

DISCUSSION PAPER SERIES

IZA DP No. 11510

**Live Longer, Work Longer: The Changing
Nature of the Labour Market for Older
Workers in OECD Countries**

John P. Martin

APRIL 2018

DISCUSSION PAPER SERIES

IZA DP No. 11510

Live Longer, Work Longer: The Changing Nature of the Labour Market for Older Workers in OECD Countries

John P. Martin

*UCD Geary Institute for Public Policy, National Statistics Board of Ireland,
Irish Government's Labour Market Council, and IZA*

APRIL 2018

Any opinions expressed in this paper are those of the author(s) and not those of IZA. Research published in this series may include views on policy, but IZA takes no institutional policy positions. The IZA research network is committed to the IZA Guiding Principles of Research Integrity.

The IZA Institute of Labor Economics is an independent economic research institute that conducts research in labor economics and offers evidence-based policy advice on labor market issues. Supported by the Deutsche Post Foundation, IZA runs the world's largest network of economists, whose research aims to provide answers to the global labor market challenges of our time. Our key objective is to build bridges between academic research, policymakers and society.

IZA Discussion Papers often represent preliminary work and are circulated to encourage discussion. Citation of such a paper should account for its provisional character. A revised version may be available directly from the author.

ABSTRACT

Live Longer, Work Longer: The Changing Nature of the Labour Market for Older Workers in OECD Countries*

Population ageing poses stark dilemmas for labour markets, social protection systems and cultural norms. It will put strong downward pressure on labour supply, leading to falling real incomes and huge financial pressures on social protection systems unless there is an offsetting increase in employment rates. This is especially true for older workers whose employment rates are well below those of prime-age adults. In this paper, I examine how the labour market for older workers has evolved in OECD countries since 1990, what are the main forces at work, what are the main obstacles to working longer and how might public policies help overcome them. I also speculate about the future for older workers faced with the challenges and opportunities posed by the gig economy.

JEL Classification: J08, J18, J21, J23

Keywords: population ageing, older workers, retention and hiring rates, ageism, seniority pay, gig economy

Corresponding author:

John P. Martin
Geary Institute for Public Policy
Dublin 4
Ireland
E-mail: seanomartin@gmail.com

* A preliminary version of this paper was presented at the Fondation Innovation Bankinter Future Trends Forum on "How will Longevity Reshape the World?" in Madrid on 29 November-1 December 2017. I am very grateful to the Forum participants and to Anne Sonnet and Rauf Gonenc for helpful comments. Thanks are also due to Dana Blumin and Pascal Marianna for their advice and assistance with some of the data, and to Helena Treadwell-Guedj for secretarial assistance. The views expressed are my own and cannot be held to represent those of the institutions with which I am associated.

Introduction

Population ageing is a huge global challenge, possibly as important if not more so than tackling climate change or other global threats¹. While, on the one hand, increased longevity is a boon for many, which our ancestors could only have dreamed about, it also poses stark dilemmas for labour markets, social protection systems and social and cultural norms concerning the concept of “generations” and intergenerational equity.

The extent and pace of population ageing is conventionally measured by the old-age dependency ratio, i.e. the number of persons aged 65 and over for every 100 people aged 20-64. As an illustration of the challenge it poses, the dependency ratio across the OECD stood at 20 in 1980; by 2015, this number had risen to 28, and the latest UN population projections suggest it could well double between 2015 and 2050. Such rapid ageing will put strong downward pressure on labour supply, leading to declining real incomes and huge financial pressures on social protection systems unless there is an offsetting increase in employment rates and/or annual working hours or productivity growth. The need to boost employment rates among older workers in order to help offset part of the challenge of an ageing population and work force explains the first part of the title for this paper.

In this paper, I look at how the labour market for older workers has evolved in OECD countries over the past two decades, what are the forces at work, what are the main obstacles to working longer and how might public policies help to overcome them. I also speculate a bit about the future for older workers faced with the challenges and opportunities posed by the 4th Industrial Revolution and the so-called “gig economy”.

Before turning to the meat of my paper, let me define what I mean by an “older worker”. Often, in OECD and EU publications, the term “older worker” is confined to the age group 55-64. However, in recognition of the fact that many workers continue working beyond the age of 65, I will often present data for the age-group 55-74. Unfortunately, even though many workers continue working in OECD countries beyond the age of 74, it is not possible to find comparable time-series data for the age group 75 and over for many countries². For example, while the European Labour Force Survey (EULFS)

¹ Peterson (1999), for example, characterises it as a “threat more grave and certain than those posed by chemical weapons, nuclear proliferation or ethnic strife”. However, for a contrary view, Bloom and Sousa-Poza (2013) state that “for many economists, doomsday scenarios associated with population ageing seem likely to be another example of overblown concern”.

² To cite one example, Australia collects data by individual year of age but does not publish labour force data by five-year age groups above the age of 70.

collects data on employment for those aged 15 and over, there are several exceptions.³ In addition, EULFS data on unemployment are restricted to the age group 15/16-74. For this reason, I have chosen in this paper to adopt the age of 74 as the upper threshold for an older worker.

1. Working Longer

With regard to the employment rate of older workers⁴, the past two decades have witnessed a sharp break in trend compared with the previous four decades when employment rates in most OECD countries declined as many older workers opted to retire before the normal retirement age⁵. Indeed, in that period, many commentators talked about a normal retirement age of 60 or less.

The trend towards early retirement in that period was driven by a range of forces: (i) strong growth in real incomes which increased the demand for leisure and facilitated saving for longer retirement; (ii) the maturation of pension systems in many countries which provided generous retirement benefits relative to wages; and (iii) deliberate public policies to encourage early retirement by older workers in response to the steep hike in unemployment post the two oil shocks of the 1970s in order to make way for increased hiring of youth.

But now the trend to early retirement has been reversed significantly in virtually all OECD countries since the late 1990s. Table 1 shows that the employment rate for the 55-64 age group rose, on average across the OECD area, from 48% in 1990 to over 59% in 2016. Only three countries recorded lower employment rates among older workers in 2016: Greece, Iceland and Turkey. For Greece, this drop is explained by the severe depression which hit the economy following the Eurozone debt crisis. As for Iceland, the drop compared with 1990 was marginal, especially when one notes that Iceland has the highest employment rates among older workers of any OECD country. In the case of Turkey, IMF (2016) argues that the pension system is one of the main culprits since it is relatively generous in international comparison, offering large incentives to retire early.⁶ Another factor behind the drop in older worker employment in Turkey is the ongoing process of rural-urban migration. Many older migrants who were previously classified in the LFS as unpaid family workers, were reclassified as inactive or unemployed after their move.

³ The exceptions are the age-group 15-74 in Denmark, Estonia, Hungary, Latvia, Sweden (from 2001 onwards), Finland, Romania and Norway (from 2006 onwards); 16-74 in Iceland and Norway (2005). In some countries, sample sizes for those employed or unemployed over the age of 74 are too small to be statistically reliable.

⁴ The employment rate of older workers is defined as the number of people employed aged 55-64 (or 55-74) as a proportion of the total population in that age group.

⁵ Of course, early retirement is not a post-WWII phenomenon. Costa (1999) highlighted the steep decline in participation rates among US males aged 65 and over between 1880 and 1990, from 78% to less than 20%. But she also notes that the period from 1950 to 1990 witnessed a fall in the participation rate of US men aged 55-64.

