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This article will examine: • near-zero interest rate policy • how quantitative easing (QE) works • why central banks undertake QE • the impact of QE • the risks of QE.

The Global Financial Crisis (GFC) in the final quarter of 2008 produced a potentially catastrophic credit freeze. Although economists differ on whether the freeze actually occurred, banks did hoard cash to shore up their balance sheets, while bank lending to households fell dramatically.

Throughout 2007–09, the collapse of US asset prices led to the failure of major financial institutions, such as Bear Stearns, Lehman Brothers and Merrill Lynch. Hundreds of billions of dollars in paper financial assets simply evaporated. Crisis contagion quickly spread to every sector. In response, the US government injected more than $US1.5 trillion in an attempt to reflate the economy in 2008–09. Spending was designed to bolster consumer spending, protect jobs and prevent the financial system from collapsing.

Under such crisis conditions, governments and international organisations have few options. Two strategies are available to governments: (i) fiscal stimulus; and (ii) looser monetary policy. Most governments adopted a mix of the two. However, there are political and financial limits to fiscal policy, particularly as governments grew increasingly overextended during the GFC. Consequently, since 2008, monetary policy has largely displaced fiscal policy as means of generating economic stimulus. In the US, the Federal Reserve was critical to the execution of a binary strategy comprising a near-zero interest rate policy (ZIRP), combined with several rounds of bond-buying programs known as quantitative easing (QE).

How does QE work?

QE is often labelled ‘printing money’, but governments do not literally turn on the printing presses to expand the economy’s monetary base. Mainstream economic theory argues that central banks have a monopoly upon the lawful creation of money in a national economy. Thus, they can create liquidity without any real assets, deposits or money. In contrast, commercial banks are financial intermediaries and cannot create money themselves, although this is heavily debated in contemporary economics.

The Bank of Japan (BoJ) undertook the first contemporary attempt at reflationary QE. In 1999, the BoJ introduced ZIRP in response to nearly a decade of flat Japanese growth. Although this partially restored Japanese productivity and export competitiveness, it did not return Japan to its 1980s peak. To bolster Japanese growth following the GFC, in 2012 Prime Minister Shinzo Abe introduced ‘Abenomics’ an unprecedented fiscal and monetary expansion designed to boost domestic demand and inflation. Abe committed $US210 billion to fiscal stimulus, while the BoJ undertook securities purchases totalling a massive 57% of Japanese GDP by 2014. This is the largest central bank QE program ever undertaken worldwide, outstripping the US Federal Reserve’s asset purchases, which peaked at 25% of US GDP in 2014. This unorthodox approach has met with mixed success; Abenomics did spur a short-term recovery, but Japan entered recession in the second quarter of 2014 and continued to record negative quarters in 2014–15.

ZIRP and QE testify to the centrality of national monetary authorities to the policy-making process, particularly during periods of serious financial stress. Central banks may choose to buy government debt bonds, equities on the stock market, mortgage-backed securities (MBS), or a mix of these. For example, between 2008 and 2014, the US Fed purchased almost $4.5 trillion in government bonds and MBS (see Box 1). To buy securities, the Fed simply writes a figure on the ‘debit’ side of its ledger. Thus, at a stroke, the central bank has effectively created new money.
Here is an example of how QE works. Commercial banks buy government bonds, which are usually extremely safe assets, but they also pay low rates of interest and are only redeemable for cash upon maturity. Thus, bonds are safe havens for parking cash, but they tie up capital. When the US Fed purchases government bonds from commercial banks, it instantly increases the quantity (thus ‘quantitative’ easing) of real money in commercial banks’ reserves. Commercial banks can then extend increased credit to consumers, mortgagees and investors. Combined with ZIRP, this makes the cost of capital extremely low, thus encouraging borrowing and driving growth in the real economy.

**Student activities**

1. Briefly explain how the Global Financial Crisis could be described as a ‘catastrophic credit squeeze’.
2. Why has the United States ‘largely displaced fiscal policy as a means of generating economic stimulus’ since 2008?
3. What is the purpose of a near-zero interest rate policy?
4. How do central banks implement programs of quantitative easing?

**Why do central banks undertake rounds of QE?**

As monetary policy tools, such as ZIRP, quickly reached their effective limits, major central banks, such as the US Federal Reserve, the European Central Bank (ECB) and the BoJ, have periodically resorted to bond-buying programs known as quantitative easing.

