



Explaining Recruiting Situations with Occupation-Specific Information

International Workshop „VACANCIES, HIRING AND MATCHING“
Nuremberg, 2nd October 2019

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Agenda

1. Motivation
2. Theory
3. Data
4. Methodology
5. Results
6. Conclusion
7. Outlook

1. Motivation

- Current discussion about “skills shortages”
- The German labour market is seen as an “occupational” labour market
- To measure recruiting difficulties, the Federal Employment Agency uses, among other sources, vacancy durations
- The effects of occupation-specific characteristics on vacancy or search durations for employers is not sufficiently researched yet

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Research question:

How do occupation-specific characteristics influence the search duration in recruiting processes?

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Research question:

How do occupation-specific characteristics influence the search duration in recruiting processes?

- Long-term aim: Can we forecast the possible occupation-specific search duration?
 - Search duration is straightforward in the interpretation

2. Theory

Vacancy and search durations may be influenced by ...

1. Characteristics of the searching establishment

- Search strategy (*Rebien et al. 2017*), economic sector, size (*Dietz et al. 2013*), location (*Brenzel et al. 2013*) ...

2. Characteristics of the vacancy

- Fixed-term contracts, wage, working hours, tasks ...

3. Characteristics of the applicants

- Skills offered, labour market situation ...

occupation-specific
characteristics

2. Theory – Characteristics of the Vacancy

Characteristics of the vacancy

- Contract properties such as weekly working hours, overtime and time limitation may influence the attractiveness of a vacancy for potential applicants (*Kubis/Müller (2014)*)
- The higher the qualification requirement, the longer the search duration (*Federal Employment Agency (2018)*)
- **NEW: Occupational closure** (*Weeden 2002, Haupt 2014, Stuth 2017, Vicari 2014, 2018*) How easy is the access to the occupational position for somebody without a corresponding certificate?

Hypothesis 1

- The more closed the occupation-specific activity is for people with other formal qualifications, the longer the search duration

2. Theory – Characteristics of the Applicants I

Demographic structure of the labour supply

Gender: *Hausmann et al. 2015* discover that an increasing share of women per occupation between 1976 and 2010 leads to a decreasing overall wage level. They trace back the effect due to more women with constantly lower earnings in the occupation.

- Easier recruiting in female dominated occupations?

Age: *Czepek/Moczall 2017:* The recruitment of older applicants is more often linked to conditions

- Longer search durations in occupations with a higher labour supply of older workers?

2. Theory – Characteristics of the Applicants II

Occupational labour market situation

It should be easier to find skilled workers, if the training activities in an occupation exceed the demand for labour.

Hypothesis 2

- The more persons are trained in an occupation compared to the labour demand, the shorter the search duration

Regardless of the training activities and closed access, a labour market situation in favour of the employers should facilitate the hiring process.

Hypothesis 3

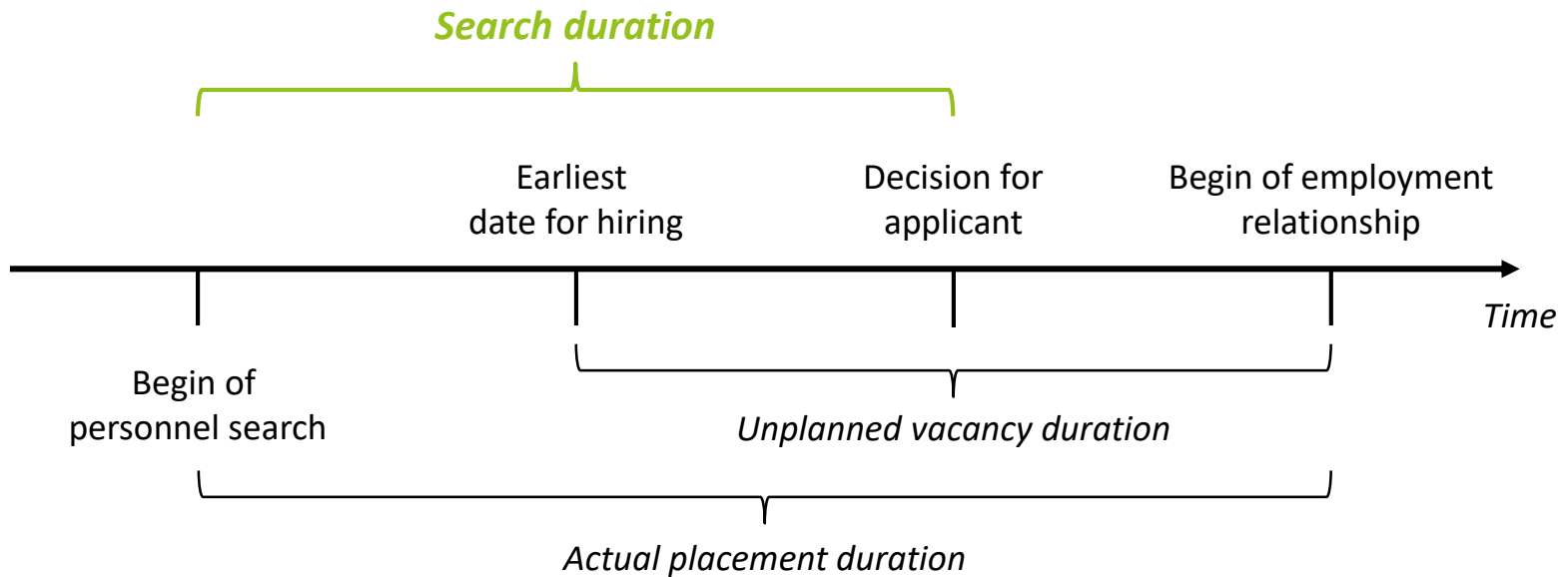
- The higher the occupation specific unemployment rate, the shorter the search duration

