

Ask WORLD STEEL DYNAMICS

World Steel Dynamics (WSD) is a leading steel information service in Englewood Cliffs, N.J. WSD's steel experience, steel database and availability of steel statistics are the principles for performing steel forecasts, studies and analysis for international clients. WSD seeks to understand how the "pricing power" of steel companies the world over will be impacted by changes in the steel industry's structure. To submit your questions for WSD, e-mail WSD@aist.org.



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Topsy-Turvy Costs

Q. The cost of most steelmaking materials has gone up substantially in the past 12 months. What is the current average cost to produce hot rolled band?

A. WSD's May 2008 world cost curve (WCC) for steel sheet mills captured the massive rise in steelmakers' costs versus November 2007 (the closing date of the prior cost curve). The global average operating cost to produce hot rolled band in May 2008, at \$653 per tonne, was \$168 per tonne above the November 2007 average figure of \$485 per tonne. As of July 2008, given the further price increases for steel scrap and pig iron, and notwithstanding some drop in ocean freight rates, we estimate that the mean global operating cost to produce hot rolled band has risen to about \$668 per tonne.

Q. Have the dynamics of the cost curve changed since November 2007?

A. The May 2008 cost curve was particularly steep. For example, the operating cost to produce hot rolled band for the steel mills in the fourth (highest-cost) quadrant, which represent a combined 125 million tonnes, averaged \$805 per tonne, or \$290 per tonne above the average figure for the steel mills in the first quadrant of \$515 per tonne.

Of the 40 mills in the fourth quadrant, 10 of them depend on the purchase of steel slab (currently at about \$1,050 per tonne, FOB the port of export) to produce hot rolled band; and 25 are EAF-based steelmakers – i.e., many of which are mini sheet mills – that need about 70% high-grade metallics (pig iron, prime industrial scrap and steel scrap substitutes) in their steelmaking furnaces. EAF-based steel sheet producers are ultrahigh cost, given the \$900+ per tonne cost of pig iron delivered to their plants and the \$950 per tonne price for prime industrial scrap in some cases.

Q. What happens if, later in 2008, the steel slab export price falls \$400 per tonne to \$600 per tonne FOB the port of export, obsolete steel scrap in the USA declines \$150 per tonne to \$350 per tonne, and prime industrial scrap in the USA falls \$450 per tonne to \$500 per tonne?

A. The world cost curve to produce hot rolled band becomes far less steep because most of the mills in the fourth cost quadrant benefit from a sharp reduction in operating costs.

Quite a few of the steel companies currently in the fourth cost quadrant would fall back to the third quadrant, and perhaps even the second in some cases. In effect, this is a reversal of what happened from November 2007 to May 2008.

The declining cost to produce the last tonne of hot rolled band, especially for the highest-cost producers, might be a factor driving down hot rolled band prices on the world export market.

Q. When it comes to steel scrap in the United States, "Where's the beef?"

A. When discussing the steel scrap situation in the United States with EAF-based steelmakers that produce hot rolled band via the thin-slab casting route, they report that a sufficient supply of prime industrial scrap is no longer available. This situation is reflected in the recent \$100-per-gross-ton surge in the price of this material to about \$950 per gross ton, delivered to the steel plant, versus only \$298 per ton last November. Let's consider the supply and demand for this material.

On the Supply Side: Based on WSD's analysis of Bureau of Mines data, it appears that about 18 million gross tons of prime industrial steel scrap was generated in 2006. Industrial scrap generation was about 12 million tons. For 2008, we suspect that the number will be less because automotive production will be down and the average vehicle size will be reduced. In general, we assume that about 1.0 tons of steel is shipped per vehicle, with about 0.15 tons returned to the steelmakers in the form of prime scrap.

