

Box B

Iron Ore and Coal Cost Curves

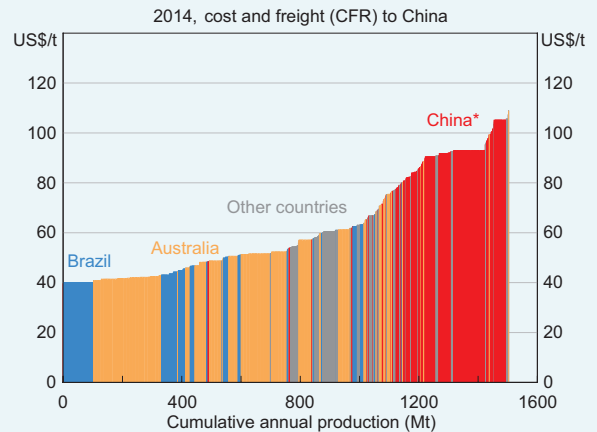
Global 'cost' curves for iron ore and coal provide an indication of the profitability of production at different price levels, which has implications for the future supply of these bulk commodities. These curves are based on the average variable costs of production of different mines, and are constructed by ranking production at each mine according to its costs. Average variable costs of production of mines include wages, processing costs and, where available, the cost of transportation.¹ The cost data, compiled by a private sector company using company reports and other public information, do not include a return on capital, debt-servicing costs or fixed costs associated with running a mine.² The data cover most of global iron ore production and around 80 per cent of the coal that is traded by sea. With the exception of coking coal, an attempt is made to adjust for differences in the quality of each tonne of output.

While the 'level' of cost curves may not provide an entirely accurate measure of all relevant costs, they can provide a good guide to the costs of particular mines relative to other global producers. For iron ore, Australian and Brazilian producers tend to be at the lower end of the global cost curve (Graph B1). In contrast, Chinese iron ore production tends to be at the higher end, which is likely to reflect higher processing costs due to the lower quality of iron ore mined as well as the high cost of transporting domestic ore to steel mills owing to the inland location of the iron ore mines.

1 For Australian producers, this will include take-or-pay contracts (where miners pay a fixed cost for access to port and rail facilities regardless of whether they use them or not). These contracts are regularly renegotiated, which is why they are often treated as variable costs.

2 The data used in this box are sourced from AME Group.

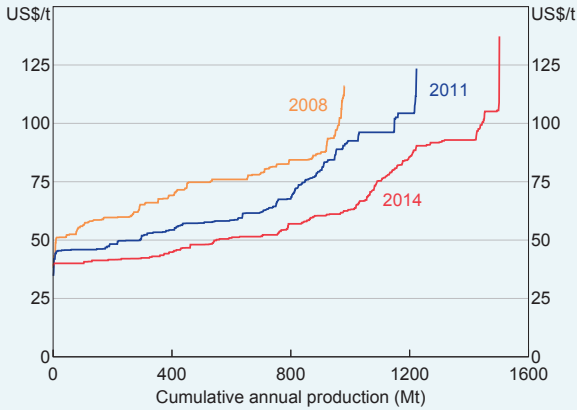
Graph B1
Global Iron Ore Production Costs



A comparison of costs curves over time illustrates how the dynamics of the market have changed. The iron ore cost curve has shifted outward and flattened in recent years because of the significant increase in iron ore production capacity that has resulted from substantial new investment, particularly from lower-cost iron ore producers in Australia, and to a lesser extent Brazil (Graph B2). Over the next few years, the pace of expansion in iron ore production is expected to slow as existing investment projects reach completion and there are few plans to commit to new projects (at this stage). Indeed, the sharp fall in iron ore prices over the year to date may elicit a reduction in existing supply from higher-cost producers.

The thermal and coking coal cost curves only capture production that is traded by sea; they do not include coal that is produced and consumed domestically (including in China). China makes up around 50 per cent of total global coal production, and has been

Graph B2
Global Iron Ore Production Costs
 CFR to China



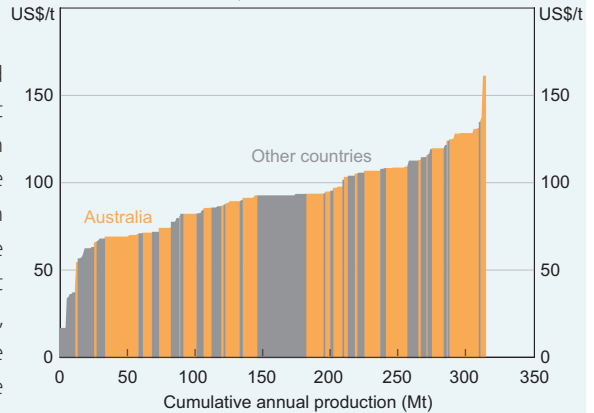
Sources: AME Group; RBA

a net importer of coal since 2009. China's demand for, and production of, coal has a significant impact on prices in the global market. There have been substantial expansions in recent years to seaborne coal production, including in Australia (which accounts for a large share of the global seaborne market). This has led to an outward shift of the cost curves for thermal and coking coal. As with iron ore, the global supply of coal is expected to increase further over the next few years, although the pace of growth is expected to be slower than in the past few years. The net increase in supply will also depend on the response of higher-cost coal producers to the recent decline in prices.

As noted before, there is some error in the measurement of the level of the cost curves, but even accounting for some omitted costs, at the current spot prices of around US\$88, the bulk of Australian iron ore production is profitable. In contrast, at the current spot prices for coking and thermal coal of US\$114 and US\$69, respectively, given these cost curves, analysts suggest that a sizeable share of Australian and other coal mines producing for the seaborne market may not be profitable. Australian coking coal production spans a wide range of low-cost to high-cost mines (Graph B3). For thermal

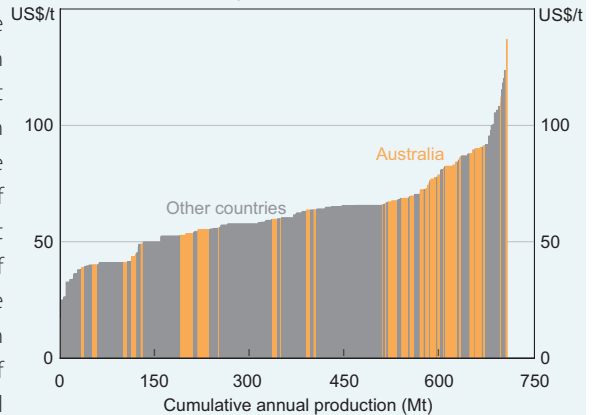
coal, Australian production is, on average, higher-cost than many other producers that are active in the globally traded market (Graph B4). Over the past year, some producers (including in Australia) have announced plans to shut higher-cost coal mines, while coal producers have also reportedly been looking for ways to reduce costs in the short run. However, some miners may be willing to continue producing and incur losses for a time, given the costs involved in ceasing production and restarting later (assuming that prices recover). ↘

Graph B3
Coking Coal Production Costs
 2014, free on board basis



Sources: AME Group; RBA

Graph B4
Thermal Coal Production Costs
 2014, free on board basis



Sources: AME Group; RBA

