

The travelling economist

Rise of the ferro dollar



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Introduction

The *Rise of the ferro-dollar* was inspired by a trip to North Asia and the mines of Central Queensland in mid-2011. Australia has long been the lucky country, but now it may also be the richest country as well. It's unique suite of mineral and energy resources place it at an extraordinary advantage, at a time when a near neighbour, China, is in the midst of a multi-decade long period of economic catch-up. Australia's economy, with its strong legal and financial regulatory institutions, can be the envy of the developed world. But ultimately, it comes down to how Australians spend those *ferro-dollars*; high cost inequality or high growth equality.

China's rise confounds economic history, but not necessarily economic theory. At the heart of growth is a focus on capital investment in infrastructure, designed to create more productive lives, funded by a government which may bear losses but is capable of capturing the still positive side-effects (externalities) from rising tax revenues. In addition, the government is more removed from activity in the consumer sector where it promotes a competitive industrial landscape designed to lower the cost of living for households. These foundations seem brittle to western investors used to judging the health of an economy through the returns on capital. But the Chinese are comfortable with low capital returns if the pay-off is a stronger economy. This has been the case.

Australia is uniquely placed to support this growth. Australia's global commodity advantage is a combination of large, high quality mineral reserves, low internal demand, dedicated mining infrastructure, the nation's vicinity to key markets in Asia and a legal system that encourages mining investment. Australia's resources have increased dramatically in value and, at average prices for 2010-11, are equivalent to 75-80% of the value of Saudi Arabia's reserves of petroleum and natural gas¹.

But efficiently capturing the benefits of this remarkable point in Australia's history requires a period of, sometimes painful, structural adjustment. Structural adjustment has been occurring for some time as labour shifts from the non-mining to the mining economy. Effectively, it has lowered the capacity of the non-mining economy (mining employment has increased from 0.9% of the labour force to 2.0% and construction, driven by engineering, has increased from 7.8% to 9.5%) and so without significant improvement in productivity, the ability of the non-mining economy to grow at a trend rate of growth without rising price pressures is limited. This is squeezing households in the non-mining economy; from higher costs and weak wage growth due to low productivity.

Raising the capacity of the non-mining economy is essential and the only agent in the economy capable of doing this effectively is the government. This part of the economy is dominated by services, not because of a failure of industry policy, but because this is how Australians spend their income. In such an economy, most often characterised by small rather than large firms,



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Note:

1. Based on 2010 proven reserves of major energy and mineral resources.

the most effective investments are in infrastructure that lower the cost of transporting people and goods through and between urban areas. For Australia, a combination of the National Broadband Network and a high-speed rail line between Melbourne and Brisbane would provide significant long-term benefits, through promoting greater regionalisation.

Australia's failure to regionalise, would lead to a squandering of the nation's good fortune. The non-mining economy would suffer from a sustained fall in productivity with attendant price pressures. Living standards in the large urban areas of the south and east would continue to fall as cities became increasingly

congested. In such an environment the Reserve Bank of Australia, in its role in managing demand, would be required to continually raise interest rates to slow demand growth (in the absence of increased supply). The economy must increase its capacity through increased capital investment driven by the government and so a failure to achieve this will rest on the shoulders of policy-makers.

The Rise of the ferro-dollar discusses the rise of China and its economic model, Australia's resources sector, the process of structural adjustment and a solution for a stronger regional Australia.

The Chinese don't play chess. They play *wei qi*. *Wei qi* is a game of strategy played on a larger board with black and white pieces each of equal value². The Chinese government views the economy as though it's *wei qi*. Each piece has its own role in the economy, but each is no more important than another.

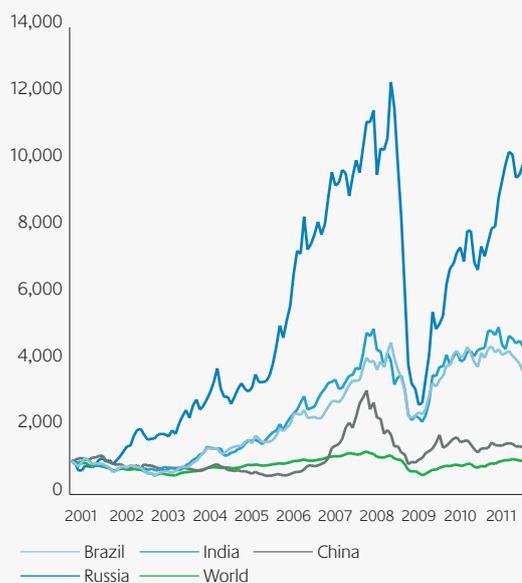
This is an important observation. In the developed world, the economy is generally seen through the prism of capital; the stronger the outcome for capital, traditionally, the stronger the perception of the entire economy. Falling or negative returns on capital are a sure sign of economic weakness reflecting the end of a period of over-investment, which is naturally followed by a period of under-investment. This is the business cycle.

In China, capital is just one piece on the board where the aim is to raise living standards of all households. As a result, capital is used and treated remarkably differently, often to the consternation of external observers and investors. It is not a matter of aggregating up the investment decisions of individual firms and households to predict macro-economic outcomes, as was done by some economists prior to the sub-prime crisis in the US. The government's role is paramount. Despite claims of dramatic imbalances (investment spending has made up to 45% of GDP in recent years, compared to below 15% in some developed economies), investment is driving sustainably higher economic growth.

This high investment economy has led to some important outcomes that support the economy's growth model.

At a macro-level, the higher allocation of capital in China has led to falling profit growth and lower returns for capital. Compared to its BRIC (the Brazilian share market, Russia, India and China) counterparts the Shanghai Composite has been staggeringly bad. Since 2004 Brazil is up 167%, Russia 176%, India 197% but China is up just 46%, despite higher growth rates. Beyond the stock market, 2011 has been punctuated with stories of large capital losses across the economy, including losses by local government financing vehicles established in the Great Stimulus of 2009, property developers and informal lenders based in the coastal cities of Eastern China.

Chart 1: Emerging market stock markets indices, ending September 2011



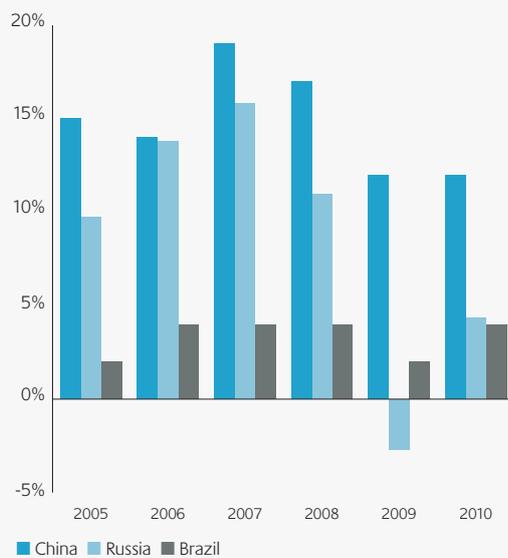
Source: Bloomberg.

But, strong investment has a very positive macro corollary; it improves labour productivity and allows wages to rise. Chinese wage growth, in real terms, far out-strips wage gains in other BRIC markets. Since 2005, Chinese wages have doubled yet wages in Brazil and Russia are up just 26% and 48% respectively. Most of Russia's wage growth occurred prior to 2008 as its capital base, largely energy, rose substantially in value. While observers see strong wage growth as a threat to China's competitiveness as an exporter, it is much more positive, reflecting productivity improvements and improving income equality.

Footnote:

2. As an aside, Henry Kissinger in his book *On China*, notes that the aim, unlike chess, is not to attain final victory over an opponent, but to surround the opponent and protect yourself from attack.

Graph 2: Average annual wages growth



Source: Bloomberg.

At a micro-level, capital is often very well protected in Western markets, relative to the other pieces on the board. Property rights are an important part of capitalism. While property rights are evolving in China, there seems less desire to protect intellectual property rights in areas where it may discourage competition. China views competition as an important means of raising living standards by lowering the cost of goods and services. This encouragement of a hyper-competitive industry structure drives innovation through the threat of failure; there is no carrot for innovation. Investors understand that achieving scale and productivity growth is the only way to sustain a profitable business model.

