

International mobility: foreign researchers productivity and motivations behind the creation of collaboration networks

Stefano H. Baruffaldi

stefano.Baruffaldi@epfl.ch

Chair of Economics and Management of Innovation (CEMI)
Ecole Polytechnique Fédérale de Lausanne

Coauthored with:

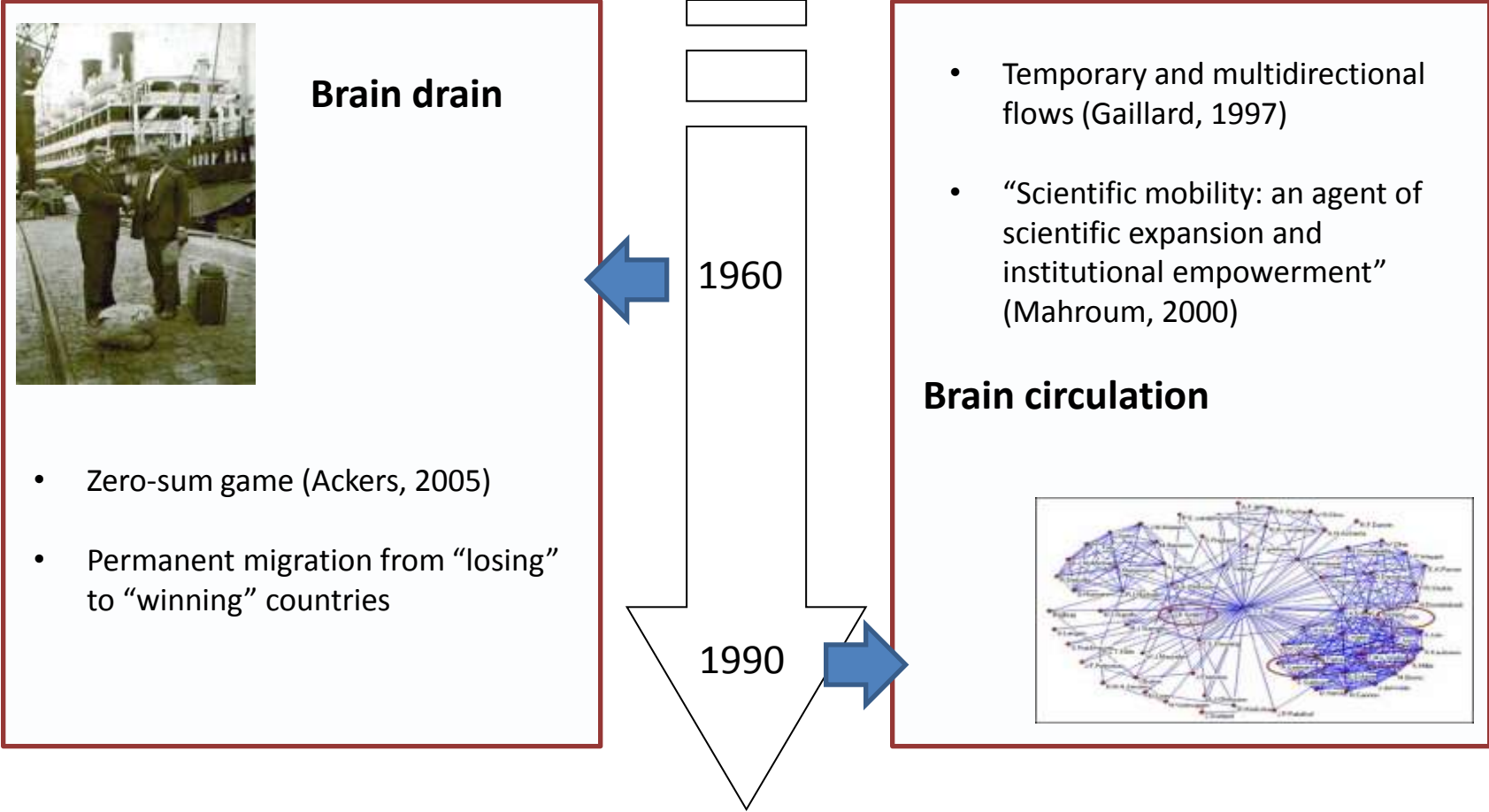
Paolo Landoni

Sabrina Romeri

Marta Valsecchi

Department of Management, Economics and Industrial Engineering
Politecnico di Milano

Brain drain or Brain circulation?



