

Energy-intensive specialization and growth: the Soviet disease

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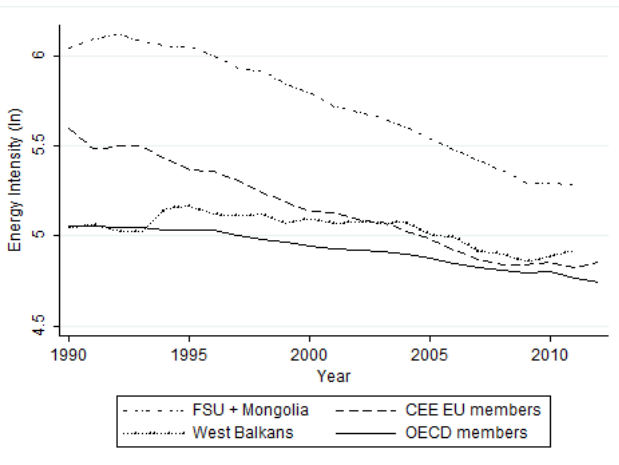
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Motivation

- ▶ East-European and Central Asian countries are heavily energy intensive
- ▶ This feature is rooted in the central planning strategy of Soviet-type economies
- ▶ Context of global resource depletion and climate warming
- ▶ Strategic role of energy in the current Eastern Europe geopolitics

Motivation

Figure: ECA more energy intensive?



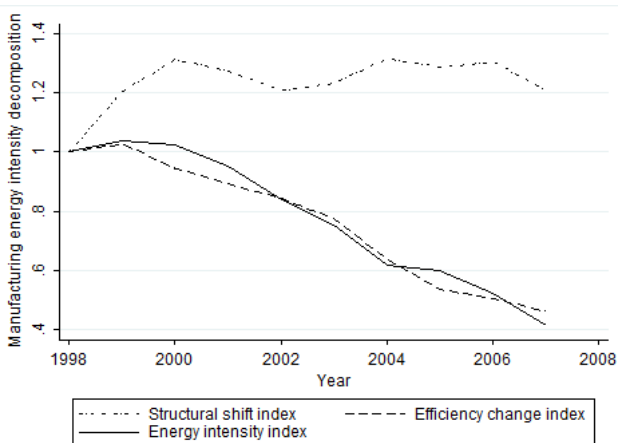
Source: WDI, World Bank, author's calculation.

Motivation

- ▶ High energy intensity = excessive reliance on energy-intensive sectors and/or low energy efficiency
- ▶ Improving energy intensity entails furthering firm-level energy performances and decrease ECA countries' involvement in energy-intensive industries

Motivation

Figure: Specialized in energy intensive industries?



Source: Unido, IEA, author's calculation.

Specialization matter

- ▶ Specialization according to comparative advantage
 - ▶ Ricardo's and HOS story
- ▶ But diversification could be better
 - ▶ Brainard and Cooper (1968)
 - ▶ Specialization and income: Imbs and Wacziarg (2003, AER); Ben Hammouda, Karingi, Njuguna and Sadni-Jallab (2006); Cadot, Carrère and Strauss-Kahn (2011, RESTAT); Parteka and Tamberi (2013, WE)

Specialization matter

- ▶ And not all specializations are alike in terms of their consequences on economic growth
- ▶ Specialization in primary goods
 - ▶ Dutch disease: Prebisch (1950) and Singer (1950); and resource curse: Sachs and Warner (2001, EER)
- ▶ Specialization in 'sophisticated' goods
 - ▶ Hausmann, Hwang and Rodrik (2007, JEG)
 - ▶ Audretsch, Sanders and Zhang (2012), Jarreau and Poncet (2012, JDE)

My point

- ▶ Soviet-type command economy strategy has generated highly energy-intensive specialization in ECA countries (Balmaceda, 2007)
- ▶ Distorted specialization in energy-intensive industries has been maintained by oligarchic elites after the fall of the Berlin Wall
 - ▶ Acemoglu (2008, JEEA);
 - ▶ Beck and Laeven (2006, JEG)
 - ▶ Omgba (2014, JCE)
- ▶ Rent-seeking and lower diversification
- ▶ 'Soviet disease': Energy-intensive over-specialization should be growth-constraining in ECA countries

