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## **Sensitivity of scrap metal prices to global economic conditions**

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# Sensitivity of scrap metal prices to global economic conditions

## Executive summary:

- The scrap metal industry is part of the broader recycling industry that involves the collection, separation and processing of materials for manufacture into raw materials or new products.
- The demand for scrap metal is a derived demand – based on the demand for steel because scrap metal is an input to steel production. Steel demand in turn is based on demand by construction, manufacturing and other industrial sectors. Hence prices for scrap metal are a function of prices for steel.
- Scrap metal is an international commodity market – Australia is essentially a price taker and prices are set in global markets based on demand and supply factors. Prices of scrap metal in Australia are essentially set by the world price.
- Estimates of the sensitivity of Australian (or even global) scrap metal prices to global economic conditions are difficult to find. Nonetheless, one implicit estimate for Australia is that a 1 per cent fall in demand for scrap metal results in a fall in domestic scrap metal prices of 0.46 per cent.
- Nonetheless estimates of the price sensitivity of scrap metal to demand and global economic conditions can be highly volatile. Evidence suggests global scrap metal prices regularly halve and double over the period of 18-24 months.

## Introduction

Scrap metal is a direct input to the production of steel with estimates suggesting the global scrap metal market supplies up to 50% of the ferrous material used for steelmaking. Global crude steel production in September 2011 was 123,567 thousand metric tonnes, of which China produced 45%, the European Union produced 12% and the United States produced 6%. In contrast, Australia produced 0.5%. Hence from an Australian perspective, developments in these overseas markets are likely to have significant implications for Australia's domestic steel and scrap metal industries.

Scrap metals, particularly steel scrap, is a close substitute for types of iron ore used to produce steel and recycling of metals results in significant savings in energy consumption costs when compared to primary metal production, ranging from energy savings of 60% for steel to 95% for aluminium.<sup>1</sup>

Scrap metal recycling rates vary between economies and data suggests Australia's recycling rates are around 36% for iron/steel (compared to 47% globally) and around 22% for aluminium (compared to 40% globally).<sup>2</sup>

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<sup>1</sup> T E Norgate and W J Rankin (2002), 'The role of metals in sustainable development', CSIRO Minerals Department.

## Global industry – supply and demand factors

The scrap metal industry is a global industry. Estimates of the global ‘production’ of scrap metal range from 350 million to 550 million tonnes.

Table 1 shows the key players in the global market for scrap metal in 2009. The United States is the biggest exporter of scrap metal and Turkey and China are the largest importers. Data for the mid 2000s indicates Australia is a small net exporter of scrap metal.

**Table 1: Key economies involved in the global scrap metal industry**

The Principal Flows of the Scrap Metal Trade: January-December 2009 (in Millions of Tonnes)			
Exporters		Buyers	
European Union	15.3	Turkey	7.4
		India	2.0
		China	1.6
USA	22.4	China	6.2
		Turkey	3.7
		South Korea	3.1
		Taiwan	2.2
		India	1.5
Japan	9.4	China	5.0
		South Korea	3.7
Russia	1.2	European Union	0.9

Source: Bureau of International Recycling (2010), ‘World markets for recovered and recycled commodities: time to smile again?’, May.

Demand for scrap metal globally is driven by China, Turkey, South Korea and India. The rapid industrialisation of China is a major demand factor, with the increased demand for steel in the industrialisation of China having a positive impact on scrap prices. For example, in 2009, China produced over 567 million tons of crude steel, nearly half of the world’s steel. That was 10 times the U.S. production.<sup>3</sup>

Global supply is driven by the United States, Japan and the European Union. Supply factors impacting on the global supply of scrap include:

- The lifecycle of metal based products.
- The availability of recycling facilities and their costs.
- The degree of activity in different sectors (for example, manufacturing activities tend to generate more scrap than construction-related activities).<sup>4</sup>
- Energy prices (both substitution and income effects – higher energy prices provides an incentive to substitute towards scrap metal and away from iron ore but higher energy prices

<sup>2</sup> Op. cit.

<sup>3</sup> Congressional Research Service, ‘China’s steel industry and its impact on the United States: Issues for Congress’, September 2010.

