributed to the falling male employment rates for the older population. Figure 1 shows that for many OECD countries the employment rate of older men fell until the mid-nineties and then started increasing again. Figure 2 shows that over the same period the employment rate for older women shows a different pattern, presumably reflecting a cohort effect whereby more recent cohorts have a higher participation rate than the older cohorts.

Policy makers have often argued that an additional benefit of facilitating early retirement is that it creates employment for the young. Older people who retire and leave the labor force release jobs for younger people. This has been a very popular argument in the 1970s and 1980 when youth unemployment was rising (see Figure 3). The validity of this argument is mainly based on the two assumptions that older and younger workers are substitutes and that there is a fixed amount of work to be done in the economy, which is not affected by older workers leaving the labor force. Economic theory suggests that this latter assumption is a very special assumption indeed and it is thus often referred to as the lump of labor fallacy.[1] Wage rates may increase when, for instance, the demand for younger workers increases or early retirement schemes are financed through payroll taxes (see, e.g., Van Dalen and Henkens, 2002). This, in turn, will reduce the total demand for labor and the effect of early retirement on employment may be negative even when older and younger workers are substitutes. Concerning the former assumption economic theory suggests that the more similar the age groups are with respect to skills, the greater is the degree of substitution. Some previous studies have identified significant substitutability between workers of different ages but with a considerable variation in the degree of substitution (see Hamermesh, 1993, Table 3.9, for an overview). Also, for instance, Card and Lemieux (2001) and Fitzenberger and Kohn (2004) estimate, based on the work of Sato (1967), a structural model using a CES production function and find that workers of different age are imperfect substitutes, while Hebbink (1993) reports a negative elasticity of substitution which suggests that older and younger workers are complements. In line with Hamermesh (2001) one has to conclude that the empirical

[1] Empirical evidence suggests that worksharing policies during the 1980s and 1990s were a rather ineffective instrument for reducing unemployment as it resulted in higher real wage rates and, consequently, reduced total employment (see Kapteyn, Kalwij and Zaidi, 2004).

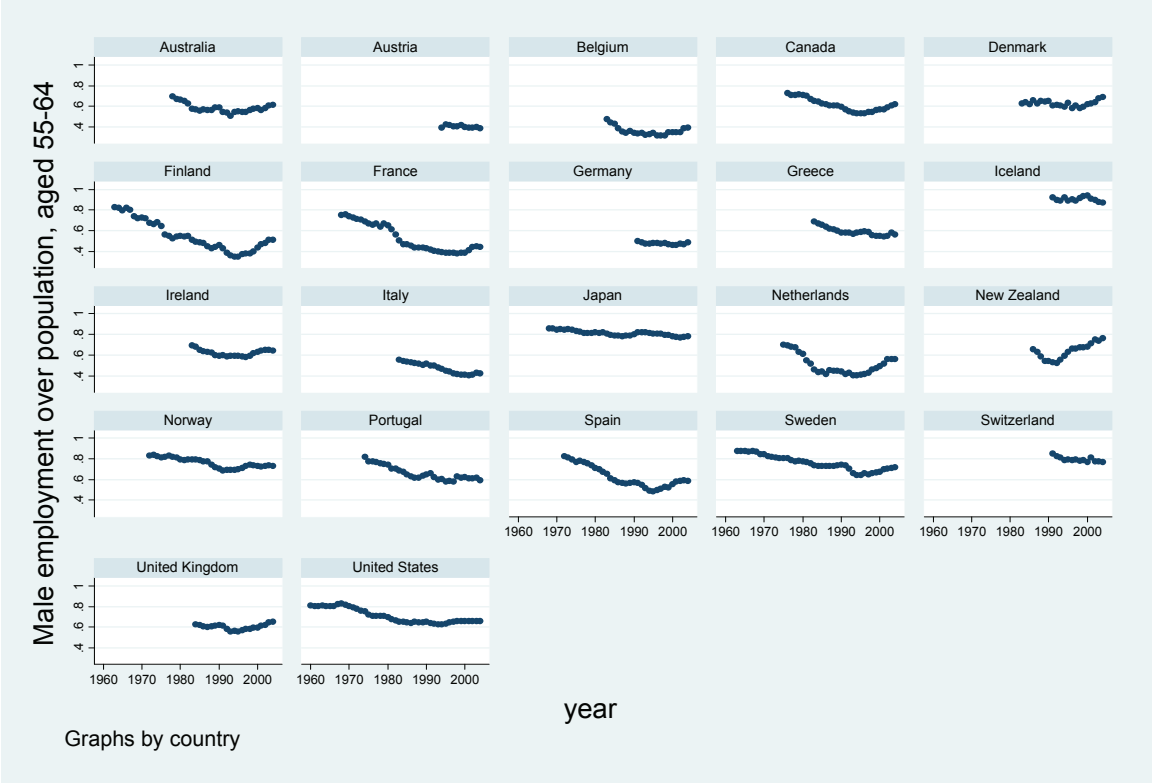
evidence is rather inconclusive concerning the degree of substitution and, furthermore, there is no empirical evidence on the degree of substitution between the groups of workers that our paper is interested in, namely between the potential early retirees age 55 to 64 (the older workers) and the younger workers age 15 to 24.