Strategy and main findings

Strategy:

- ▶ Measure of energy-intensive export specialization, based on structural energy intensity of US sectors
- ▶ Measure of the distortion in energy-intensive specialization based on countries' fundamentals
- ▶ Energy-intensive over-specialization RHS variable in a growth equation

Main results:

- ▶ Significant negative growth impact of energy-intensive over-specialization
- ▶ Evidence of a 'Soviet disease'

Empirics

- ▶ The energy intensity associated with country i 's export basket is:

$$EXENER_{it} = \sum_s \frac{X_{ist}}{X_{it}} \times ENER_s$$

where $ENER_s$ is an index of US-based sector structural energy intensity (4 digits, 1990-2009)

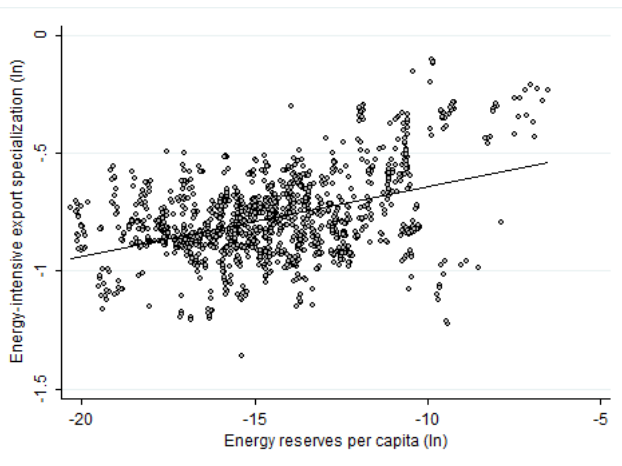
and $\frac{X_{ist}}{X_{it}}$ is the share of the sector s in the country i 's total exports for the year t .

- ▶ *Energy-intensive over-specialization* (EIOS) is defined as the residual of the estimation of $EXENER$ over 140 countries, 1990-2012
- ▶ Growth equation:

$$\ln Growth_{it} = \beta_0 + \beta_1 EIOS_{it} + \beta^x \sum X_{it} + \alpha_i + \alpha_t + \varepsilon_{it}$$

Energy-intensive specialization and energy reserves

Figure: EXENER and energy reserves per capita



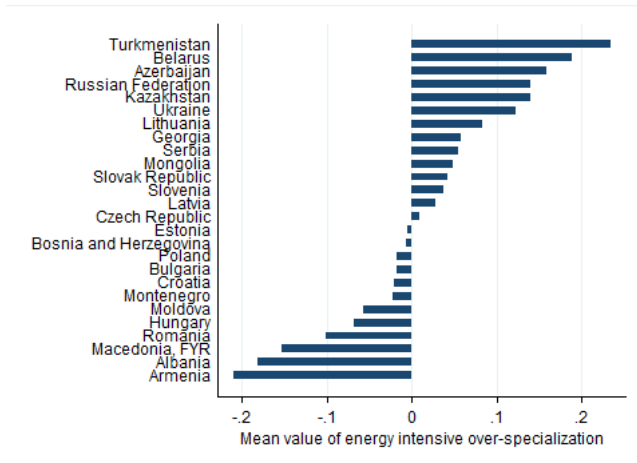
Source: author's calculation.

Determinants of energy-intensive specialization

Energy-intensive specialization (<i>lnEXENER</i>) determinants			
	World	ECA	ECA
GDP/cap (ln)	-0.024*** (0.005)	0.061*** (0.017)	0.058*** (0.010)
Pop. Density (ln)	-0.003 (0.004)	-0.030*** (0.010)	-0.023*** (0.006)
Energy res./cap (ln)	0.018*** (0.003)	0.006 (0.004)	0.009*** (0.003)
Coal res./cap (ln)	0.001 (0.002)	0.011*** (0.003)	0.015*** (0.003)
Rule of law		-0.066*** (0.023)	
Structural reform			-0.121*** (0.011)
EU members		-0.040*** (0.015)	-0.021 (0.013)
Region dummies	Yes	No	No
Year FE	Yes	Yes	Yes
Observations	2,031	298	353

Energy-intensive over-specialization in ECA countries

Figure: Mean energy-intensive over-specialization



Source: author's calculation.

