

# Bright past, shady future? Past and potential future export performance of CEE countries in a comparative perspective

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# Motivation

- the remarkable export performance of CEE countries since the early 1990s has complimented their economic revival
- in addition to an increase in volume of trade, the structure of exports has also improved substantially by shifting toward product groups with higher value added
- the resurgence of CEECs reflected in their market share primarily in the EU markets
- lately, CEEC's market share is being eroded by BRIC and East-Asian countries

## Table:

Share of EU-15 markets in total exports of CEECs and EU-15 in 2000-2011, in %

year	CEECs <sup>1</sup>	EU-15
2000	78,5	69,7
2001	78,2	69,6
2002	77,4	69,5
2003	77,1	69,9
2004	76,7	69,4
2005	75,1	68,6
2006	73,2	69,0
2007	74,0	68,5
2008	72,4	67,7
2009	73,9	66,7
2010	72,6	65,2
2011	72,0	63,6

Source: Eurostat

<sup>1</sup>Unweighted average

**Table:** Structure of merchandise exports by factor intensity of CEECs and EU-15 in 1995-2010, in %

		1995	2000	2005	2010
Resource intensive	EU-15	19,8	18.0	17.8	20.7
	CEECs	28,2	20.7	19.2	20.6
Labour intensive	EU-15	11,8	10.1	8.6	7.9
	CEECs	19,7	18.5	14.0	10.2
Low-tech	EU-15	7,9	6.6	6.6	6.7
	CEECs	14,1	10.5	10.6	9.0
Medium-tech	EU-15	30,1	29.8	29.8	28.0
	CEECs	21,4	30.1	33.3	33.4
High-tech	EU-15	24,5	29.4	28.5	27.7
	CEECs	14,6	18.1	18.2	23.3

Source: Handbook of Statistics 2007–2008 (United Nations), 2007; United Nations Commodity Trade Statistics Database, 2011; calculations by IMAD.

# Motivation

- to what can we attribute the relative decline of the CEEC countries export performance?
- are they loosing on account of a compromised supply capacity or have they suffered a negative market access shock?
- what can we say about the contribution of these factors to the CEECs overall performance and what are some of their determinants?

# Outline

- Theoretical Framework
- Data
- Econometric Approach
- Baseline Estimates
- Robustness Checks
- Conclusion

# Theory

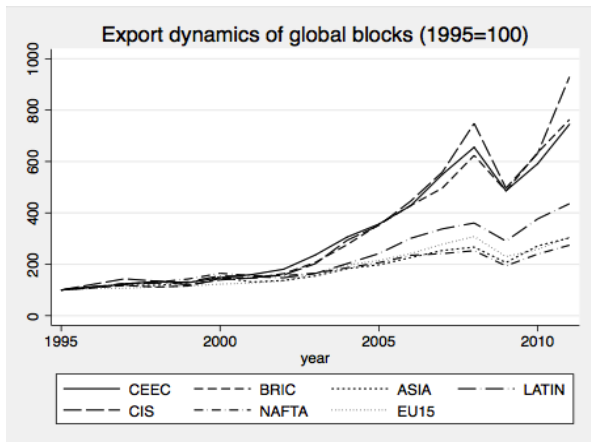
- gravity techniques to estimate to what extent the export growth of a country is due to changed access to foreign markets and to what extent it is due to changes in the internal supply capacity of the exporting
- structural equation based on the standard new trade theory (CES, monopolistic competition) model
- Redding and Venables (2004, 2004a) and Fugazza (2004);
- access to foreign markets is disaggregated to particular regional groupings. Countries at the center of a fast growing region experience favorable foreign market access;

# Data

- bilateral trade flows for 61 countries from the UNCTAD trade database (export and import values);
- inward and outward FDI stock (share of GDP) from UNCTAD's trade database;
- CEPII's Geodist database (Mayer and Zignano, 2011) on gravity determinants (physical distance, common language, regional integrations,...);
- GDP, population size, price indices come from the World Bank's World Development Indicators database;
- Data on institutions come from Institutional quality database (Kunčič, 2012).