Nowadays policy makers' goals seem to have come around 180 degrees, showing an increasing emphasis on discouraging early retirement to counter the economic consequences of an aging population. In many OECD countries social security programs are being redesigned to create stronger incentives for continued work at older ages. This may in part explain the rise in employment rates of older men during the second half of the 1990s in many OECD countries (see Figure 1). Interestingly, now that the goal is to raise labor force participation of older people concerns about the employment consequences for the young do not seem to play a role. Yet, and due to the inconclusive empirical evidence on this issue, it seems worthwhile to study the nexus between employment of older and younger workers in more depth, if only to put any concerns for adverse effects of later retirement to rest.

This paper examines empirically to what extent employment of older people aged 55-64 affects the employment of younger people aged 16-24. To be more precise, the aim of the paper is to examine to what extent employment of the young and old are complements or substitutes. Raising labor force participation of older people could reduce employment of the young if they are substitutes and could increase employment of the young if they are complements. To examine this issue we estimate a dynamic model of employment of the young, prime age and older people using panel data of 22 OECD countries over the time period 1960-2004. As discussed above, the assumption that older and younger workers are substitutes is a necessary condition for job creation for the young by promoting early retirement for the old but it is not a sufficient condition since the total amount of work to be done in the economy may be affected as well. As we will show in this paper, there is no empirical support for the assumption that younger and older workers are substitutes. If anything, there is some evidence that they are complements.

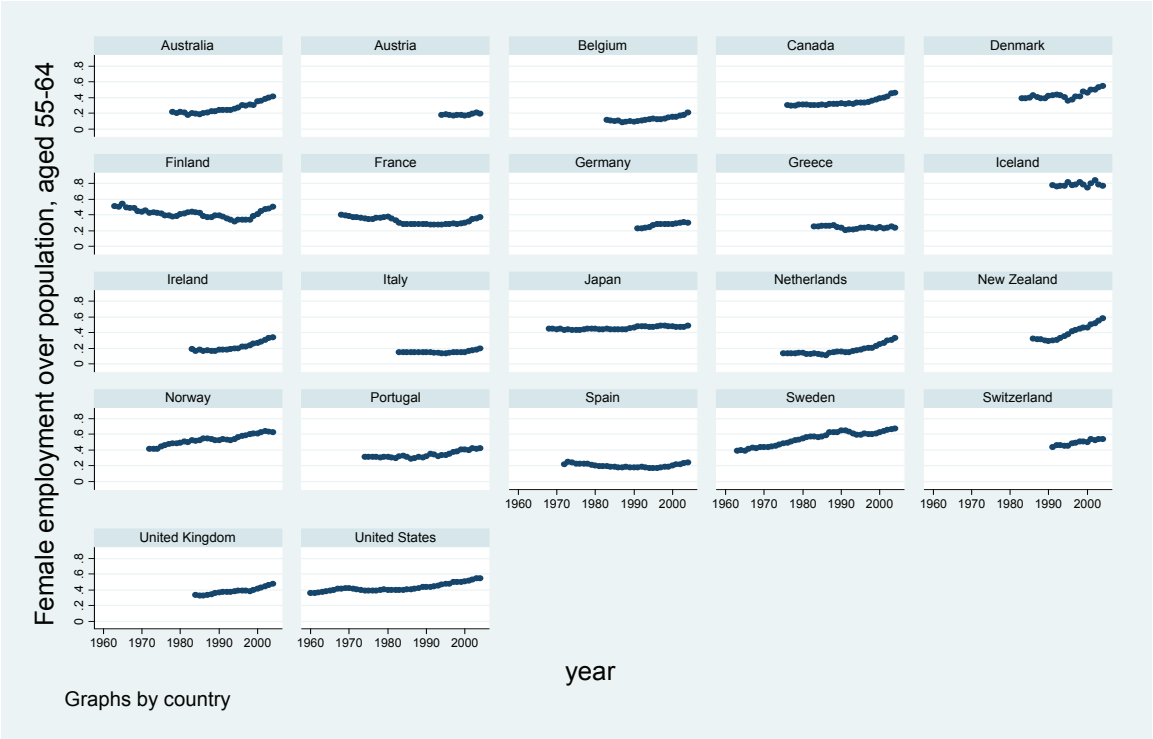
The outline of the paper is as follows. Section 2 describes the data. Section 3 sets up the empirical model and presents the empirical results. Section 4 concludes.

