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## Inequalities in Human Capital and Regional Growth in Central and Eastern Europe

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### Outline

- › Economic growth and human capital in nations, regions and cities
- › Individual benefits from investments in education
- › Mismatch, education versus skills
- › Human capital and migration
- › Labour market behaviour of higher educated graduates
- › Human capital spill overs at the personal and regional level
- › Conclusions and policy implications

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## Brain Drain and Brain Gain: the Race for Talents

Talent surplus (Strongest trend) vs Talent deficit (Strongest trend)

Figuur 1: De mismatch mondiaal tussen vraag en aanbod van talent in 2011. Getallen geven de gemiddelde jaarlijkse percentages aan. (Oxford Economics)

Bron: Kiezen voor kennisswerkers, AWT, 2013

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Date: 29-10-2012

## Expenditures on education as % of GDP

Chart B2.1. Expenditure on educational institutions as a percentage of GDP for all levels of education (2000, 2008 and 2011)

1. Public expenditure only (the Switzerland, in tertiary education only; for the Russian Federation, for 2000 only). Countries are ranked in descending order of expenditure from both public and private sources on educational institutions in 2011. Source: OECD, Table B2.2. See Annex 3 for notes. ([www.oecd.org/edu/hung.htm](http://www.oecd.org/edu/hung.htm))

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## Knowledge capital and economic growth for countries

FIGURE 2.3 KNOWLEDGE CAPITAL AND ECONOMIC GROWTH RATES ACROSS COUNTRIES

Growth of GDP p.c. 1960-2000

Human capital 1960

How about regions?

Source: OECD, In it together, 2015

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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 Carlinio 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)?
- › Do these patterns differ by level of education / human capital?

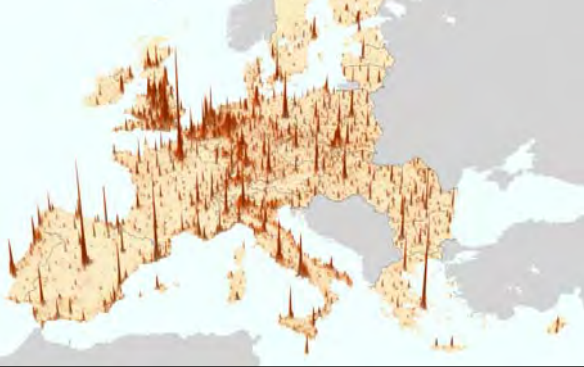
### Duelling theoretical models

- › New Economic Geography (Krugman, 1991): falling transport cost lead to concentration of people and economic activities
  - › Amenity migration (Graves, mid1970s): people moving to nice places, warm climates
  - › Agglomeration effects, attractiveness of (big) cities: high level facilities like universities, hospitals, etc.: cultural amenities like museums, concerts, etc. (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!

### 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?
- › We see changing location patterns of firms changing migration patterns of people, 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?'

### Regional development in European Economic space: the world is spiky



### The Role and Value of (Big) Cities from pure economic and broad well-being perspective

- › **ECONOMIC:** (Big) cities have higher productivity, generate more knowledge outcomes (patents, innovations, copyrights, licenses), have **more higher quality human capital** – both stocks and inflows
- › **But also: higher land and housing prices**
- › **WELL-BEING:** (Big) cities have high quality services and amenities like universities, museums, concerts
- › **But also: more traffic jams, more air pollution, more crime, higher risk of being the target of war and terrorist attacks**

