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Do jobs-follow-people or people-follow-jobs?
A Meta-analysis for Europe and the US

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Overview

› **Motivation**
› **Theoretical debate**
› **Results Meta-analysis 64 empirical studies of the Carlino-Mills model for jobs-follow-people versus people-follow-jobs**
› **Conclusion and discussion**

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Classis question about regional growth still in debate

Literature: do "jobs-follow-people or people-follow-jobs?" (Borts and Stein 1964; Steinnes and Fisher 1974) or related "chicken-or-egg" (Muth 1971). Later *The Determinants of County Growth* by Carlino and Mills (1987) with lagged adjustment framework. The question relates to questions like:

› Do people move for economic factors (jobs) or amenities and quality-of-life factors? (e.g. Lowry,1966; Partridge 2010).
› Is the residential location decision made before or after the job location decision? (e.g., Deding et al. 2009).
› Are employment locations of firms really exogenous to residential locations? Or vice-versa (as assumed in the monocentric city model)?

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Duelling theoretical models

› New Economic Geography (Krugman, 1991): falling transport cost lead to concentration
› Amenity migration (Graves, mid1970s): people or moving to nice places, warm climates
› Agglomeration effects, attractiveness of (big) cities, high level facilities, cultural amenities (Gleaser et al, 2001 etc., Florida, 2003)
› Storper & Scott (2009): people only move to nice places with suitable employment
→ Partridge (2010): for the US, Graves is the winner!

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Policy relevance

› The question what determines growth plays a central role in policy discussions: is catering to the wishes of firms by improving the business climate of a place a better strategy than catering to wishes of people and improving the people climate of a place?
› China: changing location patterns of firms (inland move), changing migration patterns, especially of higher educated and richer people with changing preferences
› Changing policy focus from only economic goals like GDP, income and (un-)employment to broader goals like well-being and quality of life: e.g. OECD-project 'How is life in your region?'

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Well-being – Quality of life - Happiness

› The problem of **definition**

› Many terms for more or less the same thing (how well one's life is going)

- Quality of life
- Welfare / Well-being
- Health
- Happiness

short term: **emotional** feelings of happiness

long term: life **satisfaction**

People's Well-being: changing preferences

Objective measures
- Life expectancy
- Mortality rates
- Poverty
- Crime
- Income
- Un-/employment
- Education
- Gender balance
- Working hours

Subjective measures
- Health perception
- Access to services
- Material deprivation
- Safety and trust
- Life satisfaction
- Happiness
- Capabilities
- Equal opportunities
- Work life balance

Resilience of cities/regions

Social resilience

Bearable   Equitable

Sustainable

Environmental resilience   Viable   Economic resilience

Regional development: European Economic space

The world is spiky: concentration of people and economic activities. BUT big cities have higher initial GDP, but NOT higher growth rates! (Broersma & Van Dijk, 2008 and OECD, Regional Outlook, 2011)

Employment rate 2010: dark is better (jobs per inhabitants 20-64 years)

Population density
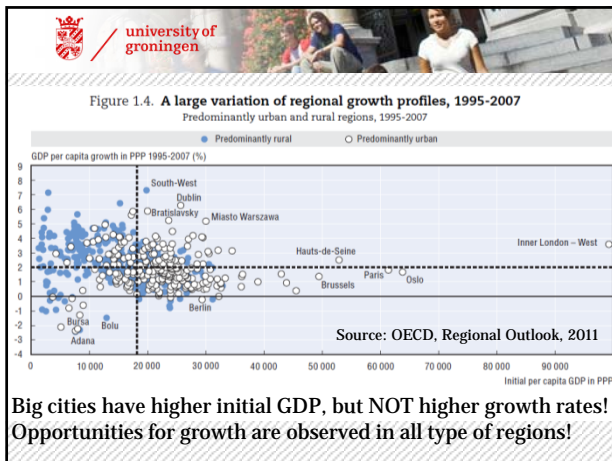Rural – urban typology

- Densely populated area
- Intermediate density area
- Thinly populated area

Source: EU-Commision (November 2010), Investing in Europe's future, 5-th Report on Economic, Social and Territorial Cohesion

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Agglomeration and growth

Growth

Lineair unfinite growth?

Finite growth?

Size

Trade off between agglomeration benefits vs congestions cost?

Figure 1.4. **A large variation of regional growth profiles, 1995-2007**
Predominantly urban and rural regions, 1995-2007

Source: OECD, Regional Outlook, 2011

Big cities have higher initial GDP, but NOT higher growth rates!
Opportunities for growth are observed in all type of regions!

