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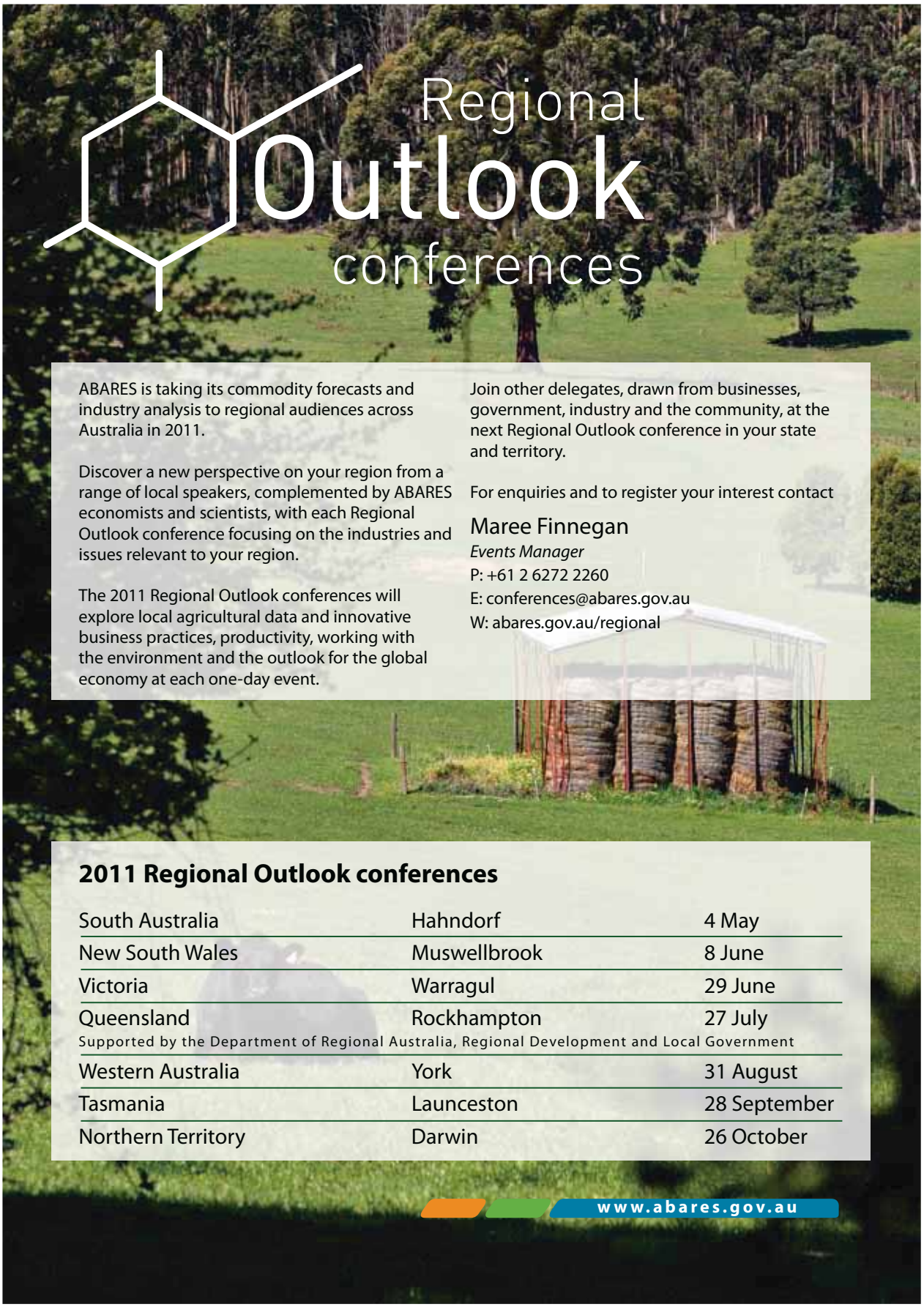
Abbreviations

a ABARES macro assumption s ABARES estimate f ABARES forecast z ABARES projection



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2011 Regional Outlook conferences

South Australia	Hahndorf	4 May
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Victoria	Warragul	29 June
Queensland	Rockhampton	27 July

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Western Australia	York	31 August
Tasmania	Launceston	28 September
Northern Territory	Darwin	26 October

Economic overview

Outlook to 2015–16

Neil Thompson and Jammie Penm

- World economic growth is expected to moderate to 4.1 per cent in 2011, following an estimated growth rate of 4.8 per cent in 2010. Over the medium term, world economic growth is assumed to average around 4 per cent a year toward 2016.
- Emerging economies will continue to underpin world economic growth, although growth rates in these economies are assumed to moderate over the outlook period. In contrast, growth in advanced economies is expected to be more subdued as many are facing the need to address rising public sector debt.
- Recent widespread flooding across eastern Australia is expected to adversely affect economic growth in the short term. Economic growth in Australia is assumed to average 2.7 per cent in 2010–11, strengthening to 3.9 per cent in 2011–12, before moderating to an average of 3 per cent a year toward 2015–16.

The global economy

Global economic growth to ease in 2011

Following strong activity in early 2010, global economic growth moderated in the second half of the year. While emerging economies in Asia continue to underpin world economic growth, weak private sector demand is slowing the recovery of major OECD economies.

Private sector demand in major OECD economies is expected to remain weak in the near term. The winding up of stimulus packages implemented during the global economic downturn in 2009, combined with high levels of unemployment and weak property markets, is expected to keep growth in consumer spending subdued. Economic growth for the OECD region as a whole is assumed to ease to 2.4 per cent in 2011, from an estimated 2.9 per cent in 2010, reflecting measures implemented in a number of OECD countries to reduce budget deficits and public sector debt.

For emerging economies, particularly China and India, the short-term outlook remains positive. Although export performance in many developing Asian economies is expected to ease in response to assumed weaker growth in demand from developed economies, domestic demand and greater intraregional trade are expected to support economic activity. Nevertheless, the emergence of inflationary pressures, particularly in non-OECD Asia, is expected to lead to an easing of economic growth as regional governments and central banks tighten accommodative fiscal and monetary policies. For developing economies as a whole, economic growth is assumed to average 6.6 per cent in 2011, following growth of an estimated 7.7 per cent in 2010.

Against this backdrop, world economic growth is assumed to moderate to 4.1 per cent in 2011, following growth of 4.8 per cent in 2010.

Key macroeconomic assumptions

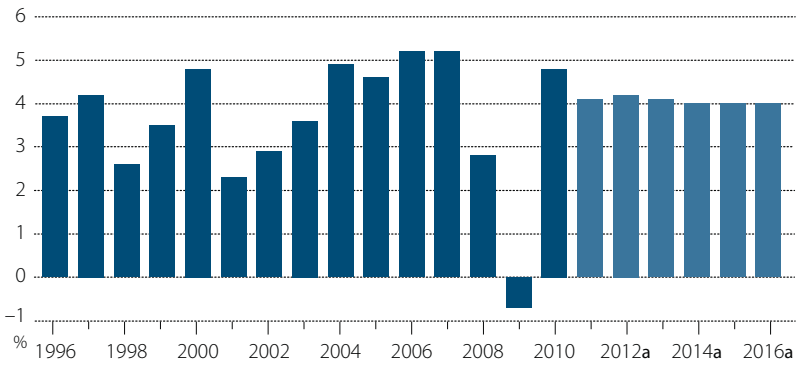
	unit	2009	2010	2011 a	2012 a	2013 a	2014 a	2015 a	2016 a
Economic growth b									
OECD	%	– 3.4	2.9	2.4	2.3	2.3	2.2	2.1	2.1
United States	%	– 2.6	2.9	2.9	2.7	2.7	2.5	2.5	2.5
Japan	%	– 6.3	3.9	1.5	1.8	1.8	1.6	1.5	1.5
Western Europe	%	– 3.9	1.7	1.5	1.8	1.8	1.8	1.7	1.7
Germany	%	– 4.7	3.6	2.1	2.0	1.9	1.8	1.8	1.8
France	%	– 2.5	1.5	1.3	1.8	1.6	1.6	1.6	1.6
United Kingdom	%	– 4.9	1.4	1.8	2.0	2.2	2.4	2.5	2.5
Italy	%	– 5.0	1.1	0.9	1.0	1.2	1.2	1.2	1.2
Korea, Rep. of	%	0.2	6.1	4.3	4.8	4.3	4.2	4.0	4.0
New Zealand	%	– 1.7	2.0	3.5	3.0	2.9	2.7	2.6	2.6
Developing countries	%	4.0	7.7	6.6	6.8	6.7	6.5	6.5	6.5
Non-OECD Asia	%	6.8	9.5	8.1	8.2	8.1	7.8	7.8	7.8
South East Asia c	%	1.7	6.8	5.4	5.9	5.6	5.5	5.5	5.5
China d	%	9.2	10.3	9.2	9.0	9.0	8.5	8.5	8.5
Chinese Taipei	%	– 1.9	10.5	4.5	5.0	5.0	4.5	4.5	4.5
Singapore	%	– 1.3	14.7	5.1	5.6	4.8	4.5	4.5	4.5
India	%	6.7	8.8	8.2	8.5	8.5	8.5	8.5	8.5
Latin America	%	– 1.7	5.7	4.2	4.3	4.2	4.2	4.2	4.2
Middle East	%	2.0	4.1	4.7	5.1	5.0	5.0	5.0	5.0
Russian Federation	%	– 7.9	3.8	4.3	4.5	4.4	4.2	4.0	4.0
Ukraine	%	– 15.1	4.3	4.2	4.6	4.4	4.3	4.1	4.0
Eastern Europe	%	– 3.6	3.7	3.6	4.0	4.0	4.2	4.2	4.5
World e	%	– 0.7	4.8	4.1	4.2	4.1	4.0	4.0	4.0
Industrial production b									
OECD	%	– 13.1	7.7	3.3	4.5	4.2	3.7	3.3	3.3
Inflation b									
United States	%	– 0.4	1.6	1.3	2.0	2.0	2.0	2.0	2.0
Interest rates									
US prime rate g	% pa	3.3	3.3	3.3	4.5	4.5	4.5	4.5	4.5

a ABARES assumption. **b** Change from previous period. **c** Indonesia, Malaysia, the Philippines, Thailand and Vietnam. **d** Excludes Hong Kong. **e** Weighted using 2009 purchasing power parity (PPP) valuation of country gross domestic product by the IMF. **g** Commercial bank lending rates to prime borrowers in the United States.
Sources: ABARES; Australian Bureau of Statistics; International Monetary Fund; Organisation for Economic Cooperation and Development; Reserve Bank of Australia.

Medium-term growth outlook

Looking ahead, world economic growth is assumed to strengthen to 4.2 per cent in 2012, before easing slightly to an average of around 4 per cent a year toward 2016.

World economic growth



In major OECD economies there are concerns about high levels of public sector debt, which created significant volatility in financial markets throughout 2010. Projections from the International Monetary Fund indicate that gross general government debt, as a share of gross domestic product, for some major OECD economies such as the United States and Japan is likely to increase over the outlook period, if no significant reduction measures are taken. In the United States, gross general government debt is projected to increase from 91 per cent of gross domestic product in 2010 to around 111 per cent by 2015, while Japanese debt is expected to rise from an estimated 221 per cent in 2010 to 249 per cent in 2015.

General government debt (gross) in selected countries, per cent of GDP

country	2007 (pre-crisis)	2010b	2011b	2012b	2015
Brazil	65.2	65.7	67.5	66.9	64.8
China	19.8	18.4	18.1	17.6	14
France	63.8	84	87.4	89.4	88.3
Germany	64.9	76.6	77.1	77.1	75.6
India	75.7	75.7	75.2	74.8	69.6
Italy	103.5	118.7	120.1	120.1	118.8
Japan	187.7	220.7	227.5	232.8	249.1
United Kingdom	43.9	77.2	82.1	84.5	83.9
United States	62.1	91.2	97.9	102	110.7

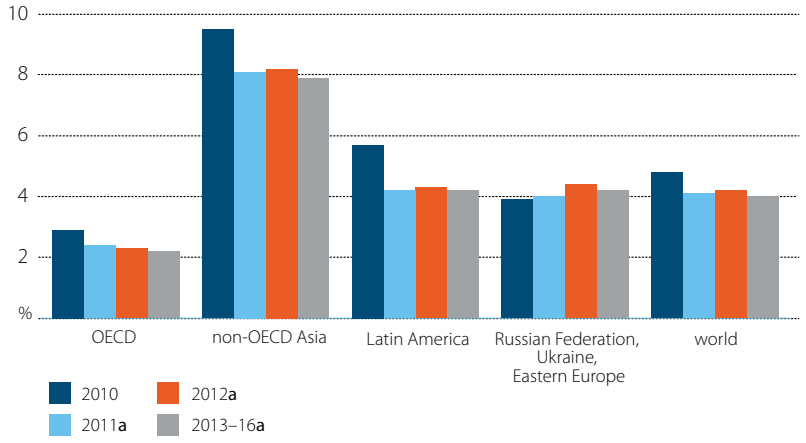
b updated January 2011.
Source: International Monetary Fund (IMF).

Many governments in OECD economies, particularly in Western Europe, have begun to review spending and implement measures to reduce budget deficits and public sector debt (see box). These measures are expected to put downward pressure on economic growth in the next several years, as government spending is cut and taxes increase. Without significant efforts for debt reduction, many of these economies could be perceived by financial markets as risky investment destinations, leading to declining inflows of foreign investment, rising real interest rates (for risk premium to prevent capital outflows) and a significant devaluation of their currencies. The rising debt problem poses a significant downside to the OECD economic outlook. In preparing this set of commodity projections, OECD economic growth is assumed to ease to an annual average of around 2.1 per cent toward 2016.