### Agglomeration and growth

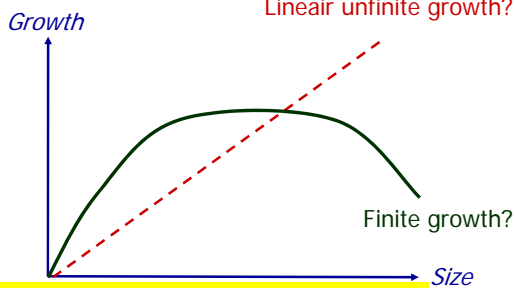
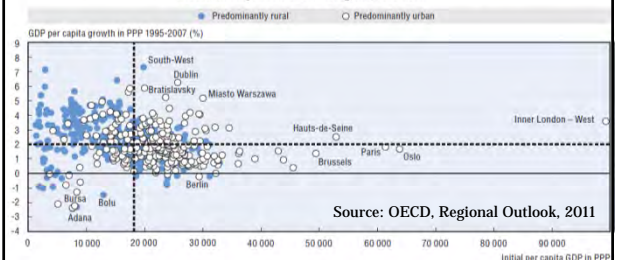
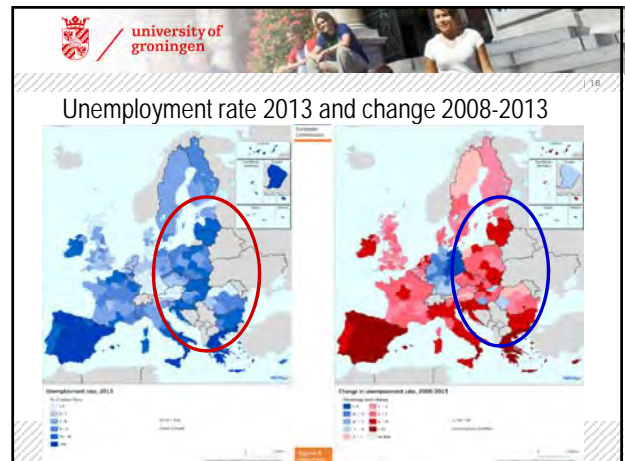
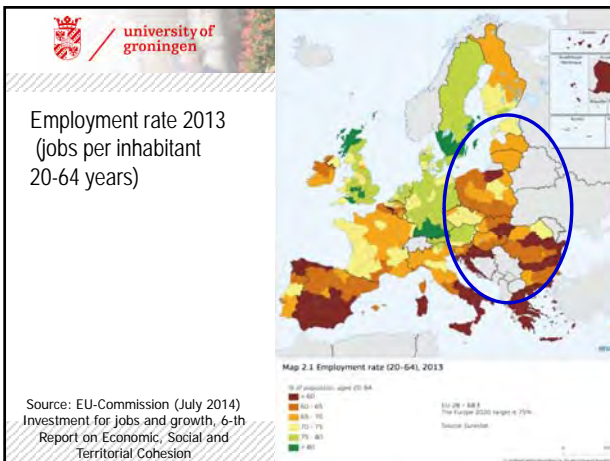
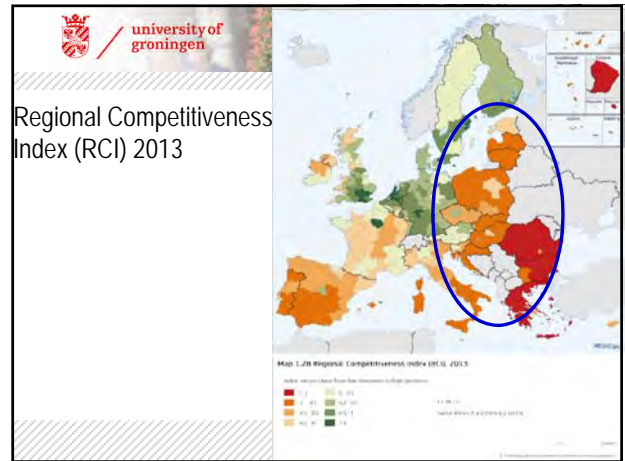
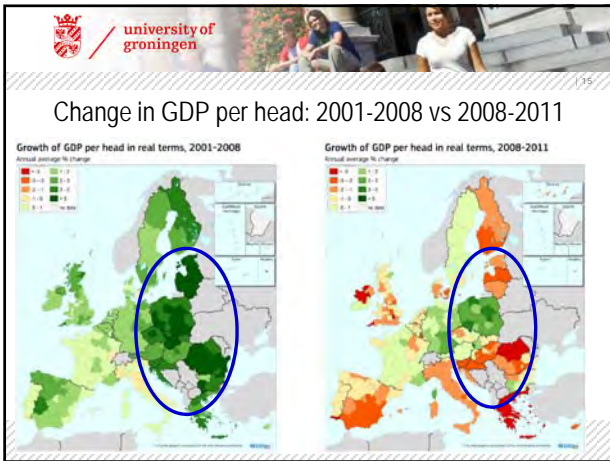
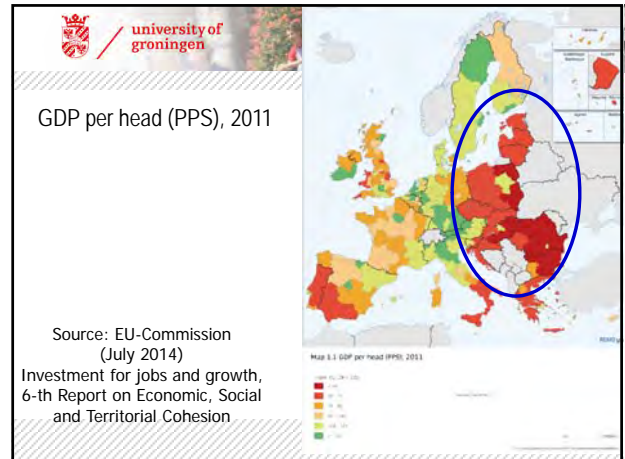
