



Mismatch and the Employers of Mismatched Workers



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Outline of presentation

- ☐ Background on mismatch
- ☐ Relevant results
- ☐ Employers and mismatch
- ☐ Conclusion

Definition of mismatch

- ❑ “Matching” as the process through which a worker and a job “get together”
- ❑ “Matching” as the measure of the quality of the worker-job matched pair
- ❑ Measures of a “good match”

Types of mismatch

- ❑ Education qualifications needed for the job
 - ❑ More, less, or just different
 - ❑ Overeducation, undereducation
- ❑ Skills needed for and utilised by the job
 - ❑ Oveskilling, skill gaps
- ❑ Other ways of being (mis)matched

Consequences of mismatch include...

- ❑ Overskilled/overeducated employee: typically worse than their well-matched counterparts
 - ❑ Wage penalty
 - ❑ Job Dissatisfaction
 - ❑ State persistence
 - ❑ Mobility
- ❑ Employer: typically more expensive than the workers that are well-matched with their jobs
 - ❑ Wage premium
 - ❑ Mobility

The economic rationale of mismatch

- ❑ Why would an employee seek and retain a mismatched job?
 - ❑ Typically, employees suffer penalties for being mismatched
- ❑ Why would an employer seek to employ and retain mismatched employees?
 - ❑ Typically employers pay a premium for the services of overskilled/overeducated workers

The economic rationale of mismatch (cont)

- ☐ A search problem?
 - ☐ An internal management problem?
 - ☐ Whose problem?
 - ☐ A problem at all?
-
- ☐ Research has been addressing these questions in a piecemeal way

Datasets on mismatch

We need data that pays equal attention to employers, employees and their matches

- ❑ Several X-section sets, including detailed skills information
- ❑ Few panel ones, notable in this context is the HILDA
- ❑ Few employer-employee linked data sets, matching not their focus
- ❑ The ‘perfect’ data set is not around...

Compensating differentials?

- ❑ One explanation for the mismatch wage penalty could be the presence of compensating differentials
- ❑ Research combines job satisfaction and different types of mismatch using panel estimation to examine “genuine” mismatch
- ❑ Mixed evidence on compensating differentials
- ❑ An example which controls for selection and unobserved individual heterogeneity using the HILDA follows

Possibilities after the onset of mismatch

<i>If Wage</i>	<i>and Job sat.</i>	<i>Then, the Mismatch is:</i>
Drops	also drops	<i>A genuine mismatch with evidence of productivity drop: (GENUINE MISMATCH)</i>
Drops	does not change	<i>Possibly a compensating differentials case: (POSSIBLE COMPENSATING DIFFERENTIAL)</i>
Drops	Rises	<i>A compensating differential case: (COMPENSATING DIFFERENTIAL)</i>
Does not change	Drops	<i>A weak mismatch: (WEAK MISMATCH)</i>
Does not change	also does not change	<i>No evidence of a mismatch: (NO EVIDENCE)</i>
Does not change	rises	<i>No evidence of a mismatch: (NO EVIDENCE)</i>

Evidence on compensating differentials

Reported Mismatch	Qualification	MALES	FEMALES
OED	Certificates	GENUINE MISMATCH	GENUINE MISMATCH
	Diplomas	NO EVIDENCE	COMPENSATING DIFFERENTIAL
	University	NO EVIDENCE	GENUINE MISMATCH
OSK	Certificates	GENUINE MISMATCH	GENUINE MISMATCH
	Diplomas	GENUINE MISMATCH	NO EVIDENCE
	University	WEAK MISMATCH	GENUINE MISMATCH
OED + OSK	Certificates	GENUINE MISMATCH	GENUINE MISMATCH
	Diplomas	WEAK MISMATCH	NO EVIDENCE
	University	GENUINE MIS	GENUINE MIS

A story of unwanted mismatches

- ❑ Little evidence to support that, *ceteris paribus*, workers seek mismatched jobs
- ❑ Strong evidence that several groups of workers suffer genuine losses from being mismatched
- ❑ Hence the next question to ask is whether this could be a temporary or permanent sacrifice/loss
- ❑ We move to panel studies of how persistent mismatch can be

Persistence of mismatch

- ❑ Again using the HILDA panel we estimate mismatch including the lagged mismatch variable in the RHS (use three lags)
- ❑ Distinguish between education level
- ❑ Present predicted probabilities for deepening mismatch by education level
- ❑ Two sets of estimates (“simple” and “serious”):
 - ❑ Ignoring job dissatisfaction and complex mismatch
 - ❑ Only complex cases and with job dissatisfaction

Scenarios of single cause mismatch (Probability of current mismatch)

	University degrees		Diplomas		Certificates III/IV	
Scenario	OSK	OED	OSK	OED	OSK	OED
000	0.05	0.03	0.06	0.15	0.09	0.06
100	0.20	0.26	0.21	0.55	0.25	0.42
110	0.34	0.54	0.42	0.79	0.45	0.69
111	0.45	0.68	0.57	0.87	0.56	0.84

OED and OSK single type of mismatch

- ❑ Differences by education level and by mismatch type
- ❑ OED more persistent, OSK less so
- ❑ Once is “forgiven”; twice gets bad; thrice and mismatch becomes almost an absorbing state for OED, a bit less so for OSK
- ❑ University graduates most likely to “escape”

Scenarios of severe/multiple cause mismatch (Probability of current mismatch)

	University degrees		Diplomas		Certificates III/IV	
Scenario	OSK+OED	OED+DISSAT	OSK+OED	OED+DISSAT	OSK+OED	OED+DISSAT
000	0.006	0.011	0.040	0.032	0.023	0.019
100	0.05	0.07	0.18	0.11	0.13	0.15
110	0.14	0.16	0.35	0.23	0.30	0.23
111	0.24	0.36	0.47	0.34	0.42	0.36

Serious mismatch

- ❑ Combining dissatisfaction with OED is revealing
- ❑ Those OED + DISSAT get out of their predicament the quickest
- ❑ Not all mismatch is perceived to be equally harmful and equally hard to escape from
- ❑ The difference between Uni graduates and the rest is confined to those OED who are not DISSAT

Evidence points to the role of employers

- ❑ Evidence of genuine mismatch (i.e. workers who suffer both wage penalties and low levels of job satisfaction)
- ❑ Also evidence of persistent mismatch
- ❑ Our results show that after we have controlled for individual (worker) unobserved heterogeneity, there remain considerable differences
- ❑ There are workers who would much rather not be mismatched: they say so and they escape faster
- ❑ Other workers do not appear to mind particularly about being mismatched

The employer

- ❑ In what circumstances would the employer wish to hire mismatched workers?
- ❑ What data would we need to investigate this?
- ❑ What methodology would be the most suitable?

