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Do jobs-follow-people or people-follow-jobs?

A Meta-analysis for Europe and the US

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Keynote Third International Workshop on Regional, Urban, and Spatial Economics in China, China Center for Economic Studies (CCES), Fudan University, Shanghai, China. June 6-7, 2014.

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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 (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?' and also in China:**





Well-being – Quality of life - Happiness

- › The problem of **definition** **short term: emotional**
feelings of happiness
- › Many terms for more or less the same thing (how well one's life is going) **long term:**
life **satisfaction**
- Quality of life
- Welfare / Well-being
- Health
- Happiness

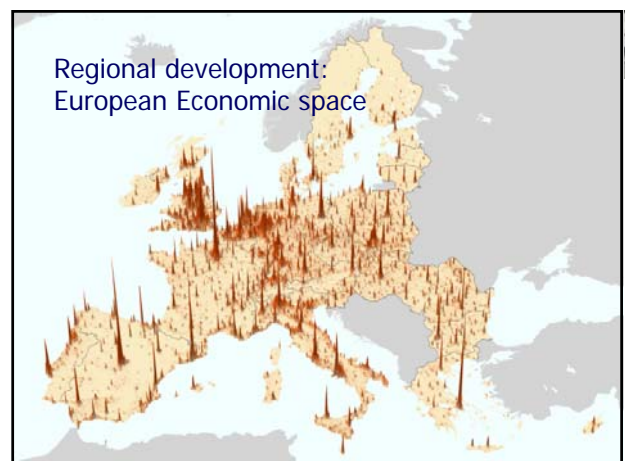
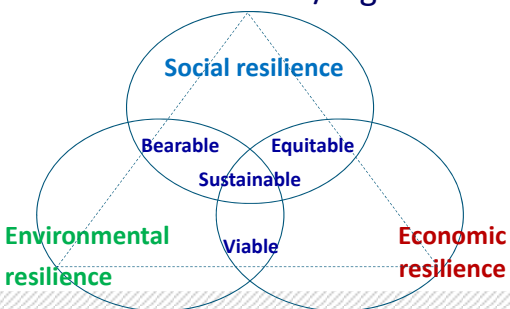


People's Well-being: changing preferences

- | <i>Objective measures</i> | <i>Subjective measures</i> |
|----------------------------------|-----------------------------------|
| › Life expectancy | › Health perception |
| › Mortality rates | › Access to services |
| › Poverty | › Material deprivation |
| › Crime | › Safety and trust |
| › Income | › Life satisfaction |
| › Un-/employment | › Happiness |
| › Education | › Capabilities |
| › Gender balance | › Equal opportunities |
| › Working hours | › Work life balance |



Resilience of cities/regions



Regional development: Asian Economic space

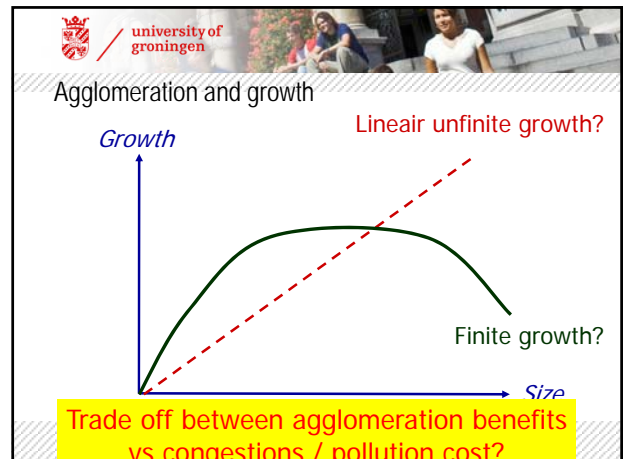
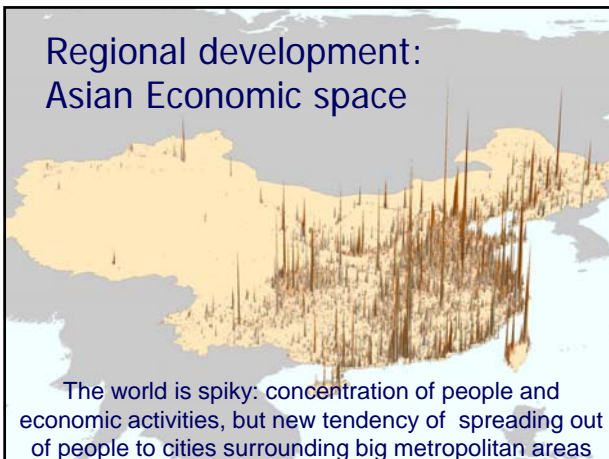
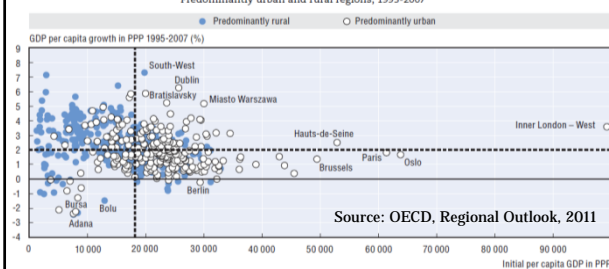