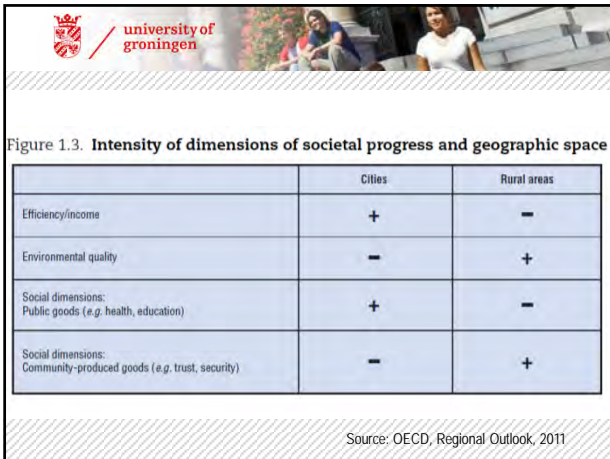
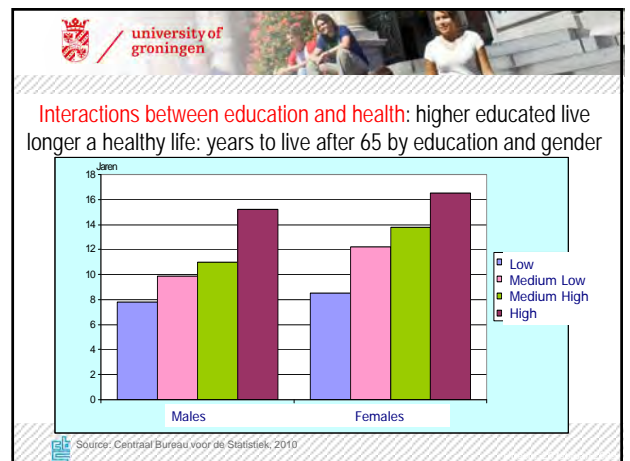
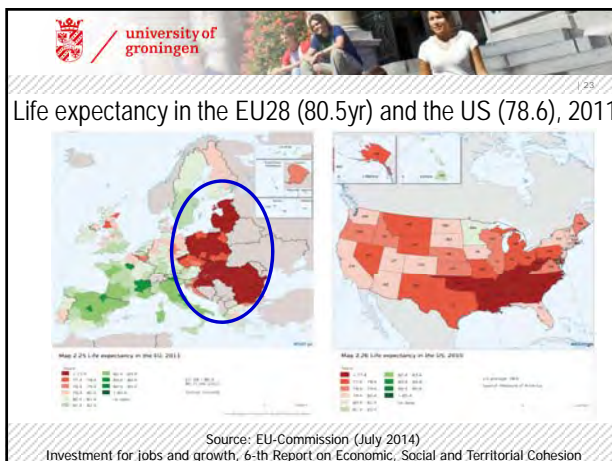
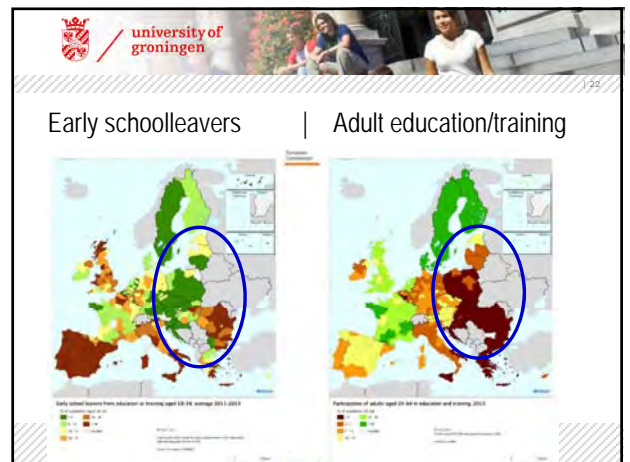
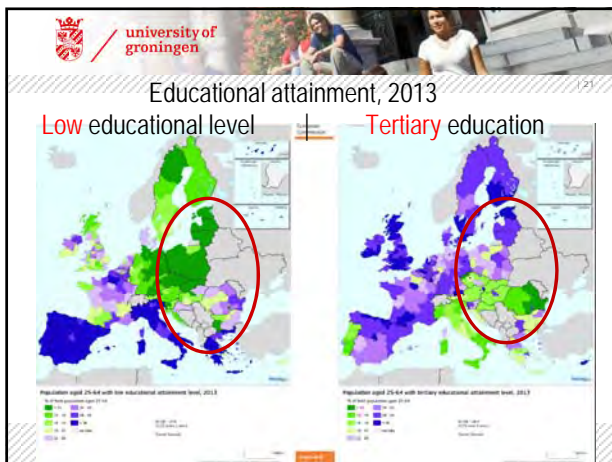
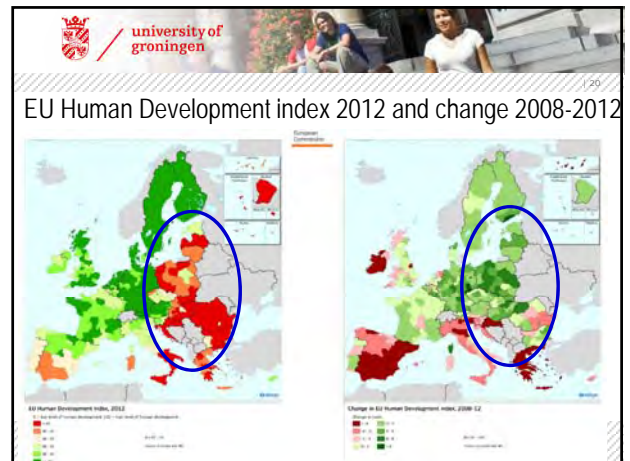
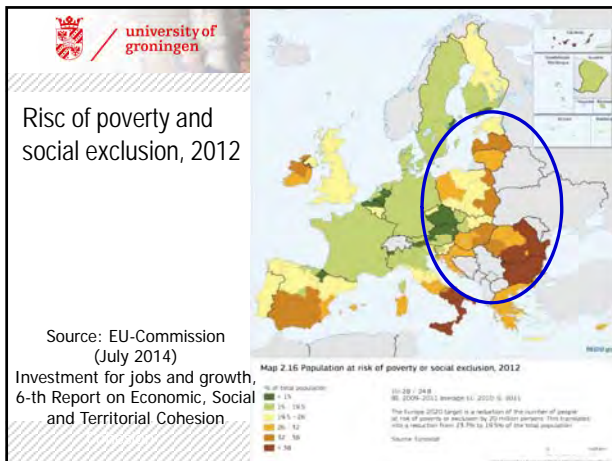


