

Graduate labour market trends in Germany

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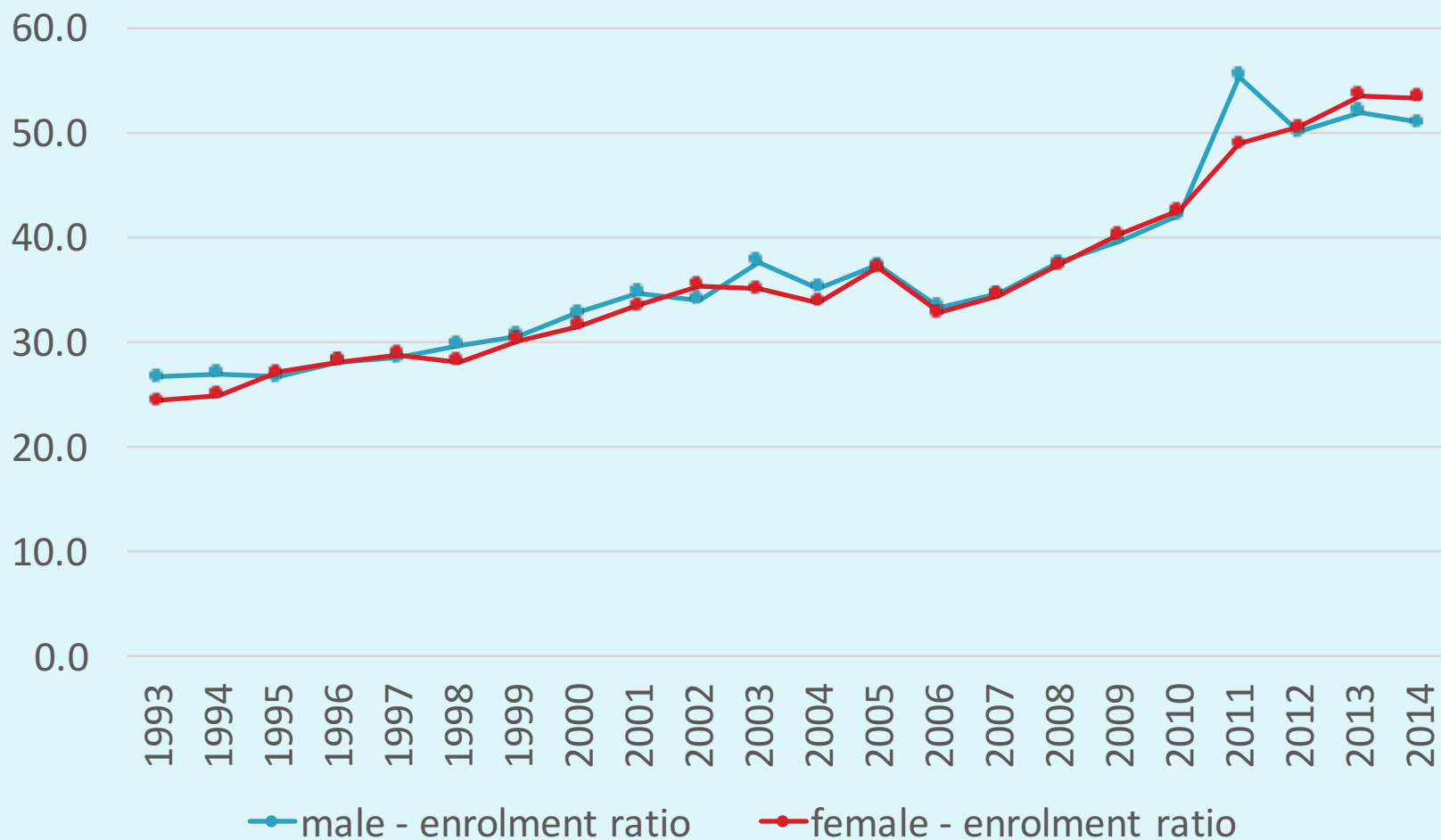
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The changing graduate labour market

- Recent period has seen BOTH:
 - Ongoing expansion of HE
 - Ongoing changing high-skills demand
- Good economic performance and improving labour market in Germany. Outlook for graduates?
- "Graduate job" as one lens for examining change
- Other uses: HR analysis incl. careers researchers

Gross enrolment rate in higher education



Concept

- "a substantial portion of the skills used are normally acquired in the course of higher education, including many of the activities surrounding it, and of its aftermath"
- Three properties to note:
 - Imprecise
 - Some skills from HE *not* used in graduate jobs
 - Some graduate skills likely to be acquired outside HE

