Effect of tightness on regional wages in Hungary

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Motivating example

Let's suppose you are a jobseeker. What happens if a new factory posts vacancies?

- if there are few unemployed then you can bargain higher wages
- if there are many unemployed then your bargain power is smaller

How does this depend on the commuting willingness of people?

- if people commute to your town then your bargaining power is much less
- if they are reluctant to commute then you have got less fellow competitors

Research questions and relevance

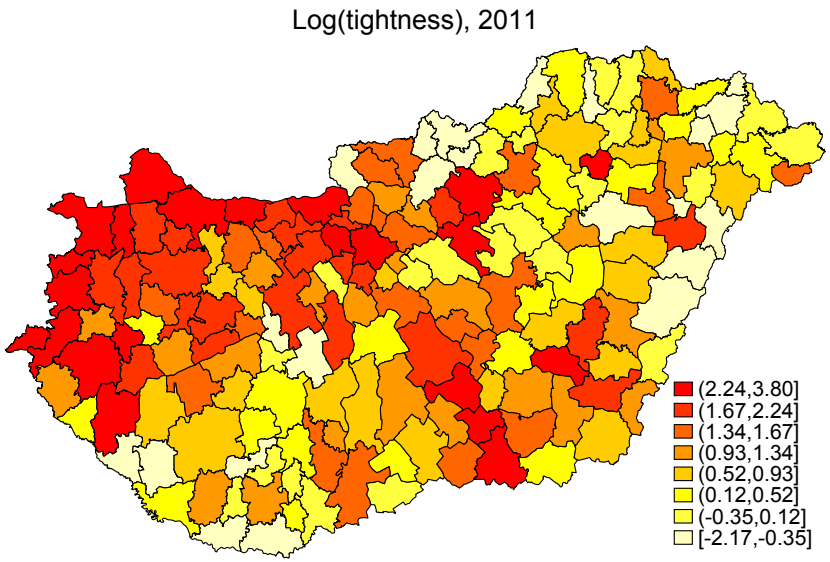
How does labour market tightness ($\theta = \frac{vacancy}{unemployment}$) affect wages?

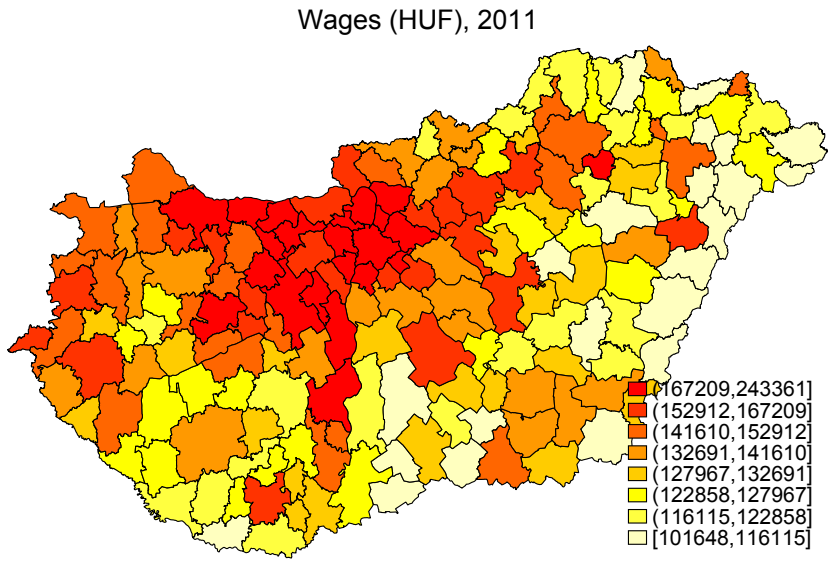
- Mortensen-Pissarides matching model: wage increases with the market tightness: $\frac{\partial w}{\partial \theta} > 0$
- Are there any spillover effects from one district to the other?

Why should we care about local labour markets?

