Defining geographic coal markets using price data and shipments data ☆

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Abstract

Given the importance of coal in world energy supply an analysis of the relevant geographic market is essential for consumers, producers, as well as for competition policy. The purpose of this paper is to define the relevant economic market for steam and coking coal, and to test the hypothesis of single world markets for these coal products. Methodologically the paper relies on two different tests for defining markets, using both shipments data and price data. The results from both methods point in the same direction. In the case of coking coal the results indicate that the market is essentially global in scope, and also that the market has become more integrated over time. The results for steam coal show that the market is more regional in scope, and there exist no clear tendencies of increased integration over time. One policy implication of the finding that the steam coal market is more regional in scope, and thus that the market boundary is smaller than if the market would have been international, is that a merger and acquisition in this market likely would have been of a more concern for antitrust authorities than the same activity on the coking coal market.
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1. Introduction

Coal represents a major energy source in a world where electricity consumption is increasing at a rapid pace. During the last decade electricity demand in developing Asia increased by more than 75%, in North America the increase was almost 30%, and in Europe the equivalent was about 20% (Keay, 2003). This development does not show signs of deceleration. Coal's share in generating electricity is about 34% (2000) globally, a number which has been relatively constant during the last decade (IEA, 2001). Developments in the coal industry, mainly the large increase in traded coal during the last decades, have led many analysts to describe the market for internationally traded coal as an integrated international coal market (e.g., Ellerman, 1995; IEA, 1997; Humphreys and Welham, 2000).

Lately the coal industry has experienced a number of mergers and acquisitions, which have led to a more consolidated market (Regibeau, 2000). This development has raised the concern for whether the new and larger companies can exert market power, and thus raise consumer prices. In order to determine whether this is a plausible scenario it is important to define the relevant market boundaries for coal. Defining market boundaries is an important part (of several steps) when determining whether a market is anti-competitive or not. At first, the market shares of leading firms are evaluated and compared to critical threshold values.[1] It is in this initial

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[1]Markets are in antitrust analysis defined both over product space and geographic space. Given the aim of this research, only the relevant geographic market boundary will be analyzed. A further reason for this is given by the relatively homogeneity of the two main coal products, as compared to differentiated product markets, such as the market for automobiles.

Table 1
Market shares for internationally traded coal, 2000 (%)

Coking coal				Steam coal			
Countries	Imports	Countries	Exports	Countries	Imports	Countries	Exports
Japan	33.6	Australia	51.5	Japan	21.1	Australia	23.0
Korea	9.8	US	14.8	Korea	11.2	South Africa	17.7
India	8.0	Canada	14.1	Ch. Taipei	10.3	China	12.6
Brazil	5.8	Indonesia	4.5	Germany	4.8	Indonesia	12.6
UK	4.4	Former SU	3.8	Netherlands	4.6	Colombia	8.9
Total	61.6	Total	88.7	Total	52.0	Total	74.8

Source: IEA (2001).

phase that market boundaries are defined and assessed. Given the relevant market boundary, in this case either regional or international, the concentration ratios will have different effects, i.e., if the market is regional it is more likely that, e.g., a merger, will have anti-competitive effects than if the market is international. After this initial step, an antitrust analysis need also to establish if there are barriers to entry, and if the existing firms conduct any anti-competitive behaviour, such as price discrimination, collusion, or have mark-ups that indicate abnormal profits. It is important to note that this paper will only consider the definition of market boundaries and will therefore not be able to answer questions regarding anti-competitive behavior.

The aim of this paper is to define the relevant economic market for steam and coking coal with the use of shipments data and price series data to test the hypothesis of a single world market for coal. Methodologically the paper relies on two distinctly different methods; the Elzinga–Hogarty test and the cointegration test. Given two different approaches to define market boundaries, a second aim of the paper is to evaluate and compare these methods. The analysis will be conducted for the time period 1978–2000 in order to distinguish any changes in market integration over time.

The paper proceeds as follows. First, an overview of the coal sector, with a focus on the market structure and trade patterns, is presented. Next, the chosen methodologies and criticism towards them are discussed. In the following, the main results from the two approaches are presented, permitting an evaluation of the different methodologies for defining a relevant market. Next, some critique towards the different methods is discussed, and finally, the overall conclusions and policy implications of the paper are outlined.

2. Coal markets and trade flows

Coal is as a consequence of different quality contents and end uses commonly divided into two different coal products; steam coal (or thermal coal) which is mainly used as an input in the energy sector to produce electricity, and coking coal (or metallurgical coal) which is primarily used as an input into blast furnace iron and steel production (IEA, 1997). The different end-uses and developments of steam and coking coal imply that these products should be treated separately in the ensuing analysis. The coal market is dominated by steam coal, which in 2000 represented 84% of world coal production, compared to 16% for coking coal (IEA, 2001).

Large coal deposits are located in specified geographic regions, but demand for coal is global. This implies that international trade is important both for consumers and producers. World hard coal consumption has grown considerably during the last three decades, an increase of over 60% since 1970. However, this increase is not as remarkable as that for world hard coal trade, which has grown by 230% during the same time period (IEA, 2001). Regarding the market structure for traded coal it is evident that there are few countries that dominate the industry. The five main actors on both the demand (import) side and supply (export) side for steam and coking coal are presented in Table 1. We can see that both markets are concentrated, especially on the supply side. The coking coal market appears to be more concentrated, given that the five largest countries on the supply side have almost 90% of the total market.

Trade flows of both coking and steam coal have not been stable since the 1970s. In the first part of the 1980s growth in export of coal came mainly from the US and Poland, but since then new exporters, such as Australia, South Africa and Indonesia, have entered the market and outplayed the previous market leaders. Australia is the largest exporter of coal in 2000, with a market share of almost 52% of coking coal exports and 23% of world steam coal exports (Mélanie et al., 2002). In 2000, 90% of all traded coal was directed to the two dominating regions, the Asia–Pacific[2] market and

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[2]The Asia-Pacific market includes Australia, China, Chinese Taipei, Hong Kong, India, Indonesia, Japan, Korea, New Zealand, Vietnam, and other Asia and Oceania.