Figure 1: Employment rate of older males, aged 55-64. A selection of 22 OECD countries



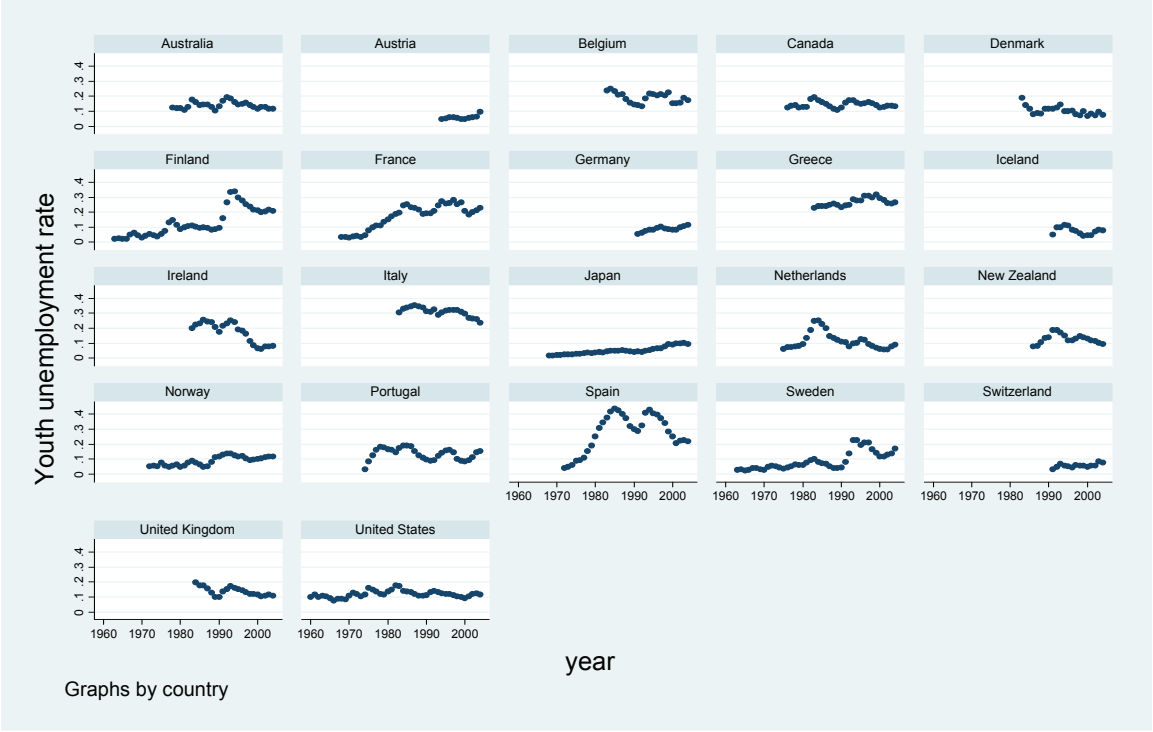
Source: OECD (2006a)

Figure 2: Employment rate of older females, aged 55-64. A selection of 22 OECD countries



Source: OECD (2006a)

Figure 3: Youth unemployment rate (15-24 years old). A selection of 22 OECD countries



Source: OECD (2006a)

2. The data

For 22 OECD countries we have collected annual data on employment rates of young, prime age and older persons, real wage rates, gross domestic product per capita, consumer price indices, the shares of female employment in total employment, average hours of work per week, and the age composition of the population. The data cover the time period 1960-2004.

Statistics on male and female employment and population by age groups are taken from the on-line Labour Force Statistics of the Organization for Economic Co-operation and Development (2006a). Employment is defined as the number of persons in paid work or self-employment. Statistics on consumer price indices and before tax average wages are taken from the on-line Statistics of the Organization for Economic Co-operation and Development (2006b). International comparable statistics on Gross Domestic Product (GDP), annual hours of work and population size have been provided by the Groningen Growth and Development Centre.[2] Real GDP is in

[2] The Total Economy Database (2006). The Groningen Growth and Development Centre collects data from the official

1990 US dollars and corrected for differences across countries in purchasing power. Hours of work are the average actual working hours per year of the employed population.

We have used all publicly available information to go back in time as far as possible. To ensure consistency over time we use only one source for any one data series and do not attempt to link earlier data, if at all possible, from another source. The statistics for Germany were influenced by the reunification of East and West Germany and for this reason only the observations of Germany from 1991 onwards are included. Altogether these years and countries form 589 observations. The panel is unbalanced and Table 1 shows the years of observation for each country.

We distinguish three age groups. The young age group is defined as individuals aged 16 to 24 (both years included), the prime age people are defined as individuals aged 25 to 54, and the older people are defined as individuals aged 55 to 64. We define age group specific employment rates as employment in persons in an age group over the population aged 15 to 64 (both years included), the wage rate as the average real hourly wage rate and working hours as the average actual hours worked per week. In the empirical analysis a logarithmic specification together with the country-specific effects will control for differences in purchasing power and the fact we use wage rate indices rather than real wage rates.

The figures A1-A7 in the Appendix show the time series of the variables for the 22 countries used in the empirical analysis. Tests for panel unit roots show that most univariate series are non-stationary and that all series in first differences are stationary.[3]

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international statistics.

[3] We use the Fisher test as outlined in Maddala and Wu (1999).