- if labor markets are local (people are not willing to commute much), an effective intervention needs to be targeted to the disadvantaged areas
- if labor markets are not so local, targeted intervention is ineffective since it benefits workers from other, more advantaged areas (Manning et al. (2017, AER))

Motivating maps





Structure of the regression

I estimate the SAC equation with the following structure:

$$\ln w_{it} = \rho W \ln w_{it} + \beta_1 \ln tight_{it} + \gamma X_{it} + \alpha + u_{it}$$

where

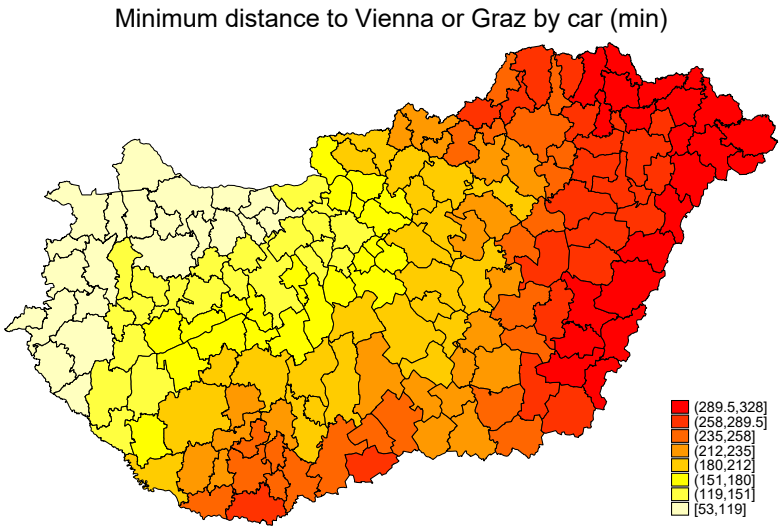
- i - district (176 districts in Hungary),
- t - time (years: 2009-2015)
- W - spatial weight matrix

Tightness is endogenous in the wage equation
IV candidate:

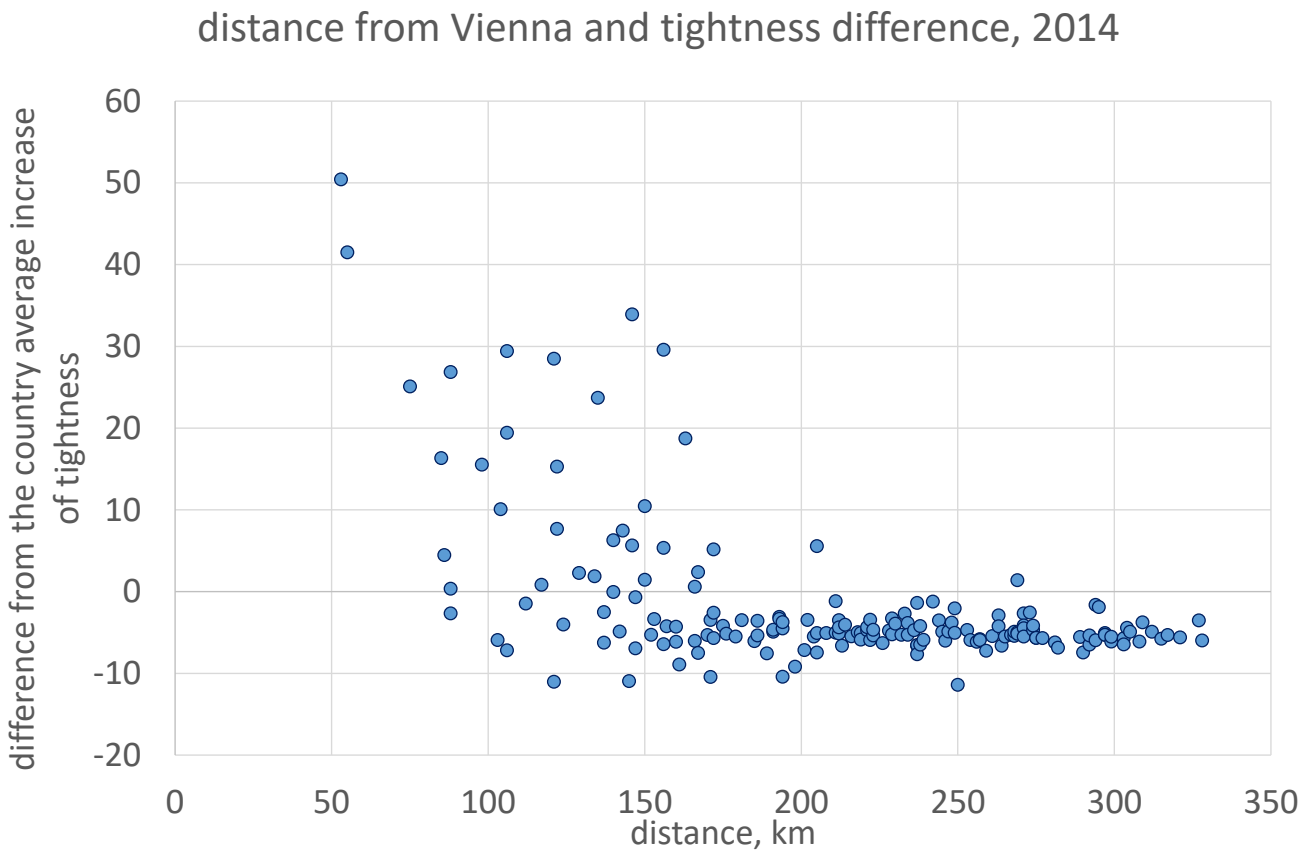
- distance from Austria - changes in space
  ($DISTANCE_i \times AT\ LABOUR\ OPENING_t$)

