The Influence of Trade With the EU-15 on Wages in the Czech Republic, Hungary, Poland, and Slovakia between 1997 and 2005

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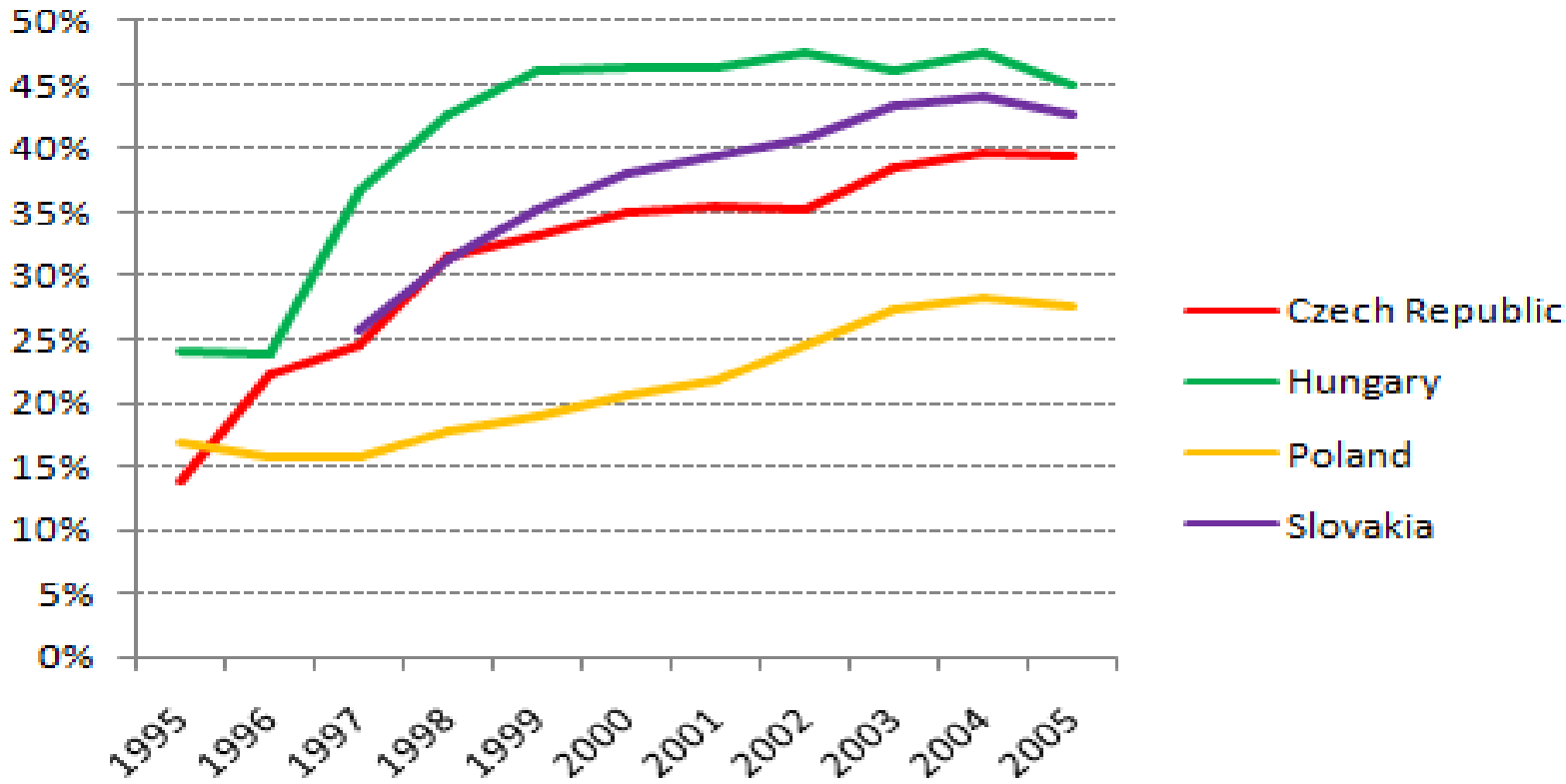
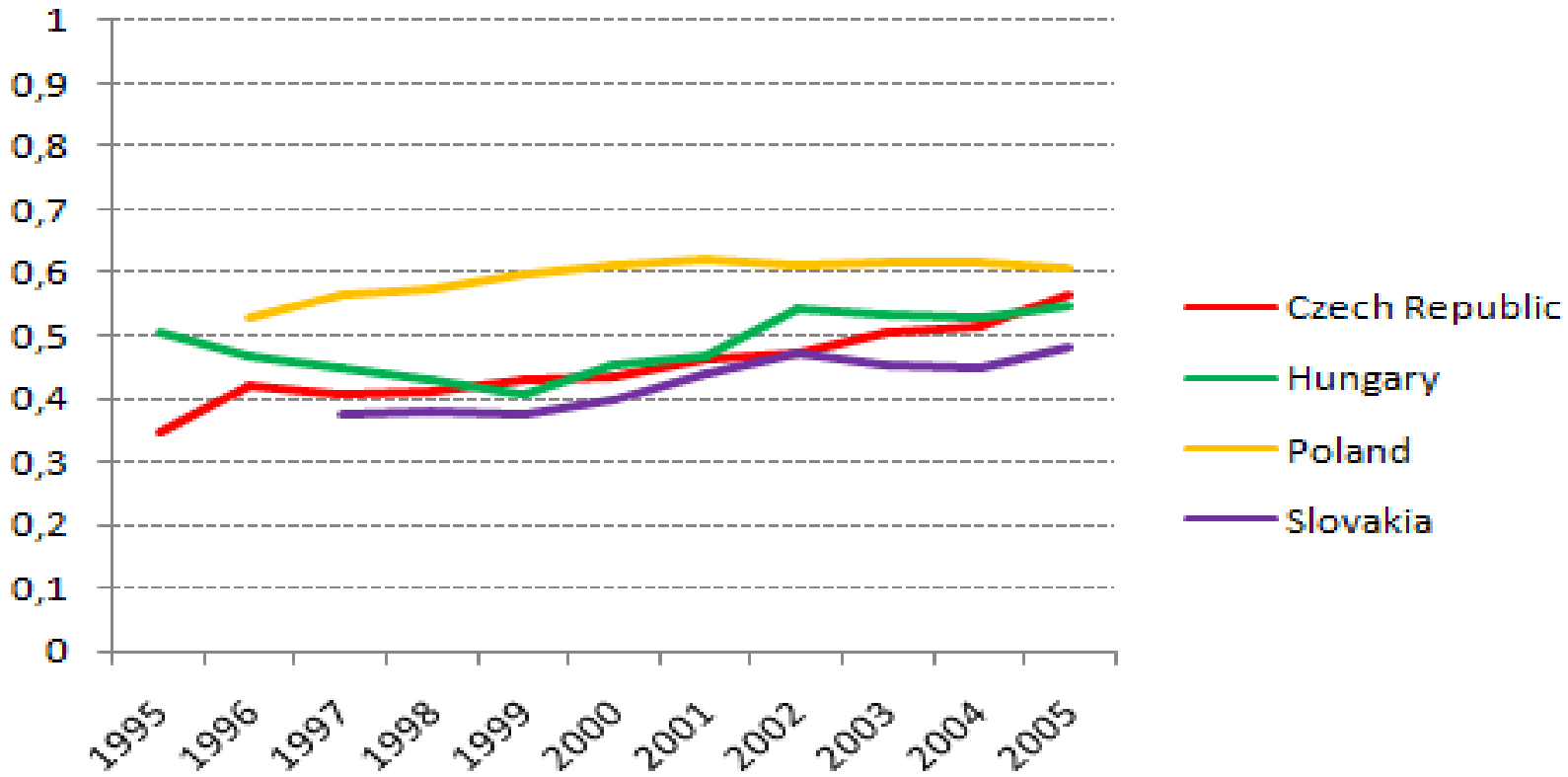
Descriptive Statistic: CEECs' Exports towards EU-15