Table 1: Number of observations per country

Country	First year	Last year	Number of observations
Australia	1978	2004	27
Austria	1994	2004	11
Belgium	1983	2004	22
Canada	1976	2004	29
Denmark	1983	2004	22
Finland	1963	2004	42
France	1968	2004	37
Germany	1991	2004	14
Greece	1983	2004	22
Iceland	1991	2004	14
Ireland	1983	2004	22
Italy	1983	2004	22
Japan	1968	2004	37
Netherlands	1975	2004	30
New Zealand	1986	2004	19
Norway	1972	2004	33
Portugal	1974	2004	31
Spain	1972	2004	33
Sweden	1963	2004	42
Switzerland	1991	2004	14
United Kingdom	1984	2004	21
United States	1960	2004	45
Total			589

3. Model Specification and Estimation Results

3.1 A Dynamic Model of Employment

The basis of our empirical approach is a dynamic model of labor demand (e.g., Hamermesh, 1993). Such a model has been used to estimate dynamic complementarities and substitutions between employment, capital and hours of work, and the speed of adjustment on the labor market (e.g., Hamermesh, 1993; Tables 7.4 and 7.8). We consider employment for the three age groups defined in Section 2: the young, prime age, and old. E_{ct} denotes a (3x1)-vector containing age group specific employment in country *c* in year *t*. Demand and supply factors affecting employment are denoted by X_{ct}, a (*k*x1)-vector. Target employment is denoted by E_{ct}^{*} and relates to demand and supply factors as follows

(1) $$E_{ct}^{*} = \alpha_c + \Phi X_{ct} + u_{ct},$$

where Φ is a (3x*k*)-matrix with the parameters of interest, α_c is (3x1)-vector with country specific intercepts, and u_{ct} is a vector of random error terms. Changes in demand and supply factors do not immediately yield a new equilibrium and partial adjustment is assumed

(2) $$E_{ct} - E_{ct-1} = \Gamma\left(E_{ct}^{*} - E_{ct-1}\right).$$

Γ is a matrix with adjustment coefficients. Substituting equation (1) in (2) yields the following partial adjustment model

(3) $$E_{ct} = \Lambda E_{ct-1} + \Gamma\alpha_c + \Gamma\Phi X_{ct} + \Gamma u_{ct},$$

where $\Lambda = (I - \Gamma)$ and *I* is the identity matrix. The long run relationship between employment and the labor demand and supply factors is given by the matrix Φ. Labor market rigidities, for instance, may cause the diagonal elements of the matrix Λ to be greater than 0. The off-diagonal elements of the matrix Λ indicate whether or not the inputs are complements (a positive sign) or substitutes (a negative sign). In the empirical analysis we test for symmetry of the matrix Λ. We impose symmetry if symmetry is not rejected. In the special case that all off-diagonal elements of Λ are equal to zero we may as well estimate employment equations for each age group separately.

The vector of control variables, X_{ct}, includes the logarithm of the real wage rate per hour, the logarithm of the real gross domestic product per capita, age group specific population shares (ages 15-24, 25-54 and 55-64), the logarithm of average hours of work per week and the share of female employment in total employment. A trend term is included in all equations.

As mentioned in Section 2, all variables used in the analysis are non-stationary in levels but stationary in first differences. We therefore estimate equation (3) in first differences. This also implies that the country specific fixed effect α_c is eliminated.

We estimate the model, i.e. equation (3), in two steps. In the first step we estimate each of the three reduced form employment equations of the model using the Instrumental Variable estimator proposed by Anderson and Hsiao (1982).[4] We improve upon the efficiency by using an optimal weighting matrix. Most of the explanatory variables discussed above are plausibly endogenous and for this reason all of them are instrumented. In the second step we use a Minimum Distance Estimator to obtain estimates of Λ and Φ (see, e.g., Kodde, Palm and Pfann, 1990).

The set of instruments used in the first step consists of lags of both dependent and independent variables of the model. Variables used to form additional instruments are the population shares of individuals under 15 and over 64, and unemployment of the population aged 15-64. The model is estimated in first differences. Under the assumption of no autocorrelation, variables that are lagged at least two periods can be used as instruments. We use lags five, four, three, and two. To validate this choice an over-identification test is carried out to test the null-hypothesis that the instruments and the error term are independent. Furthermore we test for serially uncorrelated error terms. The null-hypothesis of the autocorrelation test is that there is no second order autocorrelation in the first-differenced error term.

3.2 Estimation Results

Table 2 reports the estimation results of the model outlined in Section 3.1. Before turning to the estimation results we briefly discuss the model specification tests reported in the bottom panel of Table 2. In the discussion below we adopt a 5% level of significance. The three over-identification tests, one for each reduced form employment equation, do not reject exogeneity of our instruments.[5] The three autocorrelation tests do not reject the null of no serial correlation. Furthermore, we do not reject symmetry of the matrix Λ.

The empirical results in Table 2 do not support the hypothesis that employment of younger and older people are substitutes and even show some minor complementarities of employment in the

[4] See Bond (2002) for a review of estimators for dynamic panel data models.

[5] We have also tested whether or not the instruments have sufficient explanatory power (see Bound, Jaeger and Baker, 1995). In the first stage regressions the partial F-test statistics all have p-values that are virtually zero.

different age categories. The off-diagonal elements are jointly significant at a 1% level of significance.[6] An increase in employment of older people with one worker yields an additional 0.059 young worker.

