9th International Scientific Conference
SUSTAINABLE GROWTH IN
SMALL OPEN ECONOMIES
26th October, 2017, Belgrade, Serbia

POSSIBILITIES FOR IMPROVING ECO - EFFICIENCY AND GROSS REBOUND EFFECT: A CASE STUDY IN BSEC MEMBER STATES

Authors:
PhD Snežana Radukić
MSc Dušan Perović

1. Theoretical background of problem

- Environmental issues
- The importance of the natural resources for economies
- Jevons paradox
- “Decoupling” effect
- Gross rebound effect

- Ehrlich and Holdren equation
- I=PAT

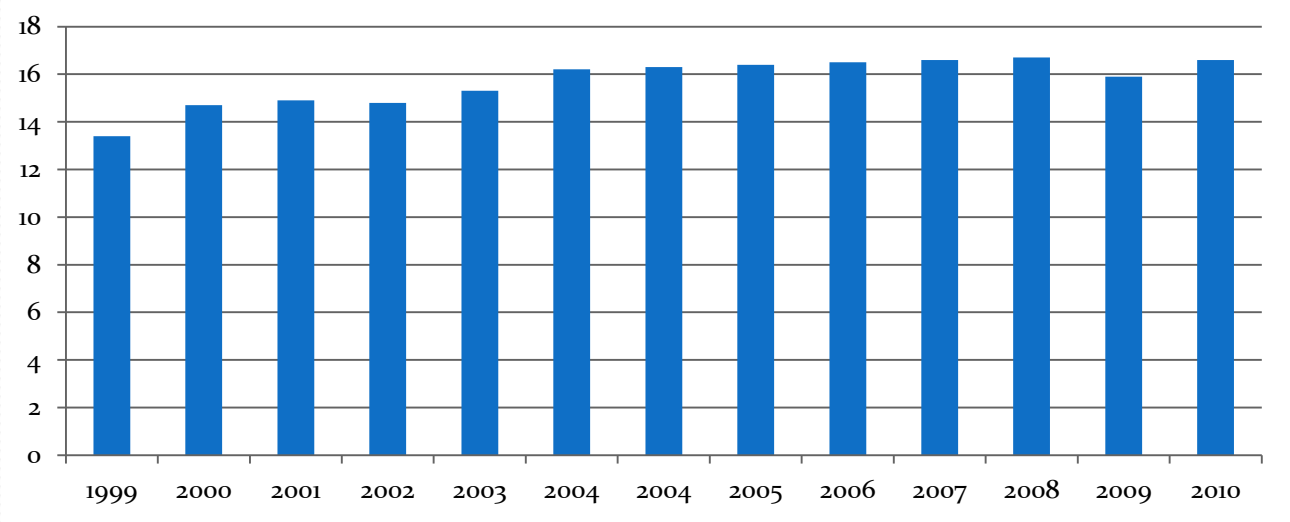
I – Environmental impact; P – Population; A – Affluence; T – Technology

- Critics of the equation
- Practical implementation

2. BSEC

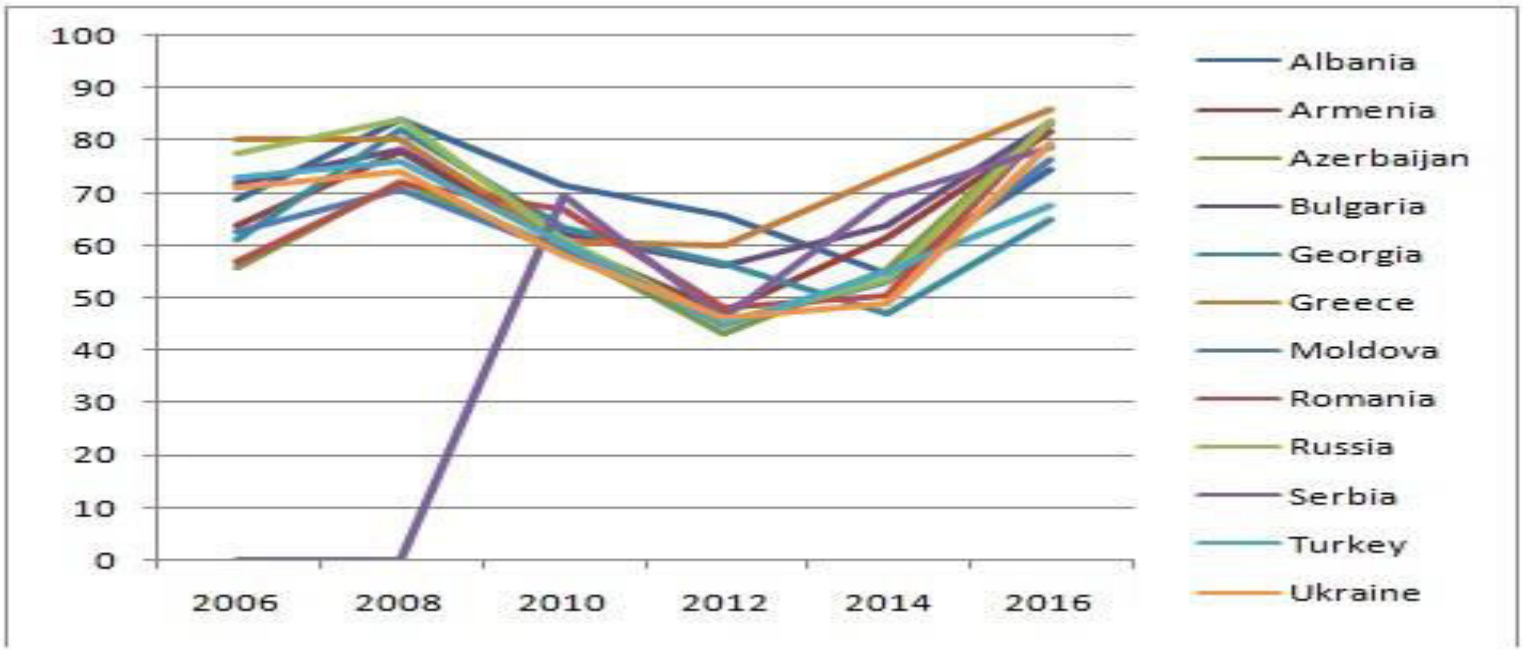
- Black Sea Economic Cooperation
- Founded in 1992
- “Bosphorus Statement”
- Work of the BSEC