For developing economies, economic growth is assumed to be relatively strong over the medium term. While domestic demand in non-OECD Asia is expected to be robust, strong intraregional trade and investment flows will continue to underpin regional economic growth. Economies in Africa, the Middle East and Latin America are also expected to maintain solid growth in the next few years as commodity prices, in real terms, are projected to remain strong. In Eastern Europe, the Russian Federation and Ukraine, economic recovery is assumed to continue, although exports could be adversely affected in the short term because of weakness in their major trading partners in Western Europe.

For developing countries as a whole, economic growth is assumed to strengthen to 6.8 per cent in 2012, before easing gradually to around 6.5 per cent a year toward 2016.

Regional economic growth

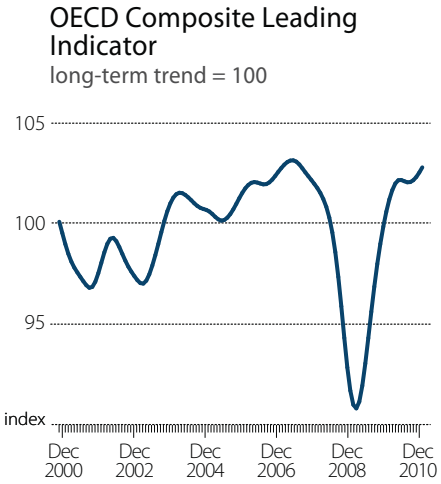


Fiscal consolidation: the implications for economic growth and commodity demand

Garth Day

The global economic outlook has improved but it remains subject to a range of uncertainties and risks. Efforts undertaken by a number of OECD countries for fiscal consolidation will improve the longer term global growth prospects because lower public sector debt and debt servicing burden will lead to a decline in real interest rates, lower tax burden and higher private sector investment. In the short term, however, fiscal consolidation is expected to lead to weaker economic growth. Higher taxation or lower government spending reduces domestic demand and raises unemployment.

In preparing this set of commodity projections, ABARES has assumed that world economic growth will average around 4.1 per cent in 2011, following an estimated growth rate of 4.8 per cent in 2010. Continued modest economic growth among the advanced economies and more robust growth in emerging economies are expected to provide many governments around the world with the opportunity to initiate the much anticipated path toward greater fiscal austerity.



While fiscal austerity measures are expected to detract from economic growth, the recently released OECD composite leading indicator (measuring early signals of turning points in economic activity) suggests that the OECD economic outlook remains positive in the short term. While recent improvement in OECD economic momentum points to continued buoyant growth in 2011, there are heightened risks to a sustained path of economic recovery over the medium term if fiscal consolidation in many OECD countries is not achieved.

Fiscal consolidation among advanced economies

A return of buoyant global economic activity is expected to provide many governments with the opportunity to consolidate their fiscal position. Fiscal adjustment is expected to gather pace this year, placing a drag on global economic growth. Analysis of government budgets from 183 countries around the world shows that over 80 per cent experienced a deteriorating budget balance in 2009, helping to ameliorate some of the worst effects of the global economic downturn. In 2010 there was a turnaround, with around half of all countries posting smaller budget deficits. This trend will continue in 2011 with around two-thirds of all countries expected to experience an improved budget balance.

According to the International Monetary Fund (IMF), the advanced economies are expected to reduce their government budget deficits, on average, by a further 2.7 per cent of gross domestic product by 2012. In pursuing fiscal consolidation, governments need to strike a balance between improving the structural budget position (that is, the budget balance excluding cyclical factors) and avoiding withdrawing fiscal support too early, which might jeopardise global economic recovery.

In China, the most important export destination for Australian commodities, the budget deficit was around 3.1 per cent of gross domestic product in 2009, around 2.7 percentage points higher than the previous year. Measures to improve the structural budget position in China are expected to

continued...

Fiscal consolidation: the implications for economic growth and commodity demand continued

account for around 1.9 per cent of gross domestic product by 2012. This withdrawal of fiscal stimulus in China represents around two-thirds of the stimulus provided during the height of the global financial crisis. There could be important implications for commodity demand in China in response to this withdrawal if a significant increase in private sector expenditure does not occur.

In the world's largest economy, the United States, there will be another large budget deficit in 2011, which is expected to be the largest budget deficit among the major advanced economies. Overall, the advanced economies in aggregate are expected to record a budget deficit around 7.1 per cent of gross domestic product this year, the second successive year of decline from a high of 8.8 per cent of gross domestic product in 2009. Despite this modest improvement in the budgetary position of the advanced economies, the average level of gross debt will increase to over 100 per cent of gross domestic product this year. In particular, net government debt among the G7, which had averaged around 45–50 per cent of gross domestic product for over a decade before the global financial crisis, will double.

A high level of government debt will result in higher interest rates which crowd out private sector investment, impose a servicing burden on government finances, and reduce fiscal flexibility to counter future business cycles. However, reducing government debt without regard to the impact on the broader economy may accentuate the problem. Historically, it has not been uncommon for government debt to rise rapidly over a few years as a result of adverse economic developments. Invariably, it has taken many years of fiscal austerity to reduce the high levels of government debt to a more sustainable level.

The austerity measures of advanced economies

The real benefits of fiscal consolidation are made from explicit decisions by governments to improve the structural position of their budget. While fiscal policy remains supportive, fiscal consolidation will become more widespread, driven by discretionary fiscal policy measures in both advanced and emerging economies. This process of fiscal consolidation is expected to begin in earnest this year and to continue into the medium term.

Among the G7 economies, the United Kingdom and Italy made modest improvements to their structural budget in 2010. Other economies in Europe made similar efforts, namely Portugal, Ireland, Greece and Spain, driven by market pressures to avoid the risk of default. European leaders have indicated ongoing support for these economies. Nevertheless, market participants remain sceptical, raising the risk of further shocks to the global financial system with the potential to adversely affect global economic growth.

With the exception of the United States and Japan, the economies of the G7 are expected to undertake austerity measures to improve their structural budget position in 2011. According to the IMF, around 90 per cent of the advanced economies are expected to record smaller deficits this year and improve their structural budget, on average, by 1.8 per cent of gross domestic product by 2012. The United Kingdom is scheduled to achieve the largest gains among the G7 from their austerity drive, reducing its structural budget deficit by a further 3.6 per cent of gross domestic product by 2012.

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Fiscal consolidation: the implications for economic growth and commodity demand continued

The US economy remains fragile. Recent fiscal policy announcements by the US government are expected to provide additional stimulus to support US economic growth in the year ahead. The Federal Reserve has also instigated a second round of quantitative easing (QE2) to push down long-term interest rates and stimulate lending. Maintaining low long term interest rates is likely to result in persistent weakness in the US dollar, which will help export-orientated manufacturing industries.

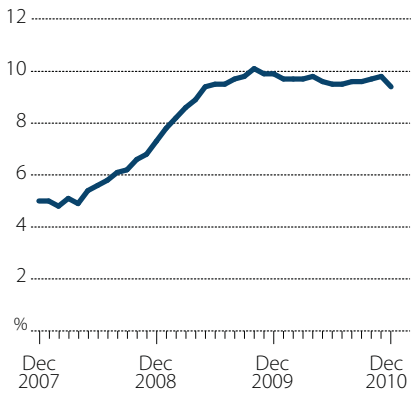
However, sustained weakness in the US dollar will have important implications for Australia's commodity sector, especially agriculture. Because Australian agriculture exports around 60 per cent of its production and the export contracts are mostly denominated in US dollars, a sustained increase in the value of the Australian dollar against the US dollar has the potential to adversely affect earnings of Australian agricultural exports. For the mineral resources sector, however, the adverse impact of a higher Australian dollar is likely to be less significant, given the substantial price increases for minerals and energy observed in recent years.

Economic prospects in Australia's major export markets

The United States

After strong recovery in late 2009 and early 2010, economic activity in the United States has moderated. Real gross domestic product expanded at an annualised rate of 3.2 per cent in the December quarter 2010, following growth of 2.7 per cent in the September quarter. This compares with 5 per cent in the December quarter 2009 and 3.7 per cent in the March quarter 2010. The weaker economic growth in recent quarters reflects slower growth in private sector demand, partly as a result of the winding back of stimulus spending.

US unemployment rate

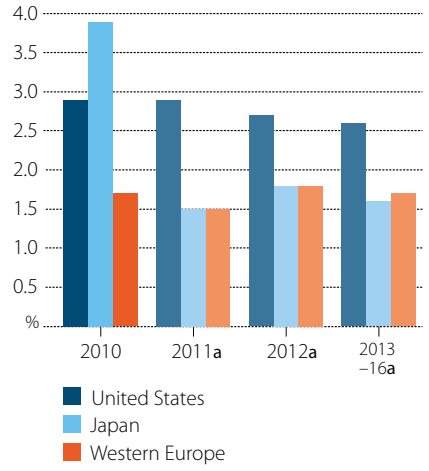


To sustain economic recovery in the short term, the US Government announced a further stimulus package in December 2010, with measures of US$858 billion to extend unemployment benefits and personal income tax cuts and to reduce payroll tax.

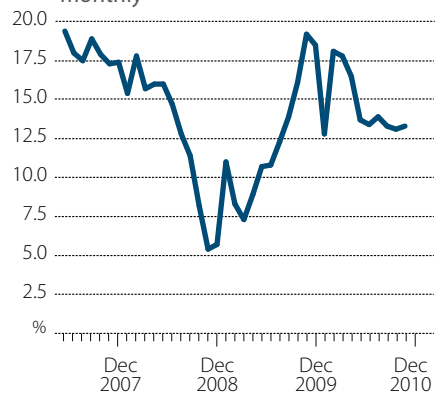
Despite these measures, weak growth in consumer spending could continue as a result of high unemployment and continued weakness in the housing market. The unemployment rate has been above 9 per cent since May 2009, showing few signs of declining significantly. Construction of new homes, seasonally adjusted, fell to an annualised pace of 529 000 in December 2010, around one-quarter of the pace during the housing boom in 2006 and around half the pace before the global financial crisis in 2008.

US housing starts
annualised monthly

OECD economic growth



Growth of industrial value added
monthly



Despite the subdued outlook for consumer spending, a brighter spot in the US economy is the recovery in manufacturing. Supported by stronger trade performance as a result of a weaker US dollar, industrial production grew by 5.9 per cent year-on-year in December 2010, the twelfth consecutive month of expansion.

Economic growth in the United States is assumed to average 2.9 per cent in 2011, similar to growth achieved in 2010. For 2012, economic growth is assumed to moderate to 2.7 per cent as stimulus measures are withdrawn and a program to reduce fiscal imbalance is assumed to occur. Toward 2016, economic growth in the United States is assumed to average around 2.5 per cent a year.

China

In China, economic growth remains relatively strong, despite a recent easing from the highs in late 2009 and early 2010. Gross domestic product, in real terms, grew at a year-on-year rate of 9.8 per cent in the December quarter 2010, following growth of 9.6 per cent in the September quarter. For 2010 as a whole, the Chinese economy is estimated to have expanded by 10.3 per cent.

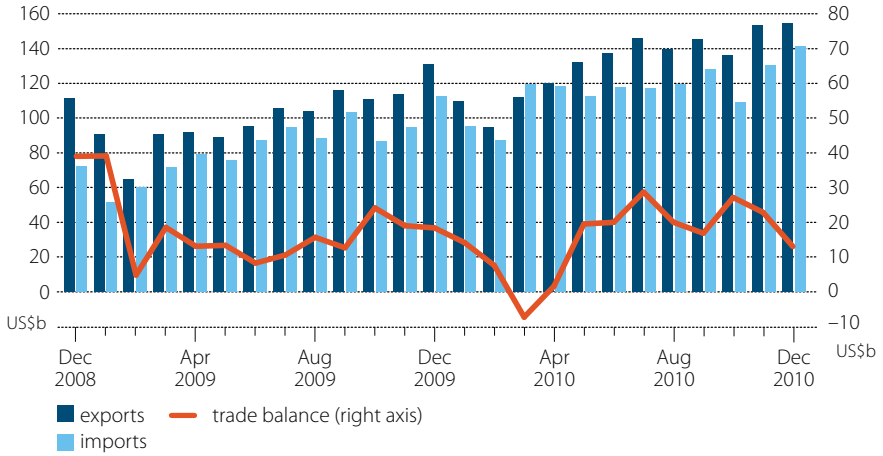
Economic growth in China has been underpinned by growth in domestic demand, supported by government spending. Industrial production expanded by 15.7 per cent in 2010, compared with 11 per cent in 2009. Exports are also recovering, with growth of 34.7 per cent in 2010 compared with a 16 per cent decline in 2009. This rapid expansion of economic activity has led to concerns over asset price bubbles, particularly in the housing market. In response, the Chinese Government has been tightening credit conditions and raising domestic interest rates.

There are signs indicating that these measures are having an effect on inflation and price movements in property markets. Growth in residential property prices slowed to a year-on-year rate of 6.4 per cent in December 2010, compared with a recent high of 12.8 per cent in April. Although consumer price inflation remained high, at a

year-on-year rate of 4.6 per cent in December 2010, it was slower than the 5.1 per cent recorded in November. For 2010 as a whole, consumer prices rose by 3.3 per cent, compared with a fall of 0.7 per cent in 2009.

The tightening measures have also slowed growth in investment spending. Growth in urban fixed asset investment averaged 24.5 per cent in 2010, compared with growth of 30.4 per cent in 2009. Looking forward, further tightening measures are likely in the short term, to further ease economic growth.

