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## Dynamics of coking coal pricing in international trade in 1980–2020

### Introduction

International trade in coking coal, currently estimated at around 300 million tons, covers nearly 30% of global consumption of this raw material (Coal Information 2020). The coal deficit in two geographically distant markets, i.e. Asia (Pacific basin) and Western Europe (Atlantic basin) is covered by coal supplies mainly from Australia and North America, and hence almost 90% of the volume is seaborne.

The demand for coking coal in international trade is mainly determined by the demand from the steel industry whose condition is dependent on the situation in the global economy and the business situation of the steel market. In the last two decades, global crude steel production has more than doubled (to 1,878 million tons in 2020) and the share of steel produced using the blast furnace-basic oxygen furnace (BF-BOF) integrated route has increased from 57% to 73% (Worldsteel Statistical Reports 2021).

On the demand side, Asian countries predominate (see Figure 1) and the four largest importers from this region (China, Japan, India and South Korea) have a combined international market share amounting to almost 70%.

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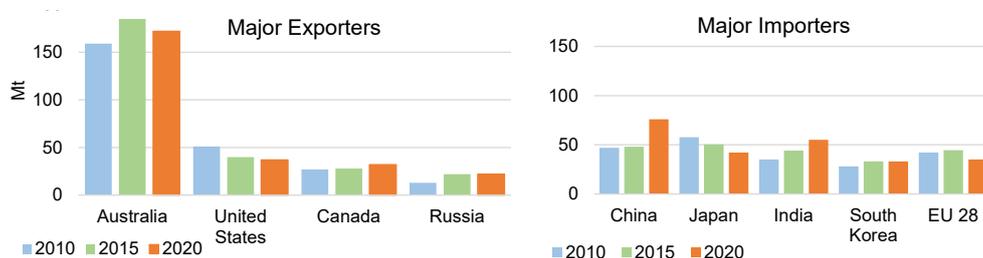


Fig. 1. Major global exporters and importers of metallurgical coals  
Source: own study based on: [Coal Information 2020](#); [Resources... 2021](#)

Rys. 1. Główni światowi eksporterzy i importerzy węgla metalurgicznych

On the supply side, the coal market is dominated by exporters from Australia (with over 55% share in world metallurgical coal trade). The quality of Australian coal is a very important asset – the share of the premium hard coking coals (PHCC) in the production structure is approximately 65% ([Resources... 2021](#)). Other countries include the United States (with a share of 12–15% depending on the market situation – the country is a so-called swing supplier), Canada (about 10%) and Russia (about 7–8%). Since 2015, Mongolia (selling coal to China by road) has become a major exporter.

Business cycles in commodity markets are normal, but in the 21st century the boom and bust cycles in the global coal market have shortened and the amplitudes of price fluctuations have been much greater than before.

In international trade, coal mainly used by the steel industry is often referred to as metallurgical coal. This category includes hard coking coals (hard premium, hard standard, semi-hard) with the best coking properties, semi-soft coking coals, and PCI coals used in the steel industry in the process that involves injecting pulverized coal into the blast furnace (mainly with a very high degree of coalification – LV, ultra LV).

The dynamics of coking coal pricing in international trade over a long period is shown on the example of benchmark prices for Premium Hard Coking Coal (PHCC) – the basic raw material for the production of metallurgical coke.

## 1. 1980–2005

From the 1980s to 2003, the prices (yoy) of internationally traded coking coal fluctuated within a range of a few to several USD/Mg (from –18% to +23%) and business cycles shortened. The 1982–87 recession in the steel industry in Japan and other industrialized countries, and the 1997–2000 economic crisis in Asian countries and Brazil resulted in reduced demand for coal and falling coal prices. As a result, the benchmark for FY'2000/01 reached its lowest value in 25 years, i.e. USD 39.75/ton (see Figure 2).