The effects of the wage rates and GDP per capita are as expected, though not all wage effects are statistically significant. An increase in the wage rate results in a decrease in employment, while economic growth is good for employment. An increase in the (age specific) population results in an increase in employment. The share of female employment has no significant effect on employment. An increase in the hours of work per week results in a significant increase in employment for the younger and older people.

4. Conclusions

Our empirical analysis does not support the hypothesis that employment of the young and old are substitutes and finds some minor complementarities of employment in the different age groups. Changes in employment of older people aged 55-64 have small but positive effects on employment of the younger people aged 16-24 and on the prime age people aged 25-54. As discussed by Acemoglu (2002), the last half century has been characterized by a continuing growth in the level of skill of new workers, type of skill requirements, and technological change that has been skill biased. This may have resulted in groups of younger and older worker that are very poor substitutes.

From a policy point of view these findings suggest that the policies during the 1970s and 1980s aimed at facilitating early retirement have been ineffective as instruments for reducing youth unemployment. This also suggests that the u-turn of policy makers nowadays to discourage early retirement will have no adverse effects on youth employment.

[6] The p-value is equal to 0.003 for testing the null-hypothesis that all off-diagonal elements are equal to zero.

Table 2. Estimation results of equation (3)

	Younger people		**Prime age people**		**Older people**	
Dependent variable	**Employment 15-24**		**Employment 25-54**		**Employment 55-64**	
	estimate	*t-value*	*estimate*	*t-value*	*estimate*	*t-value*
Λ, symmetry imposed						
Employment 15-24, t-1	0.503	6.590	-0.013	-0.300	0.059	1.780
Employment 25-54, t-1	-0.013	-0.300	0.500	8.190	0.037	2.330
Employment 55-64, t-1	0.059	1.780	0.037	2.330	0.454	4.590
Long-run effects, Φ						
Population (age group specific)	0.700	3.940	0.586	3.640	0.787	5.120
Ln(real hourly wage rate)	-0.011	-0.300	-0.171	-2.450	-0.005	-0.300
Ln(GDP)	0.135	3.500	0.328	4.510	0.038	1.990
Ln(hours of work per week)	0.313	4.230	-0.164	-1.100	0.146	3.290
Share female employment	0.143	0.740	0.149	0.430	-0.105	-1.050
Goodness of fit, R^2	0.32		0.43		0.52	
Over Identification test (p-value)	0.15		0.32		0.11	
Autocorrelation test (p-value)	0.68		0.06		0.70	
Number of observations	479		479		479	
Test of symmetry of Λ (p-value)	0.59					

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Appendix: Descriptive Statistics