Recent trade indicators for China



Continued monetary tightening and the gradual withdrawal of stimulus spending are expected to moderate economic activity in China over 2011. In preparing this set of commodity forecasts, economic growth is assumed to average 9.2 per cent in 2011, before slowing modestly to 9 per cent in 2012. Over the medium term, economic growth in China is assumed to average around 8.5 per cent a year toward 2016.

There are considerable risks surrounding the economic outlook for China. The main downside risk relates to a more severe effect of the fiscal and monetary tightening on economic growth than currently assumed. There is a possibility that domestic demand could weaken significantly, undermining growth in commodity demand.

On the upside, China appears to have been more resilient to both internal and external shocks than other major world economies. There remains a possibility that economic growth in China will again outperform current expectations, despite fiscal and monetary tightening implemented by authorities.

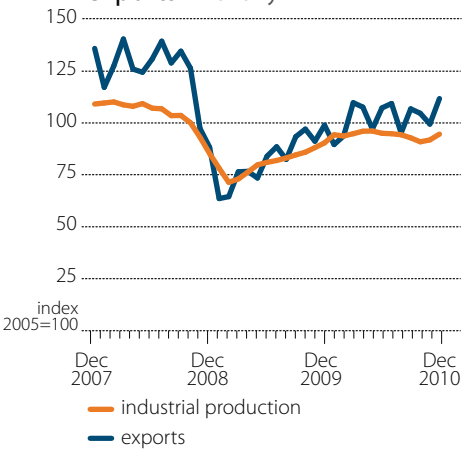
A major challenge for sustained strong economic growth in China over the medium term is the need to rebalance its sources of economic growth toward private sector demand and away from exports. As its importance in world trade rises, it will be difficult for China to

maintain rapid export growth, particularly given increased tensions on market access issues between China and other major world economies.

Japan and Western Europe

In Japan, real gross domestic product contracted at an annualised rate of 2.1 per cent in the December quarter 2010, following growth of 3.3 per cent in the September quarter and 2.1 per cent in the June quarter. This slowdown of quarterly economic growth largely reflects slowing export demand from major trading partners and a weak recovery in consumer spending because of declining prices and the ending of government assistance measures. For 2010, as a whole, economic growth in Japan is estimated to have expanded by 3.9 per cent. This compares with an economic contraction of 6.3 per cent in 2009.

Japan industrial production and exports monthly



Looking forward, economic activity is expected to remain subdued. The winding up of government stimulus spending could adversely affect private sector demand, and a significant recovery in consumer spending looks unlikely at this stage. Economic growth in Japan is assumed to average around 1.5 per cent in 2011, before rising modestly to 1.8 per cent in 2012.

One major challenge for the Japanese Government is to achieve balance between the short-term need for fiscal stimulus and the longer term need of fiscal consolidation. Japan has one of the largest fiscal deficits, as a share of gross domestic product, among the OECD economies.

In the presence of an aging population, the outlook for economic growth in Japan over the medium to longer term will also depend on the progress of structural reforms, particularly in the non-traded sector. Higher productivity growth will be required for Japan to maintain sustained economic growth. Economic growth in Japan over the medium term is assumed to gradually ease to 1.5 per cent in 2015 and 2016.

Economic activity in Western Europe has improved, albeit with significant differences in pace across the region. In Germany growth has been relatively strong, with real gross domestic product estimated to have expanded by 3.6 per cent in 2010. In contrast, growth has been subdued in other regional economies, with estimated growth of 1.5 per cent in France and 1.4 per cent in the United Kingdom in 2010. Economic activity in Greece contracted by 4.5 per cent in 2010.

Looking forward, consumer spending across regional economies is expected to be relatively weak because of high unemployment. Unemployment across the euro area averaged 10 per cent in December 2010, with highs of 20.2 per cent in Spain and 13.8 per cent in Ireland. For Germany, the largest regional economy, growth is expected to remain higher than most other European countries in the short term, but some easing of economic growth is likely in France,

the United Kingdom and Italy as authorities begin to withdraw stimulus spending. For smaller economies such as Ireland, Portugal and Greece, concerns over public debt levels and banking sector balance sheets could adversely affect consumer confidence and business investment, slowing the economic recovery.

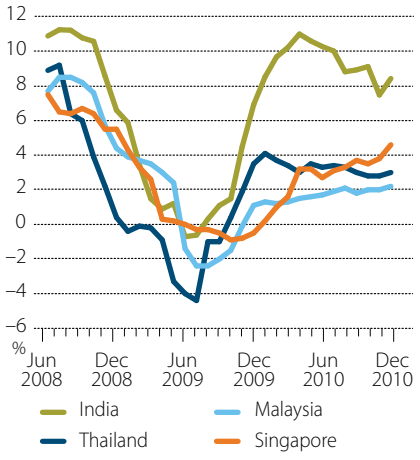
Against this backdrop, economic growth in Western Europe is assumed to average 1.5 per cent in 2011, following an estimated growth rate of 1.7 per cent in 2010. In 2012, improvements in exports and business investment are assumed to increase economic growth to an average rate of 1.8 per cent. Over the medium term, economic growth in Western Europe is assumed to average around 1.7 per cent a year toward 2016.

Non-OECD Asia

The outlook for economic growth remains positive for non-OECD Asia (which excludes Japan and the Republic of Korea). In India, economic activity expanded at a year-on-year rate of 8.9 per cent in the September quarter 2010, following growth of 8.8 per cent in the June quarter. In South-East Asia, the economy of Singapore grew year-on-year by 12.5 per cent in the December quarter 2010, after expanding by 10.5 per cent in the September quarter. In Vietnam, the economy recorded year-on-year growth of 7.3 per cent in the December quarter 2010, following 7.2 per cent in the September quarter.

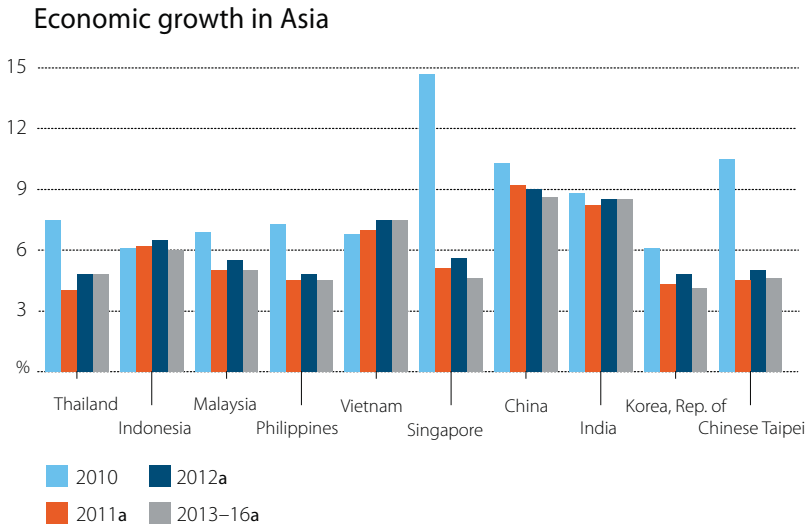
In response to strong economic growth, inflationary pressures have become an issue in many non-OECD Asian economies. For example, consumer prices in India rose at a year-on-year rate of 8.4 per cent in December 2010, while inflation in Singapore was around an annual rate of 4.6 per cent in late 2010. In response, a number of regional governments have taken a tighter stance on monetary policy. In India, the central bank has raised its benchmark lending rate by 175 basis points since March 2010.

Inflation rates in selected Asian economies



Looking forward, governments in the region are expected to undertake further measures to ease inflationary pressures in the short term. Given the reliance of regional economies on exports, the primary downside risk to the regional outlook is associated with import demand in the OECD economies. Over the medium term, regional economies will benefit from a more balanced growth strategy with a greater reliance on domestic demand. More balanced growth would also help to mitigate global trade and current account imbalances.

For non-OECD Asia as a whole, economic growth is assumed to average 8.1 per cent in 2011, compared with an estimate growth rate of 9.5 per cent in 2010. Toward 2016, economic growth is assumed to moderate to an annual rate of 7.8 per cent.



Economic prospects in Australia

In Australia, real gross domestic product rose by a seasonally adjusted rate of 2.7 per cent in the September quarter 2010, after expanding by 3.1 per cent in the June quarter.

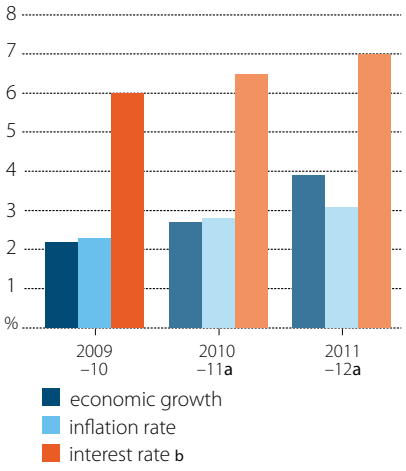
The recent flooding across Queensland, Victoria and parts of New South Wales, Western Australia and Tasmania has caused disruptions to regional economic activity and damage to infrastructure and property. ABARES has estimated that the heavy rainfall and flooding in eastern Australia from late November onwards has reduced agricultural production by around $2.3 billion in 2010–11, with significant impacts on the production of winter crops, fruit and vegetables, cotton and grain sorghum (see box). Losses of livestock appear to have been small in relation to the national herd and flock. The main effect for livestock appears to have been associated with disruptions to transport and other infrastructure support. These costs do not take into account the cost of lost farm infrastructure and assets. Tropical Cyclone Yasi, which hit the coast of Queensland around Innisfail on 3 February, caused a further $300 million in damage, principally to banana and sugar crops.

Key macroeconomic assumptions for Australia

	unit	2008–09	2009–10	2010–11 a	2011–12 a	2012–13 a	2013–14 a	2014–15 a	2015–16 a
Economic growth b	%	1.4	2.2	2.7	3.9	3.0	3.0	3.0	3.0
Inflation b	%	3.1	2.3	2.8	3.1	2.8	2.5	2.5	2.5
Interest rates c	% pa	6.3	6.0	6.5	7.0	6.8	6.8	6.8	6.8
Nominal exchange rates d – US$/A$	US$	0.75	0.88	0.97	0.97	0.97	0.95	0.93	0.90
Trade weighted index for A$ e	index	60	69	74	74	74	72	71	70

a ABARES assumption. **b** Change from previous period. **c** Large business weighted average variable rate on credit outstanding. **d** Average of daily rates. **e** Base: May 1970 = 100.
Sources: ABARES; Australian Bureau of Statistics; Reserve Bank of Australia.

Australian economic indicators



b Large business weighted average variable rate on credit outstanding.

It is estimated that Queensland's coal exports between December 2010 and March 2011 could be around 15 million tonnes lower than previous expected. This represents a reduction in export earnings of around $2–2.5 billion. Effects on coal exports could continue into the June quarter as it will take time to return mines and rail infrastructures to full capacity. However, it is anticipated that coal prices could be settled at higher levels, partially offsetting the adverse impact on coal industry revenues.

While there have been widespread reports on flood-related disruption to regional economic activity, the situation can be expected to improve as rebuilding gathers momentum in the near future. In preparing this set of commodity projections, economic growth in Australia is assumed to average 2.7 per cent in 2010–11, before strengthening to 3.9 per cent in 2011–12. Over the medium term, economic growth in Australia is assumed to ease to a level that is more consistent with longer term potential, averaging around 3 per cent a year toward 2015–16.

Inflation

The consumer price index rose year-on-year by 2.7 per cent in the December quarter 2010, compared with rises of 2.8 per cent in the September quarter and 3.1 per cent in the June quarter. The most significant price rises in the December quarter were for fruit; vegetables; domestic holiday travel and accommodation; automotive fuel; and house purchases. The effects were partially offset by lower prices for pharmaceuticals; deposit and loan facilities; motor vehicles; audio, visual and computing equipment; and motor vehicle repair and servicing.

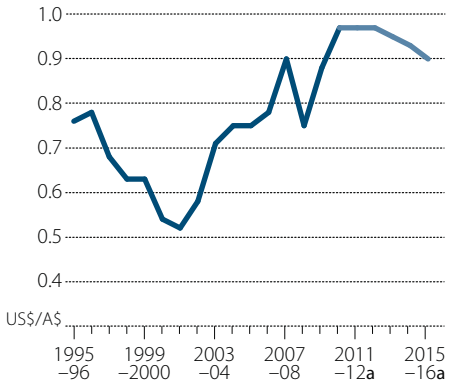
Looking forward, the headline inflation rate in Australia is expected to rise in the near term because fruit and vegetable prices have risen for some products, such as bananas, broccoli and zucchini, but the effects on other fruits and vegetables appear relatively limited. While there has been damage to fruit and vegetables in some of the flood-affected regions in Queensland and Tasmania, there is considerable scope for fruit and vegetable producers in other regions of Australia to respond to flood-induced supply shortages, which may ease upward pressures on prices over time.

Australia's inflation rate is assumed to average 2.8 per cent in 2010–11, before increasing slightly to 3.1 per cent in 2011–12. Toward 2015–16, the inflation rate is assumed to be around 2.5 per cent a year.

Australian exchange rate

The Australian dollar appreciated significantly in the second half of 2010, both against the US dollar and on a trade-weighted basis. The Australian dollar was trading around US100c and

Australian exchange rate



TWI 75 in mid-February 2011, compared with US82c and TWI 66 in early June 2010. For the first seven months of 2010–11, the Australian dollar averaged around US95c and TWI 72.