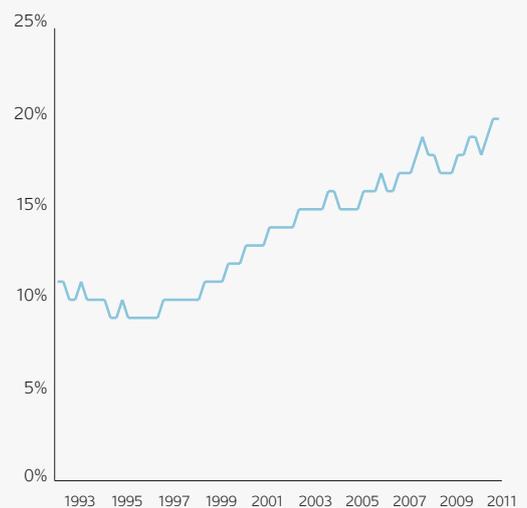
By not using capital returns as a scorecard for economic progress, China improves the allocation of capital in its economy and raises living standards. Effectively, China takes a broader perspective to the value of capital in an economy. Such an approach seems fraught with danger but there's more protection than global markets seem to understand.

First, and most obviously, the government has the ability to fund losses on individual capital projects through the accumulated financial reserves, totalling at least \$3.2 trillion. Second, and most importantly, the Chinese government, as ultimate capital allocator, can recoup returns from projects by capturing the positive externalities from projects in the form of higher tax revenues created by higher levels of activity. Third,

the failure of individual projects does not discourage investment elsewhere if other projects can still add value to the economy as a whole. The Chinese government can continue to invest through the business cycle. This has been a crucial driver of stable economic growth despite a number of asset price cycles.

As the chart below shows, government tax revenues have risen as a share of nominal GDP; 11% in 1992 to 20% in 2011.

Chart 3: Tax revenue as a % of nominal GDP

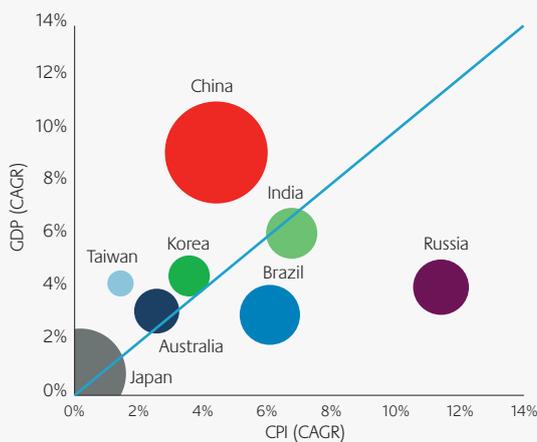


Source: Bloomberg.

This is not to say China can't or shouldn't expect returns from individual projects. Undoubtedly, if it had its time again, the Great Stimulus would have been smaller and, probably, better regulated. But similarly, the investment of the past decade will provide dividends for years to come and act as a foundation for the next stage of growth.

The result is an economy that has achieved an unparalleled balance of growth and low inflation. As chart 4 shows, China's economic performance in the last 20 years has been remarkable; very strong growth and low inflation. This is particularly the case when compared with other developed, BRIC and Asian nations. Even current levels of inflation offer much better growth to inflation trade-offs than seen in other BRICs and most developed economies.

Chart 4: Growth vs Inflation since 1992



Source: International Monetary Fund. Data from 1992 to 2010 (Russia and Brazil from 2000 to 2010).

It is worthwhile comparing China and India. India has similar positive growth dynamics; a large and young population whose lives can become considerably more productive with investment. India's government, however, for a myriad of reasons (highlighted in this report) is not capable of undertaking this investment. Instead, capital investment generally falls to the private sector, which focuses on the returns specific to an investment rather than the good of the wider economy. As a result, the economy continues to suffer from under-investment and a more unstable mix of growth and inflation.

The following sections take a more detailed look at how infrastructure investment creates economy wide positive externalities and the impact of a competitive economy on improved living standards. These two drivers stand in direct contrast and so highlight the nuanced role of government in China. The government understands it must build infrastructure because only the government can fully capture the returns from the investment. Conversely, the government tends to remove itself from consumer oriented industries where the private sector is more willing to invest. The risk, however, is property which sits between government-led infrastructure investment and a competitive private industrial economy.

Infrastructure

Infrastructure is one of the two core planks in China's growth policies. The development of infrastructure promotes growth and, crucially, price stability as it improves productivity. Indeed, productivity and supply management (increasing the supply of goods and services), rather than demand management, is at the core of successful emerging markets. It is also at the heart of Australia's relationship with China.

It's common in emerging markets to see sights long forgotten in the developed world. For instance, in rural India, women use communal pumps, as far as two or three kilometres from their homes, for their basic water needs. The lack of even simple water infrastructure comes at a cost; these women are less productive with maybe two hours out of every day taken up in activity that the developed world takes for granted. Certainly, the building of infrastructure brings jobs, initially, for miners, steel mills, equipment manufacturers and construction businesses. But its long-term impact is much more important; it creates time for households and firms to do more productive activities, earn more income and so live better lives.

Urbanisation in China is at the pinnacle of this process. The demand for housing and associated infrastructure has spurred activity in steel-making and construction. But the greater legacy of urbanisation is higher living standards, and this is accentuated in China.

By moving to a city, a family immediately increases its productivity and living standards. Cities provide access to a better range of jobs, allowing workers to find a job that best matches their skills, increases their productivity and allows them to earn a higher income. Cities also lower the cost of living through their ability to aggregate demand and create economies of scale. Services, particularly social, health and education, are also important in raising living standards.

China manages urbanisation. It does not allow the ad hoc urbanisation prevalent other emerging economies. Emerging economy cities are characterised by large areas of slums with new migrants from rural areas often sleeping on pavements. China, in contrast, limits migration to urban areas through a licensing system or hukou. This system has elements of social engineering; inhabitants of eastern cities tend to limit residency to culturally similar people. For instance, residence in Shanghai now requires at least a Masters level degree. But it also allows urbanisation to be better planned with appropriate resources available to a family once they are granted an urban hukou.

The urban hukou provides its holder with considerable privileges including access to social housing, health services and education unavailable to rural residents. Access to this welfare allows households to lower their precautionary savings. This creates considerable economic leverage to urbanisation in China as lower precautionary savings leads to increasing consumption, most often in goods and services that further increase living standards and productivity.

The hukou helps manage urbanisation. Central and provincial governments are using the hukou system in the central and western provinces for better town planning. Good examples of this are the new city of Ordos in Inner Mongolia and the plans for Chongqing in China's south-west. These cities are being built prior to settlement to limit the extent of incremental urbanisation that can lead to congestion and lower productivity outcomes.

Urbanisation, of course, is more than just housing; it requires an efficient economy where goods, services and people can be moved efficiently. To this end, China has embarked on an enormous building project that has included the largest bridge over water in the world (Jiaozhou Bay Bridge – 42.5km over water), 6,900km of high-speed rail and the Three Gorges dam project. But from all manner of perspectives it is obvious that current infrastructure levels in China are insufficient for managing inflation at around 7-9% GDP growth.

More Chinese need to move to cities. Currently, around 47% of China's population lives in urban areas, leaving around 700 million people in rural areas. In the course of the next 10 years a further 100 million people will become internal migrants and move to urban areas, bringing with them an increased demand for housing, transport, energy and water. In addition, it is likely that current urban dwellers will seek to increase the living space in which they live.

A similarly important macro-economic comparison is the level of spending on transport in the economy relative to GDP. A higher level of spending on transportation costs indicates a less efficient and less productive economy. In the US, for instance, transport spending amounts to around 5-6% of GDP while, in comparison, China spends around 10% of GDP on moving goods and people within the economy. This is despite much lower labour costs for truck drivers; wages for truck drivers in the US are around \$17.50 an hour compared to \$1.50 in China. Transport is a tax on economic activity; the higher the transport costs, the less economic activity that can occur.

For instance, it takes 10 hours to drive the 300km from the west side of the Pearl River delta in southern Guangzhou to the east side of the delta because of congestion in the region. Radical plans are also required to reduce congestion in Shanghai. Elevated expressways are now on the verge of gridlock and, as a result, the city is considering a system of underground motorways to ease congestion. Similarly, it is a regular occurrence for airlines to experience delays due to air traffic congestion. Only more infrastructure, including the high speed rail network, can lower these costs.

To date, construction has been staggering but there is still a long way to go.

Competition

The second plank in China's bid to lower the cost of living has been the creation of a super competitive industry structure. The industrial structure of China adds significantly to the economy's growth and its medium-term stability. It remains, however, a key constraint on capital returns.

China's industrial structure has its origins in the emergence of a manufacturing economy following the end of the Cultural Revolution. Rather than promote national champions, the case in the Soviet Union, China pursued a province based system of production. Each province established its own factories for the manufacture of a variety of goods. This system created great inefficiencies which came to a head with the non-performing loan crisis at the turn of the 21st century. At this point, China denied bank funding to companies that were not cash flow positive. This so-called Big Bang ended the subsidy for loss making enterprises, allowing only the strong to survive and so unleashed national competition that has resulted in the creation of hyper-competitive companies.