A new indicator of graduate jobs: KldB(HE)92

- “Jobs” are classified into a cluster of graduate and non-graduate occupations based on worker-reported tasks and associated high-skill requirements
- Aim is to classify KldB-92 3-digit occupations

Data: BIBB/BAuA Employment Surveys

Date	Survey	Sample Size
1997	BIBB/BAuA Survey of the Working Population	35,000
2006	BIBB/BAuA Employment Survey	20,000
2012	BIBB/BAuA Employment Survey	20,000

Skills indices

Dependent: self-reported education requirements to do job (1=higher education or equivalent, 0=otherwise)

Independent:

1. *High-level cognitive tasks*: research, development and design; information collection and documentation; solving new or unfamiliar problems
2. *High-level orchestration tasks*: consulting and advising; supervisor/managerial responsibilities; negotiating (convincing others and developing compromises)
3. *Autonomy*: planning own work schedule; discretion over work tasks
4. *Generic skills*: Level of mathematical skills, level of German skills, level of foreign language skills, level of project management skills; level of computer use
5. Average degree requirements in similar jobs (i.e. other jobs in the same minor group)

Method: Step 1

- Step 1: We estimate the association of high-skilled tasks and learning requirement with the propensity for a job to require tertiary level qualification.
- We do this using a ‘multi-level probit model’ separately for the 2006 and 2012 Employment Survey, drawing on more than 38,800 observations in all .
- For each person, we then derive an index of ‘Higher Education Requirements’ as the sum over the independent variables, each weighted by its estimated probit coefficient.