3. Data

- IAB Job Vacancy Survey, waves 2012 to 2015
- Almost 53,500 participating companies
- About 25,500 of them provided information about their last successful recruitment process (5,500 – 7,000 per wave)
- The dataset contains information about ...
 - Characteristics of the vacancy such as requirement level, occupation and contract properties
 - Characteristics of the search process
 - Matching with occupation specific information for the last recruitment process
- 21,382 successful recruitment processes with search duration > 0 and no missing values on the explaining variables

3. Data – Search duration

- Analysis of the *search duration* of successful staffing processes



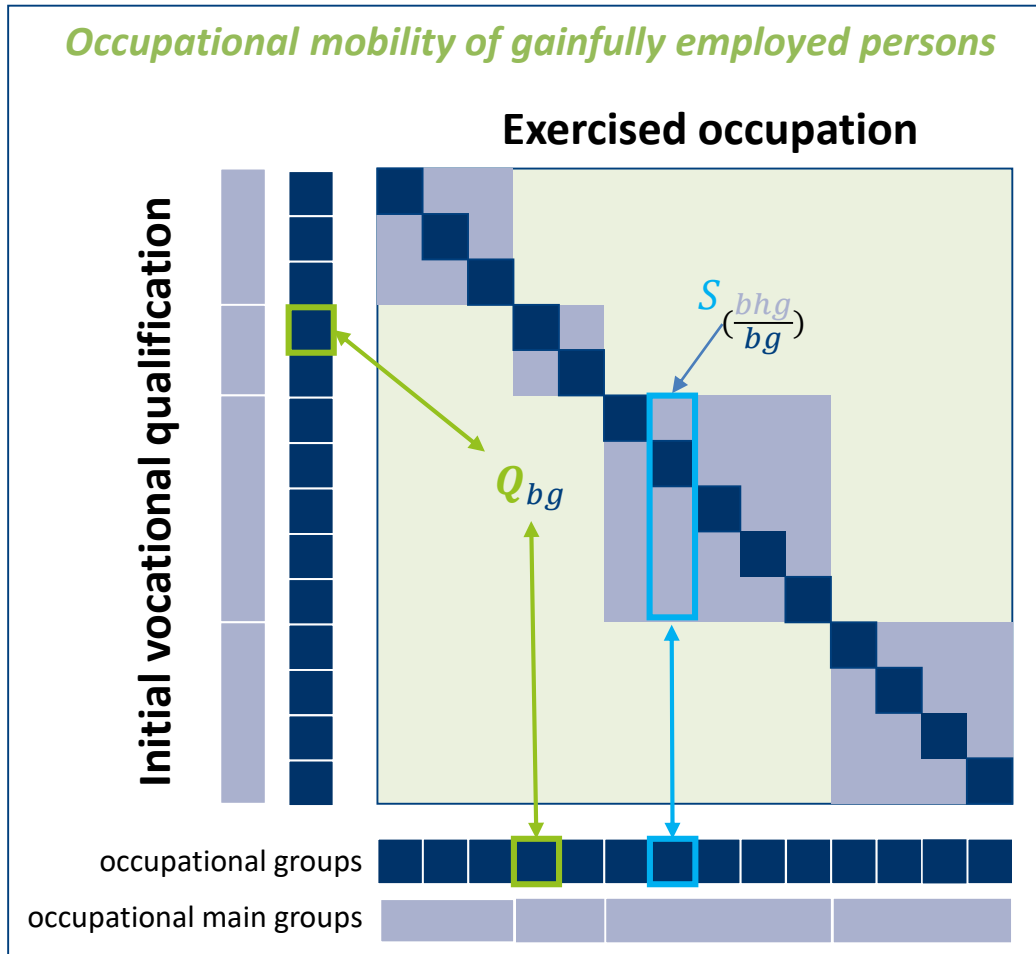
Source: Hartmann 2014, 6; IAB Job Vacancy Survey, waves 2012-2015