The problem with ZIRP is that it reduces the costs of borrowing, but does not restore business or consumer confidence. During the GFC, as asset prices collapsed and unemployment rose significantly, central banks in the US, EU and Japan sought to inject liquidity into their respective economies. In 1929, the Wall Street Crash and the subsequent Depression were caused, in part, by a lack of bank liquidity. In 1987, during the ‘Black Friday’ Wall Street crash, the Federal Reserve recalled the lessons of 1929 and immediately injected massive amounts of liquidity into the US financial system.

But the crisis of 2007–2009 was of inherently different proportions to that of 1987. The rapidity with which the contagion spread to Europe, Japan, China and Australia demonstrated that monetary policy adjustments alone would be grossly insufficient, given burgeoning business failures and rampant unemployment. Instead, the Federal Reserve and US Treasury crafted a longer-term strategy that would reflate the American economy by effectively ‘printing’ dollars that would, in turn, be injected into the global economy. Between 2008 and 2014, the Fed’s asset-buying programs totalled approximately $US4.48 trillion (Federal Reserve, 2016; see figure 1).

**Box 1: US quantitative easing timeline**

<table>
<thead>
<tr>
<th>Program</th>
<th>Action</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZIRP</td>
<td>Federal funds rate held at 0.00%–0.50%</td>
<td>December 2008 – December 2015.</td>
</tr>
<tr>
<td>QE3</td>
<td>$US1.6 trillion</td>
<td>September 2014 – October 2014.</td>
</tr>
</tbody>
</table>

The Fed’s QE programs provided a significant boost to the US economy, stimulating consumer spending, expanding credit markets and driving jobs growth. In contrast, the European Union emergency stability funds assumed a much more conservative stance, engaging in significant bond buying only when the Greece faced a full-blown debt crisis in 2011–12. The European Central Bank (ECB) belatedly introduced its own €1.1 trillion QE program in March 2015.

**Figure 1. Federal Reserve Bank Assets**

The Fed’s QE programs provided a significant boost to the US economy, stimulating consumer spending, expanding credit markets and driving jobs growth. In contrast, the European Union emergency stability funds assumed a much more conservative stance, engaging in significant bond buying only when the Greece faced a full-blown debt crisis in 2011–12. The European Central Bank (ECB) belatedly introduced its own €1.1 trillion QE program in March 2015.
The impact of QE

The principal aims of the Fed, ECB and BoJ’s QE programs have been:

(i) to ensure sufficient liquidity in the financial system;
(ii) to reduce lending rates;
(iii) to reduce financial market risk; and,
(iv) to maintain market confidence.

First, as noted above, maintaining credit market liquidity is the key to avoiding or ameliorating financial crises, such as in 1987, 2000 and 2008.

Second, QE, in combination with ZIRP, was deployed to reduce lending rates. Here, QE was only partially successful. Although US lending rates fell early in the GFC, they have trended upwards in recent years.

Third, central banks that employ QE to purchase sovereign bonds not only shore up confidence in a country’s debt markets, but also reduce sovereign bonds interest rates, mitigating risk, thus making the bonds more attractive to private sector investors.

Fourth, market confidence is an intrinsic objective of QE. The Fed’s purchase of safe asset classes, such as Treasury bonds, has a spillover effect into other assets, encouraging investors to maintain balanced asset portfolios, rather than allowing risk-averse investors to engage in a ‘flight to safety’ (Sack, 2009). Commercial banks also benefit; QE broadens banks’ underlying cash reserve assets.

Since 2008, the global economy has experienced a sustained deflationary period. Deflation means wages and corporate profits are stagnant, leading to lower consumption spending, reduced business investment and slow economic growth. What is surprising is that, despite the injection of trillions of dollars of new money, in most economies since 2008, wages and prices growth have been glacial, illustrating the extent of the deflation experienced in much of the world economy since the onset of the GFC.

Advocates of reflation, such as Paul Krugman (2012), argue that the Fed’s QE and ZIRP programs account for the US’s relatively rapid jobs and growth recovery. Europe, by contrast, has been plagued by low growth and high unemployment, leading Krugman to call for less austerity and more reflation.