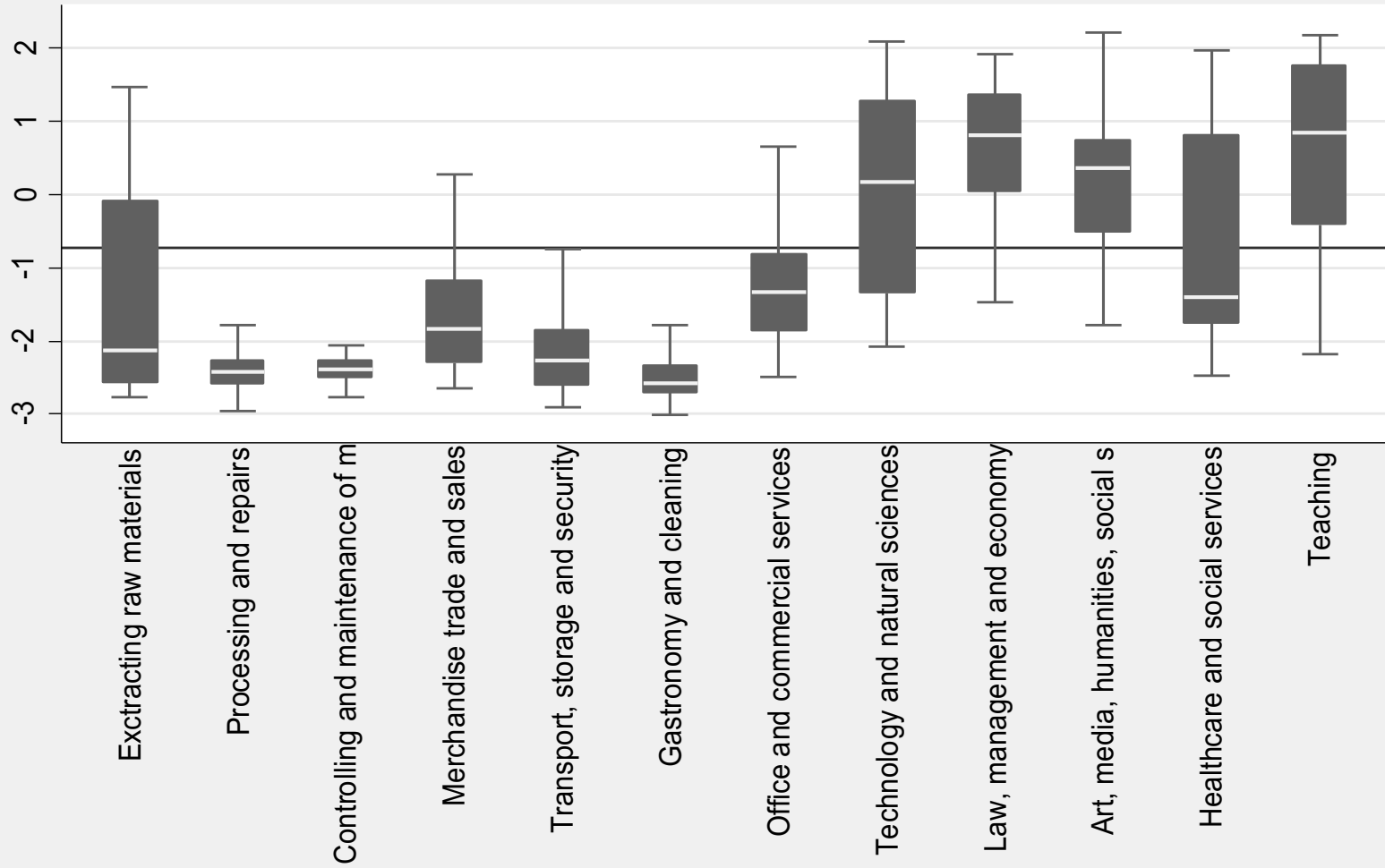
Method: Step 2

- We compute the average predicted score in each 3-digit KldB-92 occupation by survey sweep

Method: Step 3

- We ran a statistical “cluster analysis” to determine two clusters, and optimal threshold.
- It groups each 3-digit occupation in one or other cluster: graduate or non-graduate

Higher Education Requirements by Major Occupational Fields



Most frequent graduate jobs in 2012, by gender

Men		Women	
KldB-92 3-digit	%	KldB-92 3-digit	%
Unternehmer, Geschäftsführer, a.n.g.	6.3	Grund-, Haupt-, Real-, Sonderschullehrerinnen	16.5
Ärzte	5.5	Gymnasiallehrerinnen	6.1
Ingenieure des Maschinen-, Apparate- und Fahrzeugbaues	5.3	Ärztinnen	5.5
Softwareentwickler	5.2	Sozialarbeiterinnen, Sozialpädagoginnen	5.0
Elektroingenieure	5.2	Verwaltungsfachleute (gehobener Dienst), a.n.g.	4.0
Gymnasiallehrer	4.3	Rechtsvertreterinnen, Rechtsberaterinnen	4.0
Geschäftsbereichsleiter, Direktionsassistenten	4.1	Lehrerinnen an berufsbildenden Schulen	3.5
Verwaltungsfachleute (gehobener Dienst), a.n.g.	3.7	Publizistinnen	3.4
Bauingenieure	3.4	Geschäftsbereichsleiterinnen, Direktionsassistenten	3.3

Most frequent non-graduate destinations in 2012, by gender

Men		Women	
KldB-92 3-digit	%	KldB-92 3-digit	%
Bankfachleute	9.3	Erzieherinnen	10.4
Techniker ohne nähere Fachrichtungsangabe	5.2	Verwaltungsfachleute (mittlerer Dienst), a.n.g.	10.4
Versicherungsfachleute	5.1	Bankfachleute	5.5
Verwaltungsfachleute (mittlerer Dienst), a.n.g.	4.3	Krankenschwestern, Hebammen	5.3
Verkaufs-, Vertriebsfachbearbeiter	4.1	Büro- und kaufmännische Sachbearbeiterinnen	3.8
Landwirte, Pflanzenschützer	3.9	Buchhalterinnen	3.7
Elektrotechniker	3.8	Altenpflegerinnen	3.0
Büro- und kaufmännische Sachbearbeiter	3.2	Bürofachkräfte, Kaufmännische Angestellte o.n.A.	3.0
Andere Vertreter, Handlungsreisende	3.1	Masseurinnen, Bademeisterinnen, Krankengymnastinnen	3.0

New graduate jobs

KldB-92 3-digit	HERI_06	HERI_12
621 Techniker des Maschinen-, Apparate- und Fahrzeugbaues	-1.844	-0.730
623 Bautechniker	-1.316	-0.493
626 Chemo-, Physikotechniker	-1.652	-0.607
652 Ausbilder (f. gew.-techn. Ausbildungsber.), Ausb. Meister	-1.553	-0.692
832 Darstellende Künstler, Sänger	-1.238	-0.515

New graduate jobs



Validation of KldB(HE)92

- close to concept
- plausible distribution by occupation group
- Criterion validity. Graduate jobs should (among others):
 - make better use of graduates' skills
 - pay more wages
 - lead to opportunities for career progression
- Compared with KldB(SL4)10, KldB(HE)92 performs at least as well or even better