Figure 1: Export growth index (1995=100) for global trading blocks between 1995 and 2011



Source: UNCTAD

# Empirical approach

- based on Redding and Venables (2004) we decompose trade into export-country characteristics, import-country characteristics and the between-country information (i.e. geographical distance);
- very general gravity specification using only source- and destination-country indicator variables instead of the information on the respective income and other country characteristics;
- importing-country dummy to also capture other features of the market capacity such as the manufacturing price index and control for what Anderson and van Wincoop (2003) term “multilateral resistance”

- initially, a very parsimonious gravity specification is estimated

$$\ln X_{ij} = \alpha + \beta_j \text{Partner}_j + \gamma_i \text{Country}_i + \delta_1 \text{Dist}_{ij} + \delta_2 \text{Bord}_{ij} + u_{ij} \quad (1)$$

- The supply capacity estimate for country  $i$  ( $SC_i$ ) is given by the exponential of the exporter country dummy times its coefficient:

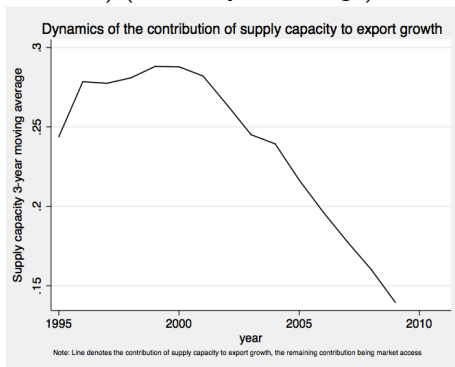
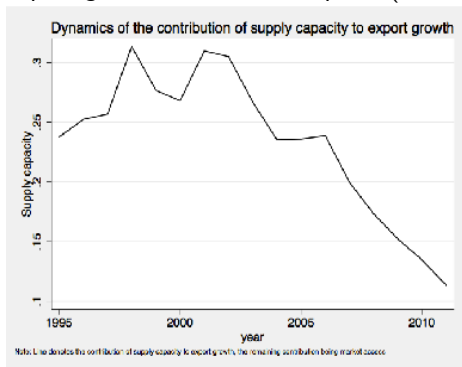
$$SC_i = \exp(\gamma_i \text{Country}_i) \quad (2)$$

- while the estimate of foreign market access ( $FMA_i$ ) is given by

$$FMA_i = \sum_{i \neq j} \exp(\hat{\beta}_j \text{Partner}_j) * \text{Dist}_{ij}^{\hat{\delta}_1} * \exp(\hat{\delta}_2 \text{Bord}_{ij}) \quad (3)$$

- Use regression based decomposition (Fields, 2004) to determine the contribution of SC and FMA to export performance

Figure 1: Regression-based decomposition: Contribution of supply capacity to export growth for CEECs' exports (in share of total) (1 and 3-year average)



- Finally, before we regress supply capacity and foreign-market access, we use factor analysis to construct four sets of latent variables out of a broader set of world development indicators and institutional quality measures:
  - **ICT infrastructure** (*Share of internet users, Share of ICT products in exports, Share of ICT products in imports, Share of mobile phones, number of public internet servers, number of telephone lines*);
  - **Road and rail infrastructure** (*Railroad lines, Quantity of goods transported by rail, Number of passengers transported by rail, Road density, Road network, Quantity of goods transported by road, Number of cars per kilometer*);
  - **Other transport infrastructure** (*Quantity of goods transported by air, Container port traffic, Port quality, Liner shipping connectivity*);
  - **Quality of institutions** (*Quality of legal institutions, Quality of political institutions, Quality of economic institutions*)

All factors are obtained separately for country of origin and destination country.

# Regression

$$SC_{it} = f(GDP_{it}^{origin}, GDPpc_{it}^{origin}, IMP_{it}, FDI_{it}, UV_{it}, \Delta ER, crisis_t, X_{it}, \varepsilon_{it}) \quad (4)$$

$$FMA_{it} = f(GDP_{it}^{dest}, GDPpc_{it}^{dest}, IMP_{it}, FDI_{it}, UV_{it}, \Delta ER, crisis_t, X_{it}, \varepsilon_{it}) \quad (5)$$

# Results

- OLS
- FE (country pair)
- seemingly unrelated regression

**Table:** Seemingly unrelated regression estimates of the SC and FMA determinants between 1995 and 2011 for all countries and for the CEEC subsample

VARIABLES	(1) SC (ALL)	(2) FMA (ALL)	(3) SC (CEEC)	(4) FMA (CEEC)	(5) SC (CEEC)	(6) FMA (CEEC)
$\ln(\text{GDP})_{t-1}^o$	0.935*** (0.108)		0.578* (0.321)		1.149*** (0.071)	
$\ln(\text{GDPpc})_{t-1}^o$	0.220** (0.095)		-0.263 (0.300)		-0.387*** (0.070)	
inward FDI share $_{t-1}$	-0.000 (0.000)	-0.000*** (0.000)	0.001 (0.001)	-0.000*** (0.000)	0.002*** (0.001)	-0.001*** (0.000)
outward FDI share $_{t-1}$	0.001*** (0.000)	0.000*** (0.000)	0.004 (0.003)	-0.000* (0.000)	0.010*** (0.003)	-0.006*** (0.000)
$\Delta$ exchange rate $_t$	-0.016 (0.026)	-0.003*** (0.001)	0.031 (0.052)	0.002** (0.001)	0.054 (0.058)	-0.072*** (0.021)
unit value $_{t-1}^{exp}$	0.001*** (0.000)	-0.000* (0.000)	0.008*** (0.001)	0.000*** (0.000)	0.013*** (0.000)	0.001*** (0.000)
unit value $_{t-1}^{imp}$	-0.005*** (0.000)	-0.000*** (0.000)	-0.011*** (0.001)	-0.001*** (0.000)	-0.017*** (0.001)	-0.000 (0.000)
institutions $_{t-1}^o$	0.516*** (0.026)		0.428*** (0.047)		0.603*** (0.046)	
institutions $_{t-1}^d$		0.000 (0.000)		-0.000 (0.000)		-0.003 (0.006)