Take the car industry for instance. Russia had seven car plants by the 1980s. Each plant made a different type of car so no competition existed. When the Russian economy opened up, nearly half the plants had to close and those that remained open were generally supported by joint ventures with foreign partners. In China, industry structure was more competitive and by the mid-90s there was a broad mix of companies competing with each other. Companies emerged from incumbent manufacturers, the defence industry and the private sector. Today, despite the Big Bang, there are over 40 Chinese based manufacturers of cars selling into the domestic market.

The impact of such competition is, of course, negative for capital returns. Many manufacturers in the industry are operating at a loss or only small profit. Despite selling more cars than any other nation in the world, unbranded manufacturers earn as little as \$100 per car according to one study.

But what's negative for capital is not necessarily negative for the economy.

The aggressive use of capital in China reflects its relative abundance due to a closed capital account and a high propensity to save amongst firms and households. The consequential low interest rates provide a strong incentive for businesses to invest because they lower the required hurdle rate of return. Uniquely, low interest rates in China tend to lead to the creation of new capital rather than asset bubbles (with the potential exception of property). Businesses start again, rather than bid up the price of assets. The financial consequences are still lower rates of return— but it's fierce competition not booming asset prices that causes them.

Finally, the country has the capacity it needs to grow. This is important. Economies with less competitive industrial structures tend to have more limited capacity that allows incumbent firms to earn higher profit margins. More profitable firms come at an economic cost to the economy – production is not maximised and growth is contained. The Chinese steel industry is a good example. The industry, in aggregate, operates at a very small profit. But the high level of state ownership allows the government to benefit through positive externalities such as lower infrastructure costs because of abundant cheap steel. Unprofitable steel mills lower the cost for other, more valuable activities, such as road-building.

Property

Property is China's Achilles' heel. It sits between the government-led infrastructure building and a hyper-competitive consumer economy. Each apartment, office, shopping centre or factory is in its own way unique. Location and design play a role in determining the value of property. The Chinese government also understands that it must shift to a system of individual property rights, particularly for residential property. These two characteristics make it difficult for the market to be truly competitive; excess returns exist and it's not possible for the government to capture them.

This makes property policy extremely difficult.

As urbanisation proceeds and cities expand, the value of property closer to the city centre, jobs and other facilities must inevitably rise. Private ownership of property excludes the government from capturing the appreciation. In addition, it promotes a feeling of missing out amongst those households who are yet to purchase property. These households become relatively comfortable bidding up house prices. This is dangerous, it creates risks of price bubbles and exacerbates inequalities; owners make capital gains and those on the outside find housing even less affordable. China cannot avoid these outcomes.

The current solution of strong administrative measures that restrict ownership to a limited number of properties will, I believe, remain in place for some time because they have created additional risk to property development. Developers must be capable of funding themselves for a considerable period of time without access to bank lending or strong demand for property. The sight of bankrupt developers only compounds this. This is likely to subdue property construction and push capital into other areas of the economy. The Chinese government realises that stable property prices are better for the economy, even if they're not so good for some buyers and developers.

Conclusion

China through the prism of financial markets is not a welcoming economy for capital. Capital returns are low because of competition, a closed capital account that makes capital abundant and companies that have more than just financial motives in mind when they invest. It takes some skill to identify those opportunities in China that can offer a sustainable long- term return above the cost of capital.

But this frosty welcome is positive for the broader economy. The aggressive use of capital is lowering the cost of living by raising the productivity of firms and individuals and cutting the prices households pay for the goods and services they need and want. The government, as the largest capital allocator, can both manage losses from individual projects and capture the benefits of loss-making projects through its tax-collecting authorities. As has been the case for some time now, capital returns based on China's growth have been highest in areas where the asset cannot be replicated. Industrial commodities are a classic example.



Australia's unique resources

Australia is uniquely placed to benefit from the rise of China. Australia has dirt that it can dig out and put on a ship cheaply, this is our advantage. At \$150 a ton, iron ore is as cheap as a ton of potatoes (imported potatoes cost between \$135 and \$450 a ton). The true value in the iron ore is in its transformation to cars, planes, bridges and buildings and, as such, buyers are relatively insensitive to increases in price. Honda, for example, reported that the sharp increase in steel input costs over the last two years has only added about \$250 to the price of a car – a relatively insignificant amount.

Natural resources are the building blocks of a modern economy – from airports, aircraft, bridges and housing to consumer durables, cars, electronics and communication. Emerging and developing economies, namely China and India, are demanding vast quantities of these natural resources to build the infrastructure required to accommodate rapid growth in population, urbanisation and industrialisation.

Australia is home to an abundant array of diverse natural resources, including the world's largest identified resources of lead, nickel, rutile, silver, uranium, zinc and zircon; the second largest resources of bauxite, copper, gold, iron ore, niobium and tantalum, and the fourth largest reserves of coal³. Australia also has significant natural gas reserves – albeit modest in comparison to countries such as Russia, Qatar, Iran and Turkmenistan.

In recent years, there has been a significant increase in global demand for key commodities, as supply struggles to keep pace with rapidly expanding economies in the developing world. As a result, prices of these commodities have risen sharply. In particular, Australia's production and exports of coal, iron ore and Liquefied Natural Gas (LNG) have increased to meet Asia's demand for natural resources.

It's not Australia's resources alone, however, which are so unique – but rather a combination of factors providing Australia with a competitive advantage rivalled by only a few countries. Australia's proximity to Asia, infrastructure and transportation capabilities, easy access to capital for plant and equipment, low domestic consumption, and scale of production allow it to leverage into the Asian growth story well ahead of its peers.

Unlike many other resource-rich countries, Australia's low population density means domestic demand for energy and mineral resources is relatively small. Accordingly, Australia's reserves are best monetised by exporting them to countries for which they are in high demand. As an island nation, Australia's economy is heavily reliant on seaborne trade. Seaborn trade is, however, the most efficient means of transport for bulk commodities. Bulk vessels typically carry upward of 100,000 tonnes, compared to around 10,000 tonnes by rail.

Australia's resources are relatively close to the coast and to Asia – minimising travel time and costs from mine to port and port to market. This provides Australia with a significant price advantage over other exporting nations such as the US, Brazil and South Africa. Australia is now the world's largest exporter of coking coal, iron ore, alumina, and lead; the second largest exporter of uranium, thermal coal and zinc, and despite holding around the 13th largest natural gas reserves in the world, is the fourth largest exporter of LNG⁴.

Australia is not alone in its abundance of natural resources. As such, mineral exploration and the development of mines, ports, rail and other related land-side logistics are critical to maintaining the competitiveness of the country's mineral resources. Australia's political and regulatory stability (albeit recent uncertainty over the carbon and mining tax) supports and encourages such investment.

Over the last five years, mining investment in Australia has doubled from 2% of GDP to 4% of GDP. The Australian Bureau of Agricultural Resource Economics and Science (ABARES) reported that in April 2011,

Footnotes:

3. Geoscience Australia, Australian Government.
4. Department of Foreign Affairs and Trade, Australian Government.

the combined capital expenditure of Australia's advanced minerals and energy projects was a record \$173.5 billion – a 31% increase from October 2010. This includes 35 energy projects, 35 mineral mining projects, 20 infrastructure projects and four minerals and energy processing plants. And that's just projects in the advanced stage. The pipeline for new projects in Australia over the coming decade is unprecedented. There are a further 305 projects, at various stages of planning prior to a final investment decision.

The scale and capacity of Australia's mining and transportation infrastructure has played a significant role in the sector's growth. While, in the past, infrastructure has placed some constraint on Australia's export capacity, recent expansions have begun to alleviate these pressures. The 20 advanced infrastructure projects include iron ore and coal ports, rail projects and gas pipelines, which will further expand Australia's export capacity and reinforce its position as the world's premier exporter of bulk commodities.

Collectively, 92% of all committed expenditure is related to oil, gas, iron ore and coal. These sectors, namely LNG, coal and iron ore are expected to benefit significantly from the mining boom and are thus the focus for this analysis.

Coal

Coal is a relatively affordable source of energy and is predominantly used in the production of steel and the generation of electricity. Other important users of coal include cement and paper manufacturers, alumina refineries and the chemical and pharmaceutical industries. Coal can be broadly classified as black or brown depending on its properties, namely moisture and carbon content.

The table below illustrates the different classifications of coal and its subsequent uses.

Brown coal

Brown coal, also called lignite, has higher moisture levels and lower carbon content than black coal. Brown coal is a less matured form of coal, typically softer and primarily used in the generation of electricity. Nearly all of Australia's brown coal resources are located in Victoria, in the Latrobe Valley. Despite accounting for 9% of brown coal reserves and 6% of global production, none of Australia's brown coal resources are exported. Instead it is used for domestic power generation. At current production levels, Australia's economically demonstrated resources (EDR) are estimated to last for 539 more years⁵.