Validation example: Skills utilisation

	KIdB(HE)92	KIdB(MD)92	KIdB(SL4)10
	Vertical Qualification Match		
Graduate Job	0.212*** (0.020)	0.194*** (0.019)	0.174*** (0.016)
R2 (N=4,238)	0.079	0.073	0.069
	Training main source of job skills		
Graduate Job	0.106*** (0.021)	0.0974*** (0.021)	0.0709*** (0.020)
R2 (N=4,256)	0.026	0.025	0.022

Source: BIBB/BAuA Employment Survey 2012

Controls: sex, age, age squared, region of work, foreign born dummy

Validation example: Hourly earnings

	KldB(HE)92	KldB(MD)92	KldB(SL4)10
Graduate Job	0.243*** (0.021)	0.218*** (0.020)	0.210*** (0.018)
R2 (N=4,248)	0.220	0.213	0.216

Source: BIBB/BAuA Employment Survey 2012

Controls: sex, age, age squared, region of work, foreign born dummy

Validation example: Participation in non-formal training

	KIdB(HE)92	KIdB(MD)92	KIdB(SL4)10
Graduate Job	0.118*** (0.021)	0.112*** (0.020)	0.0851*** (0.019)
R2 (N=4,250)	0.060	0.059	0.055

Source: BIBB/BAuA Employment Survey 2012

Controls: sex, age, age squared, region of work, foreign born dummy

- Strengths
 - close to concept
 - derived from worker-based informants
 - transparent & replicable
 - good predictor
 - can analyse change over time and comparisons
- Weaknesses
 - Difficult to apply to KldB-10
 - capture of occupation-specific knowledge
 - lingering credentialism
 - like all classifications: simplistic

GRADUATE LABOUR MARKET TREND

Graduate Employment I

	graduates in employed labour force			
	1999	2006	2012	$\Delta(2012-1999)$
Men	0.189 (0.003)	0.218 (0.005)	0.215 (0.005)	0.0257 (0.006)
Women	0.142 (0.003)	0.181 (0.004)	0.204 (0.005)	0.0616 (0.006)
Age 26-35	0.131 (0.004)	0.196 (0.007)	0.247 (0.009)	0.116 (0.010)
Age 36-55	0.185 (0.003)	0.199 (0.004)	0.193 (0.004)	0.00762 (0.005)
Age 56-64	0.192 (0.007)	0.232 (0.012)	0.223 (0.008)	0.0313 (0.011)
Total	0.170 (0.002)	0.202 (0.003)	0.210 (0.004)	0.0400 (0.004)

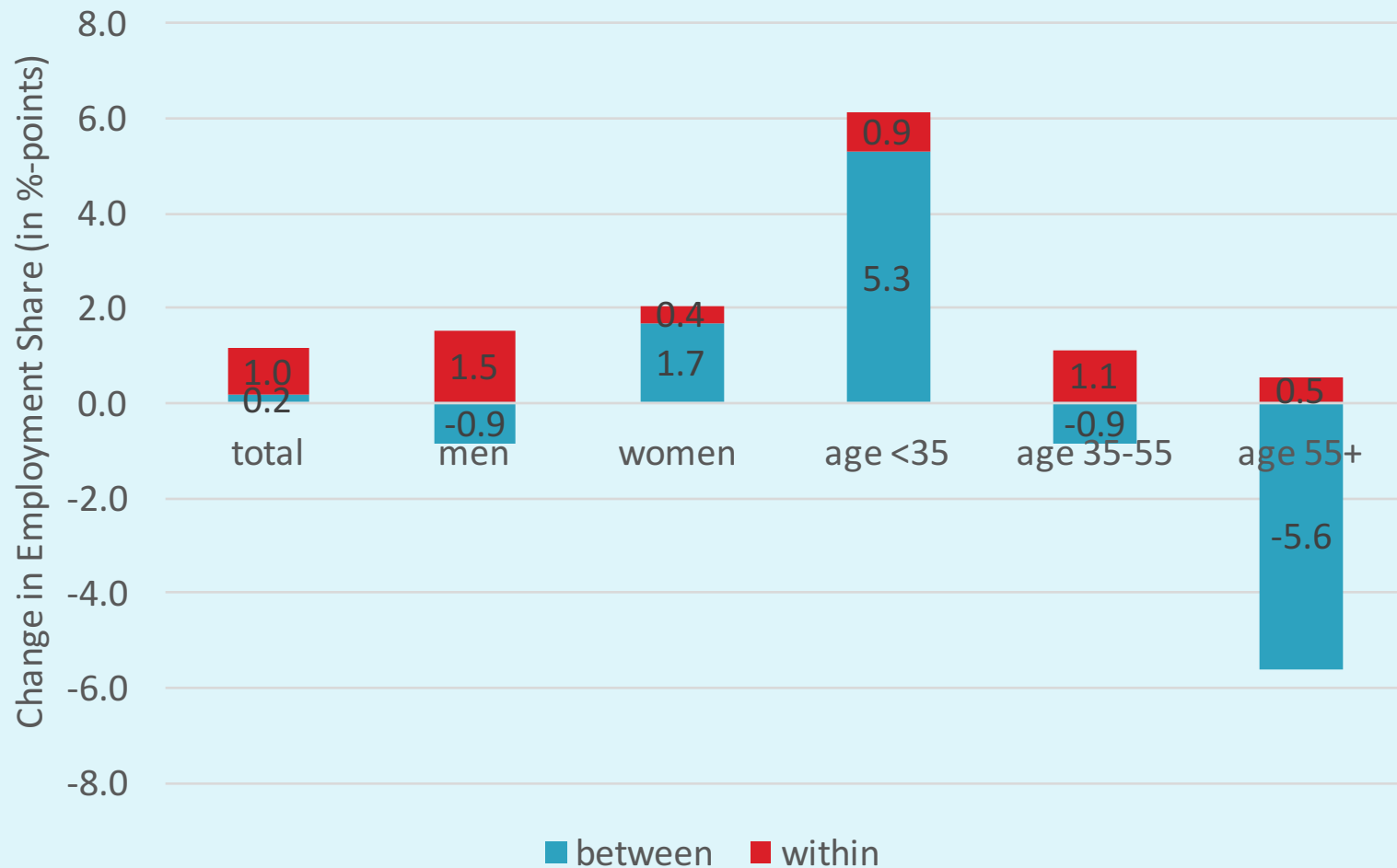
Base: Employed labour force, >10h per week, 26-64 years