Student activities

5. Briefly outline why central banks implement programs of quantitative easing.

6. Explain, in detail, the beneficial effects of quantitative easing on the economy.

7. What is deflation and how can quantitative easing reduce its adverse effects?
QE risks:

Credit bubbles

If ZIRP and QE are maintained in the medium to longer term, credit bubbles may develop, with cheap money fuelling asset speculation in real estate, stocks and technology, leading to poor allocation of capital. This, in part, explains why US stock market indices returned to pre-2008 highs relatively quickly after the GFC. In an attempt to return to ‘normal’ interest rate policy, Federal Reserve Chair, Janet Yellen, raised US interest rates by 0.25% in December 2015.

Moral hazard

Another potential downside of QE is that it provides a perverse incentive for borrowers to speculate in risky paper assets, rather than investing in the productive side of the economy. ‘Moral hazard’ in finance describes a situation where an actor takes greater financial risks because s/he is buttressed by the knowledge that government or the central bank will intervene to rescue markets from failure, as market collapse could be catastrophic. To some extent, this explains why markets undergo periods of ‘irrational exuberance’, such as the late 1980s boom, the 1990s dot-com bubble and the sub-prime mortgage crisis of the 2000s. In each case, central banks intervened with influxes of liquidity to ameliorate the worst effects of ‘exuberance’.

Currency Wars

An intentional and direct objective of QE is currency depreciation. A depreciated currency restores wage productivity competitiveness, reduces import demand and helps balance the trade account. In short, currency depreciation makes an economy more competitive instantly, without having to implement difficult structural adjustments.

The Federal Reserve’s $4.5 trillion QE program gave the US a considerable competitive advantage, returning the US to growth much faster than Japan or the EU. Consequently, both Japan and the EU undertook rounds of QE in 2015–16 in order to depreciate the yen and the euro, respectively, to avoid becoming uncompetitive with the US dollar. The People’s Bank of China (PBOC) has also been forced to respond to the Federal Reserve’s QE. In order to maintain Chinese export competitiveness, PBOC maintained the yuan renminbi’s (RMB) US dollar peg and devalued the renminbi by 2% in 2015.

This illustrates how China cannot isolate itself from the global impact of the Federal Reserve’s multiple rounds of QE. This, in turn, has contributed to the consolidation of deflation in the world economy.

In March 2015, the ECB commenced its own €1.1 trillion round of QE, designed to restore growth to the Eurozone economy. However, depreciating the euro so that it remains competitive with the US dollar is a core objective of the ECB’s program. Without QE, the Eurozone’s wage productivity and external competitiveness would suffer against the depreciated yen, RMB and US dollar. In summary, the currency wars illustrate the dangers associated with uncoordinated rounds of QE undertaken by monetary authorities to secure a competitive advantage. If haphazard, spiralling money printing persists, the world economy risks a prolonged period of deflation, low growth and a long adjustment period until ‘normal’ monetary policies resume.

Student activities

8. Discuss, in detail, the potential risks of quantitative easing programs.

9. Essay: ‘For much of the 30 year period from 1970 policy-makers struggled to develop policies to deal with inflation. Now the problem in many of the world’s economies is deflation.’ To what extent has the execution of the binary strategy of a near-zero interest rate policy and quantitative easing assisted policy-makers to overcome the problem of deflation in the United States, Japan and the European Union?

References


THE PEOPLE, PLANET, PROSPERITY, PEACE AND PARTNERSHIP: WHY THE SUSTAINABLE DEVELOPMENT GOALS SHOULD MATTER TO EVERYONE

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The most important and ambitious agreement of the 21st century that you have probably never heard of was adopted in September last year by all 193 governments represented in the United Nations. The agreement aims to end poverty and hunger, eradicate AIDS, tuberculosis, malaria and communicable diseases, ensure that all boys and girls attend school, end abuse, exploitation and trafficking, reduce corruption, protect the planet, fight climate change and reduce inequality – all by the year 2030.

The 2030 Agenda

It all began in 2012, when the United Nations began to undertake worldwide consultations to pick the top priorities as the Sustainable Development Goals (SDGs). The process took several years and involved millions of people from all corners of the globe, from little villages in East Kenya to the Arctic. These people voted for their top priorities among a long list of issues that the planet and people faced from around the world. The My World survey, the High Level Panel, the Open Working Group as well as thousands of different submissions from groups, individuals, forums and conferences ensured that everyone’s voices were heard. The United Nations then shared the results with governments which then began a long negotiation process to identify the top priorities. These negotiations produced 17 Sustainable Development Goals (SDGs); which are considered to be the most prominent issues of our time - challenges and problems that threaten the future of people and the planet.