*What policies?
How to attract mobile researchers?
Mobility leads to networks?*

Foreign researchers in Italy and Portugal

- The survey: 497 answers from foreign researchers in Italy and Portugal in Research centers and universities (18% response rate).

Geographic zone of origin	Foreign researchers in Italy	Foreign researchers in Portugal
Western Europe	0.25	0.43
Eastern Europe	0.25	0.16
North America	0.04	0.02
South America	0.15	0.24
Asia	0.23	0.1
Africa	0.06	0.05
Oceania	0.01	0

The role of home country linkages

- Return mobility and scientific productivity of researchers working abroad: The role of home country linkages (Baruffaldi and Landoni, 2012, Research Policy).

	Count	%
NOT linked	71	14.4%
Linked	426	85.6%
TOTAL	497	100%
Linked with:		(% among linked researchers)
Wide informal network	286	57.9%
Temporary mechanisms	243	49.2%
Professional Association	149	30.2%
Scientific journals	141	28.5%
Business	117	23.7%
Diaspora networks	89	18.0%

● Results:

- Foreign researchers with linkages with the country of origin are more likely to return.
- Foreign researchers with linkages with the country of origin are more productive.
- Informal professional linkages have an higher effect on productivity.

The motivations to move out of the host country

➤ Motivations of scientific international mobility: The role of non-economic factors (Baruffaldi and Landoni, 2014, Working Paper).

• Results:

- Foreign researchers unsatisfied with aspirational aspects of their position in the foreign country are more likely to leave the host country.
- Foreign researchers unsatisfied with aspirational aspects of their position in the foreign country are more likely to move to a third country (rather than return to their countries of origin).



Mobility, productivity and collaborative networks

- **International mobility: foreign researchers productivity and motivations behind the creation of collaboration networks (Work in Progress).**

Literature:

- Mobile researchers are highly productive (Stephan and Levin, 2001; Franzoni et al., 2012).
- International collaborations are increasing: they grew from 14% of all publications in ISI in 2000 to 18% in 2009 (Gazni et al., 2012).
- Social networks facilitate diffusion of knowledge (Agrawal et al., 2006; Trippi, 2011)

Research questions:

- *What is the link between productivity, mobility and international networks creation? (Scellato et al., 2014)*
- *When international mobility leads to international network creation?*

Productivity and mobility

- Access to different sources of knowledge or the creation of a broader network of relationships and thus resources can affect productivity (Meyer, 2001).
- Mobility allows access to diverse sources of knowledge (Fleming, 2001; Hargadon and Sutton, 1997).
- Productive researchers have higher opportunities and motivations to move (Franzoni et al., 2012)

Hp1: The most productive researchers are more likely to move out of the host country.

Return and collaborations

- Recent evidence reveals that often migrant scientists do not return to their countries of origin (Van Bouwel, 2010).
- Mobility is often temporary and happens in the context of purposeful creation of collaborations (Mahroum, 2000).
- Probability of return country and scientific productivity in the host country are both higher for researchers that maintain home linkages. (Baruffaldi and Landoni, 2012)

Hp2: Researchers returning to their countries of origin, are more likely to maintain collaborations with the host country.

Motivations of mobility and collaborations

- “Scientific and general migrations converge when driven by the pursuit of the basic economic conditions” (Golub, 2002)
- Non-economic incentives often motivate researchers’ career choices (Roach & Sauermann, 2010; Cohen & Sauerman, 2010)
- Non economic motivations affect the decision to stay in the host country (Baruffaldi and Landoni, 2013).

Hp3: Researchers moving out of the host country because of academic motivations are more likely to maintain collaborations with the host country.