Figure A1

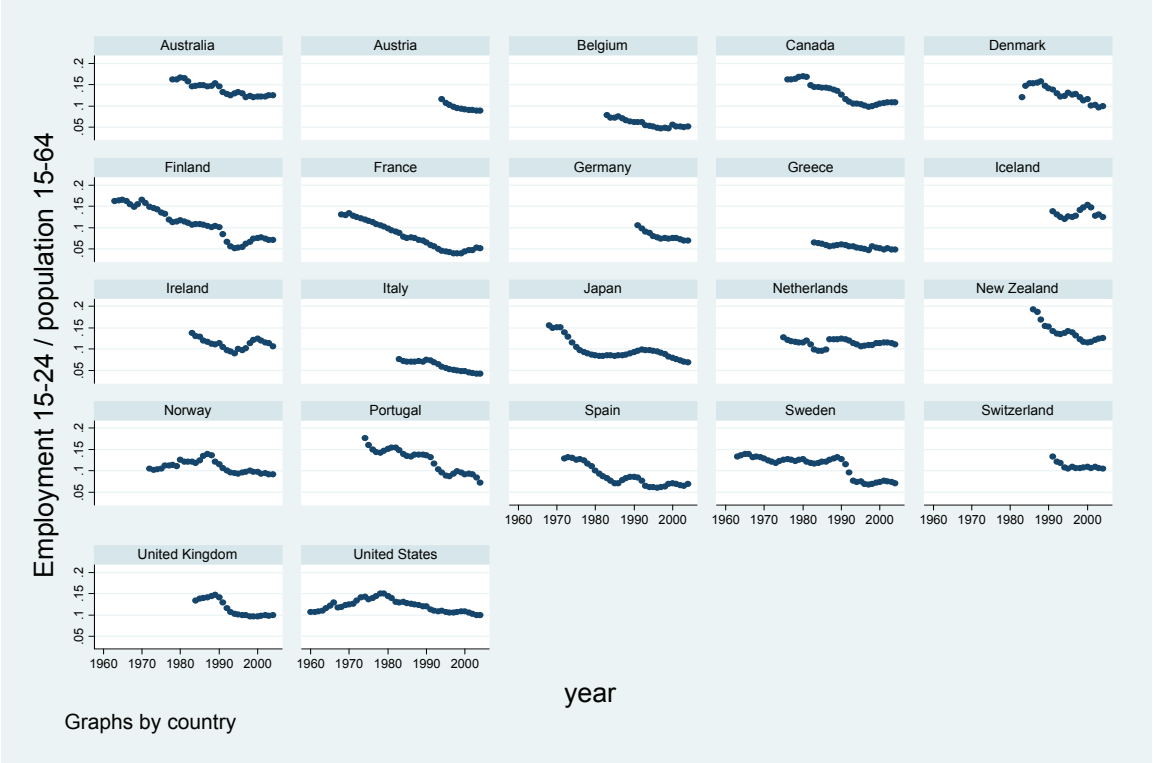

Figure A2

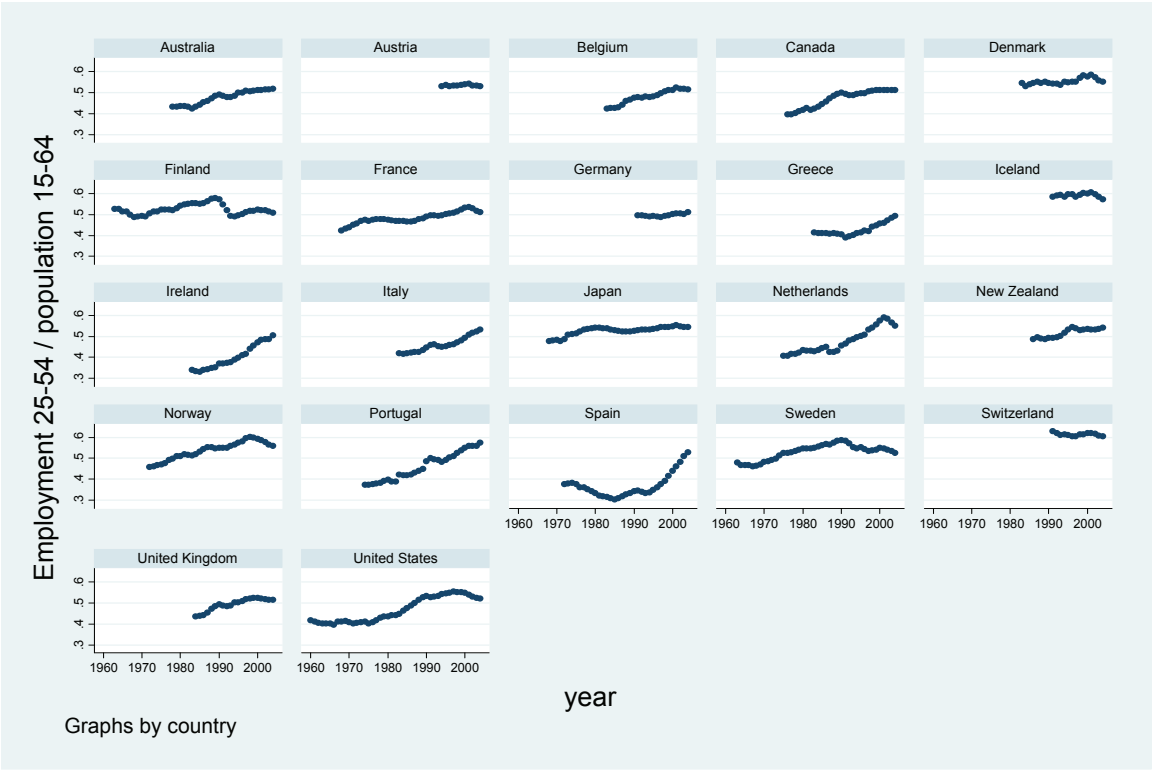