4. Methodology – Occupational characteristics

Data source: German Microcensus 2012 – 2015

- Creation of the initial vocational qualification by combining the highest vocational degree with the field of study (*Maier/Helmrich 2012*)
- Comparison with the exercised occupation: **occupational mobility matrix**
 - Calculation of the occupational closure (**substitution indicator**)
 - Compare amount of qualified persons to employed persons (**qualification indicator**)
 - Occupation specific unemployment rates
- Share of women in an occupation
- Share of labour force over 50 years of age

4. Methodology – Use of occupational mobility matrices



Occupation specific unemployment:

- Adapt the occupational flexibility matrix to the unemployed (age, gender, initial vocational qualification, nationality)

4. Methodology – Substitution indicator

Characteristics of the vacancy

- *Substitution potential/closure of the occupation*
 - Substitution indicator (S_{OG}) based on Microcensus

$$S_{OG} = \left(\frac{\text{Amount of labour demand with occupation specific qualification}_{OMG}}{\text{Amount of labour demand}_{OG}} \right) * 100$$

OG: Occupational group (3-digit code of the KldB 2010)

OMG: Occupational main group (2-digit code of the KldB 2010)

Labour demand: Gainfully employed persons

4. Methodology – Labour market

Characteristics of the labour market situation

- *Qualification of the labour supply*
 - Qualification indicator (Q_{OG}) based on Microcensus (cf. Stuth 2017)

$$Q_{OG} = \left(\frac{\text{Amount of labour supply with occupation specific qualification}_{OG}}{\text{Amount of labour demand}_{OG}} \right)$$

- *Unemployment rate*
 - Ratio of labour supply (using the occupational mobility matrix) to labour demand (UR_{OG}) based on Microcensus

$$UR_{OG} = \left(\frac{\text{Amount of labour supply}_{OG}}{\text{Amount of labour demand}_{OG}} - 1 \right) * 100$$

4. Methodology - Controls

Characteristics of the searching establishment

- Search strategy (Dummy for network#Number of formal search paths, other)
- Establishment Size (six classes)
- East-Germany
- 23 Economic sectors (WZ 2008)