Hp4: Researchers satisfied with respect to non-economic factors, are more likely to maintain collaborations with the host country.

Data: Foreign researchers in Italy

- Original data: survey on foreign researchers in Italy in 2009 in research centers and universities.
 - 262 answers
 - About 18% response rate
- Online search for updated **CVs** (2014) and publication scores (Scopus).
- Online search of publication scores of coauthors (**Scopus**).

Sample	Number of observations
Sample total	262
Sample considered (complete info)	188
Sample with publications in Scopus	152
Sample without publications in Scopus	36
Sample of people abroad	80

Main variables on total sample

Variable	Value
Movement (abroad13)	= 1 if the researcher left Italy, 0 otherwise.
Intention to leave Italy (intentionleave)	It takes the value of 1 if the researcher expressed the intention to leave, 0 otherwise.
Satisfaction (satisfaction_it_opportunities; satisfaction_it_status; satisfaction_it_unilinks; satisfaction_it_intnet)	Each variable can assume a value from 1 to 4.
Cooperation (collaboration_in_it)	It is equal to 1 if the researcher has collaboration, 0 otherwise.
Reason to move to Italy (reason_entry_job; reason_entry_academic; reason_entry_personal; reason_entry_ecopol)	It takes value equal to 1 if the researcher indicates the specific reason, 2 otherwise.
Total number of publications (publications_tot)	Total number of publications.
Total number of citations (citations_tot)	Total number of citations.
Average number of citations per year (citations_avg_y)	Average number of citations.
Italian language (italian_knowledge_bef)	It can assume a value from 1 (none) to 4 (advanced).
Moving year to Italy (yearmoveto)	Year.

Main variables on movers

Variable	Value
Copublication after moving (copublications_after)	number of publications that present at least an Italian affiliation.
Publication after moving (publications_after)	It is equal to 1 if the researcher has at least one publication after leaving Italy.
Country of destination (oecd)	It takes value equal to 1 if the country of destination is in the OECD list.
Cooperation (collaboration_in_it)	It is equal to 1 if the researcher has collaboration, 0 otherwise.
Return (homecountry)	It is equal to 1 if the researcher returns to the home country, 0 otherwise.
Reason to move out from Italy (reason_exit_academic; reason_exit_job; reason_exit_ecopol)	It takes value equal to 1 if the researcher indicates the specific reason, 2 otherwise.
Coauthors' characteristics (num_permanent_coauthors; num_temporary_coauthors; num_doct_coauthors)	Count of number of coauthors per professional position.

Descriptive statistics

- Total sample:

Sample considered (complete info) - 188	Mean	Std. Deviation	Max	Min
Age	41.25	0.83	80	26
Number of publications	14.47	2.41	194	0
Number of publications in Italy	10.20	1.44	179	0

- Movers:

- 80 researchers moved out from Italy (42%)
- 70% of researchers publishing collaborated with researchers in Italy.

Sample of people abroad - 80	Mean	Std. Deviation	Max	Min
Age	36.39	0.86	72	26
Timespent	4.76	0.29	18	0
Number of publications	14.55	3.87	194	0
Number of publications in Italy	6.79	1.45	77	0
Number of publications after Italy	3.56	1.07	61	0
Copublications	0.98	0.20	10	0

- Decision to move out of the host country (H1):
 - Probit model
 - Dependent variable: abroad13

- Number of collaborations of movers with the host country (H2-H5):
 - Quasi Maximum Likelihood Estimation (QMLE)
 - Dependent variable: copublications_after

