

PRACTICAL VALIDITY OF INPUT PARAMETERS IN THE CASE OF TIMES-UKRAINE MODEL

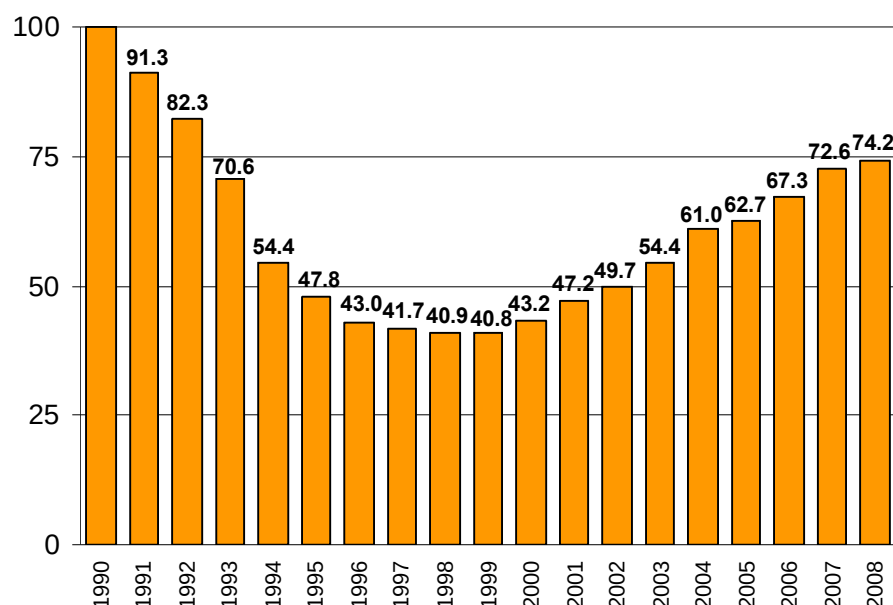
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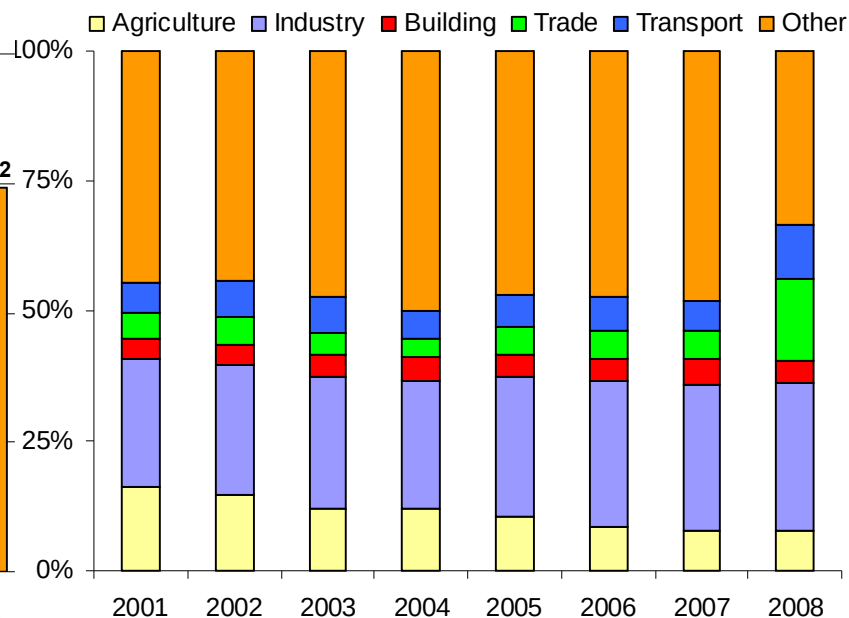
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Economic background

