

Global steel 2014

Planning to profit from opportunity:
preparing for future demand



EY

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working world



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Special thanks to Manoj Chauhan
and Subhashish Sarkar, steel analysts,
for their contribution.

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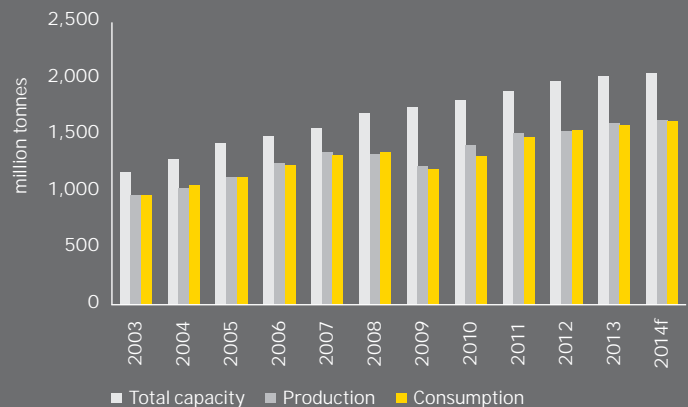
Anjani Agrawal
Global Steel Leader

“Steel producers should test the vulnerability of their business models and the resilience of their strategies to ensure sustainable growth.”

Excess capacity is the biggest threat to the sector

While there are signs that the outlook for demand is slowly improving, excess capacity remains the biggest threat to the steel sector. The sector is straining under the relentless pressure caused by years of excess steelmaking capacity and low margins.

Global steelmaking – total capacity, production and consumption



Source: World Steel Association, BREE and 'Initiating on Indian Steel Industry: Steel Support for Superiors Returns,' Metals & Mining, Jefferies, 2 October 2013.

While some capacity is expected to be removed over the next decade, the announced addition of capacity by steelmakers out to 2020 shows that investment is still alive and well.

To counteract the investment in new steelmaking capacity, we estimate that about 300 million tonnes of steelmaking capacity needs to be closed for the industry's profit margin to reach a sustainable level, and raise the capacity utilization rate for the sector globally, from below 80% to more than 85%.

Permanent shutdown of capacity is the only real solution to bring balance to the market but in the short term it is difficult to see this happening given state participation in many countries and additional political incentive to retain employment, regardless of profitability.

The overall net effect, however, has been an increase in steel making capacity despite the Chinese Government mandating 80 million tonnes of capacity to be removed by 2018. With restructuring and consolidation in the Chinese market, a hand-full of large Chinese steel players will emerge, leading to global competition intensifying.

Executive summary

Increased market competition will transform the market

Steelmakers are addressing myriad challenges such as volatility, shifting demand centers, complex supply chains, productivity and cost efficiency. As steelmakers increase their ability to survive in tough times, we will see increased market competition in nearly all products especially as there is a focus shift to high-value, higher margin steel products.

Increasing market competition will also result from the flatter marginal cost curve in the sector. We believe about 85% of hot-rolled coil (HRC) production is within US\$100/tonne of the marginal producer and 46% is within US\$50/tonne. With little difference between the positions of steelmakers along the cost curve, small changes in the operating environment, such as increased productivity or changes in cost of capital, can produce swift changes in positions, competitiveness and ultimately survival. Steel companies who monitor and constantly create new sources of value are likely to be more successful.

As a highly geared sector with limited access to capital, there will be increased pressure for 10% to 15% of steelmaking capacity to close over the next two to three years. The knock-on effect will be:

- An increase in M&A activity as stronger operators acquire their weaker competitors with the aim of rationalizing the sector
- Early refinancing as steel companies seek to take advantage of low interest rates ahead of potential rate rises
- Portfolio optimization as steelmakers assess their assets for value creation
- The complex dilemma of where to allocate capital – whether capital should be invested upstream for raw material security or downstream to capture a greater share of the value chain

The coking coal and iron ore markets are likely to remain volatile with an element of uncertainty despite forecasts for a surplus market with lower prices. These

markets are highly concentrated and their global trade is dominated by a few players. As a result, production can be quickly reduced to alter market balance and affect prices. While steelmakers have largely responded to the challenge of raw material volatility and security of supply by vertically integrating their operations, steel consumers appear to be using steel derivatives to mitigate this challenge. We are seeing the use of financial instruments increasingly being adopted by Asian steel producers, including Chinese and South Korean steel mills. However, overall steelmakers still have the lowest participation rate in steel derivatives.

Preparing for demands of the future

The speed and degree of changes in the global economy and the increasingly complex interplay of factors influencing a more globally integrated steel business make horizon watching essential.

To succeed, steelmakers must determine how to optimize and create a new product mix and decide whether they are prepared to take the plunge to invest in new geographic markets.

As demand continues to shift to developing nations, the steel sector is directed toward China, with some focus on Brazil, Russia and India. As Africa becomes increasingly urbanized, it may be that the future scramble for African demand could completely shift the landscape in years to come.

There are signs of economic improvement and demand growth in most steel markets:

Infrastructure and construction – Urbanization and a growing middle class continue to be global trends driving steel demand in construction and real estate. Increasing investment in construction and infrastructure led to an 8% y-o-y increase in global demand for long products in 2013. The Asian construction market remains the main driver of growth in this steel subsector capturing almost 40% of total construction spending.

Automotive – There will be increasing steel demand from the automotive sector in both emerging and developed regions. The US, Brazil, Japan and China are the hotspots in the automotive sector with calculated annual growth of between 5% to 11% forecast to 2016. Despite threats from other materials, steel still accounts for nearly 70% of the materials used in a passenger car so there is ample opportunity for steelmakers to capture market share with value-added products, such as AHSS.

Oil and gas – Looking upstream, the oil and gas sector will continue to experience significant capital investment over the next few years, an annual average spend of US\$657b, which should drive demand for premium oil country tubular goods (OCTGs), particularly for use in unconventional projects. In addition, there is substantial investment forecast into other parts of the oil and gas value chain, e.g., distribution pipelines and refineries.

Is 2014 the turning point for steel?

Success for steelmakers will increasingly depend on being agile and nimble in responding to market opportunities that provide better margins.

In last year's *Global Steel 2013: a new world, a new strategy*, we questioned whether 2013 was the bottom of the market. The expectation of significant improvement in 2013 did not eventuate as excess capacity continued to weigh on the sector and, with the exception of China, steel demand did not meet expectations. There were, however, signs of growth with price trends and financial results reflecting stable or improving margins for steel.

With a slightly stronger outlook for 2014 compared with 2013, and the promise of further progress in 2015 and beyond, the steel sector is focusing ahead to plan and profit from the opportunities and prepare for demands of the future. This change will not be immediate and the centers of demand will vary. Nevertheless, the steel sector is expected to gradually gain momentum as the decade unfolds, with optimism about what lies ahead.



Steel in the global economy

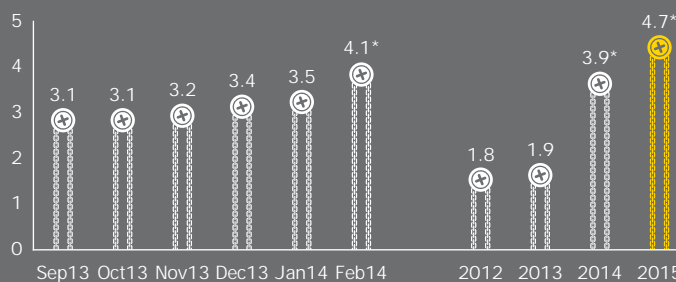


Global economic update

Although there was a slight improvement in the economies of developed markets in 2013, it was offset by slower growth in emerging economies. Overall, the global economic outlook is positive with industrial production forecast to grow by 4% in 2014.

After a period of sustained weakness and uncertainty, the global economy continues along the road to recovery and may be on the verge of acceleration. At the end of 2013, global industrial production indicators showed a definite upswing in sentiment, with 3% month-on-month growth. This growth is expected to continue into 2014, with forecast growth of about 4% compared with 1.9% in 2013.

World industrial production growth continues through tail end of 2013 (% y-o-y)



Source: Global Insight (*projected numbers)

Developed markets – looking stronger

In 2013, the economic environment improved in developed markets, with growth in the EU, the US and Japan.

The outlook for the EU improved in the latter half of 2013, with higher levels of employment, rising GDP and improved access to capital. The GDP continued to increase, although only by 0.3% y-o-y, in the last quarter of 2013. The region is expected to see a gradual recovery backed by an accommodating monetary policy, low inflation and improving consumer and business sentiment.¹

In the US, corporate earnings, employment growth and credit availability are improving. GDP grew at 3.2% y-o-y despite the drag caused by the shutdown of the Federal Government during the quarter. A combination of improving household finances, stronger housing market and improved competitiveness will accelerate US growth to an annualized rate in excess of 3% from the second quarter of 2014 onward.²

In Japan, strong export growth, rising consumer spending and a rebound in business investment led to recovery from the 2012 recession. A hike in the consumption tax rate to 8% in 2014 and 10% in 2015 should help in achieving fiscal stability, but not

1. "Modest Eurozone recovery on track as Q4 GDP growth improves to 0.3% q/q," IHS Global Insight, 5 March 2014.

2. *Eurozone Report*, EY, December 2013.



“Excess capacity remains the biggest threat to the steel sector. The sector needs to restructure to regain profitability but with high debt and reduced profitability, the options for consolidation are limited. Permanent shutdown of high-cost capacity is the only real solution to bring balance to the market. Both corporate and government leadership is necessary to make this happen.”

Michael Elliott
Global Mining & Metals Leader
EY, Australia

necessarily growth, in the country. Japan's “quantitative and qualitative monetary easing” should continue until the inflation target has been met and GDP growth achieves a consistent improvement.³

Emerging markets – muted growth

Emerging markets showed signs of slower growth in 2013 as a result of lower commodity prices, weak demand from developed countries and tighter financial conditions. This slowdown is clearly illustrated by falling manufacturing PMI data from emerging markets where a slight contraction is particularly evident from May 2013 onward. In stark contrast, there are clear signs of expansion in the EU and the US.

The governments of emerging economies are implementing structural reforms to rebalance their economies. The Chinese Government, for example, is shifting to a consumption-based economy, whereas the Brazilian and the Indian Governments are removing barriers to investment.

Global supply and demand

Global steel demand increased by an estimated 3.2% in 2013 as compared to 2012, largely due to increased infrastructure and construction activity, especially in Asia.

China was the clear driver of global steel demand, recording 6% growth in 2013 compared with 2.9% in 2012. In the rest of the world, however, demand for steel in 2013 failed to meet expectations and was lower than previously forecast. Despite structural issues and volatile financial markets in emerging markets, the majority of demand (apparent steel use) was still propelled by these economies (+4.9%), whereas demand in the EU continued to contract (-3.8%). There was, however, a slight increase in apparent steel usage in North America (+0.2%).⁴

Manufacturing PMI data indicates a contraction in economic growth across emerging markets (below 50 indicates a contraction)

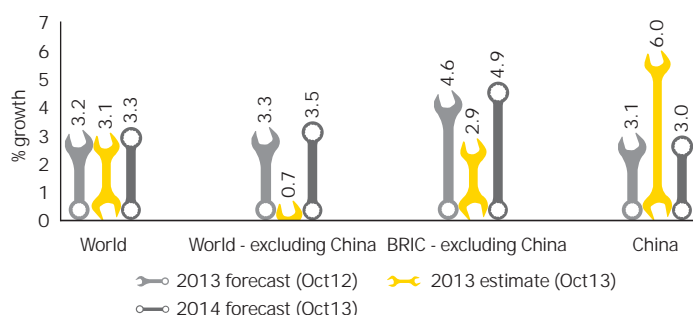
	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13	Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14
China	48	50	51	52	52	50	52	50	50	48	48	50	51	50	51	50	49
Brazil	50	50	52	51	52	53	52	51	50	50	49	49	50	50	50	51	50
India	53	53	54	55	53	54	52	51	50	50	50	49	50	50	51	48	49
Indonesia	51	52	52	51	50	51	51	52	52	51	51	49	50	51	50	50	51
Mexico	54	56	56	57	55	53	52	52	52	51	50	51	50	50	52	52	54
Russia	52	53	52	53	52	52	51	51	50	52	49	49	49	53	49	49	48
US	52	52	50	50	53	54	51	51	49	51	55	56	56	56	57	56	56
Eurozone	46	45	46	46	48	48	46	47	48	49	50	51	51	51	52	52	53
Japan	48	46	46	45	47	48	50	51	51	52	50	52	52	54	55	55	56

Source: Markit Economics, HSBC, Bloomberg

3. “Japan – Economic forecast summary,” OECD, November 2013.

4. “Short Range Outlook,” *WorldSteel*, October 2013.

Forecast apparent steel usage fails to eventuate in 2013 (with the exception of China)



Source: World Steel Association

Global steel production in 2013 continued to increase by 3.5% to 1,607 million tonnes despite tepid demand growth in most parts of the world. The most notable increase in production was in China where at least 58 new furnaces have come online, adding 80 million tonnes of annual capacity (about 8% of an existing 970 million tonnes). Steel production in Japan has also increased by 3.1% to 110.6 million tonnes. Production in some countries did decline in 2013, with a 4.4%, 2% and 1% fall in South Korea, the US and Brazil, respectively, and with Europe dropping by about 2%. Capacity utilization in the industry averaged 78.1% in 2013 – up from 76.2% during 2012.

Despite 50 million tonnes of crude steel capacity being removed from the global market (excluding China) in 2012, global overcapacity was estimated at 334 million tonnes.⁵ While some

capacity is expected to be removed over the next decade, the announced addition of capacity by steelmakers out to 2020 shows that investment is still increasing. In fact, about 300 million tonnes of steelmaking capacity needs to be closed over the next decade for the industry's profit margin to reach a sustainable level. That would raise the industry's capacity utilization rate from below 80% to more than 85%.⁶

Sustained overproduction is likely to continue impacting the global market in 2014, but the impact will vary from region to region.

High rates of overproduction combined with volatile raw material prices have adversely affected the profitability of Chinese steelmakers. This has seen the Chinese Government making attempts to restructure the steel industry to increase its efficiency and remove some excess capacity. In October 2013, the Chinese Government issued a guideline requiring that steel capacity in China should be reduced by 80 million tonnes by 2018.⁷ In addition, more than 15 million tonnes of obsolete capacity operating with old technologies should be replaced by new technologies or closed before the end of 2015. Regional governments in China have been slow to close steel mills, as it would remove sources of employment and other fiscal benefits. While some capacity has been closed, the overall net effect to date has however been an increase in steelmaking capacity in China. Anecdotally, it would appear that some Chinese steel mills are upgrading to new technology to avoid shutdown, thereby increasing the amount of investment at risk. Actual figures on just how much upgrading is taking place are yet to be announced.

Oversupply is likely to continue in 2014

Steel (million tonnes)	World		China		India		Japan		US		EU 27	
	2013	2014e	2013	2014e	2013	2014e	2013	2014e	2013	2014e	2013	2014e
Production	1,607	1,636	775	802	81	84	111	111	87	88	167	163
Consumption (estimate)	1,586	1,629	729	751	79	83	70	70	103	104	153	156
Surplus (deficit)	21	7	46	51	2	1	41	41	-16	-16	14	7

Source: Bureau of Resources and Energy Economics ; WorldSteel

Chinese net capacity additions 2010-14 (million tonnes)

China	Crude steel capacity	Outdated capacity closure	Net capacity addition
2010	756	41	
2011	820	32	32
2012	950	11	119
2013e	1,025	10	65
2014f	1,050	20	20

Source: EY, Macquarie Research, Deutsche Bank, Steel Business Briefing⁸

5. "Global Steel: Steeling for oversupply," Morgan Stanley, 22 May 2013.

6. "Mordashov urges joint action to reduce excess capacity," *Steel Business Briefing*, 24 January 2014, via Factiva.

7. "State Council urges to cut 80m tons of steel capacity in 5 years," CCICED, cciced.net/encciced/newscenter/latestnews/201310/t20131025_262245.html, 25 October 2013.

8. "Beijing collects detailed steel capacity-cut plans," *Steel Business Briefing*, 27 January 2014, via Factiva.

Global outlook for steel

In 2014, global demand is forecast to grow faster at about 3.3%. However, more demand growth is expected to come from outside of China as the Chinese Government pushes through economic restructuring with a focus on private consumption.⁹

With the exception of China, global supply and demand for steel will largely follow economic growth recovery around the world. In China, national mandates to rationalize capacity will have an effect on supply and as the Chinese economy moves to a more consumer-driven model, steel consumption is expected to moderate.

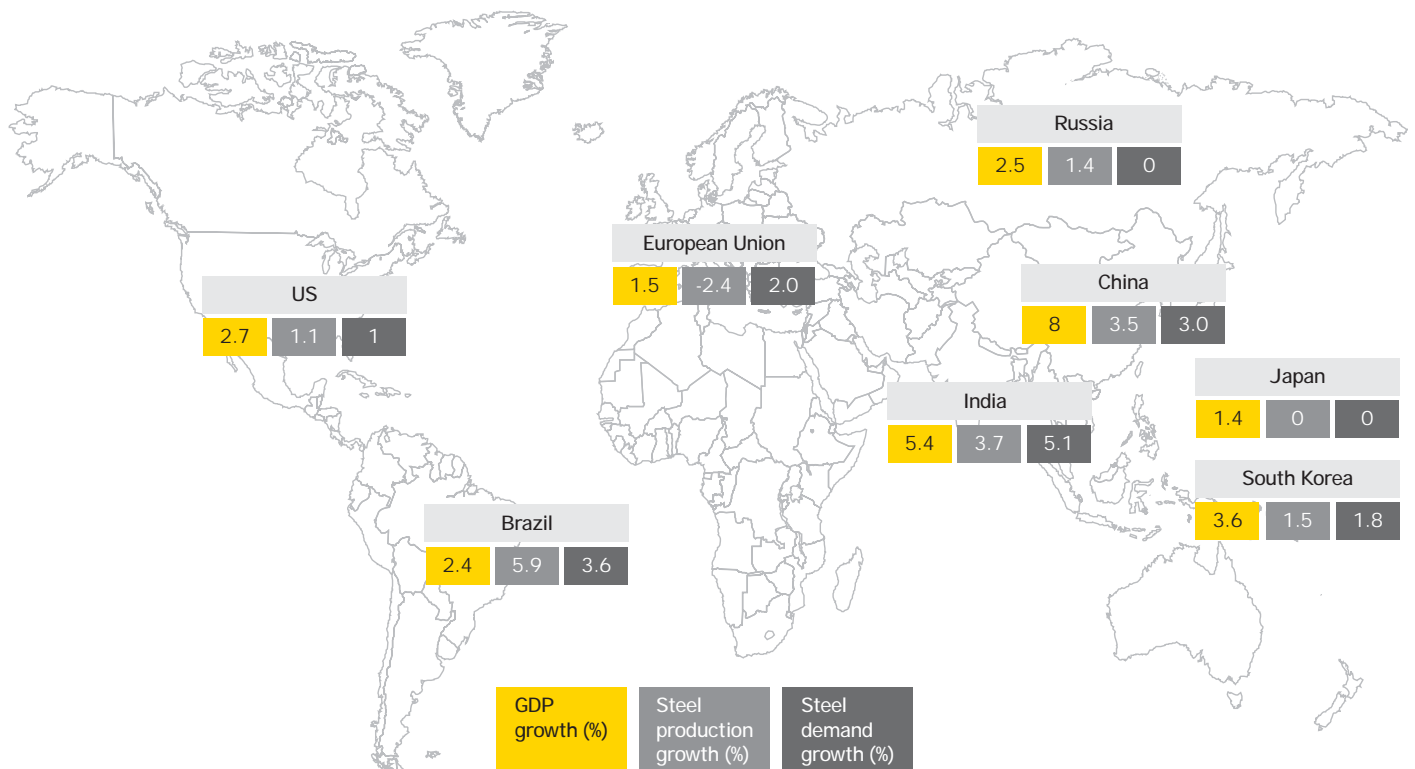
The short-term estimates by World Steel Association for global steel demand are similar on an overall basis, with some more positive views for growth in the US, the EU, Brazil and Russia but a relatively lower expectation for Asian countries.¹⁰

Growth in the Chinese economy continues to be a determining factor for the global steel market in the medium-to-long term. As China seeks to restrain investment activity, rebalancing and deleveraging, current forecasts for 2014 are for lower growth rates in production and demand with the removal of excess capacity. However, if urbanization projects continue, accompanied by a strong domestic economy and a growing middle class, the demand for steel will continue to stimulate. It will also shift the product range as more sophisticated consumer products, such as automobiles and home appliances, are sought after. This will benefit steelmakers with high-end, value-added products.