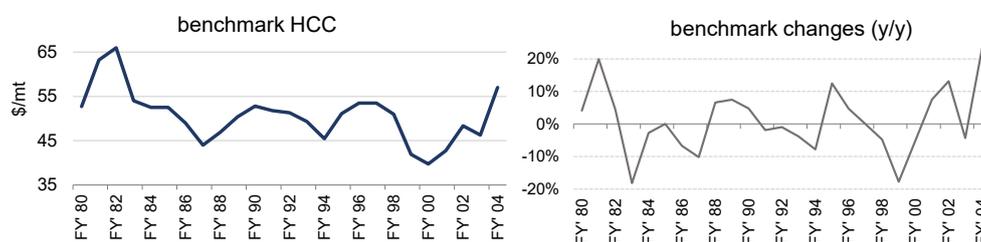


Fig. 2. Developments in HCC benchmarks by FY, 1980–2004

Source: own study based on: [ICR Platts 2021](#)

Rys. 2. Dynamika zmian cen kontraktowych (FY) węgla koksowego HCC w latach 1980–2004

Coking coal was mainly sold in long-term contracts and prices were set for a 12-month period (so-called FY – Financial Year lasting from 1 April of a given year to 31 March of the following year). Only a small tonnage was traded on the spot market (supplementary purchases).

The benchmark price would be determined in negotiations between the world's largest exporter of that type of coal, i.e. Australia's BHP BM, and Japanese Steel Mills (JSM) (representing a block of the largest importers) and used as a pricing reference for other market participants both in Asia as well as in Europe and South America.

The year 2003 marked the beginning of a new business cycle in the world economy that had recorded a higher than originally expected growth rate (3.7%) compared to the previous period. The world's fastest growing region was China and the Asian emerging markets linked to the Chinese economy. The country was growing into a giant on the world economy, and the rate of its economic growth and the magnitude of the economic transition made the situation in the world economy significantly dependent on the situation in China ([China's economy 2005](#)).

As a result of the dynamic growth in world steel production (26% between 2000 and 2004), mainly driven by China which had doubled its output in that period ([Worldsteel Statistical Reports 2021](#)), the demand for coke and coking coal has increased.

The earlier period of stagnation was not conducive to investing in maintaining production capacity, so leading manufacturers and exporters struggled to meet the rising demand. The first symptoms of changes in the markets appeared in 2003, but it was not until 2004 that a breakthrough occurred for both steel companies and producers of raw materials related to the steel industry. There was a significant increase in steel prices and in the prices of steel-making raw materials, and the scale of those increases was unprecedented compared with previous years. However, to some extent, the climate of panic emerging among consumers concerned about the availability of goods in the face of growing demand, as well as speculative activities in certain supplier groups, were responsible for such dynamic price changes ([Ozga-Blaschke 2004](#)).

The ongoing increased demand for coking coal in Japan, India and Brazil, China's inability to secure coal supplies in contracts, as well as the emerging deficit of Chinese metallurgical coke and its high prices (export license costs) caused a crisis in the international market for coking coal in 2004. At the same time, the supply of Canadian and Australian coals had been reduced (due to production problems at some mines, congestion and strikes at major ports in Newcastle, lack of stocks at ports). All those factors led to a sharp rise in coking coal prices on international markets, both on the spot market and in some contracts (some exporters broke away from the dominance of a mining giant BHP).

## 2. 2005–2015

The FY'05 benchmark price negotiations set a reference level for the HCC benchmark at USD 125/ton FOB, which represented an increase of 119% over the previous year's benchmark price. The increase was an absolute record for nominal prices and the highest value seen in the 23-year period for real prices (Ozga-Blaschke 2006).

The year 2005 marked the beginning of a period of very dynamic price movements in relatively short time frames for the international coking coal market, leading to significant changes in the way benchmark prices were set (see Figure 3).

Growing demand for imported coal from customers (mainly India and Japan and, in later years, China) coincided with a reduction in coal supply from major exporters. A series of events described as “force majeure” (problems with land transport in Canada, damage to port infrastructure and flooding of mines in Australia as a result of a cyclone and floods, production problems at mines in Russia and Ukraine) widened the coal deficit on the world market. Similar situations occurred twice – at the turn of 2007/2008 and 2010/2011 – leading to price spikes (Ozga-Blaschke 2009, 2010, 2012).