Figure 1.4. A large variation of regional growth profiles, 1995-2007

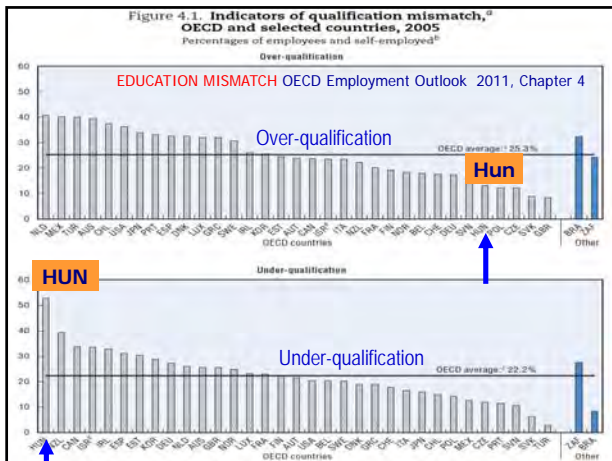


Big cities have higher initial GDP, but NOT higher growth rates!  
 Opportunities for growth are observed in all type of regions!  
 (Broersma & Van Dijk, 2008 and OECD, Regional Outlook, 2011)







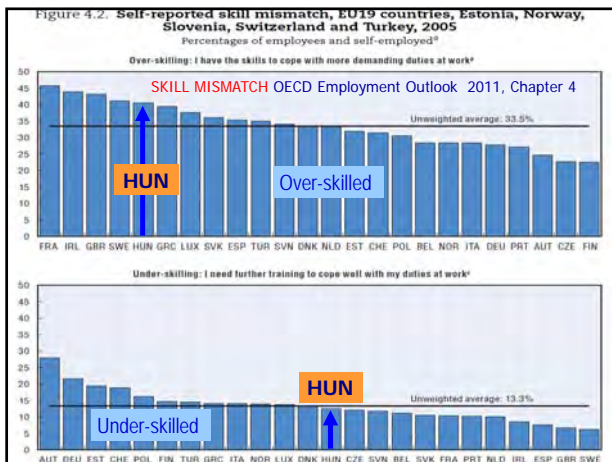


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Rapidly changing skill requirements for the 21<sup>st</sup> century

21<sup>st</sup> Century Skills

- ✓ Creativity
- ✓ Critical Thinking
- ✓ Communication
- ✓ Collaboration
- ✓ Commitment



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Cost and consequences of skill mismatch

Table 3: Costs and consequences of skill mismatch

	Individuals	Employers	Society
Direct costs	loss of earnings higher turnover and absenteeism	higher recruitment costs lower productivity lower product quality higher skilled workers' wages higher turnover costs	unemployment benefits public expenses for training and other ALMPs
Indirect, long-run and non-monetary costs	loss of skills/skill obsolescence loss of self-confidence lower levels of trust in government lower job satisfaction lower participation in training	lower innovation capacity lower competitiveness	under-investment in training low-skills bad jobs-low wages equilibrium higher equilibrium/structural unemployment loss of potential output and employment lower long-run growth