⁶ Under the rules introduced between 1986 and 1992, a Turkish male could retire after being registered with a social security institution for 25 years and having contributed for 5000 days. Since it was possible for youth to register during their studies, years before starting work, the 5000 days (or 15 years of contributions) often became the binding criterion, permitting many workers to retire in their late 40s or early 50s. The subsequent pension reforms in 1999 and 2006 did not restore the minimum retirement age to the statutory retirement age (currently 60 for men and 58 for women). Indeed, the 2006 reform increased the minimum pension eligibility age only after 2036.

**Table 1. Employment Rate for the Age-Group 55-64, 1990-2016 (a)
as a percent of the population aged 55-64**

	1990	2000	2007	2016
Australia	41.5	46.1	56.5	62.5
Austria	28.4 (a)	28.3	36	49.2
Belgium	21.4	26.3	34.4	45.4
Canada	46.2	48.1	57.0	61.6
Chile	..	47.7	54.8	63.8
Czech Republic	31.3 (b)	36.3	46.0	58.5
Denmark	53.6	55.7	58.9	67.8
Estonia	60.4	42.8	59.4	65.1
Finland	42.8	42.3	55.0	61.4
France	35.6	34.3	38.2	49.9
Germany	36.8	37.6	51.3	68.6
Greece	40.8	39.0	42.7	36.3
Hungary	22.9 (c)	21.9	32.2	49.8
Iceland	85.4 (d)	84.2	84.9	84.4
Ireland	38.6 (d)	45.3	54.2	57.2
Israel	48.3	46.5	57.1	66.5
Italy	32.6	27.7	33.7	50.3
Japan	62.9	62.8	66.1	71.4
Korea	61.9	57.8	60.6	66.1
Latvia	..	35.9	58.0	61.4
Luxembourg	28.2	27.2	32.0	40.4
Mexico	54.1 (d)	51.7	54.5	55.0
Netherlands	29.7	37.6	48.8	63.5
New Zealand	41.6	56.9	71.8	76.1
Norway	61.5	67.1	69	72.6
Poland	35.4 (c)	28.4	29.7	46.2
Portugal	47.6	50.8	51.0	52.1
Slovak Republic	21.3 (a)	21.3	35.7	49.0
Slovenia	..	22.7	33.5	38.5
Spain	36.9	37.0	44.5	49.1
Sweden	69.5	65.1	70.1	75.6
Switzerland	63.1 (d)	63.3	67.2	71.5
Turkey	42.7	36.4	27.1	33.4
UK	49.2	50.4	57.3	63.6
USA	54.0	57.8	61.8	61.8
OECD(e)	48.1	47.8	53.5	59.2
Standard Deviation	15.1	14.8	14.1	12.1
Coefficient of Variation	31	31	26	20

Source: *OECD Employment Database, www.oecd.org/employment/database*

.. Data not available.
a. Data refer to 1994.

- b. Data refer to 1993.
- c. Data refer to 1992.
- d. Data refer to 1991.
- e. Weighted average.

**Table 2. Employment Rate for the Age-Group 55-74(a), 1990-2016(b)
as a percent of the population aged 55-74**

	1990	2000	2007	2016
Australia	21.0	23.0	30.6	34.0
Austria	18.3	18.0	22.7	31.3
Belgium	10.0	14.6	20.9	27.5
Canada	29.9	31.0	40.3	44.4
Chile	..	37.3	43.5	51.8
Czech Republic	17.7	18.0	31.6	35.3
Denmark	24.9	33.9	39.7	42.0
Estonia	46.3	29.2	40.2	48.1
Finland	26.7	25.2	36.5	37.7
France	16.5	18.6	23.8	30.0
Germany	17.4	23.6	28.4	44.5
Greece	23.7	23.7	25.8	22.3
Hungary	10.9	13.1	20.0	30.0
Iceland	65.4	61.4	65.5	66.5
Ireland	26.7	30.7	38.7	39.6
Israel	35.0	31.9	42.1	52.5
Italy	16.7	17.0	20.5	30.4
Japan	43.3	39.6	50.0	52.3
Korea	46.0	49.8	51.3	56.2
Latvia	..	24.4	39.1	41.9
Luxembourg	13.7	15.7	18.2	25.1
Mexico	45.5	46.2	47.2	47.5
Netherlands	18.7	23.7	32.8	39.7
New Zealand	27.0	37.8	52.7	58.4
Norway	38.9	42.9	49.0	48.4
Poland	21.3	16.0	20.5	31.1
Portugal	35.2	37.9	38.7	35.7
Slovak Republic	12.7	12.4	22.4	31.5
Slovenia	..	17.2	23.7	24.5
Spain	18.1	20.0	26.6	29.2
Sweden	39.0	41.8	46.8	46.1
Switzerland	41.2	42.3	45.3	48.2
Turkey	37.5	31.6	22.2	27.3
UK	30.2	31.6	38.4	41.9
USA	36.6	41.0	47.6	47.1
OECD c	34.2	32.0	38.2	42.5
Standard Deviation	13	11.9	11.9	10.8
Coefficient of Variation	38	37	31	25

Source: *OECD Employment Database, www.oecd.org/employment/database*

.. Data not available.

a. The upper age limit is 75 and over in Australia, Belgium, France, Germany, Greece, Ireland, Italy in 1990; and in Japan and Poland up to 2000.

b. Data refer to 1995 for Belgium, Czech Republic, Hungary, Luxembourg, Slovak Republic, and Switzerland.

c. Weighted average.

It is instructive to note that some EU countries, where the practice of early retirement was very popular in the 1980s and 1990s such as Belgium, France, the Netherlands and Spain, have all recorded significant increases in older worker employment rates over the past two decades. Nonetheless, if one compares the situations in France and Germany which Tables 1 and 2 show had virtually identical older worker employment rates in 1990, it is striking to see how much the growth of older worker employment in Germany has outstripped that in France over the past two decades: by almost 19 (15) percentage points in 2016 for the age-group 55-64 (55-74). Part of this gap can be explained by the much stronger performance of the German labour market since the Hartz reforms of 2003-2005.

Table 2 extends the coverage of older workers to include the age-group 65-74. This shows an almost identical picture of increasing employment among older workers over the period since 1990. Greece, Portugal and Turkey were the sole exceptions to this rising trend. Another notable feature of the data in Tables 1 and 2 is that there has been significant convergence in older worker employment rates across OECD countries since 1990, as evidence by the steady drop in the coefficient of variation.

Tables A-D in the Appendix disaggregate these trends by the following five-year age groups: 55-59; 60-64; 65-69 and 70-74. They show that the trend towards working longer is a general one across all four cohorts over the past three decades. Not surprisingly, the bulk of the increases in older worker employment was recorded among the two younger cohorts. But it is also evident that the trend to working longer extended to the age group 65 and over in almost all countries. By the year 2016, on average one in every seven persons aged 70-74 were at work compared with just under one in every eleven in 1990. It is also noticeable that the convergence in employment rates across countries has been greatest among the two oldest cohorts, those aged 65-69 and those aged 70-74.

When the trends in older worker employment rates are disaggregated by gender (not shown in Tables 1 and 2), not surprisingly they show a sustained rise between 2000 and 2016 for females aged 55-64 in every OECD country with the sole exception of Turkey where a small decline was recorded. Over the same period employment rates for males aged 55-64 also recorded sizeable employment gains in all but four countries: Greece, Iceland,⁷ Mexico and Portugal.

Similar patterns by gender are apparent for the age-group 65-74. Once again, employment of both older females and males increased in the vast majority of countries though now Poland and Slovenia also recorded drops in employment of both males and females aged 70-74 in addition to the four countries cited in the preceding paragraph.