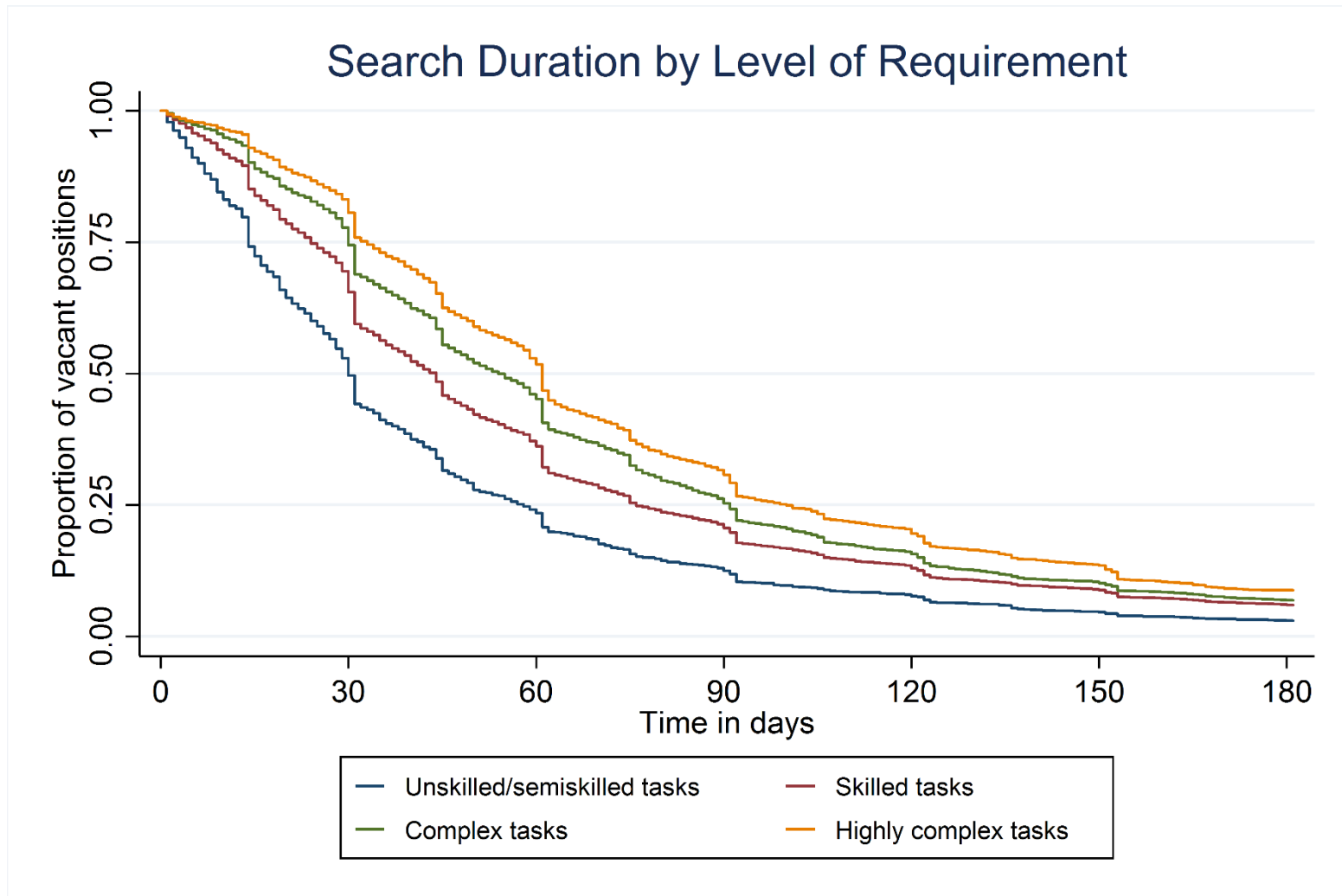
Characteristics of the vacancy

- Fixed-Term contract
- Weekly working time
- Extra hours (Dummy)
- 4 Requirement levels

Characteristics of the labour supply

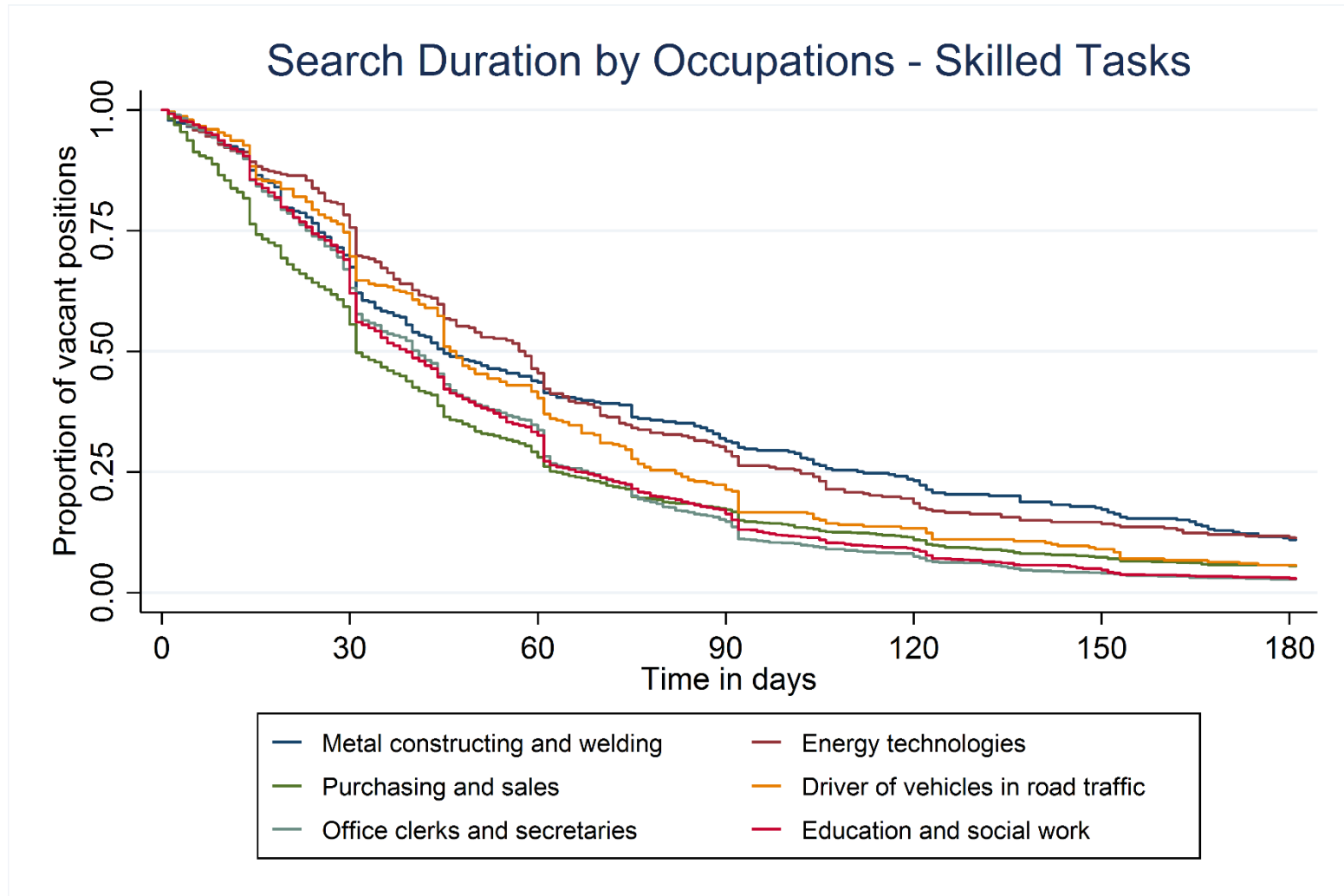
- % Persons over 50 years of age in labour supply
- % Women in labour supply
- Dummies for year and quarter