Graphic 1: Intra - regional trade in BSEC region for 1999 – 2010 (%)



- Environmental aspects of the BSEC
- Situation in BSEC member states

Graphic 2: EPI values for all BSEC member states



3. Testing the Ehlich and Holdren equation on BSEC member states

- Time period and subject of the analysis
- I – energy use; P – population growth rate; A – GDP per capita (ppp) growth rate; T – electricity consumption per capita
- *H1: Eco – efficiency has a significant impact on the environment of the BSEC member states.*
- $Yit = \alpha + Xit\beta + Ci + Ui$

Table 1 – Panel data analayis

Fixed-effects (within) regression — Number of obs = 252
Group variable: State1 — Number of groups = 12

R-sq: within = 0.4204 — Obs per group: min = 21
between = 0.3726 — avg = 21.0
overall = 0.2965 — max = 21

F(4,236) = 4.47
corr(u_i, Xb) = 0.2603 — Prob > F = 0.0000

Ecofoot	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Ecoefficie~y	.6941426	.0856921	1.68	0.000	−.0246766	.8759617
Popgrowth	.0337794	.0514235	0.66	0.512	−.0675283	.1350871
Gdpgrowth	.0545838	.0270699	2.02	0.045	.0012542	.1079133
Fincrisis	.1585954	.1381307	3.53	0.000	.0194687	.7597222
_cons	.4573717	.1907636	1.75	0.035	−.05635	.9710934
sigma_u	.50900732					
sigma_e	.07949879					
rho	.92864082	(fraction of variance due to u_i)				

F test that all u_i=0: F(11, 236) = 190.94 — Prob > F = 0.0000

4. Identifying eco – efficiency key factors

- The importance of eco – efficiency
- Level of eco – efficiency in BSEC member states
- Analysis assumptions
- Gasoline prices,CO2 emissions per capita, Coal production growth rate, Use for renewable resources during the production of electricity
- *H2: Gasoline prices and CO2 emissions per capita have statistically significant impact on the eco – efficiency.*
- *H3: Renewable resource use has positive and statistically significant impact on the eco – efficiency*

Table 2 – Eco – efficiency regression analysis

Source	SS	df	MS
Model	463.331975	5	92.6663951
Residual	74.7179962	246	.303731692
Total	538.049971	251	2.14362538

Number of obs	= 252
F(5, 246)	= 305.09
Prob > F	= 0.0000
R-squared	= 0.8611
Adj R-squared	= 0.8583
Root MSE	= .55112

Ecoefficie~y	Coef.	Std. Err.	t	P>|t|	[99.5% Conf.	Interval]
Gasolinepr~e	.1977929	.1023703	7.79	0.000	.0978212	1.087765
Co2emiss	-.4246948	.011158	-8.06	0.000	-.6930888	.2863007
Coalprod	.0031536	.0080713	0.39	0.696	-.0197091	.0260163
Renewables	.5150433	.0200337	2.57	0.011	-.0052037	.7082902
Fincrisis	.0942407	.1197638	0.79	0.432	-.2449996	.433481
_cons	.1138056	.1182351	0.96	0.002	-.2211044	.4487156

Conclusion

- Environmental issue is a very sensitive issue
- All hypothesis are accepted
- Ehrlich and Holdren equation is not suitable for BSEC member states
- Solutions and recommendations