The decision to move out of the host country

EQUATION	VARIABLES	(1) Model	(2) Model	(3) Model
abroad13	gender	-0.648*** (0.238)	-0.561** (0.247)	-0.583** (0.258)
	age	0.00427 (0.0176)	-0.00113 (0.0181)	-0.00311 (0.0188)
	2.position_it	1.498*** (0.551)	1.549*** (0.565)	1.907*** (0.623)
	3.position_it	1.716*** (0.617)	1.682*** (0.628)	2.073*** (0.696)
	publications_tot	0.0115* (0.00594)	0.0145** (0.00693)	0.0170** (0.00780)
	citations_tot	-0.000138 (0.000244)	-9.38e-05 (0.000294)	-0.000119 (0.000329)
	italian_knowledge_bef	0.0251 (0.130)	0.0941 (0.135)	0.173 (0.143)
	yearmoveto	0.0811** (0.0358)	0.0993** (0.0389)	0.0898** (0.0407)
	intentionleave	0.637*** (0.224)	0.669*** (0.234)	0.753*** (0.247)
	satisfaction_it_opportunities			0.171 (0.154)
	satisfaction_it_status			0.118 (0.147)
	satisfaction_it_unilinks			-0.210 (0.168)
	satisfaction_it_intnet			0.280* (0.162)
	reason_entry_job		0.0827 (0.260)	0.0507 (0.271)
	reason_entry_academic		-0.623** (0.264)	-0.813*** (0.293)
	reason_entry_ecopol		0.455 (0.359)	0.544 (0.376)
	reason_entry_personal		-0.538** (0.251)	-0.500* (0.258)
	Constant	-163.8** (71.76)	-200.2** (78.04)	-182.5** (81.40)
	Observations	188	188	188
	chi2	80.91	90.96	96.63

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Number of collaborations with the host country

EQUATION	VARIABLES	(1) Model	(2) Model	(3) Model
copublications_after	gender	-0.935** (0.388)	-1.035*** (0.400)	-0.608 (0.433)
	age	-0.0337 (0.0360)	-0.0327 (0.0303)	-0.0929*** (0.0279)
	2.position_it	-0.358 √(1.178)	-0.228 √(1.018)	-1.943** (0.782)
	3.position_it	0.241 √(1.683)	0.234 √(1.305)	-1.848* (1.005)
	num_yearabroad	0.616*** (0.173)	0.603*** (0.174)	0.526*** (0.132)
	publications_after	0.0212 (0.0291)	0.0253 (0.0258)	0.00911 (0.0152)
	citations_avg_y	-0.162 (0.141)	-0.190 (0.162)	-0.0815 (0.100)
	num_permanent_coauthors	0.402*** (0.0684)	0.334*** (0.121)	0.464*** (0.0846)
	num_temporary_coauthors	0.0377 (0.105)	0.0973 (0.111)	0.0857 (0.0815)
	num_doct_coauthors	-1.093 √(1.758)	-1.044 √(1.511)	-0.881 (0.750)
	oeed	0.108 (0.387)	-0.0195 (0.371)	-0.346 (0.412)
	timespent	0.171* (0.0916)	0.157* (0.0822)	0.0496 (0.0647)
	collaboration_in_it	1.092** (0.500)	0.822* (0.432)	1.049*** (0.395)
	homecountry	1.314*** (0.419)	1.259*** (0.393)	1.068*** (0.312)
	reason_entry_academic			-0.486 (0.368)
	reason_exit_academic			-0.966** (0.393)
	reason_exit_job			0.484 (0.309)
	reason_exit_ecopol			1.218*** (0.384)
	satisfaction_it_opportunities		0.0171 (0.235)	
	satisfaction_it_status		-0.114 (0.116)	
	satisfaction_it_intnet		0.425** (0.207)	
	Constant	-2.672 (3.682)	-3.305 (3.400)	1.891 (2.446)
	Observations	80	80	80
	chi2	288.5	389.8	310.4

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

Conclusions

- Results in synthesis:

- A high percentage of foreign researchers in Italy tend to move again.
- Especially highly productive researchers are more likely to move.
- However, the majority of movers that have publications after having moved out, has co-publications with researchers located in Italy.
- Researchers that return to their country of origins and that do not move for academic reasons are more likely to keep collaborations.

- Implications:

- Different typologies of movements (temporary, different motivations) lead to different consequences in terms of network creation.
- Policies should not be targeted (or not only) to keep researchers but also to favor the creation of international networks.

Thank you

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