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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. The views and opinions expressed in this article are solely those of World Steel Dynamics and not necessarily those of AIST.



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Global steel production heading back up in 2021, but not yet to 2018–2019 annual levels

WSD's "most likely scenario" — based on WSD's assessment as of late March 2020 — calls for global steel production in 2020 to decline 12.9% to 1.632 billion metric tons. Then, in 2021, given WSD's "mid-low" scenario, it recovers only 6.6% to 1.739 billion metric tons. If so, global output next year would be less than that in 2018 and 2019 at 1.805 billion metric tons and 1.873 billion metric tons, respectively (Table 1).

Global steel production gains in the next year may be hampered by the carryover of some of the adverse consequences from the coronavirus pandemic. Following are nine items that, when combined, may cause the global steel demand recovery in 2021 to be less than expected. Six of the items are macroeconomic in nature and three are steel industry-specific:

1. Consumers will likely remain far more cautious in their buying habits. Consumer sentiment the world over has been destroyed in recent months. This development is particularly bad for the United States because household spending normally accounts for 65–70% of GDP. Consumer spending in 2021 may be less than that in 2019. The U.S. automotive industry will suffer.
2. Gains in infrastructure spending may be constrained by the deteriorated financial condition of central governments and local municipalities. Both will be suffering from new debt burdens incurred in 2020 in an attempt to prop up the economy.
3. Industrial companies will be more cautious in their capital spending decisions. Many in 2020 will suffer financial setbacks tied to the slippage

in the demand for their products. Also, small businesses will have trouble accessing outside funds on a favorable basis. Global capital spending in 2021 may be less than in 2019 as many companies, given the lower-than-expected demand for their products and increases in competition, are slow in restarting delayed projects.

4. The crude oil price may not recover sufficiently to prevent a sizable downturn in the Middle Eastern economy. This part of the world, given the huge infrastructure spending, may require a Brent oil price of US\$65–70 per barrel, versus only US\$26 per barrel in late-March 2020.
5. Capital is replacing labor at an increasing pace; yet, this development may not be spurring a rise in the global economy. Instead, it's reducing costs and shifting investment away from developing world countries into the developed world. Currently, a new factory in an advanced country will usually manufacture, at a low cost with relatively few workers, the highest-quality product. There's no longer a need to build a new factory in developing countries because of the low wages.
6. The massive capital circulating the globe that's looking for high returns have not found these to the extent that is desired. Hence, a good portion of these funds is being invested in financial instruments, including government bonds, rather than new factories.
7. Steel buyers in 2021 may not be disposed to add to inventory. Instead, they may marvel at significant price competition

