erskriften
sata bold

INTERNATIONALISATION FOR EARLY CAREER RESEARCHERS – EXAMINING THE IMPORTANCE OF STAYS ABROAD EVIDENCE FROM DENMARK

Qi Wang, Carter Bloch, Malene Christensen and Allan R. Lyngs

Danish Centre for Studies in Research and Research Policy (CFA)

Aarhus University, Denmark

ft to linjer
2. linje til
sata Bold

BACKGROUND

Recent analysis of postdoc fellowships from Danish Council for Independent Research (DFF)

- Postdoc fellowships in period 2001-2009 (both individual and embedded in larger project grants)
- Natural Sciences
- Compare short and no stay abroad (less than 2 months) with longer stay (min 22 months)
- Outcomes 6-8 years after stay abroad during postdoc
  - Retention in academia
  - Academic career advancement
  - Publication activity
  - Citation impact
  - International collaboration (co-authorship)

ft to linjer
2. linje til
sata Bold

BACKGROUND

Findings: little difference in outcomes between the two groups

- No significant differences in shares that remain in academia or in share that advances to tenured position
- Citation impact (MNCS) lower for postdocs with longer stay abroad
- Publication activity (counts and fractioned) slightly higher for postdocs with longer stay abroad

ft to linjer
2. linje til
sata Bold

MOTIVATION

- Emergence/growth of international postdoc fellowships in a number of countries

- Previous studies have explored
  - ➢international collaboration and networking viewed as essential for research (e.g. Barjak & Robinson, 2008; Tand & shapira, 2012; Abbasi&Jaafari, 2013)
  - ➢the impact of studying abroad on international labor market (Parey & Waldinger, 2010)

- Lack of empirical evidence on the causal relation of researching abroad and future research performance for early career researchers

ft to linjer
2. linje til
sata Bold

RESEARCH QUESTION

This paper explores the impact of researching abroad experience on the future academic performance for early career researchers

- Whether researching abroad affects the academic performance in terms of productivity & impact?
- Whether the impact of researching abroad differs in the length of staying? Is there an optimal length for stays abroad?

ft to linjer
2. linje til
sata Bold

HYPOTHESIS: EFFECT ON ACADEMIC PERFORMANCE DEPENDS ON LENGTH OF STAY ABROAD

- Stays abroad can provide access to new knowledge (knowledge spillover, networking)

➢ Short stays
  - Absorption of new knowledge takes time (developing close relations, assimilating new ideas)
  - Moving, new environment

➢ Long stays
  - Potential novelty/value of new knowledge may decrease over time
  - Contacts with host institution may deteriorate over time. Potential negative consequences of being away for long periods of time?

ft to linjer
2. linje til
sata Bold

DATA

- Sample of early career researchers within the Natural Sciences
  - Data source: Statistics Denmark (PhD statistics, migration data, employment data)
  - Examine stays abroad within 5 year period around PhD (one year before to 4 years after degree)
  - PhD degree in period 1996-2009

- Academic performance data: Web of Science database (CWTS)
  - p – number publications
  - pten – number top 10% publications
  - ncs – field normalized citation score
  - njs – field normalized journal citation score

ft to linjer
2. linje til
sata Bold

EMPIRICAL MODELS

$$Y_{it} = \exp[\beta_1 Abroad_{\downarrow} post_{it} + \beta_2 Abroad_i + X_{it}B + \delta_t + \epsilon_{it}] \quad 1$$

$$Y_{it} = \exp[\beta_1 Abroad_{\downarrow} post_{it} + \beta_2 Abroad_i + \beta_3 Abroad_{\downarrow} length_{it} + X_{it}B + \delta_t + \epsilon_{it}] \quad 2$$

$$Y_{it} = \exp[\beta_1 Abroad_{\downarrow} post_{it} + \beta_2 Abroad_i + \beta_3 Abroad_{\downarrow} short_{it} + \beta_4 Abroad_{\downarrow} long_{it} + X_{it}B + \delta_t + \epsilon_{it}] \quad 3$$

$$Y_{it} = \exp[\beta_1 Abroad_{\downarrow} post_{it} + \beta_2 Abroad_i + \beta_3 Abroad_{\downarrow} length_{it} + \beta_4 Abroad_{\downarrow} length_{it}^2 + X_{it}B + \delta_t + \epsilon_{it}] \quad 4$$

- Dependent variable Y_{it}: four ways to measure (p, ptop10, ncs, njs)
- Controls: age, career age, gender
- Estimation:
  - Quasi-maximum likelihood estimates based on the fixed effect Poisson model
  - Robust standard errors clusters at the individual level