The situation in China had a very significant impact on the global market for metallurgical coals. Growing Chinese steel production and increased demand for metallurgical

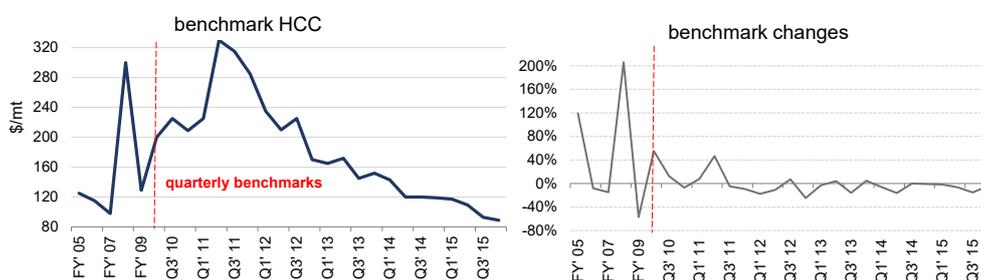


Fig. 3. Developments in HCC benchmarks by FY, 2005–2015

Source: own study based on: CTI Platts 2021

Rys. 3. Dynamika zmian benchmarków węgla koksowego HCC w kontraktach w latach 2005–2015

raw materials on the domestic market resulted in increased coke prices and reduced coke exports. Existing users of Chinese coke were forced to seek new suppliers or intensify their own coking production. Growing demand for coal on the international market gave coal producers the opportunity to negotiate a benchmark of USD 305/ton in 2008, which was an increase of over 200% compared to FY'07.

The second half of 2008 was marked by symptoms of the collapse of the global economy, caused by the crisis in the financial markets that began in 2007 in the United States. There was a two-year decline in the demand for steel products, metallurgical production was drastically reduced, and the demand for metallurgical coal fell in all regions of the world, except for some Asian countries. The downturn in steel and coke markets resulted in a 57% decline in the FY'09/10 benchmark prices.

On the spot market, despite low coal prices (down to half the values that prevailed in 2008), only customers from India and China showed more interest in purchasing coal. In the second half of 2009, traditional buyers from Japan, Korea and Europe began to return to the market, which again pushed spot market prices well above the established benchmark.

Due to the high dynamics of coking coal pricing and wide variations between (applicable for a period of 12 months) benchmark and spot market prices, in March 2010, in benchmark price negotiations for FY'10/11, the world's largest exporter BHP BM was the first to introduce quarterly benchmarks for hard coal (Ozga-Blaschke 2012, 2017).

In line with the spot market trend, the benchmark price for premium hard coal increased in Q2 2010 by 55% to USD 200/ton and by a further 12.5% in Q3. In early 2011, with a fixed benchmark of USD 225/ton, hard coals on the spot market achieved prices between USD 300 and 380/ton. As in 2008, the main reason for those increases was a reduced production and supply of coals in Australia (at the end of 2010, heavy rainfall and flooding in Queensland severely hampered the operation of the mines, and the hurricanes that hit the Australian coast in early 2011 paralyzed the ports, making it difficult to ship coal). Once again, fortuitous events (so-called *force majeure*) limited the availability of coal on the international market, which, combined with strong demand, created upward pressure on prices.

After the period of post-crisis recovery (which began in the second half of 2009 and proceeded at different speeds in different regions and countries of the world), the second half of 2011 saw the reappearance of the crisis in public finances and in the banking system of many developed countries, posing a threat to the stability of the euro area and the entire European Union. The result was a slowdown in economic growth that extended not only to developed countries but also to emerging markets.

The situation in the global economy significantly affected the economic situation in the steel market and the markets for steelmaking raw materials. The adjustment of steel production capacity utilization to the volume of demand affected the condition of the market for metallurgical coals. The weakening of demand with the increased availability of coal mainly from new investments led to an oversupply of coal in the market and put downward pressure on international trade prices. The downward trend continued for a period of four years. In 2013 mining giant companies implemented measures aimed at reducing costs and increasing

production efficiency; mines with high production costs were closed, and new projects were delayed or abandoned due to losses incurred on mining activities (Ozga-Blaschke 2016).