IV candidate: distance from the Austrian border

- living closer to the Austrian border $\Rightarrow$ cost of commuting is less
- several data available: car, train, bus (time or travelling cost)
- external shock: opening of the Austrian labour market in 2011 (distance $\cdot$ year dummy)
- Potential threat to validity:
  - distance is correlated with development



Closer to the border the rise in tightness is considerably higher than the country average



Data sources:

- registered unemployment, non-subsidised vacancy: National Employment Service
- wage of private firms: Wage Survey, which includes all firms which have more than 50 employees and a random sample of firms with 5-50 employees
- GDP proxy: National Tax Authority tax return database
- some socio-economic variables: inland migration, proportion of children, elderly, those who receive social allowances, and those who receive medicine free of charge (from administrative databases)
- proportion of high skilled workers: Census 2011
- distance between the district capitals and Vienna and Graz
- for the spatial weight matrix: average distance between districts

Spatial panel IV estimations

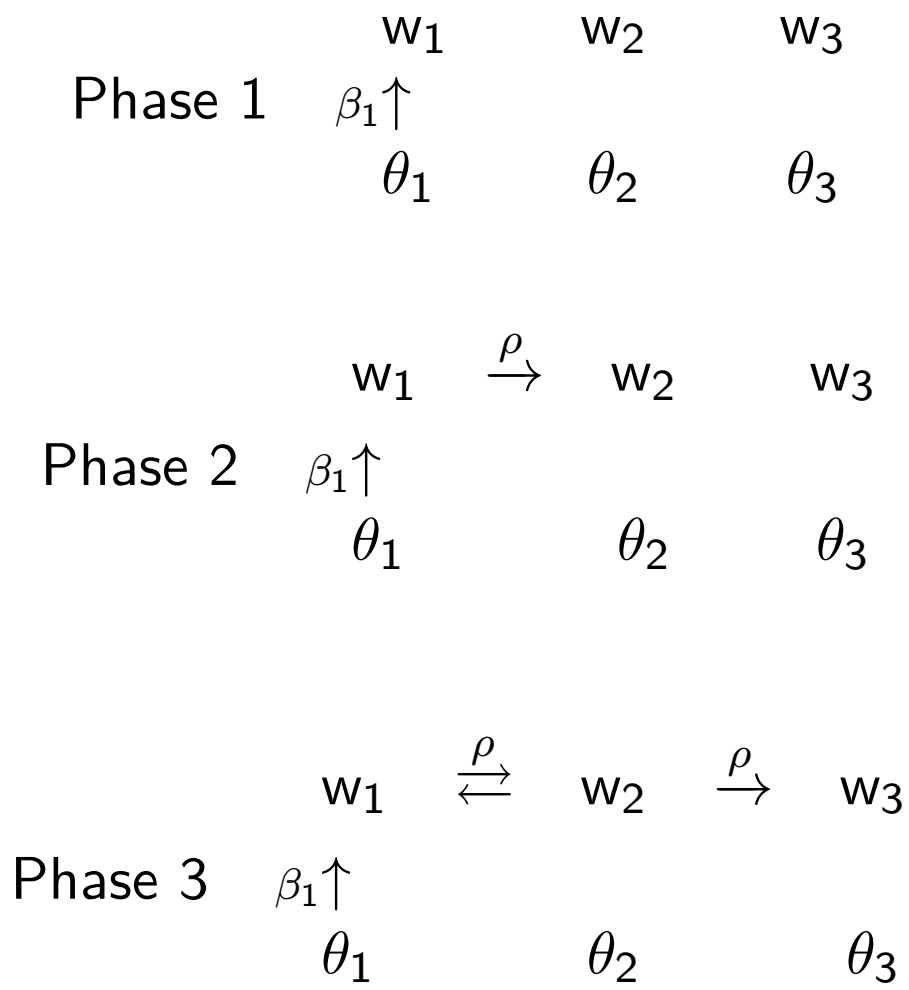
VARIABLES	lnw
lntight	0.198***
	(0.0542)
lnt × high	-0.00856***
	(0.00231)
lntight^2	0.0269***
	(0.00929)
Other covariates	Yes
Constant	21.71***
	(3.348)
Observations	1,232