Two factors may cause more rapid restructuring of the Chinese steel sector:

- The excessive levels of debt may allow Chinese policy banks to stop funding losses as a catalyst to restructure.
- The use of steel stockpiles to collateralize debt to be used for speculation is expected to be unwound.

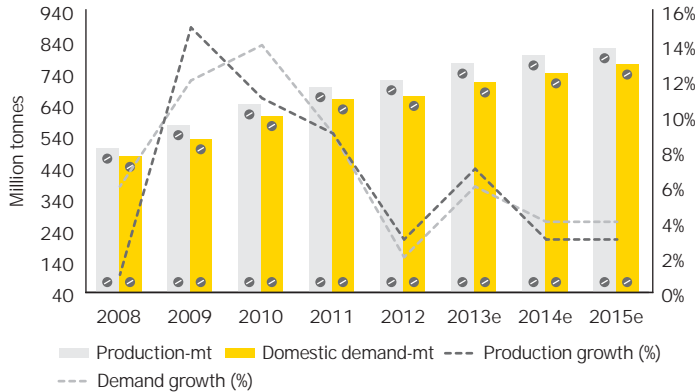
Outlook for steel and economic growth in 2014 mapped against the location of major steel markets



Source: IHS Global Insight, BREE

9. "Short Range Outlook," WorldSteel, October 2013.
 10. "Short Range Outlook," WorldSteel, October 2013.

Chinese steel supply and demand



Source: NBS, Macquarie Research, September 2013

Steel demand in Europe and the US is likely to improve during 2014–15. In Europe, it is expected to increase by a robust 2% in 2014¹¹ on the back of investment in the infrastructure and manufacturing sectors. Although the growth may be insufficient to absorb the capacity overhang, the switch from decline to marginal growth can be important for industry margins and overall sentiment.

US steel demand is also expected to improve on the back of residential construction, growing automotive production and energy investments. Other regions to experience faster steel demand growth will be India, Brazil, Russia and MENA (the Middle East and North Africa).



Cost and competitiveness

While steelmakers are most threatened by excess capacity as they strive to maintain their profitability, they are also exposed to cost-related threats:

- The increasing age of steel mills and the deferral of required maintenance will see a sharp increase in future repair and maintenance costs.
- With economic recovery, labor costs are rising faster than steel demand.
- Productivity will continue to fall as steel plants age or are run at less-than-optimal capacity.
- Historic low interest rates, prevailing in most markets, are not sustainable, with future interest burden set to be significant for the already highly geared steel sector.

Little comfort can be taken that this will hit marginal producers first. Steel producers from the Commonwealth of Independent States (CIS) and a few from India have typically occupied the bottom of the cost curve because of their integrated mining operations; whereas steel producers from China, Japan and South Korea who procure iron ore and coking coal at market prices have typically occupied the top end of the cost curve.

There has been a continual flattening of the marginal cost curve primarily due to weakening of raw material prices, which has pushed down the top end of the cost curve. However, cost inflation has been higher in emerging markets, which has pulled up the low end of the cost curve. We believe about 85% of hot-rolled coil (HRC) production is within US\$100/tonne of the marginal producer and 46% is within US\$50/tonne. Due to a flatter cost curve, the position of the marginal producer can quickly change. Factors, such as increased efficiency in operations and changes in cost of capital and currency movement due to global monetary policy changes, can quickly shift the position of a steel producer on either side of the marginal cost of production. A flatter cost curve thus promotes increased competition and delays production cutbacks even when the price falls below the marginal cost of the high-cost producer. However, a flat marginal cost curve also suggests that steel prices may be approaching the bottom.

11. "Short Range Outlook," WorldSteel, October 2013.



Angie Beifus
Steel Analyst
EY, Australia

“While the outlook for 2014 is slightly better than 2013 – and 2015 holds the promise of even greater improvement – the sector is in a weak position and any further economic shocks will have an extremely negative impact on steelmakers.”

Restructuring the sector

To date, the industry's response to overcapacity has simply been a short-term measure – maintaining margins through cost reduction and focusing on high-end products, rather than a fundamental solution. Further, it is only steelmakers with any real scale who can implement these measures. Dealing with excess capacity globally may be a larger problem than simply removing it. Other challenges may include the wrong type of steel being produced to meet new demand, incorrect manufacturing processes or steel being produced in the wrong locations.

In addition, during this period of inconsistent demand growth, as profitability returns, producers tend to utilize excess capacity impacting the demand-supply balance, thereby causing margins to dilute again. This vicious cycle is a structural problem that needs to be addressed by the industry especially as, with steel demand averaging 3% to 4% for the rest of this decade, the solution for increasing profitability in the steel sector is unlikely to be demand-led.

Given labor laws, environmental costs and permanent loss of the option value of the plants, it is unlikely that there will be permanent removal of any meaningful steel capacity. Those steel mills that have state participation or are outright owned by the state have an additional political incentive to retain employment, regardless of profitability. This may largely be due to the steel industry being an integral part of the economy for many developing countries. Morgan Stanley estimates that to remove over 300 million tonnes of capacity could mean the loss of over 1 million jobs globally.¹²

In other industries that have the required global restructuring, it has usually been achieved through consolidation where a number of major players acquire smaller producers and begin to close inefficient capacity with the highest cost. This has occurred in the oil refining, automotive and photovoltaic industries over the past decade and a half.

Alternatively, if no larger players are capable of undertaking the necessary consolidation, all producers will bleed until the weakest are forced to close as funding of ongoing losses becomes impossible. This has more been the pattern of the airline, furniture and aluminium smelting sectors.

High debt levels and little to no positive cash flow limit the ability of the sector to use consolidation to heal itself. However, as steel remains a strategic sector in many economies, the possibility of state-backed support to promote consolidation is still there. Otherwise, it is survival of the fittest.

So while the outlook for 2014 is slightly improved from 2013, the sector is in a fragile state and any additional economic shocks will have an adverse impact on steelmakers. With high gearing, the lack of availability of fresh capital for many, the possibility of continued loss-making and the pressure to attain sustainable environmental, energy and economic efficiency goals, there will be pressure for 10% to 15% of steelmaking capacity to close over the next two to three years.

An increase in M&A activity will be a product of outright mill closures as stronger operators acquire and restructure the weak to gain benefits from rationalization, and steel companies rationalize their portfolio in an attempt to repair balance sheets and adhere to national mandates, such as those in China. Not all assets put up for sale will find buyers, although some new entrants to the sector are expected to be driven by lower asset valuations. Capital markets are expected to remain tight, if not closed to major equity raisings, making ArcelorMittal's decision in early 2013 to raise US\$3.5b for debt reductions appear very timely.

The next two years will be particularly challenging for the steel sector. All steelmakers are maximizing their cost-cutting and productivity enhancement efforts and seeking to focus on high-end value-added products. This is going to significantly increase market competition in nearly all products. Consolidation in China and its growing demand for high-end products present a good business opportunity for steelmakers, particularly for those with access to the Chinese market. Some regions with competitive advantages of high long-term demand growth backed by economical resource availability will also offer newer growth opportunities for global steel players who have the ability to embrace a degree of risk.

One thing is for certain, however, and that is steelmakers will have to live through a sustained period of volatility in the short-to-medium term.

Steel producers can either choose to accept this volatility and express to the market that they are “the same as everyone else,” or seek to tame volatility by increasing the flexibility of production or hedging strategies to protect themselves from this volatility.

12. “Steeling for oversupply,” Morgan Stanley, 22 May 2013.

Q&A with Mechel and Tata Steel Group

Their perspective on challenges in the global steel sector, the future of demand and the outlook

Mechel's perspective



Oleg Korzhov
Chief Executive Officer, Mechel

Apart from the current economic challenges, what are the other major challenges faced by the steelmaking industry?

The modern steelmaking industry's main challenge is that of global imbalance as excessive supply sees demand centers shift from economically developed countries to developing ones. Another problem, which emerged from the mining and steelmaking sector, is the decline in profit margins in downstream processing. This is due to excessive supply and low rates of consolidation in steelmaking, as compared with the raw materials sector.

A regional risk that comes to mind is the lack of transparency in the Chinese steelmaking industry. Right now, no one knows precisely how many plants there are in China and what their total production capacity is. If China's internal demand is not on par with supply, there's a risk of Chinese producers expanding into the export market and this could cause a global market collapse.

In a number of countries, inefficient producers are able to continue operating because they receive direct or indirect state aid – this also impacts the supply and demand balance.

As for Russia, our top challenge – apart from the issues I've already raised – is the continued increase in tariffs of natural monopolies, such as railway transit or electricity.

How much of a major challenge is excessive production for the industry?

This is indeed a very serious problem particularly as most of the industry's new projects were built thanks to loans, and producers are forced to keep them on full load to repay those loans.

For example, in Russia, demand for long construction steel rolls totals 10.2 million tonnes a year but existing production capacity is estimated at about 14.7 million tonnes. This means the domestic market cannot absorb more than 70% of the current capacity, leaving the additional capacity in need of a home.

At the same time, new projects with a total production capacity of 7 million tonnes are due for completion by 2018, with nearly 3 million tonnes already launched in 2013. Even with optimistic growth forecasts, such volumes will lead to a load decrease below current levels.

How do steelmakers cope with these challenges?

Mechel has three ways of dealing with them.

First, we attempt to dispose of non-core businesses and halt inefficient facilities. However, we are not alone in this; the same processes are underway across Russia, Europe and other countries. China is a case in point. According to an officially announced program for reducing inefficient facilities, between 2011 and 2015, China plans to halt steelmaking facilities impacting 60 million tonnes in

the Hebei province, 6.7 million tonnes of steel and 18 million tonnes of coke in the Shanxi province, and 21.1 million tonnes of pig iron and 22.6 million tonnes of steel in the Shandong province. It also plans to reduce the total steelmaking capacity in the Tianjin province to 20 million tonnes.

Second, we focus our investment activity on the most efficient products. For Mechel, these are coking coal and highly profitable steel products with high added value.

Third, we reorganize our sales system to gain direct access to end customers by developing our own sales network, which means we don't have to share our profits with traders.

What do you think is the driving force for high steel demand from the point of both the region and the end customer?

Currently, state aid is the main driver of growth. This is essentially about pouring money into national economies – the US policy of quantitative easing is a case in point.

However, such measures lose efficiency with each passing year. Only with a change in the economic growth model and the emergence of radically new industries will the situation alter to any degree. So far, we see no reasons for, or signs of, such a change, but nor could anyone have predicted 30 years ago just how important information technologies would become.

Tata Steel Group's perspective



Koushik Chatterjee
Group Executive Director –
Finance & Corporate,
Tata Steel Group

Do you think that China is entering a new phase of slower economic growth or simply pausing for breath?

My view is that China is at an inflection point at which it will begin to show more maturity in the steel cycle. The Chinese steel model is more classical than India's hybrid between infrastructure and consumption. China will gradually mature into a growth trajectory that could be lower than historical averages of the last decade, but will add more quality and sustainability to its growth. Its recent policy measures are a step in the right direction.

What do you think will be the impact of consolidation on the Chinese steel industry?

In a way, the Chinese steel industry is also a converter of raw materials into steel. Consolidation is a plus – it will enable the Chinese steel industry to be more competitive by cutting overhead costs, and ensuring good use of capital, and it should see more spend on R&D. It will also put the rest of the global steel industry on alert to find ways to remain competitive.

At this point, Europe is restructuring to survive. The context is not the impact of China but rather a contraction in regional European demand and its higher cost base. The rise of the steel industry in China has raised the floor on raw material prices globally.

Iron ore and coking coal prices were volatile during the past year. How will this affect steel prices and what is your prognosis for steelmakers' profit margin?

To be fair, iron ore and coal prices have remained within a range over the last few quarters compared to the volatility seen last year. There are no triggers to push raw material prices too far out of range; they are likely to remain within US\$20 to US\$25 of where they are today.

While some significant mining capacity is set to come online soon, many greenfield projects are being delayed or deferred as miners are now conserving more capital. Infrastructure for mining has become difficult, costly and very capital intensive. As a result, while miners are focusing on the cost of production, free on board (FOB) costs may rise because of infrastructure costs. On the steel margin front, we expect a relatively flat spread between steel prices and raw material prices. However, companies need to curb inflation-related costs, such as wages and energy, to keep margins intact. Fixed costs are sticky and have sensitivity issues. So, managing fixed costs and producing differentiated products could be the most critical factors for the steel industry in the next two to three years, especially where demand contraction is high.

In light of this volatility, do you plan to use steel futures and hedging against risks in prices for raw materials and downstream products?

Steel has not moved in the same way as aluminium because the steel product range is not as standard. The LME launch of billets was not hugely successful. However, iron ore hedging could pick up if volumes rise – there are some Chinese exchanges that have started trading in iron ore.

The industry wants to move in the direction of hedging but there are some inherent risks. Although hedging is good for standard products, it is not as useful for differentiated premium product manufacturers because it removes the differentiation on product premium. Customers will want more stable prices. We need to see how we can put a fair but consistent mechanism in place.

Speaking about economic hedging and backward integration in steel, some studies suggest that vertical integration provides more stable EBITDA but there is no evidence of it enhancing overall enterprise value. Do you have any views on this?

It depends on the value point at which you integrate raw materials. If you buy at the peak of the cycle, you can erode value and even cash flows. In developing greenfield or early stage projects, the chances of making money are higher. In terms of infrastructure, a miner would prefer to be a rent payer rather than having to own and develop it. If this can be addressed, then value will remain, both from cash flow and economic hedge perspective.

EY would like to thank these participants for sharing their views with us.



Planning to profit from opportunity

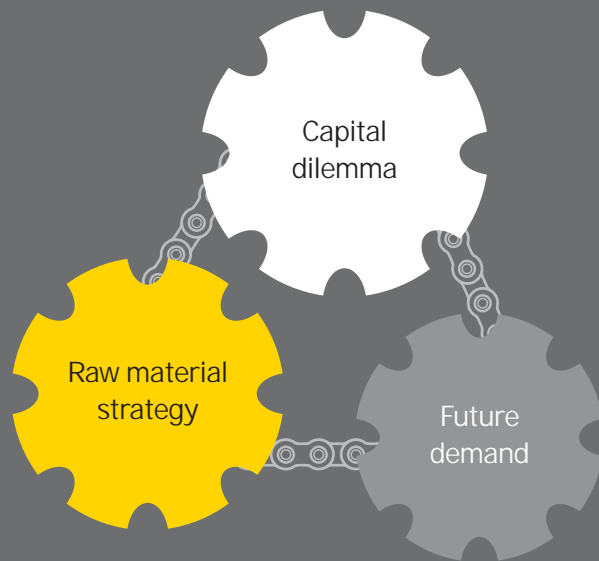


Succeeding despite challenges

Succeeding in the face of ongoing myriad challenges requires effective strategies and efficient execution – to gain raw materials security; manage price volatility; improve cost competitiveness; manage cash flows; respond to weak demand; innovate new products or applications to attract new customers; optimize product portfolios to expand market access; lead to geographic expansion; and achieve growth aligned with diverse stakeholders' expectations.

Despite some optimism for steelmakers, today's tough economic conditions have led to a reassessment of risks, strategies and operations at each stage of the steel value chain.

- Access to capital – limited funding options
- Allocation of capital – optimizing value



- Raw material outlook
- Financial instruments for margin protection

- Tapping into high-growth sectors
- Geographic outlook for steel demand



Lee Downham

Global Mining & Metals Transactions Leader
EY, UK

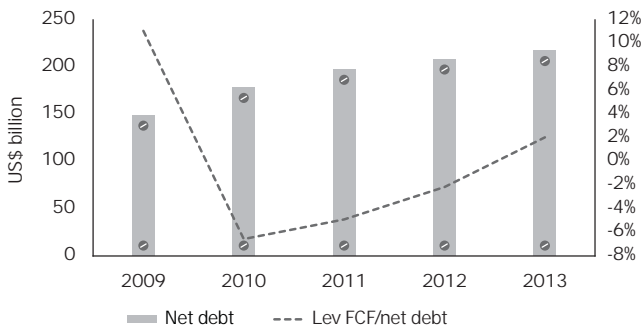
“A return to positive cash flows is encouraging for the sector, particularly with reference to its ability to service and refinance existing debt facilities. However, with higher interest rates mooted, tightening credit conditions remains a risk for those that haven’t yet refinanced their balance sheets.”

Capital dilemma

Access to capital – limited funding options

Gearing in the steel sector is high, particularly compared with other sectors, and tight margins have reduced serviceability. As a result, a number of steelmakers experienced credit downgrades during 2013. However, an analysis of the top 50 steelmakers by market capitalization shows that levered free cash flow (FCF) returns have returned to positive and this will increase the ability of the top steelmakers to service their debt in the short term.

Levered FCF returns to positive territory in 2013 for top 50 steelmakers



Note: 2013 based on S&P calculation of the last 12 months.

Source: EY analysis, S&P Capital IQ

There are also early signs of some inherent risks to come, with 2014 set to bring a shift in the interest rate cycle and, with it, higher funding costs for issuers. Critical to the year ahead is how the markets deal with the timetable for the tapering of quantitative easing. This impact will likely be felt beyond the US markets, with emerging markets having already seen significant outflows in 2013 and Asian investors fearing tighter borrowing conditions.¹³ As a result, there is a risk that access to funding for steelmakers will be difficult particularly for those either in

developed markets with high gearing or with a high exposure to volatile emerging markets. There will also be the flow-on effect from steel end consumers, who especially rely on bank funding for their operations.¹⁴ Higher interest rates could also impact steel demand for consumer goods, such as US cars and home construction.