However, what is even more extraordinary is that despite all the expertise and planning, policymakers have almost no idea how these goals could be implemented. But what many agree is that for the agenda to succeed, everyone, in particular youth, must take ownership of it and spearhead the movement for change.

Roughly 50% of the world population is under the age of 30 (http://blog.euromonitor.com/2012/02/special-report-the-worlds-youngest-populations.html). These people, particularly in the younger age groups, are going to be most affected by the 2030 Agenda and the outcomes of the Sustainable Development Goals. However they have very few tools and very little influence to spearhead the movement for change. How are young people expected to take responsibility for their futures and change it for the better when many are not even aware that the 2030 Agenda exists – let alone...
help with its implementation?

Reading the 2030 Agenda should raise many questions: what is sustainable development? Where does the concept come from? What does it mean? Why do we need 17 Goals? Why do they have to be achieved by 2030? How do we achieve them? And the most important question of all - what is my part in all of this?

**Student activities**
1. Identify some of the areas to be addressed by the 2030 Agenda.
2. How were the Sustainable Development Goals determined?
3. Why is it important for younger people to take control of the 2030 Agenda?

**A brief history of sustainable development**

The phrase “sustainable development” was adopted and popularized in 1987, in the report of the United Nations Commission on Environment and Development, chaired by Norwegian Prime Minister Gro Harlem Brundtland. The Commission coined a definition of sustainable development that many continue to use to this day.

Image 2. Brundtland Commission

The Bruntland definition was officially adopted in 1992 at the Earth Summit in Rio, Brazil. At the Earth Summit, governments (including Australia) agreed to a series of action plans to promote sustainable development. These plans, which came to be known as ‘Agenda 21’ were mostly ignored by governments (including Australia), which ultimately led to their failure. However, much has happened since then that should make us optimistic that the new agenda - the Sustainable Development Goals (SDGs) - will succeed.

Firstly, since 1987 the definition of sustainable development has evolved, linking three important components of sustainable development together; economic development, social inclusion and environmental sustainability. Many now understand sustainable development as a concept that cannot be separated from our societies, economies and environments. We now view sustainable development as system, which is so interlinked that without the other components, it will not function. This has encouraged everyone to be involved with the movement, not just governments - which make it more likely to succeed. Let's not forget that sustainable development is a system and its implementation requires a movement.

Secondly, since the Earth Summit in 1992, the world has undergone several profound changes, “(i) the feasibility of ending extreme poverty in all its forms, (ii) a drastically higher human impact on the physical Earth, (iii) rapid technological change, (iv) increasing inequality, and (v) a growing diffusion and complexity of governance (Action Agenda)”. This means that the 2030 Agenda and the Sustainable Development Goals (SDGs) are more relevant than ever before in the history of our planet.

**Student activities**
4. Using the three components, explain the concept of sustainable development.
5. Are economic growth and sustainable development compatible goals? Discuss.
The Millennium Development Goals

Here is a fact that you might not be aware of; the Sustainable Development Goals (SDGs) are built on the successful model of the Millennium Development Goals (MDGs) – the prequels to the SDGs. The MDGs were adopted in 2002 and officially came to an end on the evening of the 31st of December 2015. The model of the MDGs has since proven to policy-makers that mobilising global action around a set of goals with a clock ticking in the background works.

Image 3. MDGs Chart

In 2002, policy-makers at the United Nations packaged the world’s most pressing priorities into an easy-to-understand set of eight goals (MDGs) to promote awareness, keep governments in check, and encourage the involvement of people. Many countries and governments made significant progress.

According to the United Nations the MDGs helped spark the biggest and most successful anti-poverty movement in history. China and India collectively brought 500 million people out of extreme poverty; the global number of deaths in children under five went from 12.7 million in 1990 to 6 million in 2015; almost 2 billion more people have access to clean drinking water; the number of maternal deaths from child birth fell significantly; and finally, financial aid from rich countries to poor countries increased from 81 billion US dollars in 2000 to 135 billion in 2015 (UN MDG Report 2015).