Figure A3

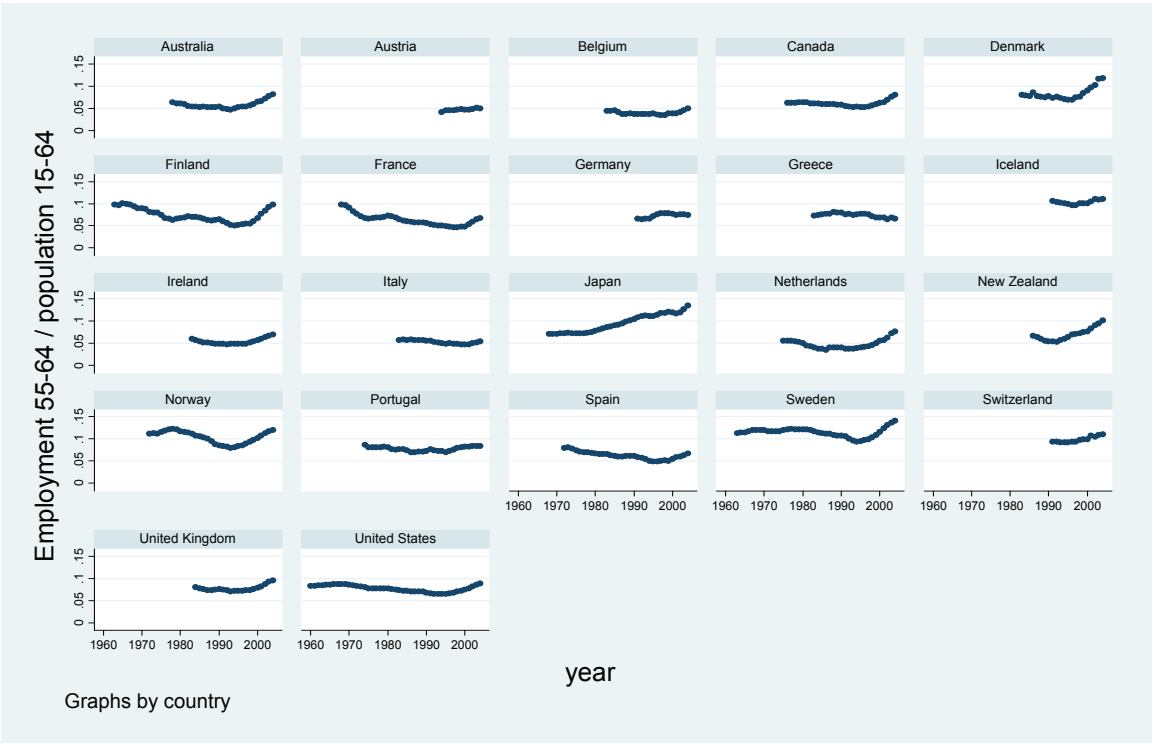

Figure A4

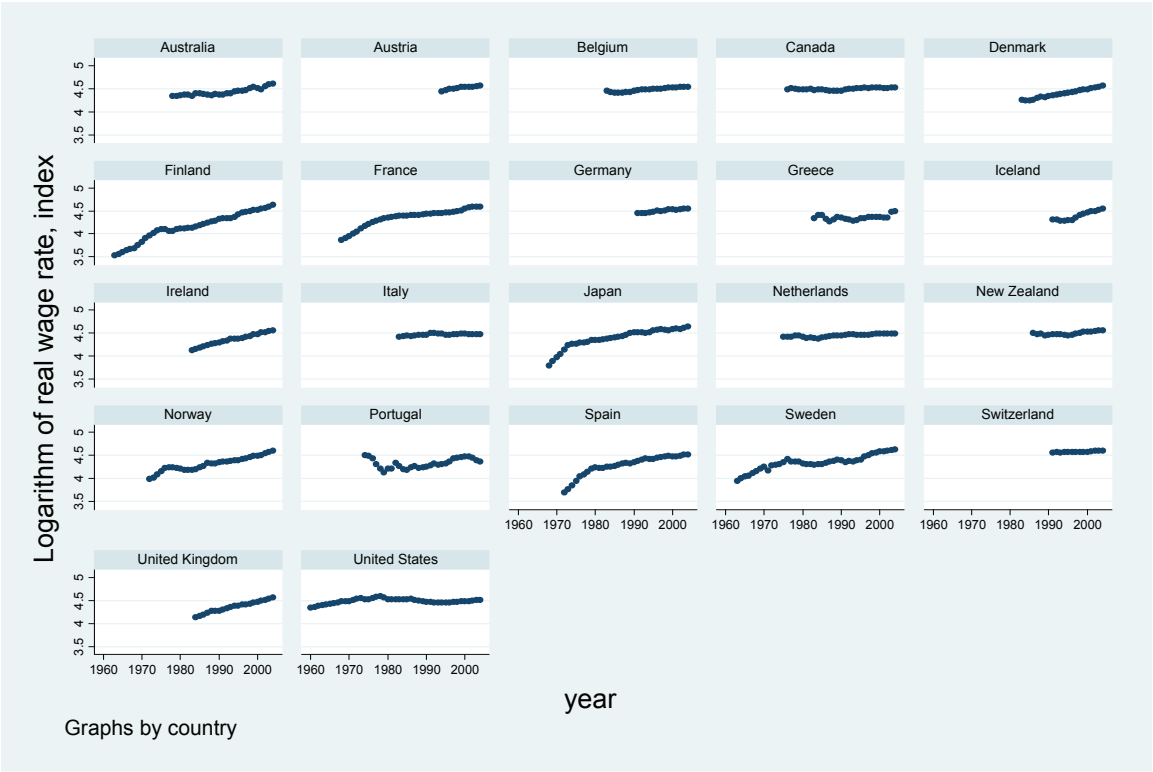

Figure A5