Some credit ratings agencies have downgraded several of the major European steelmakers, reflecting the more challenging outlook for European steel markets in 2014, and an anticipated slower rate of improvement in their credit ratings over the next two to three years.¹⁵

In particular, several Scandinavian steelmakers have struggled with liquidity in 2013. However, actions taken by companies to respond to this risk – deleveraging through non-core divestments, cost cutting, capacity cutbacks and productivity improvements – will begin to have an effect on shoring up credit ratings. For example, Finnish steelmaker Outokumpu is shoring up its finances with a rights issue of €650m. Further, Outokumpu will divest assets back to ThyssenKrupp. This will partly reverse Outokumpu’s 2012 acquisition of ThyssenKrupp’s stainless steel business, Inoxum.¹⁶

As revenue remains either flat or negative, conservation is taking hold and cash flows are weak. In this environment, borrowing only stresses the balance sheet and challenges credit ratings. Further, issuing equity dilutes shares, creates more dividends and saps the corporation of its earnings power.

Steelmakers were, however, active in the capital markets, raising more capital in 2013 than the previous year. However, when compared to 2011, capital raising remains muted. There have been an increased number of follow-on equity issues as steelmakers seek to restore their balance sheets, with 34% of all global mining and metal secondary equity raisings being undertaken by steelmakers. We expect further deleveraging to be predominantly achieved through internal cash generation or continued divestment of non-core assets, with dilutive equity issues likely to be an unpopular choice in an environment of depressed share prices.

14. “2014 Outlook: Western European Steel,” *Fitch Ratings*, 29 November 2013.

15. *Ibid.*

16. “Finland’s Outokumpu announces major financing plan, divests assets,” *Reuters News*, 30 November 2013.

13. “Fitch Street View: Asian Investors Fear Corp Liquidity Drain on Fed Tapering,” *Fitch Ratings*, 17 November 2013.



Follow-on activity increased by 217% in 2013. This included state privatizations, such as the partial stake sale of the Steel Authority of India. ArcelorMittal issued a combined offering of ordinary shares (US\$1.75b) and mandatory convertible subordinated notes (US\$2.25b) in January 2013, accounting for the lion's share of this increase. Equity offerings appear to be largely concentrated in Europe. A reduction in working capital also appears to be one of the big sources of cash flow in Europe. China's steel industry reportedly has a debt ratio of about 70%, making steel companies more susceptible to bankruptcy fears in the current demand environment.¹⁷ In India, there have been a number of debt restructurings, essentially to extend the tenure for tiding over current cash flow challenges.

In the first half of 2014, we may see early refinancing as steelmakers attempt to take advantage of low interest rates ahead of potential rate rises. Continued market volatility may limit the scope of steelmakers to issue bonds on the favorable terms of recent years. Pockets of confidence and yield seeking will continue but investors are likely to seek safety in investment-grade names. Alternatively, greater compensation on higher-risk, high-yield steel issues will be sought in the form of higher coupons, particularly given the sector's exposure to emerging markets.

Capital raising by steelmakers 2011-13

	2011	2012	Change	2013		
	US\$m	US\$m	%	US\$m	% change from 2012	% change 2013 as compared to 2011
IPOs	383	172	-123%			
Follow-ons (equity)	13,561	2,856	-375%	9,051	217%	-33%
Convertibles	459	163	-181%	2,774	1599%	504%
Bonds	30,418	22,877	-33%	19,835	-13%	-35%
Loans	53,571	19,662	-172%	31,248	59%	-42%
Total	98,392	45,730	-115%	62,908	38%	-36%

Source: *M&A and capital raising in mining & metals*, EY, 2014

17. "China's debt-laden steel industry on the brink of bankruptcy," *International Business Times*, 29 August 2013, <http://www.ibtimes.com/chinas-debt-laden-steel-industry-brink-bankruptcy-1401415>.



Bob Stall
Partner, Transactions
EY, US

“In 2014, steelmakers will face the increasingly complex dilemma between their decision to continue investing capital in upstream raw materials security or into downstream operations to expand product offerings to gain market share or capture a greater share of the downstream value chain.”

Capital allocation – optimizing value

Rising pressure to service debt will see an increased examination of asset portfolios in the steel sector. The burning platform of non-core divestments to release cash remains critical, particularly in light of negative free cash flows for most of the sector. However, a focus on extracting maximum value from the sector’s existing portfolios of assets remains important.

Over the last few years, the value chain in the mining and metals market for the steel industry has transformed, with upstream having been able to retain proportionately the larger share of the value. The reasons include degree of consolidation of the mining, steel and downstream product segments. However, margin opportunities also evolve downstream in value-added product segments or by creating new product segments with a long-term economic life cycle. Successful players will optimize through re-allocation of capital within portfolios to those components most aligned with their strategy. Despite a globalizing trend in the steel industry, the drivers of success may be different in different markets, creating demand for capital over varying investment horizons, scales and risk-reward ratios. Decisions will have to be made about how to allocate capital between upstream or downstream operations and to sectors and geographies in order to achieve the highest return on investment and maximize long-term shareholder value.

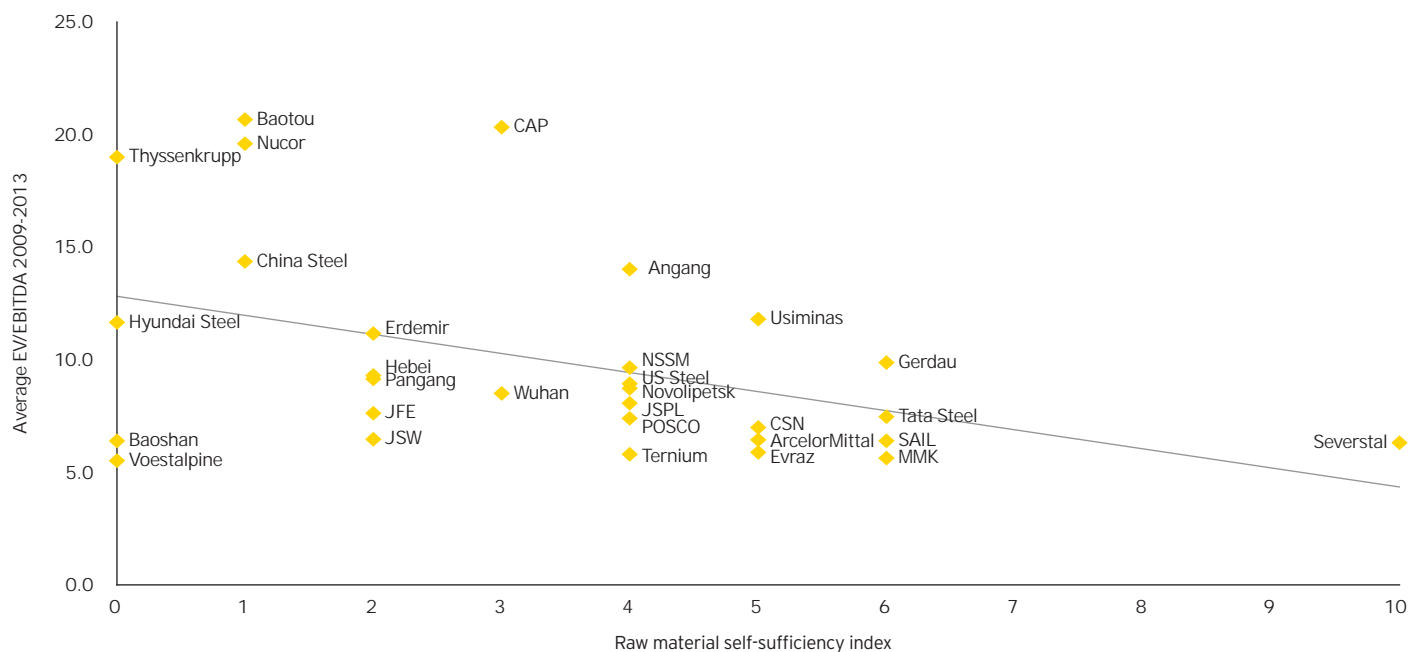
To have any hope of meeting their capital needs, steelmakers must extract as much value as possible from every capital dollar invested. While all sector participants are similarly affected as the steel cost curve is fairly flat, best-in-class capital allocation processes are important to survival and success.

Allocating capital upstream

Many steelmakers have responded to the challenge of raw materials security and margin volatility by making acquisitions or investing upstream to access raw material resources on a long-term basis. In an environment where value appeared to have moved upstream in the business, this has been quite a common trend. Captive access to iron ore and coal does provide stability to aggregated cash flow streams, and hence builds the confidence of capital providers and leads to better ratings in several markets.

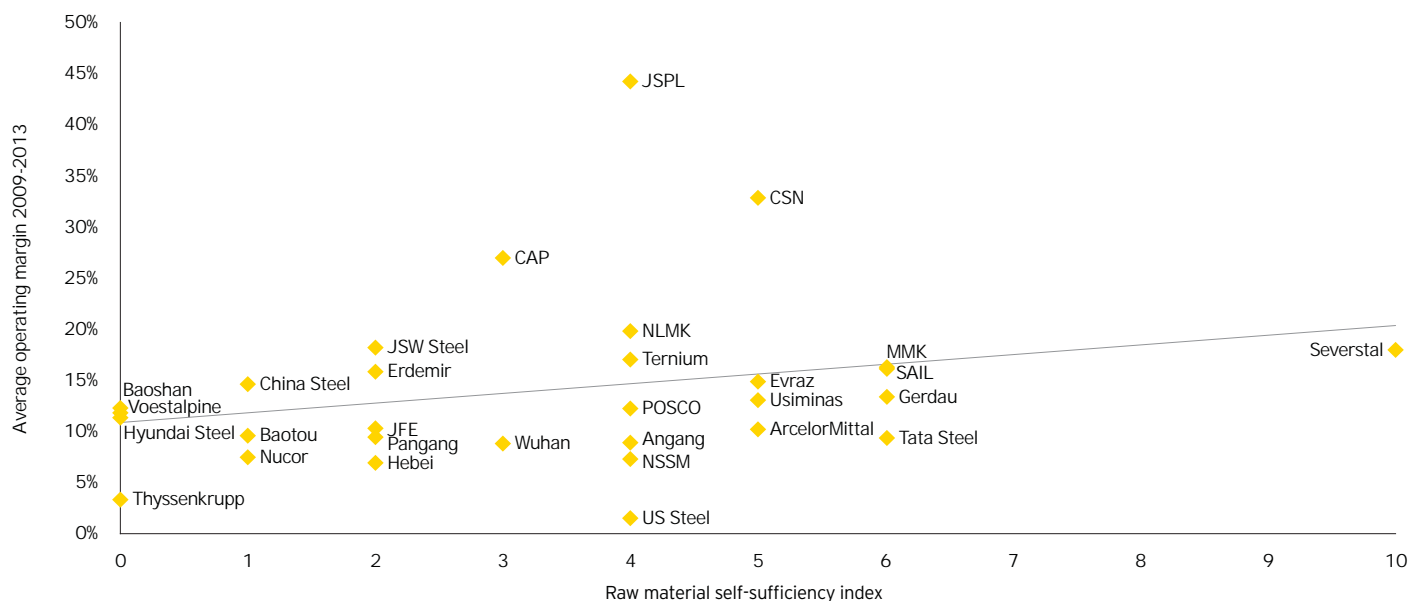
However, this approach has been losing its attractiveness of late in most situations. Admittedly, there are risks associated with this strategy, namely overpaying for scarce resources while competing with mining companies, lack of operational experience of mining business and additional capital allocation required for building infrastructure. The strategy, inherently, also assumes that raw materials prices will continue to increase.

Average EV/EBITDA 2009-13 vs. raw material self-sufficiency



Source: EY analysis, S&P Capital Insight data

Average EBITDA margin 2009-13 vs. raw material self-sufficiency



Source: EY analysis, S&P Capital Insight data

Despite these risks, vertical integration remains a trend in the sector as volatile raw material prices for iron ore, metallurgical coal and scrap steel continue to exert significant pressure on steel margins. This was evidenced by a couple of large deals in upstream mining assets in 2013, namely:

- POSCO and China Steel purchased a 15% stake in ArcelorMittal's Canadian iron ore mines for US\$1b and secured long-term offtake agreements. This enabled ArcelorMittal to extend its Liberian iron ore assets while using the proceeds to pay off debt.
- Evraz secured the remaining 50% stake in Russia's Rospadskaya coal mine for US\$964m.

This trend has likewise been observed in other raw material assets. For example, Nucor has entered into a long-term, onshore natural gas working-interest drilling program in the US to hedge natural gas pricing volatility for its Louisiana-based direct reduced iron (DRI) plant.¹⁸

In EY's *Global Steel 2013: a new world, a new strategy* we considered the effect of vertical integration on the value of steelmakers, concluding that raw material self-sufficiency has a negative correlation with the enterprise value of a steelmaker, but has a positive impact on its EBITDA margins. During 2013, this negative correlation in value only became more pronounced.

Ultimately, steelmakers must ask the question – "What business am I in?" – to determine whether they are steel producers, or steel producers and miners. If they are both a producer and a miner, then the question remains as to what value they bring to the portfolio of mining assets that another miner does not?

If that second question cannot be answered with a clear value proposition, the market will put a discount on this part of the business due to lack of transparency or clarity about the mining strategy. In other words, this may not be the best use of expensive capital if these assets could be sold for more value rather than holding them.

18. Form 10-k, Nucor website, 2012 (accessed via <http://www.nucor.com/investor/sec/html/?id=8762796&sXbrl=1&compId=107115>, 20 December 2013).



Pierre Mangers
Executive Director
EY, Luxembourg

“The proliferation of the Chinese EAF production route will globally change the level playing field of ferrous metallic supply markets: more expensive scrap at the expense of cheaper iron ore.”

Raw material strategy – finding opportunity in volatility

Raw material outlook: market surpluses to drive down prices

In 2013, global seaborne iron ore demand grew by about 9% y-o-y on the back of robust Chinese steel production, which experienced approximately 7% growth on 2012 levels and increased to 755 million tonnes.¹⁹ The rise in Chinese steel production rates kept the iron ore price (62% Fe, CFR North China) at an elevated level, with prices averaging US\$133 per tonne during the year.

China's ability to meet its domestic share of iron ore supply may be at its lowest with grades now below 20% Fe content. At these levels or lower, it is likely that China can only supply a quarter of its iron ore requirements. However, the outlook for seaborne iron ore supply is different (led by Vale, Rio Tinto and Fortescue Metals Group) with growth expectations of 8.4% per annum from 2013 to 2018 and with expected annual growth rates of 4.4% in its demand during the same period.

This will result in an oversupplied iron ore market, with the market balance moving from a deficit of more than 8% of seaborne demand in 2013 to a surplus of almost 9% by 2018. This is likely to dislodge an equivalent amount of marginal cost production in China, with a resultant downward pressure on iron ore prices.

Cost escalations during recent years pushed up the marginal cost of iron ore, thereby supporting its elevated price levels. However, from 2015 onward, increased iron ore supply to the market will displace the current high-cost production, potentially lowering the marginal cost of supply.

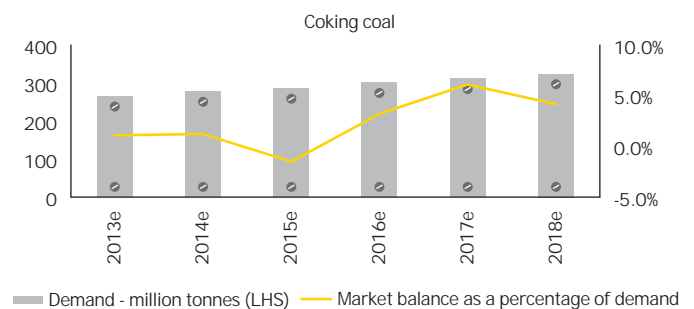
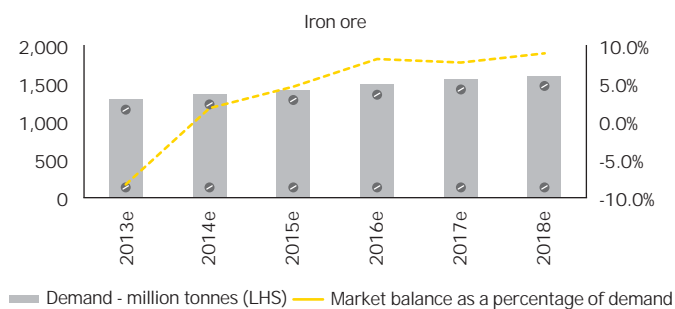
Similar to the iron ore market, the seaborne coking coal market is also expected to run into oversupply. The market balance is expected to grow from a surplus of about 1% of seaborne demand in 2013 to a 6% surplus in 2017 and back to about 4% by 2018. The US will continue its status as the swing producer, affecting the market balance in the medium term. However, the tapering of quantitative easing is likely to push up the US dollar, making US coking coal more expensive and therefore less viable in the seaborne coal market.

China will remain the biggest importer of coking coal, accounting for about a quarter of coking coal imports in 2018. Coking coal supply will be driven by large-scale expansion in Australia. Some notable projects in Australia include Anglo American's Grosvenor mine (5mtpa) and the Jellinbah's Lake Vermont expansion (4mtpa). Supply from Mozambique and Mongolia is also expected to ramp up; however, the timing of large-scale expansion from these regions is highly variable.

As a result of growing surpluses, consensus indicates a sharp fall in iron ore prices – prices are forecast to fall from an average of US\$133 per tonne to US\$100 to US\$110 per tonne between 2013 and 2018. Coking coal prices, having experienced steep declines, are forecast to rise in the medium term from US\$159 per tonne in 2013 to about US\$200 per tonne in 2015 and 2016, but are then expected to gravitate toward US\$180 per tonne by 2018.

It is worth noting that the iron ore and coking coal markets are highly concentrated and their global trade is dominated by a few major players that can swiftly reduce production to alter the market balance and affect prices. Prices will also be affected by steel market demand, which is driven by the uncertain global economic environment. The ensuing uncertain and volatile price environment will have a bearing on the steel industry's raw materials sourcing strategy.