The recent appreciation of the Australian dollar mainly reflects changed financial market sentiment toward the US dollar in response to the 'quantitative easing' implemented by the Federal Reserve. While the Australian dollar has appreciated against the US dollar, its value against other major international floating currencies has been relatively stable. Against the Japanese yen, the Australian dollar was trading around ¥84 in mid-February 2011, compared with ¥75 in early June 2010. Against the euro, the Australian dollar was trading around €0.74 in mid-February 2011, compared with €0.69 in early June 2010.

In the next few years, the value of the Australian dollar is assumed to remain relatively strong, especially against the US dollar. There are a number of reasons underpinning this assessment. First, forecast strong commodity demand, especially for mineral resources, is expected to provide support for world commodity prices and, hence, Australia's commodity export earnings and terms of trade. Second, Australia's interest rates will remain relatively high compared with major OECD countries, given Australia's advanced stage of economic recovery. Although an assumed increase in US interest rates in 2012 is expected to provide support for the value of the US dollar by that time, the effect on the Australian exchange rate is assumed to be largely offset by continued strong commodity demand, especially coming from China and India.

Looking beyond the short term, there is a strong possibility that the value of the Australian dollar could ease gradually from current highs. This would especially be the case if major OECD economies, especially the United States, can significantly improve their fiscal position. Under this scenario, financial market sentiment toward the US dollar could strengthen, which would place downward pressure on the Australian dollar. A more significant supply response is also projected for mineral resources over the medium term. Higher growth in production of mineral resources is likely to place downward pressure on energy and mineral prices on world markets toward the latter part of the outlook period.

Taking the above into account, the Australian dollar is assumed to average around US97c and TWI 74 in the next few years (to 2012–13), before moderating gradually to an average of US90c and TWI 70 by 2015–16.

While the Australian dollar is assumed to remain relatively strong in the short term, significant volatility in the exchange rate is likely to occur. This is because changes in financial market sentiment can have a significant influence on movements in the Australian dollar. For example, when looking back over the past three years the Australian dollar has been as low as US60c in late October 2008 and as high as US102c in late December 2010. Consequently, it

remains important for primary producers and exporters to manage the risks associated with fluctuations in the Australian exchange rate.

Outlook for Australia's commodity sector

Commodity export prices

The index of unit export returns for Australian commodities, in aggregate, is forecast to rise by 6 per cent in 2011–12, following a forecast increase of 24.2 per cent in 2010–11. The forecast increase in 2011–12 largely reflects higher prices for energy and minerals commodities on world markets.

For farm commodities, the index of unit export returns is forecast to decline by 3.5 per cent in 2011–12, after a forecast rise of 9.2 per cent in 2010–11. Forecast lower world prices for wheat, corn, rice, soybeans, cotton, sugar and dairy products are expected to more than offset forecast increases for beef and veal and wool.

Unit export returns for Australian mineral resources are forecast to rise by 7.4 per cent in 2011–12, after a forecast increase of 26.9 per cent in 2010–11. Unit returns for energy exports are expected to increase by 10.4 per cent in 2011–12, following a forecast rise of 22.3 per cent in 2010–11. For metals and other minerals, unit export returns are expected to increase by 5.3 per cent in 2011–12, after a forecast rise of 30.4 per cent in 2010–11.

Unit returns for Australian commodity exports are projected to ease, in real terms, over the remainder of the outlook period. Largely reflecting expected lower export prices for both farm and mineral resource commodities (in 2010–11 dollars), the index of unit export returns in 2015–16, in real terms, is projected to be around 13.2 per cent below its forecast value in 2010–11.

Commodity export earnings

Export earnings for farm commodities are forecast to be around $32.5 billion in 2011–12, an increase of 4.4 per cent from a forecast $31.2 billion in 2010–11. The increase largely reflects forecast higher export volumes. Agricultural commodities for which export earnings are forecast to increase in 2011–12 include barley, oilseeds, rice, grain sorghum, raw cotton, sugar, wine, beef and veal, sheep meat and wool. For forestry and fisheries products, export earnings are forecast to increase by 8.4 per cent in 2011–12, to be around $4.2 billion.

Over the medium term, the value of Australian farm exports is projected to fluctuate around its current level in real terms. Australian farm exports are projected to be $31.3 billion (in 2010–11 dollars) in 2015–16.

Export earnings from minerals and energy commodities are forecast to rise by 15.6 per cent to $214.6 billion in 2011–12, following a rise of 33.5 per cent to a forecast $185.6 billion in 2010–11. For energy commodities, export earnings are forecast to rise by 21 per cent to $88.8 billion in 2011–12, being largely driven by forecast higher prices for coal. For metals and other minerals, export earnings are forecast to increase by 12.1 per cent to $125.8 billion in 2011–12, reflecting higher shipments and prices for Australian iron ore.

Under the assumption that strong economic growth, and hence commodity demand, continues in developing economies, particularly in China and India, export earnings for Australian minerals and energy commodities in real terms are projected to rise over the outlook period. By 2015–16, minerals and energy commodity exports are projected to increase to $219.3 billion (in 2010–11 dollars). For energy commodities, export earnings in 2015-16 are projected to be $94 billion (in 2010–11 dollars), while export earnings for metals and other minerals are projected to be $125.3 billion (in 2010–11 dollars).

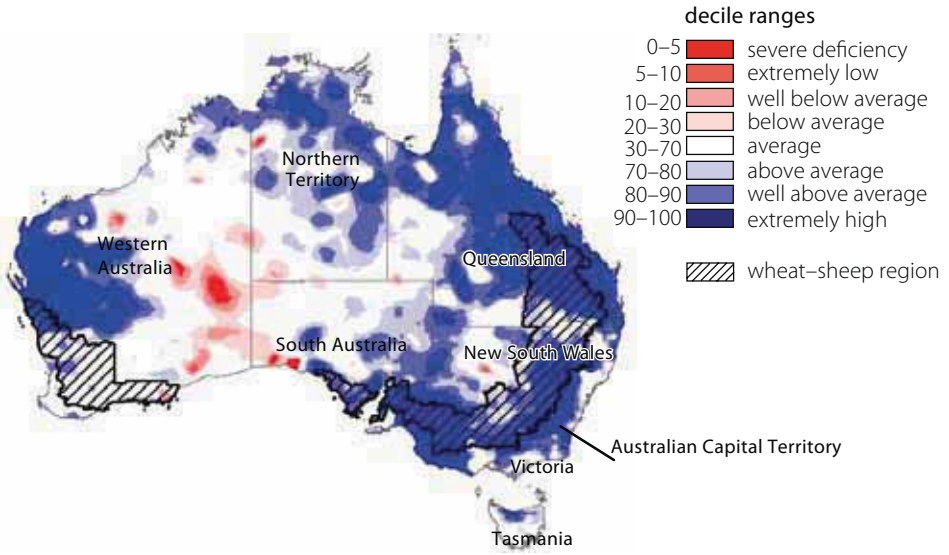
The value of Australia's commodity exports is forecast to be around $251.3 billion in 2011–12, an increase of 13.9 per cent from a forecast $220.6 billion in 2010–11. By 2015–16, the value of Australia's commodity exports is projected to rise to around $254.8 billion (in 2010–11 dollars), which is 15.5 per cent higher, in real terms, than forecast for 2010–11.

Impact of recent weather events on Australian commodity production

by ABARES commodity analysts

Australian commodity production has been significantly affected by adverse climatic conditions since mid-November 2010. Excessive rainfall in late November and through mid-December caused considerable disruption to the winter grain harvest and a significant downgrading of crop quality. Further exceptional rainfall and flooding in late December and through January caused further damage to agriculture in most of the eastern states as well as in the Gascoyne region of Western Australia, while coal mining operations were significantly affected in Queensland. Further damage was caused when Tropical Cyclone Yasi affected parts of Far North Queensland when it made landfall around Innisfail on 3 February 2011.

Rainfall percentiles – December 2010 and January 2011



Source: Bureau of Meteorology.

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Impact of recent weather events on Australian commodity production continued

Loss of agricultural production as a result of the recent adverse climatic conditions is estimated to total around $2.3 billion in 2010–11, with significant effects on production of cereals, sugar, fruit and vegetables, cotton and grain sorghum. This includes a loss of production of around $300 million due to Tropical Cyclone Yasi.

As observed with other major natural disasters, there was significant damage to property and infrastructure in the flood-affected regions. No attempt has been made to quantify these effects. The disruption to economic activity in the flood-affected regions can be expected to improve gradually as rebuilding starts and gathers momentum in the near future.

Coal exports have also been affected because of flooded pits and damage to ports, road and rail infrastructure. It is estimated that Queensland's coal exports between December 2010 and March 2011 could be around 15 million tonnes lower than previously anticipated. This represents a reduction in export earnings of around $2–2.5 billion in 2010–11. Further details on the effects of the floods on coal production and exports are contained in the Metals section of this report.

Rainfall in November and through mid-December

Because of the damage caused by excessive rainfall in late November and through mid-December, ABARES, in its December issue of *Australian commodities*, reduced the forecast value of wheat exports in 2010–11 by around $480 million up to that point. Principally due to a downgrading of the quantity of the crop.

The Australian sugarcane harvest was also severely hampered by excessive rainfall in the latter part of 2010. An estimated 5.7 million tonnes of sugarcane intended to be harvested in 2010–11 was stood over. The loss in earnings from sugar exports was estimated by ABARES in December to be around $470 million in 2010–11.

Flooding in mid-December and through January

Significant flooding occurred in the Gascoyne region of central Western Australia in mid-December, with the Gascoyne River rising to one of its highest flood levels on record. As the Gascoyne is an important fruit and vegetable producing region of Western Australia, damage to crops caused by flooding in the region resulted in an increase of prices in the Perth market.

Widespread flooding across eastern Australia in late December and through January is estimated to have caused a reduction in Australian agricultural production of an additional $1 billion in 2010–11. Of this, it is estimated that the total loss of winter crop production in the eastern states because of adverse climatic conditions in late December and through January could be around 2.5 million tonnes, or $600–700 million.

For summer crops, including grain sorghum and cotton, flooding and excessive rain have adversely affected plantings. In southern Queensland, plantings of grain sorghum reached around 80 per cent of the intended area (around 350 000 hectares) in late December. Between 15 and 20 per cent of these plantings are estimated to have been damaged by flooding, implying a loss in the value of grain sorghum production of around $30 million. For cotton, it is estimated that around 7 per cent of total Australian plantings in 2010–11 have been destroyed, valued at around $150 million.

Fruit and vegetable production has also been significantly affected by flooding, particularly in Queensland and, to a lesser extent, in parts of New South Wales, Victoria and Tasmania. ABARES estimates that around $225 million of fruit and vegetables have been lost in Queensland.

continued...

Impact of recent weather events on Australian commodity production continued

As the fresh fruit and vegetable market is very dependent on domestic production, flood-induced supply shortages led to higher prices for some products—particularly for vegetables such as broccoli, cauliflower, lettuce and zucchini. Prices of fruit have either been flat or are showing signs of easing after an increase in early January.

While there has been significant damage to fruit and vegetable production in some of the flood-affected regions, especially in Queensland, there is considerable scope for fruit and vegetable producers in other regions of Australia to respond to flood-induced supply shortages. In the Melbourne wholesale market, vegetable prices have been easing in recent weeks, with price declines being particularly large for broccoli, cauliflower and lettuce.

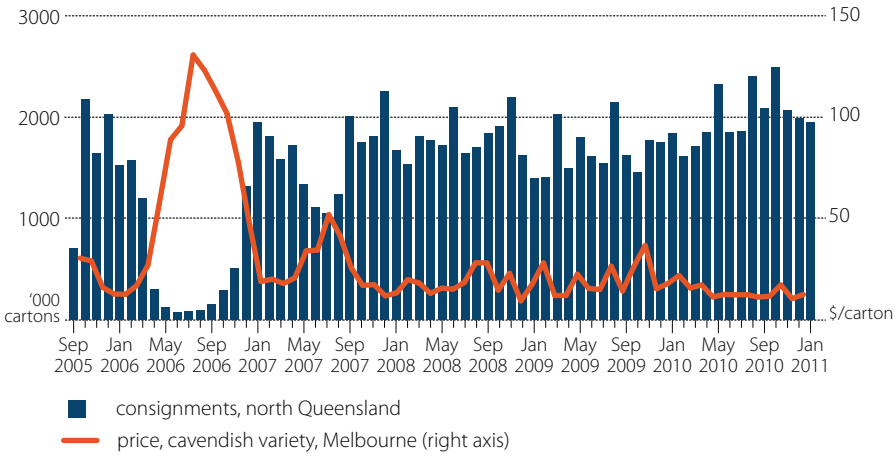
The impact of flooding on livestock has been relatively small in relation to the national herd and flock. Disruptions to transport, preventing milk collection, and damage to infrastructure, including feed stores, appear to be the main effects on livestock industries. For dairy, the floods could also increase the incidence of mastitis and loss of milk production because of stress.

Tropical Cyclone Yasi in early February

Tropical Cyclone Yasi has caused significant damage to banana and sugar production in Far North Queensland. The cyclone-affected region accounts for around 90 per cent of Australian banana production (valued at $384 million) and around 20 per cent of Australian sugar production (valued at $240 million in 2008–09).

ABARES has estimated that the damage to agricultural production in the area affected by Tropical Cyclone Yasi could have been around $300 million. Total agricultural production in the area affected by Tropical Cyclone Yasi was valued at around $1.1 billion in 2008–09.

North Queensland banana shipments and banana prices



Source: ABARES.

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Impact of recent weather events on Australian commodity production continued

Banana prices have increased significantly on supermarket shelves around the country. In the Melbourne wholesale market, the price of bananas averaged $41 a carton in the week ending 12 February, compared with slightly more than $10 a carton in late January.