Image 4. MDGs Poster

“Millennium Development Goals (MDGs) produced most successful anti-poverty movement in history”

UNDP 2015

Student activities

6. What were the Millennium Development Goals and how have they led to the Sustainable Development Goals?

7. Examine some of the improvements that occurred during the period of the Millennium Development Goals.
Lessons from the MDGs and Agenda 2030

While the MDGs inspired extraordinary achievements in some areas, they fell short in others. Despite lifting millions of people out of extreme poverty, the world still faces the plight of more than a billion human beings living on less than $1.25 a day. That is 1 out of every 7 people on the planet living in extreme poverty. So there is still much left to be done to eradicate poverty around the globe.

The MDGs had one goal specifically dedicated to the environment (Goal 7) but this goal was mostly ignored and more importantly it failed to account for the severe impacts of climate change, which have seriously amplified since the year 2000. In a number of poor countries, the efforts that had been invested into achieving the MDGs (including billions of dollars) were in some cases reversed overnight with the impacts of climate change, including flooding, storms, rising sea levels and ocean acidification and leading to the destruction of civil infrastructure, crop failures, famines and disturbance in civil order. This is because the effects of climate change on the poor are devastating as they often lead to the Poverty Trap – a phenomenon where communities are trapped into a cycle of extreme poverty, with little prospect for progress. This proves that the MDGs did not adequately address the challenges of climate change.

However, it can be argued that the most significant challenge of development has been war and conflict, of which there are no shortages, even in the 21st century. The impacts of war and conflict on the development of a nation can be devastating and potentially irreversible. The best example of this is the Syrian Civil War, where years of development and progress were completely reversed in a few years, leading to a catastrophe with global consequences. The conflict in Syria “plunged 80% of its population into poverty” life expectancy went from 76 years to 55 years in 4 years and the collapse of economic foundations led to the loss of $200 billion since the conflict began in 2010. Right now 4 out of every 5 Syrians live in poverty. However, what is even more worrying are the conclusions of a recent United Nations report which found that the impacts of climate change may have been a trigger in the conflict (UN report). The Syrian case study proves the need to incorporate peace and security into the sustainable development agenda. The MDGs failed to do this but the governments have placed ‘peace, security and justice’ as a stand-alone goal in the new 2030 Agenda.

Since 2000, inequality - in particular wealth inequality - within and among countries has increased rapidly. Basically the rich are getting richer and in many areas of the globe the poor are staying poor or getting poorer. The gap between the rich and the poor has widened.

Image 6 – Infographic A

Image 7 – Infographic B
between the wealthy and the poor is getting bigger. A recent report by Oxfam calculated that 66 of the planet’s richest people (including Bill Gates, Mark Zuckerberg and Warren Buffett) have as much money as the 3.5 billion poorest people (Oxfam Report). In Australia, the wealthiest 20% of Australians accounted for 61% of household wealth (2011-12). On the other hand, the poorest 20% of Australians only accounted for 1% of total household wealth (http://theconversation.com/income-and-wealth-inequality-how-is-australia-faring-23483) – and this figure has been increasing for a number of years (http://www.acoss.org.au/wp-content/uploads/2015/06/Inequality_in_Australia_FINAL.pdf).

There are of course many moral objections to such trends. However, more recently a number of prominent economists such as Joseph Stiglitz, Jeffrey Sachs and Thomas Picketty have provided evidence and outlined reasons on how economic inequality could actually reverse long-term progress and development within a country and lead to economic crises and unsustainable growth patterns. While missing from the MDGs framework, inequality has become one of the core components of the 2030 Agenda for both moral and pragmatic reasons.

Finally, the MDGs taught policy-makers that the new goals must be fundamentally interlinked as progress in one-area affects the other goals and vice-versa. For example; poverty (Goal 1) can lead to hunger and malnutrition (Goal 2), which may lead to health problems (Goal 5) that may prevent a person from completing their education (Goal 4). In such circumstances boys are likely to be favoured over girls (Goal 5) for further education. Of course, if no infrastructure exists (Goal 9), there can be no hospitals for healthcare in the first place but more importantly if access to energy is not available (Goal 7) then schools and hospitals cannot operate, which could leave big proportions of the population at health risks but also illiterate. However, none of these would matter if communities were being threatened by climate change (Goal 13) through rising sea levels and floods or by conflict through civil wars and unrest (Goal 16). As you can see, the links between the goals mean that we cannot see them in separation to one another but as an integrated puzzle, which cannot be completed without all the pieces.