5. Results – Survivalrates (successfully filled vacancies)



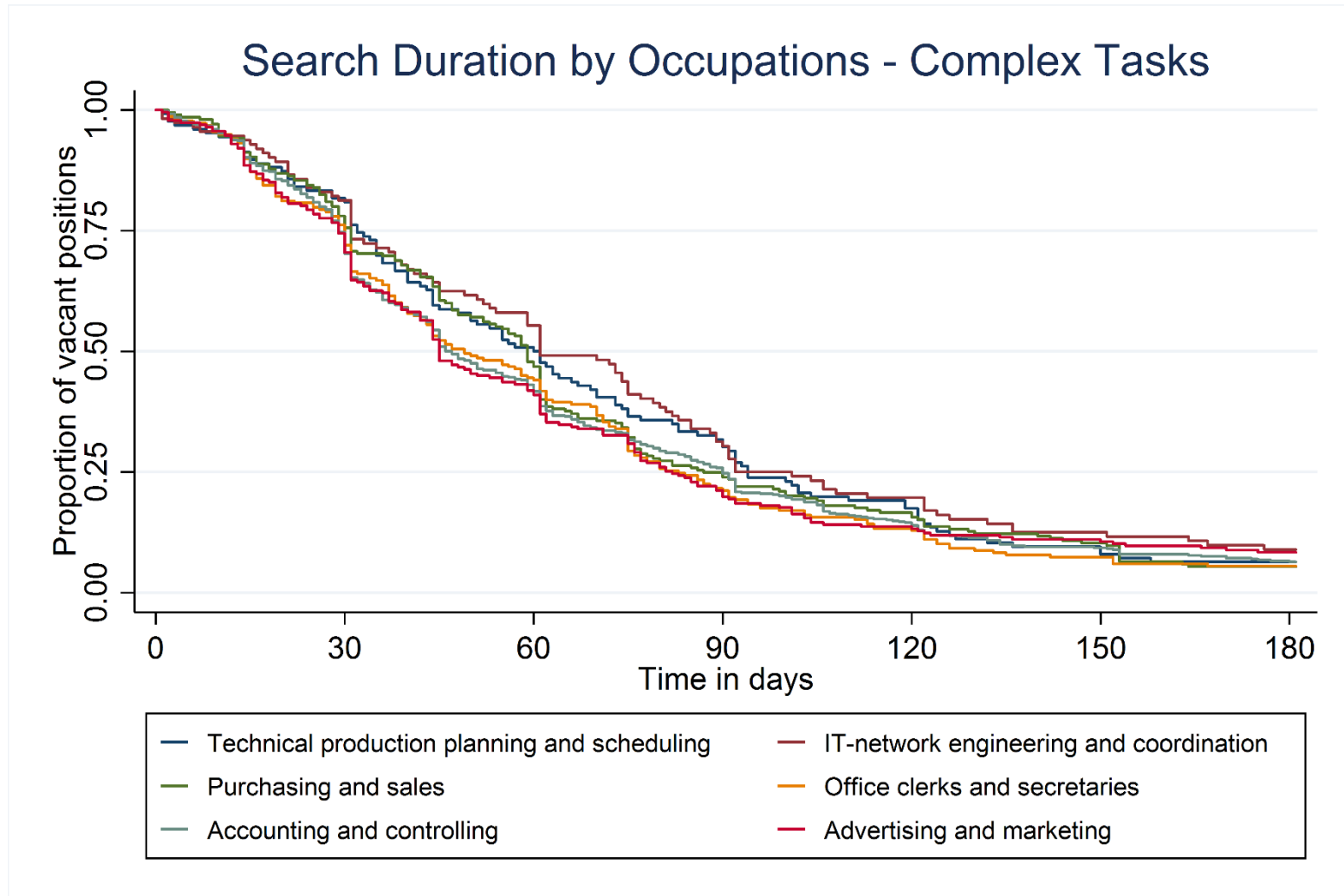
Source: Own calculations based on the IAB-Job Vacancy Survey, waves 2012 – 2015