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Other covariates: county and time FE, proportion of export sales of the firms, proportion of elderly, GDP/pop, high skilled workers

▸ OLS

A simple example for spillover effects

The effect of θ_1 on spatial units



Spatial panel IV estimations, direct, indirect and total effects

	dy/dx	p-value
direct	0.2***	0
indirect	-0.094***	0.003
total	0.106***	0.001

Summary

Conclusion

- tightness has got a significant positive effect on wages
- there is a spatial spillover effect from tightness to wages
- the spillover effect reduces the direct effect
- based on these results Hungarian labour market is integrated

Further research questions

- use administrative data set of wages, which contains the whole population
- use this method between other countries e.g. between Poland and Germany

Thank you for your attention!

Table: Summary statistics (N=1232)

Variable	Mean	Std. Dev.	Min.	Max.
Tightness	7.25	12.76	0.07	185.44
GDP/POP (bin HUF/cap)	0.93	1.12	0.04	12.71
Taxpayer prop.	0.44	0.04	0.32	0.53
High skill prop. (%)	30.16	7.26	15.25	55.27
Inland migration rate (%)	-0.27	0.6	-2.36	2.24
Prop. of soc allowance (%)	6.88	5.45	0	44.37
Proportion of children (%)	14.66	1.83	11.15	21.15
Export share (%)	25.96	18.54	0.82	96.58
Foreigners' night per 1000 inhab.	787.54	2532	0	18994.15
Min(Vienna, Graz) by car (min)	203.9	67.31	53	328
At least college degree (%)	9.6	4.15	3.97	27.05
At least high school degree (%)	20.56	3.51	11.28	28.23

OLS estimations

VARIABLES	(1) lnw	(2) lnw
lntight	0.0176*	0.0206*
	(0.0104)	(0.0123)
Year dummies	No	Yes
Constant	11.38***	11.30***
	(0.0799)	(0.203)
Observations	1,232	1,232
R-squared	0.305	0.341

District level standard errors in parentheses,
*** p<0.01, ** p<0.05, * p<0.1
Other covariates in equation (1): GDP/POP, proportion of high skilled and those who get social allowances
Other covariates in equation (2): GDP/POP, proportion of taxpayers of high skilled and those who receive social allowances

▸ Sum

Panel IV estimations with different measures of IV

VARIABLES	(1) lnw	(2) lnw	(3) lnw	(4) lnw
lntight	0.102	0.213**	0.178*	0.175
	(0.131)	(0.0939)	(0.102)	(0.111)
Other covariates	Yes	Yes	Yes	Yes
Constant	11.78***	11.21***	11.39***	11.40***
	(0.851)	(0.757)	(0.765)	(0.798)
Observations	1,232	1,232	1,232	1,232
Number of districts	176	176	176	176
R-squared overall model	0.00841	0.0556	0.0433	0.0422

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1
Other covariates: GDP/POP, proportion of the elderly and children, year and district FE
The distance IV's: (1): Vienna, (2): Graz, (3): average of Vienna and Graz,
(4): minimum of Vienna and Graz

◂ Spatial

The spatial weight matrix W

- one of the main differences from a conventional OLS
- describes the spatial connections between geographical units
- can have different measures (neighbouring, commuting costs etc.)
- if we use W^2, W^3... we get the spatial lags
- weakness of this approach: W cannot be estimated $\Rightarrow$ estimate a model with different W matrices (how sensitive are the results?)
- convention: the main diagonal is 0

I use 3 different W matrices

- simple neighbour (0-1), which is row normalized
- distance based on public road distance, inverse distance weighting with row normalization $w_{ij} = \frac{d_{ij}^{-1}}{\sum d_{ij}^{-1}}$
- distance based on travelling time

Related Literature

- Most of the papers are about labour market matching:
  - spatial interactions exist and affect the labour market matching process
  - vacancies affect matching more than the number of unemployed (Antczak, 2016)
- How local are labour markets? (Manning, 2017):
  - labor markets are quite local but a local shock can have an impact on a much wider area than the typical commute
- Elhorst (2007): people who work in labour markets with higher unemployment rates earn a substantially lower wage