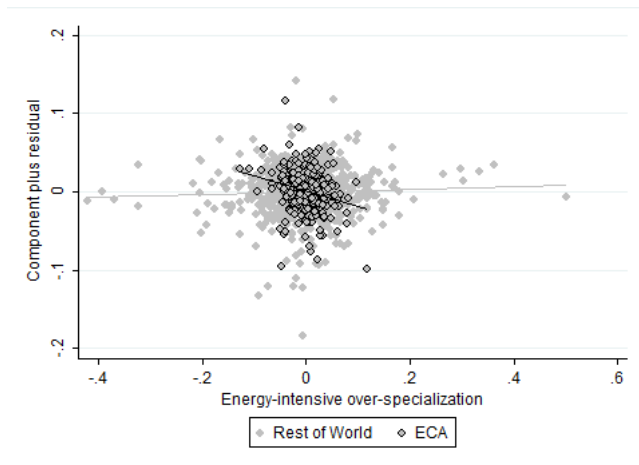
Growth empirics

Energy-intensive over-specialization and growth

	ECA yearly	ECA 3-years	World yearly	World 3-years
EIOS	-0.193*** (0.067)	-0.337*** (0.126)	0.004 (0.019)	-0.004 (0.031)
GDP/cap _{t-1} (ln)	-0.257*** (0.048)	-0.015* (0.063)	-0.112*** (0.029)	-0.004 (0.027)
Invt (ln)	0.135*** (0.017)	0.109*** (0.036)	0.067*** (0.012)	0.019* (0.012)
Hum. capital (ln)	-0.114* (0.065)	-0.001 (0.129)	0.009 (0.012)	0.029** (0.013)
Country and year FE	Yes	Yes	Yes	Yes
Observations	222	68	864	273
Controls: Oil rents, Fin. dev., Trade, Inflation, Rule of law, FDI, Gov. expenses				

Energy-intensive over-specialization and growth

Figure: Partial correlation b/n growth and energy-intensive over-specialization



Source: Partial correlations derived from Column 1 estimates.

Growth empirics

Energy-intensive over-specialization and growth: sub-samples

	New EU members	FSU	Energy poor	After 2004	Before 2005
EIOS	-0.195** (0.087)	-0.214** (0.106)	-0.190*** (0.061)	-0.224* (0.128)	-0.159* (0.095)
GDP/cap _{t-1} (ln)	-0.328*** (0.083)	-0.248** (0.104)	-0.267*** (0.048)	-0.442*** (0.065)	-0.317** (0.085)
Invt (ln)	0.155*** (0.023)	0.144*** (0.023)	0.140*** (0.019)	0.158*** (0.025)	0.150*** (0.032)
Hum. cap. (ln)	0.028 (0.056)	0.022 (0.114)	-0.082 (0.064)	0.004 (0.105)	-0.005 (0.076)
Country, year FE	Yes	Yes	Yes	Yes	Yes
Observations	149	121	239	141	132

Growth empirics

Robustness:

- ▶ Fossil fuel imports
- ▶ Structural reforms
 - ▶ Level
 - ▶ Complementarity
- ▶ Export sector composition
 - ▶ Export concentration
 - ▶ Specialization in capital-intensive industries

Concluding remarks

- ▶ The paper examines the economic consequences of a specialization shaped by the Soviet-type command economy system
 - ▶ Decreasing specialization in energy-intensive industries is positive for economic growth
- ▶ Role of oligarchic elites, institutions and corruption
- ▶ Consequences in terms of environmental policies?
 - ▶ Tighter environmental stringency should improve both environmental and economic performances