

EL FUTURO DEL TRABAJO

(CON ESPECIAL ATENCIÓN AL TRABAJO DE LOS GRADUADOS
UNIVERSITARIOS)

Juan Francisco Jimeno Serrano*

3as. Jornadas sobre el Postgrado en Iberoamérica: El futuro del empleo

Sevilla, 23 de enero de 2019

(*Opiniones personales)

INTRODUCCIÓN

- Discusión conceptual
 - ¿El futuro del trabajo? o ¿El futuro del empleo? . (Trabajo y empleo NO son sinónimos)
 - Tendencias tecnológicas (qué producimos y cómo lo hacemos) frente a legislación laboral (organización y regulación de las relaciones laborales)
- Expectativas sobre el futuro
 - Nueva revolución tecnológica en un mundo global: Robótica, Inteligencia Artificial (IA), “Globótica”.
 - Aumento del “empleo independiente” (empleo autónomo). Implicaciones para el trabajo y el empleo de los graduados universitarios
- Observaciones factuales
 - Polarización
 - Desajuste ocupacional
 - Situación laboral de posgraduados (doctores)

DISCUSIÓN CONCEPTUAL





DISCUSIÓN CONCEPTUAL

- Trabajo: factor de producción que combinado con otros factores (capital , input intermedios, etc.) genera bienes y servicios.
 - Tareas (ocupaciones): Las distintas formas en las que el trabajo entra en la “función de producción”
 - Habilidades (*skills*). Cualificaciones necesarias para llevar a cabo tareas laborales.
- Empleo: Forma contractual mediante la que el trabajo se aplica a la producción.
 - Empleo asalariado
 - Empleo autónomo (o independiente)
- Los cambios tecnológicos tienen tres efectos:
 - Aumento de la productividad
 - Desplazamiento de trabajadores (desaparición de tareas)
 - Reinserción de trabajadores (creación de nuevas tareas)
- y pueden también causar cambios en “las formas de empleo” (Uberization, Gig economy....)

DISCUSIÓN CONCEPTUAL

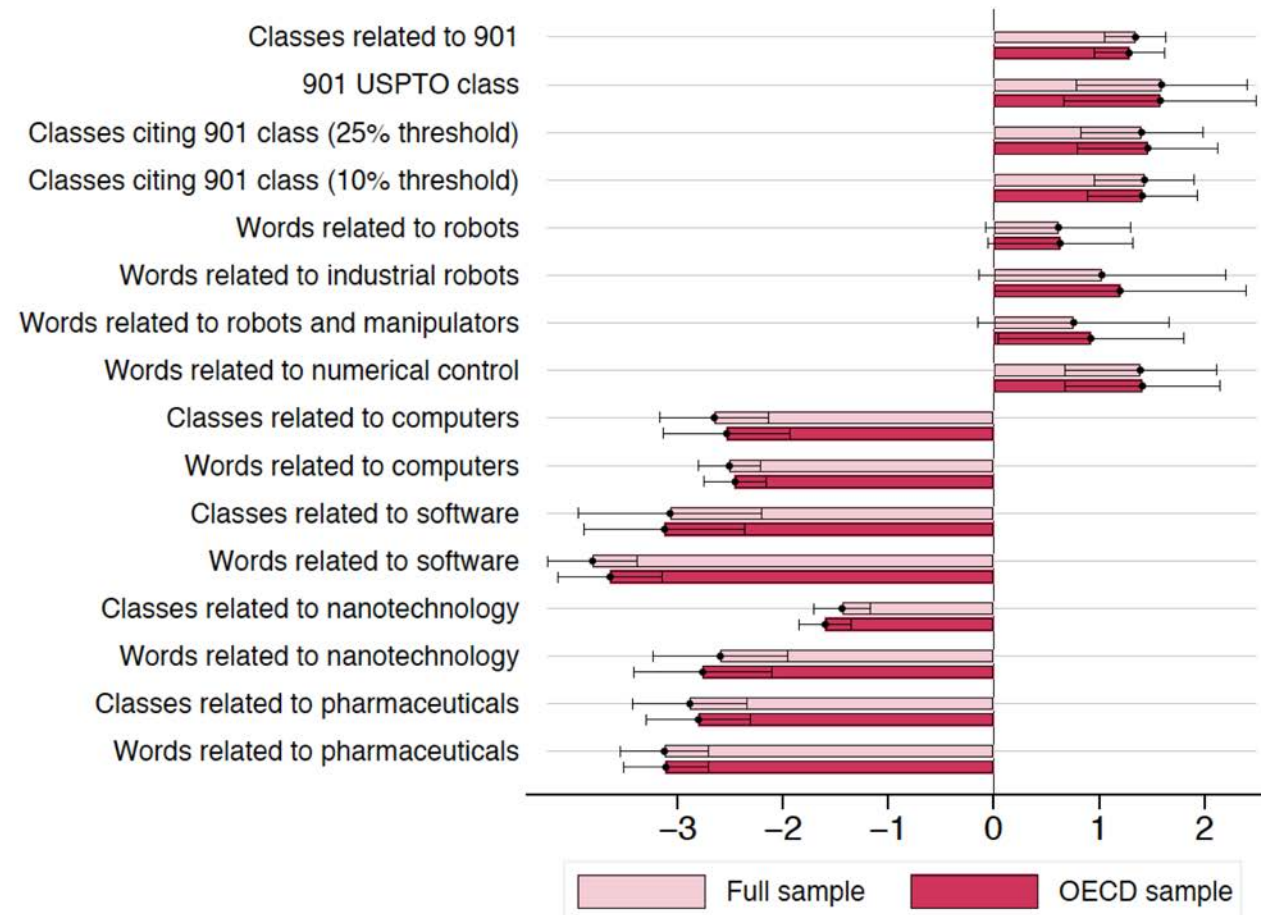
- Los cambios tecnológicos hacen que algunas tareas desaparezcan y que se creen otras nuevas
 - Progreso tecnológico sesgado a favor de las cualificaciones (PTSFC)
 - Progreso tecnológico ahorrador de trabajo
- Enfoque convencional:
 - PTSFC: Desparecen tareas de baja cualificación, reinserción de trabajadores por aumentos del nivel educativo y formación profesional. Cambia la composición ocupacional del empleo (pero no el empleo agregado disponible)
 - Polarización: Desaparecen en mayor medida las tareas rutinarias de nivel educativo medio.
- Nuevas tendencias
 - Máquinas que sustituyen “cabezas”, no “manos”: Google: *“Humans work themselves out of jobs by teaching the machines how to act”*
 - Tareas automatizables a lo largo de todo el rango de cualificaciones personales
 - Favorecen el empleo independiente

DISCUSIÓN CONCEPTUAL

- Nueva era: Revolución Industrial 4.0 + Cambios demográficos profundos
 - *Baby boomers*, reducciones de la fertilidad y de la mortalidad  Menos trabajadores y más viejos
 - Menos trabajadores  Incentivos a la automatización
 - Trabajadores más viejos  Menos innovación y menos emprendimiento
- Dos restricciones importantes:
 - Disyuntiva inversión en innovación frente a inversión en automatización
 - Automatización como actividad subsidiaria de la innovación (no se puede automatizar las tareas que no se han inventado)
- Implicaciones para estudios de posgrado:
 - La transformación de información en conocimiento (Enseñanza escolástica frente a Enseñanza “funcional”).
 - Las formas de producir (y adquirir) información y de convertir esta en conocimiento están ampliándose considerablemente (Big data, *Machine Learning*,...)
 - Robots y algoritmos  Importancia de STEM (Ciencias, Tecnología, Ingeniería y Matemáticas)
 - Impulsar la innovación (creación de nuevas “tareas”)

ACEMOGLU AND RESTREPO (2017)

EVOLUCION DEL NUMERO DE PATENTES POR CLASES



EVIDENCIA EMPÍRICA : POLARIZACIÓN

EVIDENCIA EMPÍRICA: POLARIZACIÓN

SERIEs (2018) 9:215–248
https://doi.org/10.1007/s13209-018-0177-1



ORIGINAL ARTICLE

Explaining job polarisation in Spain from a task perspective

Raquel Sebastian¹

Received: 28 May 2017 / Accepted: 21 April 2018 / Published online: 10 May 2018
© The Author(s) 2018

Abstract This paper presents new evidence on the evolution of job polarisation in Spain between 1994 and 2014. After showing the U-shaped relationship between employment share growth and job's percentile in the wage distribution, I use the task approach to investigate the main determinants behind job polarisation. Using the European Working Condition Survey I analyse in detail the task content of the jobs which display the most significant employment changes. I show that changes in employment shares are negatively related to the initial level of routine. I then explore the impact of computerisation on routine task inputs and I find that the routine measure is negatively related to computerisation. Finally, by using information on past jobs, I provide evidence on the displacement of middle-paid workers. Results suggest that they did not predominantly relocate their labour supply to bottom-paid occupations: while non-graduate middle workers move towards bottom occupations, graduate middle employees shift towards top occupations. This fact suggests that supply-side changes are important factors in explaining the expansion at the lower and upper tail of the employment distribution.

Keywords Job polarisation · Structural change · Routine employment · Occupational mobility

JEL Classification J21 · J24 · R23 · R12

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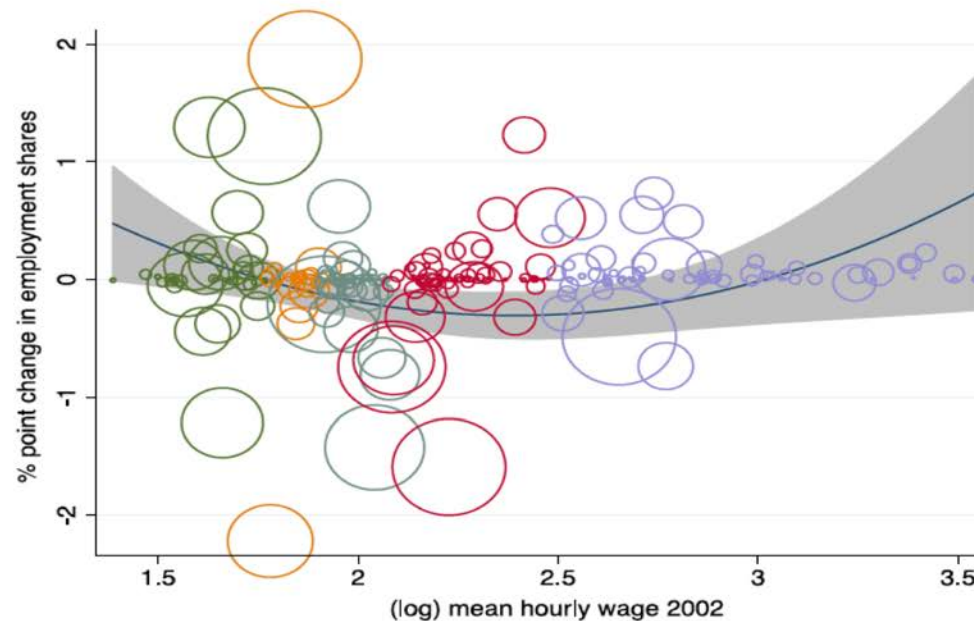


Fig. 1 Employment shares growth in Spain (1994–2014) by mean hourly wage. *Notes* scatter plot and quadratic prediction curve. The dimension of each circle corresponds to the number of observations within each ISCO-88 two-digit occupation and NACE.Rev.1 one-digit occupation in 1994; the grey area shows 95% confidence interval. Employment shares are measured in terms of workers. Colours represent the quintile of each job (green, first quintile; yellow, second quintile, grey, third quintile; red, fourth quintile; and violet, fifth quintile). *Sources*: author's analysis from the Spanish Labour Force Survey (1994, 2014), and the Structure of Earnings Survey (2002) (color figure online)