Table 1

| World Steel Dynamics' s Crude Steel Forecast (million metric tons) | | | | | | | | | | |
|--|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| | 2007 | 2008 | 2009 | 2010 | 2015 | 2018 | 2019 | 2020e | 2021e | |
| Advanced countries | 509.0 | 491.0 | 357.0 | 452.0 | 448.0 | 461.0 | 458.0 | 354.0 | 397.0 | 426.0 |
| Japan | 120.3 | 118.7 | 87.5 | 109.6 | 105.1 | 104.3 | 100.7 | 80.5 | 90.0 | 95.0 |
| South Korea | 51.7 | 53.6 | 48.6 | 58.9 | 69.7 | 72.4 | 72.6 | 56.0 | 62.0 | 66.0 |
| Western Europe | 171.8 | 163.7 | 114.3 | 144.3 | 137.8 | 136.6 | 133.2 | 105.0 | 115.0 | 125.0 |
| United States | 98.4 | 91.9 | 59.4 | 80.5 | 78.8 | 86.6 | 88.5 | 62.5 | 75.0 | 82.5 |
| Small Cap. Adv. | 67.0 | 63.5 | 47.2 | 58.9 | 56.8 | 61.1 | 63.4 | 50.0 | 55.0 | 57.5 |
| China* | 499.0 | 510.0 | 596.0 | 660.0 | 869.0 | 928.0 | 996.0 | 940.0 | 1,000.0 | 1,050.0 |
| Developing world ex-China | 348.0 | 335.0 | 304.0 | 340.0 | 368.0 | 416.0 | 418.0 | 338.0 | 372.0 | 402.0 |
| Africa | 9.2 | 8.5 | 7.7 | 7.8 | 6.6 | 6.5 | 6.2 | 5.0 | 5.0 | 6.0 |
| Brazil | 33.6 | 33.7 | 26.5 | 32.9 | 33.3 | 34.7 | 33.7 | 26.0 | 29.5 | 31.0 |
| CIS | 125.0 | 114.8 | 98.1 | 108.5 | 101.6 | 101.3 | 102.2 | 85.0 | 92.5 | 97.5 |
| Eastern Europe | 21.2 | 18.5 | 12.3 | 14.4 | 15.0 | 17.7 | 12.4 | 9.5 | 10.0 | 11.0 |
| Developing Asia | 21.5 | 20.7 | 18.3 | 21.2 | 23.8 | 33.9 | 39.4 | 30.0 | 33.5 | 37.0 |
| India | 52.4 | 55.1 | 63.5 | 68.3 | 89.0 | 106.5 | 113.0 | 95.0 | 105.0 | 113.0 |
| Latin America | 33.4 | 32.0 | 26.4 | 28.8 | 30.3 | 30.8 | 29.1 | 25.0 | 27.0 | 28.5 |
| MENA | 25.9 | 25.3 | 25.4 | 28.8 | 36.5 | 47.3 | 48.3 | 34.0 | 39.0 | 45.0 |
| Turkey | 25.8 | 26.8 | 25.3 | 29.1 | 31.5 | 37.3 | 34.0 | 28.0 | 30.0 | 33.0 |
| World total | 1,356.0 | 1,337.0 | 1,257.0 | 1,452.0 | 1,685.0 | 1,805.0 | 1,873.0 | 1,632.0 | 1,769.0 | 1,878.0 |
| World Ex-China | 857.0 | 826.8 | 660.5 | 792.2 | 815.9 | 877.1 | 876.6 | 691.5 | 768.5 | 828.0 |

Source: WSD estimates, World Steel Association.

e = estimate. *Includes WSD's estimates for induction furnace production.

prevailing in home markets and on the world market. The export market for steel products has become more competitive in recent years even though, in the fall of 2017, the industry entered an “Age of Protectionism.” Fewer country markets are now open to foreign deliveries. In the months ahead, WSD expects a surge in Chinese offerings on the world market at a relatively low price because oversupply conditions have returned to China.

8. Chinese steel demand is not sustainable. A risk for the Chinese economy is apartment prices — which, from 1999 to 2019, rose at a rate of 8% per year compounded — start to fall back. Hence, residential construction activity may lessen. Also, merchandise exports from China may lag because of the weakened foreign economy. (Note: By 2030, Chinese steel demand is forecast to be probably at least 10% lower than in 2019 as the mix of the economy shifts to rising household spending as a share of GDP and lower fixed asset investment as a share of GDP.)

9. Reduction in steel intensity. (Note: Steel intensity is defined at the million metric tons of steel demand per US\$ trillion of GDP. Hence, if apparent steel demand in 2019 was 1.85 billion metric tons and global GDP was US\$100 trillion, steel demand per US\$1 trillion of GDP was 18.7 million metric tons.) When economic growth rates are low, a higher portion of the gain in GDP will occur in services — that are not at all steel intensive. By 2021 versus 2019, if there's been a 1% drop in steel intensity for whatever the reasons — including slowed global economic growth, market share loss to competing materials and lower-weight products due to the redesign of how the steel is used — this factor alone would cause a 19-million-metric-ton decline in steel demand.