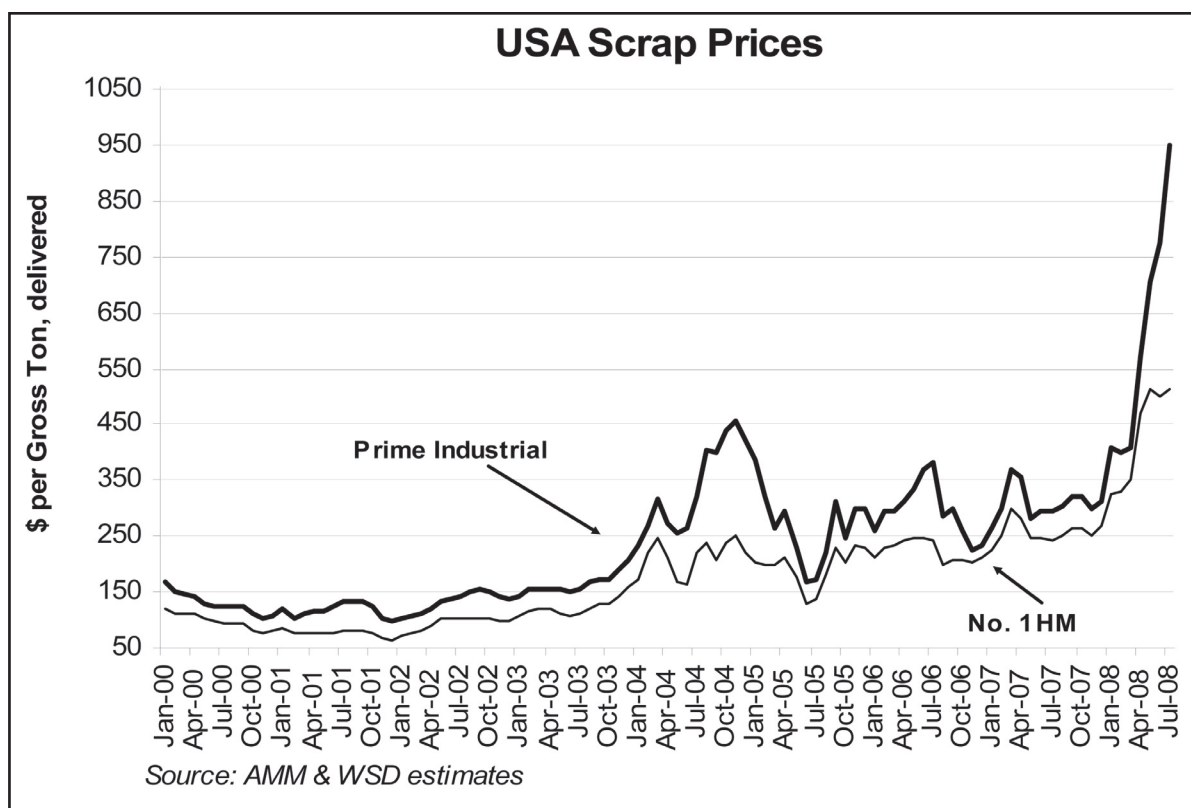
On the Demand Side: EAF-based sheet mills in 2008 may produce about 20 million tons of hot rolled band, with the metallics needed at about 23 million tonnes. Of this amount, perhaps 70%, or 15 million tons, of prime scrap, pig iron and direct reduced iron (DRI) is needed. In 2008, pig iron imports

Table 1 — Mini Sheet Mill Metal Margin Analysis (\$ per metric tonne)

Month	#1 heavy melting USA	Prime industrial USA	Pig iron world market ⁽¹⁾	USA spot hot rolled band	Metallics mix ⁽²⁾	HRB less "metallics mix"	Change in metal margin
April 2008	461	561	625	1,097	553	544	—
May 2008	505	694	750	1,158	657	501	-43
June 2008	493	763	880	1,187	723	464	-80
July 2008	515	950	930	1,187	813	375	-169
November 2008	350	450	475	965	429	536	-7

(1) Pig iron prices on a booking basis, with delivery.

(2) Metallics mix assumed to be 30% #1 heavy melting, 35% prime and 35% pig iron.



to the United States may be about 6.0 million tons, with DRI imports at about 2.5 million tonnes.