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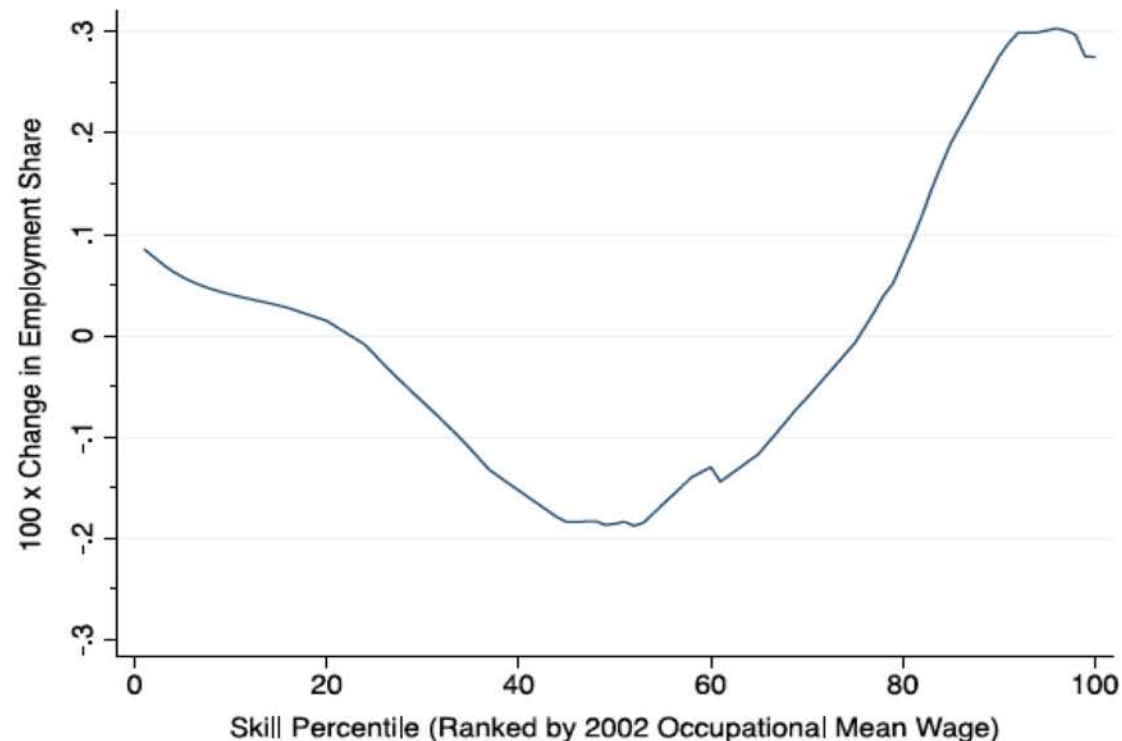


Fig. 2 Smoothed changes in Employment by wage percentile (1994, 2014). *Notes* the figure plots log changes in employment share by 2002 job skill percentile rank using a locally weighted smoothing regression (bandwidth 0.75 with 100 observations), where skill percentiles are measured as the employment-weighted percentile rank of a job's mean log wage in the 2002 ESS. *Sources:* author's analysis from the Spanish Labour Force Survey (1994, 2014), and the Structure of Earnings Survey (2002)

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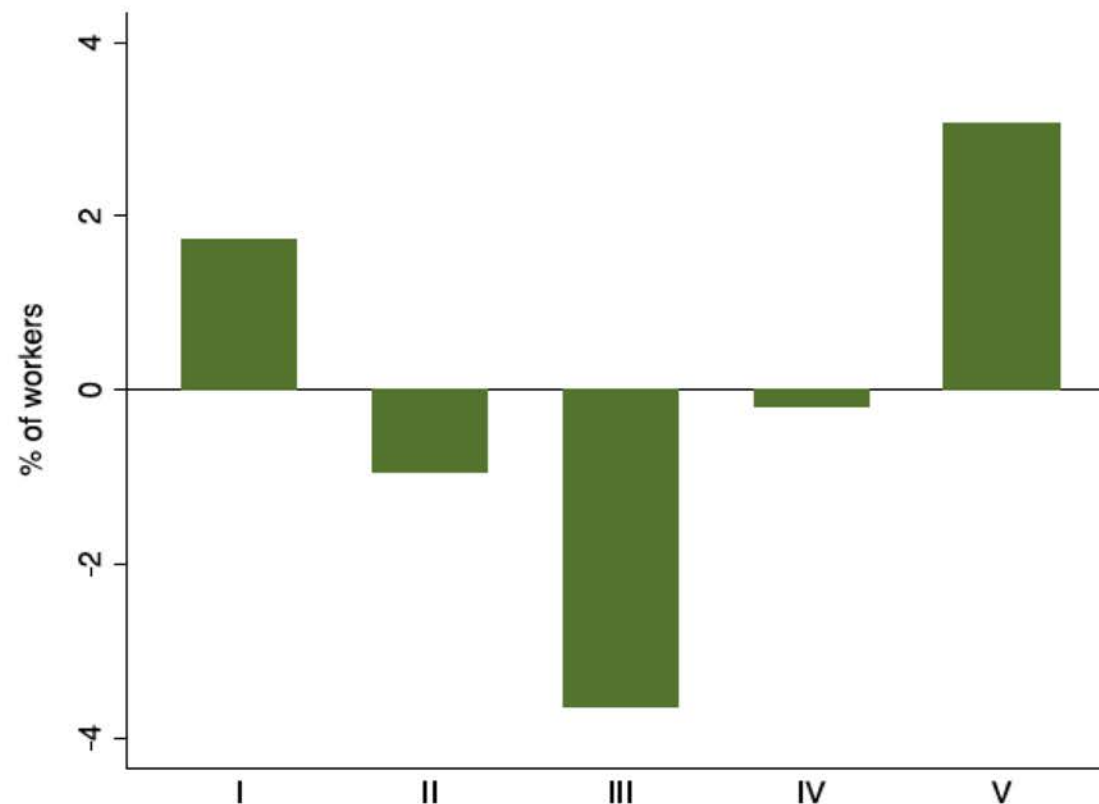


Fig. 3 Relative net employment change (1994, 2014) ranked by 2002 wage mean. *Notes* jobs wage quintiles are based on two-digit occupation and one-digit industry and on mean wages in 2002. It shows the relative net employment change quintiles (in percentage points). *Sources:* author's analysis from the Spanish Labour Force Survey (1994, 2014), Earnings Structure Survey (2002)

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Ocupaciones	% 1994	Cambio percentual 1994-2014	Salario medio	Abstracto	Rutinario	Manual
1 Ejecutivos	2.160	0.72	22.30	0.72	0.33	0.31
2 Profesionales científicos e intelectuales	12.32	1.80	15.23	0.76	0.36	0.30
3 Técnico y profesional de nivel medio	7.625	4.91	12.11	0.67	0.40	0.35
4 Empleados de oficina	12.1	-2.65	8.48	0.54	0.61	0.40
8 Operadores de instalaciones y máquinas	13.48	-2.77	7.82	0.48	0.71	0.64
7 Oficiales, operarios y artesanos	23.75	-3.96	7.33	0.60	0.70	0.62
5 Trabajadores de los servicios personales y de protección	15.68	1.80	6.39	0.53	0.52	0.59
6 Agricultores y trabajadores agropecuarios y pesqueros	0.10	-0.04	6.36	-	-	-
9 Trabajadores no cualificados	12.61	0.19	5.42	0.53	0.50	0.75

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B: Bajo
 M: Medio
 T: Alto

		B	M	T			B	M	T
<i>Trabajadores no graduados</i>									
		1997					2008		
	B	0.75	0.20	0.05		B	0.80	0.12	0.08
1994	M	0.10	0.84	0.06	2005	M	0.22	0.73	0.05
	T	0.10	0.10	0.80		T	0.12	0.15	0.83
		2000					2015		
	B	0.76	0.16	0.08		B	0.81	0.15	0.04
1997	M	0.13	0.81	0.07	2012	M	0.17	0.71	0.12
	T	0.10	0.12	0.82		T	0.13	0.15	0.82
<i>Trabajadores graduados</i>									
		1997					2008		
	B	0.73	0.20	0.07		B	0.75	0.24	0.01
1994	M	0.06	0.87	0.07	2005	M	0.04	0.79	0.17
	T	0.08	0.10	0.82		T	0.02	0.07	0.91
		2000					2015		
	B	0.75	0.21	0.04		B	0.71	0.21	0.09
1997	M	0.08	0.83	0.09	2012	M	0.04	0.81	0.15
	T	0.04	0.14	0.82		T	0.01	0.07	0.92

EVIDENCIA EMPÍRICA: DESAJUSTE OCUPACIONAL

Table 1: Overeducation Rates: Comparison of ESRI Estimates from the EU Labour Force Survey (LFS) data averaged over 2001-2011 and estimates of Flisi et al. (2014) based on Programme for the International Assessment of Adult Competencies (PIAAC) data in 2014

	ESRI Estimate (2001-2011 average)	Estimates based on PIAAC from EC (2014)
Austria	0.19	0.23
Belgium	0.26	0.24
Bulgaria	0.11	
Cyprus	0.31	0.31
Czech Republic	0.08	0.12
Germany	0.18	0.22
Denmark	0.18	0.31
Estonia	0.24	0.26
Spain	0.30	0.34
Finland	0.14	0.17
France	0.17	0.17
Greece	0.28	
Hungary	0.13	
Ireland	0.33	0.33
Italy	0.24	0.24
Lithuania	0.25	
Luxembourg	0.17	
Latvia	0.19	
Netherlands	0.22	0.22
Poland	0.11	0.11
Portugal	0.18	
Romania	0.10	
Sweden	0.14	0.19
Slovenia	0.09	
Slovak Republic	0.08	0.10
UK	0.21	0.20

Table 2: Key Characteristics of Country Level Overeducation Series based on ESRI Estimates from EU-LFS data, 2001-2011 (27 Countries)

	Male > Female	Male < Female	Positive Trend	Negative Trend	No Trend
Austria		X			X
Belgium		X			X
Bulgaria		X			X
Czech			X		
Germany		X			X
Denmark	X				X
Estonia		X			X
Spain		X	X		
Finland		X	X		
France		X			X
Greece	X				X
Hungary		X	X		
Ireland					X
Iceland	X				X
Italy	X		X		
Lithuania	X			X	
Luxemburg	X				X
Latvia		X		X	
Netherlands	X				X
Norway			X		
Poland		X	X		
Portugal		X	X		
Romania			X		
Sweden		X	X		
Slovenia		X	X		
Slovak	X		X		
UK		X			X