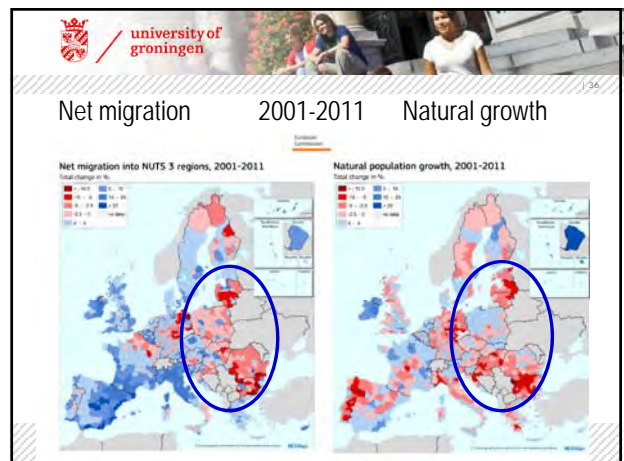
Source: Cedefop review of available literature on skill mismatch.

But is overeducation also bad from the regional perspective?

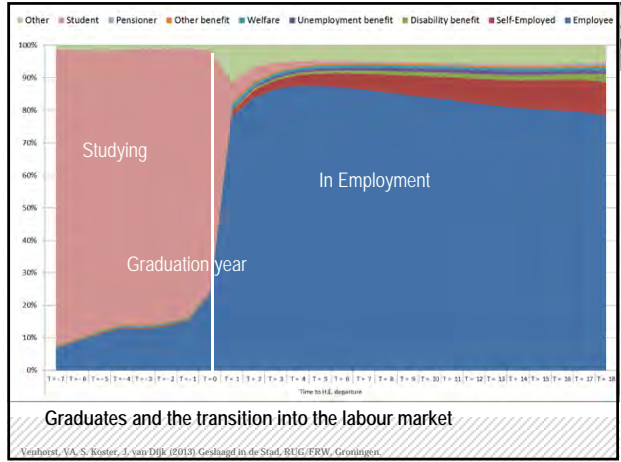
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Migration of human capital and regional growth

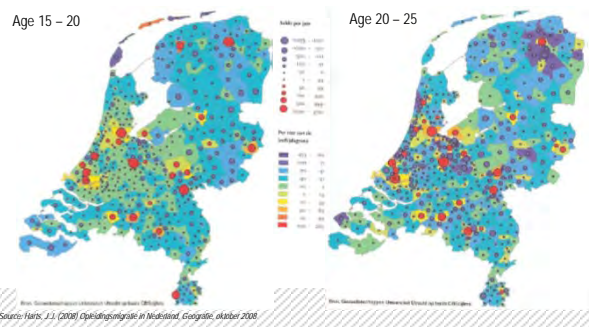
- Neo-classical theory: migrants move from regions with low wages and high unemployment to regions with high wages and low unemployment → regional differences will narrow (equilibrium)
- Cumulative causation: high wage regions attract high skilled migrants leading to an increase in effective internal regional demand → greater knowledge activities and investments and results in increasing regional disparities
- Escalator model: large gross flows of young high educated migrants (university graduates) enter particular locations to replace older workers with other residential preferences, leading to a constant human capital churn of new, ideas, knowledge and skills. Driven by intergenerational and life-cycle features, spatial effects can be divers.
- Policy perspective: is in- or out-migration good or bad? Mixed ideas.



# Graduate Migration Behaviour in the Netherlands using longitudinal (max. 25 years) micro data

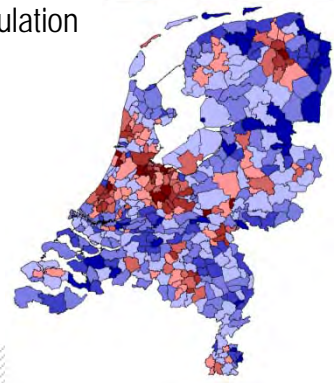


## Migration patterns of youngsters



## Education index population 15-64 year

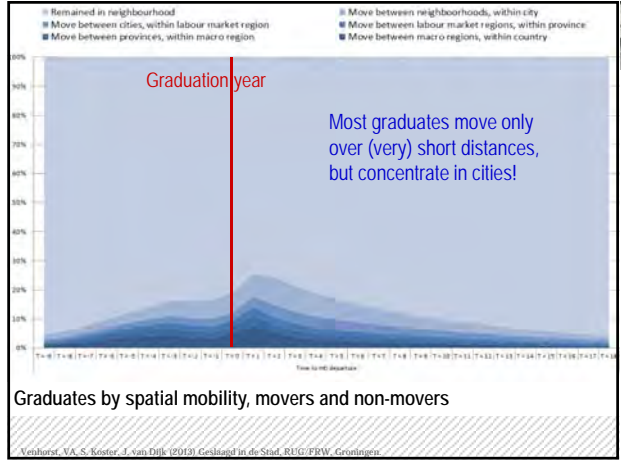
Darkred: > 2,4  
 Darkblue < 1,6  
 Source: Pau/Louter, 2010  
 Index 1-5