During that period, quarterly benchmarks for premium HCC declined (quarter over quarter) from a few to as much as 25%, while price increases of a few percent in some quarters were related to various random events and were not long-term in nature.

Over the four quarters of 2015, the benchmark fell by 24% and the annual average price of USD 102/ton was almost 65% lower compared to 2011.

The situation in China had a very significant impact on the market. Growing demand for coal from customers in China, coupled with supply problems of their domestic mining industry and high domestic coal prices, resulted in an increase in imports from around 6 million tons in 2007 to over 75 million tons in 2013 (including 60 million tons by sea). China dethroned Japan and became the world's leading importer of metallurgical coals. China's dominant (approximately 80%) share in the Asian spot market made CFR China coal prices important indicators for monitoring market trends and setting levels for quarterly benchmarks.

An increasing volume of metallurgical coal purchases on the spot market, high volatility of its prices and the introduction of a quarterly benchmarking system provided an impulse to create price indexes for coking coal, similarly to the situation on the steam coal market where indexes had already been in place for several years.

After consultation with industry leaders, Energy Publishing, with the assistance of Doyle Trading Consultants LLC, presented a proposal for coking coal price indexes in spot transactions (Energy Publishing 2010). Those indexes were created for the two largest current centers of seaborne coking coal trade – the state of Queensland in Australia and the port of Hampton Roads in the US.

The reliability and robustness of the indexes are guaranteed by the procedures adopted and by a reliable set of data from many different sources for prices (Specifications guide... 2021; CTI Platts 2021; IHS Markit 2021).

Platts, Argus Media, IHS Markit publish price indexes for metallurgical coals in their trade publications, both for export markets (Australia, the US) and import markets in China and India.

### 3. 2016–2020

In 2016 the downward trend reversed and Q3 was a period of significant acceleration in the growth of internationally traded coal prices (see Figure 4).

China, as the world's largest producer and consumer of coking coals and at the same time the largest importer and major player in the Asian spot market, played a leading role in those events. At that time, a key part was played by the policy decisions of the Chinese authorities to reduce domestic coal production (mine closures and reduction of working days for miners) while steel production was growing. In addition, floods in several southern provinces, where

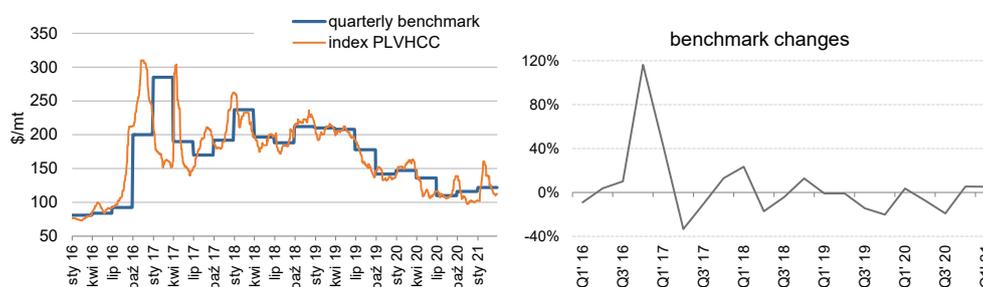


Fig. 4. Developments in HCC quarterly benchmarks, 2016–2020

Source: own study based on: [CTI Platts 2021](#)

Rys. 4. Dynamika zmian kwartalnych benchmarków węgla koksowego HCC w latach 2016–2020

mining is concentrated, disrupted coal shipments from the region. High domestic coal prices increased interest in imports.

On the supply side, coal supplies were again disrupted by adverse weather events on the Australia's east coast, in the region where production of premium coking coals is concentrated. For the first time since 2011, the price of coking coal in November 2016 exceeded the ceiling of USD 300/ton and the benchmark for Q1 2017 was set at USD 285/ton. In late 2016 a downward trend developed in the spot market – coal supply improved after the disruptions subsided and, in addition, many giant companies encouraged by high prices resumed production in dormant mines. In the second half of 2016, the Chinese government eased the restrictive measures introduced earlier, and the price competitiveness of imported coal decreased.