**Student activities**

8. Discuss some of the shortcomings of the Millennium Development Goals program.

9. Why is war and conflict such a significant challenge to development?

10. Why has inequality become such a major world issue in recent years?

11. Briefly explain why the Sustainable Development Goals are so interlinked.

Image 8 – Infographic C
Playing your part - #KnowYourGoals

We are a generation who bears the burden of overcoming these major challenges but it also makes us the generation that has the opportunity to be the first to make these great achievements. This makes us the most powerful generation in the history of the planet. We have the chance to end extreme poverty for good, to ensure that every person is healthy and lives to their full potential, the chance to give everyone a quality education, boys and girls alike, the chance to build resilient communities powered with renewable energies, with facilities to satisfy our basic needs of healthy nutritious food and also clean drinking water, the chance to overcome the impacts of climate change, to reduce inequality, to ensure healthy forests and oceans but also to make peaceful societies, where everyone lives at peace. If that is not an agenda worth fighting for, then I don’t know what is.

Some might tell you that the SDGs are too ambitious, that the goals are just a pipe dream and that the plans to achieve them are naive at best. However, young people have a several unique qualities that allow them to dream and envision this world, no matter how ambitious.

Their imaginations become the source of their inspirations; their creativity and energy become their tools for solving the puzzles that lie ahead of us. The greatest thinkers of the last millennia (Albert Einstein, Charles Darwin, Marie Curie, Isaac Newton, Harriet Taubman, Hedy Lamarr, Martin Luther King Jr) were all in their twenties when they came up with their transformative and revolutionary ideas. So, the innovations of the 21st century lie not in the policy-circles at the United Nations but in communities where young people’s ideas are valued instead of being repressed. The responsibility for implementing the SDGs lies with all of us but the greatest potential for transformative change lies within each of you - young people - who are not just our future but also our present.

You can begin by learning the goals and teaching your family, school and community about them. You can also join also join the international SDSN Youth campaign and be part of the movement to empower youth globally to create sustainable development solutions - #KnowYourGoals.

Student activities

12. Essay: Assess the links between Australia’s economic objectives and the Sustainable Development Goals in the 2030 Agenda
In China, the industrial sector accounts for around 40 per cent of GDP, and represents a key source of demand for Australian resource commodities. A range of indicators suggest that growth in Chinese industrial activity has weakened noticeably since late 2014, although it remains above the lows observed during the global financial crisis. This box examines these indicators to gain a better understanding of developments in this sector and thus the outlook for both the Chinese and Australian economies.

Data published by China’s National Bureau of Statistics (NBS) indicate that year-ended growth in the value-added measure of industrial production declined from around 7¼ per cent in December 2014 to around 5¾ per cent in September 2015 (Graph A1). The measurement of value-added industrial production is conceptually appealing as it aims to remove the problem of ‘double counting’ that can occur when simply adding up gross outputs of the various industrial products. This is because the value-added measure subtracts the value of intermediate inputs from the value of total output of the industrial sector. However, the value added of the industrial sector can be difficult to measure with precision at a monthly frequency, especially for a rapidly growing emerging economy like China. So it is also useful to examine other indicators of activity in the industrial sector.[1] http://www.rba.gov.au/publications/smp/2015/nov/box-a-chinas-industrial-sector.html#fn1

The NBS also publishes disaggregated data on the gross output of specific industries measured in physical units, such as the tonnes of crude steel, the number of automobiles, and so on. The information from these more granular data can be combined to calculate growth in the gross output of industrial products, as shown on the left panel of Graph A1.[2] Similar to the value-added measure, the gross output index of industrial production points to a sharp fall in growth and subsequent rebound during the period of the global financial crisis and China’s subsequent macroeconomic stimulus, and lower rates of growth since 2010. However, the series vary from each other, which is to be expected given the conceptual differences underpinning their construction. Since 2011, growth in gross output has been lower on average and more variable than growth in industrial value added. This has become particularly pronounced since late 2014. A part of this difference can be explained by the fact that a gross output measure may accentuate the effects of a business cycle because it double counts changes in intermediate goods. For example, a decline in iron ore production is also likely to be reflected in declining steel output.