It is also important to acknowledge that labour market participation differs strongly across socio-economic groups within the older population, even when remaining life expectancies are relatively similar. Low-skilled workers typically tend to have lower employment rates and retire earlier than their high-skilled peers. This pattern has held over the past two decades even as overall older worker employment rates have risen significantly almost everywhere. For example, OECD (2017a, Figure

⁷ The drop in the employment rate in Iceland of 5 percentage points has to be viewed against the fact that the older male employment rate was still the highest across the OECD countries in 2016 at over 89%.

1.13) shows that around 2015 the OECD average employment rate for the low-educated age-group 55-64 was 44% compared with 70% for those with a tertiary-level qualification.⁸

Data on older worker employment rates back to 1980 which are only available for a smaller sample of countries, and are not presented in Tables 1 and 2 or in the Appendix Tables, show that there was a widespread trend towards falling older worker employment rates between 1980 and the mid- to late-1990s. As noted above, this trend to early retirement has now gone sharply into reverse.

In addition, it is important to stress that the generalised trend towards higher employment rates among older workers was not broken by the Great Recession of 2008-2009 – the few exceptions to this stylised fact are countries such as Greece, Ireland, Portugal and Spain which were hard hit by the Eurozone debt crisis⁹.

Finally, evidence presented in OECD (2013a, Chapter 1) covering 25 OECD countries for the period 1997-2011 shows that rising employment rates for older workers over the past two decades did not come at the expense of jobs for youth¹⁰. Thus, one of the principal justifications for public policies to foster early retirement has once again been shown to have no empirical basis to support it.

In sum, there is good news about older workers against the background of universal population ageing: they are working longer almost everywhere and this trend shows no signs of reversing in the immediate future.

2. *Main Forces behind Working Longer*

I would argue that five general forces are driving the working longer trend across OECD countries. First, there has been a generalised drive in public pension policies to encourage this trend¹¹. This has taken several forms. Some countries have abolished a mandatory retirement age for almost all occupations, e.g. the United States took this step in 1986 and the United Kingdom in 2011. There has been a large-scale rollback of early retirement programmes in many countries. Many countries have also raised the statutory retirement age in public pension systems and taken steps to align them for men and women. In addition, there is a growing trend in OECD countries to link the statutory retirement age to life expectancy as a means of ensuring the financial sustainability of public pension systems in the future. Some countries have also introduced positive bonuses for future pensions for those who opt to work beyond the statutory retirement age while others have made it easier to combine receipt of pensions with work income without facing punitive marginal tax rates.

Second, there is a long-term effect favouring working longer via the rising average educational attainments of older age cohorts. It is well known, as noted above, that those with higher education tend to work longer and have better career prospects than those with low education.

Third, the rising labour force participation of women has facilitated working longer by their spouses. OECD (2018) cites evidence from the US and several other OECD countries to the effect that rising labour force participation by married women accounts for a non-negligible rise in older married workers labour force participation.

⁸ Part of this gap can be explained by the association between poor health and lower employment rates, especially after the age of 45. However, research reported in OECD (2017a) shows that only a part of the sharp drop in employment rates after age 55 can be explained by poor health status.

⁹ However, with the sole exception of Greece, older worker employment rates in these countries have rebounded since 2012 as their economies have recovered.

¹⁰ This finding is in line with other studies. See, for example, the country studies cited in Gruber and Wise (2010).

¹¹ See Martin and Whitehouse (2008).

Fourth, improvements in average health status have facilitated many older workers to remain in the labour force even if, as noted above, these improvements are not shared equally across countries or socio-economic groups.

Finally, there has been a wealth effect favouring working longer. The trend slowdown in labour productivity growth combined with widening wage inequality has encouraged many older workers to continue working in order to build up sufficient savings for retirement. In countries where private pensions provide a significant share of expected pension wealth, the financial crisis of 2008-2009, combined with historically low real interest rates, have also added to the financial imperatives in favour of working longer.

My judgement is that these forces driving working longer are not likely to be reversed in the future. For one thing, there is a fairly generalised upward drift in the statutory retirement age from 65 to 67/68 in many OECD countries and the day is surely not far off when 70 becomes the new (temporary) norm. For another, average educational attainment rates continue to increase in most countries, with rising participation in tertiary education. When this is combined with projected improvements in average health status and life expectancy over the coming decades, this augurs well for further increases in older worker employment rates in OECD countries.

At the same time, it is important not to cry victory too soon. For one thing, the rising trend in older-worker employment rates has still not brought us back to where we were in 1980. One way to illustrate this is to look at OECD data on the average effective age of retirement.¹² While this average has risen in almost all OECD countries since the late 1990s, it is still below 1980 levels virtually everywhere.¹³ For another, there still exist incentives to retire early in both public and private pension systems in many countries. For example, in the United States it is possible to claim Social Security benefits at age 62 subject to an actuarial reduction even though the normal retirement age in 2018 is 66 and four months. Many older US workers, especially low-educated males, still opt to take early retirement despite the fact working beyond the normal retirement age attracts a pension bonus.¹⁴

3. Retention and Hiring Rates for Older Workers

It is also important to understand the dynamics behind the rising trend in older worker employment rates. As part of its ongoing Ageing and Employment Policies series of country reports, the OECD decomposes the change in older worker employment into two components: (i) the retention rate, proxied by all employees currently aged 60-64 with job tenure of five years or more as a percentage of all employees aged 55-59 five years previously; and (ii) the hiring rate, proxied by employees aged 55-64 with job tenure of less than one year as a percentage of total employees¹⁵.

Estimates of the retention rate are shown in Table 3 for the period 2005-2015. Unfortunately, the available job tenure data do not permit one to derive comparable data for years prior to 2005, and the OECD database also lacks job tenure data for Israel, Japan, Korea and the United States. Notwithstanding these data issues, Table 3 shows clearly that older workers are being retained longer

¹² Strictly speaking, the concept refers to the average effective age of exit from the labour force. It is computed by OECD as a weighted average of (net) withdrawals from the labour force at different ages over a five-year period for workers initially aged 40 and over. In order to control for shifts in the population age structure over time, withdrawals are estimated based on changes in labour force participation rates rather than levels. These changes are calculated for each (synthetic) cohort divided into five-year age groups.

¹³ See www.oecd.org/emp/average-age-of-retirement.htm

¹⁴ See OECD (2018, Figure 1.11).

¹⁵ So far, the OECD has published seven country reports in the series: Norway [OECD (2013a)]; France [OECD (2014a)]; Netherlands [OECD (2014b)]; Switzerland [OECD (2014c)]; Poland [OECD (2015a)]; Denmark [OECD (2015b)]; and the United States [OECD (2018a)]. Two other reports, for Korea and Japan, are in the pipeline.

by their firms. For example, between 2005 and 2015 the OECD average retention rate rose by 10 percentage points. At the same time, there is only weak evidence of convergence in retention rates across countries as the coefficient of variation declined slightly over the 10-year period.

Table 3. Retention Rate after Age 60 (a),2005-2015

	2005 (b)	2010 (c)	2015
Australia	47.3	49.4	58.7
Austria	20.7	26.6	25.6
Belgium	28.1	34.7	33
Canada	46.4	48	52.8
Czech Republic	27.0	23.9	35.4
Denmark	37.5	37.6	46.6
Estonia	..	46.5	63.2
Finland	43.8	47.3	48.8
France	19.1	22.1	34.7
Germany	34.5	48.8	59.1
Greece	36.9	31.2	22.7
Hungary	27.9	15.5	31.2
Iceland	62.8	68.5	79.1
Ireland	58.5	49.4	58
Italy	31.6	31	52.1
Latvia	56.1	32.6	52.9
Luxembourg	23.2	31.1	22.3
Mexico	..	45.2	46.6
Netherlands	..	48.7	62.2
Norway	..	72.7	70.5
Poland	27.7	36.4	43.7
Portugal	49.9	50.9	50.6
Slovak Republic	21.6	26.5	30.1
Slovenia	..	22.1	18.2
Spain	52.7	45.2	50.3
Sweden	64.6	60.9	64.7
United Kingdom	42.0	44.1	47.7
United States (d)	44.5	..	53.2
OECD	38.8	45.1	48.6
Standard Deviation	14.1	14.1	15.6
Coefficient of Variation	36	31	32

.. Data not available.