Figure 1.3. **Intensity of dimensions of societal progress and geographic space**

|	Cities	Rural areas
Efficiency/income	+	−
Environmental quality	−	+
Social dimensions: Public goods (*e.g.* health, education)	+	−
Social dimensions: Community-produced goods (*e.g.* trust, security)	−	+

Source: OECD, Regional Outlook, 2011

Do 'jobs follow people' or 'people follow jobs'?

A meta-analysis of Carlino-Mills studies

Gerke Hoogstra, Raymond Florax
en Jouke van Dijk (2014)

Modelling do 'jobs follow people' or 'people follow jobs'?

› Late 1960s variety of techniques were put forward, but in a small and fragmented group of studies.
› Late 1980s, the number of research studies has rapidly grown and there has been relatively little disagreement about the choice of methodology due to the publication of *The Determinants of County Growth* by **Carlino and Mills** (1987), which marked a radical departure from previous causality studies in two respects.
› To illustrate the importance of the publication: it was the most cited regional science article of 1987. Isserman (2004)
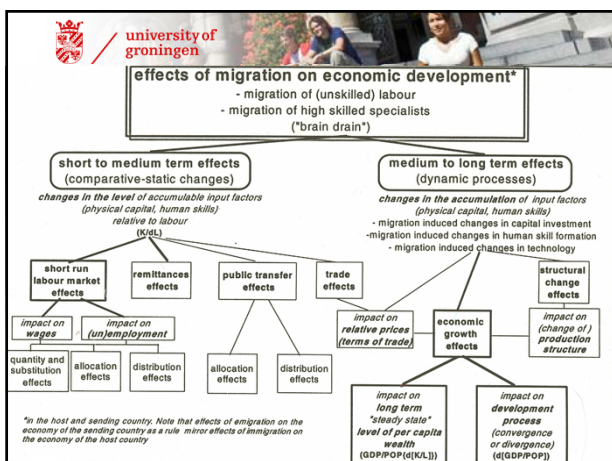
Innovative features of the Carlino-Mills models:

› First, US nationwide analysis of population–employment interactions at a very detailed spatial scale (county level).
› Second, and even more importantly, it was the first study to investigate these interactions by using **a simultaneous equations model** similar to the one introduced by Steinnes and Fisher (1974), but with a **lagged adjustment framework built in**.
› **Criticism:** the identification of the simultaneous equations system is often problematic because of the lack of good instruments and that the results may therefore not be reliable (see, e.g., Rickman 2010).

Carlino-Mills model structures

$$\bar{E}_t = \alpha_0 + \alpha_1 E_{t-1} + \alpha_2(I + \bar{W}_1)\bar{P}_t + \alpha_3 \bar{W}_2 \bar{E}_t + \alpha_4 S_{t-1} + u_t \quad (1)$$

$$\bar{P}_t = \beta_0 + \beta_1 P_{t-1} + \beta_2(I + \bar{W}_1)\bar{E}_t + \beta_3 \bar{W}_2 \bar{P}_t + \beta_4 T_{t-1} + v_t \quad (2)$$

$$\bar{E}_t = E_t - \delta_1 E_{t-1} \quad \text{changes: } \delta_1 \text{ and } \delta_2 = 1 \quad (3)$$

$$\bar{P}_t = P_t - \delta_2 P_{t-1} \quad \text{end-of-period levels: } \delta_1 \text{ and } \delta_2 = 0 \quad (4)$$

$$\bar{W}_1 = \delta_3 W \quad \text{spatial cross-regressive system } \delta_3 = 1 \quad (5)$$

$$\bar{W}_2 = \delta_4 W \quad \text{spatial autoregressive system } \delta_4 = 1 \quad (6)$$

Taxanomy of Carlino-Mills model specifications
levels vs changes   with/without cross/spatial autoregressive lags

	$\bar{E}_t/\bar{P}_t$ (LHS) δ_1/δ_2*	$\bar{E}_t/\bar{P}_t$ (RHS) δ_1/δ_2*	$\bar{W}_1$ δ_3**	$\bar{W}_2$ δ_4***	Introduced by:
a	0	0	0	0	Carlino & Mills (1987)
b	1	0	0	0	Mills & Carlino (1989)
c	1	1	1	0	Boarnet (1992)
d	0	0	1	0	Luce (1994)
e	0	0	0	1	Vias (1998)
f	1	1	1	1	Henry et al. (2001)
g	1	0	0	1	Carruthers & Mulligan (2008)
h	1	1	1	1	Kim (2008)

Note: LHS (RHS) refers to variables on the left-hand-side (right-hand side) of the equations.
* 0 = population/employment *levels* and 1 = population/employment *changes*. ** 0 = *without* spatial cross-regressive lags and 1 = *with* spatial cross-regressive lags. *** 0 = *without* spatial autoregressive lags and 1 = *with* spatial autoregressive lags. See also Equations (1)–(6).