EVIDENCIA EMPÍRICA: DESAJUSTE OCUPACIONAL

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DISCUSSION PAPER SERIES

IZA DP No. 10678

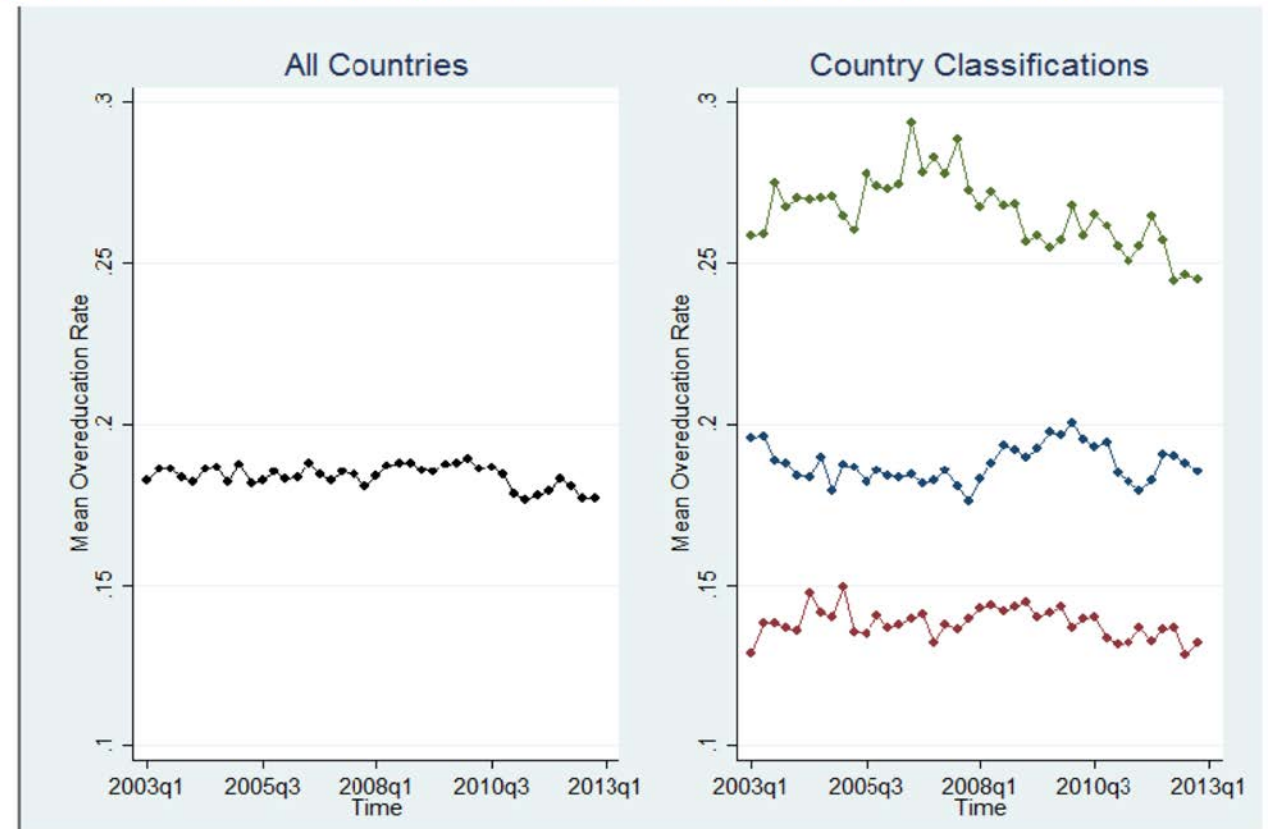
**Overeducation in Europe:
Trends, Convergence and Drivers**

Seamus McGuinness
Adele Bergin
Adele Whelan

MARCH 2017

Figures

Figure 1: Mean Overeducation Rate (restricting to full-time employees), 2003-2013.



Country Classification Legend: 1=Central (Blue); 2=Eastern (Red); 3=Periphery (Green).

EVIDENCIA EMPÍRICA: DESAJUSTE OCUPACIONAL

Experiencia laboral durante los estudios y desajuste educativo en el primer empleo en los graduados universitarios españoles

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Resumen

En este trabajo estudiamos el impacto que tienen en el desajuste educativo en el primer empleo de los jóvenes graduados en España diferentes tipos de experiencia laboral durante los estudios: la adquirida mediante trabajos remunerados y la resultante de prácticas externas. Identificamos tres tipos de desajuste entre la cualificación y el primer empleo de los universitarios (sobreeducación, en conocimientos o habilidades y por rama de estudios). Nuestra conclusión fundamental es que la experiencia laboral (remunerada o vía prácticas curriculares) durante los estudios solo reduce las posibilidades de desajuste en el primer empleo si está relacionada con los estudios y no es esporádica.

Palabras clave: desajuste educativo, experiencia laboral, prácticas externas, graduados universitarios.

Clasificación JEL: J24, I23, I26.

Abstract

In this paper we study the impact of work experience while in university on graduates' first educational mismatch in Spain. We analyse two types of labour market experience, namely, paid work and placement positions. We identify three types of mismatch in graduates' first jobs: overeducation, skills mismatch and mismatch in the field of studies. Our main conclusion is that labour market experience (either via paid employment or with curricular placements) during undergraduate education only reduces mismatch risks in the first graduates' jobs when it is related with their studies and not sporadic.

Keywords: education mismatch, work experience, university placements, university graduates.

JEL classification: J24, I23, I26.

CUADRO 1
DISTRIBUCIÓN DE JÓVENES EGRESADOS E INCIDENCIA DEL DESAJUSTE EN EL PRIMER EMPLEO SEGÚN EXPERIENCIA ADQUIRIDA MEDIANTE TRABAJOS REMUNERADOS DURANTE LOS ESTUDIOS

Experiencia laboral durante los estudios adquirida fuera del entorno universitario	%	Sobre-educación	Desajuste conocimientos y habilidades	Desajuste área de estudios
No trabajó durante los estudios	49,08	30,42	25,19	22,72
Sí trabajó durante los estudios	50,92	41,12	33,63	31,97
<i>Características del empleo de los jóvenes que trabajaron durante los estudios</i>				
Trabajo relacionado con los estudios	39,07	32,40	20,03	17,21
<i>De los cuales,</i>				
Esporádico durante menos de 3 meses	30,77	36,71	25,19	23,65
A jornada parcial durante más de 3 meses	45,80	32,33	18,97	16,41
A jornada completa durante más de 3 meses	23,43	27,01	15,33	10,35
Trabajo NO relacionado con los estudios	60,93	46,58	42,10	27,62
<i>De los cuales,</i>				
Esporádico durante menos de 3 meses	49,74	38,10	32,66	31,36
A jornada parcial durante más de 3 meses	38,97	54,40	50,72	49,76
A jornada completa durante más de 3 meses	11,28	56,29	53,18	54,50

FUENTE: Encuesta de Inserción Laboral de los Titulados Universitarios 2014 (INE).

EVIDENCIA EMPÍRICA: DESAJUSTE OCUPACIONAL

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Keywords: education mismatch, work experience, university placements, university graduates.

JEL classification: J24, I23, I26.

CUADRO 2
DISTRIBUCIÓN DE JÓVENES EGRESADOS E INCIDENCIA DEL DESAJUSTE EN EL PRIMER EMPLEO SEGÚN TIPO DE PRÁCTICAS EN EMPRESAS, INSTITUCIONES O SIMILARES REALIZADAS DURANTE EL PERIODO DE FORMACIÓN

Experiencia laboral durante los estudios adquirida en el entorno universitario	%	Sobre-educación	Desajuste conocimientos y habilidades	Desajuste área de estudios
<i>Prácticas curriculares</i>				
No las realizó	29,37	36,05	33,77	30,91
Sí las realizó	70,63	36,26	28,12	26,41
<i>Duración de las prácticas curriculares</i>				
De 1 a 3 meses	37,90	42,76	34,06	31,30
De 4 a 6 meses	30,79	39,27	28,83	28,02
De 7 a 9 meses	9,93	30,29	22,48	21,72
De 10 a 12 meses	8,48	22,56	17,16	16,68
Más de un año	7,99	17,55	15,66	12,87
La realizó pero NS/NC la duración	4,91	34,55	29,82	27,96
<i>Prácticas extracurriculares</i>				
No las realizó	65,13	36,22	29,49	27,88
Sí las realizó	34,87	36,14	30,30	27,45
<i>Duración de las prácticas extracurriculares</i>				
De 1 a 3 meses	38,05	38,91	31,86	30,23
De 4 a 6 meses	27,09	36,91	31,44	27,58
De 7 a 9 meses	8,78	36,94	30,32	27,75
De 10 a 12 meses	12,77	31,06	26,89	23,77
Más de un año	9,33	28,40	24,44	19,76
La realizó pero NS/NC la duración	3,99	37,80	32,68	29,95

FUENTE: Encuesta de Inserción Laboral de los Titulados Universitarios 2014 (INE).

EVIDENCIA EMPÍRICA: POSTGRADUADOS

OECD publishing

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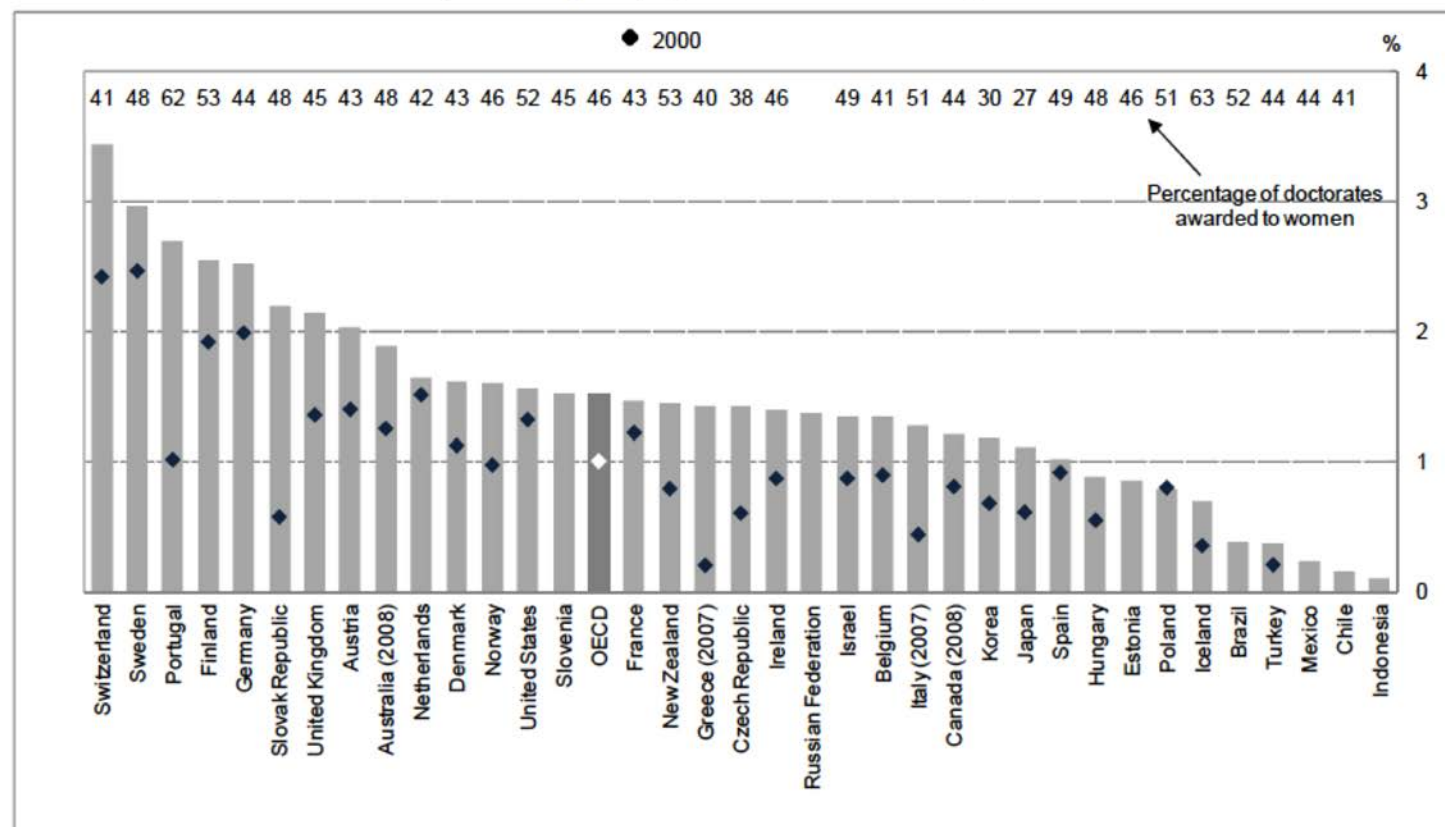
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Careers of Doctorate Holders

ANALYSIS OF LABOUR MARKET AND MOBILITY INDICATORS

Laudeline Auriol, Max Misu, Rebecca Ann Freeman

Figure 1. Graduation rates at doctoral level 2000 and 2009
As a percentage of population in reference age cohort



Source: OECD (2011), Education at a Glance 2011: OECD Indicators and (2009) Education at a Glance 2009: OECD Indicators, OECD, Paris.