Figure: EXPORTS / GROSS PROD. (MANUFACTURING)



Descriptive Statistic: Purchasing Power of Manufacturing Wages

Figure: RELATIVE TO EU-15 TRADING PARTNERS (=1)



Studies on Trade-Income Relationship in CEEC

- Breuss (2007)
  EU: - on labor income share
- Egger/Stehrer (2003) and Esposito (2007)
  intermeds: + on distribution
- Newell/Socha (1998)
  + for PL
- Milanovic/Ersado (2008)
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- **Onaran/Stockhammer (2008)**
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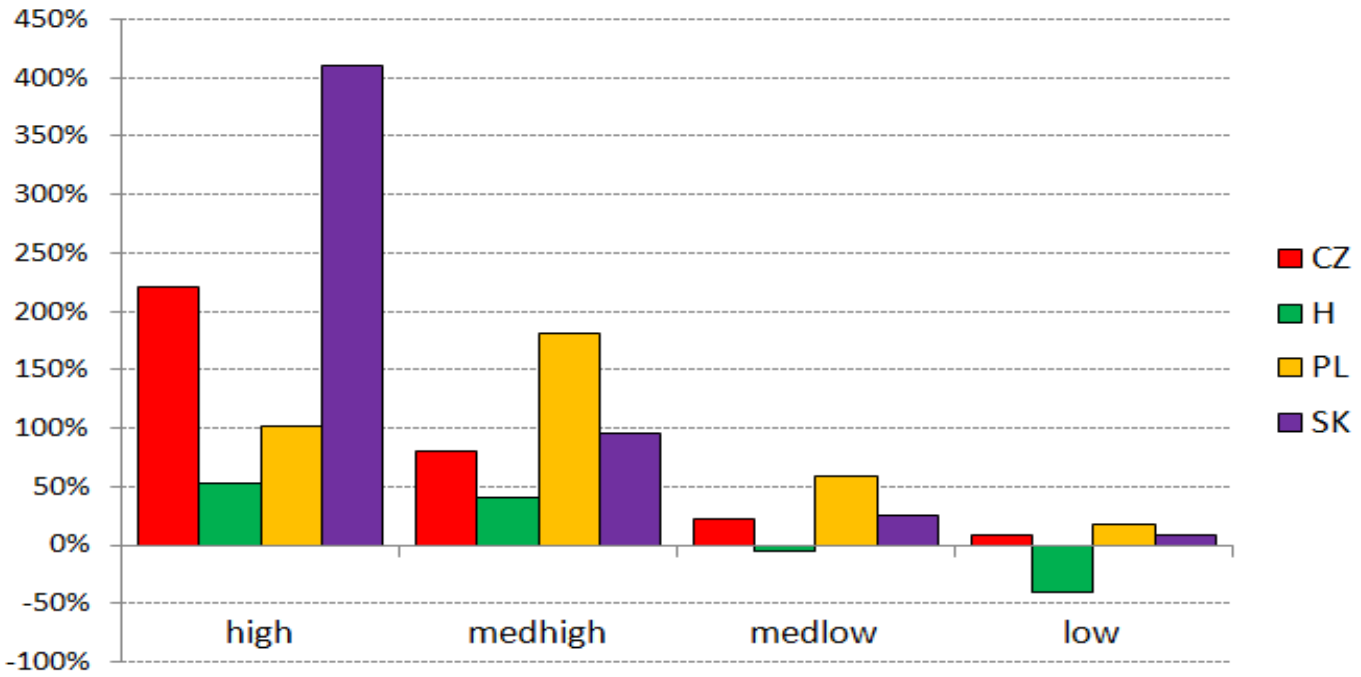
Descriptive Statistic: Skill-Intensities in CEECs' Exports Towards EU-15

Figure: % change (97-05) as %-age of manufacturing gross prod.