Table: SUREG Continued...

VARIABLES	(1) SC (ALL)	(2) FMA (ALL)	(3) SC (CEEC)	(4) FMA (CEEC)	(5) SC (CEEC)	(6) FMA (CEEC)
ICT infrastructure <sup>o</sup> <sub>t-1</sub>	0.023 (0.021)		0.294*** (0.056)		0.118** (0.048)	
ICT infrastructure <sup>d</sup> <sub>t-1</sub>		-0.000* (0.000)		-0.000 (0.000)		-0.006 (0.004)
road and rail infrastructure <sup>o</sup> <sub>t-1</sub>	-0.123 (0.100)		1.897* (1.052)		-2.464*** (0.564)	
inward FDI (man. share)					3.845*** (0.237)	0.275*** (0.033)
outward FDI (man. share)					0.163 (0.117)	-0.028 (0.025)
Crisis	-0.128*** (0.008)	-0.001*** (0.000)	-0.132*** (0.019)	-0.001*** (0.000)	-0.094*** (0.019)	-0.017*** (0.006)
EU accession dummy	0.132*** (0.013)	-0.005*** (0.000)	0.072*** (0.019)	-0.002*** (0.000)	0.113*** (0.020)	-0.007 (0.005)
Constant	-20.004*** (1.732)	0.000 (0.000)	0.000 (0.000)	5.988*** (0.004)	-15.786*** (1.019)	5.940*** (0.086)
time	NO	NO	NO	NO	NO	NO
export country dummies	YES	YES	YES	YES	NO	NO
Observations	1,619	1,619	598	598	598	598
R-squared	0.998	0.999	0.995	0.999	0.994	0.589
Breusch-Pagan $\chi^2(1)$	36.42***		113.90***		9.34***	

Notes: Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## Summary SUREG

- origin country GDP matters for SC, GDP pc has a negative effect on SC in CEECs once country size is controlled for;
- destination GDP has very weak effects (significantly negative for CEEC);
- quantitatively small effects of inward and outward FDI share in GDP (negative for FMA);
- higher unit values of exports improve supply capacity and FMA for CEECs only, while they do not have a significant negative effect on market access;
- positive effects of origin-country institutions and infrastructure on supply capacity
- crisis dummy has a negative effect on both SC and FMA

Table: Fixed effects estimates

VARIABLES	(1) SC	(2) FMA	(3) SC (CEEC)	(4) FMA (CEEC)
$\ln(\text{GDP})_{t-1}^o$	1.169*** (0.083)		0.721*** (0.231)	
$\ln(\text{GDP})_{t-1}^d$		0.007 (0.074)		-0.190 (0.194)
$\ln(\text{GDPpc})_{t-1}^o$	0.001 (0.003)		0.001 (0.005)	
$\ln(\text{GDPpc})_{t-1}^d$		-0.004 (0.003)		-0.005 (0.005)
$\ln(\text{imports})_{t-1}$	0.001 (0.001)	-0.000* (0.000)	0.004** (0.002)	-0.000 (0.000)
inward FDI share $_{t-1}$	-0.000 (0.000)	-0.000 (0.000)	0.002*** (0.001)	-0.000*** (0.000)
outward FDI share $_{t-1}$	0.001*** (0.000)	-0.000 (0.000)	0.003* (0.002)	-0.000*** (0.000)
Unit value $^{exp}_{t-1}$	0.001*** (0.000)	-0.000*** (0.000)	0.008*** (0.001)	0.000*** (0.000)
Unit value $^{imp}_{t-1}$	-0.005*** (0.000)	-0.000*** (0.000)	-0.014*** (0.001)	-0.000*** (0.000)
$\Delta$ exchange rate $_t$	0.040* (0.023)	0.001 (0.001)	0.036 (0.032)	0.004*** (0.001)
Institutions $^o_{t-1}$	0.463*** (0.021)		0.236*** (0.039)	
Institutions $^d_{t-1}$		-0.003*** (0.001)		-0.004*** (0.001)

Table: FE Continued...