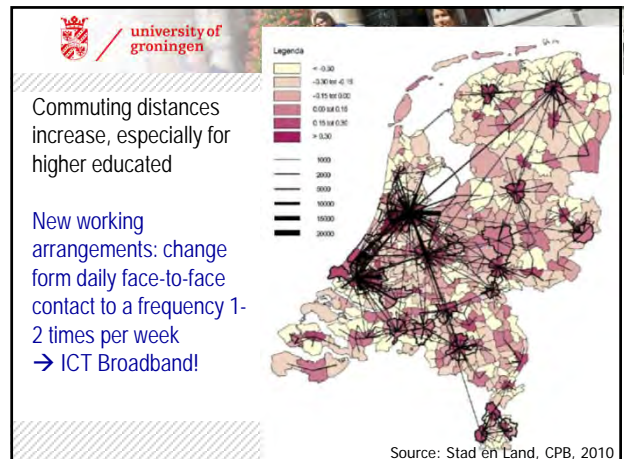
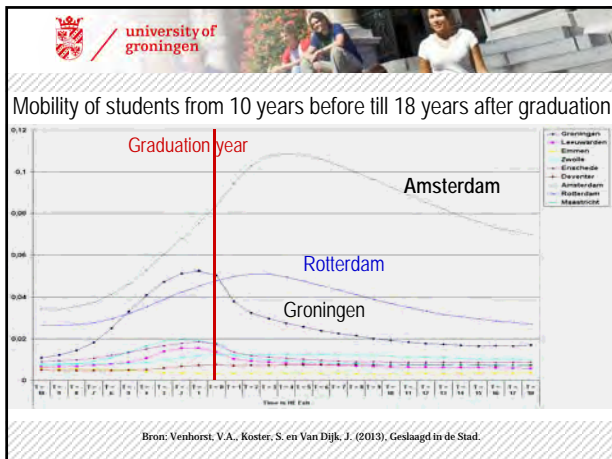


Growing cities in a shrinking surrounding region:

The escalator-model

→ redistribution of human capital mainly **within**, but also **between** regions!





Commuting distances increase, especially for higher educated

New working arrangements: change from daily face-to-face contact to a frequency 1-2 times per week  
→ ICT Broadband!

- ### Brain drain / brain gain: conclusions
- Research question:
    - Where do students come from and where are they going to live and work after graduation?
    - Does this pattern shows variation by discipline and regional labour market conditions?
  - Data and analysis: micro data (1999-2007) / regression analysis
  - Conclusions:
    - The region loses, the city wins and in the end especially Amsterdam
    - Bonding is important, mobility is only high around the graduation date. Many stay put.
    - Considerable regional differences in the way they serve their own labour market
    - Periphery doesn't lose automatically the best students, except for economists and lawyers. Is this a problem? Brain drain or clean export product?
    - Migration is paying-off, but not for all (self-selection)
    - Job opportunities are more important for migration than residential amenities

### Human Capital Externalities: Effects for Low Educated Workers and Low Skilled Jobs

Jouke van Dijk (joint work with with Lourens Broersma and Arjen Edzes)  
Published Regional Studies, 2014

- ### Relevant externalities and related literature
- Regional or firm level externalities to education: private vs. social rate of return to education / Rauch (1993) Blundell et al. (1999) Moretti (2004a) Canton (2009)
  - Urban level externalities of education: Urban Wage Premium / Moretti (2004b) Heuerman et al (2010)
  - Production vs. consumption externalities to education: Learning spill-overs vs. expenditure spill-overs / Lucas (1988) vs. Sassen (2001)
  - Proximity of low and high skilled at the firm level: Learning spill-overs / Lucas (1988); Horndal effect / Malmberg et al. (2008)

### Methodology (1)

$$\log(w_{i,f,r,t}) = \alpha + X_{i,f,r,t}\beta + Y_{f,r,t}\gamma + Z_{r,t}\delta + \varepsilon_{i,f,r,t}$$

1.  $w_{i,f,r,t}$  is the hourly wage rate of individual  $i$ , working in firm  $f$ , which is located in region  $r$ , at time  $t$ .
2.  $X$  is a vector of employee characteristics, like:
  - gender
  - working hours
  - human capital (HC) → private rate of return to education
3.  $Y$  is a vector of firm characteristics, like:
  - industry
  - size
  - Human Capital firm level → production externalities → social rate of return
  - Distribution low vs. high skilled → production externalities → social rate of return
  - McDonalds type of firm (mostly low skilled) versus Microsoft type of firm high skilled