Multilevel analysis: the intuition

- ❑ Workers in a firm will differ from one another, but they share the same environment
- ❑ Multilevel analysis is useful for cases where we need to distinguish between group and individual heterogeneity
- ❑ Using methods similar to panel analysis we can build into a hierarchical model both types of individual/firm characteristics and observed/unobserved heterogeneity
- ❑ The model estimates two levels and controls for the unobserved heterogeneity at the firm level

Multilevel analysis: the intuition (cont)

- ❑ Multilevel analysis needs employer-employee linked data
- ❑ We use the WERS UK survey
- ❑ We compare single- and multi-level estimation results
- ❑ Multilevel models are superior with firm-level estimates that are both statistically significant and informative
- ❑ Estimates of the unobserved heterogeneity (the variance of the random intercept) are statistically significant
- ❑ The firm effect is significant indicating that, *ceteris paribus*, some firms are more likely to employ mismatched workers

Employer characteristics

- ❑ Here, we focus on:
 - ❑ Establishment size
 - ❑ Sector
- ❑ We look at different measures of mismatch
- ❑ We finish with the examination of the role of unobserved firm heterogeneity by sector and mismatch type
- ❑ Further results on employer and employee characteristics are in the full paper (we control for education level, gender, minority workers, health conditions, TU individual membership, gender composition, TU composition, sector, size)

Mismatch incidence and establishment size

Mismatch by firm size. WERS UK. 0 not significant, + at 10% level, ++ at 5% level and +++ at 1% level. + denotes more mismatch than reference category, and – denotes less (but there are no such cases).

Firm Size (Quartiles)	All Mismatch			Too few skills	Mismatch with Dissatisfaction		
	OED	OSK	SEVERE OSK	SKILL GAP	OED+ DISSAT	OSK+ DISSAT	SEVOSK+ DISSAT
Up to 20: Ref Cat	0	0	0	0	0	0	0
Q2: 21-70	0	0	0	0	0	++	+
Q3: 71-300	+	+++	+++	0	+++	+++	+++
Q4: 300+	+++	+++	+++	0	+++	+++	+++

Confirmation on overskilling dynamics and establishment size: all education levels

Overskilling persistence interacted with small firm size (firms with less than 50 employees).
HILDA Aus, waves 1-10.

	One Lag		Two lags		Three lags	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Lag 1	0.42***	0.03	0.69***	0.04	0.76***	0.04
Lag 2	-	-	0.40***	0.04	0.55***	0.04
Lag 3	-	-	-	-	0.31***	0.04
Lag 1*Small Firm	-0.11***	0.04	-0.17***	0.05	-0.15***	0.05
Lag 2*Small Firm	-	-	-0.08*	0.05	-0.09*	0.05
Lag 3* Small Firm	-	-	-	-	-0.02	0.05
Total	36,299		27,941		21,185	

Establishment size

- ❑ Mismatch is a larger establishment phenomenon (WERS-UK)
- ❑ In the fewer smaller firms it is found, it is also less persistent. (HILDA-AUS)
- ❑ That is, where it is possible to be resolved, it gets resolved faster among small firms

Sectors and mismatch

- ❑ We estimate a multilevel model of mismatch using the WERS data
 - ❑ Top level is the establishment/firm
 - ❑ Bottom level is the individual worker
 - ❑ Sectors enter as RHS variables (and more later on)
- ❑ The variance of the random intercept is also estimated as a proxy of the extent that the mismatch can be attributed to the firm's unobservable characteristics (e.g. HR and hiring practices) over and above the observed characteristics

Examples of estimated mismatch probabilities by sector

	Overeducated	Severely Overskilled	Skills Gap	Overeducated and Dissatisfied	Severely Overskilled and dissatisfied
manufacturing	19.22%***	22.99%***	5.29%***	5.31%***	9.35%***
(Observed mismatch %)	(23.49)	(22.95)	(5.5)	(8.48)	(9.89)
Electricity, gas and water	31.67%***	18.76%	6.00%	8.27%**	7.28%
Construction	24.38%**	17.18%***	3.82%	5.05%	4.73%***
Wholesale and retail	17.47%	22.89%	3.71%**	4.70%	8.44%
Hotels and restaurants	20.85%	26.58%	3.29%*	4.44%	6.93%*
Transport and communications	19.77%	27.13%**	3.31%***	5.59%	11.76%**
Financial services	32.50%***	17.60%***	4.40%	9.98%***	8.43%
Other business services	35.09%***	18.59%***	5.12%	8.00%***	6.98%***
Public admin	35.14%***	19.28%***	5.11%	8.49%***	7.28%**
Education	34.66%***	18.14%***	2.62%***	6.42%*	4.59%***
Health	41.34%***	17.68%***	3.09%***	6.45%*	5.31%***
Other community services	28.60%***	24.08%	3.82%*	7.02%**	8.14%
Variance of random intercept	0.490***	0.153***	0.228***	0.301***	0.250***