5. Results – Survivalrates (successfully filled vacancies)



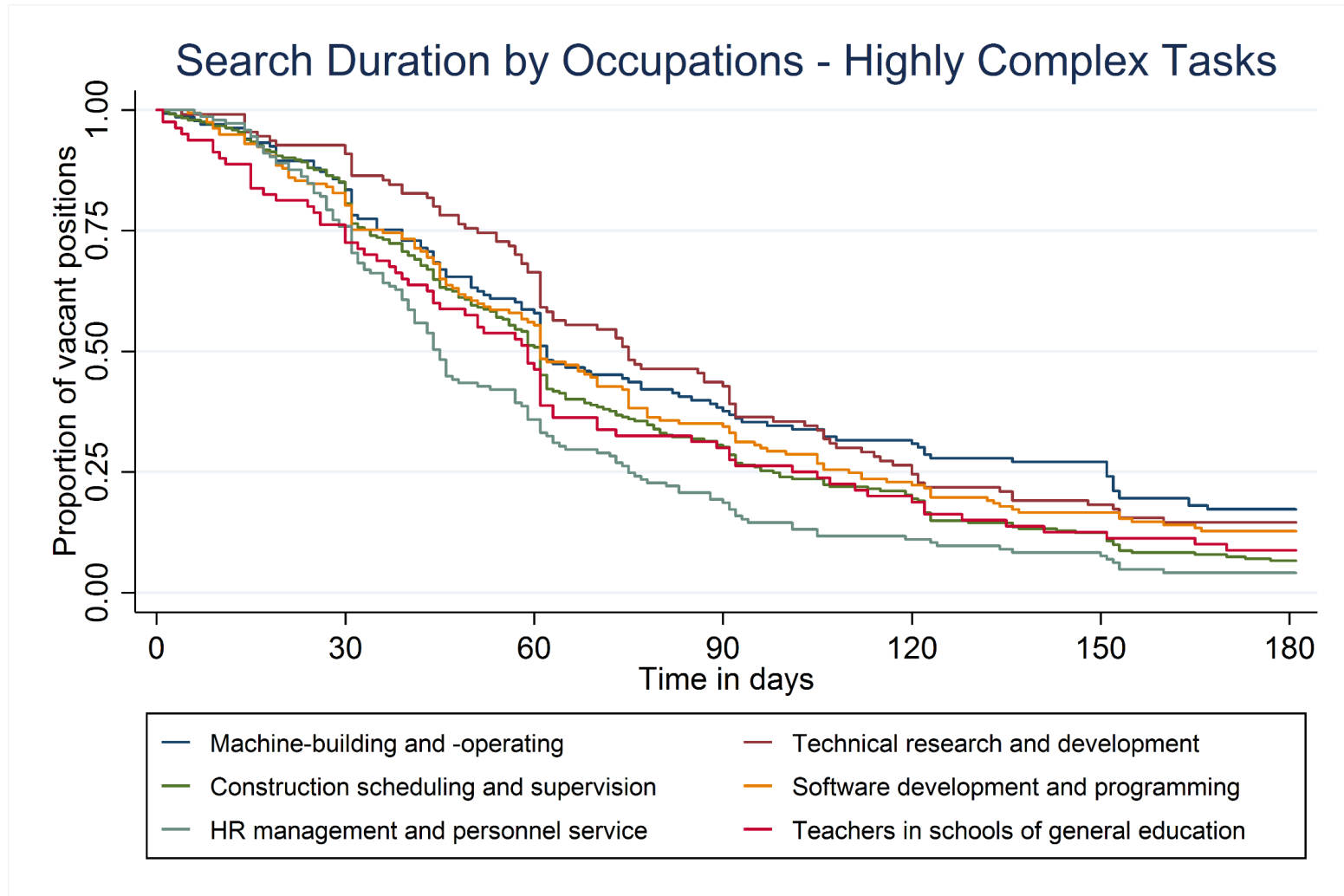
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5. Results – Substitution by occupation