## Methodology (2)

4.  $Z$  is the vector of **regional characteristics**, like
  - Urbanisation, Unemployment
  - Human Capital of persons working in region outside firm
    - **production externality**, part of social rate of return to education
  - Human Capital of persons living in region
    - **consumption externality** part of social rate of return to education
5. The residuals are represented by  $\varepsilon$ ,  $\alpha$  represents the intercept (including fixed effects),  $\beta$ ,  $\gamma$  and  $\delta$  are effect parameters.
6. We can distinguish between **educational level of the workers and the skill level of jobs**

## Data

- Matched Employer-Employee dataset over 1995-2007. Source: Dutch Ministry of Social Affairs, Working Conditions Survey (WCS)
- Sample of firms in which a stratified sample of employees is drawn, each annual wave approx. 27.000 employees in approx. 2.000 firms
- No panel, but a repeated cross-section
- Rich set of background characteristics of individual employees and firms (gender, working hours, wages, work experience, education, occupational skills, industry, firm size, firm location)
- WCS is based on work location (2-digit zip-code, 90 small regions). WCS is augmented with data on HC of workers living in these 2-digit zip-codes. Latter yields consumption externalities

## Results: Human Capital Externalities: all employees

Dependent variable	Log of hourly wage rate					
	Model	1	2	3	4	5
Level of education	Education level of individual	0.081**	0.077**	0.081**	0.081**	0.077**
	Average Education level in region	0.008**				
	Average Education workers in firm		0.011**			0.011**
	Average Education regional workers excl. firm		0.002			-0.003
	Average Education regional inhabitants 15-64			0.029**	0.027**	0.027**
Properties workers	Experience	0.047**	0.047**	0.047**	0.047**	0.047**
	Experience squared	-7.5E-04**	-7.5E-04**	-7.5E-04**	-7.5E-04**	-7.5E-04**
	Female	-0.063**	-0.065**	-0.064**	-0.064**	-0.066**
	Part-time	0.247**	0.242**	0.247**	0.246**	0.242**
Properties region	Population density	1.9E-05**	1.9E-05**	1.7E-05**	1.7E-05**	1.7E-05**
	Regional unemployment	-0.821**	-0.810**	-0.722**	-0.723**	-0.712**
	Number of variables	38	39	38	39	40
	Number of observations	368,541	368,439	368,541	368,541	368,439
	R <sup>2</sup>	0.760	0.761	0.761	0.761	0.762

All specifications include also the following control variables: industry dummies, firm size dummies, year fixed effect dummies.

## Conclusion for the analysis on all employees

- Human capital (HC) stock is years of education
- Private net rate of return to education: **8%**
- Social net rate of return to education: **3.8%** of which:
  - production externalities of education at the firm: 1.1%
  - production externalities of education in the region: 0.0%
  - consumption externalities of education in the region: 2.7%

## Results: Human Capital Externalities: low educated / low skilled

Dependent variable: log of hourly wage rate	employees with low education		employees on low skilled jobs		
	coefficient	coefficient	coefficient	coefficient	
Level of education	Education of Individual	0.033**	0.033**	0.032**	0.035**
	Average education workers in firm	0.020**	0.020**	0.016**	0.003**
	Average education regional workers excl. in firm	-0.001	-0.001	1.9E-04	-2.8E-04
	Average education regional inhabitants aged 15-64	0.019**	0.019**	0.025**	0.023**
Properties workers	Experience	0.049**	0.049**	0.048**	0.048**
	Experience squared	-7.8E-04**	-7.8E-04**	-8.1E-04**	-8.1E-04**
	Female	-0.064**	-0.064**	-0.028**	-0.028**
	Part-time	0.234**	0.234**	0.204**	0.198**
Properties region	Population density	1.3E-05**	1.3E-05**	1.4E-05**	1.3E-05**
	Regional unemployment	-0.430**	-0.430**	-0.491**	-0.447**
Distribution education at firm-level	low and high educated workers		0.001		
	low vs. high plus scientifically skilled jobs				-0.077**
	Number of variables	40	41	40	41
	Number of observations	188,532	188,532	131,773	131,773
	R <sup>2</sup>	0.766	0.766	0.765	0.766

All specifications include also the following control variables: industry dummies, firm size dummies, year fixed effect dummies.