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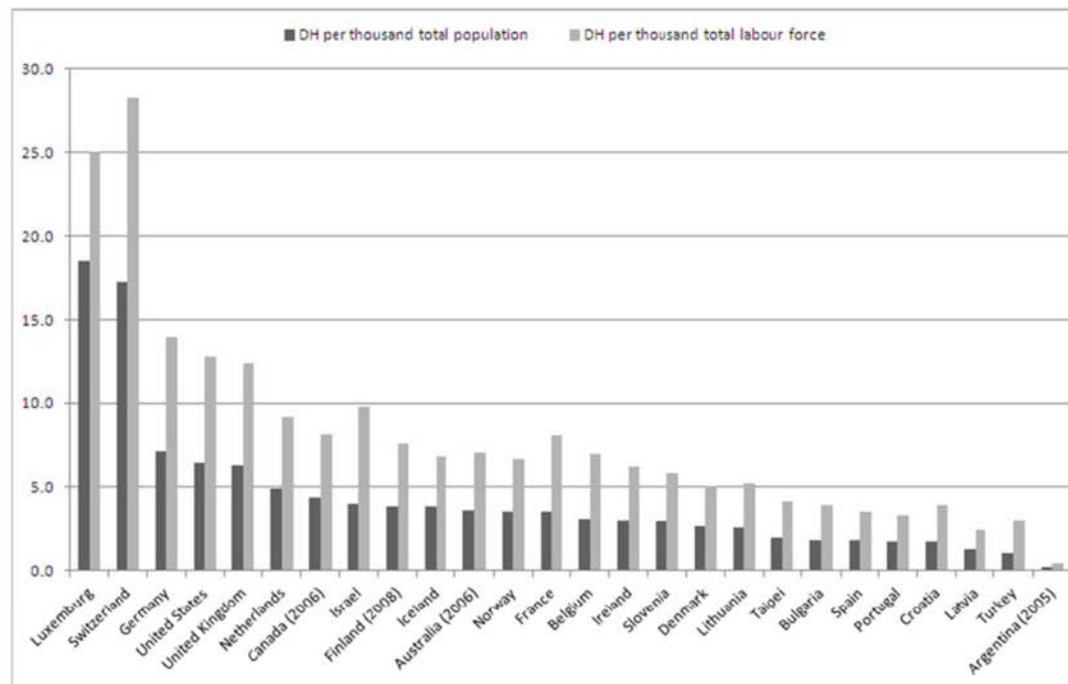
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Figure 2. Doctorate holders per thousand total population and per thousand total labour force 2009



Notes:

*Data for the Netherlands and Spain refer to graduation years 1990 onwards. For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Chinese Taipei only include those PhD in National Profiles of Human Resources in Science and Technology (NPHRST) made by STPI, NARL, Chinese Taipei (<http://hrst.stpi.narl.org.tw/index.htm#noticeChinese>).

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010; OECD Main science and technology indicators, OECD Education attainment database, US Census Bureau (ACS, 2009).

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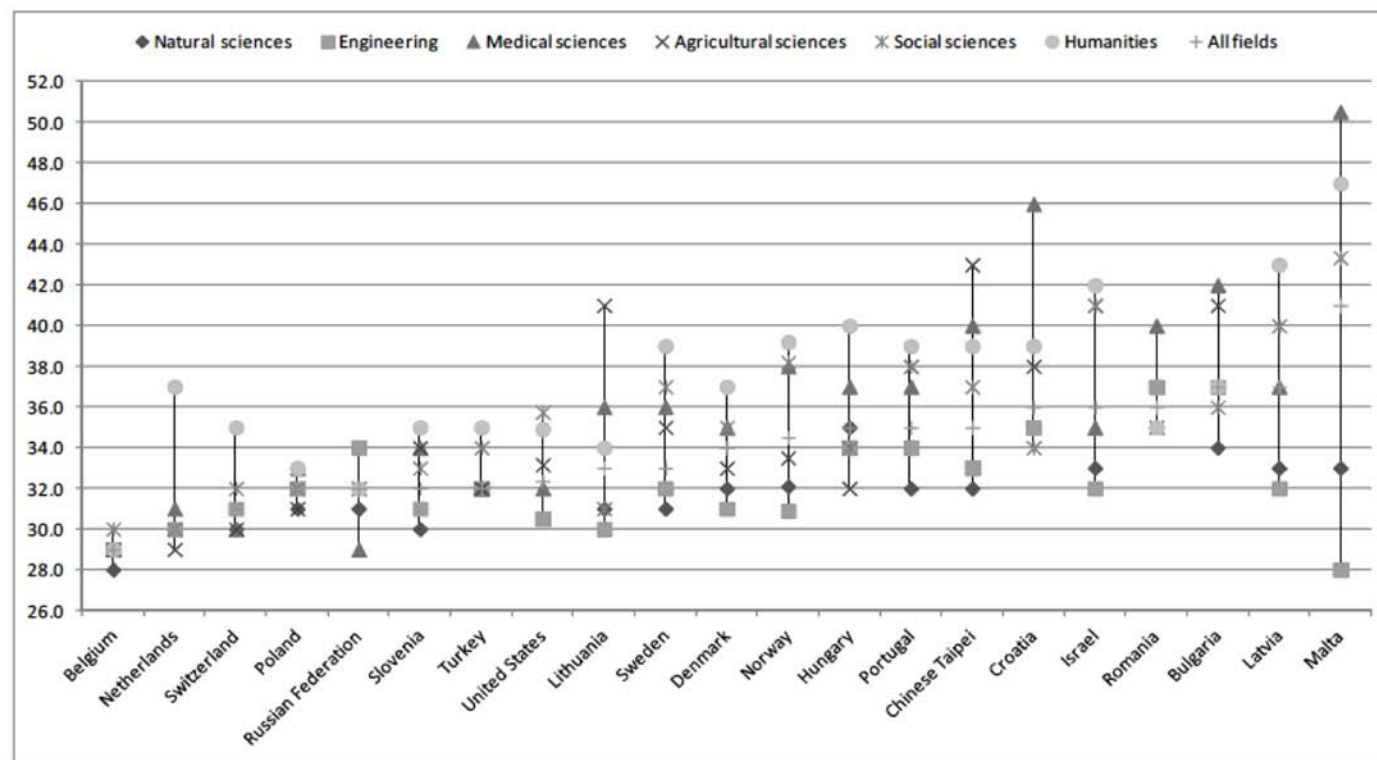
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Figure 3. Median age at graduation of recent doctorate recipients 2009



Notes:

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Chinese Taipei only include those PhD in National Profiles of Human Resources in Science and Technology (NPHRST) made by STPI, NARL, Chinese Taipei (<http://hrst.stpi.narl.org.tw/index.htm#noticeChinese>).

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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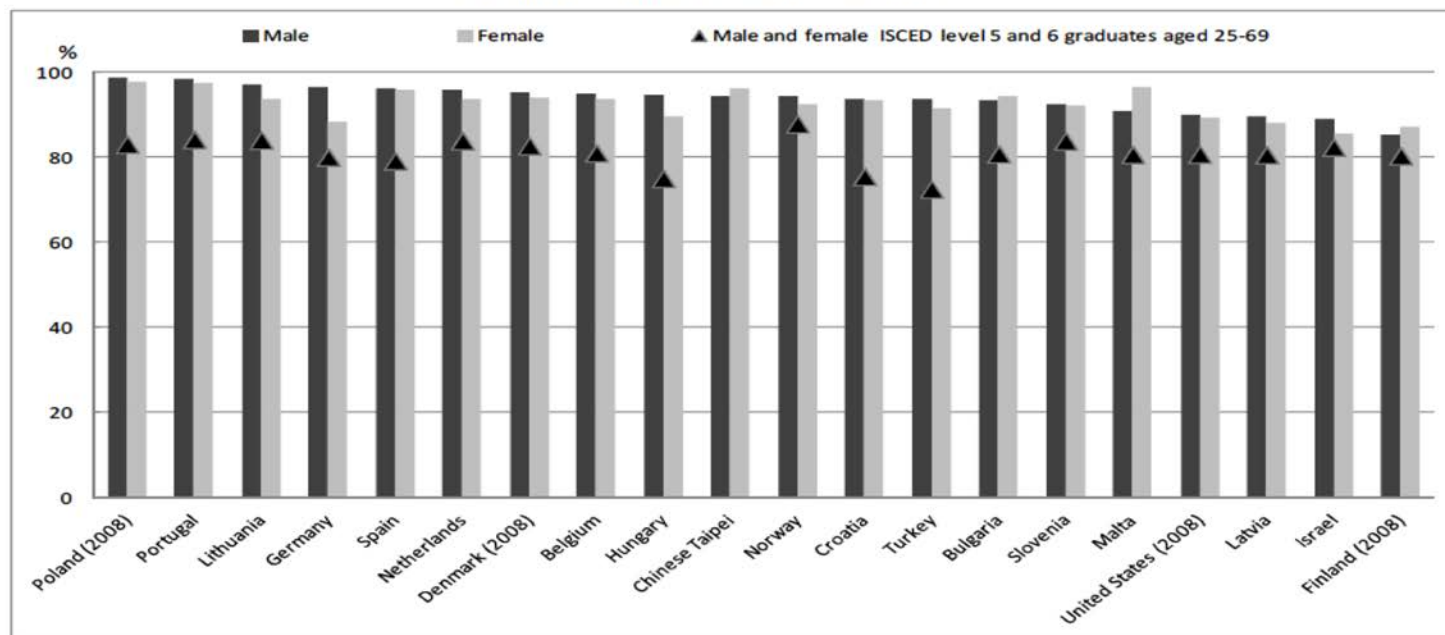
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Figure 6. Employment rate of doctorate holders by gender, 2009
As a percentage of total doctorate holders



Notes:

*Data for Belgium, Germany, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For Belgium and Malta, data for the 65-69 age class include doctorate holders aged 70 years and above.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Chinese Taipei only include those PhD in National Profiles of Human Resources in Science and Technology (NPHRST) made by STPI, NARL, Chinese Taipei (<http://hrst.stpi.narl.org.tw/index.htm#noticeChinese>).

*Data for Turkey exclude foreign citizens.

*For the United States, data exclude doctorate holders who received their degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010; Eurostat 2012; Education at a Glance 2012.