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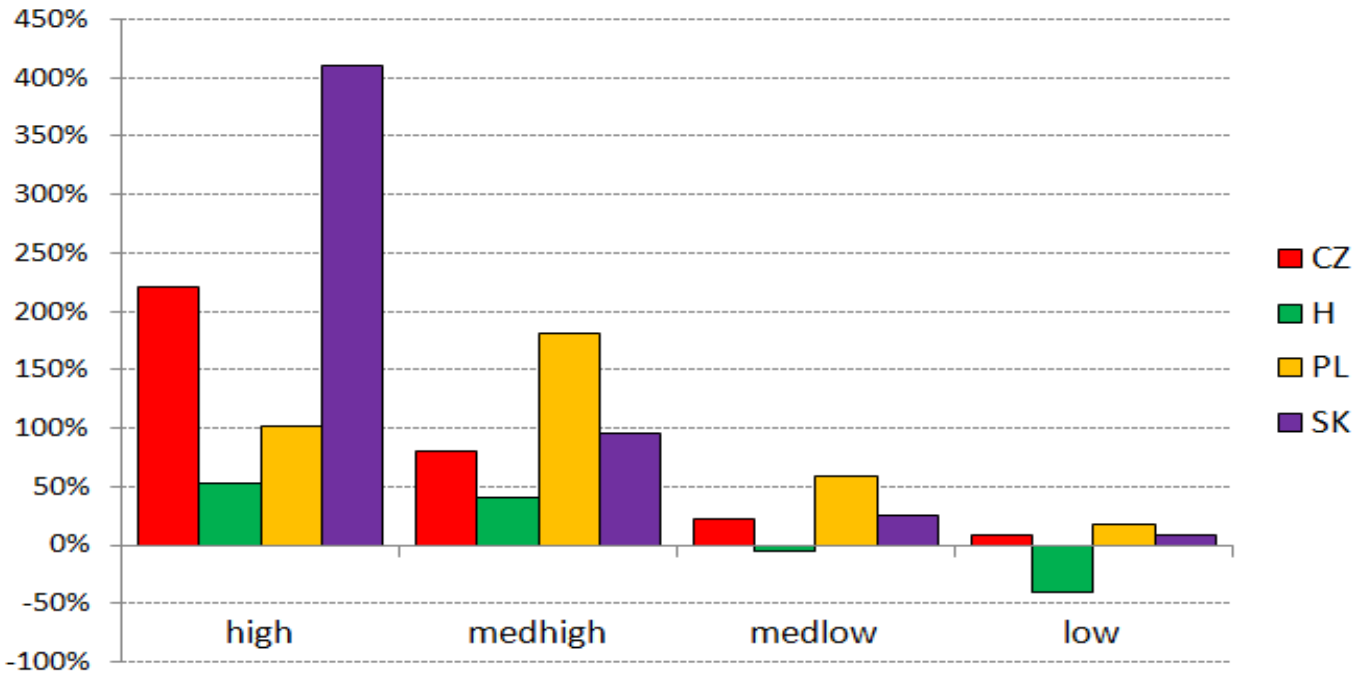

Upgrading effects shown and investigated by Dulleck/Foster/Stehrer/Wörz (2005)

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- 4 countries (CZ, H, PL, SK)
- 1995/1997 - 2005

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- unit-root and cointegration tests inapplicable ($T \leq 10$)
- first-difference model to avoid spurious-regression problems (possibly over-differentiated)

Econometric Model

General Structure:

$$Y_{i,t} = \hat{\alpha}_i + \hat{\gamma} t_i + X_{i,t}\hat{\beta} + \hat{\varepsilon}_{i,t}$$

$$\Downarrow$$

$$\Delta y_{i,t} = \hat{\gamma}_i + \Delta X_{i,t}\hat{\beta} + \hat{\varepsilon}_{i,t}$$

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1. LSDV/**FE model**
2. no time dummies (linear time trend assumed)

Descriptive Statistic: Manufacturing Wages

Table: Development of manufacturing wages 1997-2005

	CZ	H	PL	SK	EU
avg. real wage growth p.a.	3.81 %	2.92 %	1.42 %	1.63 %	0.55 %
avg. real wage growth p.a. if employment structure fixed	3.49 %	2.39 %	1.22 %	1.77 %	0.21 %
1997 living standard index	0.409	0.450	0.566	0.374	1
2005 living standard index	0.565	0.547	0.606	0.480	1