Sectors and mismatch

- ❑ There are mismatch differences between sectors.
- ❑ There are also differences between types of mismatch
- ❑ Mismatch with or without dissatisfaction is different
- ❑ Gaps are not precisely estimated
- ❑ The multilevel model estimates the different mismatch propensities due to observed firm characteristics as well as unobserved (estimated) firm attributes
- ❑ We sum up broad estimation results under the tags (i) overeducation; (ii) overskilling (iii) skill gaps

Sectoral differences in mismatch (Manufacturing sector as reference category)

Mismatch	Overeducation	Overskilling	Skill Gaps
Sector			
Electricity/Gas/Water	More OED and many do not like it	Same OSK (as Manufacturing)	Same gaps
Financial Services	More OED and many Dissatisfied	Less OSK	Same gaps
Other business services	More OED and many Dissatisfied	Less OSK and Less Dissatisfied	Same gaps
Public Administration	More OED and many Dissatisfied	Less OSK and Less Dissatisfied	Same gaps
Education	More OED and many Dissatisfied	Less OSK and Less Dissatisfied	Lowest gaps
Health	Many more OED and more dissatisfied	Less OSK and Less Dissatisfied	Lowest gaps
Other community services	More OED and many Dissatisfied	Same OSK	Lower gaps

Sectoral differences in mismatch (Manufacturing sector as reference category)

Mismatch	Overeducation	Overskilling	Skill Gaps
Sector			
Wholesale + Retail	Same OED	Same OSK And Dissatisfied	Fewer gaps
Hotels etc.	Same OED	Same OSK And Dissatisfied	Fewer gaps
Transport and communications	Same OED	Same OSK And Dissatisfied	Fewer gaps
Construction	More OED but not Dissatisfied	Fewer OSK	Same gaps

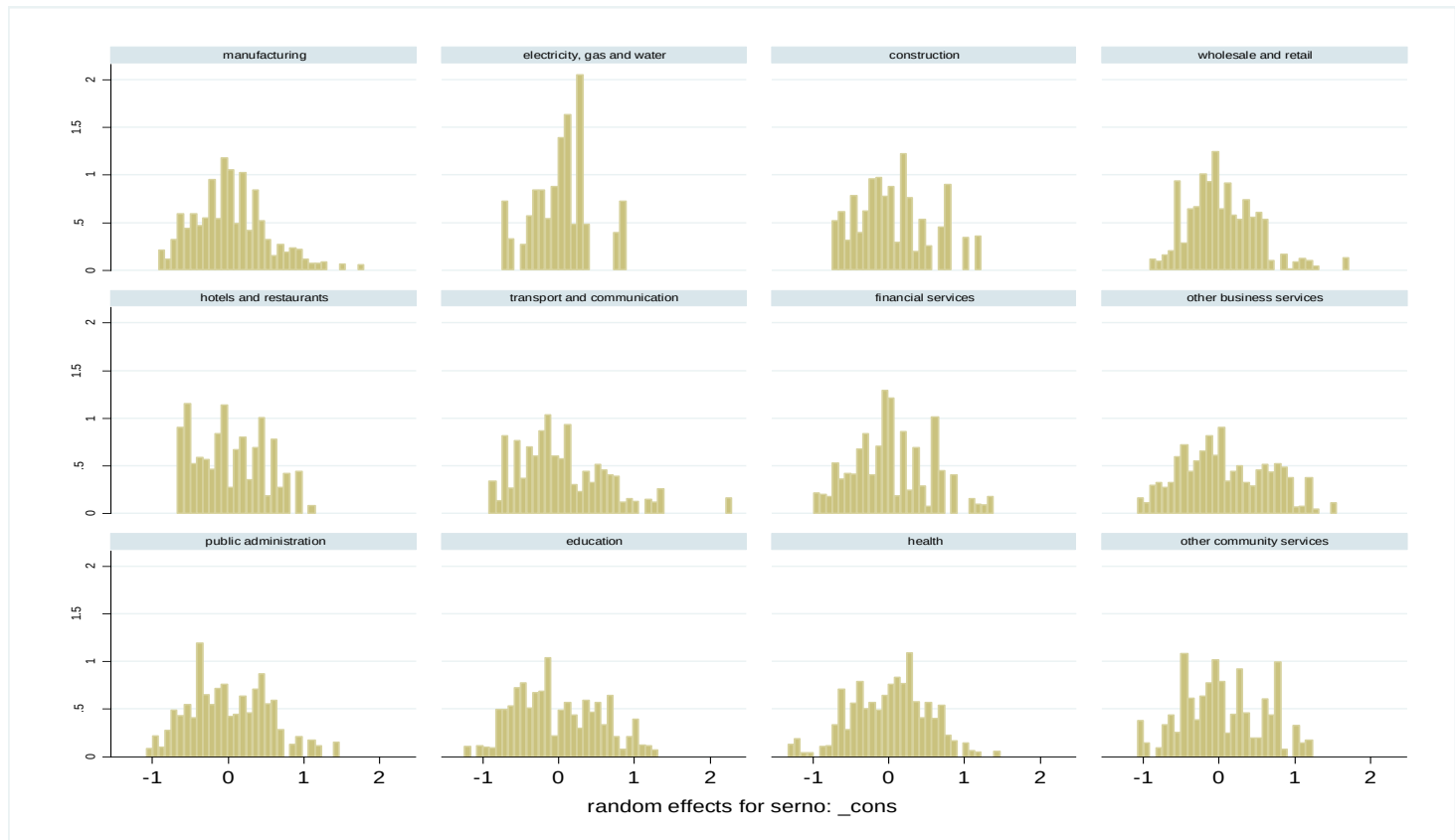
Sectors and mismatch

- ❑ There is a divide between Manufacturing and Services
 - ❑ OED is concentrated in the more specialist services and it is followed by Job Dissatisfaction
- ❑ Wholesale and Retail, Hotels and Restaurants, and Transport and Communications are also set apart
 - ❑ They have the same OED and OSK, but their OSK is accompanied by Dissatisfaction.
 - ❑ They also have fewer skill gaps (due to low skills required?)
- ❑ Construction is on its own...

