

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 ¹ | 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

¹Unweighted 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

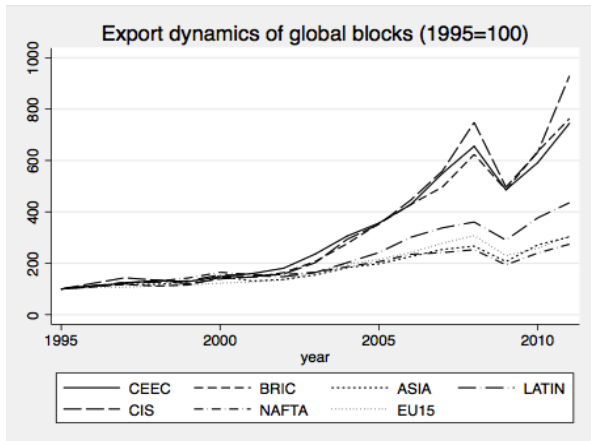
Theory

- 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:

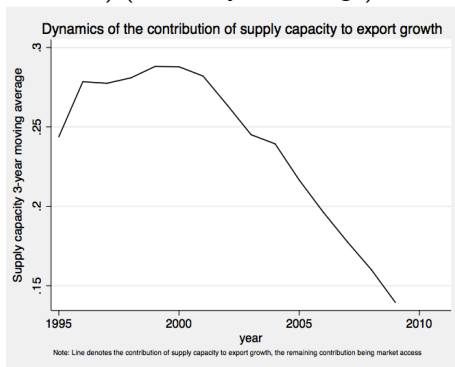
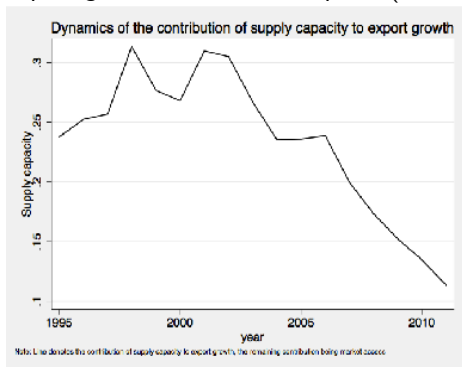
$$SC_i = \exp(\gamma_i \text{Country}_i) \quad (2)$$

- 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) |
| Δ 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 ^o _{t-1} | 0.023 (0.021) | | 0.294*** (0.056) | | 0.118** (0.048) | |
| ICT infrastructure ^d _{t-1} | | -0.000* (0.000) | | -0.000 (0.000) | | -0.006 (0.004) |
| road and rail infrastructure ^o _{t-1} | -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) |
| Δ 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 ^o _{t-1} | 0.104*** (0.015) | | 0.505*** (0.054) | |
| ICT infrastructure ^d _{t-1} | | 0.001 (0.001) | | -0.002** (0.001) |
| road and rail infrastructure ^o _{t-1} | -0.038 (0.053) | | 1.085* (0.564) | |
| road and rail infrastructure ^d _{t-1} | | -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 |
|--|----------------------|----------------------|----------------------|----------------------|
| Δ exchange rate _t | -0.187*** (0.036) | -0.171*** (0.036) | -0.199*** (0.036) | -0.198*** (0.035) |
| Institutions _{t-1} ^o | 0.175*** (0.041) | 0.155*** (0.042) | 0.106*** (0.040) | 0.169*** (0.041) |
| ICT infrastructure _{t-1} ^o | 0.534*** (0.055) | 0.473*** (0.049) | 0.510*** (0.051) | 0.509*** (0.052) |
| Road and rail infrastructure _{t-1} ^o | -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