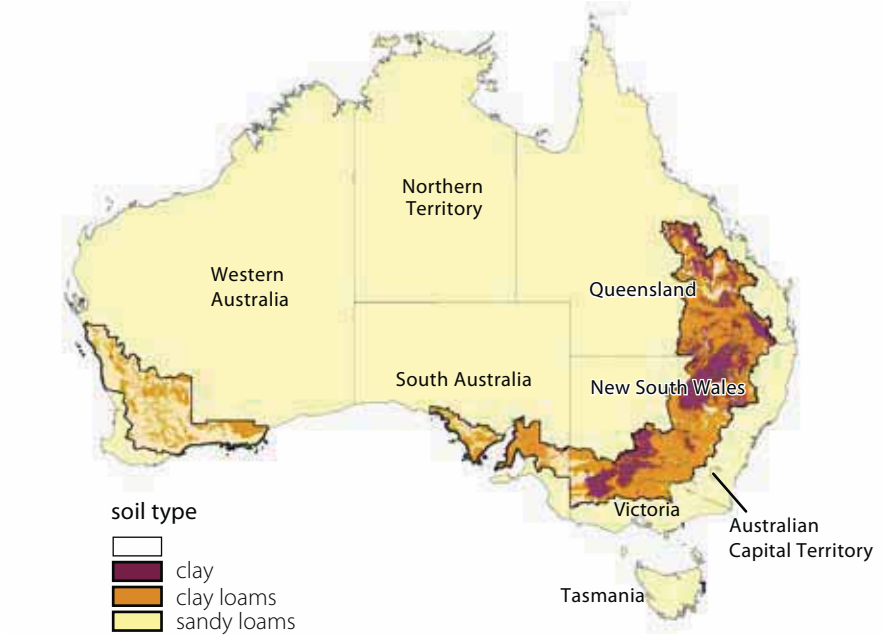
Based on past experience with the effect of Cyclone Larry, further banana price rises are likely over the next three or four months. When Cyclone Larry crossed the Queensland coast in roughly the same area in mid-March 2006, banana prices peaked at a monthly average of $130 a carton in July 2006.

Future implications

In its recent *Australian crop report*, ABARES forecast a 66 per cent increase in summer crop production to 4.8 million tonnes as compared with the previous drought-affected season.

The effect on the coming winter crop will depend on rainfall in future months and the amount of moisture retained in the soil. The ability of soil to maintain moisture is highly dependant on soil type. For example, sandy loams in parts of Western Australia and South Australia are very porous and have fast water infiltration rates, but soil holds less water. In contrast, clay and clay loam soils typical of many summer cropping regions in New South Wales and Queensland are less porous, with much slower water infiltration rates, but these soils hold more water. This is discussed in more detail in the February 2011 edition of the ABARES *Australian crop report*.

Soil types for major cropping regions



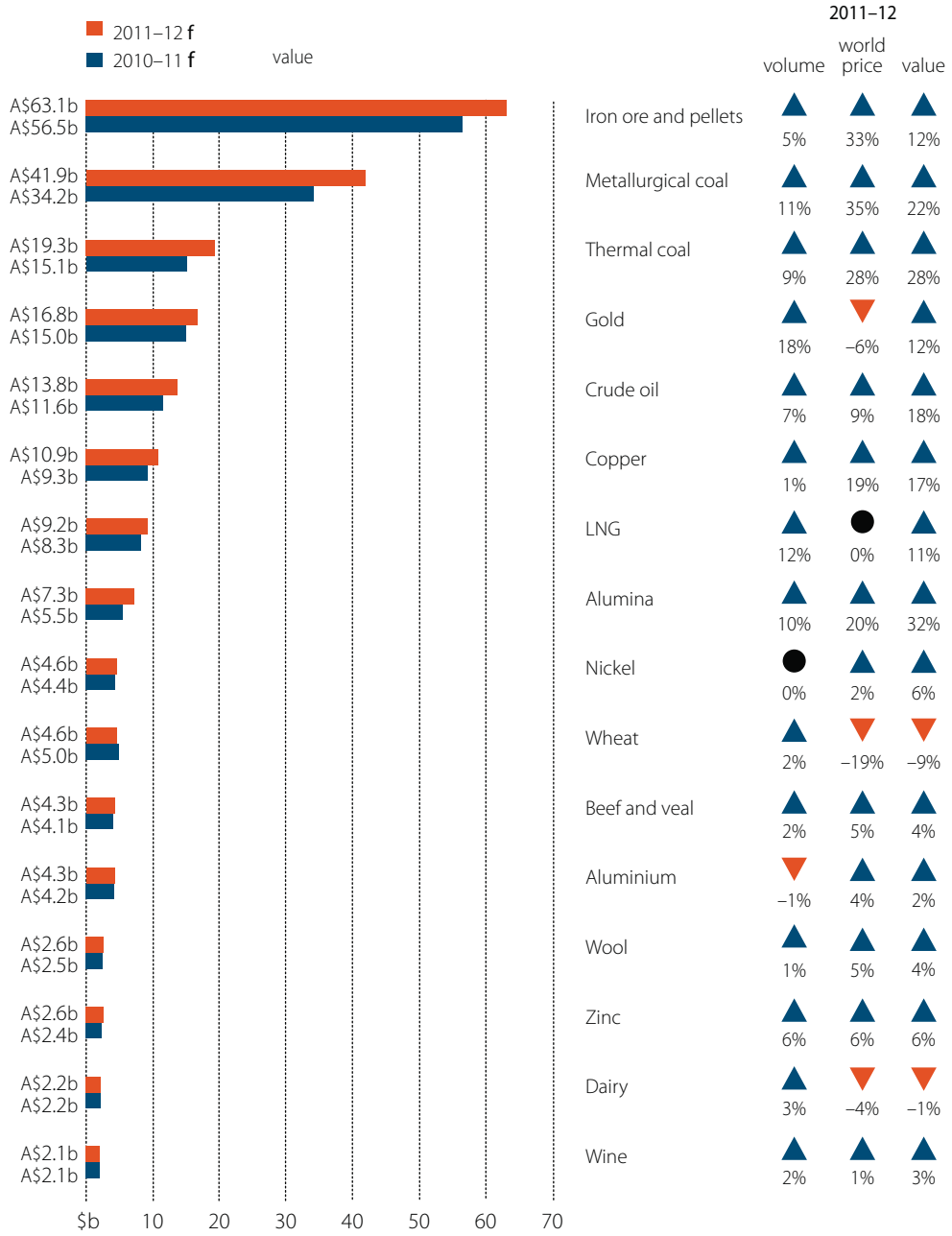
Major indicators of Australia's commodity sector

	unit	2008 –09	2009 –10	2010 –11 f	2011 –12 f	2012 –13 z	2013 –14 z	2014 –15 z	2015 –16
Commodity exports									
Exchange rate	US$/A$	0.75	0.88	0.97	0.97	0.97	0.95	0.93	0.90
Value of exports									
Farm	A$m	32 052	28 605	31 157	32 540	33 017	33 673	34 390	35 704
– real b	A$m	33 728	29 416	31 157	31 577	31 183	31 027	30 914	31 313
Crops	A$m	16 886	15 256	17 061	17 935	17 872	17 873	17 927	18 564
– real b	A$m	17 769	15 689	17 061	17 404	16 879	16 469	16 115	16 281
Livestock	A$m	15 166	13 349	14 096	14 605	15 145	15 800	16 463	17 140
– real b	A$m	15 959	13 727	14 096	14 172	14 304	14 558	14 799	15 032
Forest and fisheries products	A$m	3 872	3 507	3 854	4 177	4 297	4 473	4 666	4 860
– real b	A$m	4 075	3 606	3 854	4 053	4 058	4 122	4 195	4 262
Mineral resources	A$m	161 758	139 082	185 631	214 618	217 523	221 358	233 270	250 009
– real b	A$m	170 219	143 027	185 631	208 267	205 438	203 961	209 694	219 260
Energy minerals	A$m	77 892	57 472	73 349	88 786	90 976	92 619	97 683	107 148
– real b	A$m	81 967	59 102	73 349	86 158	85 922	85 340	87 810	93 969
Metals and other minerals	A$m	83 865	81 610	112 282	125 833	126 547	128 739	135 588	142 862
– real a	A$m	88 252	83 925	112 282	122 109	119 516	118 621	121 884	125 291
Total commodities	A$m	197 682	171 194	220 643	251 334	254 838	259 505	272 326	290 573
– real b	A$m	208 021	176 049	220 643	243 896	240 679	239 110	244 803	254 835
Farm sector									
Farmers' terms of trade	index	90.9	94.2	100.0	95.3	92.2	91.3	90.8	90.2
Gross value of farm production c	A$m	42 103	41 446	48 485	48 983	48 579	49 005	49 851	51 386
– real b	A$m	44 305	42 622	48 485	47 533	45 880	45 153	44 813	45 066
Crops	A$m	22 828	22 087	27 757	27 166	25 905	25 936	26 132	26 801
– real b	A$m	24 022	22 714	27 757	26 362	24 466	23 897	23 491	23 505
Livestock	A$m	19 275	19 359	20 728	21 817	22 673	23 069	23 719	24 585
– real b	A$m	20 283	19 908	20 728	21 172	21 414	21 256	21 321	21 561
Net value of farm production	A$m	5 473	6 734	12 095	11 128	9 905	9 342	9 129	9 509
– real b	A$m	5 759	6 925	12 095	10 798	9 355	8 608	8 206	8 340
Volume of farm production	index	93.1	92.6	100.0	102.6	103.9	104.8	105.9	105.4
– crops	index	85.9	86.7	100.0	103.7	104.4	104.3	104.3	103.4
– livestock	index	101.8	99.6	100.0	101.4	103.2	105.3	107.4	107.4
Minerals and energy sector									
Volume of mine production	index	90.8	93.5	100.0	108.3	114.5	120.7	126.2	129.1
– energy	index	94.0	96.6	100.0	110.6	115.1	121.3	130.7	135.2
– metals and other minerals	index	87.7	90.5	100.0	106.0	114.0	120.0	122.0	123.6
Gross value of mine production	A$m	155 288	133 519	178 206	206 034	208 822	212 504	223 939	240 009
– real b	A$m	163 410	137 306	178 206	199 936	197 220	195 803	201 307	210 490

b In 2010–11 Australian dollars. **c** For a definition of the gross value of farm production see table 21. **f** ABARES forecast. **z** ABARES projection.
Note: ABARE revised the method for calculating farm price and production indexes in October 1999. The indexes for the different groups of commodities are calculated on a chained weight basis using Fisher's ideal index with a reference year of 1997–98 = 100.
Sources: ABARES; Australian Bureau of Statistics.

Major Australian commodity exports

LNG, alumina, wine, wool, beef and veal and dairy are export unit returns or domestic prices in $A. All other commodities are world indicator prices in $US. For export value, annual forecasts are the sum of quarterly forecasts. As a result, annual export values do not necessarily reflect variations in export volumes, world prices and exchange rates. Iron ore and metallurgical coal are average negotiated contract prices for calendar years (e.g. 2011–12=2011). Thermal coal is the annual negotiated contract price for the Japanese Fiscal Year running from April 2011 to March 2012.



Crops

Grains

Outlook for wheat, coarse grains and oilseeds to 2015–16

Henry To, James Fell and Fiona Crawford

Short-term outlook

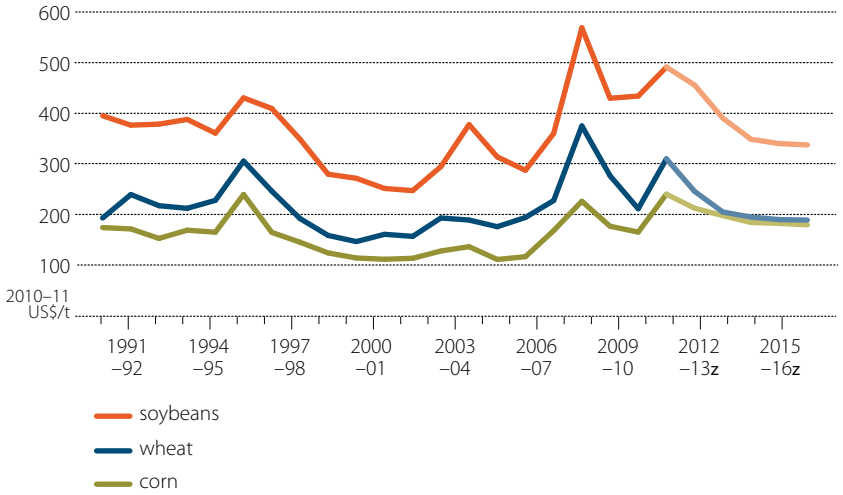
Prices to fall in 2011–12

World prices for grains and oilseeds increased substantially in 2010 and have remained high in early 2011, primarily because of shortfalls in production in some of the major exporting countries. Lower production combined with strong demand has also resulted in a general drawdown in global grain and oilseed stocks, particularly for corn, which is the main feed grain used in the world.

Grain and oilseed producers are expected to respond to current high prices by increasing production next season, and this is forecast to put downward pressure on world prices in 2011–12. The world wheat indicator price (US hard red winter, fob Gulf) is forecast to fall by 19 per cent in 2011–12 to average US$250 a tonne. Increased wheat supplies are forecast to outweigh a rise in demand.

For coarse grains, the world indicator price (US corn, fob Gulf) is forecast to average around US$216 a tonne in 2011–12, US$24 a tonne lower than the previous season. The stocks-to-use ratio for corn is forecast to increase but still remain relatively low in historical terms by the end of 2011–12.