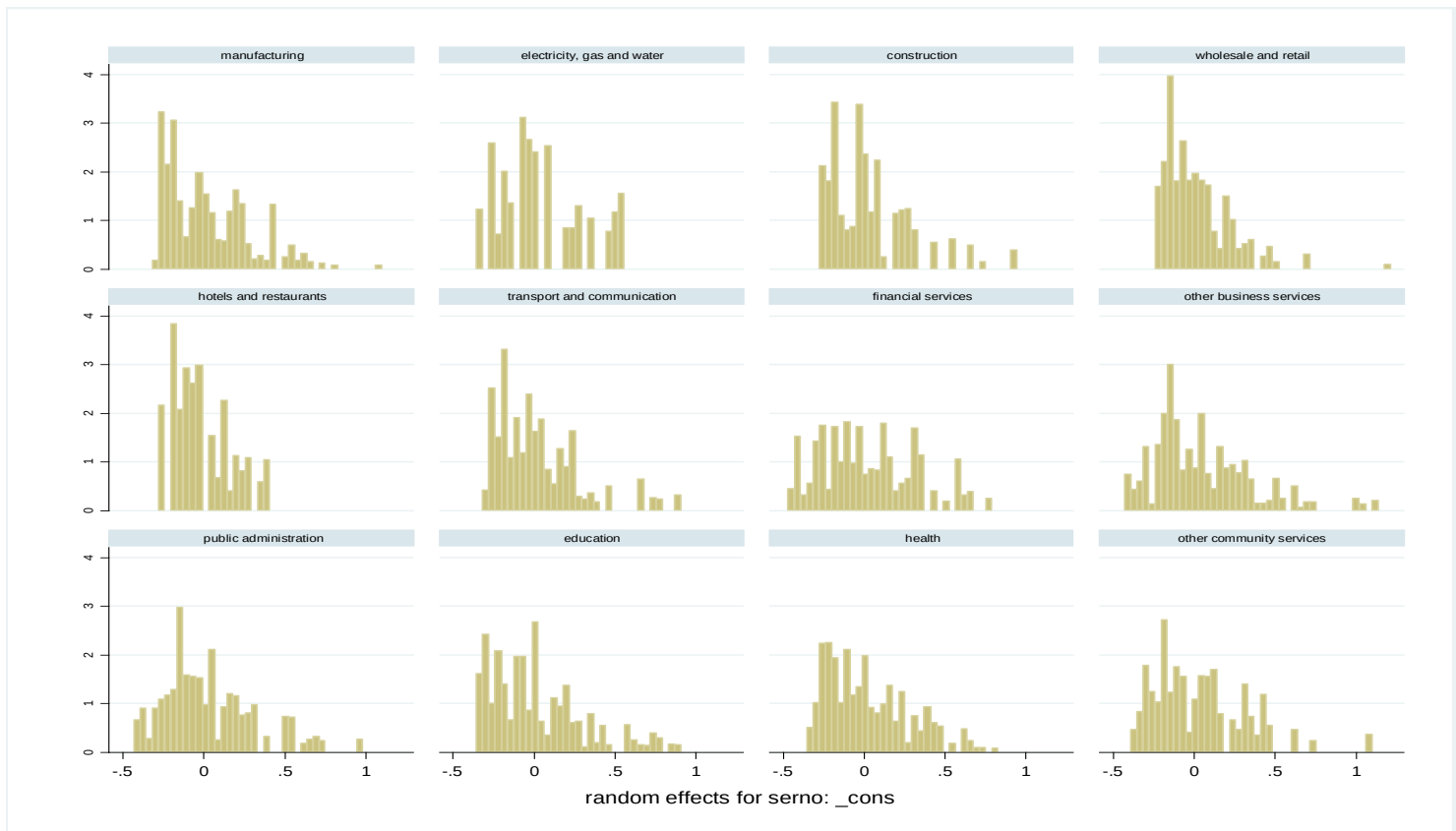
What more could we learn?

- ❑ The multilevel nature of the data allows us to estimate the unexplained part of the mismatch variation
- ❑ This is all the variation *over and above* what can be accounted for by the explanatory variables of the model
- ❑ We take this to be a measure of all remaining factors that affect mismatch: (match quality, HR practices, management of jobs?)
- ❑ We predict for parts of the sample to examine
 - ❑ Does it differ by sector?
 - ❑ Does it differ by type of mismatch?
- ❑ Few examples follow...

Unexplained firm effect: Overeducated (Distribution of unobservables by sector)