## Conclusion for the analysis for low educated, low skilled jobs

- Private net rate of return to education for low educated / low skilled jobs substantially lower: **3.2 - 3.5%**
- For **low educated** the Social net rate of return is: **4.0%**
  - production externalities at the firm: 2.0%
  - production externalities in the region: 0.1%
  - consumption externalities in the region: 1.9%
  - No effect of distribution of education within firm 0.0%
- For **low skilled jobs** the Social net rate of return is: **4.1%**
  - production externalities at the firm: 1.6%
  - production externalities in the region: 0.0%
  - consumption externalities in the region: 2.5%
  - **But large effect of distribution of education within Microsoft type firm of 7.7%!**



## Overall conclusions effect of Human Capital Externalities

- › An additional year of schooling increases the wage rate of average employees with 8% and for low educated / low skilled with 3%  
→ improve position low skilled by increase in individual education
- › Social returns HCE's are about 4% and the same for all employees and low educated.
- › At the regional level consumption spill overs are significant and more or less equal for all employees, low educated and low skilled jobs.
- › Production/learning spill overs are not significant at the regional level, these take place at the firm level. These effects are larger for low educated workers
- › Those with low skilled jobs in firms with many high skilled jobs realize a substantial higher wage: → proximity to many high skilled improves position of workers on low skilled jobs



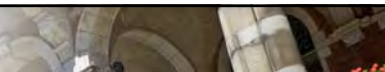
## Human Capital and Regional Economic Growth

- › Endogenous growth models → accumulation of knowledge (Romer, 1990) and of human capital (Lucas, 1988) leads to higher growth rates in terms of GDP and employment. For countries this is true, but empirical evidence for regions is inconclusive.
- › Possible explanations: the 'openness' of regions and the high spatial mobility of higher educated; and also: the measurement of human capital stock (years of education, spendings on education), education versus skills, vertical and horizontal mismatch, over- and under-education, migration of human capital (brain drain versus brain gain), location of universities
- › Re-allocation of human capital does not necessary lead to reduced interregional disparities as neo-classical theory predicts, instead 'cumulative causation' or the escalator model is more likely to happen at the regional level (Van Dijk et al.1989)

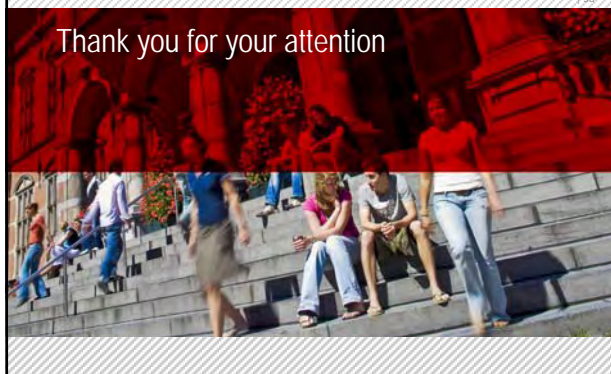


## Conclusions and Policy Implication

- › Higher educated graduates are the most spatially mobile group in the labour market, especially in the years before and after graduation. But most of them stay in the home region.
- › It leads to a redistribution of human capital within regions, but also between regions; impacts on regions are complex processes
- › **If they leave:** brain drain or clean export product? Higher education institutes (HEI's), like universities are boosters of the regional economy, even if graduates leave the region after study
- › **If they stay:** underutilization of human capital investment or beneficial for the region due to positive production and consumption externalities of which also low educated benefit?
- › **Policy implication:** stimulate private and public investment in education because it is beneficial both for individuals and regions



Thank you for your attention





Jouke van Dijk, President of ERSA

**ERSA is part of Regional Science Association International (RSAI) together with RSAmericas and Pacific - PRSCO**

## Organisation ERSA

- **European Regional Science Association Council (ERSAC)**
  - consists of the representatives of the *European Sections* (Baltic, British-Irish, Croatian, Dutch, French-Speaking, German-Speaking, Greek, *Hungarian*, Israeli, Italian, Moroccan, Nordic, Polish, Portuguese, Romanian, Russian, Slovak, Spanish, Turkish).
  - The Council is represented by the *President* of the ERSA (Prof. Jouke van Dijk)
- **European Organizing Committee (EOC), ERSA Office**
  - Organization **annual congress**, Summerschools, Workshops
- **Prizes:**
  - **Epainos Award for Young Regional Scientist**
  - **EIB-European Prize in Regional Science**

## ERSA Congresses: 2015 Lisbon



- 2014 - St Petersburg (RU)  
*Regional development and globalization: Best practices*
- **2016 - Wien (AT)**  
*Cities & Regions: Smart, Sustainable, Inclusive?*
- 2017 – Groningen (NL)  
*Smart Specialisation and Resilience for more Regional Well-Being]*  
2018?? Glasgow??  
*Hungary again, like Budapest in 1986?*

ERSA Lisbon Congress  
<http://www.ersalisbon2015.org/>

Lisbon: Keynotes by EU Commissioner Ms. Corina Cretu,  
Plenary sessions with EIB and OECD

## New journal REGION

- **Fully Open Access Online Journal of ERSA - joint initiative by ERSA and Vienna University (WU) launched in 2014**

- “Stimulate the dialog in the regional science community and make REGION the Open Access medium of discussion of regional issues at a worldwide scale”

Quotation by the President of ERSA - Jouke van DIJK (taken from the REGION website)



<http://openjournals.wu.ac.at/ojs/index.php/region/issue/view/issue/1/5>

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