Table 1:

Properties	Carbon/Energy content → High			
	← High Moisture content			
Broad classification	Brown coal (48%)		Hard coals (52%)	
Sub-classification	Lignite (20%)	Sub-bituminous (28%)	Bituminous (51%)	Anthracite (<1%)
Main uses	Largely power generation	Power generation Cement manufacture Industrial uses	Thermal Metallurgical Manufacture of iron and steel	Domestic/ industrial including smokeless fuels
Energy content Calories Kcal/kg)	3,850 – 6,000	5,500 – 7,150	7,700 – 8,800	8,000 – 8,250
Carbon content (% carbon)	45-65%	60-75%	75-90%	90-95%

Footnote:
5. Reserve Bank of Australia 2011

Source: The Australian Coal Association, UBS 2011.

Hard coal

Hard (or Black) coal is the higher ranking coal and includes anthracite and bituminous coal. The latter can be further classified as thermal (steaming) and metallurgical (coking) coal. Coking coal is a vital ingredient in the iron and steel making process, while thermal coal is predominantly used in the generation of electricity. Anthracite, the highest ranking coal, accounts for less than 1% of global coal reserves.

Australia has the fifth largest proven black coal reserves (8.9%), ranked behind the US (26.5%), China (15.1%), India (13.1%) and Russia (11.9%)⁶. Black coal is found in all States and the Northern Territory; however the majority of identified resources are located in New South Wales (thermal coal) and Queensland (coking coal). Increased prices result in further exploration and the reclassification of reserves previously considered uneconomic. At current production levels, Australia's EDR of black coal are estimated to last for 111 more years⁷. China's are expected to last for 38 years.

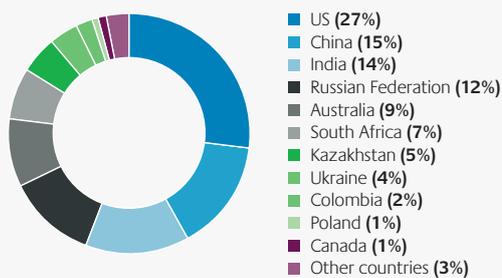
Given its relatively stable and cheap price compared to oil and gas, coal has been the favoured fuel for power generation in many developed and industrialising

countries. This is unlikely to change. Currently more than 40% of global electricity generation is powered by coal, with this number typically upward of 60% in coal-rich countries.

Specifically, China and India have turned to their large indigenous coal reserves to meet the rising demands of their growing economies. China is now the world's biggest coal consumer – accounting for 53% of total black coal consumption⁸. Conversely, Australia consumes just 64 million tonnes, or 1% of global consumption⁹.

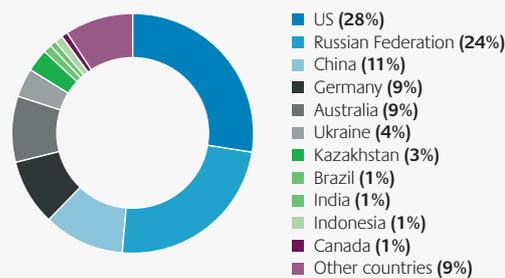
In China, despite large reserves, domestic supply has failed to keep pace with demand for several reasons. China's mines are generally old, and located in the North-West of the country – away from the populous coastal regions. Reserves are located deep underground and are not always economical to extract. This is not helped by the high cost of travel due to congested roads and railways, which impacts the price and reliability of domestic supplies. It is a similar story in India. Reserves, which are generally poor quality, are often located under protected land, and current rail infrastructure is unable to cope with the required quantities of bulk commodities.

Chart 5: Black coal reserves



Source: IEA 2011.

Chart 6: Brown coal reserves



Footnotes:

6. World Coal Association 2011.

7. Department of Resources, Energy and Tourism, Australian Government 2011.

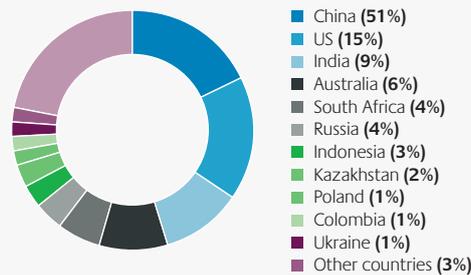
8. International Energy Agency.

9. International Energy Agency.

Australia's unique resources

continued

Chart 7: Top black coal producers



Source: IEA 2011.

Chart 8: Top black coal consumers

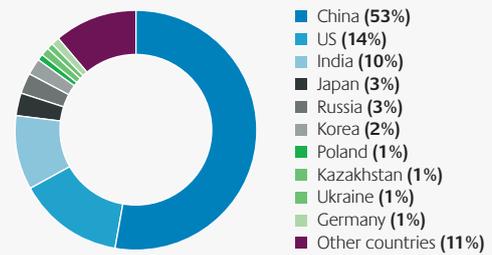
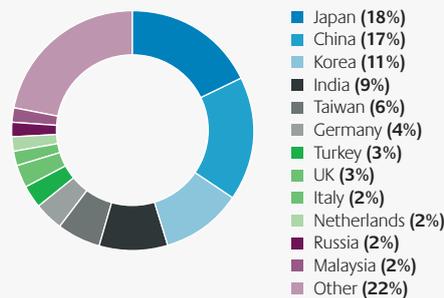
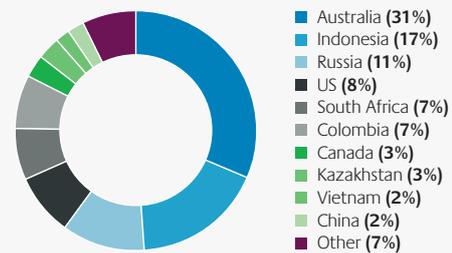


Chart 9: Top black coal importers



Source: IEA 2011.

Chart 10: Top black coal exporters



Despite these limitations, China is the largest producer of coal and India is the third. However, local production is not nearly enough. Other countries such as Korea and Taiwan have little or no domestic coal resources and so they rely on imports of both thermal coal and coking coal to meet domestic demand.

The coal export industry in Australia is serviced by nine coal terminals at six ports. In Queensland these are the Ports of Brisbane, Abbot Point (north of Mackay in Queensland), Gladstone and Hay Point. In New South Wales, coal is exported through Newcastle and Port Kembla. Most coal in Australia is transported by dedicated rail connections between mines and ports, with the majority of coal mines being located less than 300km from the port of loading and many within 100km. This results in short rail haulage times and fast responses to changes in demand. Of the 20 advanced infrastructure projects, 10 are coal-related, including six coal terminal expansions and four rail expansions either

committed or under construction. As a result, Australia's annual coal exporting capacity is expected to increase by 60% from 2010 to 2015¹⁰.

Australia's black coal resources are high quality bituminous coals, characterised by a low sulphur and low ash content. These properties are preferred for power generation as they result in less boiler slag and lower polluting emissions. In 2010, Australia's black coal exports were worth almost \$43 billion, or 15% of the total value of Australia's goods and services exports¹¹. Australia accounts for nearly one third of the world's black coal exports (57% of coking coal and 23% of thermal coal exports) – with around 90% of Australia's coal exports destined for Asia.

Indonesia is currently the second largest exporter of coal, and produces some of the cleanest coal in the world. However, at current production levels, Indonesia's proved reserves will only last another 18 years.¹²

Footnotes:

- 10. CLSA 2011.
- 11. The Australian Coal Industry.
- 12. BP Statistical Review of World Energy, 2011.

Iron ore

Iron ore, a rock from which metallic iron can be extracted, is one of the most abundant minerals in the Earth's crust, and a key ingredient in the steel making process. Iron ore is fed into a blast furnace with coking coal and limestone to produce steel. Scrap iron and steel can also be recycled and used in this process.

The table below lists the primary forms of the mineral ore, which can differ significantly in iron content. The difference in iron content affects both the value and quantity of reserves. Commercial ore usually has an iron content of at least 58% and may be in the form of lumps, fines or pellets. Because of its lower cost, current world production of iron ore is predominantly from haematite deposits.