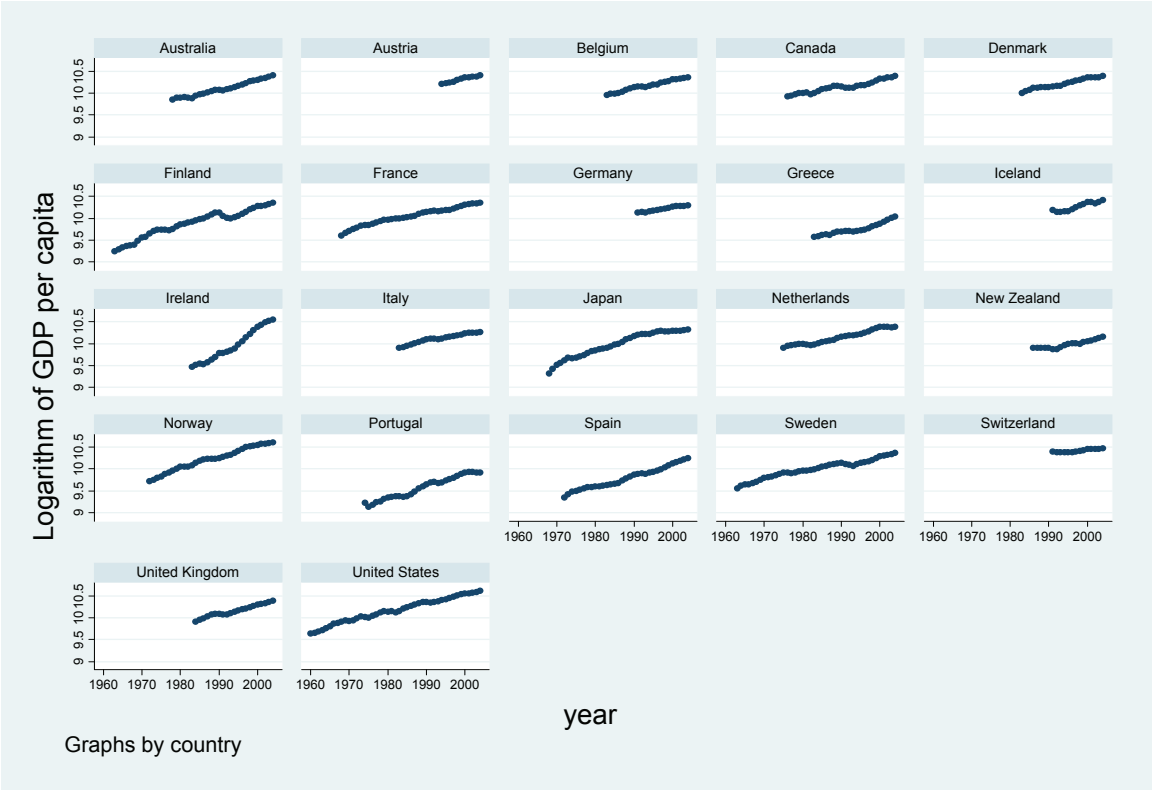

Figure A6

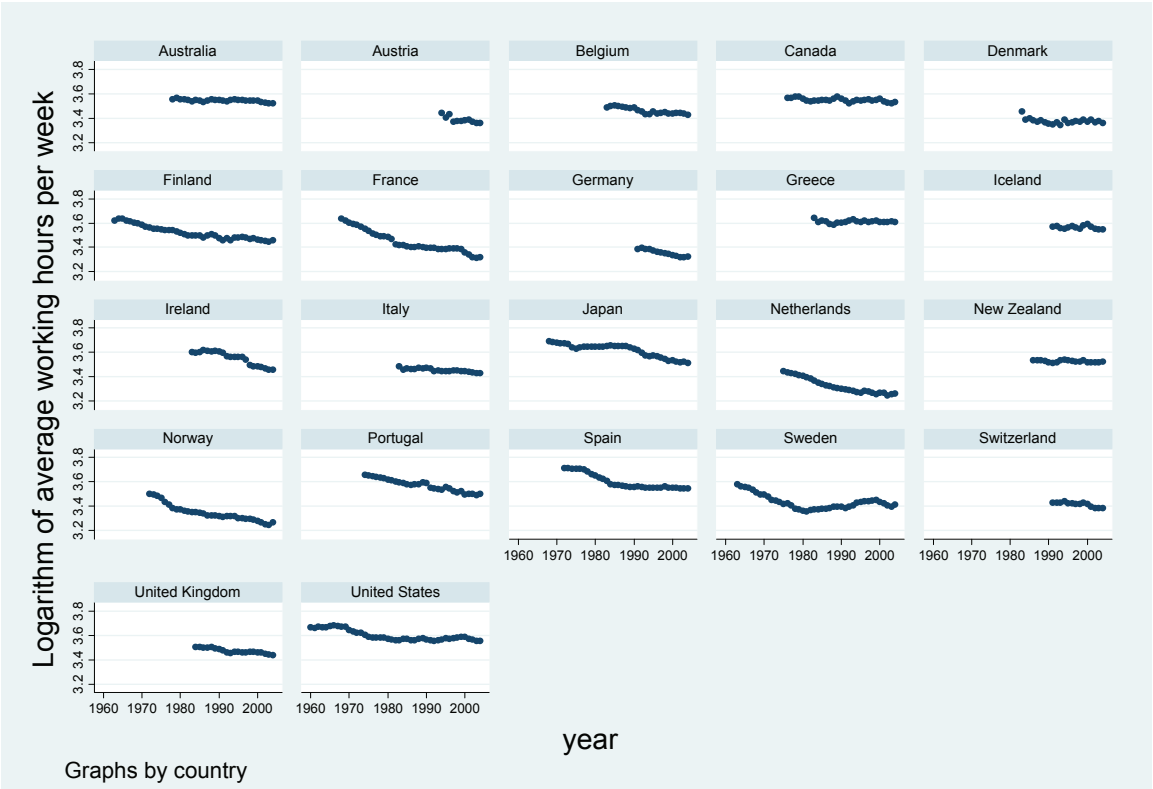

Figure A7