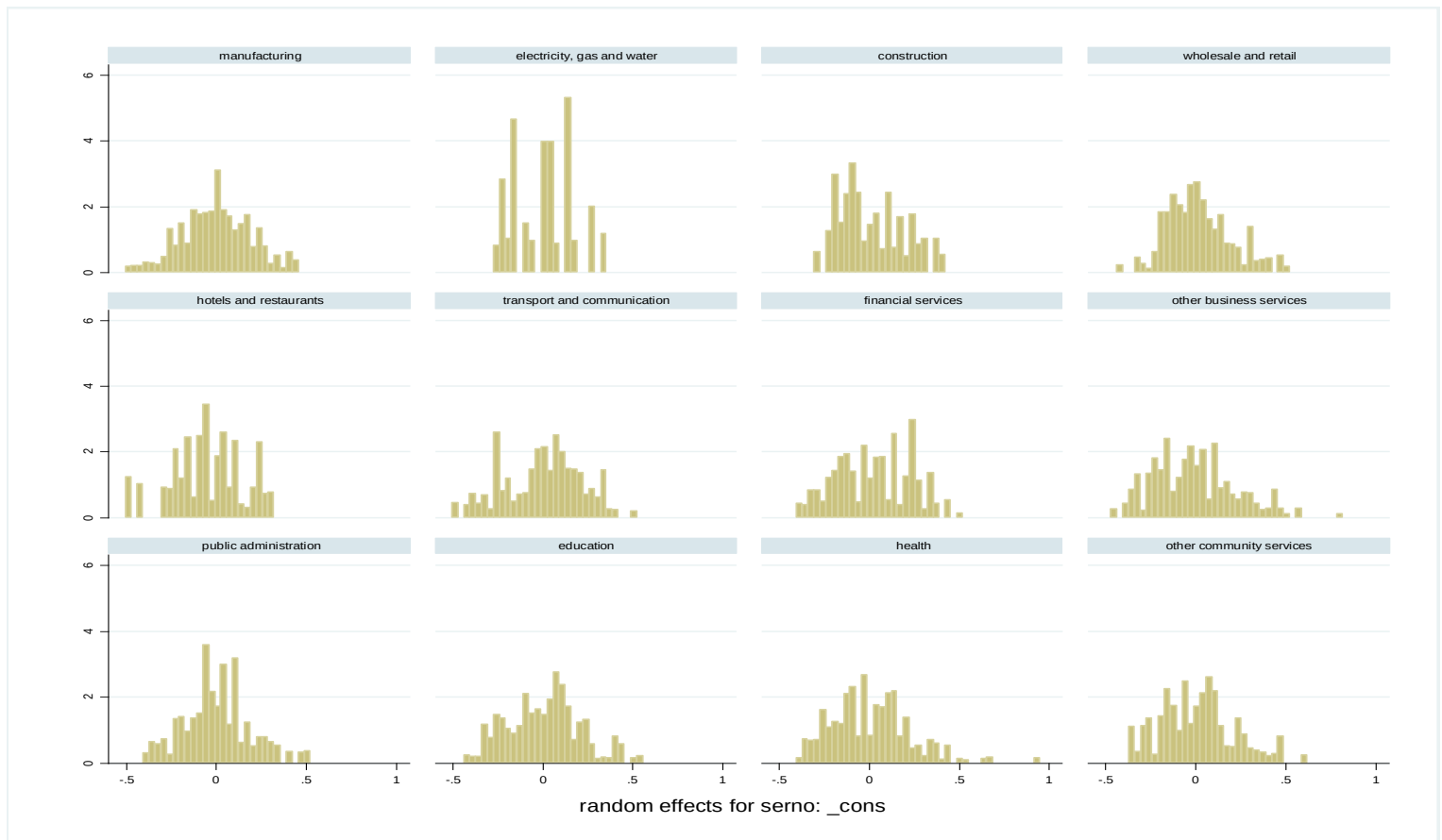


Overeducated and dissatisfied (Distribution of unobservables by sector)

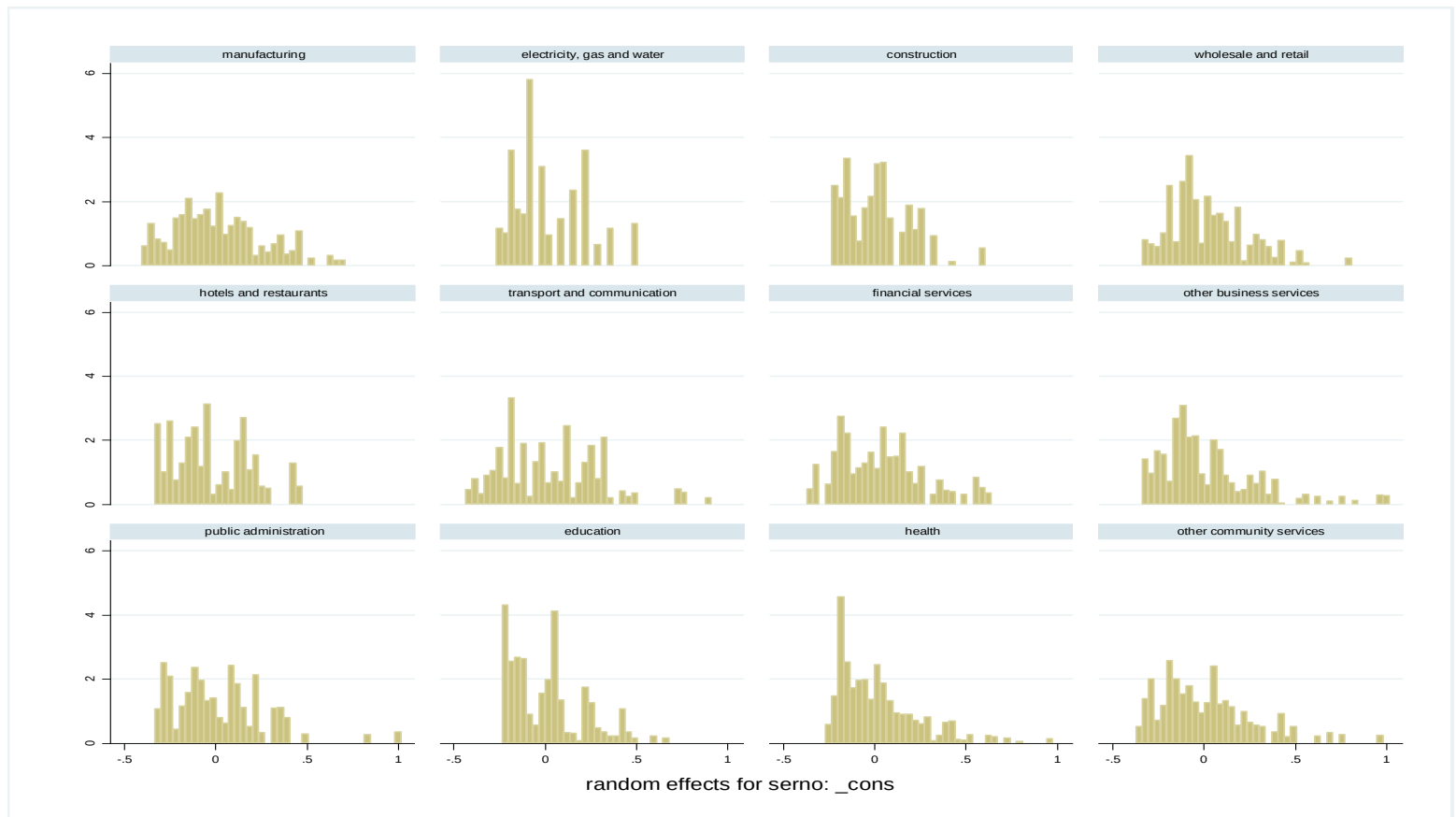


Overskilled

(Distribution of unobservables by sector)