Meta-analysis of 64 studies for US and Europe

› "*The application of statistical techniques to collections of empirical findings from previous studies for the purpose of integrating, synthesising, and making sense of them*" (Wolf, 1986)

› We will use a multinominal logit model and base the interpretation on the marginal effects obtained from this model

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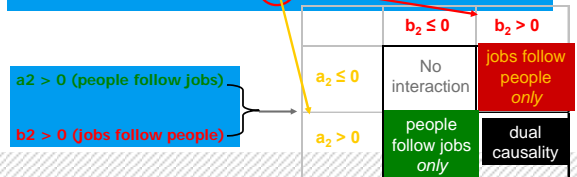## Meta-analysis based on 64 studies with 321 results

■ journal article ■ other (e.g., book chapter, working paper, thesis, dissertation)

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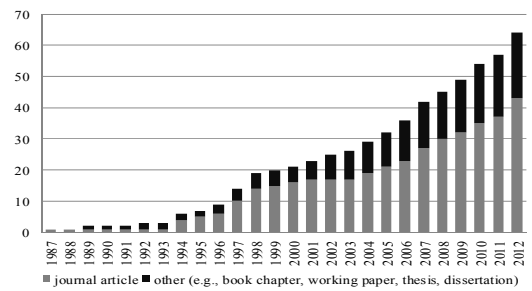
43 Journal articles

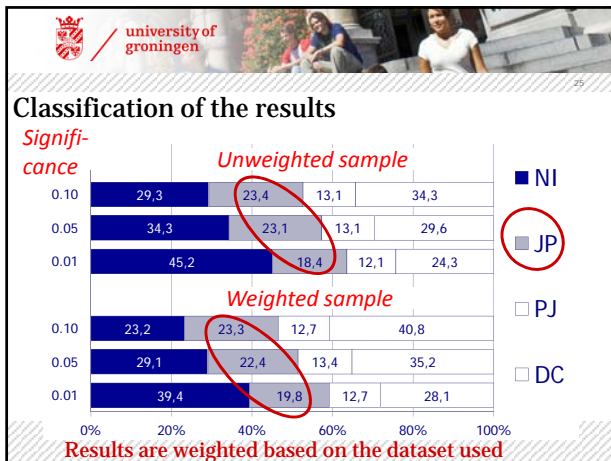|	
7 x Journal of Regional Science	1 x International Regional Science Review
5 x Annals of Regional Science	1 x Journal of Develop. Entrepreneurship
4 x Journal of Urban Economics	1 x Journal of Economic Research
3 x Agricultural and Resource	1 x Journal of Leisure Research
3 x Papers in Regional Science	1 x Journal of Transport Geography
2 x Geographical Analysis	1 x Land Use Policy
2 x Growth and Change	1 x Public Finance Quarterly
2 x Reg. Science and Urban Economics	1 x Région et Développement
2 x Review of Regional Studies	1 x Review of Agric. and Environ. Studies
1 x Economic Analysis and Policy	1 x Transportation Research A
1 x Food Economics	1 x Urban Geography

Carlino-Mills model with simultaneous equations: possible outcomes

$$\tilde{P}_t = a_0 + a_1 P_{t-1} + a_2(I + \tilde{W})\tilde{E}_t + \ldots + u_t$$

$$\tilde{E}_t = b_0 + b_1 E_{t-1} + b_2(I + \tilde{W})\tilde{P}_t + \ldots + v_t$$

a2 > 0 (people follow jobs)

b2 > 0 (jobs follow people)

	$b_2 \leq 0$	$b_2 > 0$
$a_2 \leq 0$	No interaction	jobs follow people *only*
$a_2 > 0$	people follow jobs *only*	dual causality

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Classification of the results