Table 1. Primary forms of iron ore

Name	Formula	%Fe
Haematite	Fe ₂ O ₃	70%
Magnetite	Fe ₃ O ₄	74%
Geothite/Limonite	HFeO ₂	63%
Siderite	FeCO ₃	49%
Chamosite	(Mg,Fe,Al) ₆ (Si,Al) ₄ (OH) ₈	29%
Pyrite	FeS	47%
Ilmenite	FeTiO ₃	37%

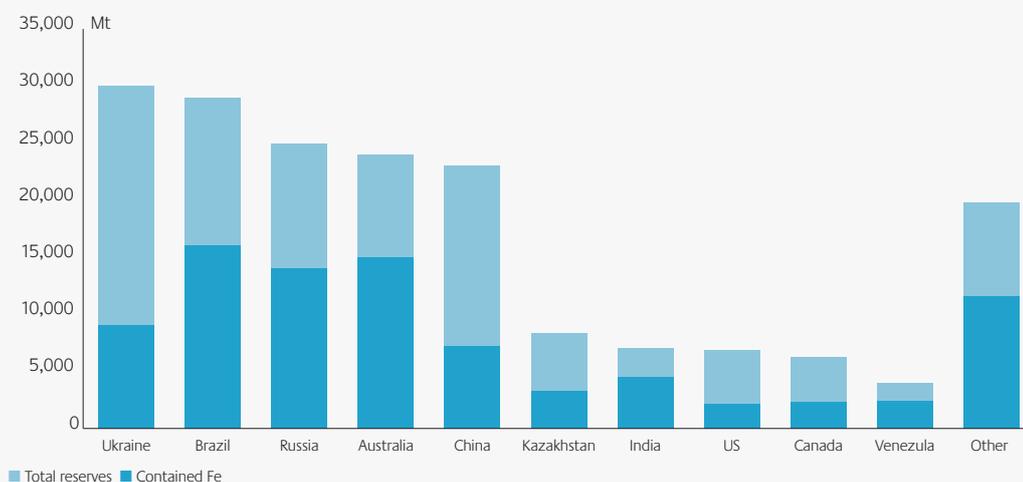
Source: UBS 2011.

Depending on the quality of the ore and the requirements of the end consumer, mineral ores often need to be upgraded for commercial production. This is achieved through beneficiation – a process whereby the ore is crushed and separated into mineral and waste. The process of beneficiation is specific to each deposit depending on its physical, magnetic and electrical properties. Beneficiation of Haematite and Magnetite is more cost-effective compared to Limonite and Geothite (which require beneficiation through calcination or sintering). China's reserves are mainly the latter, while Australia's are the preferred Haematite and Magnetite.

Mining iron ore is a low margin, high volume business requiring significant investment in infrastructure to transport large quantities of ore from mine to port. The location and distance of the iron ore mines to shipping ports (or domestic markets) is an important factor in determining the price competitiveness and economic viability of extracting the mineral. Access to infrastructure is the major barrier separating the iron ore from the end customer. As a result, even though iron ore is mined in about 50 countries, commercial production is dominated by only a handful of players. The three largest iron ore companies (Vale, Rio Tinto and BHP Billiton) control 61% of total seaborne iron ore trade¹³.

Western Australia, namely the Pilbara region, accounts for around 97% of Australia's iron ore production – and nearly all of Australia's economically demonstrated

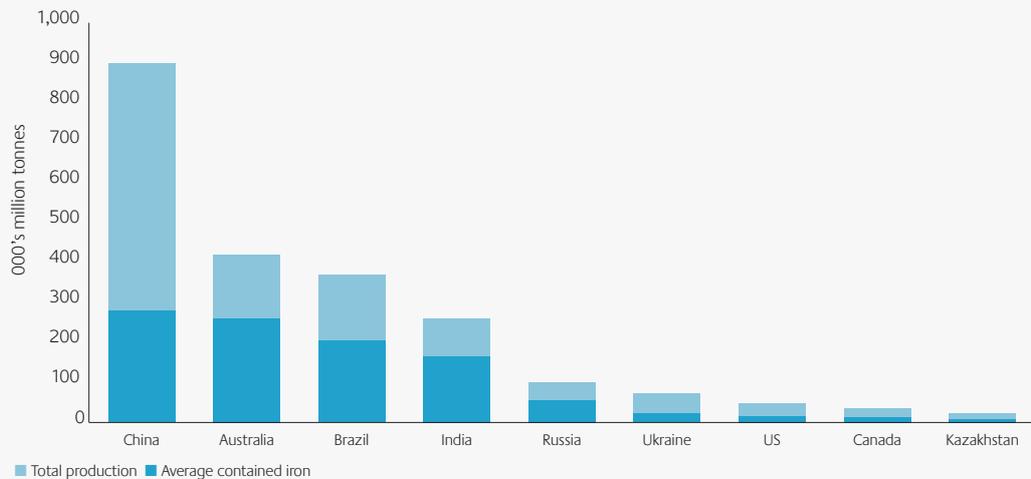
Chart 11: Total iron ore reserves



Source: USGS 2011 (2010 estimates).

Footnote:
13. UBS 2011.

Chart 11: Top iron ore producers



Source: USGS 2011 (2010 estimates).

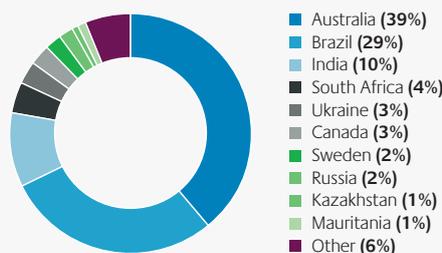
resources¹⁴. Australia has around 13.1% of global iron ore reserves, ranked fourth after Ukraine (16.5%), Brazil (15.8%) and Russia (13.6%). However, as shown in chart 11 on the previous page, in terms of contained iron content, Australia (17%) has the second largest iron ore reserves after Brazil (18%).

China is by far the largest producer of iron ore by weight, however in terms of contained iron, China's production is only marginally higher than Australia's. The average apparent grade of China's iron ore has slipped to below 30%—consequently the country relies heavily on imports

to satisfy demand. Conversely, Australia, Brazil and India produce the highest quality iron ore (around 60% Fe).

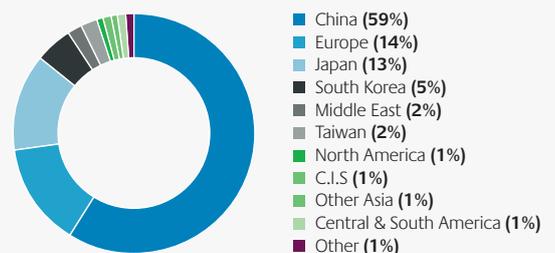
98% of mined iron ore is used in the production of steel, and while some of the largest steel producing countries are also large producers of iron ore, others, namely Japan, Germany and South Korea, lack sizable reserves of their own. As a result, Asia is responsible for 87% of all seaborne iron ore imports, with the remainder destined for western Europe. In 2010, China alone was responsible for 63% of all seaborne iron ore imports.

Chart 13: Top iron ore exporters



Source: Metalytics 2011 (data for 2010).

Chart 14: Top iron ore importers



Footnote:
14. Geoscience Australia, Australian Government.

Australia is the world's largest exporter of iron ore. China currently sources 43% of iron ore imports from Australia, 21% from Brazil and 16% from India. Japan, also a large steel producer, was the second largest importer of iron ore, and sources 60% of its iron ore requirements from Australia¹⁵. Australia's dominance in global iron ore exports is made possible by significant mine, rail and port infrastructure.

Australia's main iron ore producers, Rio Tinto and BHP Billiton (BHP), have vertically integrated systems for mine, rail and port infrastructure. BHP and Fortescue Metals Group (FMG) both export from Port Hedland, while Rio Tinto exports from Dampier Port and Cape Lambert. Renewed confidence in the long-term outlook for iron ore prices has led to increased planned investment in infrastructure and mine development. Overall, the \$35 billion of already committed iron ore related investment projects suggest that Australia's iron ore exports are likely to increase by around one-half over the next four years¹⁶.

As well as expanding Port Hedland's Inner Harbour by 20mt (million tonnes), BHP's proposed Port Hedland Outer Harbour Development could increase annual capacity by 240mt over the next 10 years. Rio Tinto's expansion of Cape Lambert will increase annual capacity by 53mt to 133mt by 2013, while capacity at Dampier Port will be increased by 5mt to 230mt a year by early 2012. FMG is also expanding port capacity at Port Hedland by 100mt a year by the end of 2012, which will support a further 40mt expansion at the Chichester Hub mine and the first stage (60mt) of the Solomon Hub expansion. Rail infrastructure is also being upgraded in the Pilbara region to support this additional capacity.

Brazil, Australia's major competitor, produces a slightly higher quality iron ore than Australia. However, Brazil's distance to key Asian markets (around 35 days sailing, compared to 11 days from Australia) results in higher prices for the consumer. Australia, however, is expected to lose some of its price advantage through Vale Brazil's recent delivery of its own fleet of 400,000-tonnes iron ore carriers named 'Chinamax'. Vale is also developing new ports in Brazil and Malaysia, to assist in exportation and distribution.

Brazil has an extensive railroad system dedicated almost entirely to iron ore, however it is largely controlled by MRS Logistica and Vale. Vale leaves little room for third party cargo on its railroad – with the company's own

goods accounting for 80% of the total transported. Access for smaller producers to rail infrastructure in Australia is a key differentiator to Brazil.