Overskilled and Dissatisfied (Distribution of unobservables)

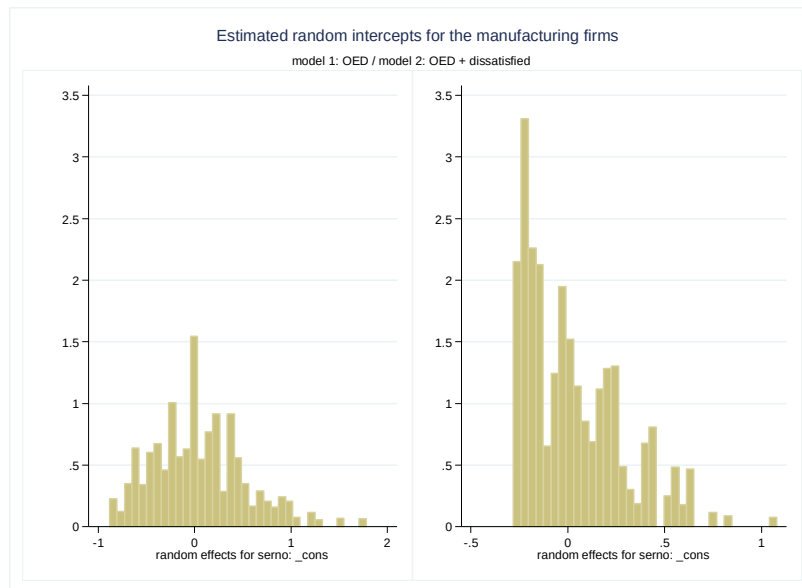


Unobservables (cont)

- ❑ There are clear differences between sectors (within each of the mismatch measures)
- ❑ There are also clear differences between measures of mismatch (within each sector)
- ❑ Caveats
 - ❑ estimates will be sensitive to underlying model
 - ❑ this is unexplained variation we are looking at...
 - ❑ the normalisation could be concealing important differences
 - ❑ the data has limitations
- ❑ Notwithstanding, it is worth looking at some of these differences...