RESULT I

Table 1: Impact of researching abroad on junior researchers' academic performance

Dependent variable:	p			pten			ncs			njs		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Abroad_post	0.0292	0.297**	0.285**	0.259*	0.599***	0.494***	0.276*	0.638***	0.583***	0.0505	0.294**	0.231
	(0.101)	(0.116)	(0.123)	(0.134)	(0.156)	(0.168)	(0.142)	(0.164)	(0.180)	(0.130)	(0.145)	(0.155)
Abroad	0.283***	0.322***	0.322***	0.195	0.259**	0.258**	0.156	0.219	0.218	0.291**	0.331***	0.330***
	(0.0957)	(0.0963)	(0.0963)	(0.119)	(0.121)	(0.121)	(0.144)	(0.147)	(0.147)	(0.121)	(0.121)	(0.121)
length*post		-0.105***	-0.0964***		-0.143***	-0.0665		-0.151***	-0.110		-0.0982***	-0.0536
		(0.0162)	(0.0362)		(0.0287)	(0.0627)		(0.0306)	(0.0683)		(0.0189)	(0.0449)
length^2* post			-0.000838			-0.00803			-0.00433			-0.00446
			(0.00337)			(0.00655)			(0.00643)			(0.00407)
Observations	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646

RESULT I

Table 1: Impact of researching abroad on junior researchers' academic performance

Dependent variable:	p				pten			ncs			njs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Abroad_post	0.0292	0.297**	0.285**	0.259*	0.599***	0.494***	0.276*	0.638***	0.583***	0.0505	0.294**	0.231
	(0.101)	(0.116)	(0.123)	(0.134)	(0.156)	(0.168)	(0.142)	(0.164)	(0.180)	(0.130)	(0.145)	(0.155)
Abroad	0.283***	0.322***	0.322***	0.195	0.259**	0.258**	0.156	0.219	0.218	0.291**	0.331***	0.330***
	(0.0957)	(0.0963)	(0.0963)	(0.119)	(0.121)	(0.121)	(0.144)	(0.147)	(0.147)	(0.121)	(0.121)	(0.121)
length*post		-0.105***	-0.0964***		-0.143***	-0.0665		-0.151***	-0.110		-0.0982***	-0.0536
		(0.0162)	(0.0362)		(0.0287)	(0.0627)		(0.0306)	(0.0683)		(0.0189)	(0.0449)
length^2* post			-0.000838			-0.00803			-0.00433			-0.00446
			(0.00337)			(0.00655)			(0.00643)			(0.00407)
Observations	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646

RESULT I

Table 1: Impact of researching abroad on junior researchers' academic performance

Dependent variable:	p			pten			ncs			njs		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Abroad_post	0.0292	0.297**	0.285**	0.259*	0.599***	0.494***	0.276*	0.638***	0.583***	0.0505	0.294**	0.231
	(0.101)	(0.116)	(0.123)	(0.134)	(0.156)	(0.168)	(0.142)	(0.164)	(0.180)	(0.130)	(0.145)	(0.155)
Abroad	0.283***	0.322***	0.322***	0.195	0.259**	0.258**	0.156	0.219	0.218	0.291**	0.331***	0.330***
	(0.0957)	(0.0963)	(0.0963)	(0.119)	(0.121)	(0.121)	(0.144)	(0.147)	(0.147)	(0.121)	(0.121)	(0.121)
length*post		-0.105***	-0.0964***		-0.143***	-0.0665		-0.151***	-0.110		-0.0982***	-0.0536
		(0.0162)	(0.0362)		(0.0287)	(0.0627)		(0.0306)	(0.0683)		(0.0189)	(0.0449)
length^2* post			-0.000838			-0.00803			-0.00433			-0.00446
			(0.00337)			(0.00655)			(0.00643)			(0.00407)
Observations	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646	8,646

VARIABLES

Defining short/long stays

RESULT II

Table 2: Impact of abroad length on junior researchers' academic performance

Dependent variable:	**p**	**pten**	**ncs**	**njs**	**p**	**pten**	**ncs**	**njs**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
abroad1_post_abroad	0.563***	0.729***	0.696***	0.549***	0.605***	0.847***	0.880***	0.681***
	(0.0920)	(0.135)	(0.184)	(0.0935)	(0.122)	(0.179)	(0.235)	(0.117)
abroad_short_stay	-0.340*	-0.548*	0.0789	-0.306	-0.282**	-0.460**	-0.544**	-0.382***
	(0.203)	(0.284)	(0.374)	(0.222)	(0.143)	(0.203)	(0.229)	(0.148)
abroad_long_stay	-0.594***	-0.664***	-0.688***	-0.519***	-0.742***	-0.899***	-0.996***	-0.820***
	(0.120)	(0.178)	(0.205)	(0.127)	(0.156)	(0.240)	(0.260)	(0.160)
Observations	8,646	8,643	8,643	8,646	8,646	8,643	8,643	8,646