14-country economic condition: Far from a near-term positive for global steel demand

In order to better perceive the forces impacting the global economy that are most relevant to the steel industry, WSD has created Key Economic Factors for 14 Countries, shown in Table 2 on the next page. These 14 countries account for about 85% of global steel production, 84% of global GDP, 95% of global automotive output and about 82% of global fixed asset investment.

Steel is a “late-in-cycle” industry tied significantly in most countries to fixed asset investment (FAI) spending. (Note: On a GDP reporting basis, FAI is equivalent to gross fixed capital formation.) FAI accounts for 20–33% of GDP in many countries — with the figure for China at about 43%. However, FAI accounts for 75–85% of many countries’ steel demand — with the figure for China at about 92%. Key observation: FAI will not be rising as a share of GDP in the next few years if more economies, as expected, become even more household spending intensive.

The current coronavirus crisis is a demand crisis, while the global financial crisis that came into effect in the second half of 2008 was a monetary crisis. The 2008 crisis was overcome by shoring up the banks’ balance sheets, which resulted in long-term global economic benefits. In the current case, many countries are incurring huge fiscal deficits in order to “bootstrap” their economy. However, this corrective action is a long-term economic negative. If interest rates rise in the years ahead, for whatever the reason, rising governmental interest payment obligations will “crowd out” expenditures on other items including infrastructure spending.

Here are some economic conditions related to near-term global steel demand:

- **GDP change.** Based on the World Bank estimates as of April 2020, after a 3% global GDP decline in 2020, there will be a recovery of 5.8% in 2021. If so, global GDP in 2021 would be only 2.6% higher than in 2019. Key perspective: When global GDP is expanding slowly, services account for a growing share of the global output, which diminishes steel intensity — i.e., steel consumption per point of GDP.
- **Services (a supply-side GDP figure) as a share of GDP.** In the U.S. in 2018, services amounted to 79.8% of GDP, with the next highest figure at 71.4% for Japan. The lowest figure was Saudi Arabia at 37.9%, followed by China at 38.7%. The EU figure was 71.4%. Key perspective: When services are a high share of GDP, fixed asset investment is, by definition, far less important, explaining why steel demand growth tends to be slow in the advanced world.
- **Gross fixed capital formation (a demand-side GDP figure) as a share of GDP.** The high figure in 2018 was China at 41.6%, followed by Indonesia

at 32.2% and South Korea at 31.1%. Interestingly, Vietnam is about 26.5%. Key perspective: China’s proportion is so high that, as a result, there’s been a huge rise in its municipalities’ debt in order to support this spending.

- **Share of global automotive output.** The 2019 figure for the first five Advanced Countries was about 45% of the global total. Key perspective: Automotive output in 2021 may be 5–7% less than in 2019 because of less optimistic household sentiment.
- **Interest rates on 10-year government bonds.** The figures for Japan and the EU are close to zero. The high figure at present is Indonesia at 8.0%, followed by Mexico at 7.3%. The U.S. 10-year T-bill rate is 0.8%. Key perspective: The interest rate on the lower-yielding governmental bonds in the next year may be pulled up by the recent rise in yields on non-investment-grade bonds.
- **Gross government debt as a share of GDP.** The high figures, prior to the increases resulting from the coronavirus threat, were Japan at 238%, the U.S. at 106% and Canada at 88%. The figures are lower in the developing countries, including 54% in China, probably because of less international appetite for their debt — i.e., it was too expensive to issue. Key perspective: Governmental debt in 2021 in many countries will probably rise further due to fiscal deficits reflected in tax (revenue) shortfalls.
- **Consumer prices.** At the current time, the high year-to-year gain is India at 6.6% and Russia at 6.6% (due in large part to the devaluation of the ruble versus the U.S. dollar). The figure for China was 5.2%, and 2.3% for the U.S. Key perspective: When the rise in consumer price indices is less than 2%, many economists view this as a negative because it’s a sign of subpar economic growth.
- **Stock market performance since 21 December 2019.** The largest declines are Russia at 29% and Brazil at 34%. The U.S. figure is 18%, while that for China is only 7.5%.
- **CO₂ emissions.** For the 14 countries, the figure in 2017 was about 29 billion metric tons, which compares to total global emissions of about 37 billion metric tons. China accounts for a whopping 29% of the global total, with the U.S. at 14%. At an average emission rate of 1.47 metric tons of CO₂ per metric ton of steel produced (perhaps not fully including indirect emissions), the global steel industry emits about 2.6 billion metric tons of CO₂ per annum — or about 7% of the global total (and about 25% of the total by all industry). Key perspective: Steel companies in an increasing number of countries are committing to zero