Surpluses in seaborne iron ore and coking coal markets



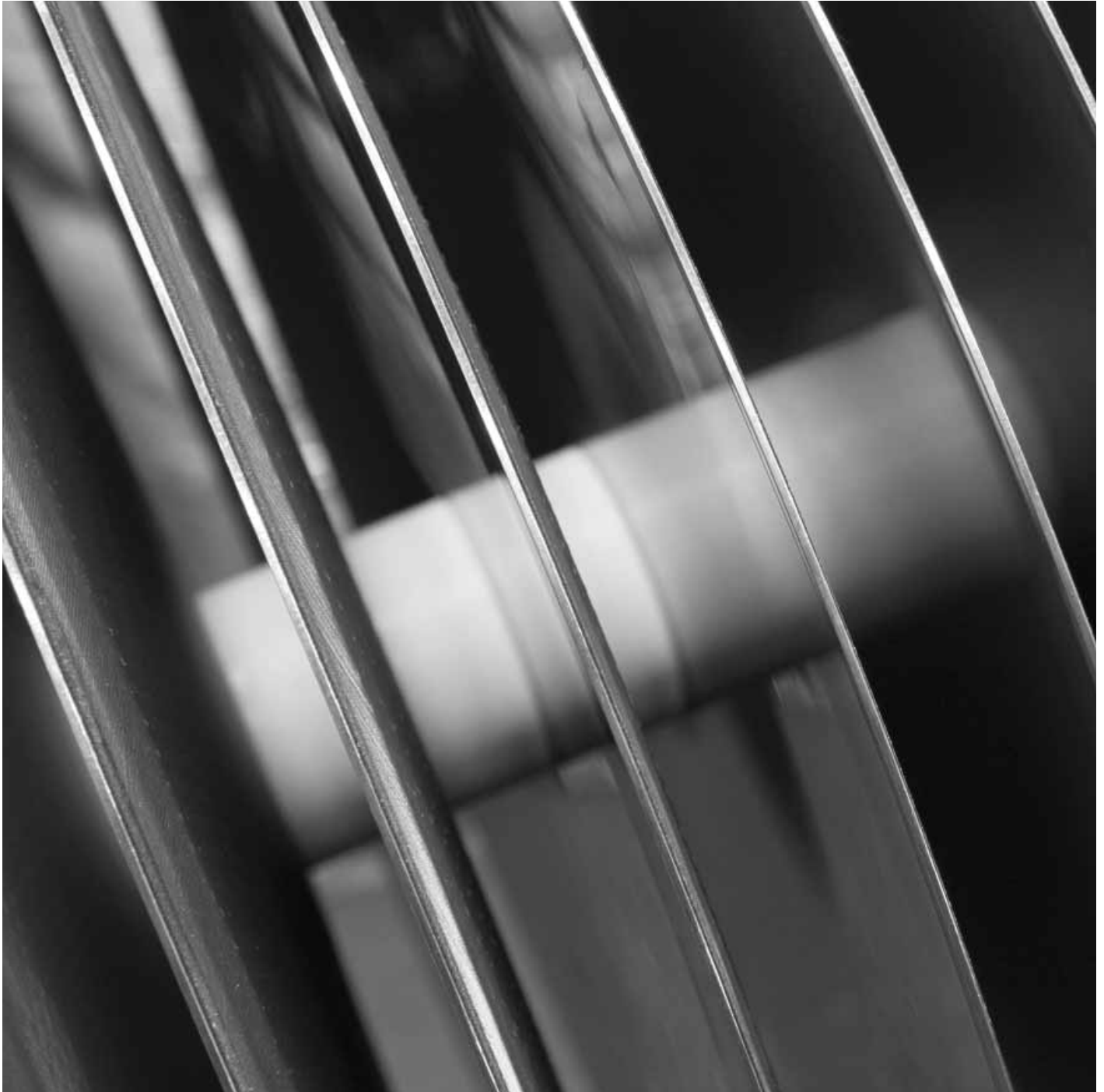
Source: Morgan Stanley²⁰

19. "Global Metals Playbook: 4Q13," Morgan Stanley, 7 October 2013, via ThomsonOne.

20. Ibid.

From 2015, we expect to see a rising supply of steel scrap in China. As this will impact the price of scrap, the proportion of blast furnace feed from scrap is expected to increase to 20% as is common in the US blast oxygen furnaces. Reports suggest increasing availability and use of scrap from China could displace about 350mt of iron ore imports by 2030.²¹

The anticipated market balance shift between 2013 and 2018 will be driven by supply surpluses. Imports will grow at 4.1% per year, led by China (7.8% per year) and India (7.1% per year), whereas exports will grow at an annual rate of 4.7%.²²



21. "Miners steel against China's scrap growth," *The Australian*, 30 September 2013, (accessed on 14 January 2014).

22. "Global Metals Playbook: 4Q13," Morgan Stanley, 7 October 2013, via ThomsonOne.

Volatility in raw material prices

Steelmakers have largely responded to the challenge of raw material volatility and security of supply by vertically integrating their operations, whereas steel consumers appear to be using steel derivatives to mitigate this challenge.

Volatile raw material prices may not necessarily be negative for steelmakers who can be sufficiently agile to benefit from falling raw material prices. However, historic trends suggest steelmakers have not fully benefitted from downward movement: steel prices have responded quickly. In the current environment of surplus steel capacity, steelmakers' ability to pass through cost escalations has been capped. On the other hand, a relatively more consolidated raw materials industry has been swifter in its opportunistic reactions to demand-supply imbalances. Hence, steel producers often face margin squeeze without any protection. Steelmakers may enter into long-term supply agreements with miners, but prices are settled on an ongoing basis.

Steelmakers need to understand their exposure at every stage of the value chain and implement risk management strategies to efficiently manage the exposure arising from the timing difference between the selling price (of steel) and the purchasing price (of raw materials). This delta impacts a steelmaker's profitability which, in turn, impacts investors' confidence in the industry. Increased price volatility also makes it more difficult to predict prices, thus impacting capital projects and financing.

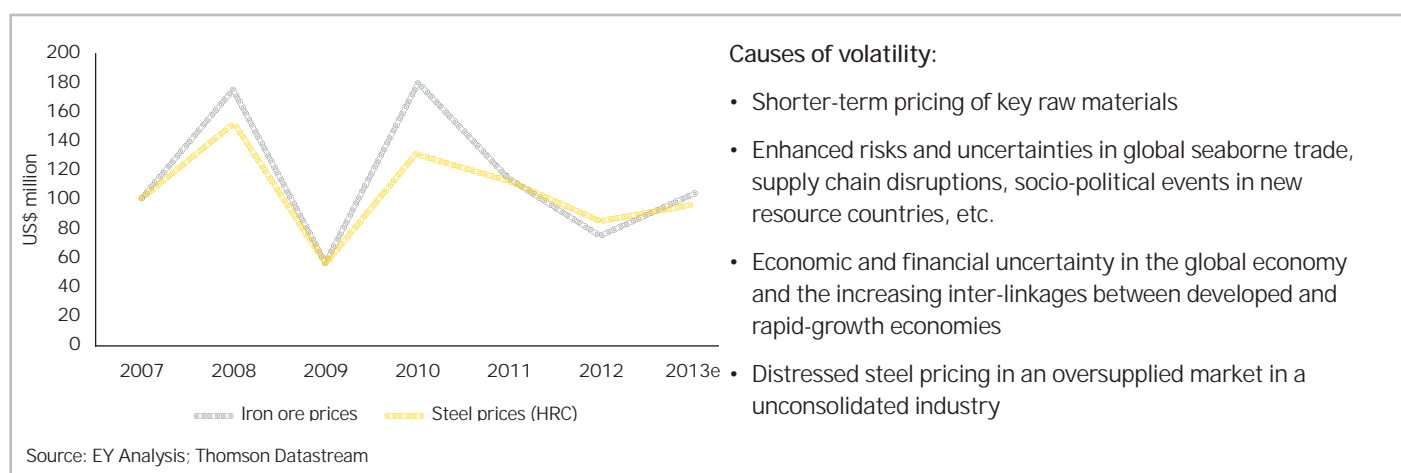
Financial instruments

Financial instruments have become an increasingly important alternative strategy to manage volatility in steel markets, with the recent price setting mechanism moving away from fixed contracts. The practice of using financial instruments to hedge both raw material and steel product price risks is not as prevalent in steel markets as it is in other commodity markets, such as base metals, oil and agricultural resources. Steelmakers, in general, have yet to fully embrace the use of derivative instruments to manage volatile input costs, while they remain in inventory, and assist customers with pricing certainty. They appear to be concerned about a number of risks, including:

- **Price divergence risk:** it is caused by the divergence between physical and derivative prices due to economic factors affecting physical commodities, even if a suitable derivative product is available.
- **Basis risk:** the financial contracts are for a certain specification of steel and do not fully reflect the wide variety of steel products required by customers. The wide product variety can also lead to basis risk in steel derivatives, leading to a faulty hedging strategy.
- **Liquidity risk:** illiquid steel and raw material contracts, unlike other more mature markets, make prices more prone to speculation and thus do not fully reflect market conditions.

However, financial instruments are increasingly being adopted by Asian steel producers, including Chinese and South Korean steel mills.

Average price movement of steel, iron ore (indexed to 100)



Causes of volatility:

- Shorter-term pricing of key raw materials
- Enhanced risks and uncertainties in global seaborne trade, supply chain disruptions, socio-political events in new resource countries, etc.
- Economic and financial uncertainty in the global economy and the increasing inter-linkages between developed and rapid-growth economies
- Distressed steel pricing in an oversupplied market in a unconsolidated industry

It can be argued that steelmakers are concerned that in a more transparent market, they may lose the pricing power of closed-door price negotiations with their customers.²³ We believe steelmakers' reluctance to accept derivatives are part of the price evolution. That said, we also believe the advent of derivatives is inevitable and that first movers can take advantage of early stage opportunities. For example, when aluminium was introduced on the LME, it faced similar concerns, but today it is one of the most heavily traded metals on the LME.

Steelmakers' initial concerns are being countered by their customers' openness to derivatives. For example, companies such as General Motors and Ford Motor Company have begun to use derivative instruments as part of their material sourcing strategy.²⁴

Data from CME shows that participation in steel derivatives markets is highest among merchants, followed by end customers and junior miners that need to hedge to get finance. Steel mills and major miners have among the lowest derivative adoption rates.²⁵

Prevalence of steel and raw material financial instruments

The market has identified the opportunity of using derivatives for steel and raw materials. As a result, a number of hedging instruments have come into play in recent years, as shown in the accompanying table.

Iron ore derivatives remain the most traded and established of all ferrous derivatives, with steel derivatives being most active at the SHFE. The LME billets are also widely followed but have relatively lower volumes than steel derivatives in the SHFE. Liquidity in scrap derivatives is still building at a moderate pace, whereas coking coal futures are very much in the early stage.²⁶ Liquidity in steel derivatives is expected to pick up in the near term, with the hedging of price risk for steel products and steelmakers' raw materials set to "become an almost universal activity" ²⁷ by 2016.

In October 2013, China's DCE launched the country's first iron ore futures. Some of China's largest steelmakers, such as Baosteel, Angang and Shagang, have already shown an interest in these financial instruments.²⁸ Since derivative trading is inevitable to gain momentum, EY recommends that steelmakers:

- Understand which markets and instruments are most appropriate for their needs
- Determine their required level of liquidity for participation
- Consider how to manage their business risks
- Understand their risk appetite
- Design and implement appropriate governance processes
- Decide what trading system to use
- Have a strategy to access necessary skills

23. "Steel Users Seek Futures," *The Wall Street Journal*, 21 September 2011, <http://online.wsj.com/news/articles/SB10001424053111904194604576583113702321854>, accessed on 20 December 2013.

24. "Whirlpool enters steel futures," *SteelOrbis website*, 12 March 2010, <http://www.steelorbis.com/steel-news/latest-news/whirlpool-enters-steel-futures-market-518247.htm>, accessed on 21 December 2013.

25. "Principal role of a commodity futures exchange," CME Group, 2013.

26. "The 'financialisation' of ferrous markets," The Steel Index, 30 May 2013.

27. "Strategic insights from WSD - January 2014," AIST website, www.aist.org/AIST/aist/AIST/Publications/wsd/14_jan_wsd.pdf, accessed on 28 December 2013.

28. "China iron ore futures debut briskly, back pricing clout push," Reuters, 18 October 2013, <http://www.reuters.com/article/2013/10/18/china-ironore-futures-idUSL3NOI809Z20131018>, accessed on 21 December 2013.

Various financial instruments available in steel and raw materials

Commodity	Grade	Market platform	Reference index	Region of commodity delivery
Iron ore	DCE Iron Ore Quality Standards	DCE	DCE settlement price	DCE warehouse
	62% Fe Fines	ICE (OTC)	Platt's iron ore 62% CFR China	CFR China
	62% Fe Fines	NYMEX CME	Platt's iron ore 62% CFR China	CFR China
	62% Fe Fines	NYMEX CME	TSI iron ore 62% CFR China	CFR China
	62% Fe Fines	SGX	TSI iron ore 62% CFR China	CFR China
Coking coal	Australian HCC mid vol	NYMEX CME	Platt's	FOB Australia
	Australian premium HCC low vol	NYMEX CME	1) Platt's 2) Argus	FOB Australia
Steel scrap	US ferrous busheling	NYMEX CME	AMM US Midwest	Midwest US
	Turkish HMS imports	NYMEX CME	Platt's	CFR Turkey
Steel	Global Billet	LME	LME settlement price at expiry	LME warehouse
	Domestic US HRC	NYMEX CME	CRU US Midwest domestic HRC index	Midwest US
	Billet	NYMEX CME	Platt's	FOB Black sea
	Rebar	DGCX	DGCX settlement price at expiry	Dubai
	China domestic rebar	SHFE	SHFE settlement price at expiry	Warehouses in China
	China domestic wire rod	SHFE	SHFE settlement price at expiry	Warehouses in China
	Ingot/Billet	NCDEX	NCDEX settlement price at expiry	Warehouses in India
Ingot/Billet	MCX	MCX settlement price at expiry	Warehouses in India	

DCE: Dalian commodity exchange; ICE: Intercontinental exchange; NYMEX: New York mercantile exchange; SE: Singapore exchange; SMX: Singapore mercantile exchange; LME: London metal exchange; DGCX: Dubai gold and commodity exchange; SHFE: Shanghai futures exchange; NCDEX: National Commodity & Derivatives Exchange; MCX: Multi-commodity exchange of India

Opportunity in volatility

Another way steelmakers and steel consumers can address volatility is through better collaboration and communication. This would require steelmakers to become more customer-focused and respond to their customers' desire for price certainty from order to delivery. Steelmakers will need to know their customers' plans and requirements as well as their own inventory cycles and steel distribution strategy. A derivatives-based strategy can allow producers to give pricing certainty to their customers and build out the cost of this into the price quoted. This tool may indeed become a differentiator in attracting and retaining a long-term customer with a higher degree of mutual trust and confidence.

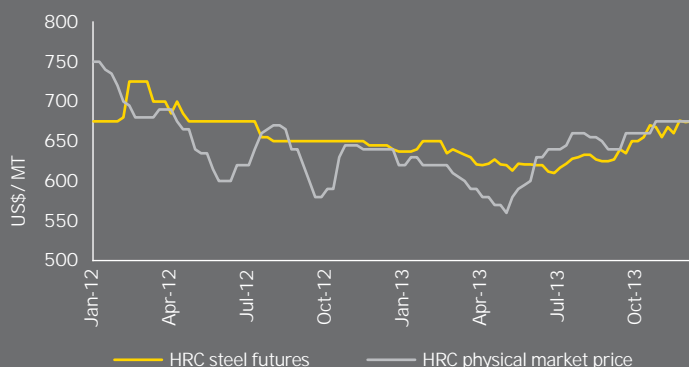
Managing risks related to steel derivatives

Managing price divergence risk

The principle of hedging price risk with futures is based on the assumption that futures and spot prices converge since the price of the derivative should be closely linked to the underlying price. If prices diverge, the gain or loss in a futures position would fail to offset any movement in the underlying cash position and the hedge would be ineffective.

The chart below shows the price variation of CME's Hot-Rolled Coil (HRC) steel futures against that of physical HRC prices. We observe the two prices usually diverge rather than converge with the price difference in the range of -US\$75/tonne to +\$75/tonne (-10% to +13%).

Price variation observed in steel market²⁹



Source: Bloomberg

Two factors need to be considered in the price discovery process of the futures:

- The relative dominance of the two markets, i.e., in which market prices are first determined, as this influences price discovery in the other market
- The nature and extent of price divergence between the two markets

These factors, or some variants of them, can be estimated using various statistical models, such as Garbade and Silber, Gonzalo and Granger, Granger causality and the Hasbrouck model.

Managing basis risk

Hedging with derivatives entails taking a position in a derivative that will offset the price movement in the underlying commodity in the same time period. However, the price movements of the two assets may not always occur in this time period, especially if there are market or geographic differences. Hence, time lag is also an important factor that needs to be taken into account when constructing a hedge.

Steel derivatives are not standardized like those of base metals, agricultural products or oil. Hence, a like-for-like derivative may not always be available for hedging, making the use of a proxy to hedge necessary. For example, a steelmaker may not have an exact steel derivative to hedge cold-rolled coil (CRC) steel price risk and may have to use CME's HRC contract, which is a related product. This type of hedging is commonly known as proxy hedging.

Proxy hedging exposes hedgers to basis risk. This risk can be minimized by using a proxy with a high price correlation with the physical commodity and by monitoring the correlation throughout the hedging period to avoid unhedged exposures in case of a correlation breakdown. Therefore, regular rebalancing of the hedge portfolio needs to be done dynamically in case of proxy hedging.