India's infrastructure has also been a limiting factor on the country's ability to increase exports. More recently, the Indian steel industry has been pushing for bans on iron ore exports as the government cracks down on illegal mining and exports.

Liquefied Natural Gas (LNG)

LNG is a natural gas which has been cooled to its liquid state. The majority of the world's natural gas is traded and transported, in its gaseous form, through large pipeline networks. However Australia's geographical location prevents trade by the conventional pipeline method. As a liquid, LNG is not flammable or explosive, occupies dramatically less space than its gaseous form, and can be readily transported to Australia's key export markets in specifically designed tankers. LNG is used in gas turbines to generate electricity and to power water and space heating for industrial, domestic and commercial users.

Natural gas (methane) for LNG production is predominantly sourced from conventional offshore gas fields, located in Western Australia. However recent technological advances have improved the economic viability of extracting gas from unconventional sources. As a result, the exploitation and use of coal seam gas (CSG) and shale gas for LNG production has increased in the past few years. CSG and shale gas are formed during the process of coal formation and are thus predominantly located in the coal mining areas of New South Wales and Queensland. According the CSIRO, eastern Australia has 250 trillion cubic feet of CSG, which is enough to power a city of 1 million people for 5,000 years¹⁷.

South Korea's consumption of natural gas has approximately doubled over the last decade, and it is now the world's second largest importer of LNG after Japan. Domestic gas production in South Korea is negligible, accounting for less than 2% of total consumption. As such, the country relies on imports to satisfy nearly all of its natural gas demand. Similarly to Australia, South Korea does not have any international gas pipeline connections, and must import all gas requirements via LNG tankers. South Korea is the third largest export destination for Australia's LNG, behind Japan and China.

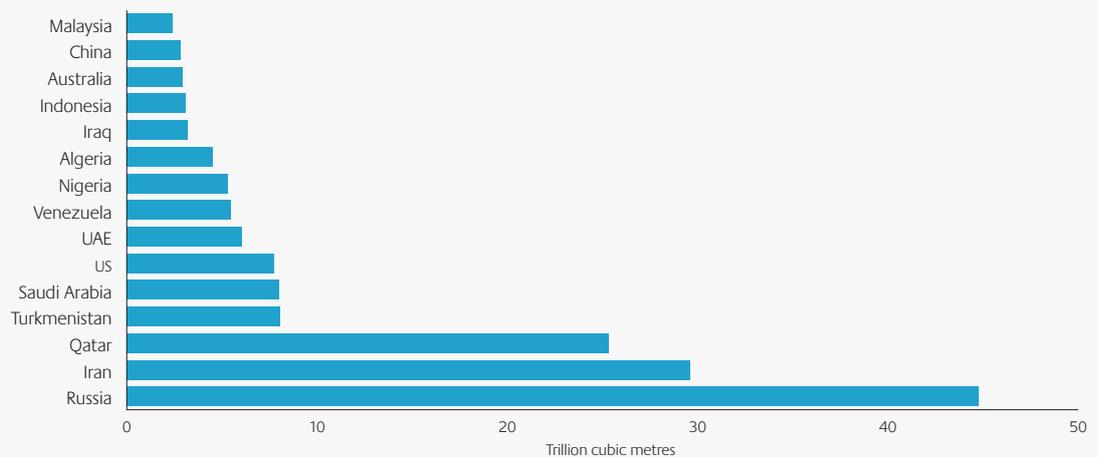
Footnotes:

15. UBS 2011.

16. Reserve Bank of Australia 2011.

17. Queensland Resources Council.

Chart 15: Natural gas reserves



Source: BP Statistical Review of World Energy 2011 (data for 2010).

In contrast to other gas-rich nations, Australia has an enviable combination of factors supporting the growth of its LNG sector. These factors include a limited domestic gas market, considerable unexploited reserves, a stable political environment and an advantageous geographical location in the Asia-Pacific. As a result, Australia has a plethora of LNG projects currently planned or in progress and is well positioned to become a leading global supplier of LNG.

Currently there are two operational LNG plants in Australia; the North West Shelf LNG project and Darwin LNG. The North West Shelf LNG project accounts for 80% of Australia's total production and is located off the coast of northern Western Australia. Among the capital-intensive projects currently undergoing feasibility studies are 15 proposed LNG developments, which collectively could add up to 85mt to Australia's annual LNG production capacity in the longer term. These projects include the Browse, Ichthys, Sunrise and Wheatstone projects off the coast of Western Australia and three coal seam gas based LNG projects in Queensland and one in New South Wales¹⁸.

Cost curve

All of these advantages, in each of these commodities, can be summarised in the form of cost curves. Cost curves represent the amount of production that can be produced at a particular cost. Those with the highest cost are the most marginal. Australian production costs are amongst the lowest in the world for iron ore, but higher for thermal and coking coal. In each of these commodities Australia produces large export volumes at costs well below the cost of the most marginal producers.

Australia's cost structures tend to be competitive in terms of freight and mining but higher for labour and royalties. In iron ore and coal, freight costs are very competitive in Australia, especially compared with India for iron ore and Canada and Russia for coal.

These strengths effectively protect Australia from only the most substantial falls in demand for either iron ore or coal. Indeed, in both iron ore and coal, China offers the greatest protection to the price Australian producers can demand for their production. In iron ore, for instance, Chinese production, the marginal producer, has a cash cost of between \$120 and \$140 per ton, well above the Australian average of \$33 per ton.

Footnote:

18. ABARES, Minerals and energy Major development projects – April 2011 listing.



These two concurrent realities, the emergence of China and Australia's mineral wealth, will make Australia a very wealthy country. But wealth comes with problems. How does Australia gain the most from its wealth? How can all Australians best benefit from the nation's wealth?

The mining boom is a gift to the long-term prosperity of Australia and all Australians. At the very least, every Australian will benefit from increased tax revenues and a stronger Australian dollar, making Australia one of the richest economies in the world. Australia can optimise its wealth by embracing the structural change required by the mining boom.

Australia has so far failed to fully capture these benefits. There is a reluctance to embrace a structural adjustment that would maximise mining output, whilst also creating a more robust non-mining economy. Instead of demanding or hoping for a slowdown in mining investment that would allow price pressures to ease, the non-mining economy must harness the strength of the mining boom to create a more productive non-mining economy. The non-mining economy must heal itself.

Structural adjustment

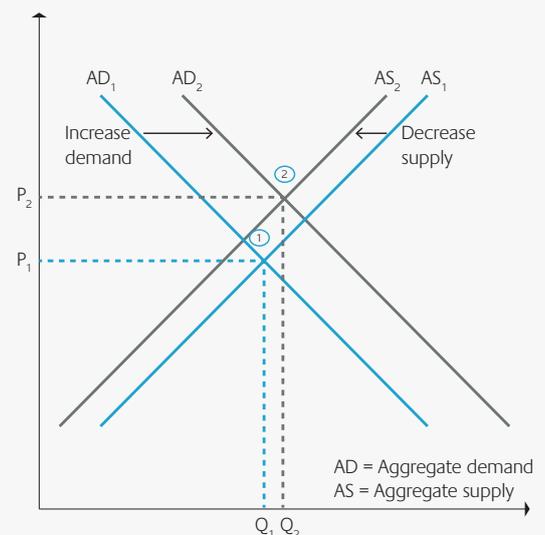
Structural adjustment is painful. There is no doubt about that. But it is also both inevitable and necessary. It is inevitable because so much of the adjustment created by the mining industry is driven by private capital that is free to move as it sees fit. It is necessary because structural change, if done efficiently, will raise the living standards of all Australians, much more substantially than if it does not occur. In addition, it will be fairer.

Structural adjustment is the reallocation of capital and labour to maximise economic activity in the country. In the short-term, adjustment is generally limited to the movement of labour. In the longer term, capital can be allocated to create growth and make good for the shift in labour supply to improve productivity and raise living standards.

For most Australians, working in the non-mining economy, the impact of structural adjustment has not been pleasant; particularly from higher interest rates and rising prices. The standard aggregate demand model from economics is a useful tool to explain why structural adjustment hurts the non-mining economy, despite being good for the economy as a whole. Around 2003 the economy was in broad equilibrium, highlighted by

P1 and Q1 in the chart below. Then the mining boom took off and while it has largely used new capital, it has sucked around 400,000 workers from the non-mining economy. They now, effectively, work for the buyers of commodities Asia, not the non-mining economy. This causes the supply curve to shift to the left, supply shrinks. At the same time, from a demand perspective, these workers are still non-mining economy households demanding goods and services, like everyone else. As a result the demand curve must shift to the right, demand expands. Effectively, the capacity of the Australian economy has shrunk despite higher demand. As a result, prices have risen and so living standards in the non-mining economy have improved only slightly, at best.