GDP Growth rates

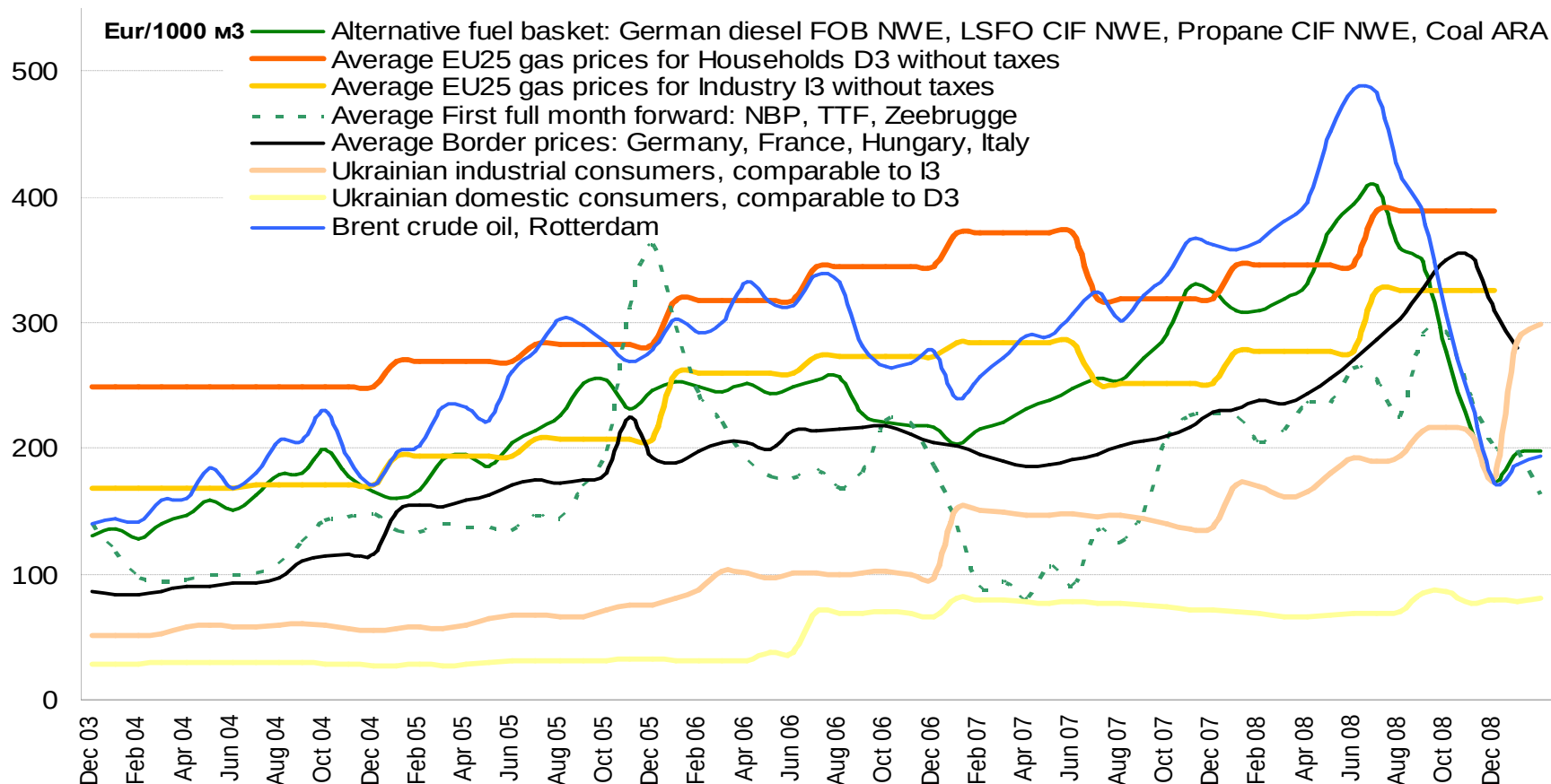


Structure of gross value added



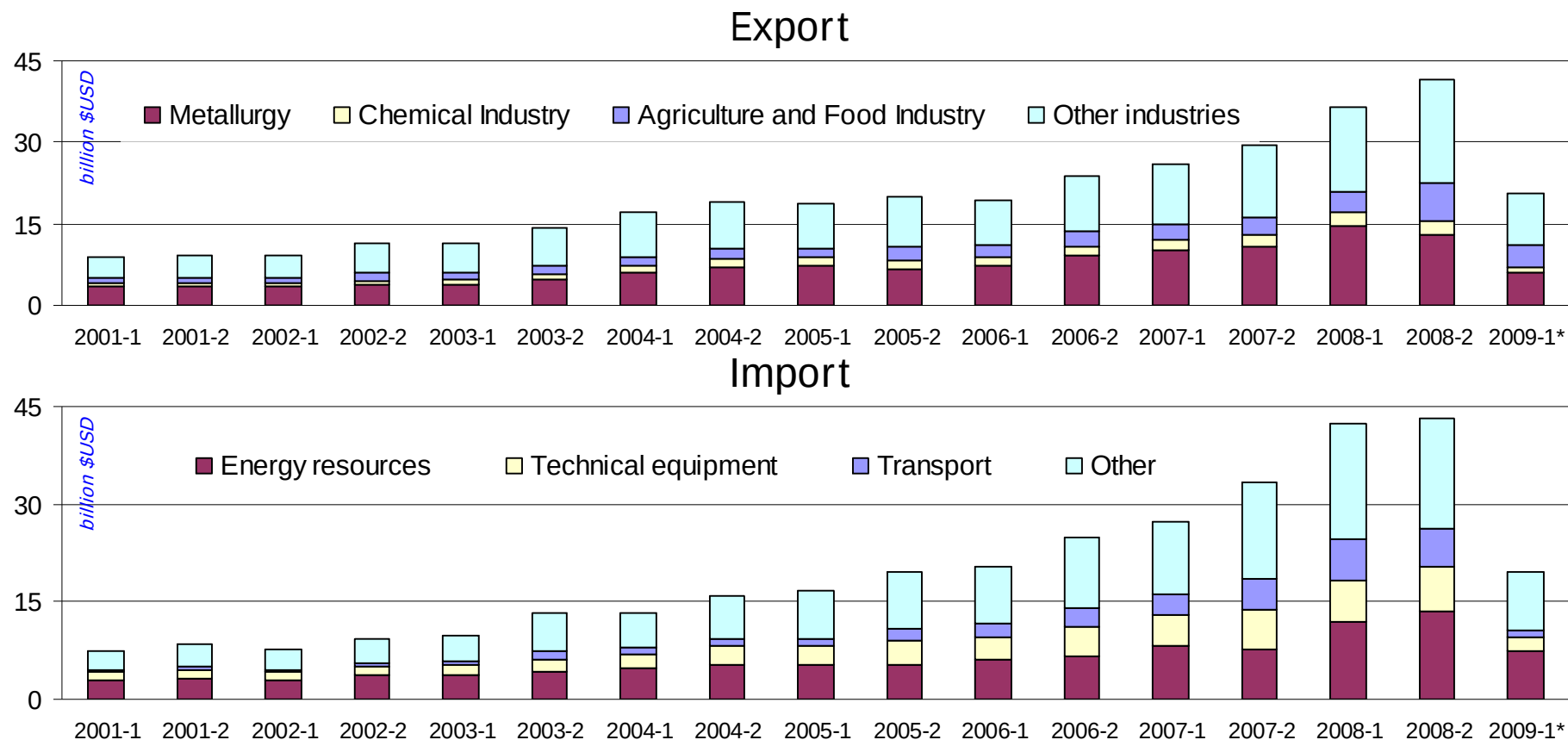
After protracted crisis of the nineties, relatively high rates of economic growth among European countries were maintained in Ukraine by virtue in large part of the availability of comparatively cheap energy resources from Russia and favorable conditions in the foreign markets of metal and chemical products.