- a. Retention rate is measured as all employees currently aged 60-64 with job tenure five years or more as a percentage of all employees aged 55-59 five years previously.
- b. Data refer to 2006 for Australia, Czech Republic, Latvia and the Slovak Republic.
- c. Data refer to 2009 for Australia; 2011 for the Netherlands; 2012 for Norway.
- d. U.S. data are not comparable with other countries since the job tenure intervals are four-years previously – see OECD (2018, Annex Table 2.A.1). Data refer to 2006 and 2016.

Table 4. Hiring Rates for Older Workers, 2000-2016 (a)**Employees aged 55-64 with job tenure of less than one year as a percentage of total employees**

	2000	2007	2012	2016
Australia	9.3	11.5	10.1	8.2
Austria	..	5.7	5.5	5.6
Belgium	2.9	3.1	2.5	2.2
Canada	9.4	9.8	8.6	8.1
Chile	28.7	18.7
Czech Republic	18.7	8.7	6.7	6.0
Denmark	7.5	11.2	8.1	10.2
Estonia	..	8.7	6.2	8.9
Finland	6.6	7.1	7.0	7.5
France	4.1	4.6	5.7	4.4
Germany	5.1	5.2	5.4	5.2
Greece	5.8	5.7	4.6	6.7
Hungary	4.7	6.0	9.1	9.2
Iceland	7.4	8.2	7.0	7.0
Ireland	7.5	5.8	4.7	6.6
Italy	4.6	4.3	4.2	4.4
Korea	46.9	44.7	38.7	33.9
Latvia	9.3	11	10.5	8.6
Luxembourg	0.7	2.0	2.6	5.3
Mexico	..	16.7	13.8	13.0
Netherlands	..	2.6	4.1	5.1
Norway	..	5.1	4.5	3.5
Poland	8.9	9.3	6.7	6.5
Portugal	4.4	4.5	5.8	5.7
Slovak Republic	..	7.0	5.0	7.6
Slovenia	..	3.4	4.6	4.5
Spain	8.9	7.7	5.3	7.0
Sweden	4.8	6.9	6.8	8.7
Turkey	..	21.8	30.0	31.2
UK	8.7	7.6	6.1	7.8
USA	11.2	11.4	9.4	10.2
OECD (b)	9.3	9.1	8.9	9.2

..

Standard Deviation	9.4	7.8	8.2	6.9
Coefficient of Variation	101	86	92	75

.. Data not available.

- a. Data refer to 2001 for Australia, Latvia and the Slovak Republic; 2003 for Korea; 2006 for the US; 2015 for Australia.
- b. Weighted average.

In all but five countries, retention rates increased between 2005 and 2015. It is notable that three of the exceptions – Greece, Ireland and Spain – were hard hit by the Eurozone debt crisis, though in the latter two cases retention rates rose between 2010 and 2015 when the labour market rebounded after 2012. The two other countries where retention rates fell between 2005 and 2015 were Latvia and Luxembourg.

We now turn to the hiring picture for older workers. Table 4 presents data on hiring rates for the age-group 55-64 for the period 2000-2016¹⁶. On average across OECD countries, hiring rates of older workers are typically between one-third and half of the hiring rates of prime-age workers, and far below those of youth.

Table 4 shows that about two-thirds of OECD countries have either recorded a drop in older worker hiring rates or relative stability over the period 2000 to 2016. Among the 12 countries which recorded an increase in the hiring rate, it is noticeable that the Nordics feature among them as well as Estonia. There is also a very large variation in hiring rates across countries and over time. The highest hiring rates by far are recorded in Korea and Turkey reflecting specific characteristics of the labour markets for older workers in these countries. For example, Korea has a relatively high share of temporary/contingent jobs, many of which are taken by older workers who lose their regular jobs as they approach retirement and are obliged to take insecure jobs in order to supplement their income. Turkey also has a relatively high share of older workers on temporary contracts.¹⁷ Not surprisingly, the advent of the Great Recession led to a drop in older worker hiring rates in most countries. However, as labour demand recovered post-2012, the later period has witnessed a recovery in hiring rates.

In sum, the main driving force behind the dynamics of rising older worker employment rates almost everywhere is that older workers are staying on longer with their firms. Increased hiring rates for older workers are a much less significant factor over the past two decades. This latter finding is worrying since one might have expected, *ceteris paribus*, to see a generalised increase in the hiring of older workers as the size of new youth cohorts entering the labour force declines in most countries. What might explain it?

4. Possible Explanations for Low and Stable Hiring Rates for Older Workers

One obvious explanation is that, despite the ubiquity of anti-age discrimination legislation in almost all OECD countries nowadays, employers still have an implicit bias against hiring older workers. There is strong supporting evidence from many countries that this is indeed part of the story. For example,

¹⁶ These data are only a proxy for hiring rates since they are computed based on job tenures of less than 1 year with the same employer. Hence, they underestimate hiring rates in connection with short-duration jobs. It should also be noted that the OECD job tenure data base does not cover Israel, Japan or New Zealand.

¹⁷ In both Korea and Turkey, self-employment is above the OECD average and there is a relatively large incidence of self-employment among the older work force. This serves to boost the observed hiring rate when, as is the case in Table 4, the dependent work force is the denominator in the calculation.

Rich (2014) surveys field experiments which have sought to measure age discrimination in hiring in a range of countries. On the basis of her meta-analysis of such studies, she concludes:

“One consistent finding is identified from these studies of age discrimination which is that an older worker needs to make between two to three times as many job applications as a young worker to get a positive response, where “old” can range between late thirties and early fifties”[Rich (2014, p.23)].¹⁸

Hence, ageism is alive and thriving so far as hiring decisions are concerned. Applewhite (2016) provides many examples from the United States to back up this statement, and she also highlights how ageism makes older workers more vulnerable to firing. She argues that almost all of the negative stereotypes about older workers (e.g. they cannot master new skills, are prone to sickness absence, are burnt out, etc.) are baseless in fact. Yet the evidence suggests that many employers in OECD countries either continue to believe these stereotypes or are unwilling to take a risk in the hiring decision when confronted with older candidates.

Yet another explanation focuses on the nexus between ageing, skills, productivity and wages. Data from the OECD Survey of Adult Skills from 2011-2012 covering over 20 countries show that the age-cognitive skills profile typically peaks around the age of 30 before declining slowly among older cohorts¹⁹. But there are large dispersions in skills within age groups, and also large cross-country differences in age-skills profiles. It is notable, however, that age gaps in skills are much larger at the bottom than at the top of the skills distribution, suggesting that more able or better motivated workers experience lower skills declines as they age.

Martin (2017) draws upon data from the OECD Survey of Adult Skills to highlight the negative correlation across countries between age and proficiency in so-called “ICT-literacy skills”.²⁰ Youths in all countries covered in the Survey tended to outscore older workers on these digital skills though the gaps varied significantly across countries, with the Nordics and the Netherlands featuring as countries where older workers scored better.