Econometric Model

Extensive Specification:

$$\Delta y_{i,t} = \hat{\gamma}_i + \sum_{j=1}^{3} \hat{\beta}_j \Delta exp.share_{i,t-j} + \hat{\beta}_4 \Delta unempl_{t-1}$$
$$+ \hat{\beta}_5 realwagegap_{i,t-1} + \sum_{k=1}^{2} \hat{\beta}_{k+5} \Delta imp.pen_{i,t-k}$$
$$+ \hat{\beta}_8 \Delta OPS_{i,t-1} + \hat{\beta}_9 OPS_{i,t-1}$$
$$+ \sum_{l=1}^{3} \hat{\beta}_{l+9} R\&D_{i,t-l} + \hat{\varepsilon}_{i,t}$$

$$\text{assuming } \hat{\varepsilon} \dot{\sim} N(0, \sigma^2)$$

(Full) Econometric Model: Results

Table: FD FE estimation results (full model)

	dependent variable: **d.(real wage)**				
	CZ	H	PL	SK	all
d.exp share (1 lag)	7,829 (39,128)	-1,148,858** (487,104)	3,489 (18,645)	-26,448 (61,961)	-1,650** (719.8)
d.exp share (2 lags)	7,499 (40,368)	23,969 (337,318)	-13,220 (16,518)	-46,625 (79,421)	-712.2 (599.3)
d.exp share (3 lags)	-9,322 (16,305)	568,228* (326,264)	14,877 (13,776)	19,421 (26,129)	588.8 (573.8)
d.unempl (1 lag)	-127,561 (89,781)	-545,245 (4,495,944)	54,461 (37,016)	132,753 (142,947)	-9,949*** (3,370)
real wage gap (1 lag)	0.5132 (0.9510)	-63.1*** (23.0)	-0.8384** (0.3783)	-3.34 (2.67)	-0.2593*** (0.0371)
...					
Prob F-stat	0.1225	0.0064	0.0655	0.7936	0.0
within R^2	0.2400	0.3468	0.5057	0.1759	0.3582
AIC	1,703	2,247	819	1,280	3,990
Obs	84	84	48	60	264

(Full) Econometric Model: Results (cont'd)

Table: FD FE estimation results (full model)

	dependent variable: **d.(real wage)**				
	CZ	H	PL	SK	all
			...		
d.mpen	1,305	36,728*	-1,187.887	35,957	23.06
(1 lag)	(40,032)	(18,676)	(17,502)	(50,121)	(33.22)
d.mpen	-13,759	7,637	12,241	42,352	5.24
(2 lags)	(41,752)	(11,598.28)	(13,906)	(57,844)	(29.73)
d.ops	3.34e-07	-0.000259	3.67e-08	-1.16e-07	7.12e-08
(1 lag)	(8.98e-06)	(0.000269)	(1.78e-06)	(0.0000306)	(2.20e-06)
ops	-0.0000149	0.0000575	2.68e-07	0.0000183	2.54e-06
(1 lag)	(0.0000102)	(0.0001673)	(1.56e-06)	(0.0000307)	(1.86e-06)
d.R&D	-2.20	-27.9	-0.1904943	-6.97	2.50
(1 lag)	(4.32)	(17.6)	(7.497906)	(21.82)	(6.16)
d.R&D	3.26	-24.76	-16.1	19.6	-3.99
(2 lags)	(3.30)	(20.41)	(11.12)	(20.83)	(6.98)
d.R&D	-8.31**	-4.84	-17.04	-3.93	-10.47*
(3 lags)	(3.60)	(19.32)	(10.26)	(16.20)	(6.06)
constant	32,144	-1,818,200***	-26,065**	-105,111	-7,613***
	(29,986.65)	(661,762.8)	(11,422)	(83,775)	(1,120)

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- Note: considerable effects on inference (e.g. Pötscher, 1991)

Model Selection: Results

Table: FD FE estimation results (best AIC models)

	dependent variable: **d.(real wage)**				
	CZ	H	PL	SK	all
d.exp share (1 lag)	7,492 (17,588)	-1,122,453** (454,739)	8,485 (6,905)	16,330 (21,129)	-1,355*** (492.7)
d.exp share (2 lags)	X X	190,731 (212,489)	4,305 (8,155)	6,745 (25,167)	-737.0 (486.1)
d.exp share (3 lags)	X X	597,576** (242,615)	31,651*** (10,410)	25,586 (22,135)	573.2 (549.3)
d.unempl (1 lag)	-145,691** (72,563)	X X	X X	X X	-11,007*** (3,310)
real wage gap (1 lag)	X X	-67.67*** (19.82)	-0.3793* (0.1910)	-3.97* (2.12)	-0.2649*** (0.0363)
constant	15,793*** (2,806)	-1,959,282*** (587,919)	-12,207** (5,546)	-121,745* (66,310)	-7,811*** (1,094)
other controls	OPS(-1)[+**] d.R&D(-1)[-] d.R&D(-2)[+] d.R&D(-3)[-**]	d.R&D(-1)[-]	d.OPS(-1)[+]		d.OPS(-1)[-] OPS(-1)[+*]
Prob F-stat	0.0075	0.0003	0.0092	0.3637	0.0
within R^2	0.2275	0.3148	0.3761	0.0917	0.3426
AIC	1,692	2,239	816.3	1,269	3,987
JB	0.0215	0.7430	0.7228	0.0304	0.0208
Obs	84	84	48	60	264