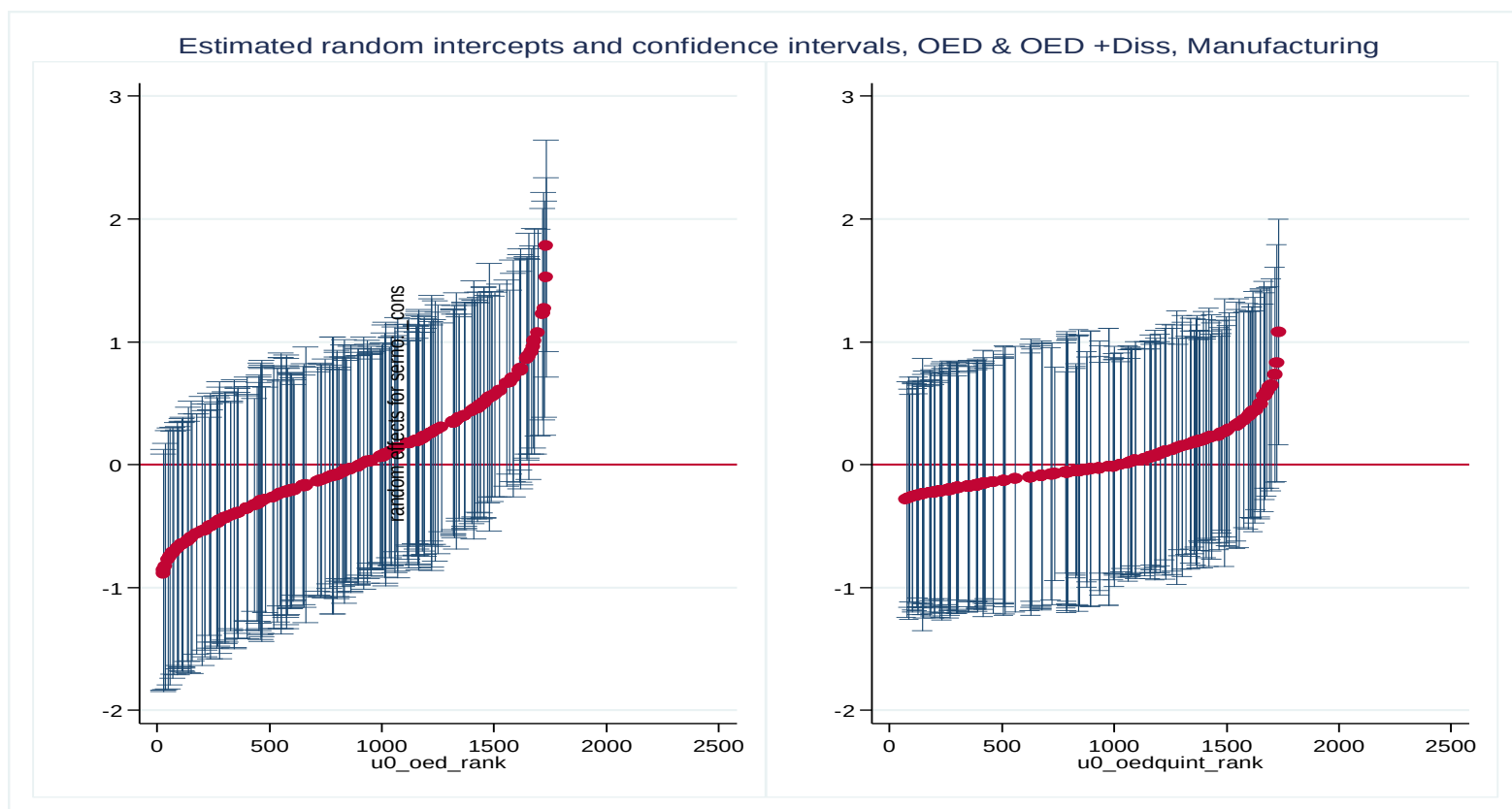
Manufacturing

Comparing OED with OED + DISSAT



- Note: all has been normalised with mean=0
- The distribution of OED is symmetric (looks normal)
- The OED+DISSAT distribution is far more compressed
- Firm unobservables related to dissatisfaction are also spread unevenly (strong left skew)
- The negative values are not as strongly negative

These graphs show the asymmetric compression of the firm effects on the probability to employ OED+DISSAT

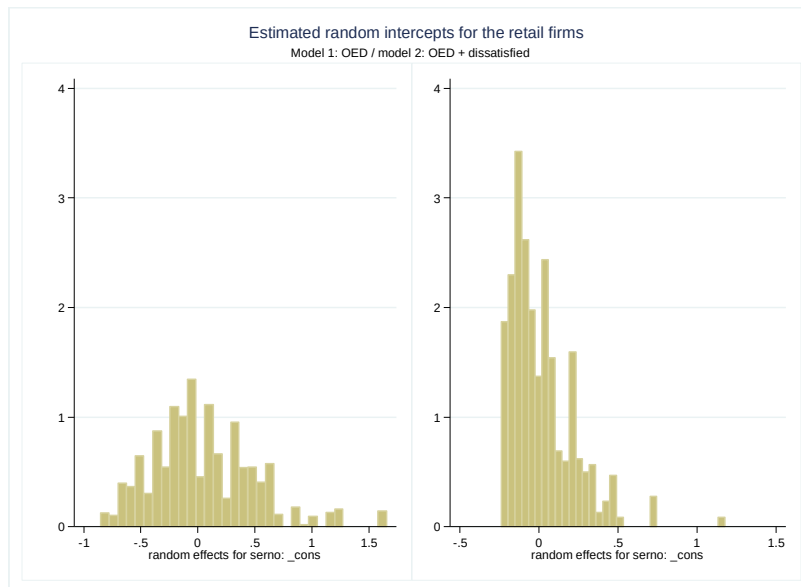


An interpretation

- ❑ The negative side of the distribution (below average chance of mismatch) is the good news for the worker, and the positive side is the bad news (above average chance of mismatch)
- ❑ It works the other way around for firms
- ❑ Shifting from all OED to those who are OED+DISSAT reduces the extent of the negative side (less good news) and leaves the extent of the positive side largely unchanged (the same bad news)
- ❑ This implies that, on the whole, when it comes to genuine mismatch the firm effect is tilted more towards the type that disadvantages the worker
- ❑ Assuming that the firm has no reason to wish to disadvantage the worker unless this benefits the firm sufficiently to compensate for the effect of this dissatisfaction on the worker's marginal product, we can think that our result is evidence that the firm perceives potential gains from the employment of dissatisfied mismatched workers.

Wholesale and Retail Trade

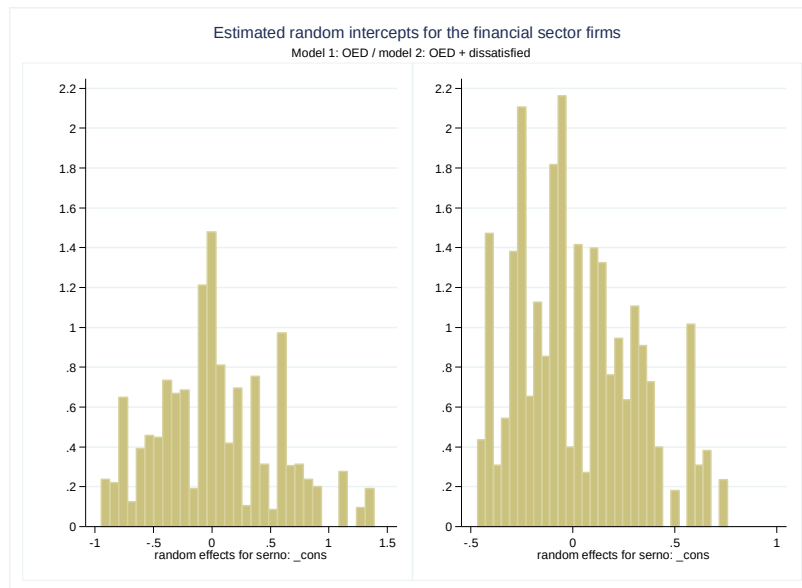
Comparing OED with OED + DISSAT



- Note: this is the same exercise for another sector; still normalised with mean=0
- The distribution of OED is symmetric (still looks normal)
- Firm unobservables related to dissatisfaction are spread unevenly (same left skew)
- Similar pattern as in Manufacturing (even more compressed...)