Graduate Employment II

	employed in graduate jobs			graduates in non-graduate jobs		
	2006	2012	$\Delta(2012-2006)$	2006	2012	$\Delta(2012-2006)$
Men	0.286 (0.005)	0.293 (0.006)	0.0065 (0.008)	0.218 (0.010)	0.222 (0.012)	0.0043 (0.016)
Women	0.212 (0.005)	0.233 (0.005)	0.0204 (0.007)	0.295 (0.013)	0.265 (0.012)	-0.0297 (0.017)
Age 25-35	0.237 (0.007)	0.298 (0.010)	0.0614 (0.012)	0.267 (0.018)	0.208 (0.018)	-0.0592 (0.026)
Age 35-55	0.249 (0.005)	0.252 (0.005)	0.0025 (0.007)	0.245 (0.010)	0.256 (0.011)	0.0109 (0.015)
Age 55-65	0.323 (0.013)	0.273 (0.009)	-0.0509 (0.016)	0.226 (0.024)	0.245 (0.017)	0.0193 (0.029)
Total	0.254 (0.004)	0.266 (0.004)	0.0115 (0.005)	0.248 (0.008)	0.241 (0.008)	-0.0069 (0.012)

Base: Employed labour force, >10h per week, 26-64 years

Decomposing the Growing Share of Graduate Jobs between 2006 and 2012



Log wage differential between graduates and non-graduates

	1999	2006	2012	$\Delta(2012-2006)$
Total	0.170 ^{***}	0.159 ^{***}	0.254 ^{***}	0.085 ^{***}
Men	0.143 ^{***}	0.160 ^{***}	0.275 ^{***}	0.132 ^{***}
Women	0.208 ^{***}	0.143 ^{***}	0.223 ^{***}	0.014
<=35	0.137 ^{***}	0.165 ^{***}	0.238 ^{***}	0.101 ^{**}
35-55	0.193 ^{***}	0.153 ^{***}	0.263 ^{***}	0.0697 [*]
55+	0.155 ^{***}	0.139 ^{**}	0.226 ^{***}	0.071


Wage differential between graduates and non-graduates by occupation

	(1)	(2)	(3)	(4)	(6)
	Total	Men	Women	<=35	55+
2006					
OE non-graduates	0.212***	0.188***	0.243***	0.124***	0.261***
UE graduates	0.0582*	0.0792*	0.0229	0.101*	0.0385
M Graduates	0.284***	0.272***	0.281***	0.228***	0.370***
2012					
OE non-graduates	0.176***	0.197***	0.157***	0.138**	0.248***
UE graduates	0.184***	0.273***	0.0967**	0.154**	0.155**
M Graduates	0.339***	0.369***	0.306***	0.283***	0.383***
$\Delta(2012-2006)$					
OE non-graduates	-0.0362	0.00976	-0.0861	0.0138	-0.0137
UE graduates	0.126***	0.194***	0.0739	0.0533	0.116
M Graduates	0.0550*	0.0966**	0.0245	0.0548	0.0130