Gas prices



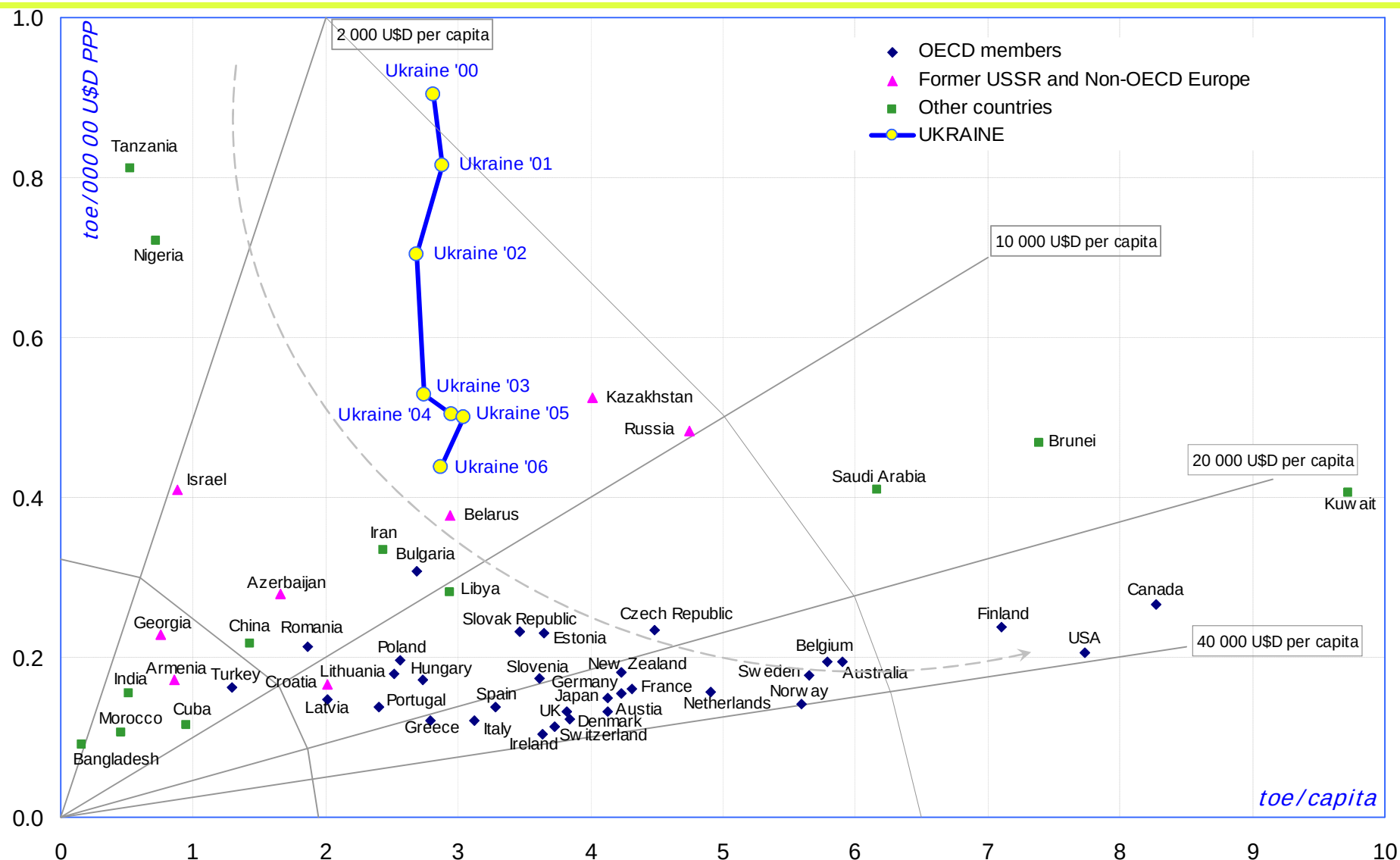
Direct government regulation of natural monopolies allowed to provide gradual price rise and protection against foreign acquisition. Meantime, cost plus method of pricing did not induce to rationalization of energy use and fixing of the price parity between consumers and between alternative fuels.