Managing liquidity risk

Market liquidity ensures ease of buying and selling, efficient price discovery and lower transaction costs. In the global steel derivatives market, this liquidity is still evolving. Because steel tends to have regional pricing and steel derivatives contracts currently exist for only a few product markets.³⁰

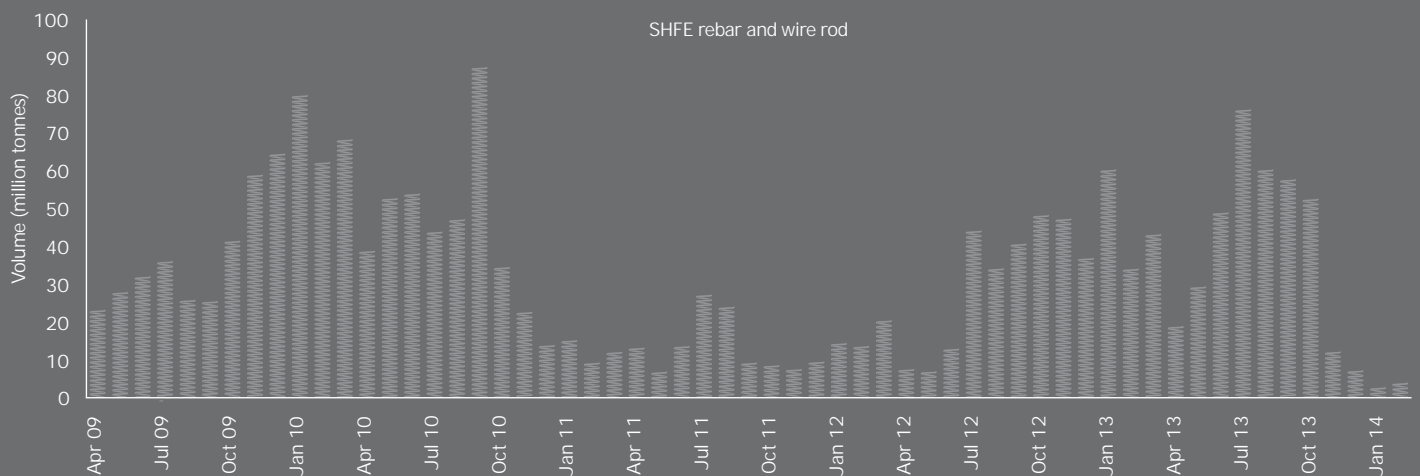
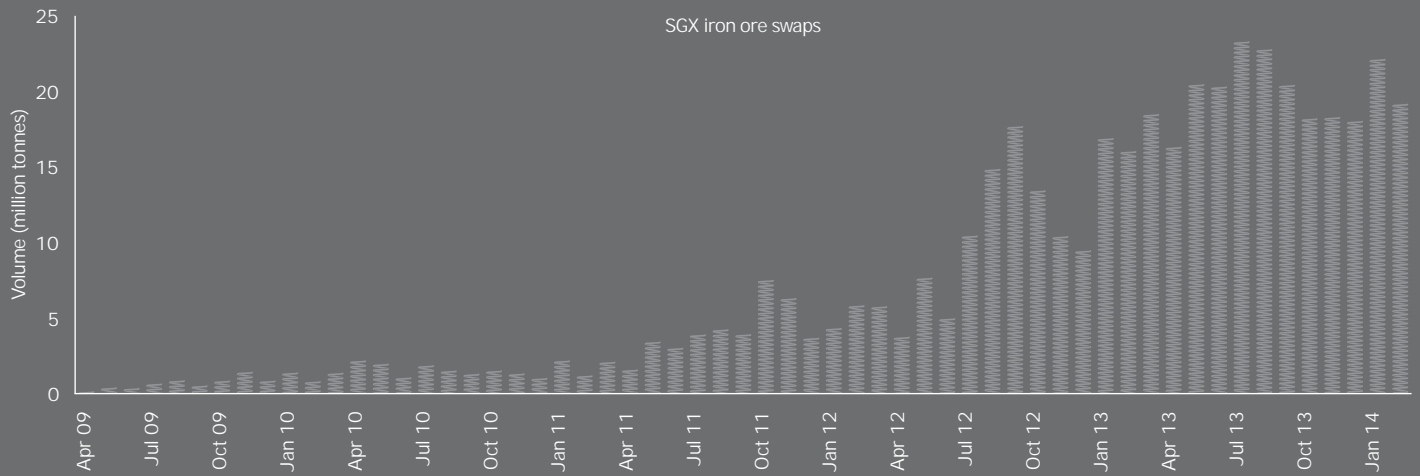
The accompanying graphs show an increasing trend in the Singapore iron ore contract and a strong liquidity for rebar futures on the Shanghai Futures Exchange (SHFE). Unsurprisingly, most of the derivatives trading is taking place in China, the largest producer and consumer of ferrous commodities.

Daily volumes in excess of 2 million tonnes of iron ore are providing ample liquidity for most steel mill purchasing. This increase in liquidity will, in turn, attract greater volumes from the major suppliers who are weary of flooding the derivatives markets.

29. HRC Steel Futures - US Midwest Domestic Hot-Rolled Coil Steel Index Future, HRC physical market price - HRC price of US carbon steel US or CA origin short tonne delivery Midwest warehouse.

30. "The 'financialisation' of ferrous markets," The Steel Index, 30 May 2013.

Iron ore and rebar derivative volumes on Shanghai and Singapore exchanges



Source: SGX, SHFE, ThomsonOne

On the basis of estimates by the World Steel Dynamics (WSD), in 2013, the traded derivatives volume of the SHFE rebar's futures was more than three times that of physical consumption volume. For other major global steel contracts, such as the US HRC and LME billet contracts, the traded derivative volumes are lower than physical consumption volumes. The world's oldest major steel contracts – the LME steel billet futures – have seen a sharp falling

trend in volumes over the past few years. This is due to LME's significant reduction in the supply of steel billets used for physical delivery in its major delivery locations. The decreasing liquidity of the LME steel billet contracts has led to the CME HRC futures gaining popularity in recent years.³¹ However, traded derivatives volume remains low as compared with consumption volumes, indicating low market development and limited liquidity.

31. "LME Metal Inventory Hubs Signal Steel Billet Contract's Downfall," *MetalMiner website*, <http://agmetalmminer.com/2012/12/07/lme-metal-inventory-hubs-signal-steel-billet-contracts-downfall/>, accessed on 7 February 2014.



Preparing for future steel demand



Steel demand and competitiveness

Globally, we see steel intensity stabilizing as developed markets mature and as China shifts its economy away from infrastructure and toward consumer-led economic growth. The steel intensity curve explains the long-term drivers for steel use – both over time and across countries at a point in time. The curve of steel intensity shows this decline in peak consumption as economies mature to a more stable intensity. China's steel intensity is forecast to peak at above 900 million tonnes per annum after 2020.

Countries or sectors may enjoy a temporary boost depending on economic conditions but will eventually mature and stabilize in the long run. Stage 1 of the curve is the most steel intensive, driven by construction and infrastructure demand. In many rapid-growth markets, which are still at the bottom of the steel intensity curve, we believe steel consumption will continue to be driven by the growth of the construction and infrastructure sector in those regions.

As previously discussed, in the face of variable demand, the industry's flatter cost curve can be both a challenge, and an opportunity. Over the last few years, many steelmakers have focused on improving their cost effectiveness, and as a result, the competitive landscape has changed. The larger steelmakers have more opportunity to tap into other geographic markets, given the lower freight rates, and several players have increased confidence to do so.

In addition, steelmakers can increase their competitiveness through strong customer relationships and by tapping into niche, higher-value markets. However, the competition in these high-value steel segments is going to intensify as the major players are already using relationships they have built in these niche markets to drive the continuum of value for their products.

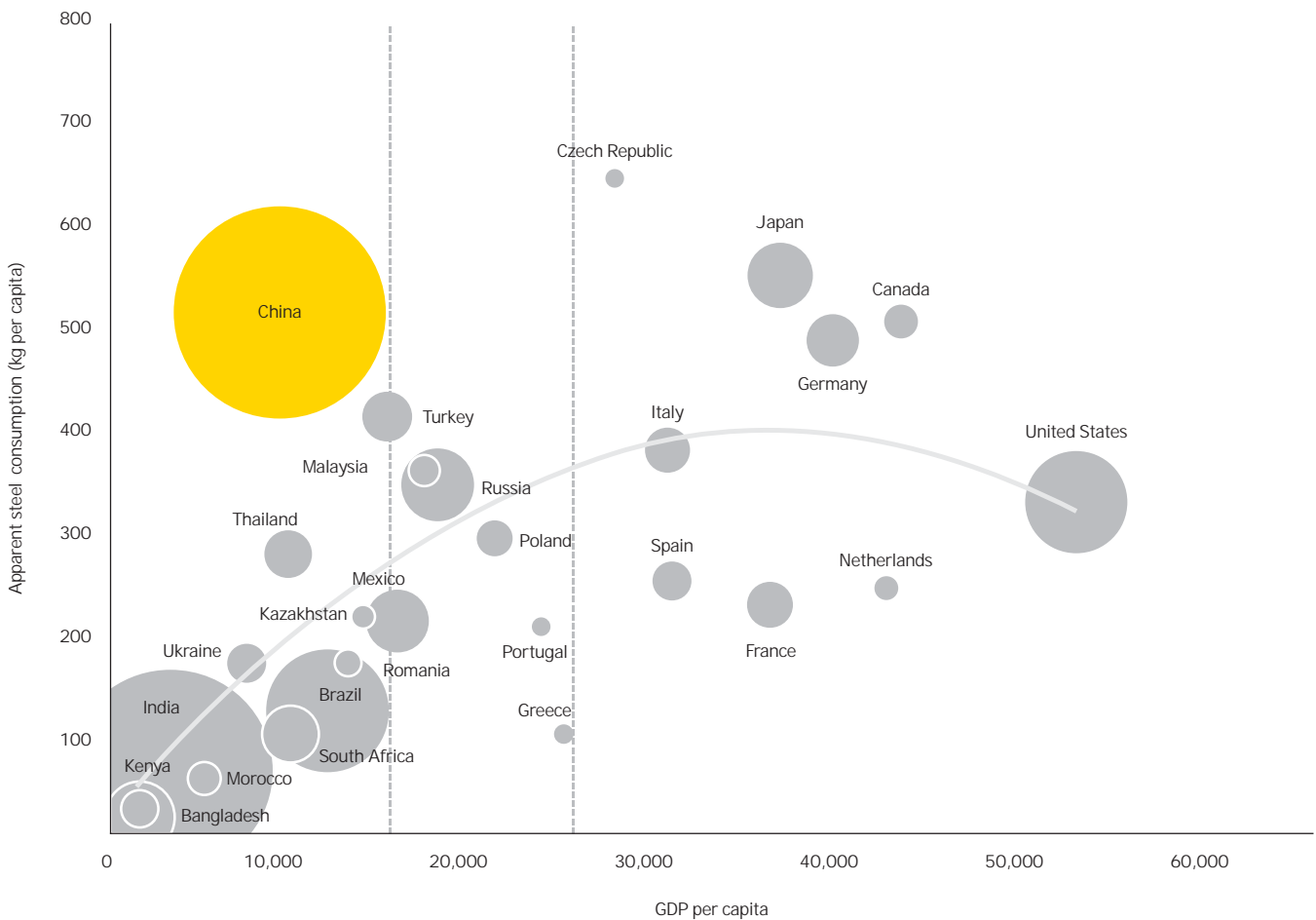
Commodity steel producers will struggle to survive as this competition intensifies. Producers with old technology and high-cost production will be driven out of the market. In China, this trend has the potential to transform the industry. Increased consolidation of production in the hands of the top producers will bring about better cost management, more ability to invest in new technology and research and development. It will enable a stronger negotiation on prices with raw material producers and will remove distressed selling of steel below marginal cost. It will also increase the competitiveness of the larger Chinese players globally.



Carlos Bremer
Partner
EY, Brazil

“The survivors in today’s steel market will have a better footprint in terms of market access, a more efficient cost curve and better access to raw materials, resulting in more efficient value chains. Increasing vertical integration of the steel value chain and diversification of product portfolio is a big question in today’s Brazilian market, as local players are still unsure of right path forward.”

Current steel intensity



Source: World Steel Association, IMF

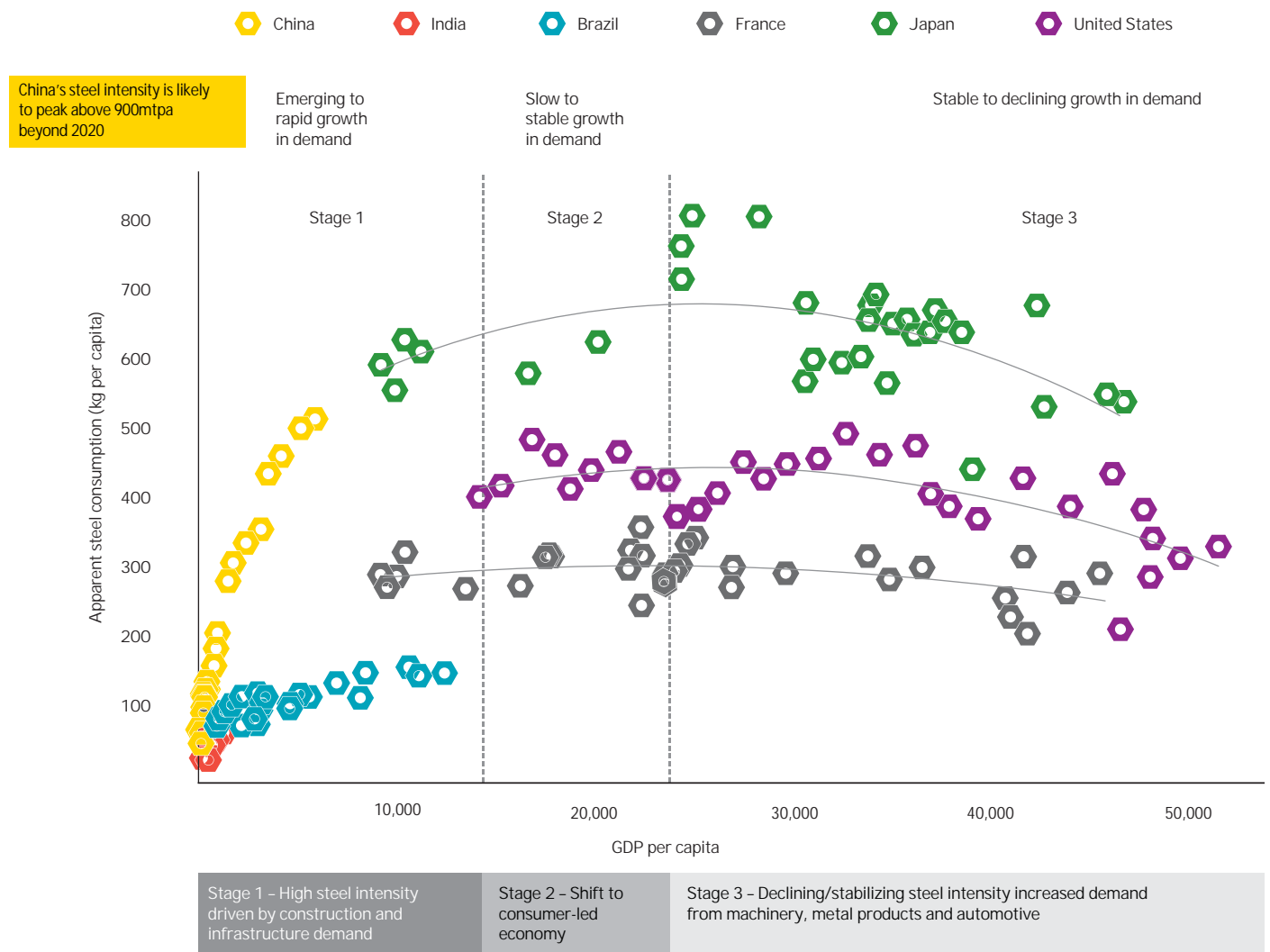
In light of this, steelmakers are keeping an eye on the horizon as to which sectors are likely to need differentiated, high-value steel products. An understanding of the challenges and opportunities in end-user markets will lend insights into the life cycle of products and enable significant competitive advantage. Clearer visibility over who buys where (procurement center), buying strategies, as well as where supply is needed (consumption center) will be essential for successful marketing and tapping into shifting supply chains across the world. It will create opportunities to produce high-value products and to access markets in a more creative and agile manner. However, there will be caution about sticking to a particular strategy of product mix for the long term as many steelmakers see value in having more flexibility in terms of capacity utilization, product mix, technology and customers.

How to prepare for future steel demand

1. Carry out optimal capital management
2. Consider derivatives to mitigate price risk management
3. Understand downstream markets
4. Understand and pursue demand in rapid growth countries
5. Map supply chains and trade flows
6. Ensure operational agility to ensure flexibility and rebalance portfolios when necessary
7. Collaborate with customers
8. Innovate new products

Steel intensity over time

Steel intensity stabilizes or starts to decline at around US\$15,000 to US\$20,000 GDP per capita



Tapping into high-growth sectors

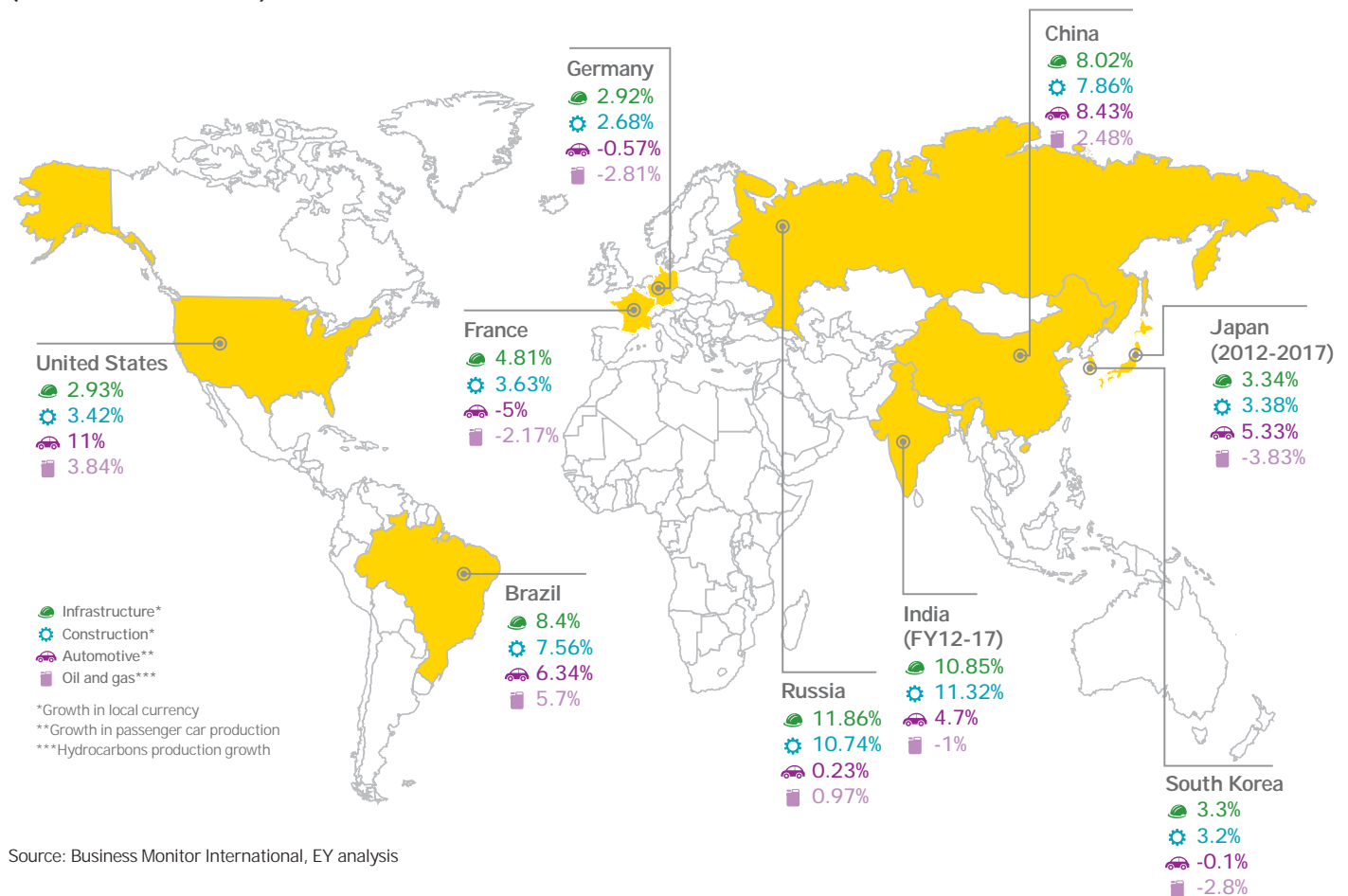
While growth in sectors varies from region to region, overall we will see robust growth rates for steel in construction and infrastructure, automotive, and oil and gas sectors.