Table 2

Key Economic Factors for 14 Countries

| Countries/ regions | GDP | | Real GDP growth % change | | | Population (millions) | % share of GDP (2018/2019) | | | | | |
|-----------------------|------------------------------|--------------------|-----------------------------|-------|-------|--------------------------|----------------------------|-------------|----------|-----------|--|------------|
| | % change from year ago | USD (trillions) | | | | | Agriculture | Industry | Services | Household | Gross fixed capital formation | Government |
| | Q4 | 2019 | 2019 | 2020e | 2021e | | 2018 | Supply side | | | Demand side | |
| USA | 2.3 | 21.44 | 2.3 | (5.9) | 4.7 | 327 | 1.2 | 19.2 | 79.8 | 68.1 | 19.5 | 21.0 |
| Canada | 1.5 | 1.73 | 1.6 | (6.2) | 4.2 | 37 | 1.8 | 28.6 | 69.6 | 58.0 | 23.0 | 20.9 |
| European Union | 1.0 | 18.40 | 1.6 | (6.7) | 4.4 | 342 | 1.6 | 25.1 | 70.9 | 54.3 | 20.0 | 25.0 |
| Japan | (0.7) | 5.16 | 0.7 | (5.2) | 3.0 | 126 | 1.2 | 27.5 | 71.4 | 55.6 | 23.5 | 19.8 |
| South Korea | 2.3 | 1.63 | 2.0 | (1.2) | 3.4 | 52 | 2.7 | 39.8 | 57.5 | 59.7 | 31.1 | 24.5 |
| China | 6.0 | 14.14 | 6.1 | 1.2) | 9.2 | 1,392 | 7.9 | 40.5 | 51.5 | 38.7 | 41.6 | 14.7 |
| Mexico | (0.5) | 1.27 | (0.1) | (6.6) | 3.0 | 126 | 3.8 | 34.3 | 62.0 | 64.8 | 22.4 | 11.7 |
| Brazil | 1.7 | 1.85 | 1.1 | (5.3) | 2.9 | 209 | 5.4 | 27.4 | 67.2 | 64.8 | 15.6 | 19.7 |
| Poland | 3.6 | 0.57 | 4.1 | (4.6) | 4.2 | 38 | 3.4 | 33.6 | 63.0 | 58.6 | 18.0 | 24.0 |
| Russia | 2.1 | 1.64 | 1.3 | (5.5) | 3.5 | 144 | 4.5 | 36.9 | 58.6 | 49.3 | 21.7 | 17.3 |
| India | 4.7 | 2.94 | 4.2 | 1.9 | 7.4 | 1,352 | 17.4 | 25.8 | 56.9 | 59.4 | 28.5 | 11.2 |
| Indonesia | 5.0 | 1.11 | 5.0 | 0.5 | 8.2 | 268 | 14.3 | 46.9 | 38.8 | 57.0 | 32.2 | 11.2 |
| Malaysia | 3.6 | 0.37 | 4.3 | (1.7) | 9.0 | 31 | 12.0 | 69.1 | 48.0 | 57.4 | 25.3 | 12.0 |
| Saudi Arabia | 0.3 | 0.78 | 0.3 | (2.3 | 2.9 | 34 | 2.0 | 69.1 | 28.9 | 37.9 | 22.7 | 24.6 |
| World | — | 87.27 | 2.9 | (3.0) | 5.8 | 7,600 | | | | | | |