Export and import structure by sector

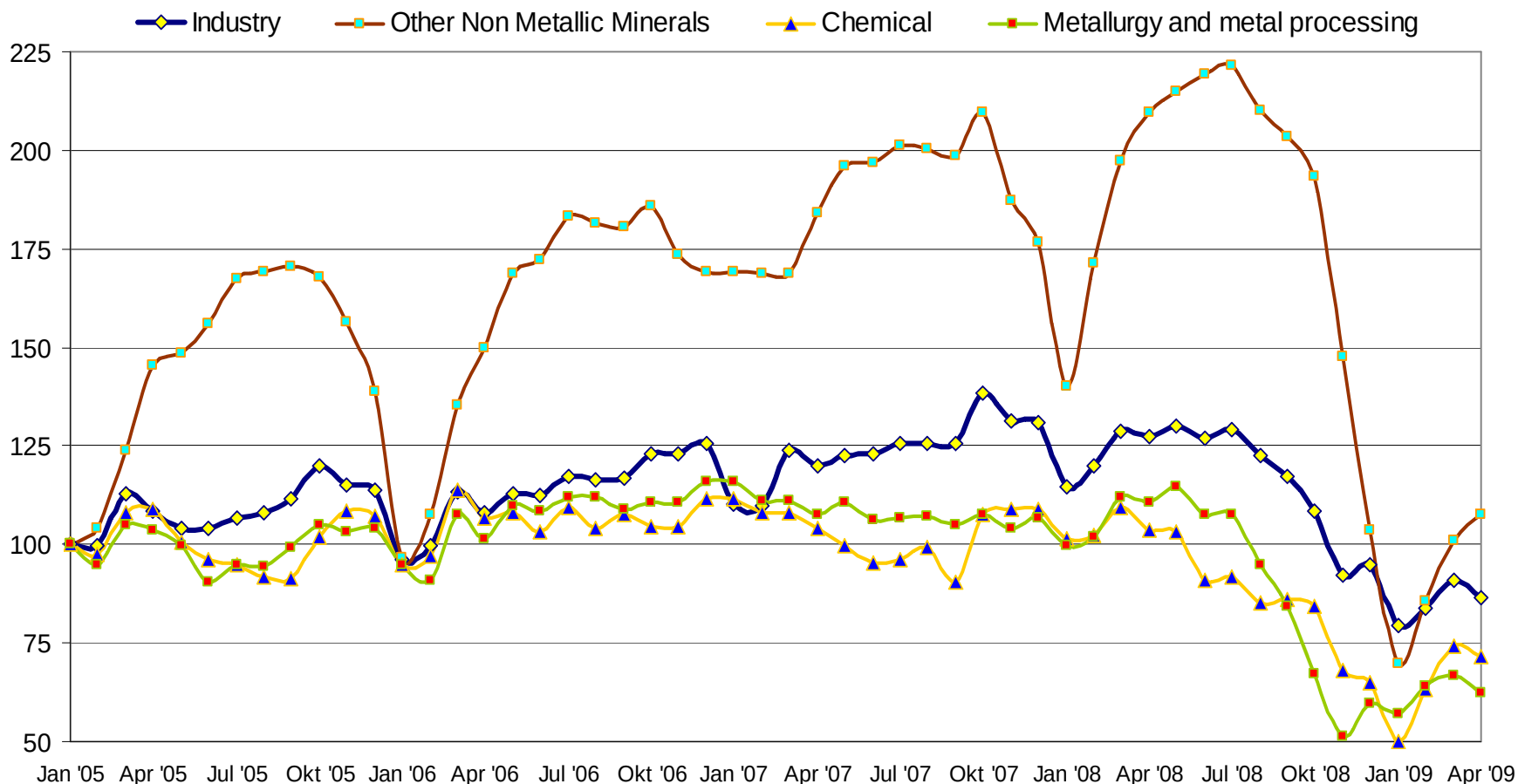


Deliberate government policy for supporting of the export-oriented industries (metallurgy, chemical and non-mineral producers) by tax preferences and other indirect subsidies enabled to maintain the surplus on trade balance and to keep export earnings. Such policy predetermined the freezing of the structure of energy consumption in industry.

