

Steel and coke coal sector in Ukraine: can the future be predicted?

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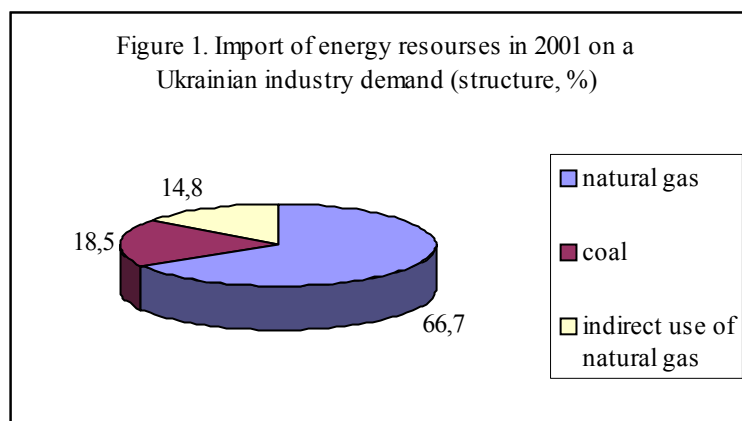
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Abstract

This paper is a part of the study on effectiveness of the Ukrainian energy sector. We have based this study on publicly available statistics and data provided by the Ukrainian Ministry of Energy and Fuel, and the Ministry of Industrial Policy. We showed the current tendencies, which exist in the Ukrainian steel and coke coal production. The paper also provides a comparison of the existing Ukrainian tendencies in this sector of economy with the world tendencies.

1. Metallurgy Industry Overview

The Ukrainian industrial sector uses about half of all energy consumed in Ukraine at a total cost of \$5.4 billion (2001)¹. At the same time domestically produced energy resources do not cover the demand of the Ukrainian industrial sector. Our study shows that within this total, energy imports for the industrial sector amount to about \$2.7 billion. The composition of this import is given in Fig1.



The most significant part in such import is related to direct use of natural gas. It accounts for \$1.8 billion, coal \$0.5 billion, and indirect use of natural gas to generate electricity used by Ukrainian industries \$ 0.4 billion. Some 10 large industrial companies use approximately 50% of the total energy consumed by the industrial sector in Ukraine.²

Our study shows that specific of the Ukrainian iron and steel sub-sectors define by two factors. First, these sectors are the main consumers of the coke coal (around 90% of the domestic production of this type of raw material).³ Second, the main source of energy for the Ukrainian metallurgy is natural gas. The Ukrainian metallurgy consumes around 80% of the natural gas used in the industrial sector.⁴

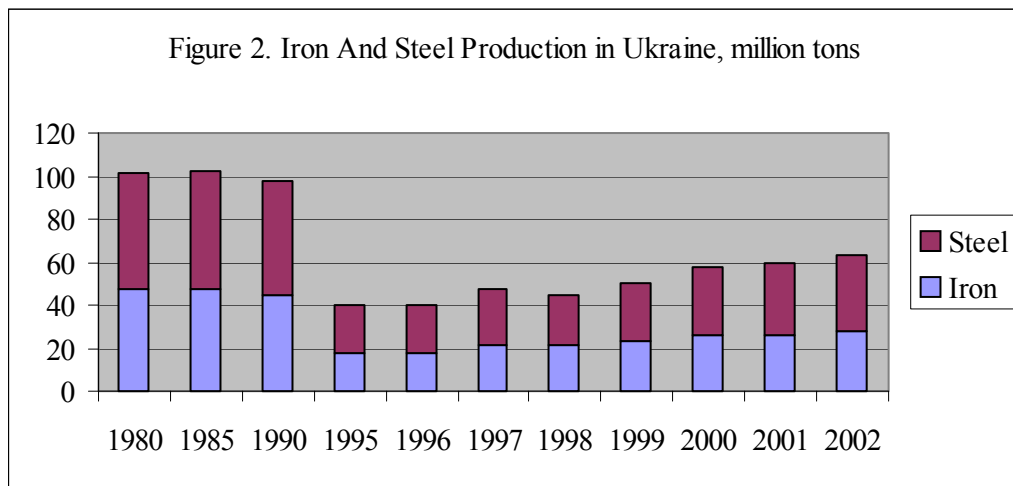
Over the period of 1980-1990 Ukraine produced around 50 million tons of steel and almost the same quantity of iron (see Fig 2). After Ukraine gained its independence and started to be oriented on a building of market economy the amount of iron and steel production produced in the country started to shrink. Statistical data suggest that output of 1995 has been at the level of only 40% from one in 1990. At that time the total production of steel and iron reached 40 million tones (iron – 18 million tones and steel – 22 million tones).