The match: so far so good

- Match with graduate jobs, 2006 to 2012:

- Graduates as % of employment:

20%  21%

- Graduate jobs as % of employment:

25.4%  26.6%

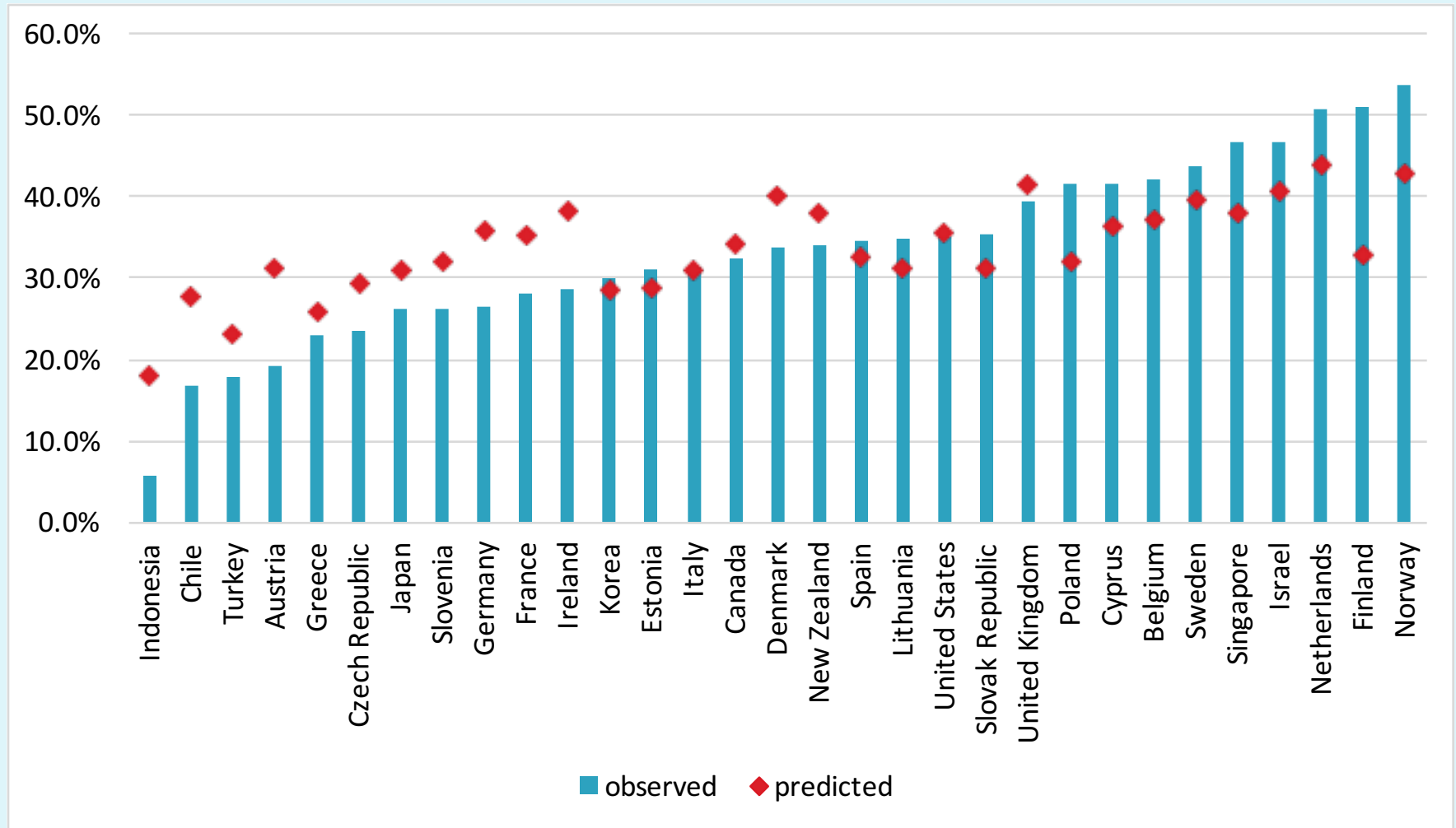
Average "returns" (=wage gap) have grown
unconditional of occupational position

Graduate Employment Clouds?