In terms of steel demand, construction and infrastructure remains the dominant sector, but we do expect to see more high-value products, especially sector, but in terms of light weight and

strength. Most of the growth in the automotive sector will come from the US, China, Brazil, Japan and India. China's automotive sector is expected to boom, with light vehicle production significantly outpacing that of the US out to 2017. Increasing capital expenditure in upstream oil and gas offers a significant opportunity to provide high-value, anti-corrosive products for oil wells and pipelines.

These are all positive indicators that, despite the challenges of overcapacity, exchange rate fluctuations and pressure on margins, support the optimistic outlook for the steel sector.

Forecast growth rates in steel end-user markets to 2016 (unless otherwise indicated)



Source: Business Monitor International, EY analysis

Infrastructure and construction

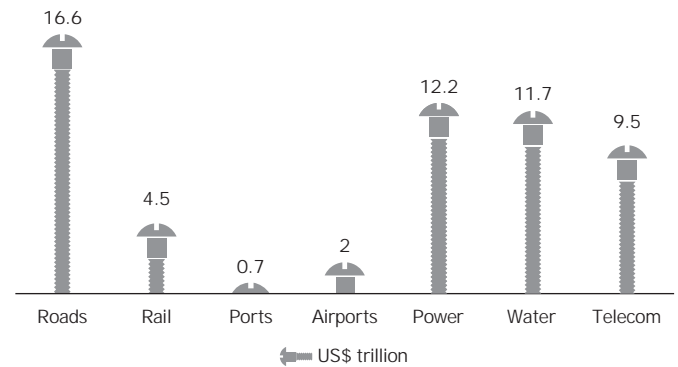


Infrastructure investment

Globally, steel demand from construction and infrastructure accounts for more than half of the overall steel demand. It accounts for 55% of steel demand in China and about 42% in the US.

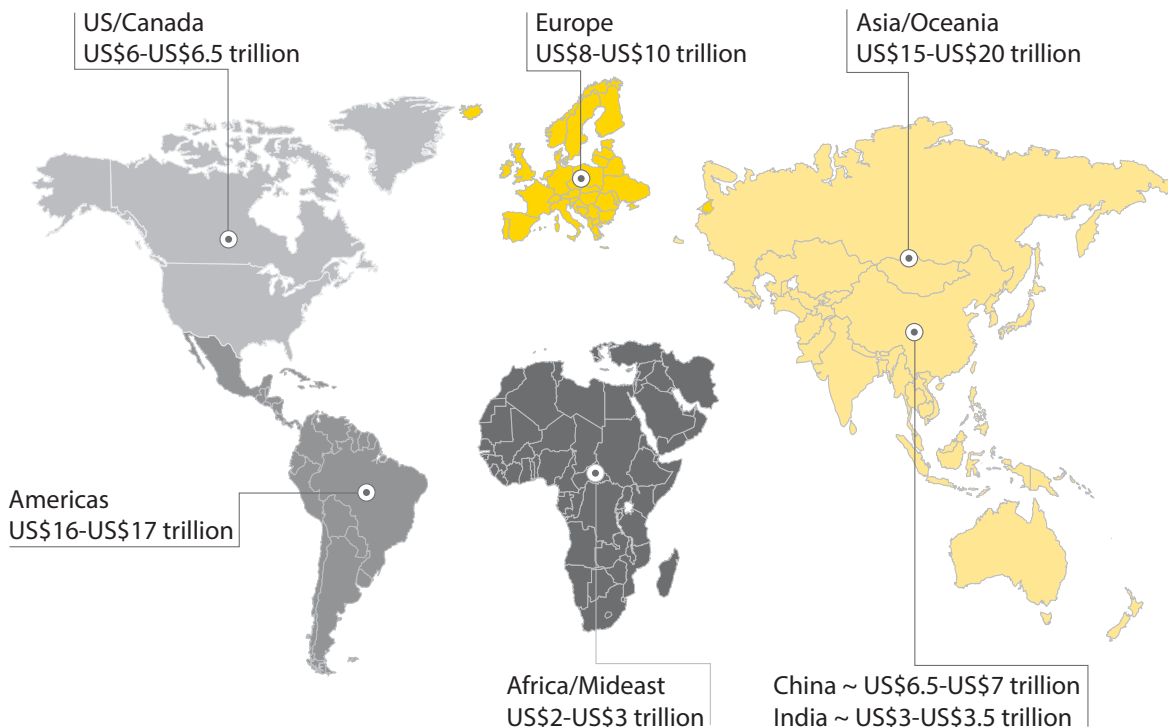
Investment in infrastructure is seen as a critical success factor for economic growth. It is estimated that the global investment required by 2030 is c. US\$57t and is expected to be incurred across all aspects of infrastructure assets; steel intensive infrastructure such as rail, ports and airports will require about US\$7.2t over the same period.³²

Estimated infrastructure spending 2013-2030 (based on projections of demand equalling 3.5% of global GDP, 2013-30)



Source: Mckinsey Global Institute, "Infrastructure productivity: How to save \$1 trillion a year," McKinsey Global Institute, January 2013.

Projected global infrastructure spending by region (2010-2030)



Sources: BCG report - The Global Infrastructure Challenge, 2010, EY report - Infrastructure 2011 - Strategic Priority, secondary research.

³². "Infrastructure productivity: How to save \$1 trillion a year," McKinsey Global Institute, January 2013.



Bill Banks
Global Infrastructure Leader
EY, Australia

"The pace of change in the world is shifting rapidly with new expectations emerging about the speed at which infrastructure should generate benefits. Infrastructure solutions must not only support economic growth, but have the flexibility to adjust to a rapidly changing environment."

Many governments do not have enough resources to finance the required capital-intensive infrastructure. The numbers vary across regions but there has been a general trend of governments (including the developing economies of Asia) spending less than their overall budgets on infrastructure. The gap between global infrastructure investment needs and public financing is estimated to widen to US\$500b a year by 2030.³³ Innovative models, such as public-private partnership (PPP), public concession models and investment from sovereign wealth funds are being used to attempt to bridge this gap.

China and Brazil represent the obvious opportunities for infrastructure growth over the coming years. Over the past 20 years, China has invested over 8.5% of its annual GDP into infrastructure,³⁴ almost double the World Bank's recommended 4% to 5% of GDP, and far exceeding that of the US and EU. Under China's current five-year plan (2011-2015) the Government intends to invest US\$1t in urban public facilities and a further US\$500b is planned for its rail network. Brazil has significant investment requirements to prepare itself for both the World Cup in 2014 and the 2016 Summer Olympics.

Other areas of continuing growth are in the Middle East and Africa where major public and private investments are being made in infrastructure and real estate. Both the regions, despite growth in steel capacity, are attractive steel export markets. Turkish steelmakers, in particular, have benefited from exporting to Africa and the Middle East as traditional EU steel exporters have been less competitive because of a strong euro. For example, Saudi Arabia's steel industry is expanding to meet increasing demand for long products as investment into real estate and infrastructure grows. Currently over half of this demand is met through imports.³⁵

We will also see increased investment in infrastructure around the world particularly as supply chains are playing an even bigger role in a country's growth. In today's world, products may routinely be assembled from components transported from across the world. This therefore requires much greater synchronization in infrastructure to feed the world supply chain.

33. "Institutional Investors Could Help Fill \$500 Bil. Infrastructure Funding Gap," S&P, 20 January 2014.

34. "Riding China's infrastructure boom," China Spectator, 27 February 2014, <http://www.businessspectator.com.au/article/2014/2/27/china/riding-chinas-infrastructure-boom>.

35. "Saudi Arabia Steel Industry Outlook 2018," PRNewswire, 13 March 2014, <http://www.prnewswire.com/news-releases/saudi-arabia-steel-industry-outlook-2018-250230621.html>.

Infrastructure spending to stimulate economic growth in developed markets

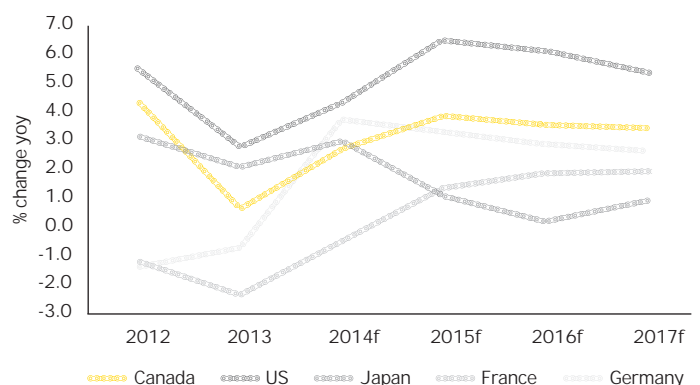
Maintenance and replacement of infrastructure to promote fiscal spending provides a source of steel demand. As governments withdraw stimulus, there are concerns that demand will decline again.

In this period of low growth and government deficits, economies need fiscal stimulus and creation of employment. Many are seeking to achieve this through investment in fixed assets, such as infrastructure (see figure below). While new infrastructure will provide the most stimulus, many developed nations are having to focus on replacing or repairing worn-out infrastructure.

The American Society of Civil Engineers estimates that the US requires \$3.6t in investment to maintain the national infrastructure in good condition.³⁶ The opportunity for steel in this required investment is obvious as steel plays a vital role in transportation infrastructure repair and development through a wide range of steel products such as steel plate, beams, reinforcing rebar and signage.

There are concerns, however, that steel demand will decline as economic stimulus is tapered, particularly as much infrastructure financing is dependent on both public and private spending.

Developed markets fixed asset investment (% change y-o-y)



Source: Oxford Economics

36. "2013 report card for America's infrastructure," American Society of Civil Engineers, 21 March 2013, <http://www.infrastructurereportcard.org>.

A growing middle class demands better infrastructure and housing

Steel-intensive phase of development with higher steel demand in emerging markets

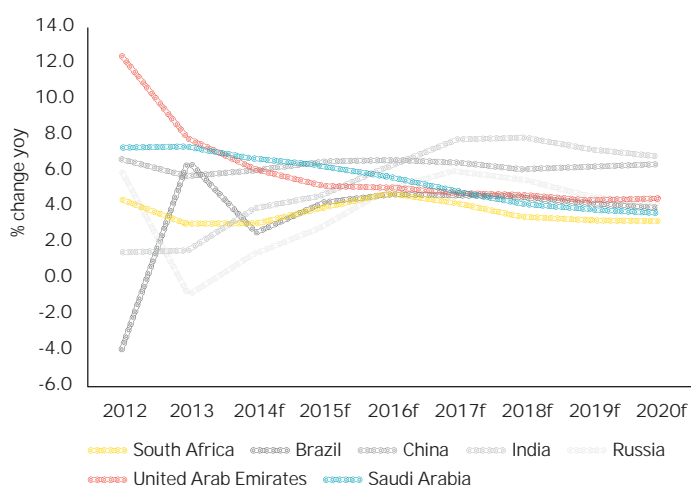
The pace and scale at which urbanization is taking place has risen dramatically from Asia to Africa. There is a greater concentration of population from rural to urban, that places a great need on necessary infrastructure to support major populations.

In addition, studies indicate that the middle class will constitute about half to two-thirds of the global population with Asia-Pacific forming two-thirds of this middle class, up from the current one-third. The middle class will have new money and new demands ranging from better housing and infrastructure to various other consumer durable items. The rising middle class will also lead to changing demographics in terms of average income and age of a household thereby accelerating the demand for per capita space.

The construction sector is particularly steel intensive in the early stages of an economy's urbanization, as there is an increasing need for new and better infrastructure for improved connectivity, efficient use of natural resources and creation of sophisticated transport hubs. Increased population density means taller buildings requiring more high-quality steel. Demand for steel will also arise from non-residential construction, which tends to lag residential construction. In 2014, several developed markets, looked set to see a revival in non-residential construction. In the US, construction spending increased by 9.4% in January y-o-y and is expected to maintain momentum throughout the year.

The chart below shows an increase in fixed asset investment (infrastructure, real estate and buildings) in developing economies where growing urbanization and the demographic changes are

Rapid-growth markets fixed asset investment (% change y-o-y)



Source: Oxford Economics

and will be a trigger for respective economies for fixed asset investments and for rising levels of steel consumption and intensity.

In rapid-growth markets, we expect that demand for long steel for use in the construction and infrastructure sector will increase. However, an oversupply of so-called "commodity steel" (due to lack of differentiation) and a large number of small to mid-size producers means profitability is expected to be muted as compared to other sectors.

Commodity long steel products for construction and infrastructure do not attract substantial margins. In China, steelmakers such as Angang Steel and Maanshan Iron & Steel have significant exposure to long products, and as a result, have been under tremendous pressure to protect margins over the last few quarters. As steel demand has weakened, steelmakers have optimized their product portfolio to focus on higher-value flat steel products.

Steelmakers do, however, have the opportunity to add value to their long steel product offerings. In emerging markets, steelmakers have the opportunity to leverage the technological advancement in developed markets and produce better quality steel for construction and infrastructure.

Major steel companies such as ArcelorMittal have innovated value-added steel solutions, e.g., anti-graffiti and anti-corrosion coatings, to improve its construction division products and to generate higher margins. The company recently launched the Optigal™ coating line in France, which increases the coating's performance and anti-corrosion characteristics of steel and uses half as much zinc as is normally required.



Implications for steelmakers

- Increasing investment in construction and infrastructure led to an 8% y-o-y increase in global demand for long products in 2013, but this varied considerably between countries and regions.
- China will retain importance in the long products market despite slowing growth in Chinese construction sector. Chinese long product demand growth is expected to settle by 2018 to below 5%.³⁷
- Geographic hotspots are emerging for construction demand e.g., the Asian construction market accounts for approximately 40% of total global construction spending. This is translating into significant steel demand in various countries, e.g., in Indonesia in the first half of 2013 demand for long products increased 73% to 3 million tonnes.³⁸ Steelmakers can increase sales by diversifying sales channels, including export channels, to take advantage of these hotspots.
- New product development to increase competitiveness with substitute materials, e.g., Tata Steel plans to introduce “Ground Granulated BF Slag” (GGBS) for the construction sector. This product is sustainable, cost effective, increases compressive strength and reduces carbon foot-print significantly.³⁹
- There are significant opportunities for product innovation and branding to differentiate construction steel products in the market.
- While long product volumes are expected to increase, to profit from these increases it will be necessary to have either flexibility in supply chain to supply hotspots in emerging markets or specialist steels to improve margins in developed markets.

37. “Global long products market overview,” Presentation to the CRU World Steel Conference, Prague, 18 March 2014.

38. “Indonesia president calls on steel sector to support growth,” *Steel Business Briefing*, 26 December 2013.

39. “Tata Steel launches ‘Ground Granulated BF Slag’ for the construction sector,” *Economic Times*, 11 December 2013.

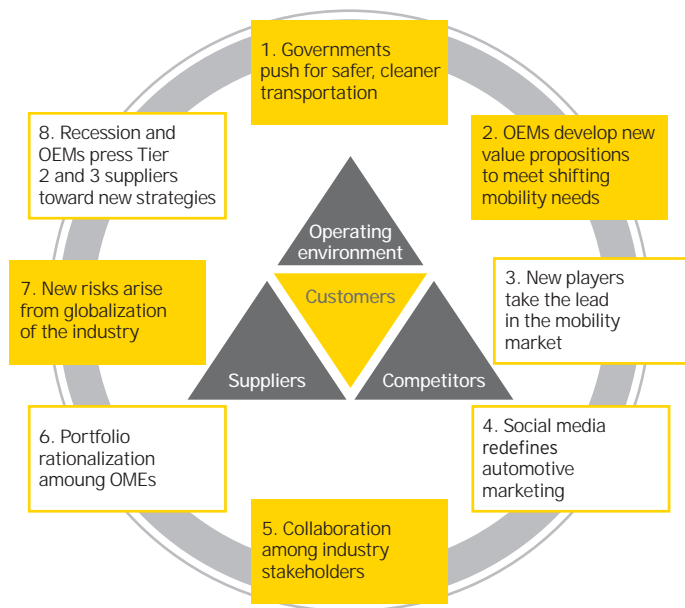
Automotive



Megatrends affecting the automotive industry

According to the EY Global Automotive Center there are eight mega trends affecting the automotive industry. These are as diverse as increased regulation to ensure safer, cleaner transportation to how social media is transforming marketing in the sector. A good understanding of how these trends will affect both the commercial and light vehicle industry over the next decade will enable steelmakers to become more competitive in how they pitch their products to this industry.

Eight mega trends shaping the global light vehicle industry



Source: EY Global Automotive Center

These trends will have a varying degree of relevance to steelmakers, depending on where the impact is on the value chain. We have highlighted megatrends that are likely to have an impact on steelmakers.

Governments push for cleaner, safer transportation

Cars of the future will drive demand for advanced high-strength steel

Mandatory emissions control is one of the biggest challenges faced by the automotive industry in North America and Europe,

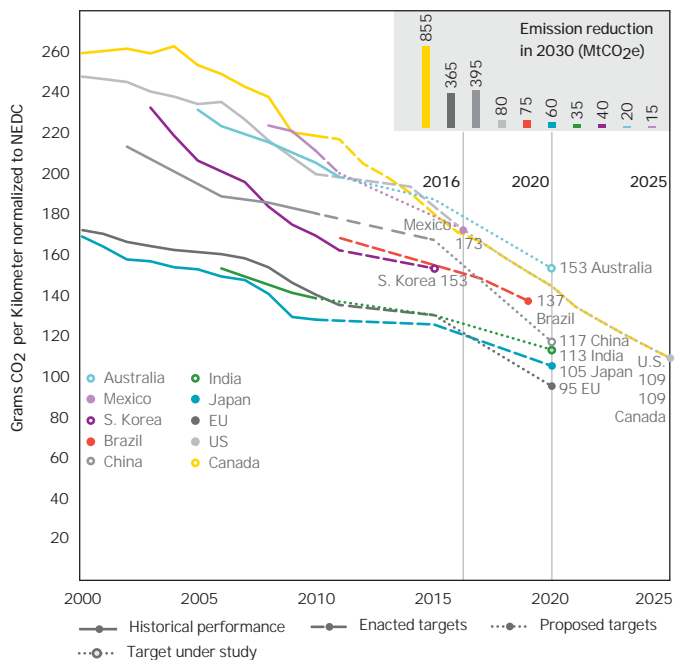
leading to an increased focus on both the size and weight of vehicles. Emissions criteria vary from region to region. In the US and Canada, emissions criteria are based on size, which benefits aluminum, whereas the rest of the world uses weight, which gives high-strength steels an advantage in the near term.

Further, emissions legislation and related regulations are not being implemented across the world to the same degree and this will have an impact on where we will see increased demand for advanced high-strength steel (AHSS).

In China, legislative and financial measures are being used to accelerate the introduction of sustainable technologies and alternative mobility choices to alleviate excessive energy consumption, severe traffic congestion and worsening air pollution. The Chinese Government continues to place strategic emphasis on the plug-in hybrid electric vehicles (EVs) and pure EVs while promoting the adoption of energy-efficient hybrid and ICE vehicles.⁴⁰

Graphic below shows the expected new light vehicles' greenhouse gas emission rates in the main vehicle markets that have either adopted (solid lines) or formally proposed (dashed lines) fuel efficiency and/or GHG standards. These standards will drive the development and introduction of new energy efficient technologies, smaller engines and lighter vehicles.