Figure 1.4. A large variation of regional growth profiles, 1995-2007
Predominantly urban and rural regions, 1995-2007



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

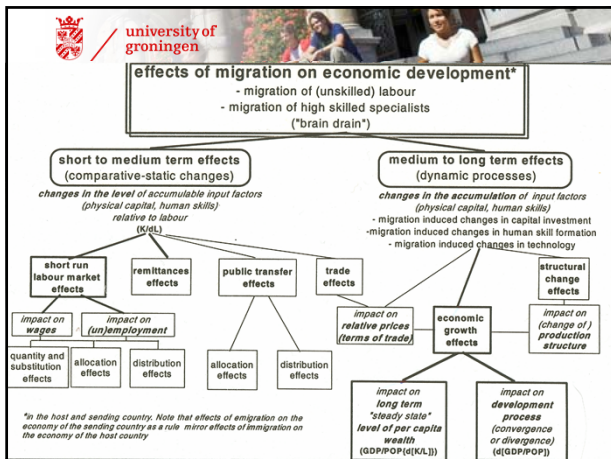
Do 'jobs follow people' or 'people follow jobs'?

A meta-analysis of Carlinio-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 **Carlinio 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)



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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).

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Carlino-Mills model structures

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

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

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

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

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

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

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Taxonomy of Carlino-Mills model specifications

levels vs changes with/without cross/spatial autoregressive lags

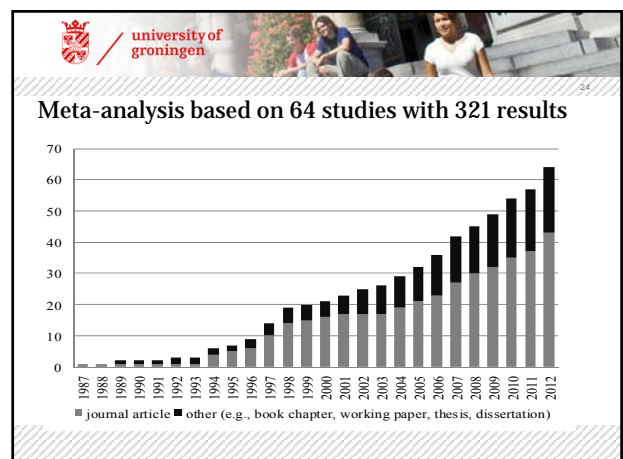
	E_t/P_t (LHS)	E_t/P_t (RHS)	\bar{W}_1	\bar{W}_2	Introduced by:
	δ_1/δ_2^*	δ_1/δ_2^*	δ_3^{**}	δ_4^{***}	
a	0	0	0	0	Carlino & Mills (1987)
b	1	0	0	0	Mills & Carlino (1989)
c	1	1	1	0	Boarnet (1992)
d	0	0	1	0	Luce (1994)
e	0	0	0	1	Vias (1998)
f	1	1	1	1	Henry et al. (2001)
g	1	0	0	1	Carruthers & Mulligan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

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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 multinomial logit model and base the interpretation on the marginal effects obtained from this model



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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