- Persistent and unequal risk of underemployment
- Ongoing rise in supply of graduates
- Demand uncertainty:
 - maturity of existing ICT?
 - the difference in new-wave automation?
 - Wider political uncertainties (e.g. EU)
- Balance between HE and TVET?

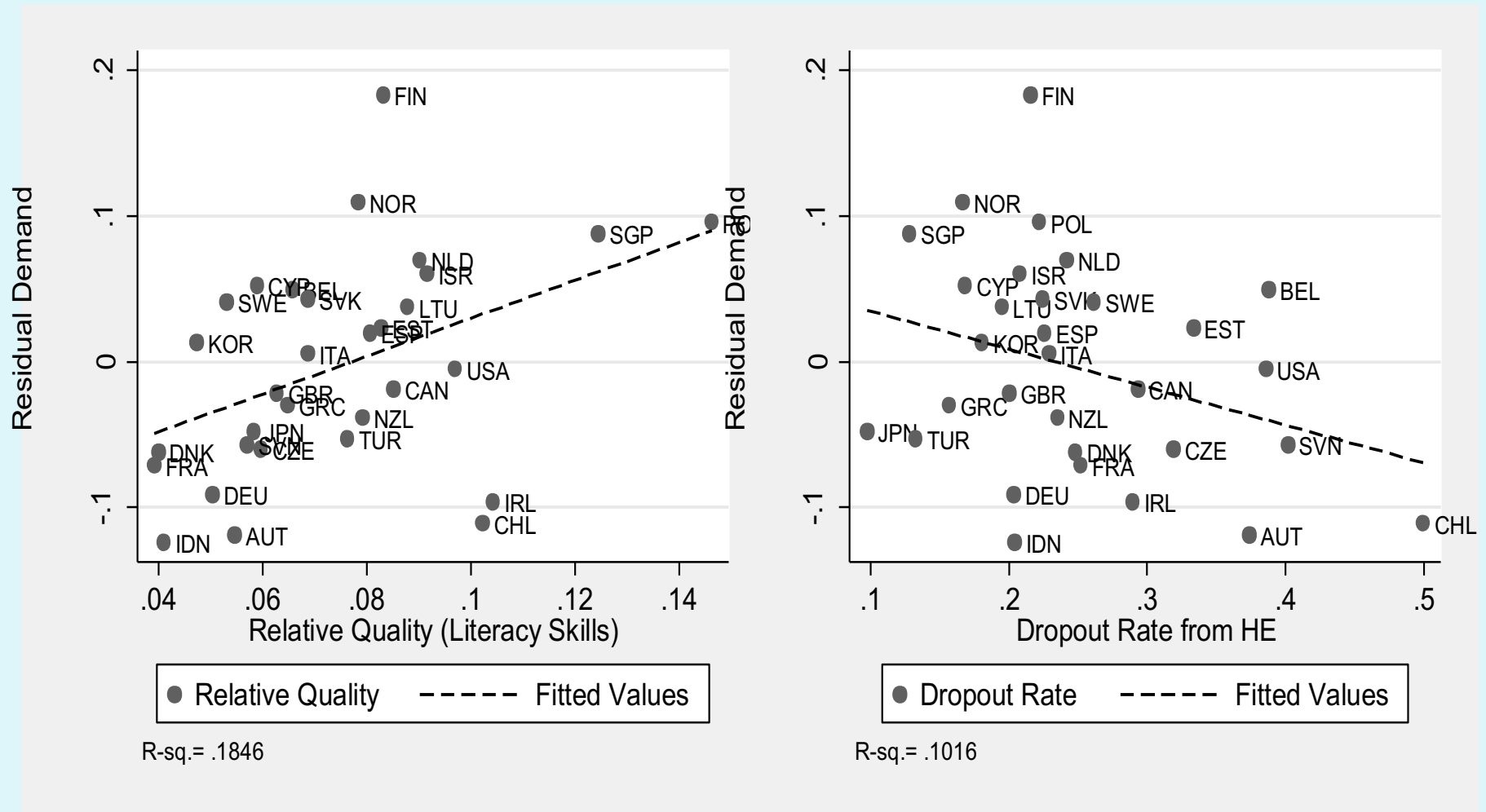
INTERNATIONAL PERSPECTIVE

The proportion of total working hours in graduate jobs* in international comparison