The divergence between spot and benchmark coking coal prices in 2016 was greater than ever and continued in 2017. In Q4 2016 the differences even exceeded USD 100/ton (in favor of the spot market) and since the beginning of 2017 the trend reversed and spot prices fell below the established benchmark, also by more than USD 100/ton. A further increase in spot market prices in April was driven by concerns about the liquidity of Australian coal supplies due to Cyclone Debbie.

Such dynamic market changes led to the abandonment of bilateral negotiations in setting Q2 2017 benchmark, and a new formula was used to determine the PHCC price based on three independent spot market price indexes provided by: S&P Global Platts, Argus Media and The Steel Index. The price set was close to the three-month (March to May) average of the spot market coal indexes. The new formula for setting the coking coal benchmark takes into account the index values of the period to which the benchmark applies ([Ozga-Blaschke 2017, 2018](#)).

The year 2017 ended with an increase in spot coal prices (to around USD 260/ton) triggered by concerns about coal availability due to force majeure declarations at major US hubs and the persistence of long queues of ships at Australian ports.

The start of 2018 saw a fall in prices due to the calming of concerns over uninterrupted supply of seaborne coal to the market and the lack of activity from Chinese customers who had secured adequate stock levels. The PHCC benchmark for Q1 2018 set according to the new formula based on spot market indexes (last month of the previous quarter and two months of the current quarter) was USD 237/ton (driven by high spot coal quotations in December 2017). In the following months, price volatility on the spot market was related, but not limited to logistical problems in ports and rail transport in Australia (policy of the largest rail operator Aurizon), and the activity of customers from China and India. The market was strongly influenced by the relationship between the prices of domestic coals and coals imported to China. The high spread between the Shanxi Premium HCC price and the CFR China price in coal equivalent imports resulted in a significant increase in spot purchases in May ([Metallurgical Coal 2018](#)). Increased import activity from India (ahead of the upcoming monsoon season) was also a factor that supported prices during that period.

In the second half of the year, the increase in spot market prices was due to the declaration of force majeure for one of Australia's coal exporting mines and increased buying due to fears of Cyclone Owen in the Queensland area. The benchmark at USD 212/ton for Q4 2018 was up almost 13% compared to Q3 (but down 10% compared to Q1).

The year 2019 was a difficult one for the steel industry – slowing global economic growth, protectionist policies by the US and trade disputes with China caused an imbalance in the supply chain for steel and steelmaking raw materials. That prompted steel companies to cut production especially in the second half of the year ([Global Economy 2019](#)).

The situation in the steel market and the Chinese government's measures regarding coal imports had an effect on the metallurgical coal market. In the first half of the year, internationally traded coal prices remained fairly stable, with benchmarks in Q1 and Q2 set at USD 210/ton and USD 208/ton, respectively. In the second half of the year, a downward trend in prices resumed as a result of the accumulation of various events in the market.

That was primarily due to weaker demand in all major consumption regions except China (which is consistent with an unbalanced geographical profile of BF pig iron production).

In India, a period of weak economic activity and low infrastructure expenditure slowed down the demand for steel. Stocks of coking coal in Indian steel mills and ports were high, reducing the demand for imported coal. In the EU, the vulnerability of the steel sector resulted in deeper than usual production cuts. Performance across Europe was affected by the bankruptcy of British Steel and forced closure of the Taranto steel plant due to pollution concerns.

On the supply side, the availability of Australian coals on the market increased (improved throughput in the main Queensland ports); there had been a rise in coal exports from Canada as well as from Mongolia. Exceptions to the general trend were the United States and Mozambique. Exports from the US were predictably limited when coal prices fell (swing supplier).

The effect of improved raw material availability (excluding supply-reducing one-off events) and weakened demand from major importers was a decline in coal prices, with benchmarks in Q3 and Q4 2019 falling to USD 178/ton and USD 142/ton, respectively.

In 2020, metallurgical coal quotations were determined by the effects of the COVID-19 pandemic, i.e. a slowdown in economic activity and, consequently, a decline in demand for steel and steelmaking raw materials.