¹ Ukraine 2002: annual statistics

² Data of the Ukrainian Ministry of Energy and Fuel

³ Donetsk Commercial and Industrial Chamber: www.cci.donbass.com

⁴ Same as 2



After the deep decrease in the Ukrainian metallurgy production in 1990-1995 was followed by a steady increase in domestically produced iron and steel. Over 1996-2002 the Ukrainian metallurgy experienced structural changes in the metallurgical production. If in 1990 the iron production was around 45.9% of the total production in metallurgy, in 2002 its share declined and reached 44.4%.

The analysis of the Ukrainian industrial market over the last decade suggests that structural changes in the Ukrainian economy and particularly decrease in steel pipes production (from 599 million meters in 1990 to 247 million meters in 2002) lead to decrease in domestic demand for steel.⁵ At the same time, the high quality of the domestically produced steel and the existing available capacities gave an opportunity for Ukrainian steel production sector to be more oriented on a world market.⁶

The existing domestic steel consumption in Ukraine in 2001 was only 31% compare to its 1992 level.⁷ Obviously, shrinking in domestic consumption of steel caused to increase the volume of the exporting steel. In 2001 Ukraine became one of the major exporters of steel. In 2002 around 51% of the Ukrainian steel production was exporting to other countries. This increase was very significant. In the pre-independence steady state such export was around 12%.⁸ As our study shows, in 2002 the steel export earned almost 7% of the total hard currency in Ukraine.

While substantial capacity reduction has taken place, steel mills also face several obstacles to capacity rationalization and restructuring. Based on the Soviet industrialization model, Ukrainian steel mills are regionally distributed and are key employers and key sources of tax revenue in a number of regions. With 475,000 employees in the Ukrainian steel industry in 2002, and an estimated average man-hour per ton production rate of 19.5 compared to 4.1 in

⁵ Ukraine 2002: annual statistics

⁶ Exports of steel from Russia and Ukraine account for 21 per cent of global steel exports

⁷ Ukraine 2002: annual statistics

⁸ Ukraine 1993: annual statistics

OECD Member states, steel mills are on the average extremely inefficient.⁹ Restructuring has been impeded by a lack of financing and by constraints on shedding workers due to a lack of alternative employment and social concerns.

There are some studies, which shows that Ukrainian steel mills are on the average less environmentally friendly than OECD mills.¹⁰ Due to a lack of financing and competing priorities, environmental clean up of existing and idle steel capacity in these countries has been stalled. Energy intensity of steel production is 2-3 times higher than in OECD countries. Production of steel using the Open Hearth Furnace, which has been completely phased out in other industrialized countries, remains common in Ukrainian steel mills.

2. Steel Prices

The emergence of steel from the former Soviet Union (FSU) and particularly from Russia and Ukraine on global markets over the last several years at extremely low prices and often through ad hoc marketing arrangements has become one of the main reasons for the difficulties in world steel trade.¹¹ The pricing of Ukrainian steel exports has often been sub-optimal due to the inability in the country under the current economic conditions to employ standard accounting principles, the lack of finance and the use of barter, and the orientation toward production rather than profit. In addition, a lack of familiarity by producers in Ukraine with market principals and established distribution channels in export markets has led to pricing which does not reflect the prevailing conditions in the consumer markets either. These constraints have resulted in a reduction of returns to their mills and contributed to price suppression in many export markets. As a result, over 20 countries have taken trade actions under trade laws against Ukrainian steel imports.¹²

The comparison of domestic and world prices for steel (Fig. 3) shows that domestic prices in 2001-2003 were 53.77% lower than the world prices. In some periods of time this gap between the world and domestic prices for steel were even higher (Fig. 4). In 1990 such gap was 105.12%. Currently (in 2003) domestic prices for steel are 52.65% lower than the world prices. At the same time, the domestic prices have been significantly rising over period of 1990-1998 from \$156 per ton in 1990 to \$267 per ton in 1998. After the 1998 financial crisis the domestic prices declined to \$210 per ton. Such decrease in prices could be a response for shrinking in the world market demand for steel in that period of time and attempts of the local producers to sell some over produced steel on a domestic market.