World wheat, corn and soybean indicator prices



Similarly, the world oilseeds indicator price (soybeans, cif Rotterdam) is forecast to be around 8 per cent lower next season than in 2010–11 at US$474 a tonne. Prices are expected to remain relatively high next season. Although world production of soybeans, canola and sunflower seeds is forecast to increase, the effect on world oilseed prices is expected to be largely offset by continued growth in demand.

Producers to respond to current high prices

World wheat production is forecast to increase by 4 per cent to around 675 million tonnes in 2011–12. High prices in 2010–11 are expected to encourage producers to increase areas planted to wheat. Planting of the northern hemisphere's 2011–12 winter crops began in the northern autumn of 2010, when prices averaged around US$300 a tonne.

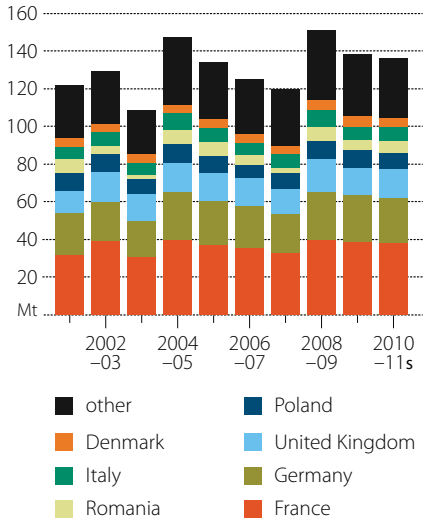
World coarse grains and oilseeds plantings are both forecast to rise by 3 per cent in 2011–12, to 317 million hectares and 218 million hectares, respectively. Assuming trend yields, world coarse grains and oilseeds production is forecast to increase by 6 per cent and 5 per cent, respectively, to 1.1 billion tonnes and 467 million tonnes in 2011–12.

World production

Wheat

In the United States, total winter and spring wheat area is forecast to rise by 9 per cent to around 21 million hectares. Despite the increase in planted area for next season, US wheat production is forecast to fall by 2 per cent in 2011–12 to around 59 million tonnes as a result of a return to average yields after the exceptionally good yields of 2010–11.

European Union wheat production



In the European Union, wheat production in 2011–12 is forecast to rise by 2 per cent to around 139 million tonnes, largely reflecting a greater area planted as producers respond to higher prices and a return to average yields. However, increases in production in the European Union's two largest producers, Germany and France, are forecast to be lower. Based on official statistics from these countries reported in December 2011, the planted French winter wheat area had increased by 2 per cent compared with last season and the planted German winter wheat area was largely unchanged.

Wheat production in Canada in 2011–12 is forecast to rise by 5 per cent to around 24 million tonnes, in response to higher prices for producers and more favourable planting and growing conditions than were experienced in the spring wheat growing areas last season.

Despite dry winter conditions, China's total winter and spring wheat production is forecast to increase by 1 per cent to 116 million tonnes in 2010–11, on the assumption of a return to trend yields. In January 2011, the Chinese Ministry of Agriculture reported a marginal increase in the area planted to winter wheat to an estimated 23 million hectares. Winter wheat is predominantly grown in the North China Plain and there have been reports that the winter snowfall in this region has been less than average and that some areas received less than 10 per cent of their average late autumn to early winter precipitation. However, the lack of rainfall prior to the onset of the crop dormancy over the winter period has been made up, at least partially, by increased use of irrigation.

India, the world's third largest producer of wheat after the European Union and China, is forecast to produce around 81 million tonnes, largely unchanged from 2010–11, on the assumption of a return to trend yields. In late January, the Indian government announced that winter wheat plantings had increased by almost 4 per cent compared with 2010–11.

Wheat production in Argentina is forecast to be largely unchanged in 2011–12 at around 4 million tonnes, with relative grain prices received by Argentinean producers likely to favour an increase in corn rather than wheat production. The planting window for corn production largely occurs before the wheat harvest.

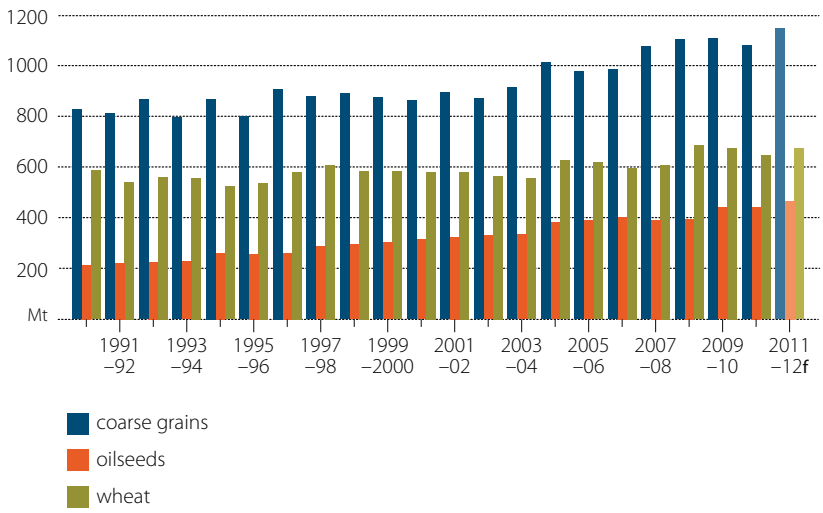
In the Russian Federation, wheat production is forecast to increase by 30 per cent to 54 million tonnes on the assumption of a return to more favourable seasonal conditions. Area harvested is forecast to increase significantly, given the very dry weather conditions last season that resulted in a high rate of crop abandonment. Ukraine's 2011–12 wheat production is forecast to increase by 9 per cent to around 19 million tonnes, while Kazakhstan's is forecast to rise by 23 per cent to around 15 million tonnes. The large increase in production reflects an assumption of a return to average yields after poor growing conditions for the previous crop.

Coarse grains and oilseeds production to rise in 2011–12

Expected higher returns from corn compared with soybeans in the United States are likely to result in the harvested area for corn rising by 1.5 million hectares to 34 million hectares in 2011–12. Yields are forecast to increase after declining last season because of dry conditions. Corn production in the United States in 2011–12 is forecast to be around 334 million tonnes. Similarly, the area harvested for soybeans is forecast to increase by 5 per cent to 33 million hectares, with production forecast to rise to a record 97 million tonnes.

The Prairies in Western Canada experienced wet conditions during spring last season, resulting in lower plantings of canola and barley. This was followed by abnormally cool conditions, which reduced yields and increased abandonment for both these crops. Harvested area in 2011–12 for all crops grown in this region is expected to rise. With the area harvested for canola forecast to increase by 7 per cent to 7 million hectares and production expected to be 8 per cent higher at 13 million tonnes. Barley production is forecast to be around 9 million tonnes in 2011–12, 13 per cent higher than last year, with the increase being driven by a return to average yields.

World wheat, coarse grains and oilseeds production



Dry conditions in the European Union last season resulted in some crop abandonment and reduced production. The expected relative returns, using prices from 2010–11, favour barley, wheat and canola over other crops. As a result, the areas harvested for barley and canola are forecast to increase by 8 per cent and 7 per cent, respectively, to 14 million hectares and 7.4 million hectares. Assuming average yields, EU barley and canola production in 2011–12 is forecast to be 59 million tonnes and 23 million tonnes, respectively.

Coarse grain and oilseed production in 2011–12 is forecast to recover in the Black Sea region, particularly in the Russian Federation. Production fell substantially last season because of adverse seasonal conditions and many crops were not harvested. The harvested area for barley in 2011–12 is forecast to increase significantly in the Russian Federation and Ukraine. Barley production in these countries is forecast to rise by 117 per cent and 32 per cent, respectively, to 18 million and 12 million tonnes, assuming a return to average yields. Sunflower seed production is forecast to increase by 22 per cent in the Russian Federation and by 2 per cent in Ukraine, to 6.7 million tonnes and 6.6 million tonnes, respectively.

In Argentina and Brazil, the area harvested for corn is forecast to rise by 4 per cent and 9 per cent to 3 million hectares and 14 million hectares, respectively. Harvested area for soybeans is forecast to rise by 3 per cent in both countries, to 19 million hectares and 25 million hectares, respectively. Plantings of soybeans and corn will not occur until around September 2011, through to January 2012. Harvested area for sunflower seeds in Argentina, the world's fourth largest producer, is also forecast to rise, by 8 per cent to 1.8 million hectares.

World consumption

Feed wheat consumption to rise

World consumption of wheat is forecast to increase by 2 per cent to 670 million tonnes in 2011–12. An important contributor to this rise is increased demand for feed wheat, as intensive

East Asian feed wheat and feed corn consumption

livestock producers seek alternatives to corn because of an increase in corn prices. Food consumption of wheat is forecast to rise in 2011–12, in line with population growth. Consumption of wheat for other uses (such as industrial) is also forecast to rise.

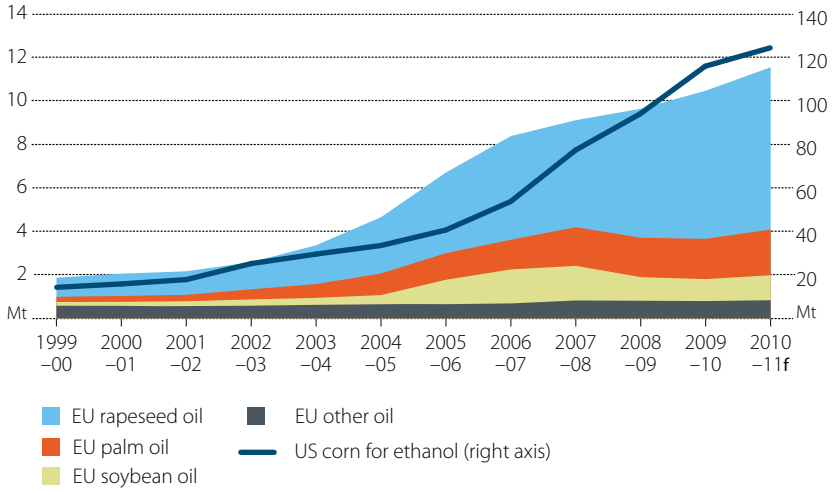
Since July 2010, the world corn indicator price increased by more than 50 per cent. With strong supply of feed grain from the recent weather-affected Australian harvest, feed wheat consumption is forecast to rise in East Asia, where Australian feed wheat can be exported.

Coarse grains and oilseeds consumption to rise

World coarse grains and oilseeds consumption is forecast to rise in 2011–12 by 1 per cent and 2 per cent, respectively, to a record 1.1 billion tonnes and 461 million tonnes. Ethanol production in the United States is mandated to increase to 14 billion gallons (53 billion litres) in 2011 and 15 billion gallons (57 billion litres) in 2012 under the Energy Independence and Security Act 2007. Around 125 million tonnes of corn were used to produce ethanol in 2010–11. In the next season, this use is expected to rise but at a slower rate than over the past few seasons.

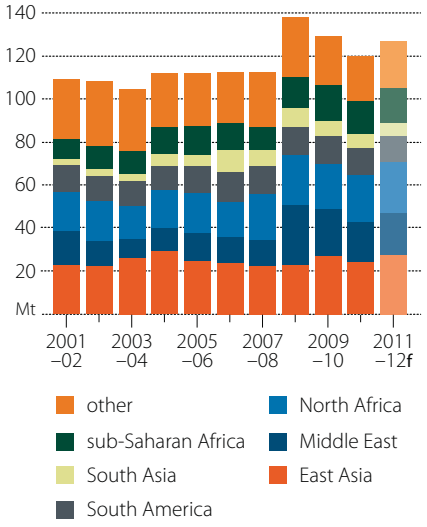
Global industrial use of vegetable oils (primarily biodiesel) has increased markedly as a result of government policy in EU countries, as well as Argentina, Brazil, Malaysia and the United States. In 2010–11, around 33 million tonnes of vegetable oils were for industrial use, compared with just 9 million tonnes in 2000–01. The industrial use of vegetable oils is expected to continue to rise because of biodiesel mandates in these countries.

Consumption of grains and oilseeds for biofuels; EU and US



Feed demand from the livestock sector in East Asia is forecast to increase in line with increased consumption of livestock products in that region. In China, for example, feed corn and oilseed protein meal consumption has been rising as the pig herd has expanded. Chinese feed corn and soybean protein meal consumption in 2011–12 is forecast to rise by 2 per cent and 3 per cent, respectively, to new records of 118 million tonnes and 46 million tonnes. Consumption of vegetable oil (soyoil) for human consumption (cooking) has also been increasing in China, rising to 14 million tonnes in 2011–12, 8 per cent higher than last season and more than triple the consumption in 2001–02.

Wheat imports by region



Similarly, Brazil has a growing beef cattle industry, which has led to rising feed corn and soybean meal consumption over the past decade. Feed corn consumption is forecast to rise by 1 per cent to around 44 million tonnes in 2011–12. Soybean meal consumption is forecast to rise by 9 per cent to 16 million tonnes in 2011–12.

Consumption of feed barley declined last season in the Black Sea region because of lower domestic production and higher prices resulting from severe drought. Barley consumption is forecast to recover in the Russian Federation next season to around 10 million tonnes, compared with 6 million tonnes last season.

Wheat and soybean trade to increase

In 2011–12, trade in wheat is forecast to increase, largely as a result of higher production and an expected easing of export restrictions in the Black Sea region. Exports are forecast to increase for all major world exporters, with the exception of the United States where lower wheat opening stocks (compared with 2010–11) and an assumed return to trend yields are forecast to result in lower export availability.