VARIABLES	(1) SC	(2) FMA	(3) SC (CEEC)	(4) FMA (CEEC)
ICT infrastructure <sup>o</sup> <sub>t-1</sub>	0.104*** (0.015)		0.505*** (0.054)	
ICT infrastructure <sup>d</sup> <sub>t-1</sub>		0.001 (0.001)		-0.002** (0.001)
road and rail infrastructure <sup>o</sup> <sub>t-1</sub>	-0.038 (0.053)		1.085* (0.564)	
road and rail infrastructure <sup>d</sup> <sub>t-1</sub>		-0.005** (0.002)		-0.006 (0.004)
crisis dummy	-0.143*** (0.005)	-0.000 (0.000)	-0.138*** (0.009)	-0.001*** (0.000)
EU accession dummy	0.100*** (0.013)	-0.007*** (0.000)	0.000 (0.018)	-0.001*** (0.000)
Constant	-22.950*** (1.361)	5.964*** (0.051)	-6.999*** (2.149)	6.179*** (0.077)
export country dummies	YES	YES	YES	YES
Observations	4,329	4,242	1,637	681
Number of pair_id	1,294	1,282	396	208
R2 within	0.580	0.569	0.610	0.958
R2 between	0.867	0.139	0.863	0.0195

Robust standard errors in parentheses. \*\* p<0.01, \* p<0.05, \* p<0.1

Table: Fixed effects estimates of SC determinants by product group for CEECs

VARIABLES	labour resource	low skill/tech	medium skill/tech	high skill
$\ln(\text{GDP})_{t-1}^o$	1.382*** (0.274)	1.162*** (0.224)	1.005*** (0.213)	1.034*** (0.224)
$\ln(\text{GDPpc})_{t-1}^o$	-1.112*** (0.234)	-0.853*** (0.201)	-0.667*** (0.184)	-0.754*** (0.193)
$\ln(\text{import})_{t-1}$	0.002 (0.001)	0.004*** (0.002)	0.001 (0.002)	0.001 (0.002)
inward FDI share $_{t-1}$	0.009*** (0.001)	0.008*** (0.001)	0.008*** (0.001)	0.009*** (0.001)
outward FDI share $_{t-1}$	-0.003 (0.003)	-0.005* (0.003)	0.000 (0.003)	-0.004 (0.003)
Unit value $^{exp}_{t-1}$	0.003*** (0.001)	0.003*** (0.001)	0.004*** (0.001)	0.004*** (0.001)
Unit value $^{imp}_{t-1}$	-0.006*** (0.001)	-0.006*** (0.001)	-0.007*** (0.001)	-0.006*** (0.001)

Robust standard errors in parentheses. \*\*  $p < 0.01$ , \*  $p < 0.05$ , \*  $p < 0.1$

Table: Fixed effect: Product groups. **Continued...**

VARIABLES	labour resource	low skill/tech	medium skill/tech	high skill
$\Delta$ exchange rate <sub>t</sub>	-0.187*** (0.036)	-0.171*** (0.036)	-0.199*** (0.036)	-0.198*** (0.035)
Institutions <sub>t-1</sub> <sup>o</sup>	0.175*** (0.041)	0.155*** (0.042)	0.106*** (0.040)	0.169*** (0.041)
ICT infrastructure <sub>t-1</sub> <sup>o</sup>	0.534*** (0.055)	0.473*** (0.049)	0.510*** (0.051)	0.509*** (0.052)
Road and rail infrastructure <sub>t-1</sub> <sup>o</sup>	-0.494 (0.636)	0.094 (0.643)	-0.826 (0.629)	-0.849 (0.619)
crisis dummy	-0.222*** (0.008)	-0.206*** (0.007)	-0.211*** (0.007)	-0.208*** (0.007)
EU accession	-0.071*** (0.017)	-0.046*** (0.017)	-0.077*** (0.016)	-0.056*** (0.017)
Constant	-3.322 (2.640)	-3.652 (2.376)	-4.266* (2.422)	-3.066 (2.460)
country dummies	YES	YES	YES	YES
Observations	1,661	1,642	1,620	1,653
Number of pair_id	400	399	400	400
R2 within	0.651	0.630	0.626	0.641
R2 between	0.853	0.855	0.898	0.885

Robust standard errors in parentheses. \*\* p<0.01, \* p<0.05, \* p<0.1

# Summary

- still very early work!
- CEEC losing market share compared with BRIC or East-Asian countries;
- decreasing effect of supply capacity (already noted in other studies), future market access likely to remain more or less constant;
- institutions and infrastructure matter for export performance, as does the size of the exporter;
- inward FDI positively affects the capacity to supply, but has a negative effect on foreign-market access;
- crisis and EU accession;

# To-dos

- endogeneity
- dynamic setup
- contribution shares
- some counterintuitive results