⁹ Ukraine 2002: annual statistics

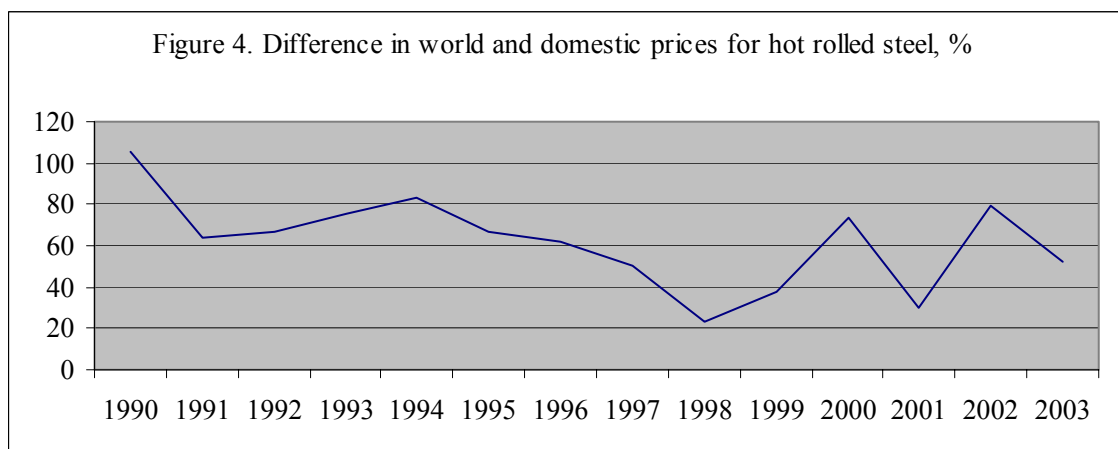
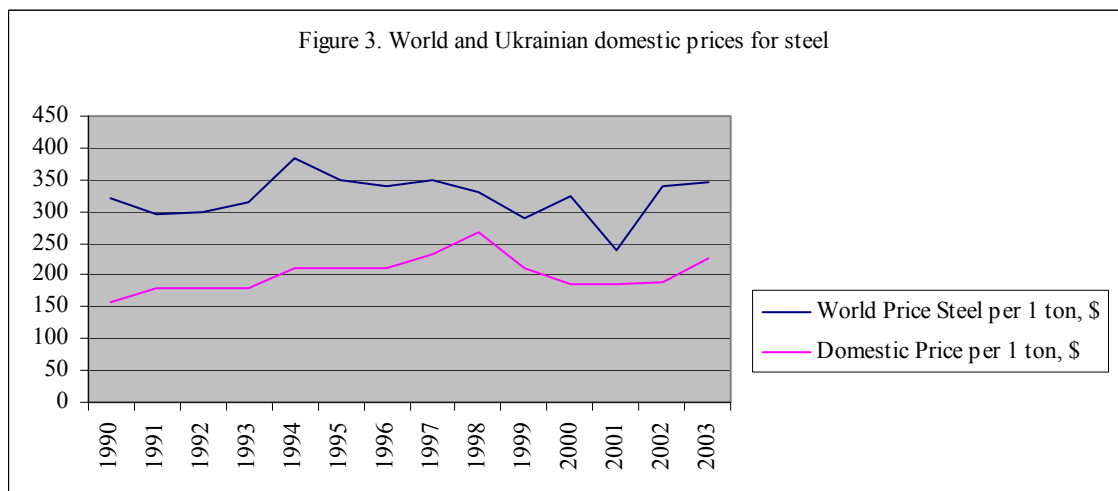
¹⁰ See in more detail at <http://www1.oecd.org/media/release/nw98-126a.htm>

¹¹ World Steel Dynamics, *Global Steel Albert* #5 at 1 (June 13, 2002).