Higher import demand for wheat is forecast for East Asia, consistent with increased feed wheat consumption. Demand from other importing regions, such as North Africa and the Middle East, is also forecast to increase imports, in line with a forecast fall in prices.

In contrast to wheat, global coarse grains trade in 2011–12 is forecast to decline because of increased domestic use in the major exporting regions, particularly the United States. World oilseeds trade is forecast to rise, driven mainly by expected higher soybean imports by China.

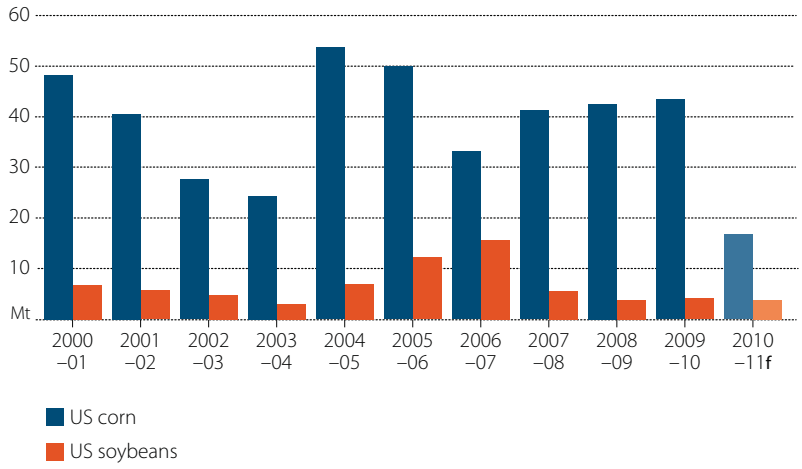
World corn trade is forecast to fall by around 10 million tonnes in 2011–12 because of lower exports from the United States and Brazil more than offsetting higher exports from Argentina. Rising industrial consumption in the United States and rising feed demand in Brazil are expected to reduce their exportable supplies.

World soybean trade is forecast to grow in 2011–12 to around 101 million tonnes, 5 per cent higher than in 2010–11. The higher trade volume reflects forecast increases in production in the United States and South America, and higher import demand from China. China has become the world's largest importer of soybeans, accounting for around 60 per cent of total world imports in 2010–11.

Stocks to increase

World wheat closing stocks are forecast to increase by 3 per cent in 2011–12 as a result of production exceeding consumption. Stocks as a percentage of consumption are forecast to increase to 29.1 per cent, the second highest since 2001–02.

US corn and soybean stocks



After declining by 22 per cent in 2010–11, world coarse grains stocks are forecast to increase by 10 million tonnes to 156 million tonnes in 2011–12. Global oilseeds stocks are forecast to increase by around 8 per cent to around 69 million tonnes in 2011–12, after falling by around 12 per cent in 2010–11 because of lower production.

In the United States, corn ending stocks in 2011–12 are forecast to recover modestly to around 19 million tonnes, around 2 million tonnes higher than last season. Similarly, US soybean stocks are forecast to rise in 2011–12 to around 5 million tonnes after last season's dry finish resulted in soybean production increasing only marginally.

Corn stocks in China are forecast to increase by 3 per cent to around 52 million tonnes in 2011–12. Corn is an essential grain for the livestock sector in China and stocks have declined over the past two seasons because of higher consumption and drought-affected domestic production. Corn stocks in Brazil are also forecast to rise in 2011–12, to around 11 million tonnes.

In contrast, corn stocks in Argentina are forecast to decline modestly to around 3 million tonnes in 2011–12.

Soybean stocks in Argentina and Brazil account for more than half of world soybean stocks and are forecast to fall slightly in 2011–12 because of continued import demand from China.

Australian production and exports

Wheat area to increase in 2011–12

Favourable forecast prices and a high soil moisture profile in some grain growing regions are expected to result in the area planted to wheat rising by 3 per cent in 2011–12 to 13.8 million hectares. Despite the forecast increase in area, wheat production in 2011–12 is forecast to be around 24 million tonnes as a result of an assumed decline in yields from the record achieved in many regions in 2010–11. Given this forecast production, Australian wheat exports in 2011–12 are forecast to be around 16.5 million tonnes.

Production, and consequently exports, may fluctuate from these volumes depending on the seasonal conditions. In its ENSO (El Niño – Southern Oscillation) wrap-up on 2 February 2011, the Bureau of Meteorology suggested that the current La Niña event will gradually decay and approach neutral conditions by mid-2011. This could potentially affect production, predominantly in eastern Australia. Given the sandier soils of Western Australia, production in that state is more dependent on the timing of rainfall.

Canola area to increase but barley to fall in 2011–12

The area planted to canola is forecast to increase by 6 per cent in 2011–12, reflecting favourable prices and strong global demand for high oil bearing oilseeds. Production is forecast to be around 2.2 million tonnes, 4 per cent higher than last season, reflecting a larger area and a return to average yields, particularly in Western Australia after drought last season. However, the area planted to barley is forecast to fall 3 per cent to just under 4 million hectares. Production is forecast to fall by 5 per cent, reflecting a return to average yields, particularly in New South Wales, Victoria and South Australia, where record yields were achieved in 2010–11.

Medium-term outlook

Over the medium term, world grain prices are projected to decline gradually from current highs but remain above the prices observed in the early 2000s, in real terms. Factors expected to support world grain prices over this period include continued income and population growth in key import markets, which will lead to higher demand for feed grains and protein meal, and for industrial use, such as biofuels production.

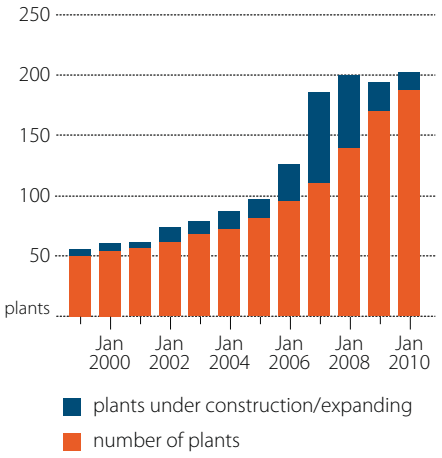
World demand

World wheat consumption is projected to rise by around 1 per cent a year to around 689 million tonnes by 2015–16. Consumption of wheat as food is projected to rise by 4 per cent by 2015–16 to around 473 million tonnes. The effect of population growth on consumption is expected to

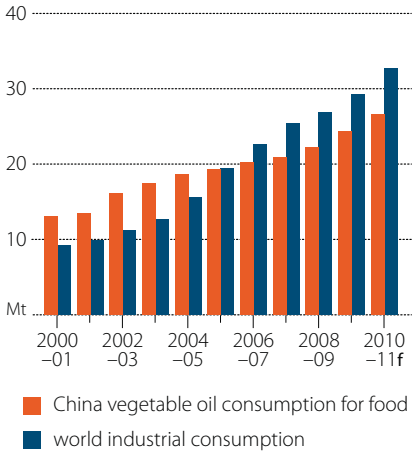
more than offset the downward effect of rising incomes on consumption of wheat for food. Currently, just less than 70 per cent of total world wheat use is for food. World wheat use for feed is forecast to increase on average by 2 per cent a year to around 124 million tonnes by 2015–16.

World consumption of coarse grains is projected to reach 1.2 billion tonnes in 2015–16, around 7 per cent higher than 2010–11. Global oilseeds consumption is projected to rise by less than 3 per cent a year to 517 million tonnes in 2015–16. The major driver of grains and oilseeds consumption over the past several years has been industrial use, specifically for the production of biofuels (ethanol and biodiesel). This is expected to continue over the projection period, assuming no changes in government energy policies in major world economies over the period.

Growth in ethanol capacity in the United States



Vegetable oil consumption



Industrial use driving demand

Biofuels have been the major driver of increased grains and oilseeds consumption over the past several years. The amount of corn used to produce ethanol has increased substantially since mandated ethanol production was introduced in the mid-2000s in the United States (rising from less than 20 million tonnes in 1999–2000 to 125 million tonnes in 2010–11). Over the same period, the number of ethanol plants has risen from 50 to 187, with total capacity now estimated by the Renewable Fuels Association to be 55 billion litres, including plants under expansion.

The *US Energy Independence and Security Act* of 2007 mandates incremental minimum volumes of ethanol to be blended into transport fuels in the United States up to 2022. However, a limit on the amount of ethanol to be produced from corn was put in place because of concerns about food security from diverting corn into ethanol production. From 2015, a maximum 57 billion litres of corn-based ethanol can count towards the mandates, with the balance to be sourced from non-food feedstocks.

Increased biodiesel demand is also expected to be the driver of oilseeds consumption over the medium term. Mandated biodiesel targets have been in place in the European Union, parts of South-East Asia and South America. Recent changes to some of these policies is expected to result in greater consumption of vegetable oils for biodiesel in the coming years. For example, Argentina increased the blend rate of biodiesel from 5 per cent to 7 per cent in mid-2010 and is considering increasing it further. Similarly, the biodiesel blend rate in Brazil increased from 3 per cent to 5 per cent in 2010.

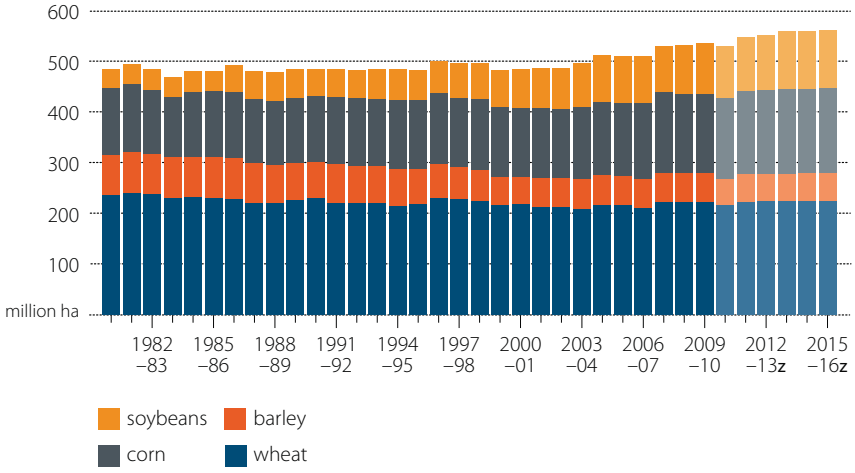
Another driver of oilseeds demand has been Chinese demand for vegetable oil. In 2010–11, consumption of all vegetable oils in China is forecast to be around 30 million tonnes, compared with 15 million tonnes in 2000–01. Growth in consumption is expected to continue over the medium term with rising household incomes.

World supply

Although the global area planted to the major grains and oilseeds (wheat, barley, corn and soybeans) has grown slowly over the past 20 years, production has increased significantly as a result of improvements in yields.

Over the medium term, the global area planted to wheat is projected to rise marginally to around 224 million hectares. Most of this rise is expected to occur in the Black Sea region. In contrast, the global area planted to coarse grains is projected to increase by almost 4 per cent to 320 million hectares by the end of the projection period, compared with the estimated 308 million hectares planted in 2010–11. Most of the rise is expected to occur in South America.

World area harvested – wheat, barley, corn and soybeans

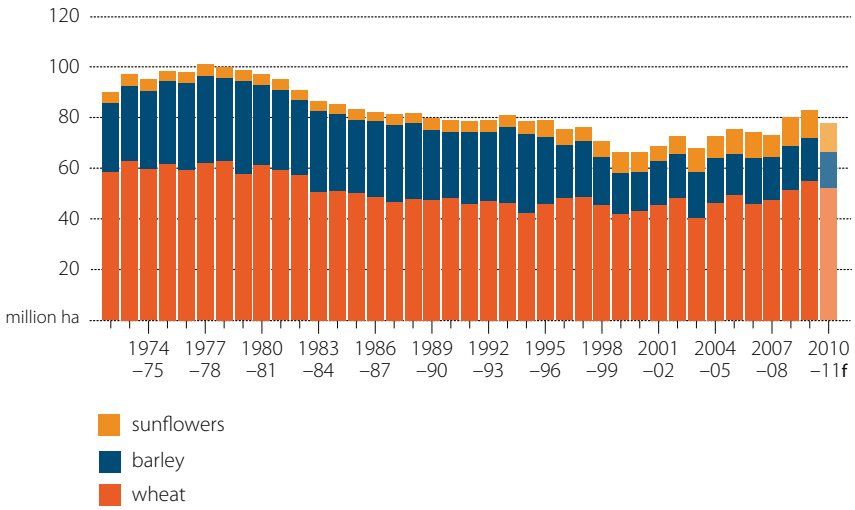


Strong export potential in the Black Sea region

The potential exists for large increases in production (and exports) in the Black Sea region. Over the projection period, the area planted to barley in the Black Sea region is expected to increase modestly as expected returns favour wheat and sunflower seeds. With yields expected to improve over the medium term, barley production is projected to rise by 17 per cent and 10 per cent in the Russian Federation and Ukraine, respectively, to 21 million tonnes and 13 million tonnes by the end of the projection period.

Plantings for sunflower seeds are also expected to increase in this region over the same period, driven by expected higher crush demand. The Black Sea region became the world's major sunflower seed exporter in the mid-2000s, overtaking the European Union and Argentina.

Black Sea region wheat, barley and sunflower areas



Sunflower seed crush has increased significantly in the Russian Federation over the past decade, with crushing capacity for total oilseeds, primarily sunflower seeds, more than doubling to 10 million tonnes since 2004. For Ukraine, sunflower seed crush has also increased significantly to around 6.2 million tonnes in 2009–10. Drought in 2010–11 saw crush decline in both countries but growth is expected to resume over the projection period.