It is tempting to make a direct leap from these age-skills profiles to argue that individual productivity falls off as workers age. Unfortunately, it is extremely difficult to measure age-productivity profiles with much accuracy. Nevertheless, Skirbekk (2004) surveys the results of using alternative methods of estimating how individual productivity changes with age. He concludes that individual productivity tends to decline from age 50 onwards. Productivity declines at older ages are particularly marked for job tasks where physical strength, problem solving, learning and speed are of the essence, while for tasks which rely heavily on experience and verbal competences, older worker’s productivity remains relatively high.

Given the measurement difficulties around individual or team productivity, many researchers have opted instead to focus on the role of seniority pay in the hiring decision. Seniority pay measures the degree to which wages are tied to job tenure within a firm. In all OECD countries, wages typically rise with tenure in a firm until they peak when workers are aged around 55, and then decline slowly.

Recent OECD evidence suggests that a large seniority wage premium is a disincentive to hiring older workers, especially in countries where employment protection legislation (EPL) is relatively strict for permanent workers and relatively lax for temporary workers²¹. This situation prevails in many OECD

¹⁸ This conclusion is backed by a recent field experiment from the UK conducted by Drydakis *et al.* (2017) which concludes that age discrimination in hiring persists at alarming levels.

¹⁹ See Martin (2018).

²⁰ Strictly speaking, the skill domain in question is called “problem solving in technology-rich environments” but given the nature of the competences being tested it is a good shorthand to refer to the domain as “ICT-literacy”.

²¹ See OECD (2017b).

countries, especially in Southern Europe despite recent reforms to loosen EPL for permanent workers in Greece, Italy and Spain.

Hence, it seems reasonable to conclude that a combination of seniority pay plus strict EPL for permanent workers accounts for part of the low hiring rate for older workers. But ageism in the workplace and a perceived lack of digital skills on the part of many older workers also play their part as barriers to hiring older workers.

5. *What Might be Done to Increase Hiring and Retention of Older Workers?*

One might hope that as populations age and work forces begin to shrink, discrimination in hiring decisions against older workers might wane as employers are faced with smaller cohorts of youth and prime-age workers as potential new hires. Better enforcement of existing age-discrimination legislation and publicising the benefits of a more age-diverse work force with concrete firm-specific examples might help lower the barriers to hiring older workers. However, given the entrenched nature of ageism in the workplace, this will require a major cultural change on the part of managers and human resource departments so it is unlikely to come quickly.

Help might, however, be at hand from an unexpected source: the use of data analytics and machine learning to help guide hiring decisions. Two recent papers demonstrate how they might help overcome the ageism bias in hiring. Hoffman *et al.* (2016) show how the use of a multiple-choice job test administered to potential candidates for job vacancies may help managers in making good hiring choices²². They analyse how the introduction of job testing and giving hiring managers access to the test scores, while not obliging them to factor the test scores into their hiring choices, affected their hiring decisions and the resulting performance of those who got hired. Their results suggested that hiring against the test recommendations produced worse outcomes in terms of job durations for the hired workers --their preferred outcome metric. This highlights how data analytics can help offset the effects of managerial and HR screeners mistakes and biases in hiring.

Cowgill (2018) shows how a machine-learning algorithm can help improve resume screening, interview outcomes, job offer acceptances and productivity on the job for new hires compared with choices made by human screeners. The key here is that the human screeners exhibit both bias and inconsistent judgements (what Cowgill calls “noise”) in screening resumes and deciding which candidates should be interviewed and who should get a job offer. The machine’s advantage over the human screeners arose because it selected more candidates from non-elite institutions, those who lacked job referrals, those who did not have much prior work experience, those with atypical credentials and those with strong soft skills.

Now these are specific cases tied to specific occupations: a low-skilled service sector job in Hoffman *et al.* (2016), computer programmers in Cowgill (2018). Hence, it is not clear how generalizable the findings are to other sectors/occupations²³. In addition, neither study makes use of demographic controls so it is impossible to assess how the use of job tests or machine learning could overcome the ageism effect in hiring. Nevertheless, the use of such technology to help offset managerial bias and inconsistency in hiring decisions is likely to increase in the future and it will be important to assess whether it can diminish the ageism factor.

²² The job test in question is an online questionnaire which covers computer skills, cognitive skills, personality traits and various job scenarios. It is designed by a job-testing firm which sells its services to

²³ It is interesting to note, however, that the French National Employment Agency (Pole Emploi) has developed a skills-based recruitment method under which candidates are selected for employer interviews on the results of aptitude tests rather than CVs. It is argued that this method is more favourable to less-qualified older workers. For more details, see Sonnet *et al.* (2016) and OECD (2018b).

Encouraging the spread of part-time working among older workers, especially males, would also help the goal of working longer. At present, the large majority of older part-timers are female: in 2016, on average across OECD countries, 71% of all part-timers aged 55-64 were women.²⁴ In addition, the share of males aged 55-64 in total part-time employment fell on average over the period 2000-2016 from almost 33% to 29%²⁵. This suggests that it will not be an easy task to encourage more older males to opt for part-time work as a route to keeping them active in the labour market longer and easing their transition to retirement.

Another route would be to reduce the size of seniority pay premia at the expense of greater reliance on performance-pay systems as workers job tenure with the firm increases. Again, this will not be easy to achieve since seniority pay is so closely linked to collective bargaining patterns and workers and their unions are strongly attached to this principle. In addition, having an element of seniority in the pay structure serves as an incentive for new hires to work hard and invest in firm-specific skills while at the same time reducing monitoring costs for the firm as it seeks to minimise shirking²⁶. While relative wages are likely to decline for older workers relative to young workers as the weight of the former increases in the work force, this process too is likely to be slow and to vary greatly across OECD countries in line with the relative bargaining strengths of unions and employers.

Active labour market policies (ALMPs) are another vehicle which could help older workers find a new job. Many countries target the older unemployed in such measures, with hiring subsidies, training and schemes to promote entrepreneurship being particularly popular for this group. The question is: what do evaluations of such ALMPs targeted to older workers tell us about their outcomes?

Unfortunately, it is not easy to answer this key question. The recent meta-analyses of large numbers of ALMP evaluations covering many OECD and non-OECD countries by Card *et al.* (2015) and Escudero *et al.* (2017) do not distinguish older workers as a separate target group. Instead, they focus on the outcomes by gender and also for youth. My reading of the evaluation literature suggests a mixed picture with regard to the success of such measures in promoting hiring of older workers, though it appears that training tied to local labour market needs and subsidies for entrepreneurship and self-employment can prove beneficial for the older unemployed. But in order to make a real dent in the issue countries would have to increase significantly their spending on such programmes. In 2015, for example, OECD countries on average spent just over 0.5% of GDP on all ALMPs. In addition, it would be necessary to increase the degree of targeting on the older unemployed, but this would create a potential conflict with the observed preference on the part of most OECD countries to target the young unemployed.

Looking ahead, in order to increase hiring and retention of older workers as workforces age, it will be necessary to boost investment in lifelong learning. While all OECD countries pay lip service to this ideal, it is far from being realised in reality. OECD data on adult participation in education and training activities show very large differences across countries: participation rates in 2012 or 2015 were highest in the Nordics, New Zealand, the Netherlands, Canada and the US; the lowest participation rates were recorded in the Southern European countries, Slovakia, Turkey, Poland and France. Among the adult work force, participation rates were relatively low for older workers in all countries. It seems that neither employers nor their older workers see great benefits to investing much in training to upgrade skills. It is particularly worrying that OECD data highlight that large proportions of older workers in many countries lack proficiency in the digital skills needed for success in the labour markets of the 21st century.