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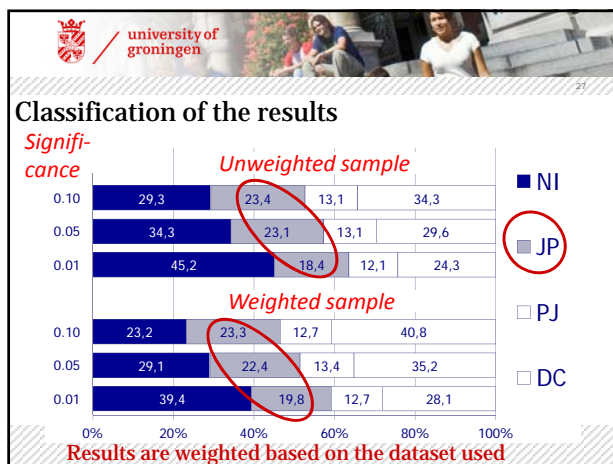
Carlino-Mills model with simultaneous equations: possible outcomes

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

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

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

$a_2 > 0$ (people follow jobs)
 $b_2 > 0$ (jobs follow people)



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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)

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

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

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Methodological study factors

Methodological study factors	NI	JP	PJ	DC
LHS & RHS levels	-.256 (.100)	.700 (.144)	-.309 (.081)	-.134 (.115)
RHS changes & LHS levels	.127 (.396)	.238 (.295)	-.296 (.086)	-.069 (.183)
LHS & RHS changes*				
Densities	-.256 (.095)	-.161 (.117)	.104 (.135)	.313 (.158)
Shares*				
Non-linear function form	-.217 (.091)	-.260 (.106)	-.100 (.086)	.576 (.155)
Linear				
Flow matrix	-.381 (.052)	-.083 (.142)	-.066 (.108)	.530 (.210)
Other, like distances*				
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



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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



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Suggestions for future research on jfp-pfj

- › **Evidence from outside the US and Europe**
→ e.g. CHINA!
- › Use models that permit causality running in different directions and test robustness 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**



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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

Distribution of study results across selected study factors (in %)

	NI	JP	PJ	DC	n
<i>Substantive study factors</i>					
US West	56.7	24.0	9.6	9.6	104
US East	24.4	22.2	20.0	33.3	90
Non-US	35.9	28.2	11.5	24.4	78
Entire US*	2.0	14.3	10.2	73.5	49
Small sized area obs.	80.6	8.1	9.7	1.6	62
Medium sized area obs.*	29.1	23.6	14.3	33.0	182
Large sized area obs.	9.1	33.8	13.0	44.2	77
1970s + 1980s data	41.4	21.7	12.7	24.2	157
1990s + 2000s data*	27.4	24.4	13.4	34.8	164
Subgroups	50.0	24.1	12.1	13.8	58
Total pop/emp data*	30.8	22.8	13.3	33.1	263

* Reference group in logit regression

% >40%

Distribution of study results across selected study factors (in %)

	NI	JP	PJ	DC	n
<i>Methodological study factors</i>					
LHS & RHS levels	22.2	61.1	7.4	9.3	54
RHS changes & LHS levels	10.2	18.4	10.2	61.2	49
LHS & RHS changes*	42.7	14.7	15.1	27.5	218
Densities	17.9	21.7	17.0	43.4	106
Shares*	42.3	23.7	11.2	22.8	215
Non-linear functional form	19.8	16.0	7.4	56.8	81
Linear functional form*	39.2	25.4	15.0	20.4	240
Flow matrix	24.5	15.1	18.9	41.5	53
Other*	36.2	24.6	11.9	27.2	268
With SAR	26.9	13.5	5.8	53.8	52
Without SAR*	35.7	24.9	14.5	24.9	269
2+ Equations	31.8	7.6	12.1	48.5	66
2 Equations*	34.9	27.1	13.3	24.7	255

Distribution of study results across selected study factors (in %)

	NI	JP	PJ	DC	n
Land use variables included	44.4	23.7	11.1	20.7	135
Land use variables excluded*	26.9	22.6	14.5	36.0	186
Income variables included	21.5	25.6	14.4	38.5	195
Income variables excluded*	54.0	19.0	11.1	15.9	126
Economic variables included	35.6	26.4	12.0	25.9	216
Economic variables excluded*	31.4	16.2	15.2	37.1	105
<i>External study factors</i>					
Non-journal article	47.1	21.2	10.6	21.2	104
Journal article*	28.1	24.0	14.3	33.6	217

NI = No Information; JP = John-Polster; PJ = People-John-Polster; DC = Dutch Capital; Study results are in the 5% significance level. * Reference group in the multivariate logit model.