Chart 16: Demand supply



The pain, of course, can be offset by short and long term actions by individuals, firms and the government. The following sections look at some of these issues.

The short term

The shift in the labour supply that has hurt the structure of the non-mining economy has been driven by a significant shift in the relative value of Australia's capital base. While the value of capital in the southern and eastern parts of the country has grown relatively slowly, there has been a significant revaluation of the asset base of north and Western Australia as prices for commodities have risen.

This value change has set off a chain reaction of relative price shifts that have provided the impetus for, and confirmed, a broader shift in the allocation of labour and, to an extent, capital. First, wages rose to reflect the greater productivity of labour in the resource sector. This in turn reduced labour supply elsewhere in the economy and lowered productivity growth. A relatively low productivity economy caused interest rates to rise. This constrained demand and further encouraged the shift of labour from the non-mining economy to the mining economy. Finally, the Australian dollar rose. This provided external validation of the change in Australia and further enhanced allocation of capital and labour to mining.

The construction industry is a good example of the positive impact of higher interest rates on resource allocation. Since the beginning of 2010 higher interest rates and borrowing costs have led to slower demand for new housing construction in Australia, which is at a level considered to be below the level of natural demand. But construction spending and construction employment have continued to rise. Indeed, the construction sector has seen the fastest employment growth of any sector in Australia in the period to August 2011.

The steel industry is a similar example. The strong Australian dollar has allowed mining firms to capture lower input costs into mining projects by using cheaper imported steel. While this has had a devastating impact on companies in the domestic steel industry, it has also enabled workers in the industry to relocate to mining where high skill levels are in demand and more valuable.

Other industries have seen price signals create changes in the way they spend capital. The big supermarkets are good examples. In 2004 or 2005 the *Australian Financial Review* reported that Chicken Treat, a WA based fast food retailer, was employing a manager at its Karratha store for over \$100,000p.a on a fly-in, fly-out, two weeks on – two weeks off basis. This was one of many price signals for Australia's largest employers of low-skilled labour that suggested things had to change. Consequently, the two big supermarkets spent dramatically on supply chain improvement to lower their reliance on low-skilled labour. This capital

expenditure enabled greater efficiency at a time of rising labour costs and has helped supermarkets lower food prices. Effectively, the two supermarkets responded to clear price signals, gaining efficiencies for themselves and households.

But for many businesses, the rising price of labour and an inability to control it has lowered profitability and led to inflation for their customers. The example of bread baker Goodman Fielder highlights these problems. At its mid-2011 results it said it cost more to deliver a loaf of bread than to bake it, despite the rapid rise in the price of wheat. The company faces higher demand for truck drivers and must also deal with an increasingly congested urban transport network. Both factors raise costs and are beyond the control of the company itself.

Long term

While price signals are very effective in allocating labour, they are not necessarily as effective for optimising capital allocation, particularly in the long term. Diverse individuals and firms will see the world differently, have different risk and utility preferences or may simply be unable to change their environment. They are ill-equipped to create the change they need. For this reason, the government is crucial to the process of long-term adjustment and better capital allocation. It will be both the collector of mining boom revenues, through tax, and the agent most capable of making the investments required to create a more efficient economy.

One proposal is a sovereign wealth fund (SWF). Such a fund, however, fails to achieve positive outcomes for the economy. First, it is unfair on current generations. The government is expected to collect high tax revenues from mining for at least 30-40 years, meaning many Australians alive today may see little benefit from the returns the fund generates. Second, Australia has little need for financial assets, particularly if the fund, due to liquidity reasons, is exposed to the low growth markets of the North Atlantic. Finally, there is clear demand for physical investment in the domestic economy.

A recent critique of Norway's SWF highlights many of these issues. The Government Pension Fund of Norway (previously named the Petroleum Fund of Norway) has been collecting revenues from the nation's substantial oil operations, with an aim to "safeguard and build financial wealth for future generations" for two decades. It is now the second largest SWF in the world (behind Abu Dhabi) and has financial assets exceeding US\$500bn. To avoid domestic inflation, Norway's SWF invests all of its funds abroad—namely in European and US stocks and

bonds. By doing this, however, not only do foreigners receive the majority of Norway's oil, but they also receive the royalties and profits from its production through its foreign investments. In contrast, nations such as Singapore manage their SWFs with the aim of shaping their economies for decades to come, rather than with a purely financial target. These nations are actively investing their trade surpluses to raise education levels, productivity and living standards.

An alternative suggestion of lowering taxes would fail to meet the need for physical investment in Australia. Indeed, increasing demand within the non-mining economy would only exacerbate price pressures in the absence of a supply side response.

This would promote an Indian style solution where individual households and firms invest in an attempt to raise their own productivity. This, however, is likely to result in sub-par growth and unstable prices with only minimal positive externalities for the wider economy. The Goodman Fielder example is again useful. The competitive response from bread bakers has seen the rise of on-premise baking. This has improved the returns and efficiency of individual bakers no longer exposed to a heavy reliance on urban transport networks. But it is inefficient for the wider economy because it's capturing the benefits of scale from centralised production.

Instead, Australia, through its government, must leverage its strong balance sheet, easy financing conditions and strong dollar to invest heavily in the non-mining economy regardless of any pricing pressures. In the formation of long-term adjustment policy, the government must take the lead – with the Reserve Bank of Australia (RBA) only capable of sending the right price signals. The government needs to take responsibility for the majority of investment spending in the non-mining economy with the aim of building an efficient services based economy.

Governments and financial markets have, generally, struggled to understand the shift to a service economy and its implications for policy and capital allocation. From a political perspective, former Australian Labor Party (ALP) leader Mark Latham, made an interesting observation in his book "The Mark Latham Diaries". He said the failure of the ALP has been to misunderstand the changing work habits of voters in Sydney's western suburbs as working exclusively for large employers. Instead Latham points out that most people in western Sydney now work for consultants or contractors in small businesses providing services to others in Sydney.

From a financial perspective, financial markets represent the capital intense areas of the economy. In the last 30 years, the traditionally capital intense sectors, such as manufacturing, have shrunk as a share of the total economy. The equity market remains dominated by mining, banks, property and infrastructure trusts, construction and engineering companies and retailers. But, the economy and employment is dominated by Mark Latham's consultants and contractors who may be tradesmen, lawyers, accountants, health professionals, teachers etc. This is a developed world shift; some of the world's most valuable companies have limited need for physical capital. Apple, for instance, has just \$4.5 billion of fixed assets compared to a market cap of \$200 billion.

Governments want to implement sweeping industrial policies, while capital markets are looking for large capital intense manufacturing firms. But the broader economy needs neither and has still managed to thrive and become the biggest employer, by some distance, of Australians. This is where Australians spend their money and will continue to spend more of their money as they get richer.

So policy and the flow of capital must now focus, more intently, on helping this sector. This new focus must solve three key problems for the sector. First, demand for services is negatively impacted by rising price pressures and interest rates. Second, small businesses have limited say in public policy because of the sector's disaggregation and the individual firm's focus on survival and success. Third, small businesses operating in urban areas face cost pressures from rising transport and infrastructure costs that lower productivity. The government must listen to the sector, identify the solutions and pay for them.

For these problems to be overcome the government, financed by capital markets, must look to make a dramatic improvement in the capacity of the Australian non-mining economy. It must improve the supply side.

What does an improvement in the supply side look like?

For it to be effective, supply side investment would probably need to cost upwards of \$500 billion dollars, or around 50% of Australia's annual GDP. This period of investment would occur over a span of perhaps 10 to 15 years. But it needs to begin quickly.

Supply side investment would lower the cost of living for households in the non-mining economy. This would, in many ways, make up for the relatively lower wages that would likely exist. Transport will be at the heart of the

infrastructure improvement, with Sydney a good example of what problems capital investment could solve.

Sydney struggles with the same problems as all Australian cities, they are just more magnified. Sydney, the country's largest city by population, trapped as it is by topography, suffers from the highest costs in a number of different areas, including housing, transport and many other services. It, like other cities, needs a comprehensive infrastructure upgrade plan.

The solutions for Sydney's internal congestion are well-understood. There are a number of projects currently mooted that would have a significant and immediate impact on congestion. These include the North West Rail Link, the M5 East extension and the Inner West Light Rail. These projects, however, have the Sydney CBD as their hub. The challenge for infrastructure planners in Sydney will be to create alternative hubs, to the already congested CBD, such as the population centre of Sydney, Parramatta. Such a hub would make existing business centres like North West Business Park and Homebush Bay more valuable. These centres offer lower costs than in the Sydney CBD, are well-located to population centres and served by good road networks. Access to a Western Sydney rail transport hub would further increase their value.