Emissions-related policy performance across regions



Source: ICCT

40. *Mega trends shaping the Chinese light vehicle industry*, EY, 2013.



Michael Hanley
Global Automotive Leader
EY, US

“Around the world, competition is fierce. Newly designed vehicles with state-of-the-art technologies are being introduced at every auto show. Understanding supply chain issues are more important than ever, as component suppliers are stretched to maximum capacity in some markets. From a resource perspective, steelmakers are collaborating with automotive manufacturers to embed flexibility into the supply chain for combined competitive advantage.”

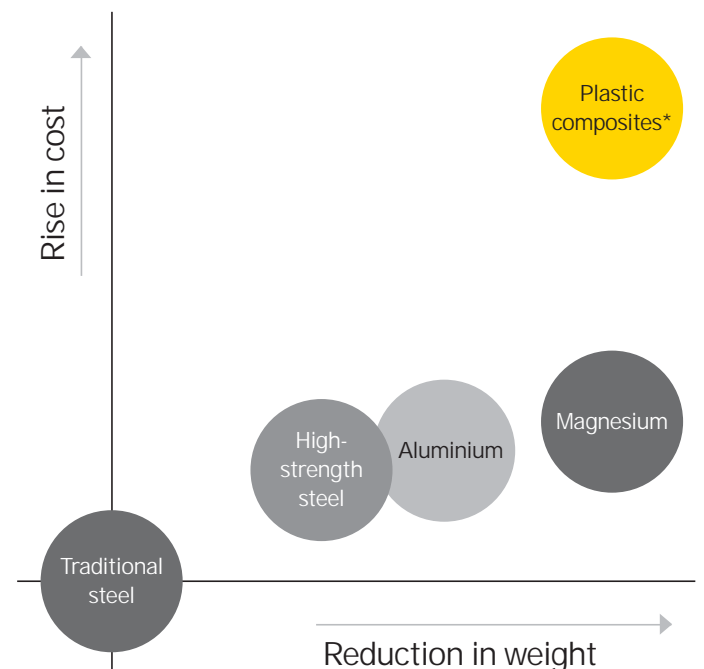
As a result of these regulations, vehicle manufacturers are now aggressively looking to re-invent their products (hollow seat frames, engine downsizing and electric power steering) and manufacturing processes (resistance spot-welding, rotary forging and resin transfer molding). In addition, they are increasing their research on hybrid vehicles and ultimately working toward complete electrification of vehicles using fuel cell technology to produce commercially viable EVs. Some of the top vehicle manufacturers, such as Toyota, General Motors, BMW and Ford Motor Company, have already showcased their versions of hybrid and pure EVs.

Use of AHSS along with other alternative materials, such as aluminum, magnesium and carbon fiber, is expected to increase significantly in these “cars of the future” (see chart below). However, vehicle manufacturers will also need to look at the applicability of various materials to different parts of the car. This is required to achieve a balance between lightweighting and costs (see chart to right). Significant weight reduction benefits of carbon fiber need to be balanced with concomitant rise in costs. Different parts of a vehicle also require different materials, and therefore, vehicle manufacturers will have to assess how they can reduce weight on a part-by-part basis.

Several vehicle manufacturers are working with steelmakers to develop AHSS to enable them to meet their emission-reduction targets. For example, Nissan has developed a new type of steel

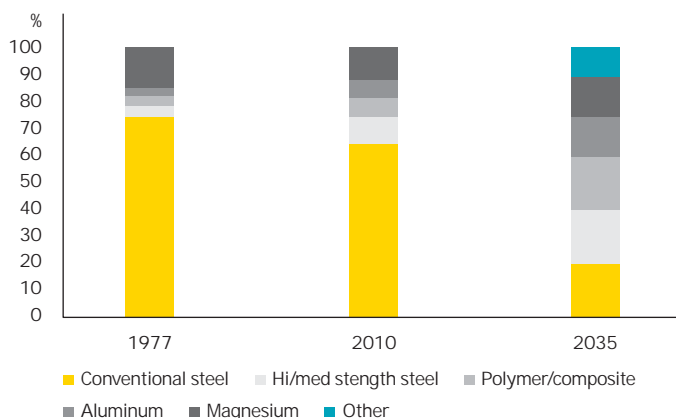
across its entire range when compared with 2005 levels.⁴¹ Steelmakers are also linking with government agencies to further the use of AHSS. For example, Severstal received a US\$730m conditional loan from the U.S. Department of Energy to support production of AHSS for the automotive industry.⁴²

Comparison of traditional steel with alternate materials



*Plastic composites include fiber reinforced plastics, thermoplastic, etc.
Source: US Department of Energy, Vehicle Technologies Program; Frost & Sullivan

Changing composition of light vehicles by material



Source: LMC Automotive

with Nippon Steel & Sumitomo Metal as well as Kobe Steel. Nissan plans to increase the use of AHSS in its vehicles by 25% by 2017. The use of this metal is integral to Nissan's “Green Program 2016,” which sets out to achieve a 35% improvement in fuel economy

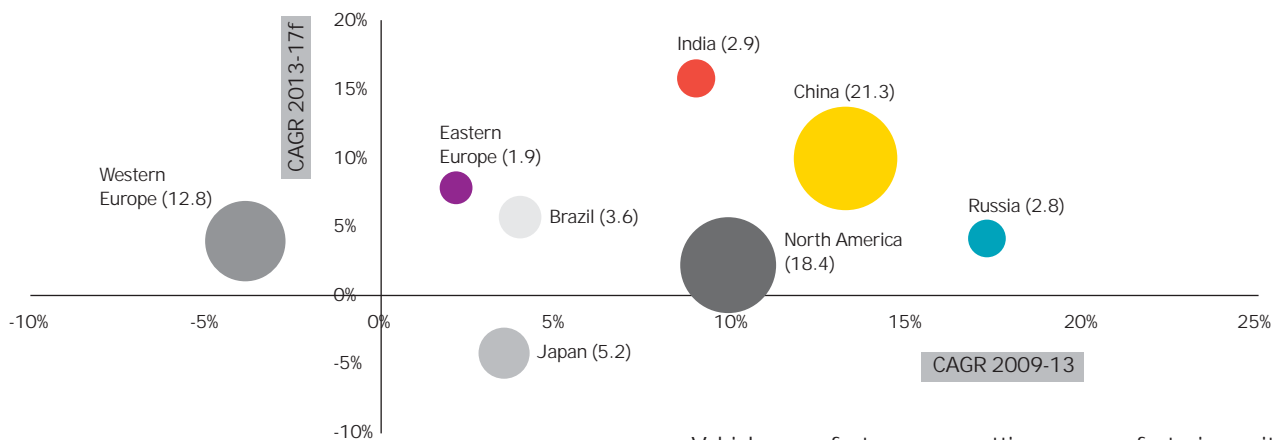
Original equipment manufacturers (OEMs) develop new value propositions to meet shifting mobility needs

Steelmakers investing through joint ventures to increase auto steel market share

Consumers in the developed and developing world have different mobility needs. Continued urbanization is likely to lead consumers

41. “Material trends in vehicle lightweighting,” *ProActive Magazine*, Issue 48, Spring 2013.
42. “Steel faces weighty ultimatum: steelmakers battle new competitors in the race to produce lighter-weight products for the auto industry,” *IndustryWeek*, 8 September 2011.

Light vehicle sales growth forecast



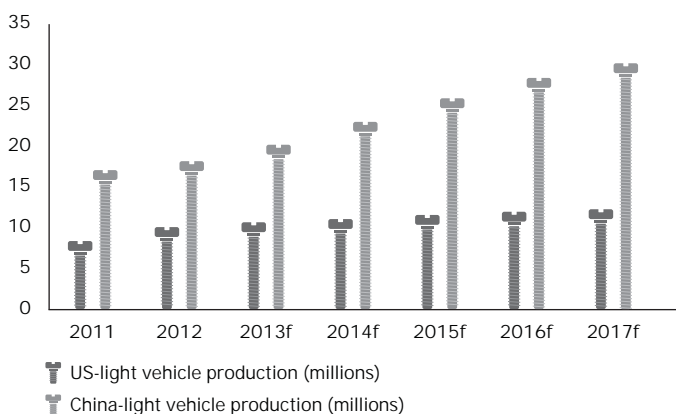
Source: LMC Automotive (4Q10, 4Q13)

in the developed world to seek alternatives to car ownership, even as it leads people in the developing world to buy more cars.

This diversity in demand is going to influence growth as well as the location of production. Most of the 4.8% per year growth in the global sales of light vehicles is going to come from rapid-growth markets of Brazil, China and India. The US and Europe will see moderate growth, whereas some developed markets, such as Japan, are expected to see a decline in sales over 2013–20 (see chart above).

In China, we expect to see a surge in steel demand from the automotive sector, particularly as rising per capita income is increasing the rate of vehicle ownership.⁴³ Steel demand from the Chinese automotive sector currently accounts only for 8% of

Light vehicle production – US versus China



Source: ICCT

the country's total steel consumption as compared to the US and Japan, which account for 20% to 25% each.

43. "Iron ore outlook – Raising the floor," Macquarie research, 26 September 2013, via ThomsonOne.

Vehicle manufacturers are setting up manufacturing units in higher-growth markets as regional demand for vehicles increases. There are several reasons for this, namely:

- Some governments have policies requiring local manufacturing and sourcing of material.
- A local presence provides a natural hedge against currency and cost fluctuation.
- A local manufacturing unit provides automakers with better visibility of the supply chain.
- Vehicles are increasingly being customized to cater to local needs.

As the size of the market is small and the economics for local manufacturing facilities do not stack up, vehicle manufacturers are likely to supply vehicles from regional manufacturing centers, which can serve as export hubs. For example, vehicle manufacturers are setting up units in India, southeast Asia and eastern Europe to export to regional markets.

As regional growth in automotive manufacturing increases, we expect to see an increase in joint ventures between steelmakers, as well as acquisitions by steelmakers to secure market share in various regions. ArcelorMittal, for example, has truly moved away from being a national or regional steel player and now has presence in a number of markets around the world (Brazil, Ukraine, Europe and the US). ArcelorMittal and Nippon Steel & Sumitomo Metal also recently acquired ThyssenKrupp's Steel America assets in Alabama for US\$1.6b to gain greater market share in the US auto sector.

In anticipation of the growing demand from China and other emerging markets, steel companies are either setting up or stepping up their auto-grade steelmaking facilities close to local vehicle manufacturers. For example, Japanese steelmaker, Kobe Steel, has signed a joint venture agreement with China's Angang Steel Company to produce and sell advanced cold-rolled high-strength steel sheets for automobiles in China.⁴⁴ India has witnessed several such partnerships between Japanese and Indian steel majors.

44. "Kobe Steel and Angang Steel sign joint venture agreement to make automotive cold-rolled high strength steel in China," Kobelco Angang Auto Steel Co. website, 17 October 2013. http://www.kobelco.co.jp/english/releases/2013/1188903_13522.html.

Collaboration among industry stakeholders

Steelmakers are increasing collaboration with vehicle manufacturers

Steelmakers are working closely with vehicle manufacturers and OEMs to intimately understand their raw material needs. For example, working with new types of steel may result in a retooling of machinery to provide the right shapes for vehicles. An understanding of the whole process is integral to productivity and cost effectiveness for both the steelmaker and the vehicle manufacturer.

Steel producers must continue to be an integral part of an automotive manufacturer's supply chain and build partnerships with the manufacturer and/or its tier-one and tier-two suppliers. This involves setting up certain downstream units closer to the customer and undertaking R&D activities in collaboration with these players in the value chain. For example, steel foundries, which produce semi-finished casting and work as an integral part of the supply chain, are located near customers and engage in R&D with them.⁴⁵

These suppliers are also often customers of the steelmaker, so good relationships will benefit the steelmaker along the supply chain. In addition, the more efficient is the setup of the steel distribution system, the better placed steelmakers will be able to supply a variety of automotive customers, many of whom work on a just-in-time basis.

Steelmakers may also restructure their business to optimize their product competitiveness, for example, Hyundai Steel acquired the cold-rolling steel business of Hyundai Hysco in December 2013 for US\$2.6b. This new integrated structure will help the companies sell auto steel to their affiliate company – Hyundai Motors – which enjoys an 80% share of the South Korean domestic auto market.⁴⁶

New risks arise from globalization of the automotive industry

Steelmakers will be increasing their bargaining power with customers through consolidation

OEMs are being challenged to devise radical operational strategies to tackle new risks emerging from globalization. From demand-to-supply misalignment and volatile raw material prices, to changing regulatory policies and shortage of qualified workers in developed markets, OEMs are looking at how they can enable their value chain to be flexible enough to adapt.

45. "Study on the Competitiveness of the European Steel Sector," Directorate-General Enterprise & Industry, August 2008 page 18.

46. "Hyundai Steel to buy Hysco unit for carmaker sheet supply," *Bloomberg*, 17 October 2013.

Vehicle manufacturers will identify demand first and then assess how to build the supply chain. On the basis of the size of a given market, vehicle manufacturers are moving to produce localized vehicles. While ultimately the economics of the supply chain will determine procurement of raw materials such as steel, often a locally based steelmaker will be preferred to ensure supply security. This also helps manage currency volatility.

In addition, vehicle manufacturers, such as General Motors and PSA Peugeot Citroën, and BMW and Daimler, work together to jointly procure raw materials. This helps with the volumes and the ability to standardize steel grades, and helps bring down costs. The terms of these agreements tend not to be disclosed publicly. Vehicle manufacturers also address raw materials price volatility by being more flexible in procurement contracts with suppliers, e.g., if the price goes above a certain level, then steelmakers can increase the price and vice versa. Increased consolidation in the steel sector will give producers more bargaining power with vehicle manufacturers. In addition, increased liquidity in derivatives for steel products will help vehicle manufacturers and steelmakers manage price volatility across the value chain.

Implications for steelmakers

- Automotive steel demand accounts for around 12% of global steel consumption.
- Flat steel demand is expected to remain stable or decrease slightly due to continued weight reductions and material substitution offset by the increase in the number of new vehicles manufactured. However, the lightweight strength attributes of these products will attract higher margins.
- Steel accounts for 68% of passenger car material. While the use of other materials is increasing, steel could remain the largest used material in automobiles for the foreseeable future.
- Increasing use of AHSS in automotive production even though aluminum and carbon fiber reinforced polymer (CFRP) are lighter. This is largely because on AHSS offers the right balance on a cost-weight-strength basis.
- Implementing strategic joint ventures to take advantage of increasing automotive demand in certain regions, e.g., ArcelorMittal and Nippon Steel & Sumitomo Metal also recently acquired ThyssenKrupp's Steel America assets in Alabama for US\$1.6b to gain greater market share in the US auto sector.
- Regulation to increase industrial activity, for example the removal or lowering of excise duties on vehicles in India, will have a positive effect on flat steel demand.⁴⁷
- Efficient procurement of steel is vital for automotive manufacturers and they are often willing to share in the cost of ensuring a stable supply of steel.

47. "Excise duty cut on automobiles to spur steel demand," *Business Line (The Hindu)*, 18 February 2014.

Oil and gas



Capital spending in upstream oil and gas

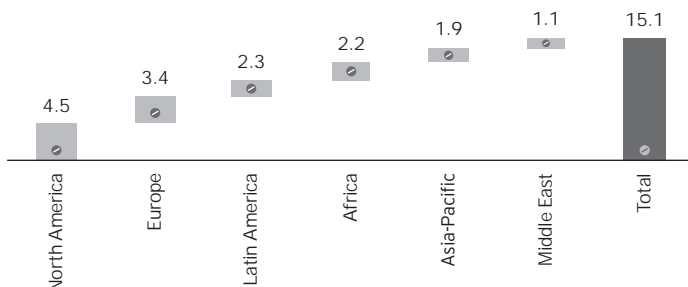
Demand for oil country tubular goods (OCTGs) is going to increase in line with growing capital expenditure in upstream oil and gas.

According to the EY Global Oil and Gas Center the oil and gas industry is witnessing an unprecedented wave of capital spending, driven by the need to build capacity to meet the growing energy demand from emerging markets and to replace depleting supply sources. This capital expenditure is being underpinned by consistently higher global oil prices as well as gas prices in and outside of North America, driven by what is called the “shale revolution.”

According to IHS Herold, global upstream capital expenditure reached a record US\$626.7b in 2012, representing a 13% increase over US\$555b in 2011 and a CAGR of 18% from 2009. This trend is expected to continue: in its most recent *World Energy Outlook*, the International Energy Agency (IEA) estimates a cumulative investment of US\$15.1t (equivalent to an annual average spend of US\$657b) in the global upstream oil and gas sector during 2013–35. This investment is spread across all regions, as depicted in the accompanying chart.

Similarly, other estimates of upstream oil and gas spending are equally bullish. For example, analysts at Morgan Stanley see upstream oil field services (OFS) spending growing at a rate of 5.5% per year through 2020, with offshore spending growing by

Regional cumulative upstream oil and gas investment 2013–35 (US\$ trillion)



Source: “World Energy Outlook 2013,” International Energy Agency.

8.4% per year and onshore spending growing at 3.6% per year. On a regional basis, Morgan Stanley expects North American spending growth at 4.3% per year, with Latin American growth at 8.8% per year, spending growth in Europe, Africa and CIS at 7.2% per year, and growth in the Middle East and Asia at 3.5% per year.⁴⁸

The majority of steel is sold to upstream projects through OFS companies and contractors. OFS’ revenues are the dominant part of upstream oil and gas spending, and OCTG is one of the largest sub-segments of the total estimated spend in 2013.⁴⁹

Era of “easy oil” approaches its end

An increase in unconventional oil and gas projects gives OCTG steel producers an opportunity to tap into a niche market where premium steel products will be essential.

As the era of easy oil approaches its end, players are looking to tap into opportunities in unconventional oil and gas (including shale gas and light, tight oil), as well as in frontier areas, such as ultra-deep water and the Arctic. Recovering these reserves requires high levels of investment and advanced technology. Companies are increasingly engaging in multibillion dollar, technically and operationally demanding projects, termed as “mega projects” to commercialize these reserves.

In North America, there has been a dramatic increase in unconventional projects, particularly in light of the shale boom. Elsewhere, other major projects include offshore projects such as the Gorgon LNG projects in Australia, which will cost about US\$60b, and deep-water projects off both East and West Africa.

The most readily available indicator of upstream activity is the Baker Hughes rotary rig counts. As is shown on the next page drilling activity has broadly recovered from the collapse associated with the global financial meltdown. Activity has been broadly increasing in every region, except North America. Rig activity has also been gradually shifting to offshore.

48. “Global Upstream Spending Analysis Through 2020,” Morgan Stanley Research, 13 January 2014.

49. “Oilfield Service revenues by sub-segment,” *Spears & Associates*, 2014.