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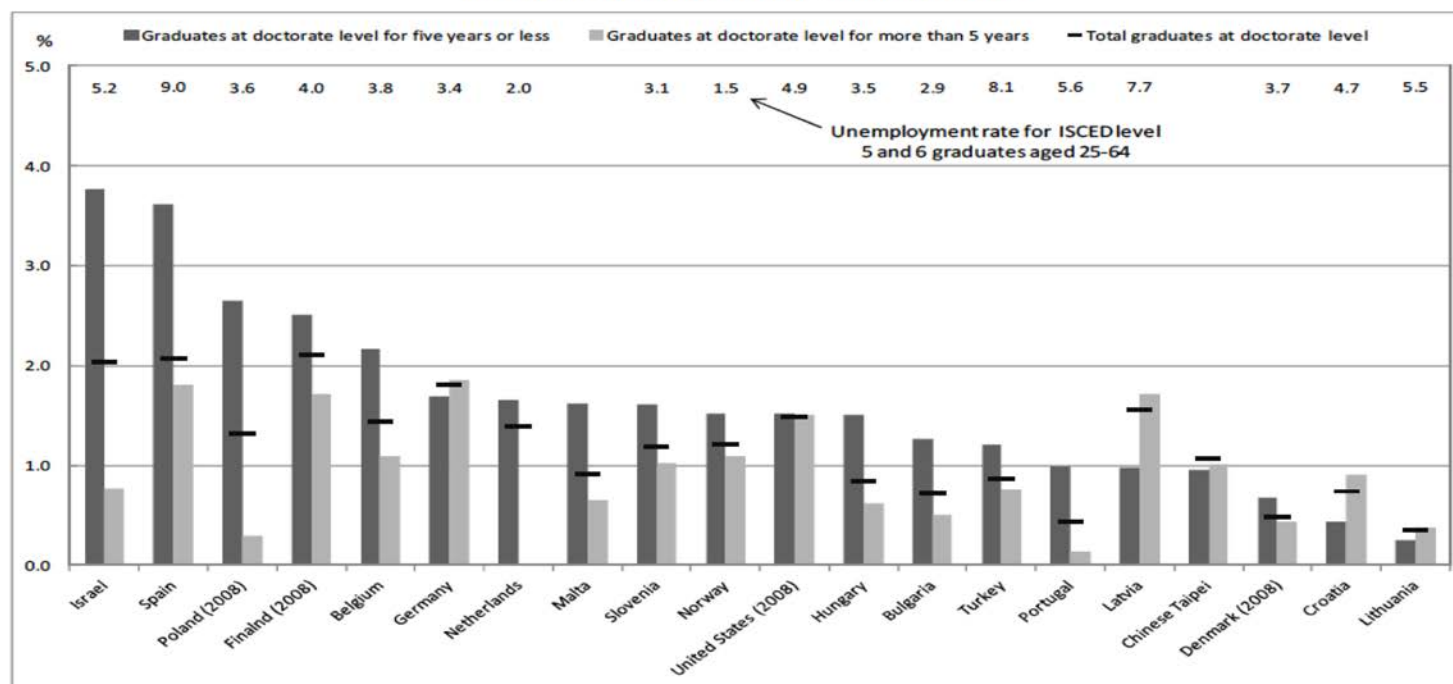
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Figure 7. Unemployment rates of doctorate holders over career path, 2009
 As a percentage of total doctorate holders



Notes:

*Data for Belgium, Germany, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For Belgium and Malta, data for the 65-69 age class include doctorate holders aged 70 years and above.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Chinese Taipei only include those PhD in National Profiles of Human Resources in Science and Technology (NPHRST) made by STPI, NARL, Chinese Taipei (<http://hrst.stpi.narl.org.tw/index.htm#noticeChinese>).

*Data for Turkey exclude foreign citizens.

*For the United States, data exclude doctorate holders who received their degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010; Eurostat 2012; Education at a Glance 2012.

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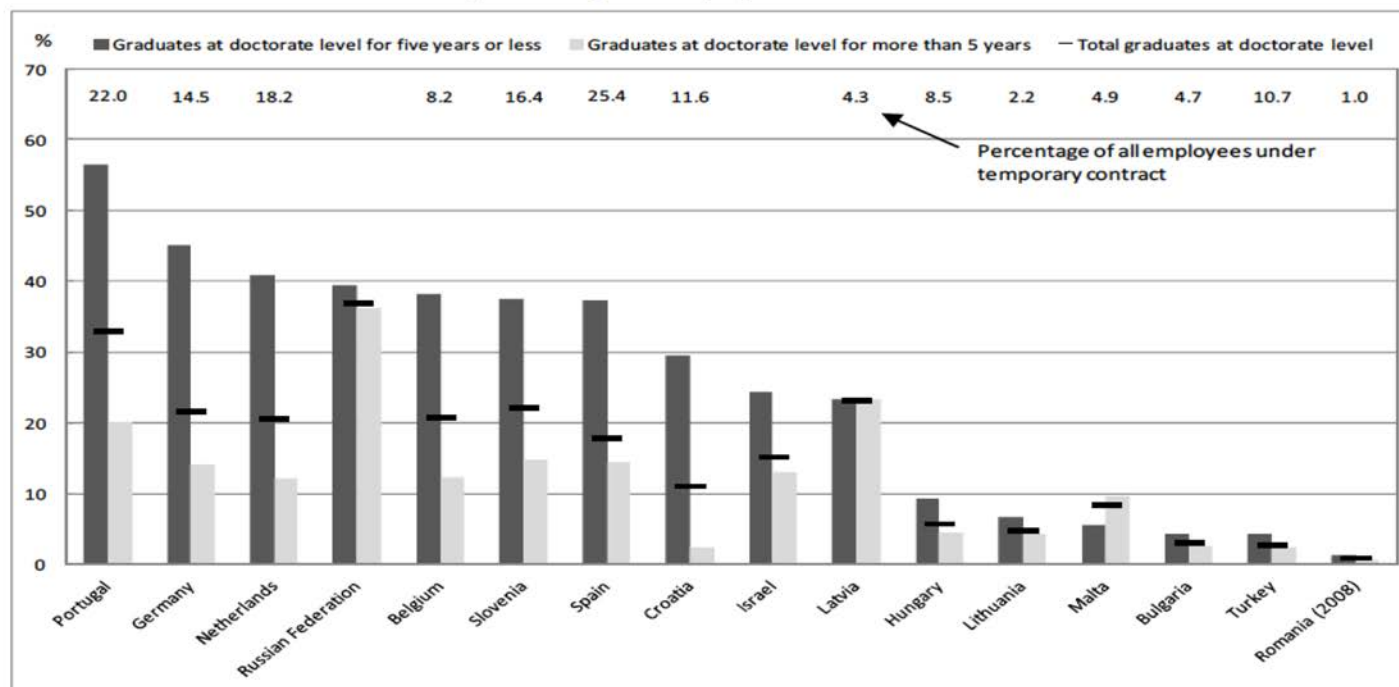
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Figure 8. Doctorate holders on temporary contracts over career path, 2009

As a percentage of employed doctorate holders



Notes:

- *Data for Belgium, Germany, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.
- *For the Netherlands, data refer to employees only.
- *For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.
- *For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.
- *For Spain, doctorate holders with "unspecified contracts" refer to self-employed.
- *Data for Turkey exclude foreign citizens.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010; Eurostat 2012.

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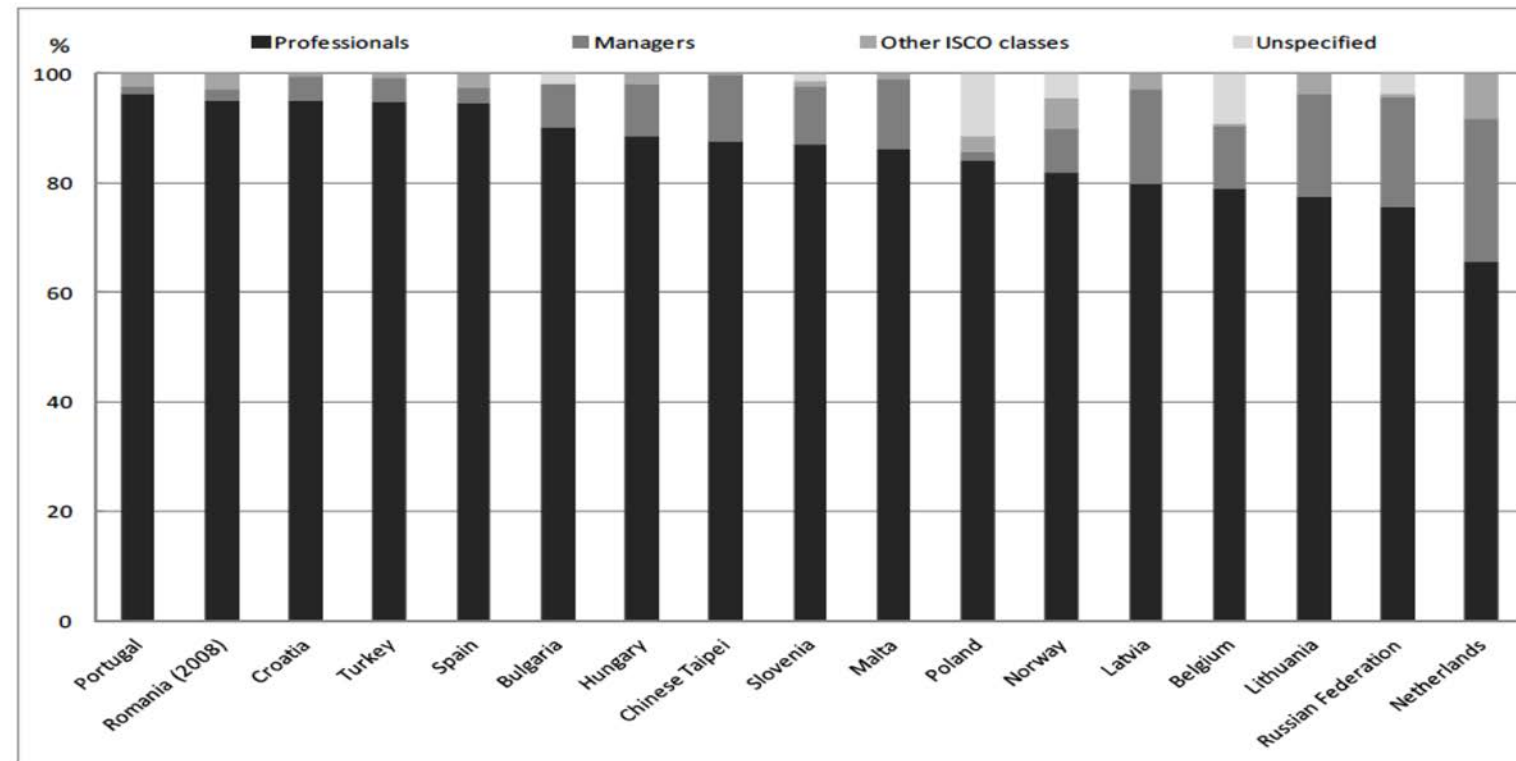
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Figure 10. Employed doctorate holders, by main occupation, 2009
 As a percentage of employed doctorate holders



Notes:

- *Data for Belgium, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.
- *For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.
- *For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.
- *Data for Turkey exclude foreign citizens.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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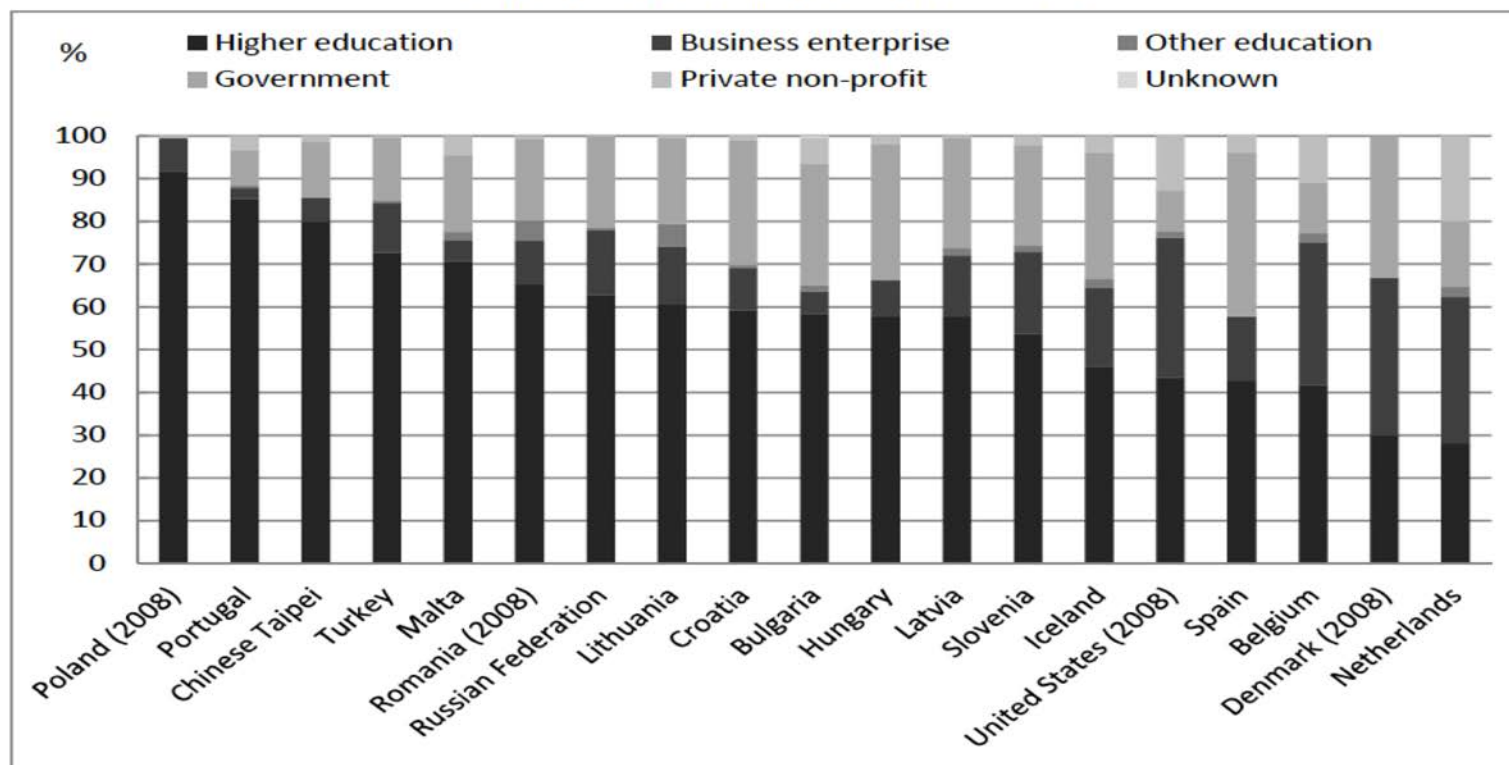
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Figure 11. Doctorate holders, by sector of employment, 2009
 As a percentage of employed doctorate holders



Notes:

*Data for Belgium, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

*Data for the United States exclude doctorate holders who received degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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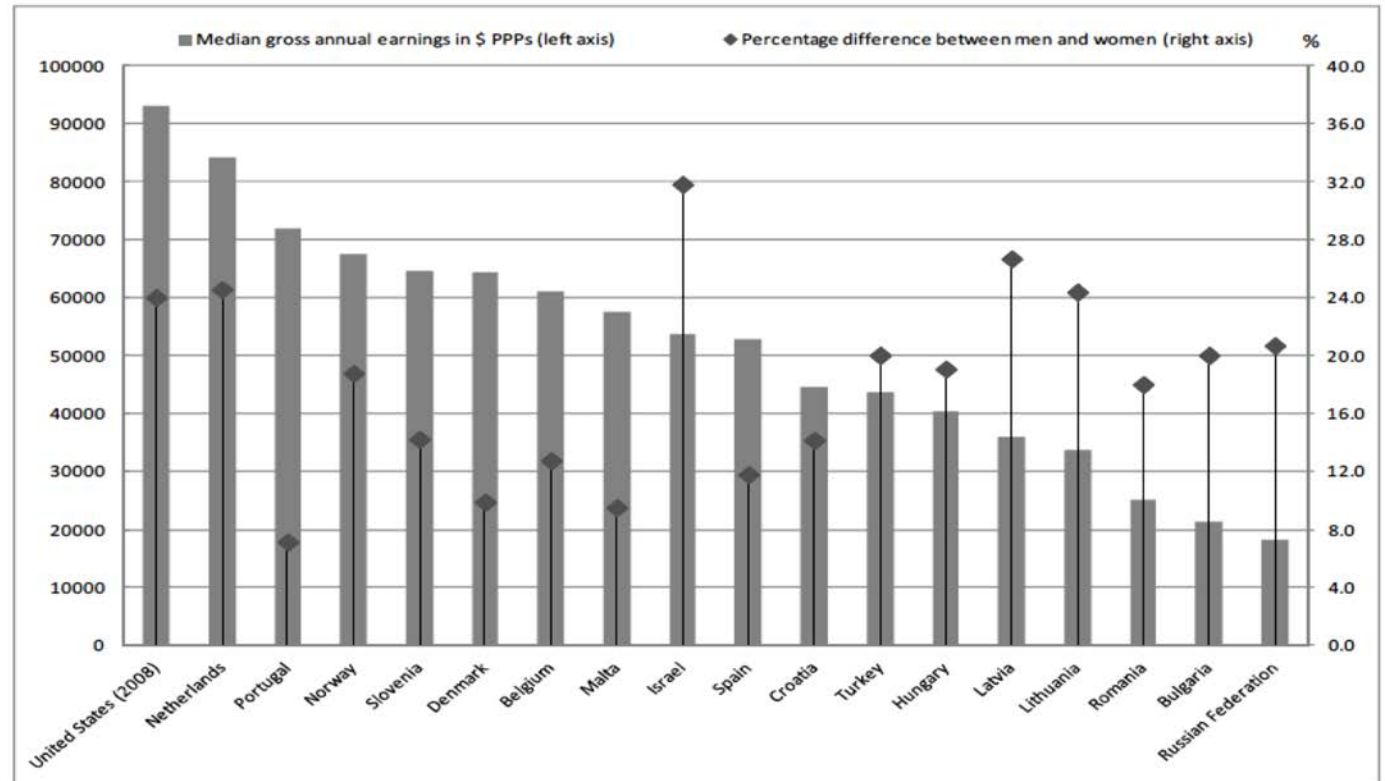
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Figure 12. Median gross annual earnings of doctorate holders, 2009
 USD PPPs



Notes:

*Data for Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

*Data for the United States exclude doctorate holders who received degree abroad and who received a doctorate in humanities

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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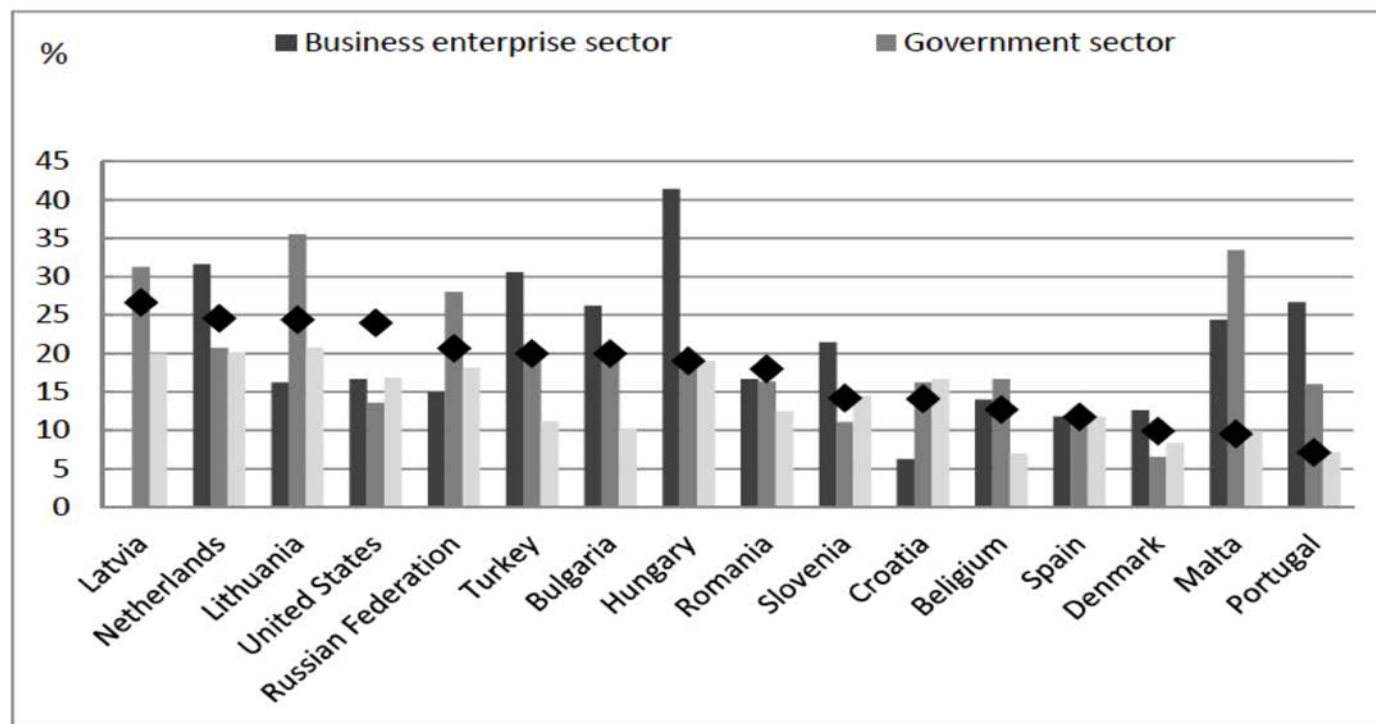
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Figure 13. Difference in median gross annual earnings of male and female doctorate holders, 2009
 As a percentage of gross annual earnings of male doctorate holders



Notes:

*All sectors include the business enterprise, government, higher education, other education and private non-profit sectors.