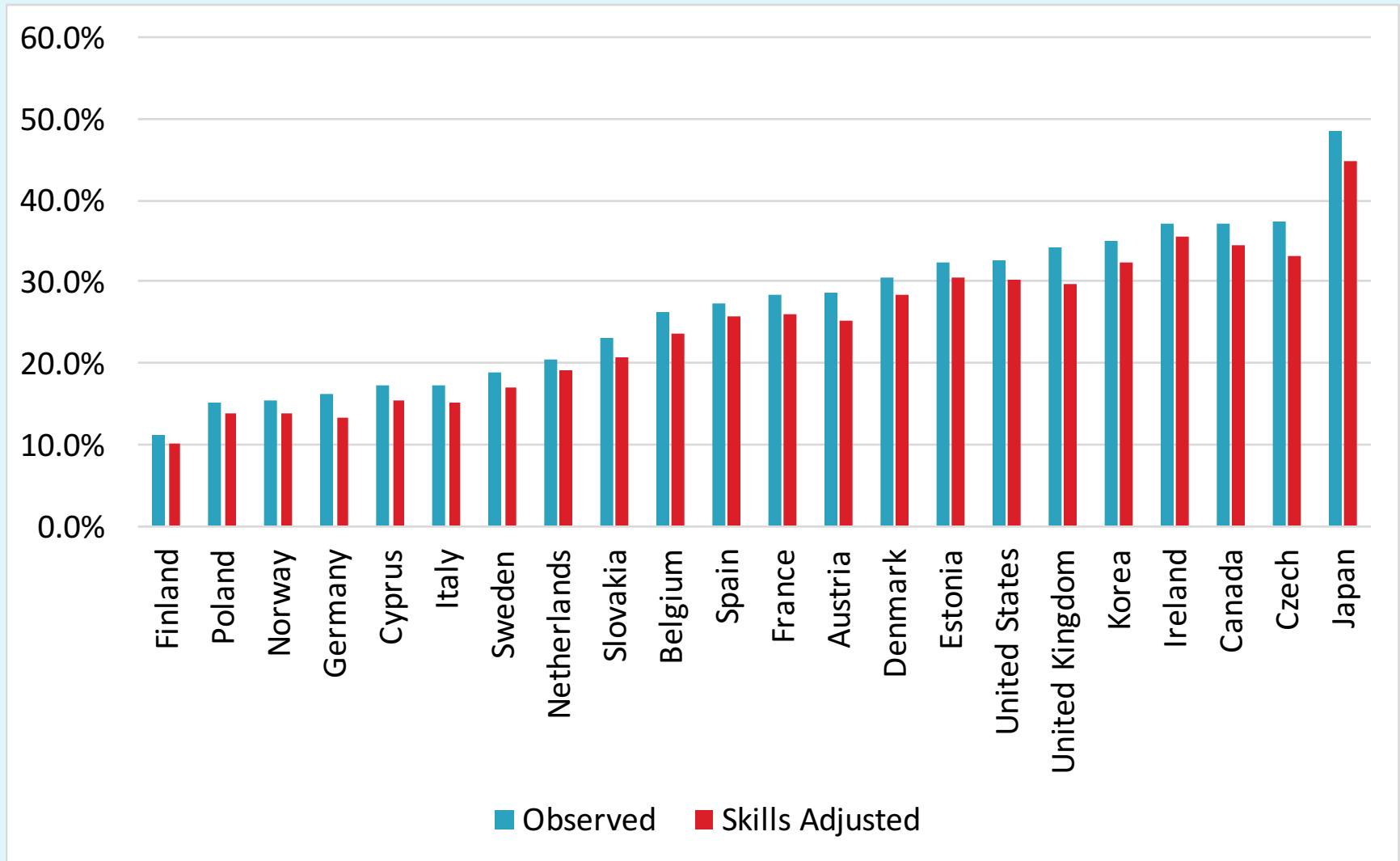


Base: Employed Labour Force 25-54 years. Source: SAS Rounds I and II

Higher education systems and the 'surplus' labour demand in graduate jobs



Proportion of underemployed graduates, observed and skills adjusted



Our work at LLAKES and CGHE

- studying the differentiation in the economic and other returns to higher education for many developed countries
- differentiation within the labour market, and/or within HE itself

So far:

Green, F. and G. Henseke (2016). "The Changing Graduate Labour Market: Analysis Using a New Indicator of Graduate Jobs". IZA Journal of Labor Policy.

Green, F. and G. Henseke (2016) "Should governments of OECD countries worry about graduate underemployment?" Oxford Review of Economic Policy.

Both available open access online.