Energy-economic coordinate system

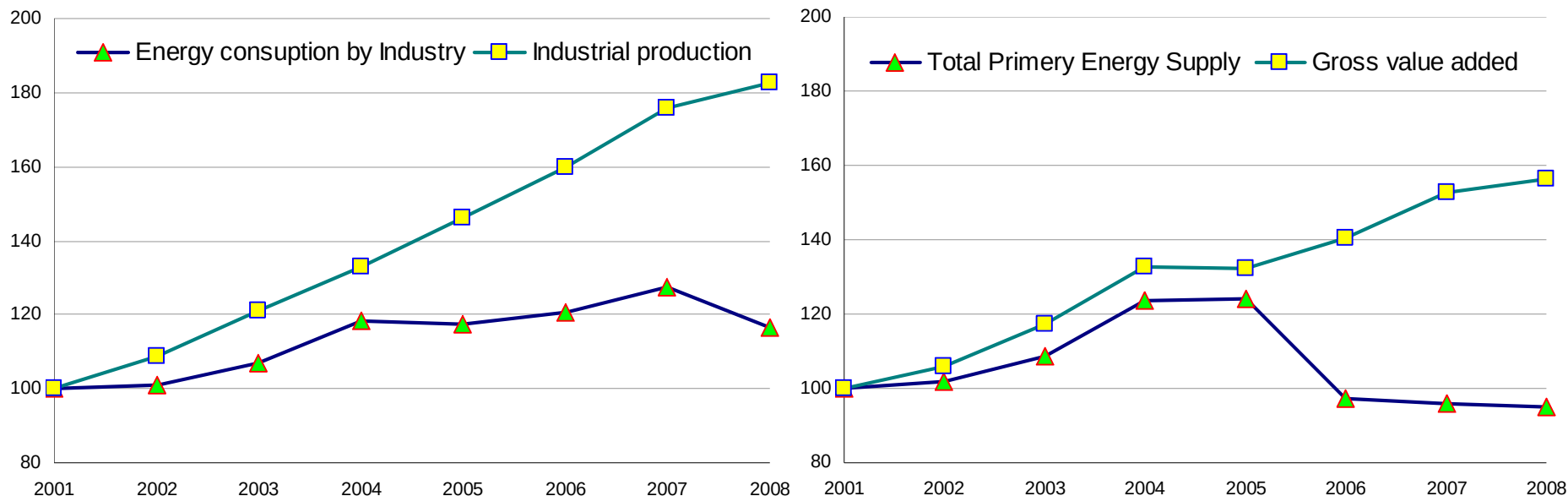


Slowdown of industrial production



Global markets slump against a backdrop of energy cost increase led to reduction of GDP growth rates, double reduction of export earnings. In 2009 reduction of industrial production can make up to 30%.

Opposing trends of industrial production and energy consumption



Meanwhile energy consumption history of Q42008 and Q12009 showed different tendency.

With account of weakening relation between economic growth (production level) and energy consumption after the 70's oil crisis, causes of opposite tendencies in production and consumption are features in each country. Although very often analytic determination of these causes is evident, it is still complicated to represent this dependence between energy and economy in the model.

Origins of the recent energy intensity growth in Ukraine

- uneven drop in production was compensated by output expansion (and energy consumption) in other producing sectors;
- weak administrative control and lack of energy management led to uncontained energy consumption and energy losses;
- drop in production resulted in increase of energy share in the cost structure in physical and monetary terms. In other words this energy, being a part of fixed costs, is used for heating, lighting and other needs and is not used in production directly, and does not depend on the volume of production.

Elasticity of energy demand

Although general effects of elasticity of energy demand are studied quite well, numerous studies show a significant dependence of the absolute values of elasticity on the number of national features : level of economic development and traditions of energy use, structure of end-use demand, availability and prices of alternative fuels and the level of prices change, intensity of competition between different energy consuming appliances and equipment etc.

This recalls the fact that it is impossible to define universal dependencies and assessments of elasticity, but the modelers should always try to determine the direct action of price and income elasticity over the past period to justify elasticity projection in the model.

“With the introduction of variable magnitudes and the extension of their variability to the infinitely small and infinitely large ... we have reached the point where most people differentiate and integrate not because they understand what they are doing but from pure faith, because up to now it has always come out right.”

Frederick Engels

Anti-Dühring (Herrn Eugen Dührings Umwälzung der Wissenschaft)

Methodological trick

Provided by:
economic agents-corporate persons and their separated subdivisions of all types of economic activity (NACE), which use and have in remains energy resources and refinery products – to the department of state statistics upon their location

Types of fuel	Measurement units	Row code	CPA code
A	B	C	D
Hard Coal	tons	100	10.10.10.010
Briquettes, ovoids and similar solid fuels manufactured from coal	tons	110	10.10.12
Brown coal (lignite)	tons	115	10.10.10.020
Brown Coal Briquettes	tons	120	10.20.10.500