At the same time, OECD data highlight the ubiquity of the so-called “Matthew effect” in the access by adults to lifelong learning opportunities. This term was coined by the sociologist Robert Merton

²⁴ For the age-group 55 and over, the female share was slightly lower in 2016 at 66%.

²⁵ Among males aged 55 and over, the share of part-timers on average across the OECD countries fell from 40.4% in 2000 to 33.6% in 2016.

²⁶ The classic reference here is Lazear (1981).

drawing on the well-known quotation from St. Matthew's Gospel: "For unto everyone that hath shall be given, and he shall have abundance." In all OECD countries, those workers with the most education and skills participate far more in learning opportunities than their peers with less education and skills. However, it is noticeable that the size of the Matthew effect differs significantly across countries. The Nordics, the Netherlands, Australia and New Zealand do significantly better than other countries in ensuring more equal access to formal and informal learning opportunities for adults across age, education and income.

Going forward, countries will have to invest more in lifelong learning and in ensuring more equal access to it, especially on the part of less-educated adults. Possible innovations in this area could include greater reliance on individual training accounts which are attached to individual workers and can be transferred between employers. These accounts could consist of money and/or accumulated training hours: the US provides an example of the former and France of the latter. The money or number of training hours could be larger for less-skilled, less-educated workers in order to minimise the Matthew effect. Funding for the training accounts could come from employers and/or the public purse. At the same time, in order to induce firms to invest more in training their work force, especially those who are less-skilled, it may be necessary to offer specific tax incentives tied to training.

But it has to be recognised that it will be a hard sell to both older workers and their employers. Neither at present sees a strong incentive to invest significantly in skills upgrading given the short period remaining to amortise the costs of training before the worker retires and the high opportunity cost of leisure for many older workers. It may be a better idea to invest more in skills upgrading for mid-career workers, i.e. those aged from 35-50, so that they can remain active longer in the work force as they age. In any event, there needs to be a greater focus on upgrading digital skills for both mid-career and older workers, especially as the 4th Industrial Revolution is now underway.

6. *Can the Gig Economy Ride to the Rescue of Older Workers?*

Some commentators, including a recent Special Report in the Economist, argue that the advent of digitalisation and the so-called "gig economy" could provide a host of new work opportunities for many older workers who want to combine work and leisure past the normal retirement age²⁷. They point to examples such as Uber where a quarter of all drivers are aged over 50, as a model. They also highlight the fact that older people are much more likely to start a new firm than younger workers and to be self-employed. But they tend to ignore the fact that the incidence of self-employment has always been higher among older workers.

As for the spread of the gig economy favouring older workers over younger workers, this may be true for certain occupations and tasks but not for others. To take one example, UpWork is currently the world's largest freelancer platform. It has 12 million registered freelancers on its books and 5 million registered clients. An ongoing study at the Ludwig-Maximilian University in Munich uses a sample of over 60 000 freelancers registered on the platform and the clients who offered them contracts²⁸. Typically, the purchasers of freelance services come from the OECD countries while two-thirds of the freelancers come from South-East Asia. While many freelancers are older workers, the bulk are aged under 30.

Before we hail the gig economy as a new source of jobs for older workers, we need to get a much better grip on the phenomenon. Unfortunately, the standard sources of labour market data, such as household surveys or administrative data, are singularly ill-equipped to capture this phenomenon²⁹. Data on self-

²⁷ See The Economist (2017).

²⁸ For details, see Kretschmer (2017).

²⁹ See Abraham *et al.* (2017) for a detailed critique of available U.S. data sources in terms of their capacity to track the growth of the gig economy.

employment cover a multitude of categories and temporary work, as defined and measured in household surveys, fails to capture many freelance tasks.

Data on multiple job holders might seem to hold more promise as it seems plausible that many gig workers have more than one job. However, as highlighted by Abraham *et al.* (2017), the share of multiple job holders in total employment has been stable for many years in the US at around 5%, as measured by the Current Population Survey. This relative stability hardly fits with the notion that the gig economy is spreading rapidly. The data on multiple job-holding in Europe show a similar picture. Zangelidis (2014) uses data from the European Labour Force Survey for the period 1998-2011 to show that the multiple job holding rate averages around 3%, ranging from less than 1% to a high of 9%. Nor is there any evidence of a clear trend in the multiple job-holding rate over the period.³⁰ Clearly, a major effort is needed to rejig household surveys and strengthen their links with administrative data such as tax returns if we are to get a better handle on the gig economy and its potential for promoting longer working lives.

Even if the gig economy were to provide an expanding source of jobs for older workers, it would take quite a long time to build up scale. Nor is it the only possible saviour for older workers. A glance at the experience of the Japanese labour market over the past two decades is instructive in this regard. The working-age population in Japan has fallen sharply since 2000 but its labour force remained very stable over the same period. This stability was due to a rapid increase in the labour force participation rate among Japanese women aged 25-54. Much of the increase in female employment was concentrated in the healthcare services industry which has expanded rapidly in Japan to match the needs of the rapid growth in the elderly population. Japan is the leader in terms of ageing population among the OECD countries but others will soon follow. This, in turn, should fuel the demands for health and long-term care services and many older workers could find new jobs in that sector, enabling them to combine caring with carrying on working.

7. Concluding Remarks

There is general agreement that one way to combat the challenges of population ageing is to encourage older workers to remain active in the work force longer. The past two decades have yielded good news and bad news on this front.

The good news is that almost all OECD countries have recorded increases in older worker employment rates over the past two decades; in some countries the increases have been very substantial indeed. Nor have the increases been confined to those older workers aged less than 65; older workers aged 65 to 74 have also recorded rising employment rates over the same period. It is also encouraging that the Great Recession of 2008-9 did not interrupt this generalised increase in older worker employment rates with the sole exceptions of a few countries which were especially hard hit by the Eurozone debt crisis.

The bad news is that the increase in older worker employment rates was not driven by an increased willingness on the part of employers to hire older workers as their share of the labour force has increased. Instead, in virtually every country, the rise in older worker employment reflected an increase in their retention rate within firms, i.e. older workers staying on longer with the same firm. The bulk of OECD countries did not record an increase in the hiring rate for older workers over the past two decades. Thus, it seems that there are still large barriers against hiring older workers. Some combination of ageism in the workplace, seniority pay out of line with older worker productivity, strict employment protection legislation for permanent workers and relatively low “digital skills” may all contribute to this lack of willingness to hire older workers. Hence, public policy will have to pay greater attention to

³⁰ Zangelidis (2014, Table 2) shows that individuals with a second job in the EU-27 countries plus Iceland and Norway worked almost 13 hours per week in that job, equivalent to about a quarter of their total weekly hours worked.

reducing these barriers to hiring older workers if it wants to turn the mantra *Live Longer, Work Longer* into a reality³¹.

It is possible that if the gig economy expands significantly in the future, as many commentators believe will be the case, that this will provide many new job openings for older workers. It is, however, only speculation at this stage since there is no agreed definition of the gig economy nor how to measure it using standard labour force survey data or administrative records. Thus, it is impossible to know whether older workers are disproportionately represented or not among the gig workforce or to hazard a prediction as to how their numbers will develop in the future. It should be a priority for policy makers to agree upon a workable definition of the gig economy and develop and implement data instruments to measure its scale. Only then will we be able to judge whether the rise of the gig economy will serve to boost labour demand for older workers or not.

³¹ The OECD Council has recently adopted a set of policy recommendations which, if implemented by its member countries, would go a long way to achieving this objective. See OECD (2015c) for details. More targeted country-specific recommendations can be found in the seven country reports published to date as part of the OECD's Ageing and Employment Policies series. See footnote 14 above for details on the country reports.