Signifi-cance

Unweighted sample — NI, JP, PJ, DC

0.10	29,3	23,4	13,1	34,3
0.05	34,3	23,1	13,1	29,6
0.01	45,2	18,4	12,1	24,3

Weighted sample

0.10	23,2	23,3	12,7	40,8
0.05	29,1	22,4	13,4	35,2
0.01	39,4	19,8	12,7	28,1

Results are weighted based on the dataset used

Meta analysis with control variables

› Model specification: changes/levels, spatial weights
› Area scaling: densities VS shares
› Linear VS Non-linear (mostly logarithm) specification
› Two or more equations in the simultaneous system
› Weightmatrix: flows vs distance/no
› Geographical area: (parts of) US, Europe
› Area size: small – medium – large
› Period: 1970s + 1980s VS 1990s + 2000s
› With Land use, Income, Economic variables included
› Total population/employment vs subgroups
› Journal vs non-journal articles
› Note: only studies with results at 5% significance are used for the multivariate meta analysis

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Estimation results multinomial logit model (marginal effects at the means)

	NI	JP	PJ	DC
Substantive study factors				
US West	.586 (.103)	.149 (.099)	.100 (.049)	-.835 (.097)
US East	.329 (.094)	.137 (.137)	.369 (.139)	-.835 (.109)
Non-US *Entire US**	.226 (.091)	.476 (.189)	-.098 (.116)	-.800 (.134)
Small sized area obs.	.614 (.137)	-.150 (.143)	.025 (.070)	-.489 (.124)
Large sized area obs. *Medium sized**	-.164 (.109)	-.050 (.281)	.692 (.260)	-.478 (.135)
1970s + 1980s data *1990s + 2000 data**	.092 (.076)	-.111 (.112)	.026 (.107)	-.007 (.085)
Subgroups	.729 (.085)	-.329 (.098)	-.102 (.064)	-.298 (.079)

In parentheses the standard errors. **Significant at the 5% level**

Methodological study factors	NI	JP	PJ	DC
LHS & RHS levels	-.256 (.100)	.700 (.144)	-.309 (.081)	-.134 (.115)
RHS changes & LHS levels *LHS & RHS changes**	.127 (.396)	.238 (.295)	-.296 (.086)	-.069 (.183)
Densities *Shares**	-.256 (.095)	-.161 (.117)	.104 (.135)	.313 (.158)
Non-linear function form *Linear*	-.217 (.091)	.260 (.106)	-.100 (.086)	.576 (.155)
Flow matrix *Other, like distances**	-.381 (.052)	-.083 (.142)	-.066 (.108)	.530 (.210)
With SAR	.086 (.131)	.033 (.164)	-.080 (.090)	-.038 (.087)
2+ Equations	-.249 (.121)	-.119 (.183)	.120 (.122)	.248 (.238)
Land use variables incl.	.119 (.086)	.000 (.090)	-.144 (.078)	.025 (.073)
Income variables incl.	.384 (.112)	-.252 (.172)	-.090 (.126)	-.043 (.143)
Economic variables incl.	.254 (.091)	.212 (.108)	.042 (.099)	.000 (.126)
External study factors				
Non-journal article	.083 (.095)	-.193 (.119)	-.088 (.077)	.198 (.120)

In parentheses the standard errors. **Significant at the 5% level**

Conclusions and discussion

› Empirical evidence from 64 studies for the US and Europe on jfp-pfj: still mixed and inconclusive results
› One third each for no-interaction, jfp+pfj, dual causality
› Jobs-follow-people > people-follow-jobs (about 2x more)
› Data matter: results vary by geographic location of the regions, spatial resolution and population and employment characteristics, but not by time period
› Methodology: results vary by levels vs changes, functional form, specification weightmatrix, standardization by density or shares, number of equations, inclusion of other variables; but not by SAR
› No difference by publication type

Suggestions for future research on jfp-pfj

› Evidence from outside the US and Europe → e.g. China!
› Use models that permit causility running in different directions and test robusstness with alternative models
› Include variables for land use, spatial policies, income and economic conditions. Natural and cultural amenities, location and demographics are less important
› W-matrix with flows is preferred, but less exogenous
› Meta-analysis on size of the parameters instead of sign
› Or: Microlevel analysis of underlying processes based on firm-employee micro-data

Policy relevance

› The question: improve the business climate for firms or the living conditions for the people?
→ depends on the characteristics of the region
→ place based policies needed.

› Most likely improving both is needed

› What goals to reach: from purely economic or broader well-being perspective? What are the peoples preferences?

› What are effective and efficient policy measures?

Thank you for your attention