¹² Data of the Ukrainian Ministry of Industrial Policy on year 2002

While some of the world market price increases may appear dramatic, current price levels are still relatively low by historic standards. The data show that world steel prices fell in 2001 to some of their lowest, if not the lowest, levels since 1990.¹³ In fact, world spot prices for hot-rolled were higher in nominal dollars in 2000 than in 2002, and nominal prices were higher during the entire period from 1990 to 1998 than they are now. When adjusted for inflation, current prices are even further below historic levels.¹⁴ Available data suggests that now prices are only returning to their average levels over the past six years.

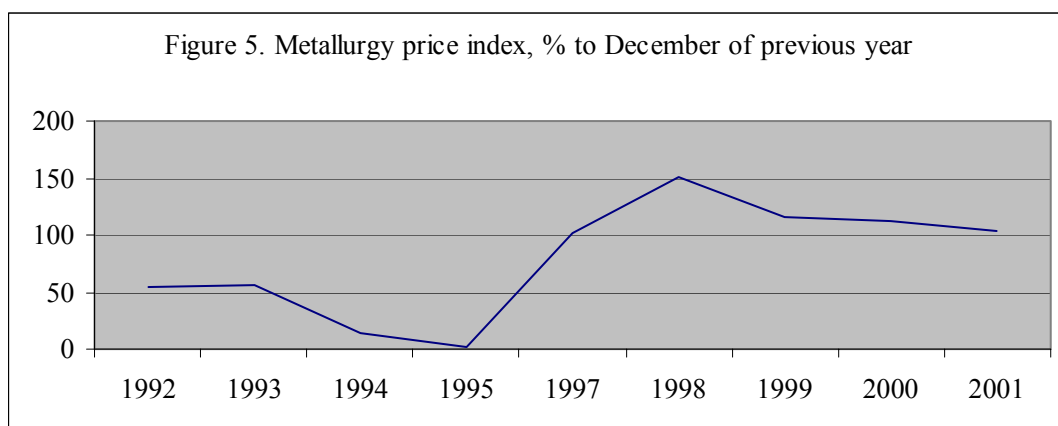
The following chart shows the history of the world market spot prices for hot rolled steel for June of each year since 1990 for the same products. Note that all prices are in nominal dollars, and have not been adjusted for inflation. Also, all prices are spot prices. It is needed to be said, that spot prices are frequently higher than contract prices. For these reasons, the chart actually overstates the recent price recovery on the world market for hot rolled steel (see Fig. 3 for more details).



¹³ Peter Morici, THE IMPACT OF STEEL IMPORT RELIEF ON U.S. AND WORLD STEEL PRICES: A SURVEY OF SOME COUNTERINTUITIVE RESULTS, 2002

¹⁴ Assume that annual average inflation rate in USD is 4%

Our study shows that Ukrainian prices in metallurgy have been significantly fluctuating over the last decade (Fig. 5). The data suggest that industry experienced only one period of the steady growth in price index. Such increase appeared only in period of 1995-1998. In all other periods of times the price index was either unchanged or fallen.



3. Coke coal prices

Competitively priced coke of increasing quality is essential for integrated steel makers to maintain their position as the primary source of top quality virgin hot metal and steel. In the past, coke makers relied on domestic single-sourced medium volatile coking coal charges. As these domestic resources became depleted, the medium-volatile coking coal charge was simulated by increasingly complex coal blends comprised of an increasing number of coals.

World Coking Coal Production and Consumption

World blast furnace hot metal production in 2002 amounted to approximately 600 million tons. There are some studies, which suggest that between 2003 and 2006, production is expected to increase at an average annual rate of 2.4%, resulting in approximately 661 million tons of hot metal production in the year 2006.¹⁵ Most of the growth is expected in China, CIS, Eastern Europe and South America, and will more than offset the expected production reduction in North America and Western Europe. The world's coking coal and coke consumption will essentially keep up with increased hot metal production, each growing at an average of approximately 1.5% annually over that period.¹⁶ The difference in annual growth rate between hot metal production and coke consumption is due to the projected increase in blast furnace fuel efficiency and pulverized coal injection.) For coking coal consumption, this signifies an expected increase from approximately 507 million tons in 2002 to 533 million tonnes in 2006.¹⁷

¹⁵ IISI, CRU, AME and industry data, Oct. 2002.