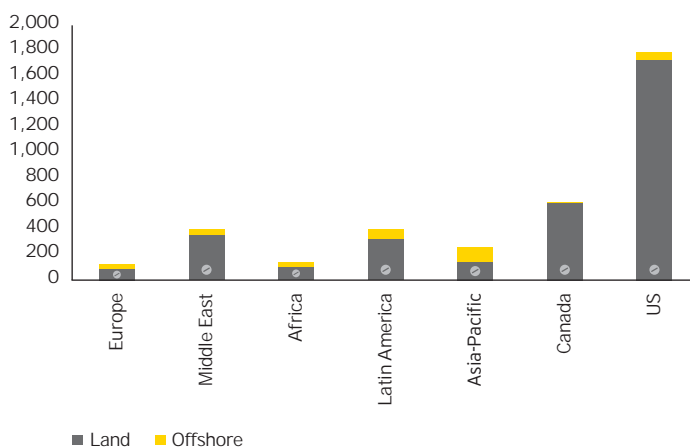


Dale Nijoka
Global Oil & Gas Leader
EY, US

“The upstream oil and gas sector will continue to experience significant capital investment over the next few years, particularly in unconventional oil and gas development and in numerous, more demanding projects, such as deep-water offshore projects, Arctic exploration and development, and LNG liquefaction.”

The chart below shows the relative regional concentration of rig activity, using the latest Baker Hughes data for January 2014. With the shale revolution in North America, rig counts have fallen, but this data is somewhat misleading in that there have been tremendous gains in drilling efficiencies, and as a result fewer rigs are drilling more wells. Notably in the US, while the number of rotary rigs is down, the number of wells drilled has broadly remained the same.

Regional rotary rig counts (Baker Hughes data for January 2014)



Source: Baker Hughes Inc.

As these more demanding oil and gas projects come online, we expect to see an increase in demand for premium casings and connections. The grade and quality of OCTG is determined by a number of factors, including the use of oil versus gas, drilling direction and extremity of the drilling environment (e.g., corrosive or high pressure).

Horizontal rigs demand a higher grade of casing than vertical rigs as they generally have greater amounts of pressure. Gas requires superior grade connections than that of oil, given the need for a gas-tight seal. In certain circumstances, the grade of casing will need to be higher, for example, if the environment is corrosive or exerts high temperatures.

Shale gas wells require more premium steel casing and connections than shale oil wells and the margin for error is generally fairly small; if a casing fails, the well will typically be abandoned. There has also been a heightened focus on safety in the sector, which likewise increases the demand for premium steel products. Tubular producers can provide additional services for their premium products by establishing threading and heat treating capability close to their key clients' operations.

Oil and gas distribution

Substantial investment will also be required in other parts of the industry value chain to monetize existing and future discoveries. The IEA forecasts a cumulative investment of approximately US\$2t in natural gas transmission and distribution networks and US\$765b in LNG facilities during 2012–35.⁵⁰

The *Pipeline and Gas Journal's* 2014 survey shows that 109,066 miles of pipelines are planned or under construction. In North America alone, US\$22b will be spent on the construction of more than 23,000 miles of pipeline during 2014–22. Mexico plans to invest US\$8b expanding its natural gas pipeline system. In China, Sinopec is involved in an US\$11.3b coal-to-gas plant project in Zhundong, which could result in 4,971 miles of gas pipeline being built by 2021. In Australia, LNG developments continue to be the focus.⁵¹

Pipelines need to consistently deliver product year in and year out, under a range of operating conditions. The pipe needs to be handled, transported and installed with minimal risk of damage. The pipe also needs to be resistant to long-term loss of strength or damage through corrosion, aging and other external effects. For this purpose, steel offers a very high strength-to-weight ratio.⁵²

The type of steel pipes required for the construction of these pipelines varies among regions. In Australia, the natural gas transmission system is characterized by relatively small, fragmented markets located at long distances from the supply sources. As a result, the pipes are usually of smaller diameter but need to deal with a relatively high design pressure of 15MPa as compared to 10MPa in other parts of the world. The transmission of rich gas also places special demand on fracture toughness.⁵³

50. "World Energy Outlook 2013," International Energy Agency, 2013.

51. "P&GJ'S 2014 Worldwide Construction Report" *Pipeline and Gas Journal*, January 2014.

52. "Steel for pipelines: delivering under pressure," *The Australian Pipeliner*, January 2011.

53. "Steel - meeting the needs of an evolving linepipe industry," *BlueScope Steel*, 2010.

Refinery projects

A significant increase in refining capacity to 2035 will lead to an increase in steel use – at least during the construction phase.

There will also be continued capital expenditure in new refinery projects. New refinery projects around the world amount to about 7.4mb/d in net refining capacity to be added before 2020, and a further 5mb/d of refinery capacity is likely to be added between 2020 and 2035. Most of the capacity additions will be in China, India and the Middle East.

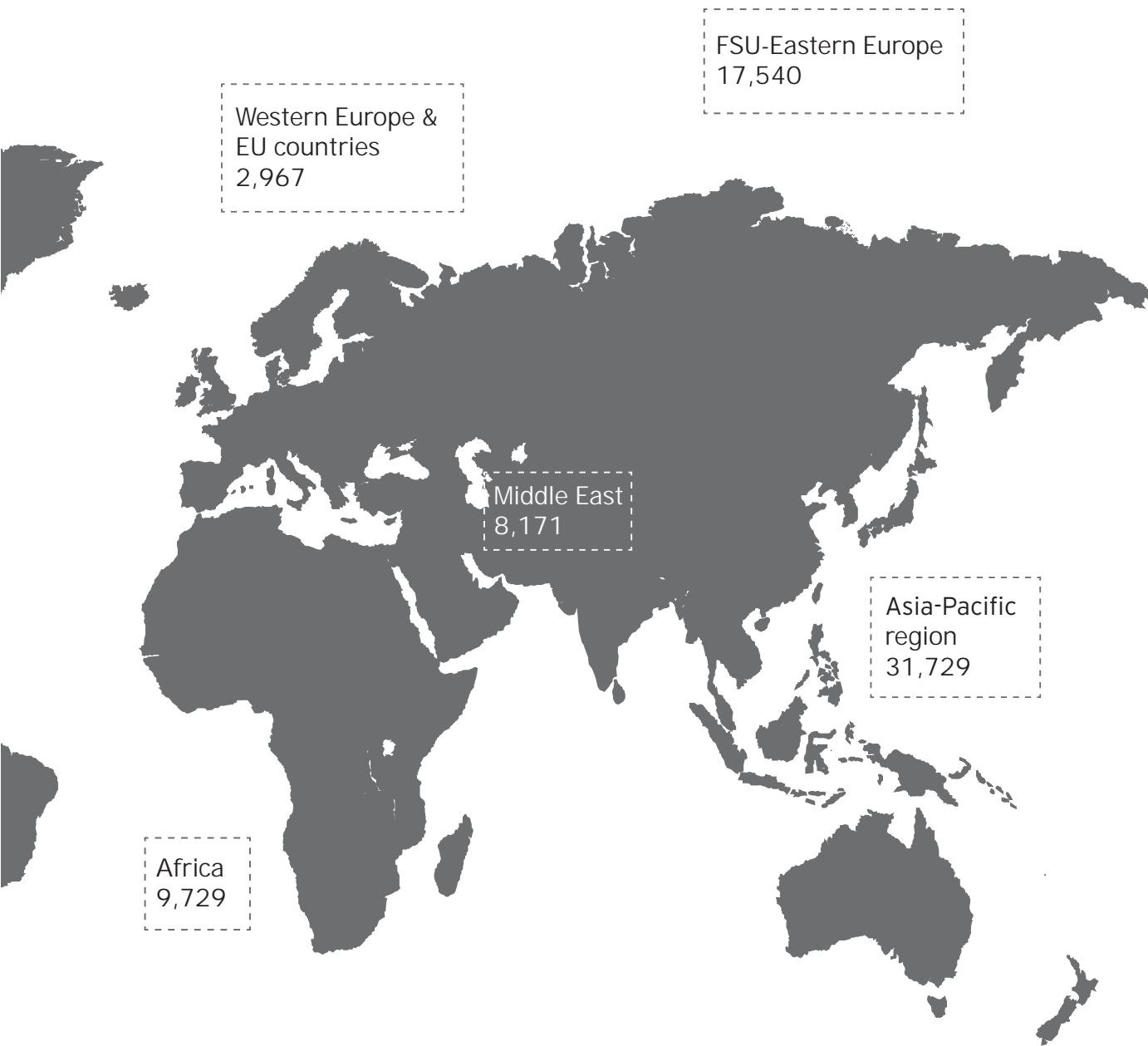
Implications for steelmakers

- Globally, the pipe and tube sector accounts for around 8% of total steel consumption.
- Premium OCTG casing, tubing and connections are used for more challenging drilling environments. Major players in this sector have advanced connection technology which prevents over-torquing and maintains a gas-tight seal in extreme drilling environments.
- Pipes are being designed for specific situations and challenges, for example, corrosion-resistant alloys.
- In the largest markets, the US and Canada, demand for both electric resistance welded pipe (ERW) and seamless OCTG products is expected to increase from 2012's level of about 7.1 million short tons to 8.4 million short tons by 2018.
- South Korean pipe mills' efficient logistics and mill design, easy access to HRC and cheap financing are driving their ability to compete with US producers despite freight.
- Imports into the US are declining after anti-dumping levies were imposed on Taiwanese and Thai OCTG.
- Line pipe demand in the US is expected to pick up due to replacement of aging pipeline infrastructure.
- Steel pipe and tube volumes are expected to increase over the next five years. Margins will be best in those regions where drilling and pipeline construction activity is most active.

Miles of pipeline planned and under construction



Source: "2014 Worldwide Construction Report," Pipeline & Gas Journal



Under construction: 35,132 miles
 Planned: 73,934 miles

Total: 109,066

Geographic outlook for steel demand

European Union

- Steel consumption in the EU is expected to expand by about 2.0% to 138 million tonnes in 2014.
- Germany and Italy remain the two largest steel producing nations in Europe and economic activities in these nations could be instrumental in the revival of the domestic steel industry.
- German steel demand will be driven by the construction sector as the automobile sector continues to be under pressure due to a sluggish export market.
- Italy's steel companies will remain under pressure over 2014-17 because of low domestic demand and cheap Chinese imports.
- EU's share as a proportion of global steel production is likely to continue to decline.

US

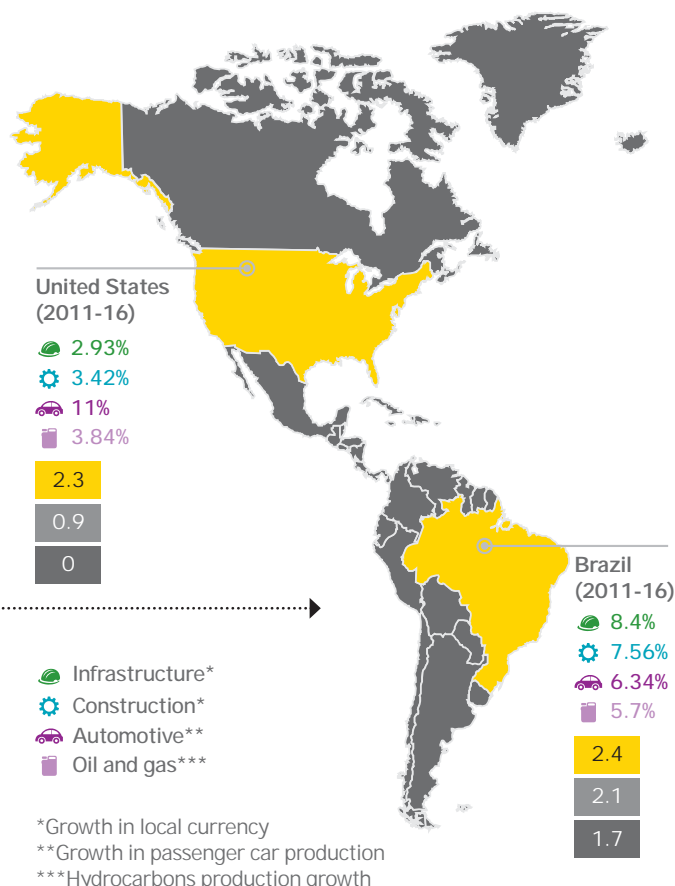
- Residential construction is driving steel demand to be followed by non-residential construction in the near term.
- The automotive sector and shale gas-related infrastructure will provide further impetus to steel demand.
- Domestic prices may remain subdued due to oversupply and import competition.
- Capacity utilization reached 77% in 2013 and has the potential to reach just under 90% over 2015-18.
- The US steel industry is set to consolidate in the near term and the focus will remain on enhancing the productivity and efficiency of existing plants.

Brazil

- Steel demand is forecast to grow at 3.6% per annum, driven by the growth from the infrastructure, construction and automotive sectors.
- Despite a positive outlook for demand, current overcapacity and low utilizations (about 72%) will keep prices muted.
- Many Brazilian steelmakers have integrated mining into the value chain to protect margins.

Africa

- Construction, driven by population growth and infrastructure development, is driving steel demand.
- Africa's urban growth of 3.5% during the last two decades is expected to continue into 2050.
- About US\$93b per year until 2020 is required for infrastructure development in Africa.
- Africa will import steel to fulfill demand as the two largest steel producers, South Africa and Egypt, lack enough capacity to supply.
- The region has the demand and the availability of natural resources for steelmakers to set up plants.

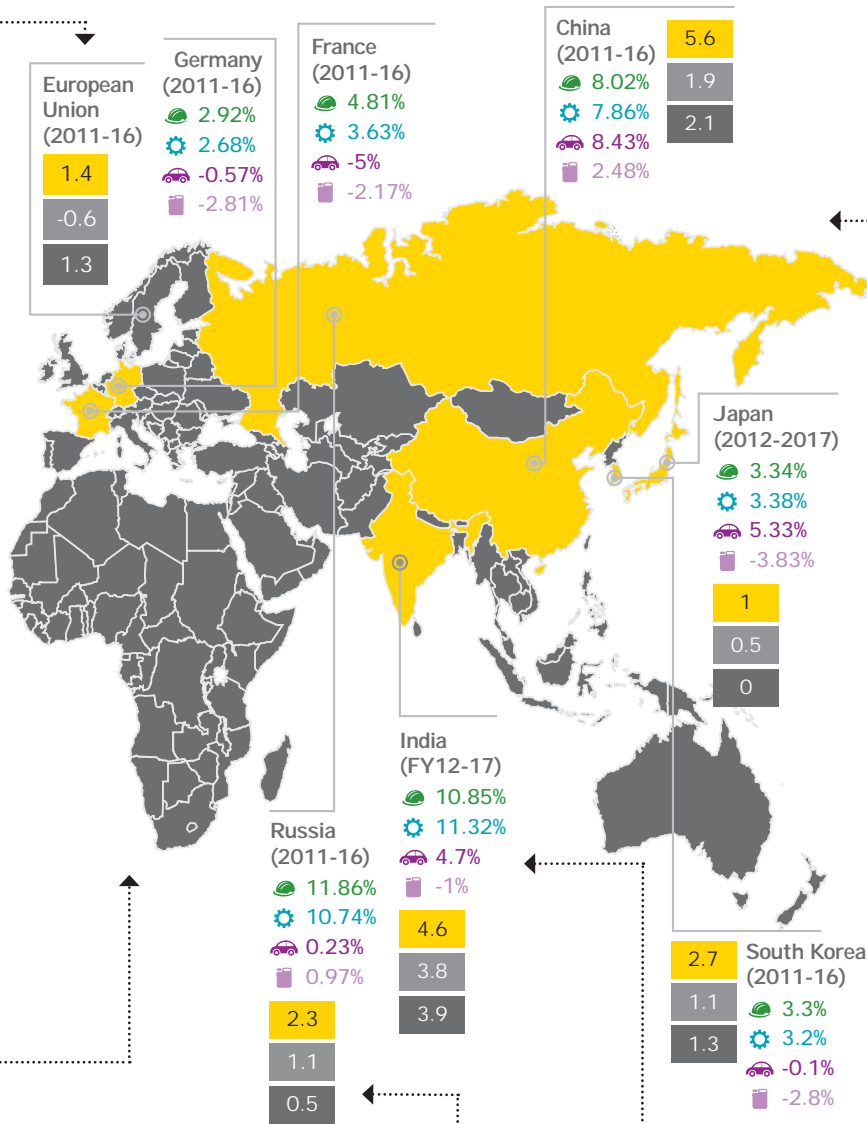




Germano Mendes De Paula

The Institute of Economics, Federal University of Uberlândia

“Overcapacity will remain a serious issue in Brazil and could keep prices for steel products under pressure. The Brazilian steel industry used to have a lower idle capacity than elsewhere until 2005. Now, it is using only 72% of its rate capacity, while the global figure is around 80%. This has meant that Brazilian steel companies are induced to adopt a wait-and-see perspective in the short to medium term.”



GDP growth (%) CAGR 2013-16

Steel production growth (%) CAGR 2013-16

Steel demand growth (%) CAGR 2013-16

China

- As China moves toward a consumer-led economy, steel demand will stabilize at about 4% per annum.
- The Chinese Government is focusing on removing excess capacity.
- Low utilization of just about 75% will remain a concern.
- Steel margins will remain under pressure due to overcapacity and weak demand.

Japan

- Japanese steelmakers face weak domestic demand and cheap Chinese imports.
- Steelmakers shifting production bases in emerging markets are losing out on high-margin special steel for automotive.
- Domestic shipbuilding remains under pressure in light of shrinking orders and competition from Chinese and South Korean shipyards.
- Some improvement in steel demand as Abenomics provides a boost to automotive manufacturers, the construction industry and civil engineering firms.

India

- Despite the fact that surplus iron ore had resorted to imports, constrained iron ore availability impacted capacity utilization.
- Integrated as well as standalone steel majors have dominance in market share.
- A depreciating currency has supported margins through a surge in exports.
- Industry margins generally are healthier than global peers.
- Urbanization and demographic changes will support long-term steel demand.
- Substantial capacity additions are planned.
- Many global steel players have formed joint ventures with domestic steel companies in India.

Russia

- Russia has a better platform to manage oversupply. Domestically, the steel sector is consolidated.
- Steel consumption could be boosted by the number of large-scale events being hosted by Russia, such as the upcoming 2018 FIFA World Cup.
- Steel consumption expected to grow at 2.9% per year until 2017.
- An increase in capacity is expected to lower the utilization rates to below 75%.
- The market could be affected by the ongoing geopolitical events.

EY's Global Mining & Metals Center

With a volatile outlook for mining and metals, the global sector is focused on cost optimization and productivity improvement, while poised for value-based growth opportunities as they arise. The sector also faces the increased challenges of changing expectations in the maintenance of its social license to operate, skills shortages, effectively executing capital projects and meeting government revenue expectations. EY's Global Mining & Metals Center brings together a worldwide team of professionals to help you succeed – a team with deep technical experience in providing assurance, tax, transactions and advisory services to the mining and metals sector. The Center is where people and ideas come together to help mining and metals companies meet the issues of today and anticipate those of tomorrow. Ultimately it enables us to help you meet your goals and compete more effectively.

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EYG no. ER0152
CSG/GSC2014/1257532
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