Financial Services

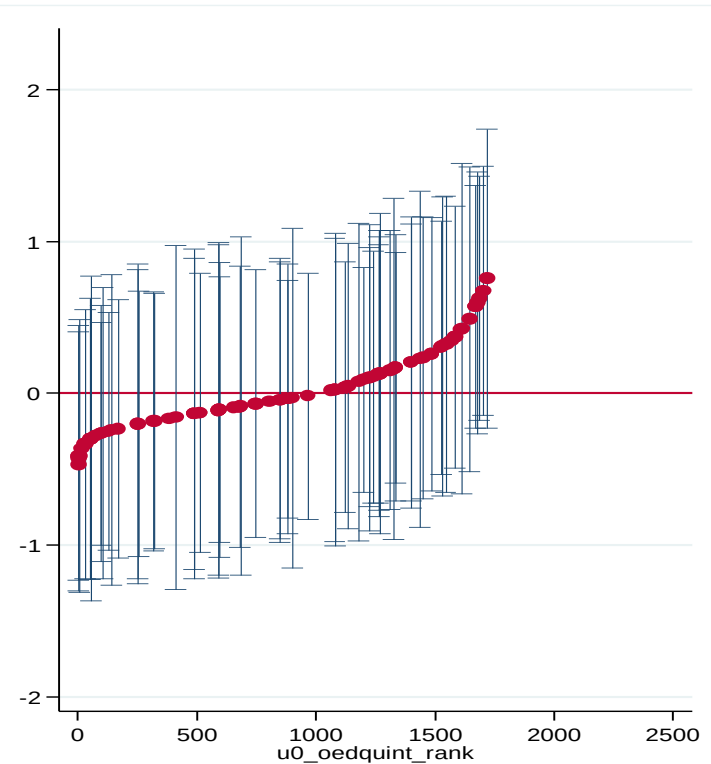
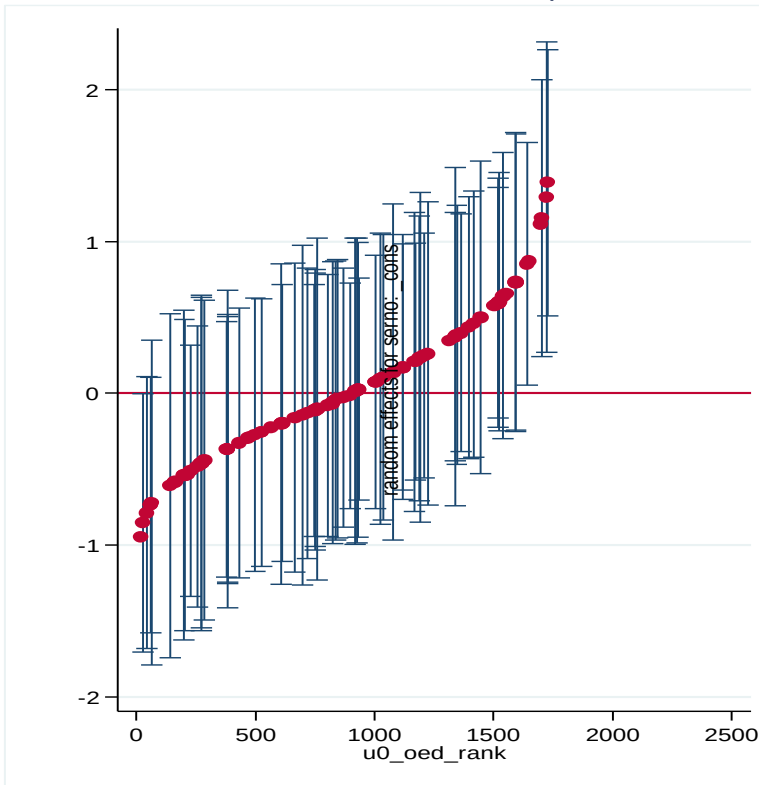
Comparing OED with OED + DISSAT



- The OED distribution looks evenly spread
- Left skew in OED+DISSAT is almost not there (esp. if we remove the RHS outliers)
- Given the normalisation, this is tantamount to a less compressed negative part of the distribution
- The negative values are as strongly negative as the positive values are strongly positive

This is neither as compressed nor as asymmetric a shift when we introduce dissatisfaction

Estimated random intercepts and confidence intervals, OED + Diss, Financial Services



The distributions for all sectors

	OED	OED + Diss	OED	OED + Diss	OED	OED + Diss	OED	OED + Diss	OED	OED + Diss
Industry	mean	mean	variance	variance	skewness	skewness	min	min	max	Max
manufacturing	0.045	0.029	0.232	0.065	0.574	0.949	-0.880	-0.281	1.780	1.080
electricity, gas	0.039	0.037	0.140	0.064	0.056	0.587	-0.710	-0.344	0.823	0.538
construction	0.066	0.028	0.230	0.061	0.454	1.312	-0.726	-0.261	1.167	0.932
wholesale and re	0.047	0.018	0.205	0.041	0.729	1.560	-0.852	-0.237	1.656	1.174
hotels and resta	0.045	-0.013	0.207	0.031	0.212	0.667	-0.651	-0.260	1.096	0.390
transport and co	0.048	0.018	0.346	0.063	0.921	1.347	-0.895	-0.293	2.215	0.871
financial servic	0.034	0.020	0.260	0.084	0.360	0.451	-0.947	-0.469	1.387	0.757
other business s	0.078	0.040	0.335	0.089	0.210	1.161	-1.058	-0.398	1.493	1.131
public administr	0.009	0.029	0.269	0.079	0.285	0.881	-1.031	-0.404	1.403	0.977
education	-0.006	0.014	0.303	0.082	0.255	1.006	-1.171	-0.348	1.260	0.870
health	0.019	0.021	0.256	0.063	-0.181	0.779	-1.319	-0.339	1.457	0.803
other community	0.049	0.031	0.284	0.078	0.118	1.030	-1.067	-0.361	1.156	1.073

Final remarks

- ❑ From previous research we have a good idea about the labour supply side, but the demand side is less well documented and researched
- ❑ We think that the lack of bespoke data will be a challenge in this type of research
- ❑ We find that multilevel analysis is a good econometric tool for this analysis
- ❑ We find employer-level observable characteristics to be associated with mismatch even after we control for observed employee characteristics
- ❑ We find that firm level unobservable characteristics are clearly visible, even in a data that is far less than perfect for the task
- ❑ We find that the distinction in the literature between apparent/simple versus genuine/complex mismatch is reflected in the firm level unobserved heterogeneity estimates
- ❑ Our evidence suggests that firm optimising behaviour is in part responsible for the presence of mismatch in the labour market