¹⁶ Medium-Volatile Coal —The Solution for Coke Oven Blends With Reduced Low-Volatile Coal Content
WWW.STEELTECHNOLOGY.ORG

¹⁷ IISI, CRU, AME and industry data, Oct. 2002.

World's Major Metallurgical Coal Exporting Countries

Between 1980 and 2002, metallurgical coal exports increased from 139 to approximately 191 million tonnes. Since the 1980s, a major shift has occurred in the supply of metallurgical coal. In 1980, the U.S. was the world's major exporter, with a 41% export market share, followed by Australia (26%) and Canada (10%). By 1986, the U.S. and Australia each claimed 33% market share. In 2003, the U.S. is expected to be down to an 11% market share, falling below Canada's export tonnage. In the meantime, Australia increased its share to approximately 57%. The projection for 2006 is for the U.S. to decline further, such that its market share equals that of China (7%). Australia's and Canada's market shares are projected to increase to 60 and 14%, respectively.

The existing studies predict that market share for the world's major metallurgical coal exporting countries will be significantly changed before the year 2010.¹⁸ China's export market share is not expected to grow faster due to the closure of small mines and logistical constraints between the mines and ports, in combination with China's aggressive internal growth. China's blast furnace hot metal production grew by approximately 17% from January to May 2002, compared to the same period in 2001. This growth rate generates shortages of high-quality metallurgical coal in internal Chinese markets.¹⁹

The resulting price increases inherently discourage the export of high-quality metallurgical coal. In fact, China imported, on average, 308,000 tones of coking coal 2001. Doubling of imports into China could easily occur in the short term.

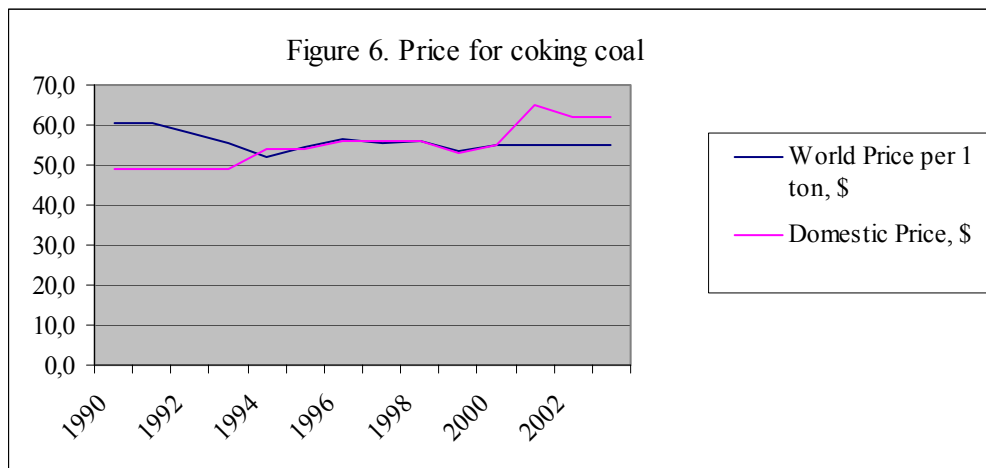
Ukrainian coke coal market' tendencies

Our study shows that over the last decade Ukrainian domestic prices for coke coal were significantly changing. Over this period of time we can easily observed a tendency to the prices increase. In last 7 years the Ukrainian domestic coke coal prices increased by 1.26 times. In 2002 the average coke coal price for fraction of 25 mm was \$61.8 per ton compare with \$49 in 1990 (Fig. 6).²⁰