Blast furnace-oriented steel mills may produce almost 60 million tonnes in 2008. With the ratio of pig to metallic at 72–75%, these mills may purchase 10–15% scrap or other metallics per ton produced. Much of what they purchase is prime indus-

trial scrap, although there is an increasing emphasis on using the obsolete steel scrap grades because of the high cost of prime scrap. Overall, if they need 66 million tonnes of metallics, they may purchase 9 million tonnes of scrap and other metallics.

When considering that steel scrap exports have surged in past two years, it is clear why the supply is so tight.

Table 2 — World Cost Curve as of June 2005 (\$ per metric tonne)

Quadrant (midpoint)	Operating cost	Raw material cost	Other operating cost	Variable cost	Fixed cost ⁽¹⁾
1st (low cost)	320	175	145	206	114
2nd	360	200	160	234	126
Mean	370	203	168	239	131
3rd	380	205	175	243	137
4th (high cost)	410	210	200	255	155

(1) Fixed cost is 7% of raw material cost and 70% of other cost.

Table 3 — World Cost Curve as of November 2007 (\$ per metric tonne)

Quadrant (midpoint)	Operating cost	Raw material cost	Other operating cost	Variable cost	Fixed cost ⁽¹⁾
1st (low cost)	400	240	160	271	129
2nd	465	290	175	322	143
Mean	485	300	185	335	151
3rd	505	310	195	347	158
4th (high cost)	550	335	215	376	174

(1) Fixed cost is 7% of raw material cost and 70% of other cost.

Q. Most steel product prices have risen to very high levels. Why aren't the mills (particularly the steel minimills that sell all or most of their product on a spot basis) raking in the dough at these astounding price levels?

A. The hot rolled band price and metallics costs data indicate that, in the period from April to July 2008, the thin-slab flat rolling mills in the United States – i.e., the mini sheet mills – incurred a sizable price/cost squeeze. Assuming that the current cost of scrap is immediately translated into costs, when the lag is typically about two months, we see that the profit squeeze from April to July was about \$169 per metric tonne.

The analysis assumes that the mini sheet mills' metallics costs was composed of 30% #1 heavy melting steel scrap, 35%

prime industrial scrap and 35% pig iron (and/or steel scrap substitutes).

The estimates for November 2008, which assume a sizable decline in metallics prices, indicates that, even if the price of hot rolled band falls by about \$200 per tonne, the profit margin rebounds to April 2008 levels. ♦

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Table 4 — World Steel's Steepened Cost Curve as of May 2008 (\$ per metric tonne)

Quadrant (midpoint)	Operating cost	Raw material cost	Other operating cost	Variable cost	Fixed cost ⁽¹⁾
1st (low cost)	515	345	170	372	143
2nd	620	435	185	460	160
Mean	653	458	195	484	169
3rd	685	480	205	508	177
4th (high cost)	805	605	200	623	182

(1) Fixed cost is 7% of raw material cost and 70% of other cost.

Table 5 — World Steel's Projected Cost Curve as of July 2008 (\$ per metric tonne)

Quadrant (midpoint)	Operating cost	Raw material cost	Other operating cost	Variable cost	Fixed cost ⁽¹⁾
1st (low cost)	530	360	170	386	144
2nd	635	450	185	474	161
Mean	668	473	195	498	170
3rd	700	495	205	522	178
4th (high cost)	820	620	200	637	183

(1) Fixed cost is 7% of raw material cost and 70% of other cost.

Note: Integrated steelmakers use from 0 to about 17% purchased scrap and other metallics per tonne of steel.

Table 6 — World Steel's Projected Cost Curve as of November 2008* (\$ per metric tonne)

Quadrant (midpoint)	Operating cost	Raw material cost	Other operating cost	Variable cost	Fixed cost ⁽¹⁾
1st (low cost)	525	355	170	381	144
2nd	625	440	185	465	160
Mean	638	443	195	470	167
3rd	650	445	205	475	175
4th (high cost)	570	370	200	404	166

(1) Fixed cost is 7% of raw material cost and 70% of other cost.

* Assuming a sharp fall in scrap and other metallics prices.

Note: The May 2008 WCC 4th quadrant is 25% slab buyers, 63% mini sheet mills and 13% integrated mills.

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