*Data for Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

*Data for the United States exclude doctorate holders who received degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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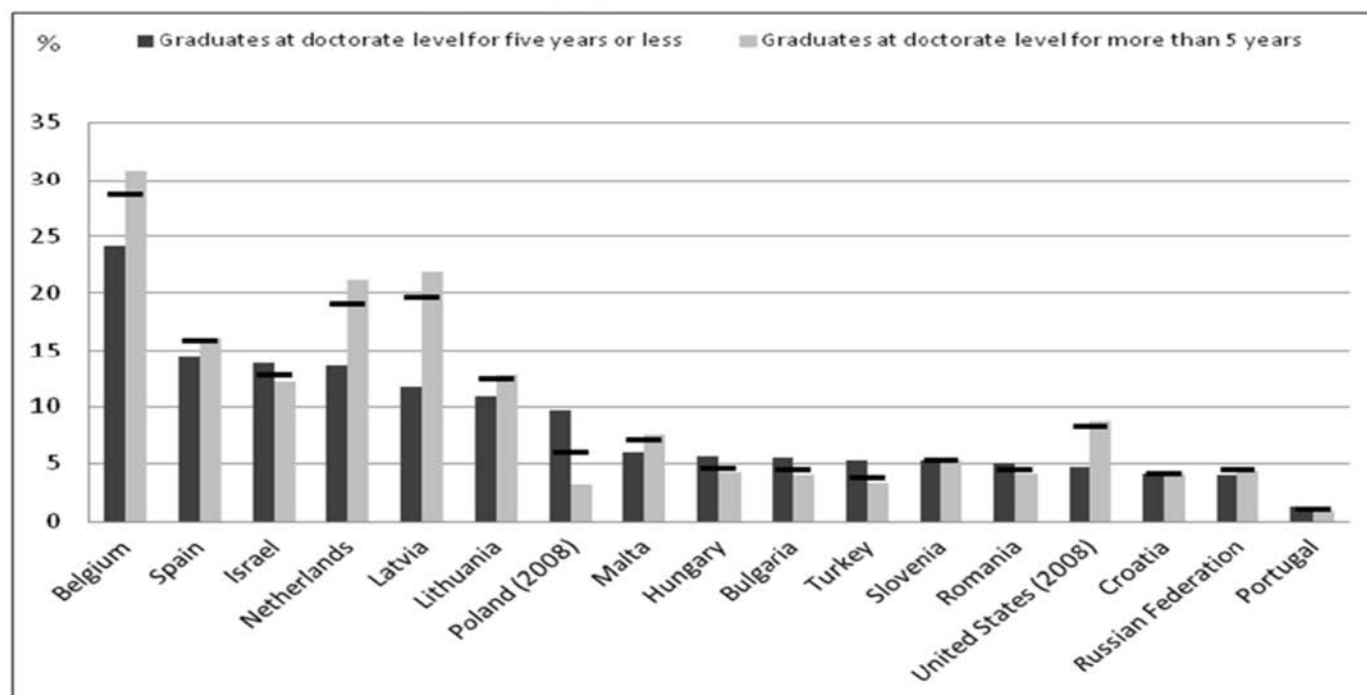
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Figure 14. Doctorate holders whose jobs are not related to their field of study over career path, 2009
As a percentage of employed doctorate holders in all relation criteria



Notes:

*Data for Belgium, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For Belgium, Malta and the Russian Federation, data for the 65-69 age class include doctorate holders aged 70 years and above.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

*For the United States, data exclude doctorate holders who received their degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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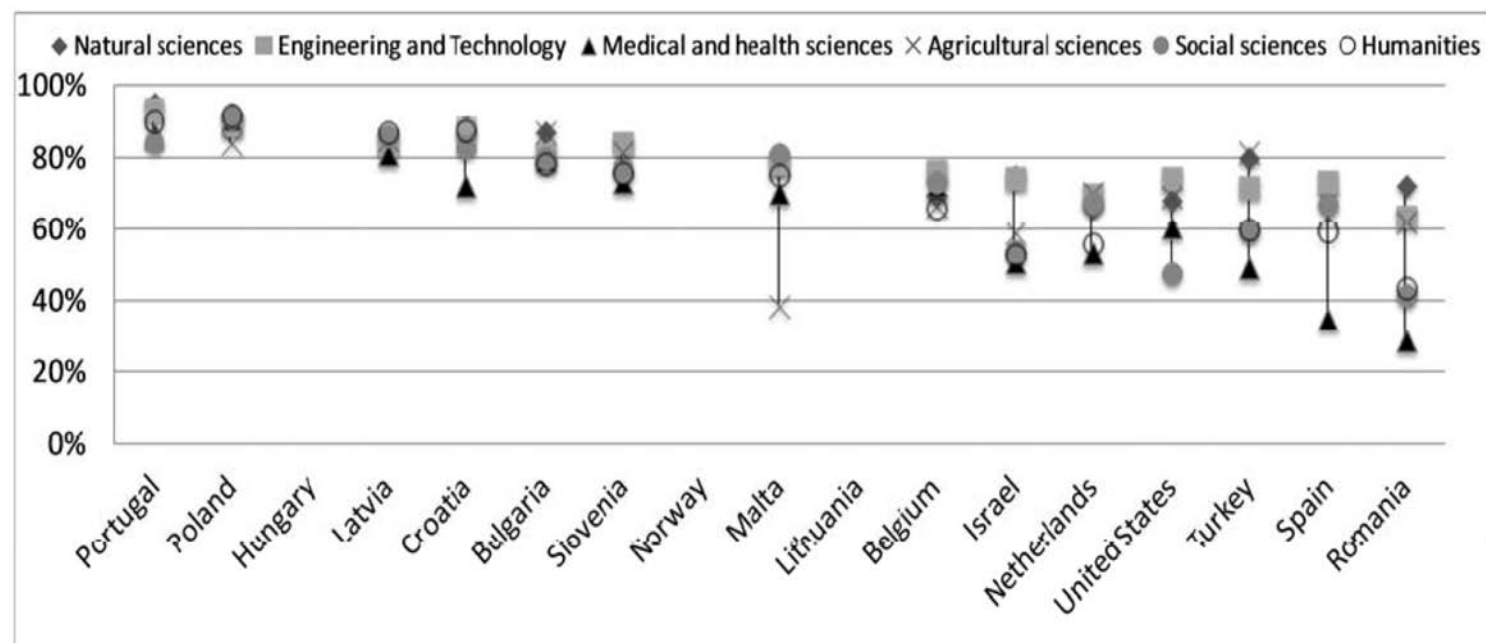
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Figure 16. Percentage of doctorate holders working as researchers by field of study, 2009



Notes:

- *Data for Belgium, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.
- *For Belgium, Malta and the Russian Federation, data for the 65-69 age class include doctorate holders aged 70 years and above.
- *For Norway, data for researchers in the business sector only cover R&D institutes and not enterprises.
- *For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.
- *Data for Turkey exclude foreign citizens.
- *Data for the United States exclude doctorate holders who received degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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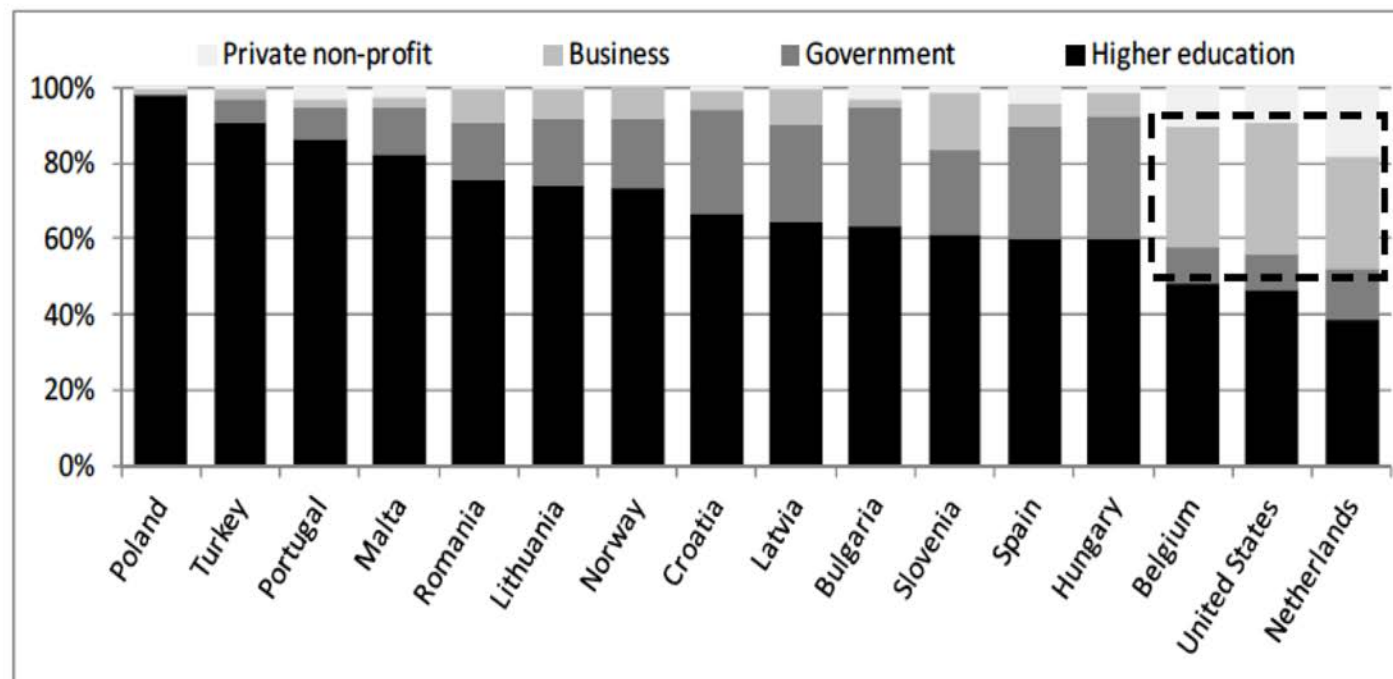
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Figure 17. Sector of employment of doctorate holders working as researchers, 2009



Notes:

*Data for Belgium, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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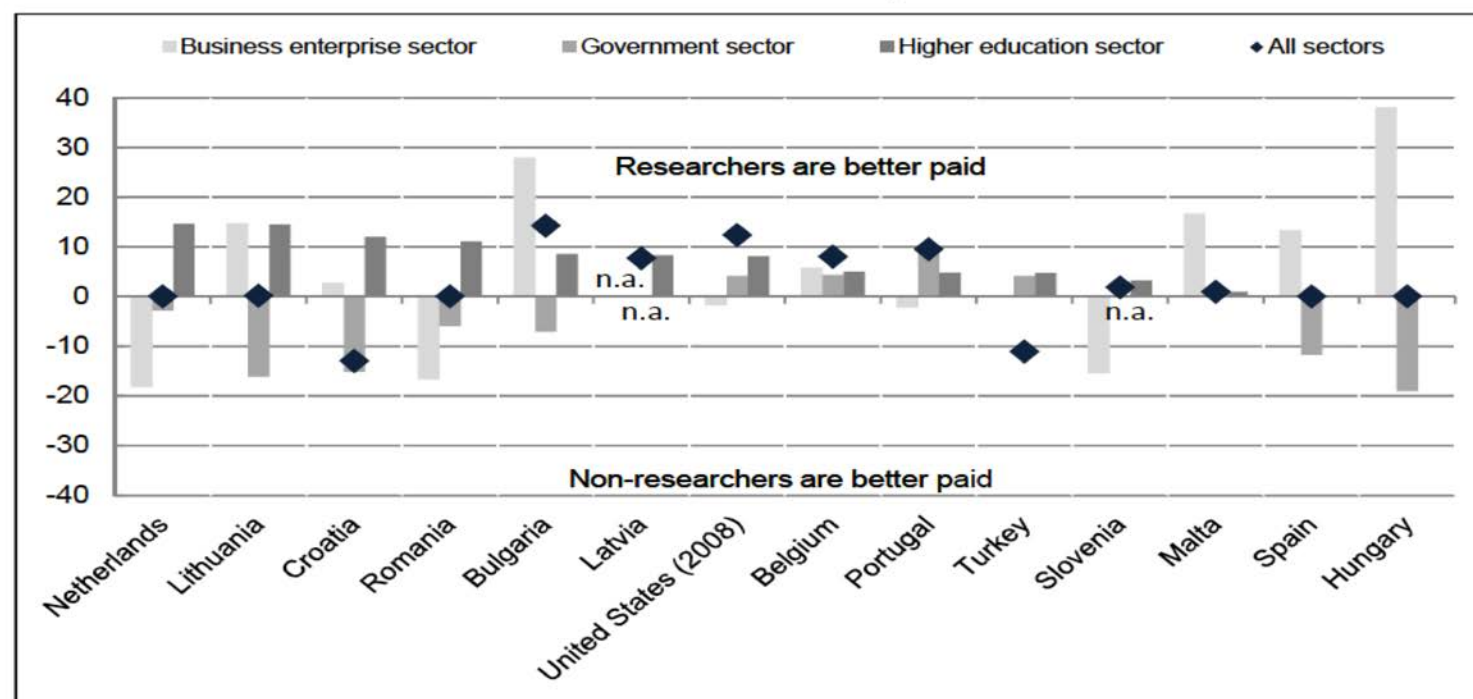
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Figure 20. Difference in median gross annual earnings of doctorate holders working as researchers and as non-researchers, 2009



Notes:

*All sectors include the business enterprise, government, higher education, other education and private non-profit sectors.