¹⁸ Same as 9

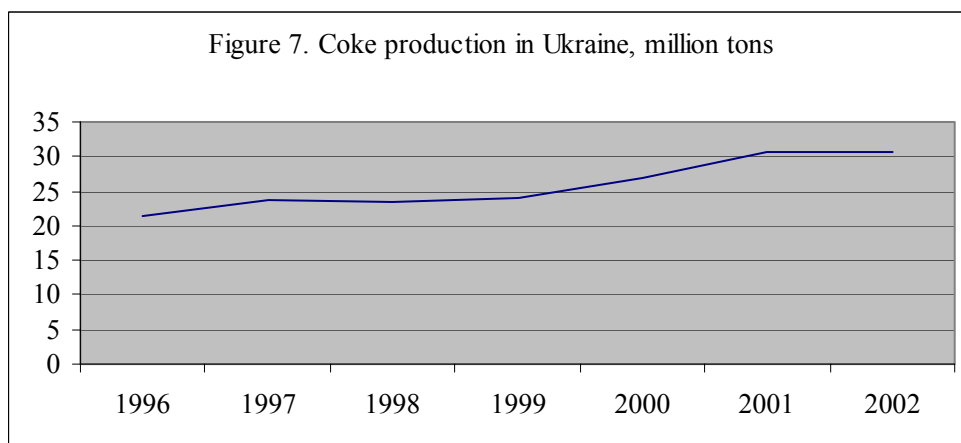
¹⁹ Same as 9

²⁰ 25 mm fraction is a standard measure for coke coal.



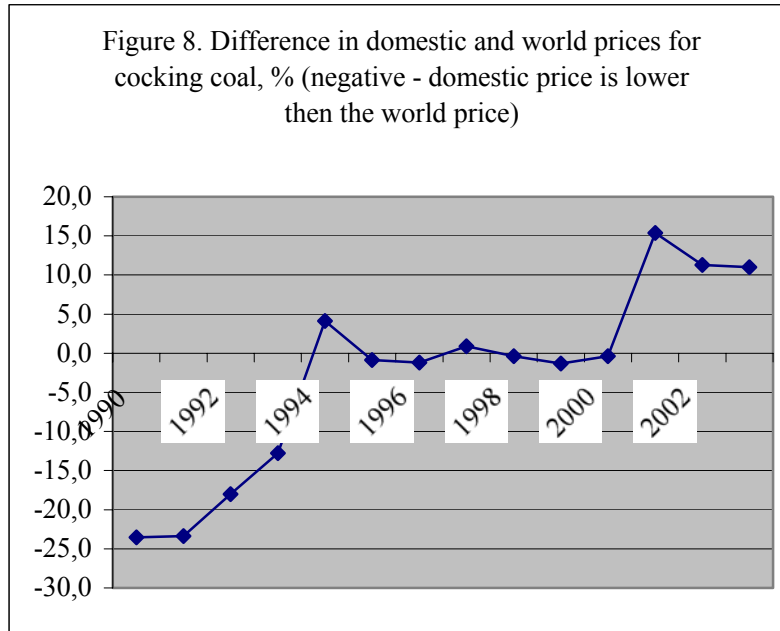
Data suggest that the most significant increase appeared in 2001. That year price for coke raised by 18.6% compare with its level in 2000 or 32.7% compare with the country pre-independent steady state level in 1990. The crises of 1998 took the prices down to \$53 per ton, which is translated into 5.4% lower level than coke coal price before the crises level. Starting from 1999 the steady increase in coke prices has been stimulating an increase of the coke production in the following periods (Fig. 7). Eventually, in 2002 the domestic production of coke coal was 31.6 % higher then its level before the 1998-year crisis.

The trend of growth in domestic price for coke clearly comes from demand of metallurgy, which should be profitable to be able to expand. Clearly, mines are willing to supply more coke if price is rising. Opposite effect is for coal production as fuel, which is stagnating due to low price.



Based on the analysis of the dynamics in the world and domestic prices for coke coal, it can be concluded that in 1990-2002 these prices have been moving in opposite directions (Fig. 8). Initially, at the beginning of the studied period, the domestic prices for coking coal were 23.5% lower then the world prices. Then this difference started to be eliminated. And in 1994 the domestic price was only 4.1% higher then the world price. In 1995 this difference almost disappeared and the domestic price became 0.9% lower then the world price. Since that time and