References

- Abraham, K.G., J.C. Haltiwanger, K. Sandusky and J.R. Spletzer (2017), “Measuring the Gig Economy: Current Knowledge and Open Issues”, U.S. Census Bureau, March, mimeo.
- Applewhite, A. (2016), This Chair Rocks: A Manifesto Against Ageism, Networked Books.
- Bloom, D.E. and A. Sousa-Poza (2013), “Ageing and Productivity: Introduction”, IZA Discussion Paper No. 7205, Bonn, February.
- Card, D., J.Kluve and A. Weber (2015), “What Works? A Meta-Analysis of Recent Labor Market Program Evaluations”, IZA Discussion Paper No. 9236, Bonn, July.
- Costa, D.L. (1998), The Evolution of Retirement: An American Economic History 1880-1990, Chicago: University of Chicago Press.
- Cowgill, B. (2018), “Bias and Productivity in Humans and Algorithms: Theory and Evidence from Resume Screening”, Columbia Business School, Columbia University, 29 January.
- Drydakis, N., P. MacDonald, V.Bozani and V. Chiotis (2017), “Inclusive Recruitment? Hiring Discrimination Against older Workers”, IZA Discussion Paper No. 10957, Bonn, August.
- Escudero, V., J. Kluve, E.L. Mourello and C. Pignatti (2017), “Active Labour Market Programmes in Latin America and the Caribbean: Evidence from a Meta-Analysis”, IZA Discussion Paper No. 11039, Bonn, September.
- Gruber, J. and D.A. Wise (eds.) (2010), Social Security Programs and Retirement Around the World: the Relationship to Youth Employment, Chicago: University of Chicago Press.
- Hoffman, M., L.B. Kahn and D. Li (2017), “Discretion in Hiring”, NBER Working Paper No. 21709, September. <http://www.nber.org/papers/w21709>
- Kretschmer, T. (2017), “The Gig Economy: How do online labor markets change the way people work and their careers?” Presentation at the Kiel Institute for the World Economy Workshop on “Shaping Digitalization at a Global Level”, Kiel, 19 September.
- Lazear, E. P. (1981), “Agency, Earnings Profiles, Productivity, and Hours Restrictions”, American Economic Review, Vol. 71, September, pp. 606-620.
- Martin, J.P. and E. Whitehouse (2008), “Reforming Retirement-Income Systems: lessons from the Recent Experiences of OECD Countries”, IZA Discussion Paper No. 3521, Bonn, May.
- Martin, J. P. (2017), “Policies to Expand Digital Skills for the Machine Age”, IZA Policy Paper No. 123, Bonn, January.
- Martin, J.P. (2018), “Skills for the 21st Century: Findings and Policy Lessons from the OECD Survey of Adult Skills”, OECD Education Working Papers, No. 166, OECD Publishing, Paris. <http://dx.doi.org/10.1787/96e69229-en>. Also published as IZA Policy Paper No.138, Bonn, January 2018. <http://ftp.iza.org/pp138.pdf>
- OECD (2006), Live Longer, Work Longer, OECD Publishing, Paris.
- OECD (2013a), OECD Employment Outlook 2013, OECD Publishing, Paris. http://dx.doi.org/10.1787/empl_outlook-2013-en
- OECD (2013b), Ageing and Employment Policies: Norway 2013: Working Better with Age, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264201484-en>

OECD (2014a), Ageing and Employment Policies: France 2014: Working Better with Age, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264207523-en>

OECD (2014b), Ageing and Employment Policies; Netherlands 2014: Working Better with Age, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264208155-en>

OECD (2014c), Veillissement et politiques de l'emploi: Suisse 2014: Mieux travailler avec l'age, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264222283-fr>

OECD (2015a), Ageing and Employment Policies : Poland 2015: Working Better with Age, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264227279-en>

OECD (2015b), Ageing and Employment Policies:Denmark 2015: Working Better with Age, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264235335-en>

OECD (2015c), Recommendation of the Council on Ageing and Employment Policies, C(2015) 172/CORR1, Paris, 14 December.

OECD (2017a), Preventing Ageing Unequally, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264279087-en>,

OECD (2017b), Identifying Ways of Raising Effective Retirement Ages, Report for Work Stream 3: “Impact of the Wage-Skill Relationship on the Labour Demand for Older Workers,” mimeo.

OECD (2018a), Ageing and Employment Policies: United States 2018: Working Better with Age and Fighting Unequal Ageing, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264190115-en>

OECD (2018b), Key Policies to Promote Longer Working Lives in France: Country Note 2007-2017, OECD Publishing, Paris.

Peterson, P.G. (1999), “Grey Dawn: the Global Ageing Crisis”, Foreign Affairs, January/February.

Rich, J. (2014), “What Do Field Experiments of Discrimination in Markets Tell Us? A Meta-Analysis of Studies Conducted since 2000”, IZA Discussion Paper No. 8584, Bonn, October.

Skirbekk, V. (2004), “Age and Individual Productivity: a Literature Survey”, Vienna Yearbook of Population Research, Verlag der Osterreichischen Akademie der Wissenschaften, Vienna.

Sonnet, A., H. Olsen and T. Manfredi (2016), “Towards More Inclusive Ageing and Employment Policies: the Lessons from France, the Netherlands, Norway and Switzerland”, De Economist, Vol. 162, December, pp. 315-339.

The Economist (2017), “The New Old”, Special Report: The Economics of Longevity, 8 July.

Zangelidis, A. (2014), “Labour Market Insecurity and Second Job-Holding in Europe”, July. <http://dx.doi.org/10.2139/ssrn.2615268>

Table A. Employment Rate for the Age-Group 55-59, 1990-2016 (a)
as a percent of the population aged 55-59

	1990	2000	2007	2016
Australia	52.1	57.2	66.4	70.4
Austria	42.6	41.9	52.1	67.1
Belgium	31.2	40.8	48.9	63.2
Canada	57.0	59.3	67.1	70.9
Chile	..	54.3	61.7	69.0
Czech Republic	46.2	50.6	63.3	81.0
Denmark	69.3	72.9	79.8	80.9
Estonia	68.1	54.8	74.2	77.5
Finland	60.5	59.4	67.8	75.6
France	51.9	53.7	55.4	70.7
Germany	52.6	56.7	66.7	79.4
Greece	48.8	48.1	53.5	46.8
Hungary	32.2	33.5	48.0	70.0
Iceland	88.6	87.6	89.4	85.7
Ireland	44.9	53.2	61.7	66.1
Israel	57.9	55.9	64.0	71.7
Italy	42.7	36.9	46.0	62.2
Japan	71.2	73.1	74.5	79.9
Korea	68.0	62.1	65.2	70.9
Latvia	..	48.9	71.9	70.9
Luxembourg	40.2	38.9	48.3	59.2
Mexico	57.6	56.6	59.8	60.6
Netherlands	43.7	53.5	65.5	72.9
New Zealand	58.3	67.3	78.4	79.9
Norway	70.2	77.1	78.4	79.9
Poland	42.8	37.0	36.8	61.7
Portugal	55.3	57.6	59.0	63.8
Slovak Republic	36.2	34.3	50.3	70.5
Slovenia	..	30.5	45.2	57.6
Spain	44.6	46.3	55.1	59.3
Sweden	82.1	77.9	79.8	83.2
Switzerland	74.5	77.7	79.9	81.5
Turkey	47.1	40.2	29.7	38.0
UK	63.2	63.2	68.9	73.4

USA	64.7	67.3	69.7	68.9
OECD e	58.8	59.1	63.2	68.6
Standard Deviation	14.1	14.2	13.4	10.1
Coefficient of Variation	24	24	21	15

Source: *OECD Employment Database, www.oecd.org/employment/database*

- .. Data not available.
- a. Data refer to 1991 for Iceland, Ireland, Mexico, Switzerland;
1992 for Hungary, Poland; 1993 for the Czech Republic;
1994 for Austria, Slovak Republic.
- b. Weighted average.