Short stay: less than and equal to 12 months (10)
Long stay: greater than 48 months

Short stay: less than and equal to 24 months
Long stay: greater than 48 months

ROBUSTNESS CHECK

Excluding researchers who went abroad during their PhD studies

Dependent variable:	p		pten		ncs		njs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Abroad_post	0.642***	1.246***	0.761***	0.372***	0.894***	3.886**	0.640***	2.196***
	(0.106)	(0.359)	(0.143)	(0.125)	(0.150)	(1.507)	(0.116)	(0.563)
length*post	-0.0690*		-0.0341		-0.0309		-0.0497	
	(0.0414)		(0.0760)		(0.0931)		(0.0525)	
length^2* post	-0.00376		-0.0162		-0.0180		-0.00690	
	(0.00501)		(0.0111)		(0.0145)		(0.00629)	
abroad_short_stay		-0.596		-0.212*		-2.601*		-1.237**
		(0.385)		(0.126)		(1.497)		(0.619)
abroad_long_stay		-1.437***		-0.376***		-4.144**		-2.462***
		(0.402)		(0.138)		(1.603)		(0.639)

ROBUSTNESS CHECK

- OLS estimation

Dependent variable:	p		pten		ncs		njs	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Abroad_post	1.080***	1.246***	0.302***	0.372***	3.071***	3.886**	1.577***	2.196***
	(0.208)	(0.359)	(0.0749)	(0.125)	(0.844)	(1.507)	(0.341)	(0.563)
length*post	-0.198***		-0.0438**		-0.542**		-0.210*	
	(0.0616)		(0.0208)		(0.224)		(0.113)	
$length^{2}$* post	0.00255		-0.000205		0.00627		-0.00312	
	(0.00443)		(0.00139)		(0.0144)		(0.00792)	
abroad_short_stay		-0.596		-0.212*		-2.601*		-1.237**
		(0.385)		(0.126)		(1.497)		(0.619)
abroad_long_stay		-1.437***		-0.376***		-4.144**		-2.462***
		(0.402)		(0.138)		(1.603)		(0.639)
Observations	8,673	8,673	8,673	8,673	8,673	8,673	8,673	8,673

ft to linjer
2. linje til
sata Bold

SUMMARY & CONCLUSION

- The effect of staying abroad on future research performance for early career researchers depends on the length of staying
  - Long length staying abroad does not increase research performance relative to medium length
  - Not enough sample to show the impact of short length stays on research performance, but according to our small sample, short length staying do not increase either relative to medium staying length
  - The impact of researching abroad on junior researchers' research performance seems to approximate an inverted U-shape relation

ft to linjer
2. linje til
sata Bold

LIMITATION & FUTURE WORK

- Limitation
  - Poor coverage of short stays

- Future work
  - Control for research fields
  - Mechanisms: why the experience of staying abroad would benefit research performance (collaboration)
  - Include researchers from other fields like medicines

References

- Abbasi, A., & Jaafari, A. (2013). Research impact and scholars' geographical diversity. Journal of Informetrics, 7(3), 683-692.
- Barjak, F., & Robinson, S. (2008). International collaboration, mobility and team diversity in the life sciences: impact on research performance. Social Geography, 3(1), 23.
- DFF. (2017). DFF-international postdoctoral grant. Online available: http://ufm.dk/en/research-and-innovation/councils-and-commissions/the-danish-council-for-independent-research/for-applicants/what-can-you-apply-for/overview-of-instruments/dff-international-postdoctoral-grant
- Parey, M., & Waldinger, F. (2011). Studying abroad and the effect on international labour market mobility: Evidence from the introduction of ERASMUS. *The Economic Journal*, *121*(551), 194-222.
- Tang, L., & Shapira, P. (2012). Effects of international collaboration and knowledge moderation on China's nanotechnology research impacts. Journal of Technology Management in China, 7(1), 94-110.

DANISH CENTRE FOR STUDIES IN RESEARCH AND RESEARCH POLICY

DEPARTMENT OF POLITICAL SCIENCE

AARHUS UNIVERSITY