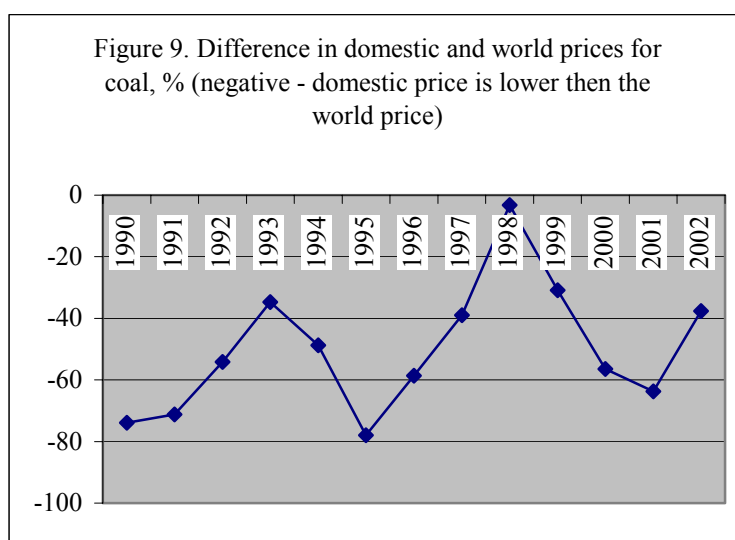
till 2000 we can observe synchronicity in the prices' movement - the domestic price followed the world price and the level of volatility was very small. This situation was changed in 2001. That year the local Ukrainian prices for coking coal became 15.4% higher then the world price. Although this difference became smaller in 2002 it's still exists. In 2003 the Ukrainian price was 11% higher then the world price.²¹



For purposes of this study we analyzed the volatility in coal prices: world and domestic (Fig. 9)²². Our study suggests that in 1990-2002 the domestic coal price was on average 50.1% lower then the world price. Such mismatching in price volatility in coal and coking coal could be evidence either of significant ineffectiveness of the coking coal production in Ukraine compare to the world level or high demand on a local market for coking coal from the side of the metal producers.

²¹ For purposes of the prices' comparison we used the CIF price of coking coal imported to Japan. The reason is that trade in coking coal is limited by the distance in transportation and the price for imported coal significantly differs around the world.

²² Price Volatility = (Domestic Price – World Price)/Domestic Price



4. Profitability of steel production in Ukraine

In May 2003 Summary Report on Operation of the Largest Ferrous Metallurgy Companies in Ukraine mentioned that five biggest producers of steel in Ukraine produced 2,140 thousand tons of this product in one month (Table 1).²³

Company name	pig iron	steel	rolled products
Krivorozhstal	543.5	603.5	527.7
Azovstal	343	423.6	374.5
Illyich Steel Works	446.7	552.7	458.2
Zaporozhstal	268.1	356.6	310.4
Dzerzhynsky Steel Works	190.9	203.5	161.1

The weight of the biggest producer Krivorozhstal in producing steel is 28.2% while its share in the total production of the main steel products²⁴ in this group is 29.05%.

Data suggest that Ukrainian steel industry is still experiencing global structural changes (Table 2).

Table 2.

World rank of Ukrainian steel producers²⁵

Company name	Rank in 2001	Rank in 2002
Krivorozhstal	25	26
Azovstal	41	45
Illyich Steel Works	31	30
Zaporozhstal	51	55
Dzerzhynsky Steel Works	68	69

Some experts believe that the profitability of steel production in Ukraine is around 15%. At the same time if Ukrainian producers will become more export oriented they will be able to

²³ See for more details <http://www.kggmk.dp.ua/news/>

²⁴ Steel related products are steel, pig iron and rolled products

²⁵ This rank is based on the value of the steel production. Source: International Iron and Steel Institute. Also available at Investgazetta #8 (437) February 24, 2004

increase this level significantly. Partly, it will be a result of the higher level of prices on the world market compare to the local market. On the other hand, according to the experts' forecasts average world price for steel in the middle of 2004 is going to be around \$380 due to the increasing demand from Asian consumers (including China).²⁶

Conclusions

The study shows that:

- Ukrainian steel production is currently highly growing sector of the country's economy;
- Export orientation of the Ukrainian steel production can heavily benefit domestic producers of steel;
- Domestic price for coke coal is higher than the world price, which should lead to decrease in demand for domestically produced coke and re-orientation of the Ukrainian steel producers to imported coke;
- Structural changes (as merges and acquisitions) in the Ukrainian steel productions can be expected in the nearest future.

²⁶ same as 25

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