The outbreak of coronavirus in late January in China translated into delays in resuming production of coking coal mines, mainly in Shanxi province, which in turn reduced the supply of domestic raw material. Despite port restrictions and logistical problems caused by the coronavirus outbreak, imports of coking coal to China grew in the first few months – import arbitrage averaging USD 21/ton provided a strong incentive for end-users to buy seaborne coal that was cheaper than domestic supplies (China–Australia relations... 2021). Increased imports into China (following the release of new import quotas) with limited supply to the market (coal terminal shutdowns in Queensland, the explosion at Anglo American’s coal mine, reduced coal shipments from Mongolia to China following border closures due to an outbreak), pushed up international market prices.

Premium HCC LV benchmark in Q1 2020 at USD 147/ton was up 3.5% compared to Q4 2019, but was 30% below the Q1 2019 price.

The rapid spread of COVID-19 forced the governments of many countries to introduce restrictions and measures to combat the epidemic. The global lockdown caused a decline in industrial production, including in sectors that generate the greatest demand for steel.

The scale of reduction in steel production capacity (72 blast furnaces had been temporarily shut down) translated into weak demand for coal and a fall in coal quotations on the international market. Spot market coal price indices set benchmarks in Q2 and Q3 at USD 136/ton and USD 110/ton, respectively.

September 2020 marked the beginning of a period of economic recovery, increased demand for steel and the return to the operation of previously stopped blast furnaces. Record levels of steel production in China, recovery in India and Europe supported increases in coal price indexes in the international market. The upward trend was halted by China’s decision in October to block imports of Australian coals, which had a direct impact on their spot market quotations.

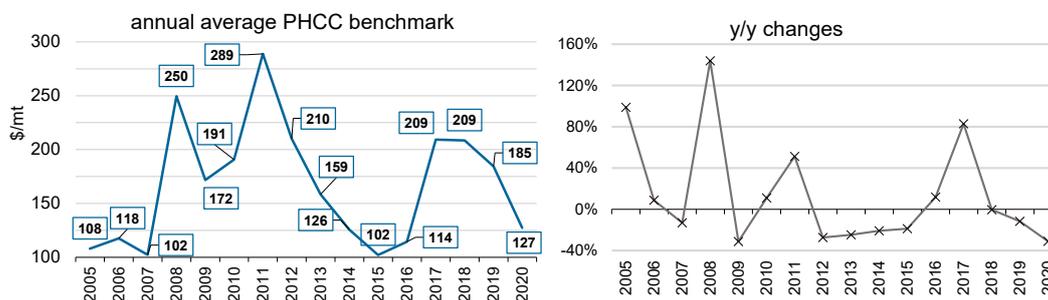


Fig. 5. Developments in annual average PHCC benchmarks, 2005–2020

Source: own study based on: ICR Platts; CTI Platts 2021

Rys. 5. Dynamika zmian średnich rocznych benchmarków węgla koksowego Premium HCC w latach 2005–2020

The annual average Premium HCC benchmark decreased in 2020 by 31% compared to 2019 (see Figure 5).

The deterioration of relations between China and Australia, and the ban on imports of Australian coals triggered a shift in the major supply routes for global trade in late 2020. China increased purchases of coal from the US and Canada to make up for a shortage of premium hard coals. The result was a significant increase in the price of US LV HCC well above the price level of Australian PHCC. That allowed Australian exporters to redirect their coal to the European and Indian markets, as price competitiveness encouraged spot market purchases.

China's import policy is likely to remain a key wild card for the global market outlook in 2021 (CTI Platts 2021; Asia's met coal... 2021).

## Summary

Coal prices on the international market are mainly shaped by relations between Australian suppliers and Asian customers. The increased share of China and India in the global coking coal trade has reduced the bargaining power of Japanese giant companies in benchmark price negotiations.

Since 2010, when quarterly benchmarks were introduced, the market has evolved towards short-term pricing. Currently, benchmark prices for coal are based on published spot market price indexes.