Identification code of ED RPOU					
State statistical supervision					
Confidentiality of statistical information is provided by the article 21 of a Law of Ukraine "About state statistics"					
Disturbing presentation or use of information of state statistical supervision results in responsibility which is set by the article of 1868 of Codes of Ukraine about administrative offences					
REPORT ABOUT REMAINS AND USE OF ENERGY RESOURCES AND REFINERY PRODUCTS FOR JANUARY 2006 YEAR					
Provided by:	Terms of presentation				
economic agents-corporate persons and their separated subdivisions of all types of economic activity, which use and have in remains energy resources and refinery products – to the department of state statistics upon their location	15 January				
Form 4-mip (annual) RATED by Order of Durbolstat of Ukraine 27.07.2007 №656					
Respondent's Name: (corporate person or separated subdivision)					
Location (legal address): (corporate person or separated subdivision)					
(zip code, region/AB of Crimea district, city, street building, flat/apartment)					
Section 3 Consumption of energy resources and refinery products for energy purpose					
Types of fuel	Measurement units	Row code	CPA code	code - 1	code - 2
A	B	C	D	1	2
Hard Coal	tons	100	10.10.10.010		
Briquettes, ovoids and similar solid fuels manufactured from coal	tons	110	10.10.12		
Brown coal (lignite)	tons	115	10.10.10.020		
Brown Coal Briquettes	tons	120	10.20.10.500		
Peat is unagglomerated fuel	tons	130	10.30.10.011		
Briquette and semi-briquette peat	tons	140	10.30.10.020		
Crude Oil	tons	150	11.10.10.310		
Gas condensate	tons	160	11.10.10.500		

Energy consumption of the sector is the amount of energy, consumed by enterprises, that belong to this sector by NACE code of their main economic activity.

Production output of the sector is the overall production of commodities, that belong to the commodity nomenclature of this sector by the first six characters of their CPA code (regardless of the NACE belonging of the manufacturer).

Important implications for the modelers

1. As enterprises, that belong to specific sector by NACE, may produce products, that belong by CPA to the sectors other than mentioned, than a part of production output of this sector may be also provided by the enterprises, that do not belong to the mentioned sector by NACE code of their main economic activity.
2. Hence, not all amount of energy consumed by specific sector by NACE could be used for production of commodities, that belong to this sector by CPA. On the other hand, this amount does not cover energy, consumed for production mentioned commodities by enterprises, that does not belong to the mentioned sector by NACE.

Non-core production by metallurgy in Ukraine, 2005

Commodity	CPA 2002	Sector	NACE Rev.1	Production	Share
Coke and semi-coke of coal, of lignite or of peat; retort carbon, kton	23.10.10.310	Manufacture of coke, refined petroleum products and nuclear fuel	23	16 128.4	85.45%
		Manufacture of basic metals	27	2 661.7	14.10%
		Other Sectors		85.3	0.45%
Oxygen, th.m3	24.11.11.700	Manufacture of chemicals and chemical products	24	2 713.7	53.40%
		Manufacture of basic metals	27	2 276.9	44.80%
		Other Sectors		91.5	1.80%
Lime, kton	26.52.10	Manufacture of other non-metallic mineral products	26	425.4	9.75%
		Manufacture of basic metals	27	2 630.3	60.27%
		Other Sectors		1 308.8	29.99%

Manufactured non-core commodities are not necessarily intermediate products, they may also be final products and the level of productions may be predicated upon domestic demand, as well as favourable external market environment.