*Data for Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

*Data for the United States exclude doctorate holders who received degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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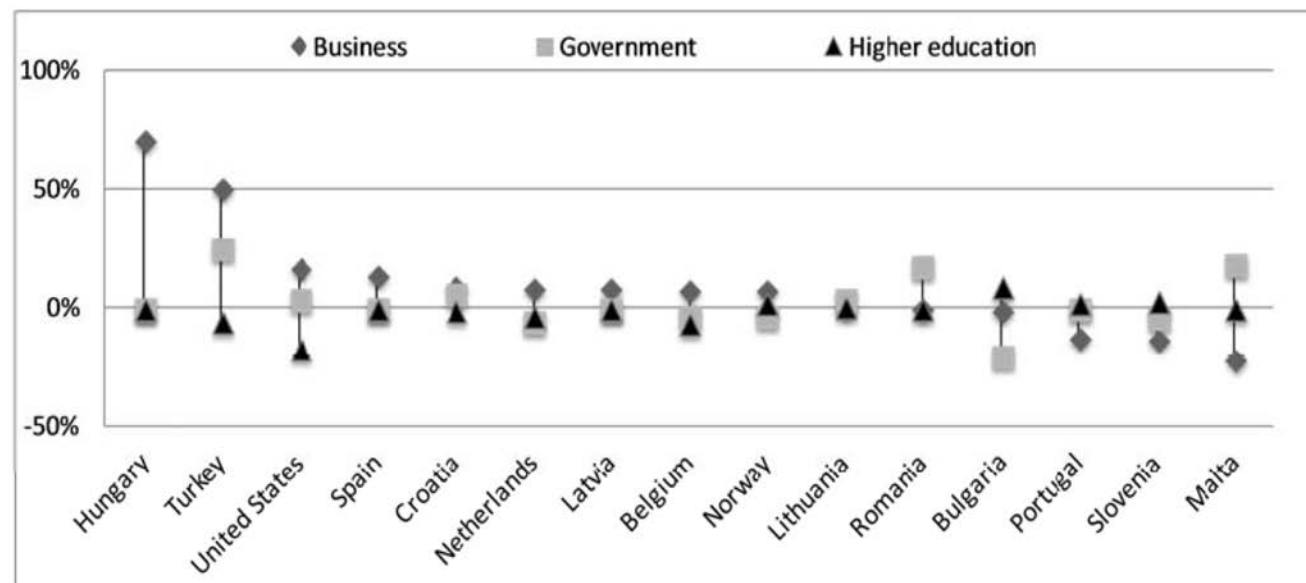
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Figure 21. Percentage difference in median gross annual earnings of doctorate holders working as researchers by main sector of employment as compared to total doctorate holders working as researchers, 2009



Notes:

*All sectors include the business enterprise, government, higher education, other education and private non-profit sectors.

*Data for Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

*Data for the United States exclude doctorate holders who received degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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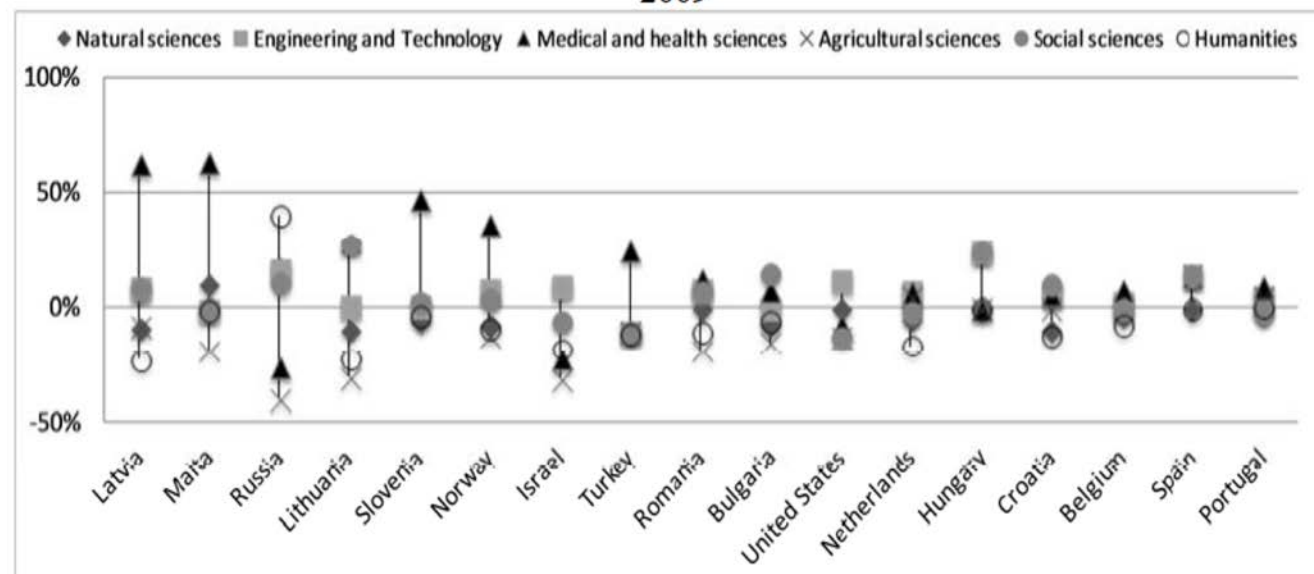
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Figure 22. Percentage difference in median gross annual earnings of doctorate holders working as researchers by field of doctoral study as compared to total doctorate holders working as researchers, 2009



Notes:

*All sectors include the business enterprise, government, higher education, other education and private non-profit sectors.

*Data for Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

*Data for the United States exclude doctorate holders who received degree abroad and who received a doctorate in humanities.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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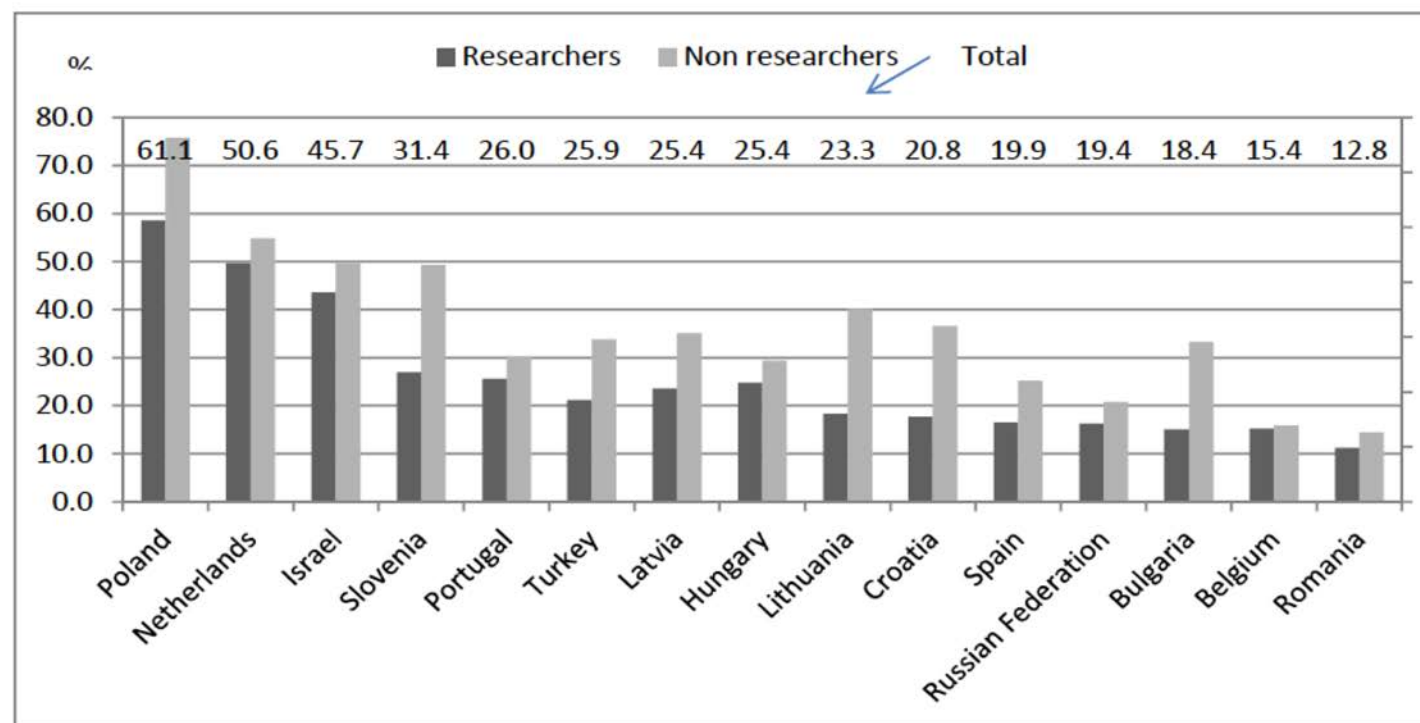
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Figure 27. Doctorate holders having changed jobs in the last 10 years, 2009



Notes

*Data for Belgium, Germany, Hungary, the Netherlands and Spain refer to graduation years 1990 onwards.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Spain, there is limited coverage of doctorate holders for the years 2007 to 2009.

*Data for Turkey exclude foreign citizens.

Source: OECD, based on OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.

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Annex table 4. Ten top destination countries of national citizens with a doctorate having lived/stayed abroad in the past ten years, 2009

	Belgium	Bulgaria	Croatia	Hungary	Israel	Lithuania	Latvia
1	USA	DEU	USA	USA	USA	USA	USA
2	FRA	USA	DEU	DEU	GBR	SWE	DEU
3	GBR	FRA	ITA	GBR	FRA	DEU	SWE
4	NLD	GBR	AUT	FRA	CAN	BEL	FRA
5	DEU	AUT	GBR	NLD	AUS	POL	GBR
6	CAN	GRC	FRA	AUT	ITA	GBR	JPN
7	CHE	BEL	CHE	CHE	DEU	FIN	EST
8	AUS	ESP	AUS	ITA	CHE	DNK	AUT
9	ITA	RUS	ISR	BEL	NLD	LVA	BEL
10	ESP	ITA	RUS	CAN	RUS	CZE	ESP
	Malta	Netherlands	Poland	Portugal	Romania	Slovenia	Sweden
1	GBR	USA	DEU	GBR	FRA	USA	USA
2	ITA	GBR	USA	USA	DEU	DEU	GBR
3	USA	DEU	GBR	ESP	USA	GBR	DNK
4	DEU	AUS	ITA	FRA	ITA	ITA	NOR
5	CAN	BEL	FRA	DEU	GBR	AUT	DEU
6	BEL	CAN	SWE	NLD	BEL	FRA	RUS
7	AUS	CHE	BEL	ITA	ESP	CHE	FRA
8	FRA	FRA	CAN	CHE	JPN	NLD	IRQ
9	NLD	ITA	JPN	BRA	CHE	ESP	CHE
10	CHE	SWE	AUT	SWE	NLD	BEL	FIN

Notes:

*Data for Belgium, Hungary and the Netherlands refer to graduation years 1990 onwards.

*For Romania, unemployed and inactive doctorate holders are underestimated.

*For the Russian Federation, data relate only to those doctoral graduates employed as researchers and teachers.

*For Sweden, the population includes employed doctorate holders only.

Source: OECD, OECD/UNESCO Institute for Statistics/Eurostat data collection on careers of doctorate holders 2010.