For transactions based on current spot quotations, the most common determinant is The Steel Index. TSI's Premium Hard Coking Coal reference price is calculated as a weighted-average index on an FOB East Coast Port Australia for Australian exports. Market data is considered for transactions with specifications within specified ranges and normalized to a standard quality, which for TSI is: CSR 70%, volatile matter (ad) 20.0%, ash (ad) 10.0%, total moisture (ar) 10.0%, sulphur (ad) 0.65%, phosphorus (ad) 0.04%, vitrinite 67%.

By definition, TSI is a regional benchmark for the Asia-Pacific basin, but the importance of the combined flows of Australian exports and imports to China has made it a global reference assessment.

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**DYNAMICS OF COKING COAL PRICING IN INTERNATIONAL TRADE IN 1980–2020****Keywords**

coking coal, benchmark prices, spot market

**Abstract**

The demand for coking coal in international trade is determined mainly by demand from the steel industry, which, in turn, is dependent on the global economic situation and the condition of the steel market.

Business cycles in commodity markets are normal, but in the 21st century the good and bad times in the global coal market have shortened, and the amplitudes of price fluctuations have been much greater than they used to be.

China, as the world's biggest producer and consumer of coking coals, and at the same time the largest importer and major participant in the Asian spot market, played a leading role in these events. On the supply side, the main factor for these events is the concentration of production of premium hard coals on the east coast of Australia (in Queensland), in an area exposed to strong weather conditions (floods, hurricanes). Australia's share of coal supply to the international metallurgical coal market (seaborne) is about 60%.

Coal prices on the international market are mainly shaped by the relationships between Australian suppliers and Asian customers. The increased share of China and India in global coking coal trade has weakened the bargaining power of Japanese giant companies in benchmark price negotiations.

Using the example of FOB prices of the Australian Premium HCC, the article shows how prices in metallurgical coal trade have evolved (in a long time horizon) against the background of market conditions. It also describes how the ongoing changes have affected the way benchmark prices are set in international coking coal trade.

**DYNAMIKA ZMIAN CEN WĘGLA KOKSOWEGO  
W HANDLU MIĘDZYNARODOWYM W LATACH 1980–2020****Słowa kluczowe**

węgiel koksowy, rynek spot, ceny kontraktowe

**Streszczenie**

Popyt na węgiel koksowy w handlu międzynarodowym jest determinowany głównie zapotrzebowaniem ze strony branży hutniczej, której kondycja jest zależna od sytuacji w gospodarce światowej i koniunktury na rynku stali.

Cykle koniunkturalne na rynkach surowców są zjawiskiem normalnym, jednak w XXI wieku okresy dobrej i złej koniunktury na światowym rynku węgla ulegały skróceniu, a amplitudy wahań cen były znacznie większe niż kiedyś.

Wiodącą rolę w tych zdarzeniach odegrały Chiny, będące największym światowym producentem i konsumentem węgla koksowych, i równocześnie największym importerem oraz głównym uczestnikiem azjatyckiego rynku spot. Po stronie podaży, głównym czynnikiem tych zdarzeń jest koncentracja produkcji najlepszych jakościowo węgla typu hard na wschodnim wybrzeżu Australii (Queensland), w rejonie narażonym na mocne oddziaływanie czynników pogodowych (powodzie, huragany). Udział Australii w podaży węgla na międzynarodowy rynek węgla metalurgicznego (drogą morską) wynosi około 60%.

Ceny węgla na rynku międzynarodowym kształtowane są głównie w relacjach dostawców australijskich i odbiorców azjatyckich. Wzrost udziału Chin i Indii w globalnym handlu węglem koksowym spowodował osłabienie siły przetargowej koncernów z Japonii w negocjacjach cen kontraktowych.

W artykule pokazano dynamikę zmian cen w handlu węglem metalurgicznym (w długim horyzoncie czasowym) na przykładzie cen FOB najlepszego jakościowo australijskiego węgla koksowego (Premium HCC) na tle uwarunkowań rynkowych. Opisano również, w jaki sposób zachodzące zmiany wpłynęły na sposób ustalania cen kontraktowych w międzynarodowym handlu węglem koksowym.