<sup>4</sup> US International Trade Commission, ‘The effects of increasing Chinese demand on global commodity markets’, Office of Industries, July 2006.

result in a negative income effect on steel demand and in turn both iron ore and scrap metal demand).<sup>5</sup>

- Trade policies (as many as 20 countries, including Russia, China and the Ukraine have imposed restrictions on scrap exports as a means to try ensure adequate domestic supplies).<sup>6</sup>

## Sensitivity of scrap metal pricing to economic conditions

There are surprisingly very few publicly available studies that directly examine the sensitivity of scrap metal prices to global economic conditions. One analysis by the Industry Commission finds that the estimate for Australia is that a 1 per cent fall in demand for scrap metal results in a fall in domestic scrap metal prices of 0.46 per cent.<sup>7</sup> Another study using data for the United States compares initial and predicted prices of scrap using an econometric model and finds much smaller long-run sensitivity of US scrap iron and/steel prices (a 2.8 percentage point decrease in average annual final demand from 1975 to 2000 is associated with a fall in prices by around 14 per cent).<sup>8</sup>

Another theme in the literature is the high volatility of scrap metal prices as well as the occurrence of 'price bubbles' and strong seasonality driven by the timing of US supply into global markets.<sup>9</sup> Evidence suggests that the long-run relationship between primary metal and scrap metal prices is led for the most part by primary metal prices while scrap metal prices follow (demand-pull theory). However, in the short-run the relationships may differ. For example, evidence suggests that in the cases of lead, primary prices lead, contrary to zinc where they follow and contrary to copper, where price influences are bidirectional.<sup>10</sup>

The period of the global financial crisis provides a useful illustration of the global price volatility and sensitivity to global economic conditions. Between March and June 2009, global scrap metal prices were often below 75% of the record values set in June 2008. The global market price for scrap metal spent much of 2009 recovering from the global financial crisis. Between September 2009 and March 2010 reports indicate that global scrap prices rose by US\$ 100-140 per tonne depending on the quality and the market.<sup>11</sup>

In 2010 figures by the Bureau of International Recycling indicated a 57.3% slump in Chinese steel scrap imports (demand was increasingly met domestically). In contrast, Turkey increased its overseas purchases of steel scrap in 2010 by 22.5%. The US remained the world's leading exporting economy even though its overseas shipments fell 8.4%.

<sup>5</sup> Jonathan Aylen and Kevin Albertson (2006), 'Markets in ferrous scrap for steelmaking', *Ironmaking and Steelmaking*, vol. 33, no. 3, pp. 203-212.

<sup>6</sup> OECD Steel Committee, 'Scrap supply in the global steel industry: a better path', December 2010.

<sup>7</sup> Industry Commission, 'An analysis of the factors affecting steel scrap collection', Working paper no.1, May 1991.

<sup>8</sup> Marian Radetzki and Carl Van Duyne (1985), 'The demand for scrap and primary metal ores after a decline in secular growth', *The Canadian Journal of Economics*, vol. 18, no. 2, May, pp. 435-449.

<sup>9</sup> Aylen and Albertson (2006), op. cit.

<sup>10</sup> Irene M. Xiarchos and Jerald J. Fletcher (2009), 'Price and volatility transmission between primary and scrap metal markets', *Resources, Conservation and Recycling*, vol. 53, pp. 664-673.

<sup>11</sup> Bureau of International Recycling, op. cit.

## Conclusion

The short to medium term outlook for global scrap metal prices will depend on the supply and demand from the United States, China and Turkey. IMF forecasts suggest that Chinese economic growth will remain solid through 2011 and 2012, pointing to solid scrap metal prices, even though global economic growth forecasts have been cut and uncertainty regarding Europe are weighing down global confidence. China's steel use in 2011 is expected to increase by 7.5% following 8.5% growth in 2010.<sup>12</sup>

On the supply side there is uncertainty regarding whether the US economy will improve its growth performance, which in turn may affect the global supply of scrap metal.

In the medium to longer term with scrap metal providing a less energy intense input to steel production (hence less costly and more environmentally friendly) the demand for scrap metal is likely to be strong.

### Contact

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<sup>12</sup> World Steel Institute (2011), 'Short-range outlook', October.