| Countries/ regions | Global auto output share, % | Stock market year to date % change | Interest rates 10-year govern- ment bond % | Consumer prices % change year on year | Currency per US\$ | Government gross debt % of GDP | Current account balance % of GDP | CO ₂ emissions (thousand metric tons) |
|-----------------------|--------------------------------------|--|--|---|----------------------|--------------------------------------|--|--|
| | | 31 Dec 2019– Apr 2020 | Current | Latest 2020 | Current | 2019 | 2019 | 2017 |
| USA | 11.3 | (17.7) | 0.8 | 2.3 | — | 106.2 | (2.3) | 5,107 |
| Canada | 2.0 | (20.2) | 0.8 | 2.2 | 1.40 | 87.5 | (2.0) | 617 |
| European Union | 16.5 | (23.7) | (0.3) | 0.7 | 0.92 | 72.9 | 2.3 | 3,548 |
| Japan | 9.7 | (19.9) | Nil | 0.5 | 107.70 | 237.7 | 3.6 | 1,321 |
| South Korea | 4.0 | (17.0) | 1.6 | 1.0 | 1,233.00 | 40.1 | 3.7 | 673 |
| China | 27.8 | (7.5) | 2.1 | 5.2 | 7.09 | 55.6 | 1.0 | 10,877 |
| Mexico | 4.1 | (20.7) | 7.3 | 3.2 | 24.40 | 53.8 | (0.2) | 507 |
| Brazil | 2.9 | (34.0) | 3.3 | 4.0 | 5.32 | 91.6 | (2.7) | 493 |
| Poland | 0.9 | (23.7) | 1.6 | 4.7 | 4.17 | 47.8 | 0.5 | 319 |
| Russia | 1.8 | (29.0) | 6.8 | 2.6 | 77.30 | 16.5 | 3.8 | 1,734 |
| India | 5.2 | (27.1) | 6.4 | 6.6 | 76.95 | 69.0 | (1.1) | 2,455 |
| Indonesia | 1.3 | (24.1) | 8.0 | 3.0 | 15,705.00 | 30.3 | (2.7) | 511 |
| Malaysia | 0.5 | (13.8) | 3.4 | 1.3 | 4.39 | 56.3 | 3.3 | 259 |
| Saudi Arabia | — | (16.7) | N/A | 1.2 | 3.75 | 23.2 | 6.3 | 639 |

carbon emissions by 2050. If the industry-wide capital requirement to accomplish this goal were to be US\$350 billion, the capital outlay per year over 30 years would be about US\$6.50 per metric ton.

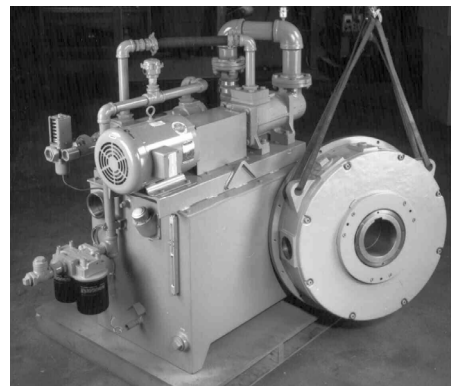
The rise in the operating cost to produce hot-rolled band could be US\$50–100 per metric ton when taking into account the expense to

generate the needed hydrogen and convert the captured CO₂ into products such as methane, ethylene, caustic soda and those long-chain polymers (materials made from long, repeating chains of molecules including rubber, polyester, epoxies and glass).

This report includes forward-looking statements that are based on current expectations about future events and are subject to uncertainties and factors relating to operations and the business environment, all of which are difficult to predict. Although WSD believes that the expectations reflected in its forward-looking statements are reasonable, they can be affected by inaccurate assumptions made or by known or unknown risks and uncertainties, including, among other things, changes in prices, shifts in demand, variations in supply, movements in international currency, developments in technology, actions by governments and/or other factors. ◆

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