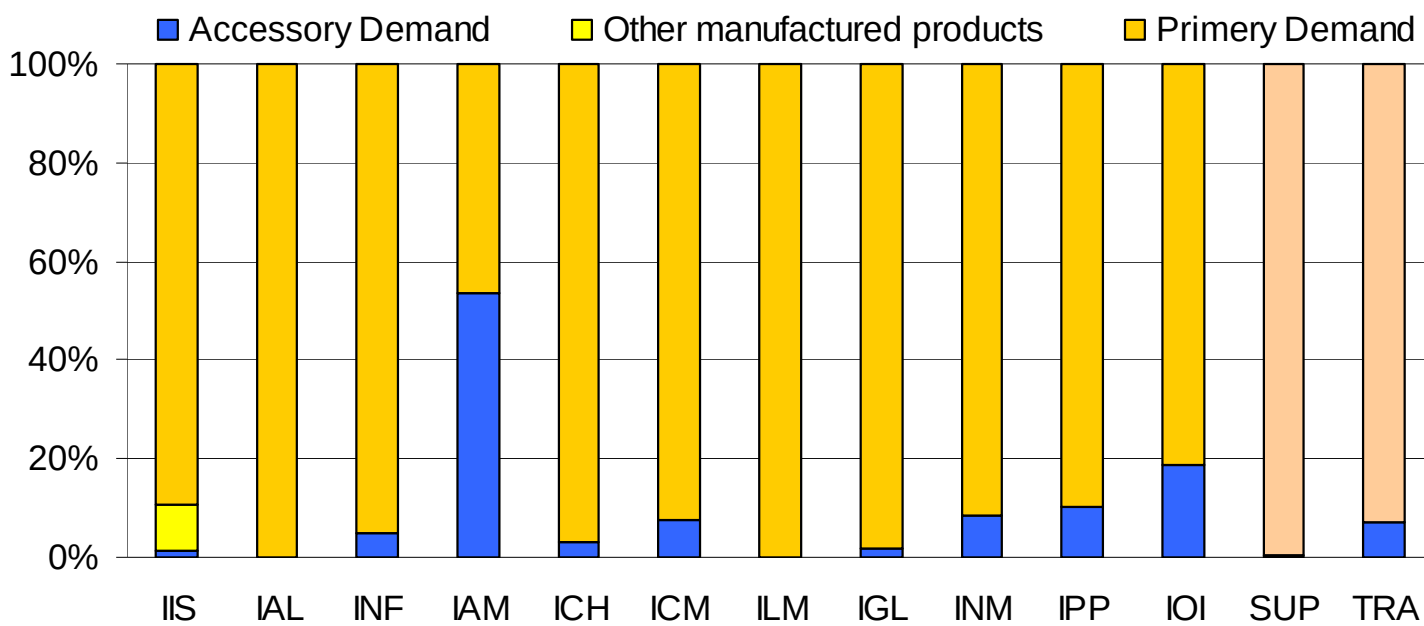
Another example: Zasyadko Coal Mine

Zasyadko Coal Mine includes:

- Coal concentrating plant
- Cogeneration plant
- 22 farms with 62355 ha agricultural land and 123 ha fishery pools
- Poultry factory
- 2 meat processing plants and 1 butter making plant
- 2 animal feed factories
- Transport overhaul agency
- Development and construction company
- 2 shopping mall
- 2 resorts and 1 hotel



Accessory demands in TIMES-Ukraine model



Non-core energy consumption or “accessory demand” on the average reach 10% of final consumption. In absolute values Ukrainian accessory demand is almost equal the final consumption of Lithuania, Latvia and Estonia put together.

Conclusion 1: Nature of numbers

	Final energy consumption by Industry in 2005, ktoe					
	Coal	Petroleum Products	Gas	Electricity	Heat	Total
IEA DATA	8 132.0	1 409.0	11 055.0	5 651.0	6 759.0	33 006.0
TIMES-Ukraine	8 399.5	1 859.1	11 176.9	5 516.8	6 422.4	33 374.6
Including:						
<i>Primary demands</i>	6 392.8	519.4	10 170.4	4 841.6	5 724.5	27 648.6
<i>Accessory and non-core demands</i>	2 006.7	1 339.7	1 006.5	675.2	697.9	5 726.0

Data difference does not testify to calculation mistakes or incorrectness of the methodological approach, but for the modeling purpose allocation of the finale consumption seems essential. Direct use of energy balance data is feasible for interregional models. For national models where detailed information is available, the usage of such data is unfounded.

Conclusion 2: Why policy makers must believe modelers?

Misunderstanding or incompleteness of input data leads to necessity of additional assumptions and simplifications of the model comparing to the real system, creating what Ronald Coase has called “blackboard economics”. Meanwhile, advanced theoretical foundation and modeling tools create an impression of the perfect scientific validity of results.

Indeed, advanced modeling tools can provide the accuracy of calculation, however that is just the accuracy of mathematical model created by the researcher. The model itself may be created under fallacious assumptions, incorrect interpretation and hence – its poor validity may whittle away any advanced methodological approach and make the results useless.

“Economists have converted the subject into a sort of social mathematics in which analytical rigour is everything and practical relevance is nothing.”

*Mark Blaug
Ugly currents in modern economics*



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