Table B. Employment Rate for the Age-Group 60-64, 1990-2016(a)
As a percent of the population aged 60-64

	1990	2000	2007	2016
Australia	31.1	32.6	44.8	53.5
Austria	14.0	11.8	17.4	26.9
Belgium	11.1	12.1	17.2	25.6
Canada	34.9	34.2	44.6	51.0
Chile	..	39.7	46.9	57.6
Czech Rep.	17.5	16.9	25.7	38.3
Denmark	37.5	33.7	38.6	54.7
Estonia	52.3	31.7	39.6	55.0
Finland	25.2	23.4	39.1	47.4
France	18.9	13.7	15.7	27.9
Germany	20.2	20.0	32.9	56.0
Greece	32.3	31.3	31.2	25.3
Hungary	13.3	7.9	13.2	32.2
Iceland	81.0	79.9	79.2	82.9
Ireland	32.5	36.0	45.3	47.0
Israel	37.7	36.9	46.9	61.1
Italy	21.9	18.4	19.4	36.9
Japan	53.4	51.0	55.5	63.6
Korea	53.4	53.0	55.0	59.6
Latvia	..	23.3	41.3	51.5
Luxembourg	16.1	14.5	11.5	13.8
Mexico	49.6	46.1	48.1	48.0
Netherlands	14.9	18.8	29.6	53.0
New Zealand	24.9	44.2	63.8	71.7
Norway	53.6	54.0	58.8	65.2
Poland	27.8	20.4	18.4	30.5
Portugal	38.9	44.0	42.0	39.3
Slovak Rep.	6.7	6.1	15.4	27.0
Slovenia	..	14.3	17.1	18.1
Spain	28.7	27.0	32.9	36.8
Sweden	57.1	48.3	60.7	67.7
Switzerland	51.3	46.5	53.2	59.6
Turkey	37.7	32.1	23.7	28.2
UK	35.0	36.1	44.6	52.2
USA	43.4	46	51.7	53.8
OECD(b)	36.6	35.1	41.5	48.9
Standard Deviation	16.8	16.2	16.9	16.4
Coefficient of Variation	46	46	41	34

Source: *OECD Employment Database, www.oecd.org/employment/database*

.. Data not available.

- a. Data refer to 1991 (Iceland, Ireland, Mexico, Switzerland);
1992(Hungary, Poland); 1993 (Czech Republic); 1994
(Austria, Slovak Republic).
- b. Weighted average.

Table C. Employment Rate for the Age-Group 65-69, 1990-2016 (a)**As a percent of the population aged 65-69**

	1990	2000	2007	2016
Australia	9.2	13.0	20.2	25.9
Austria	7.2	5.0	7.2	8.6
Belgium	..	2.9	3.2	4.7
Canada	11.3	11.0	18.1	24.9
Chile	..	26.5	30.9	39.9
Czech Rep.	..	7.6	9.4	12.2
Denmark	..	8.0	12.6	19.1
Estonia	35.0	16.9	26.2	31.8
Finland	7.2	4.9	9.7	13.8
France	4.6	3.0	3.2	6.3
Germany	..	5.1	7.1	15.5
Greece	..	11.1	10.5	8.7
Hungary	8.6	3.4	4.9	5.3
Iceland	64.3	49.3	49.3	56.3
Ireland	15.5	14.0	18.5	19.4
Israel	18.5	14.9	21.3	39.3
Italy	6.8	6.3	7.3	9.1
Japan	..	34.3	35.8	42.8
Korea	..	43.0	43.0	45.0
Latvia	..	12.6	23.6	19.6
Luxembourg	..	3.4	1.1	5.3
Mexico	43.4	41.4	38.6	38.6
Netherlands	5.3	6.0	9.8	13.1
New Zealand	10.2	16.2	29.8	42.6
Norway	33.2	18.1	22.2	28.0
Poland	..	10.8	8.5	9.9
Portugal	22.2	26.5	27	18.8
Slovak Rep.	..	2.0	2.3	5.6
Slovenia	..	12.7	12.7	5.2
Spain	..	3.8	5.3	5.3
Sweden	11.2	14.5	14.7	22.0
Switzerland	23.9	17.7	17.0	22.9
Turkey	29.8	28.6	16.9	19.5
UK	10.2	11.2	15.2	21.0
USA	20.3	23.7	28.7	31.0
OECD (b)	17.6	15.9	20.9	25.5
Standard Deviation	15.1	12.1	12.2	13.9
Coefficient of Variation	86	76	58	55

Source: *OECD Employment Database, www.oecd.org/employment/database*

- .. Data not available.
- a. Data refer to 1991 France, Iceland, Ireland, Mexico, Switzerland; 1992 for Hungary; 1994 for Austria, Italy; 2002 for the Czech Republic, Japan, Poland; 2015 for Luxembourg.
- b. Weighted average.

Table D. Employment Rate for the Age-Group 70-74, 1990-2016 (a)
as a percent of the population aged 70-74

	1990	2000	2007	2016
Australia (b)	3.1	3.2	4.0	6.0
Austria	3.6	3.0	4.9	6.0
Belgium	..	1.4	1.8	1.5
Canada	5.5	5.5	7.4	12.6
Chile	..	17.1	20.8	25.6
Czech Rep.	..	3.7	4.1	5.4
Denmark	..	5.2	6.0	8.8
Estonia	..	7.9	8.9	16.3
Finland	3.6	2.4	3.9	6.1
France	1.8	1.0	1.4	2.7
Germany	..	2.4	3.3	6.6
Greece	..	3.7	3.7	1.2
Hungary	..	1.6	1.2	2.6
Iceland	28.2	16.6	14.8	19.2
Ireland	8.1	7.8	8.6	10.6
Israel	15.6	11.5	12.4	20.2
Italy	3.1	2.7	3.1	3.7
Japan	..	22.0	21.7	25.2
Korea	..	26.7	32.7	32.6
Latvia	..	5.9	11.9	10.5
Luxembourg	..	1.2	0.2	..
Mexico	35.8	31.5	30.6	29.3
Netherlands	3.3	3.7	4.7	6.0
New Zealand	5.9	6.8	13.4	22.2
Norway	..	3.6	6.6	7.2
Poland	..	7.2	5.4	3.9
Portugal	12.2	19.0	20.4	11.5
Slovak Rep.	..	0.7	1.1	2.1
Slovenia	..	7.8	9.5	4.3
Spain	..	1.1	1.8	1.2
Sweden	5.3	5.6	6.4	9.0
Switzerland	14.0	10.1	9.4	13.2
Turkey	15.9	18.8	11.8	11.5
UK	5.1	4.8	6.5	10.5
USA	10.9	13.1	16.6	18.4
OECD (c)	9.2	8.7	12.3	14.6
Standard Deviation	9.27	7.79	7.97	8.52
Coefficient of Variation	101	90	65	58

Source: *OECD Employment Database, www.oecd.org/employment/database*

- .. Data not available.
- a. Data refer to 1991 for France, Ireland, Italy, Mexico, Switzerland; 1994 for Austria; 2001 for Denmark; 2002 for the Czech Republic, Japan, Poland.
- b. Data refer to the age group 70 and over.
- c. Weighted average.