Occupational Group		S _{OG}
541	Occupations in cleaning services	1.9
522	Drivers of vehicles in railway traffic	2.7
843	Teachers and researcher at universities and colleges	4.1
271	Occupations in technical research and development	4.6
943	Presenters and entertainers	4.8
525	Drivers and operators of construction and transportation vehicles and equipment	6.5
611	Occupations in purchasing and sales	7.4
273	Technical occupations in production planning and scheduling	7.7
341	Occupations in building services engineering	7.8
921	Occupations in advertising and marketing	8.0
....		
817	Occupations in non-medical therapy and alternative medicine	76.6
914	Occupations in economics	76.7
412	Occupations in biology	78.9
421	Occupations in geology, geography and meteorology	79.5
812	Laboratory occupations in medicine	81.2
816	Occupations in psychology and non-medical psychotherapy	81.6
818	Occupations in pharmacy	82.9
731	Occupations in legal services, jurisdiction, and other officers of the court	86.8
815	Occupations in veterinary medicine and non-medical animal health practitioners	92.5
814	Occupations in human medicine and dentistry	98.1

Source: Own calculations based on Microcensus 2012 – 2015

5. Results – Labour market characteristics

Occupational Group		Q _{BG}
712	Legislators and senior officials of special interest organisations	0.000
522	Drivers of vehicles in railway traffic	0.002
611	Occupations in purchasing and sales	0.011
432	Occupations in IT-system-analysis, IT-application-consulting and IT-sales	0.014
943	Presenters and entertainers	0.017
843	Teachers and researcher at universities and colleges	0.020
341	Occupations in building services engineering	0.028
541	Occupations in cleaning services	0.036
271	Occupations in technical research and development	0.050
922	Occupations in public relations	0.065
	...	
612	Trading occupations	2.595
414	Occupations in physics	3.121
412	Occupations in biology	3.259
282	Occupations in the production of clothing and other textile products	4.028
913	Occupations in the social sciences	4.323
421	Occupations in geology, geography and meteorology	5.351
411	Occupations in mathematics and statistics	7.295
912	Occupations in the humanities	10.731
914	Occupations in economics	20.200
911	Occupations in philology	90.232

Occupational Group		ELQ _{BG}
815	Occupations in veterinary medicine and non-medical animal health practitioners	0.9
814	Occupations in human medicine and dentistry	1.2
532	Occupations in police and criminal investigation, jurisdiction and the penal institution	1.7
841	Teachers in schools of general education	1.8
816	Occupations in psychology and non-medical psychotherapy	2.2
818	Occupations in pharmacy	2.3
842	Teachers for occupation-specific subjects at vocational schools and in-company instructors in vocational training	2.3
732	Occupations in public administration	2.4
731	Occupations in legal services, jurisdiction, and other officers of the court	2.4
817	Occupations in non-medical therapy and alternative medicine	2.5
	...	
541	Occupations in cleaning services	7.1
525	Drivers and operators of construction and transportation vehicles and equipment	7.1
121	Occupations in gardening	7.2
222	Occupations in colour coating and varnishing	7.3
513	Occupations in warehousing and logistics, in postal and other delivery services, and in cargo handling	7.3
633	Gastronomy occupations	7.5
321	Occupations in building construction	7.6
293	Cooking occupations	7.7
112	Occupations in animal husbandry	7.8
332	Painters and varnishers, plasterers, occupations in the waterproofing of buildings, preservation of structures and wooden building components	8.7

Source: Own calculations based on Microcensus 2012 – 2015

5. Results – AME (at median survival time) Piecewise exponential model

Variable	Model 1	Model 2	Model 3
Requirement level <i>(Reference = Unskilled)</i>			
Specialist activities	9.035***	9.065***	8.701***
Complex specialist activities	14.001***	14.383***	13.424***
Highly complex activities	19.399***	19.20***	18.060***
Fixed-term contract	-4.284***	-4.20***	-4.146***
Weekly working time	.144**	.088 ⁺	.089 ⁺
Overtime	5.83***	5.501***	5.56***
S_{BG}	.053 ⁺	.067*	.068 ⁺
% persons over 50_{OG}		.054	.033
% women_{OG}		-.069***	-.078***
unemployment rate_{OG}			-.647
ln(Q_{OG})			-.344
N	21 382	21 382	21 382
BIC	58 238.240	58 232.504	58 248.555

Source: Own calculations based on the IAB-Job Vacancy Survey, waves 2012 – 2015. Controlled for year, quarter, employment size, East-Germany, search strategy, industrial sector, cluster robust standard errors for 139 occupational groups

6. Conclusion

➤ Characteristics of the vacancy

- Requested overtime extends search duration, fix term contracts don't
- The requirement level of the vacancy has the strongest effect on the search duration
- ✓ **H1:** The more closed the occupation-specific activity is for people with other formal qualifications, the longer the search duration

➤ Characteristics of the applicants

- Significantly shorter search duration in female occupations are puzzling
- × **H2:** The ratio of occupationally trained persons compared to the labour demand does not influence the search duration
- × **H3:** The occupation specific unemployment rate does not influence the search duration (if controlled for substitution)

7. Outlook

- Results are preliminary – a lot of work to do!
- Robustness checks necessary
- Influence of indicators on vacancies that could not be filled
- Implement a parameteric model to facilitate the interpretation of possible long term labour market mismatches



Thank you for your attention!