Long Run Correlation

Table: LONG-RUN CORRELATION (FULL MODELS)

dependent variable: Δ_{98-05} **real wage**					
	H	PL	all	all(2)	all(3)
Δ_{97-04} exp share	0.3047	0.0559114**	-0.0430825	X	X
	(0.2509)	(0.013508)	(0.0535559)	X	X
Δ_{97-04} unempl	X	X	-0.0619558	X	X
	X	X	(0.0600708)	X	X
real wage gap	-0.0000154	-9.62e-06*	-7.80e-06*	-8.32e-06**	-8.51e-06***
	(0.0000118)	(4.01e-06)	(4.57e-06)	(3.29e-06)	(2.65e-06)
Δ_{97-04} MPEN	0.4924	-0.1095	0.1345	0.0757959	X
	(0.5100)	(0.0494)	(0.1611)	(0.1149141)	X
$\overline{OPS}^{97-04}$	-4.40*	-0.7938*	-0.9514	-0.9742*	-0.8250*
(% of gross prod.)	(2.01)	(0.2810)	(0.7007)	(0.4985)	(0.4564)
$\overline{R\&D}^{97-04}$	13.22	-2.51	10.28*	1.34	X
(% of gross prod.)	(12.30)	(14.13)	(5.65)	(4.31)	X
constant	0.1456	-0.1377	0.0703555	-0.0438819	-0.0574905
	(0.3836)	(0.0996)	(0.1617761)	(0.1313139)	(0.1068122)
country dummy	no	no	no	yes	yes
observations	12	9	45	45	48
R^2	0.7005	0.9657	0.2872	0.7030	0.7044
prob F-stat	0.1206	0.0209	0.0356	0.0	0.0
AIC	-4.412561	-39.19999	-31.12484	-60.5143	-70.77059
JB	0.0139	0.0461	0.0	0.0	0.0

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dependent variable: Δ_{98-05} **real wage**					
	H	PL	all	all(2)	all(3)
...					
CZ	X	X	X	0.2627*	0.2660***
(dummy)	X	X	X	(0.0704994)	(0.0654068)
H	X	X	X	0.0905609	0.1028*
(dummy)	X	X	X	(0.065151)	(0.059471)
PL	X	X	X	-0.0806327	-0.0581152
(dummy)	X	X	X	(0.0769566)	(0.0658328)
expshare	X	X	X	-0.0942253	-0.0672449
(CZ)	X	X	X	(0.0981182)	(0.0883706)
exp share	X	X	X	0.4731218***	0.4880513***
(H)	X	X	X	(0.1445702)	(0.1366209)
exp share	X	X	X	0.0349513	0.0315527
(PL)	X	X	X	(0.0508951)	(0.0446638)
exp share	X	X	X	-0.0145322	0.0005896
(SK)	X	X	X	(0.0659978)	(0.0597317)

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2. but effects in Hungary (and Poland) significant
3. negative in the short, positive in the longer run
4. trade potentially explaining variation in wages
5. but appropriateness of HOS model very questionable

Einstein on Theorems

"As far as the theorems of mathematics refer to reality, they are not certain, and as far as they are certain, they do not refer to reality."

(Albert Einstein, 1921)

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1. Classical transition economics' (e.g. Roland, 2000) arguments fail to account for difference
2. market-oriented forces failed in CSSR in 1960s
3. but reforms in Hungary and later Poland (1981)
4. might have strengthened geographical agglomeration
5. and thus increased mobility of workers

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Figure: Dominant Economic Sectors in CEEC-4