Nevertheless, the disaggregated nature of the gross output data provides insights into the drivers of weakness in the industrial sector. The data suggest that falls in the output of machinery, equipment and some construction-related products, including crude steel, cement and plate glass, have been particularly pronounced. These trends are consistent with the recent weakness in investment in Chinese real estate and manufacturing. Output of coal and iron ore mines has also been relatively subdued. In contrast, the production of oil, chemicals and non-ferrous metals, such as
copper and aluminium, have made significant positive contributions to the growth of industrial output in 2015.

The weakness observed in industrial output is also evident in a range of other data, including financial measures such as industrial revenue and profits (Graph A2). Although they are generally more volatile, financial indicators have historically followed similar patterns to measures of industrial sector activity and have weakened noticeably over the past year. It is worth noting that both revenue and profits were growing strongly prior to the downturn that coincided with the global financial crisis. In contrast, the recent slowdown in the industrial sector has followed a number of years of declining growth in revenue and profits. This may have consequences for the ability of firms to continue operations and service debt if the weakness persists. In the first half of 2015, there was a sharp increase in the ratio of non-performing loans (NPL) to total loans for the manufacturing and wholesale and retail trade sectors at the four largest Chinese state-owned commercial banks. The reported overall NPL ratio for Chinese banks also increased moderately but remained low.

Regional variation in industrial sector conditions could also have implications for Chinese financial stability and government policy. While the large Chinese banks operate nationwide, regional exposures can be significant for individual institutions and some smaller financial institutions are likely to have more geographically concentrated exposures. If conditions in one part of the country were to deteriorate significantly, financial institutions with sizeable on- and off-balance sheet exposures to that region may come under pressure, potentially requiring policy responses to mitigate the spread of risks to the broader financial system.

Since 2014, growth of value-added industrial production has slowed but remains relatively high in Guangdong, Jiangsu and Shandong. These three provinces accounted for almost 30 per cent of total industrial GDP in 2014, and produce a diverse range of items, including a number that have made positive contributions to growth in industrial output in 2015 to date. In contrast, growth in industrial activity has been especially weak in the north-east, where there is significant production of motor vehicles, machinery and equipment (Figure A1). Growth is also weak in the resource-intensive provinces of Shanxi (which produces around a quarter of Chinese coal) and Hebei (which produces more than a third of China’s iron ore and around a quarter of domestic crude steel).

Together with Liaoning, Jilin and Heilongjiang, these provinces account for roughly 15 per cent of GDP. If the industrial downturn in the north-east persists, it is expected to weigh on the growth of aggregate economic activity in coming quarters.

**Student activities**

1. Assess the relative importance of China’s industrial sector to both the Chinese and Australian economies.
2. Explain the difference between the gross measure and the value-added measure of China’s industrial output.
3. What has happened to the growth rate of China’s industrial production in recent years?
4. How could the weakness in the industrial sector spread to other sectors of the Chinese economy?
5. Explain how ‘regional variations in industrial sector conditions could also have implications for China’s financial stability.
6. Identify the factors that have contributed to the ‘weakness in the industrial sector’ and explain how this weakness has affected revenue and profits of industrial firms in China.
7. Essay: Discuss the effects of the slowdown in China’s economic growth rate on the Australian economy.
Footnotes

1. It can be difficult to measure value-added industrial production because detailed information on the value and prices of inputs and outputs for individual industries is often not available on a monthly basis.

2. The gross output index presented here is a geometric weighted average of changes in gross output of around 160 industrial products, measured in their original units. The index uses weights based on available industrial revenue data; unweighted geometric averages are used at lower levels of aggregation for which revenue data are not available. The results are relatively robust to the selection of products included and to the use of weights based on the value of gross output.

3. The higher volatility observed in the growth of the financial measures partly reflects the fact that these are nominal indicators, while value-added industrial production and the gross output index are measured in real terms. In addition, the profits series includes a range of income sources other than sales (such as subsidies and investment earnings), and costs other than the value of inputs (such as merger and acquisition activity).

4. Value-added industrial production has contracted in the major cities of Beijing and Shanghai, but these provinces account for a modest (and declining) share of industrial sector GDP.

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