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Literature I

- Brenzel, Hanna; Kettner, Anja; Kubis, Alexander; Moczall, Andreas; Müller, Anne; Rebien, Martina; Röttger, Christof; Szameitat, Jörg (2013): Neueinstellungen im Jahr 2012: Strukturwandel und Demografie prägten die Personalsuche. IAB-Kurzbericht Nr. 17, Nürnberg.
- Czepek, Judith; Moczall, Andreas (2017): Betriebe machen meist gute Erfahrungen. IAB-Kurzbericht 8/2017
- Dietz, Martin; Kubis, Alexander; Leber, Ute; Müller, Anne; Stegmaier, Jens (2013): Personalsuche in Deutschland: Kleine und mittlere Betriebe im Wettbewerb um Fachkräfte. IAB-Kurzbericht Nr. 10, Nürnberg
Hartmann, M. (2014): Möglichkeiten und Grenzen einer Engpassanalyse auf Basis der Statistiken der gemeldeten Arbeitsstellen und der registrierten Arbeitslosen, Statistik der Bundesagentur für Arbeit, Nürnberg
- Hartmann, Michael (2014): Möglichkeiten und Grenzen einer Engpassanalyse auf Basis der Statistiken der gemeldeten Arbeitsstellen und der registrierten Arbeitslosen. Materialien der Statistik der Bundesagentur für Arbeit für Universitäten
- Haupt, Andreas (2014): Lohnungleichheit durch soziale Schließung. Karlsruher Instituts für Technologie.
- Hausmann, Ann-Christin; Kleinert, Corinna; Leuze, Kathrin (2015): „Entwertung von Frauenberufen oder Entwertung von Frauen im Beruf?“ Eine Längsschnittanalyse zum Zusammenhang von beruflicher Geschlechtersegregation und Lohnentwicklung in Westdeutschland. KZfSS, 67 (2): 217-242
- IAB Job Vacancy Survey, waves 2012 to 2015, DOI: 10.5164/IAB.IABSE0015.de.en.v1. (The data was accessed via a research visit to the Research Data Center of the Federal Employment Agency at the Institute for Employment Research (FDZ) and / or via controlled remote data processing at the FDZ)
- Maier, Tobias und Helmrich, Robert (2012): Creating the Initial Vocational Qualification from the German Microcensus. In: ACSPRI Conferences, RC33 Eighth International Conference on Social Science Methodology.

Literature II

- Stuth, Stefan (2017): Closing in on Closure. Occupational Closure and Temporary Employment in Germany. Baden-Baden: Nomos Verlagsgesellschaft.
- Vicari, Basha (2014): Grad der standardisierten Zertifizierung des Berufs. Ein Indikator zur Messung institutioneller Eigenschaften von Berufen (KldB 2010, KldB 1988). IAB FDZ-Methodenreport 04/2014.
- Vicari, Basha (2018): Der Einfluss strukturierender Eigenschaften von Berufen auf horizontale und vertikale berufliche Mobilität im Kohortenvergleich. IAB-Discussion Paper 25/2018.
- Weeden, Kim A. (2002): Why Do Some Occupations Pay More than Others? Social Closure and Earnings Inequality in the United States. American Journal of Sociology 108(1): 55{101.

5. Results – Hazard-Ratios Cox-Regression

Variable	Model 1	Model 2	Model 3
Requirement level <i>(Reference = Unskilled)</i>			
Specialist activities	0.780***	0.779***	0.783***
Complex specialist activities	0.695***	0.690***	0.710***
Highly complex activities	0.622***	0.624***	0.631***
Fixed-term contract	1.103***	1.101***	1.103***
Weekly working time	0.997***	0.998*	0.997***
Overtime	0.875***	0.882***	0.885**
S_{BG}	0.999*	0.998**	0.875***
% persons over 50_{OG}		0.999	0.999
% women_{OG}		1.002***	1.002***
Unemployment rate_{OG}			1.015
ln(Q_{OG})			-1.007
N	21 382	21 382	21 382
BIC	58 238.240	58 232.504	58 248.555

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