But transport's more important role will be achieving the regionalisation that Australia has struggled with since Federation. Regionalisation is essential as current urban areas will be unable to support the likely population growth. Urban populations wish for a particular lifestyle, generally including a free-standing family home that is increasingly difficult to sustain. But it's impossible to attract families to regional areas without proper connectivity.

The National Broadband Network (NBN) begins the process of joining urban and regional Australia. The NBN will act as a catalyst to help shift Australians from urban to regional areas. It will provide people with greater workplace flexibility, particularly for those in knowledge, service based jobs. Increasingly, these people will be able to take advantage of the lower living costs outside of urban areas.

This, in itself, will ease some of the pressure on the large urban areas. But there will be a coincidental rise in demand for goods and services in the regions. Partly, this will be positive for the regions as the shift in labour location creates demand for a larger service sector and more employment in regional areas. But it will also create price pressures as population growth outstrips the local provision of infrastructure; including transport

and energy as well as social infrastructure such as hospitals and schools. Undoubtedly, a co-ordinated plan, accounting for changing demographics across regions, must be a crucial part of the NBN roll-out.

The proper solution to encourage regional migration requires a European or Japanese style, high-speed railway. The high-speed rail would run from Melbourne to Brisbane via approximately 17 to 20 stations. The line would travel cross-country to Sydney from Melbourne, taking in Canberra, and then along the coast to Brisbane taking in Newcastle. Based on current technology, the 1800km journey could be done in six to eight hours. Sydney would sit in the middle, three to four hours from both Brisbane and Melbourne. The trains would necessarily have to stop in the middle of the three capital cities – but could have terminals on the peripheries of regional cities.

As in China and elsewhere, the value of the high speed rail is not in capital city to capital city travel. For those who are time constrained, air travel will remain the preferred option for this. The opportunity, however, is for those living in regional areas. Travel times to Melbourne from Wangaratta, Sydney from Newcastle or Lismore from Brisbane could be cut to an hour or less. Suddenly, each of these regional centres would be within easy commuting distance of large metropolitan areas. With lower costs of living, particularly for housing, many of the pressures from rising populations would be eased on the large metro areas.

A high-speed rail would have an immediate impact on traffic congestion on key freight corridors. For instance, traffic on the Pacific Highway in Sydney's north would fall as more people used the train than cars. This would lower travel times between Sydney and Newcastle and so lower the cost of goods in Newcastle. It would enable the construction of a second Sydney airport, either in the Sydney Basin or, perhaps, closer to Canberra or Newcastle.

The cost of the project is likely to be at least the current estimate of \$108 billion. The solution would have to be made to the highest possible specification to ensure it is most effective. In particular, it would need to be able to enter and exit the three major cities at close to high speed. This would likely mean extensive tunnelling. If the train had to slow, it would remove some of its efficiency. The greater the efficiency of the project, the greater the benefits for the government to capture through higher taxation.

The rail would accelerate the regionalisation, for which the NBN is a catalyst. Activity would shift to regional areas with

positive consequences for economic activity, job creation and property prices. By increasing capacity and lowering the cost of living, the project would create more demand in the economy and promote a long period of economic growth similar to that enjoyed in the wake of the micro-economic reforms of the 1980s and 1990s.

There are of course risks and problems associated with such a large project. Costs will likely be high, populations will shift and rise and the nation's balance sheet will take on more risk—but the rewards remain attractive.

Project costs

The costs of a substantial transport infrastructure upgrade, including the high-speed rail, would likely rise in the course of the next 10 years. On the plus side, a strong Australian dollar will make a lot of the capital goods imports cheaper. Broadly, however, the demand for labour from the project will exacerbate the already strong price pressures within the Australian economy and in the short term, further decrease the capacity of the south and east. The RBA will be required to address this inflation through higher interest rates.

This does not seem an attractive proposal. The counterfactual, not building the upgrade, will also add to price pressures, as has been the case in the last decade. This is similarly unattractive given there will be only limited change in the level of capacity. This paper argues, strongly, that the impact of the mining boom on Australia will be multi-decade. At some stage, Australia must undergo a period of rapidly rising price pressures to create the capacity it needs. Without this, the negatives of the mining boom, including falling labour supply and greater inequality would emerge even more aggressively.

Population change

Population change is an inevitable consequence of Australia's growing wealth. An increase in the wealth of the nation is likely to contribute to a higher birth rate as confidence in the future encourages fertility. Australia will also require a greater flow of immigrants to cope with the increased demand for labour. It is likely that by 2050 Australia will have a population of close to 50 million people (at current growth rates the population would be 39 million in 2050, at 2008 growth rates the population would be 53 million).

Without substantial incentives to change the pattern of Australia's population growth from urban to regional areas, Australia's eight capital cities will be substantially more crowded by 2050. The lifestyle of the average family will be unrecognisable from that enjoyed in 2011, with increasing numbers of middle class families

living in apartments. Furthermore, it is not clear that metropolitan areas are capable of coping with higher population densities. The value of the housing stock will continue to increase and transport efficiency will suffer. The result will be a continued increase in the cost of living.

The counterfactual to a planned regionalisation is higher prices and a lower standard of living for urban Australians. Australia simply cannot cope without a greater focus on regionalisation.

The nation's balance sheet

The global financial crisis and subsequent events in Europe have highlighted the strength of the Australian government's balance sheet. National net debt stands at just 7.7% of GDP and the fiscal deficit at -5.89% in 2010/11. This compares remarkably well to deficits in other developed nations. For many Australians, the idea of substantially increasing government debt is anathema.

This paper argues, however, that it is essential and not problematic. First and foremost, the government is the only agent in the Australian economy that can both finance high capacity infrastructure development and capture the externalities, particularly from increased taxation revenues, that make the projects worthwhile. Second, the debt is clearly used to fund capital projects with long-term return profiles. This differs substantially from debt used to fund ongoing consumption programs.

There have been proposals for the economy to use the superannuation pools to finance infrastructure projects. This proposal ignores the ability of the sovereign to finance at more attractive rates and may, also, constrain some of the personal choice that is inherent in the guaranteed superannuation contribution scheme. The superannuation industry must continue to focus on maximising risk-based returns to members. While it may be in the best interests of members to finance projects through government bonds or to purchase assets from the government, there should be no element of coercion.

Does government financing leave the economy vulnerable to a crisis in China? The obvious answer is yes, but, in all likelihood it helps protect Australia.

First, the economy can afford to take on considerably more debt, denominated in Australian dollars. The economy's capacity to take on more debt, particularly to fund capital projects, was outlined by CFSGAM Investment Markets Research in 2010. This is the perfect time to take on more debt; interest rates are relatively low, demand for Australian denominated debt is high

and the terms of trade support strong import demand, particularly for capital goods.

Second, much depends on the timing of a crisis in China. A crisis in the middle of construction would be more problematic than a crisis once construction is completed.

In the middle of construction, financing problems are likely to arise as the market raises the cost of funds for the project. This may jeopardise the project. But there are important offsets. The project would be part of any stimulus package, offering employment to those no longer working in the north and west. In addition, many of the input costs, including labour and steel (presumably cheap iron ore and coking coal inputs) would likely fall.

A crisis beyond the completion of the project would be less problematic. The project would not require financing and Australian dollar debt would mean servicing remained affordable.

Most importantly, however, infrastructure building in the south and east represents Australia's best defence against a decline in China. Australia already offers many of the things international labour and capital demand when looking for a home. The lifestyle is attractive; good weather, English speaking, the rule of law, a nice environment and, relatively, uncrowded. In addition to good regulation, a responsible central bank and government help attract capital.

The attractiveness of Australia to capital will remain in place. The attractiveness, for people, is much more dependent

upon the nation's ability to create room for growth that maintains lifestyle. Infrastructure and the associated regionalisation are at the heart of this attraction. Australia's best hope, as a rich, modern, non-China dependent economy relies on its ability to become the Switzerland of the Pacific (with more transparent banking laws!).

Politics

This all seems to make sense, but, the argument goes, such a large scale infrastructure investment program is not possible in a political environment dominated by the three year electoral cycle. This seems, largely, to be true. For the most part, successive governments, with the exception of the global financial crisis, have handed economic management over to the RBA. But, in time, the electorate will come to understand the ineffectual role government is playing in limiting the rise of price pressures in Australia. While the RBA has long been blamed for excessive policy tightening, it will become clearer that inactivity by government is the greatest source of rising price pressures. Governments have got to find a way to act.

Conclusion

Australia is lucky; extraordinarily lucky. The challenge for Australia, and particularly its policy makers, is to properly capture the benefits of this good fortune. Failure would be a shame. The country has a strong and proud history of economic reform that creates sustainable economic growth with remarkable improvement in employment. Again the country must seek to make these reforms, at perhaps the most politically difficult time, when things are good.



Further information

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