Growing livestock industries are affecting the exportable supplies of barley and sunflower seeds from the Black Sea region. For example, poultry production has increased by 300 per cent in the Russian Federation and swine production has more than doubled over the past decade. Higher domestic demand for feed grains and protein meal has the potential to reduce exportable supplies, especially in years of production shortfalls.

South America

Cropping area in South America has expanded rapidly over the past three decades, driven by soybeans plantings. South America has potential to expand its agricultural areas, particularly in Brazil. A 2006 European Commission report stated that at least 90 million additional hectares of agricultural land could be brought into use in the central west of Brazil. Although the majority of additional land is currently used for cattle industries, there is scope for additional cropping land to be brought into production.

South America is a major player in the world oilseeds trade. Argentina and Brazil now account for just less than half of world soybean trade, roughly equal to the share of the United States. Further increases in agricultural land for cropping will strengthen the region's role as a major oilseeds exporter.

Over the projection period, the area planted to soybeans is expected to reach 21 million hectares in Argentina and 27 million hectares in Brazil, driven by relatively favourable returns.

Soybean plantings in 2010–11 were 19 million hectares in Argentina and 24 million hectares in Brazil.

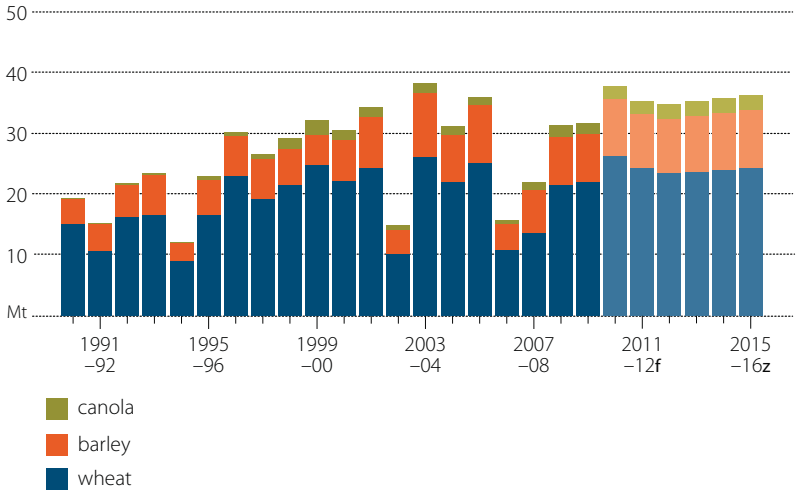
In comparison, corn plantings in South America are projected to increase by around 10 per cent by 2015–16, reflecting the growing livestock sectors and associated demand in both Argentina and Brazil. The area planted to corn is projected to rise to 3.5 million hectares in Argentina and 15 million hectares in Brazil.

Australian medium-term outlook

Aggregate area sown to grains and oilseeds is projected to average just under 24 million hectares over the medium term. Production of grains and oilseeds in Australia over the medium term is projected to increase by 2 per cent (between 2011–12 and 2015–16) to reach 45 million tonnes by 2015–16. For wheat, this reflects an assumption of favourable seasonal conditions and a return to yields that are closer to drought-exclusive averages (calculated on a state-by-state basis for the five most recent non-drought-affected seasons to 2009–10). Furthermore, an annual 2 per cent increase in yields is assumed over the medium term, reflecting assumed technological progress. For canola, yields are also projected to increase over the outlook period, with an expected increase in the adoption of genetically modified canola varieties. In Canada, such adoption has led to a gradual increase in canola yields and lower production costs, especially from the early 2000s when hybrid canola varieties became available.

Australian wheat exports are projected to grow to 17 million tonnes by 2015–16, in line with production. This is a continuation of the trend over the past 20 years, in which Australian wheat exports have shown a strong positive correlation with production volumes.

Australian barley, wheat and canola production



Outlook for wheat

	unit	2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
World									
Area	million ha	223	223	217	223	223	224	224	224
Yield	t/ha	3.08	3.03	2.99	3.03	3.04	3.06	3.07	3.08
Production	Mt	686	677	648	675	680	685	689	690
Consumption	Mt	638	648	656	670	675	680	685	689
Closing stocks	Mt	169	198	190	195	200	205	209	210
Trade	Mt	136	127	121	127	125	127	129	130
Stocks to use ratio	%	26.5	30.5	28.9	29.1	29.6	30.1	30.5	30.5
Trade to use ratio	%	21.3	19.5	18.4	19.0	18.5	18.7	18.8	18.9
Price **b**									
– nominal	US$/t	271	209	310	250	213	206	205	208
– real **c**	US$/t	277	211	310	246	205	195	190	189
Australia									
Area	'000 ha	13 530	14 028	13 374	13 808	13 730	13 610	13 510	13 450
Yield	t/ha	1.58	1.56	1.97	1.76	1.71	1.74	1.78	1.81
Production	kt	21 420	21 923	26 325	24 264	23 437	23 692	23 988	24 357
Export volume	kt	13 410	13 725	16 222	16 511	16 576	17 022	17 248	17 374
Export value									
– nominal	A$m	5 028	3 692	5 012	4 564	3 981	3 826	3 912	4 103
– real **d**	A$m	5 291	3 797	5 012	4 429	3 760	3 525	3 517	3 598
APW 10 net pool return **e**									
– nominal	A$/t	324	249	368	251	210	208	211	221
– real **d**	A$/t	341	256	368	244	198	192	190	194

b US hard red winter wheat fob Gulf, July–June. **c** In 2010–11 US dollars. **d** In 2010–11 Australian dollars. **e** Australian premium white wheat, 10 per cent protein. From 2009–10, the pool return is an estimated average across the major companies offering grain pools. **f** ABARES forecast. **z** ABARES projection.

Sources: ABARES; Australian Bureau of Statistics; International Grains Council; US Department of Agriculture.

Outlook for coarse grains

	unit	2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
World									
Area	million ha	313	308	308	317	317	318	319	320
Yield	t/ha	3.54	3.61	3.52	3.63	3.67	3.70	3.73	3.76
Production	Mt	1 107	1 112	1 083	1 149	1 163	1 177	1 189	1 206
Consumption	Mt	1 072	1 099	1 138	1 147	1 168	1 185	1 199	1 213
Closing stocks	Mt	193	187	146	156	160	164	164	167
Trade	Mt	113	120	113	107	108	103	105	107
Stocks-to-use ratio	%	18.00	17.04	12.83	13.60	13.71	13.84	13.69	13.78
Price **b**									
– nominal	US$/t	173	163	240	216	205	195	197	198
– real **c**	US$/t	177	165	240	212	198	184	182	180
Australia									
Area									
barley	'000 ha	5 015	4 446	4 077	3 931	3 973	4 018	4 063	4 108
oats	'000 ha	870	865	917	871	854	828	804	779
triticale	'000 ha	323	350	330	323	317	311	304	301
sorghum	'000 ha	767	516	637	702	705	710	714	717
maize	'000 ha	65	59	61	58	58	57	58	58
total	'000 ha	7 039	6 236	6 022	5 886	5 907	5 924	5 942	5 964
Production									
barley	kt	7 997	7 909	9 334	8 854	8 993	9 141	9 288	9 439
oats	kt	1 160	1 180	1 536	1 286	1 273	1 241	1 209	1 182
triticale	kt	363	545	685	537	529	521	513	510
sorghum	kt	2 692	1 598	2 221	2 379	2 399	2 431	2 455	2 480
maize	kt	376	328	373	328	326	320	332	332
total	kt	12 587	11 560	14 149	13 383	13 519	13 653	13 798	13 943
Domestic use **d**	kt	5 918	5 494	6 784	6 664	6 682	6 689	6 709	6 723
Export volume	kt	5 560	4 974	5 562	6 048	5 980	6 085	6 191	6 301
Export value									
– nominal	A$m	1 820	1 280	1 640	1 704	1 639	1 642	1 650	1 686
– real **e**	A$m	1 915	1 317	1 640	1 654	1 548	1 513	1 483	1 479
Price – nominal									
barley **g**	A$/t	231	191	203	193	186	184	182	184
grain sorghum	A$/t	205	212	218	205	196	190	189	189
Price – real **e**									
barley **g**	A$/t	243	197	203	187	176	170	164	161
grain sorghum	A$/t	216	218	218	198	185	175	169	166

b US corn, fob Gulf, September–August. **c** In 2010–11 US dollars. **d** Includes changes to stocks. **e** In 2010–11 Australian dollars. **g** Gross unit value of production. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; US Department of Agriculture.

Outlook for oilseeds

	unit	2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
World									
Oilseeds									
Production	Mt	396	442	444	467	483	501	507	517
Consumption	Mt	401	423	451	461	479	496	506	517
Closing stocks	Mt	56	73	64	69	73	77	77	75
Indicator price **b**	US$/t	421	429	515	474	403	383	368	371
– real **c**	US$/t	430	434	515	466	388	361	340	337
Protein meals									
Production	Mt	223	239	259	263	274	285	291	293
Consumption	Mt	223	235	258	262	273	284	290	292
Closing stocks	Mt	6	7	7	8	8	9	10	10
Indicator price **d**	US$/t	385	390	404	367	318	284	295	309
– real **c**	US$/t	393	395	404	360	306	268	273	280
Vegetables oils									
Production	Mt	133	139	147	152	158	166	172	178
Consumption	Mt	130	138	151	151	157	164	170	176
Closing stocks	Mt	13	13	9	10	11	12	14	16
Indicator price **e**	US$/t	826	905	1 248	1 195	1 064	1 012	954	916
– real **c**	US$/t	844	916	1 248	1 175	1 025	956	884	832
Australia									
Total production	kt	2 478	2 609	3 454	3 916	3 994	3 879	3 832	3 770
Winter	kt	1 858	1 933	2 151	2 244	2 360	2 434	2 509	2 587
Summer	kt	620	676	1 303	1 672	1 633	1 446	1 323	1 183
Canola									
Area	'000 ha	1 693	1 712	1 642	1 742	1 810	1 846	1 883	1 921
Production	kt	1 844	1 920	2 136	2 232	2 347	2 420	2 495	2 573
Export volume **g**	kt	1 067	1 187	1 676	1 708	1 789	1 856	1 926	2 007
Export value **g**									
– nominal	$m	636	553	942	957	879	864	872	873
– real **h**	$m	669	569	942	929	830	796	784	766
Price **i**	A$/t	525	440	550	548	481	456	444	437
– real **h**	A$/t	553	452	550	532	454	420	399	384
Sunflowers									
Area	'000 ha	52	27	29	28	30	31	32	32
Production	kt	55	41	45	38	41	43	44	46
Exports **j**	kt	2	3	1	6	4	4	5	5
Price **k**	A$/t	550	550	663	661	580	549	535	528
– real **h**	A$/t	579	566	663	642	548	506	481	463

b Soybean, cif Rotterdam, October–September basis. **c** In 2010–11 US dollars. **d** Soybean meal, cif Rotterdam, 45 per cent protein. **e** Soybean oil, Dutch, fob ex–mill. **g** Marketing year: November–October. **h** In 2010–11 Australian dollars. **i** Delivered Melbourne, November–October. **j** Marketing year, April–March. **k** Delivered Sydney, April–March. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; US Department of Agriculture.

Sugar

Outlook to 2015–16

Max Foster

World sugar prices are expected to remain favourable for Australian sugar cane growers over the next couple of years as the industry recovers from the adverse effects of excessive rainfall in 2010 and of Tropical Cyclone Yasi in early February 2011.

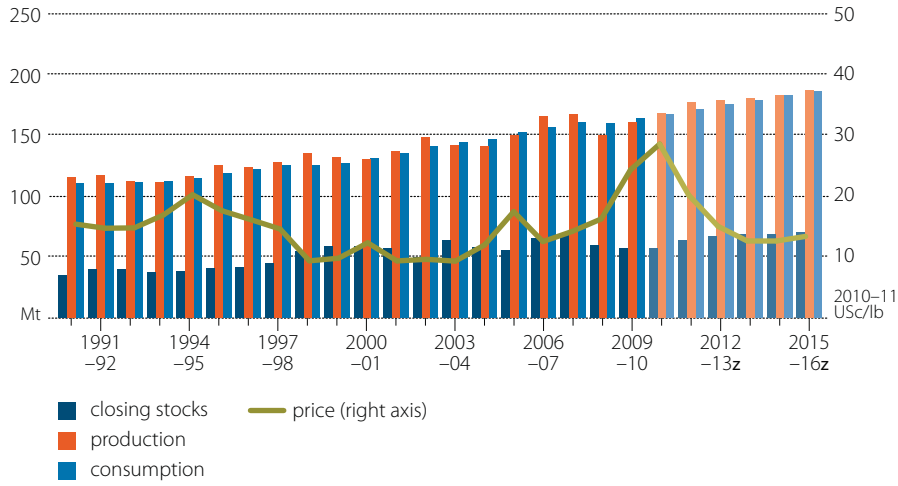
Short-term outlook

World sugar prices to ease but remain high in 2010–11 and 2011–12

The world indicator price for sugar (Intercontinental Exchange no. 11 spot, fob Caribbean) is forecast to average US28.5c a pound in 2010–11 (October to September), US4.5c a pound higher than in 2009–10, and the highest in real terms since 1980–81. Steady growth in sugar demand and low world stocks of sugar are keeping world sugar prices high in 2010–11, although there has been a recovery in world sugar production this year.

Looking further ahead, current market expectations are for world sugar prices to ease throughout the remainder of 2011 and in 2012. The profile of sugar futures prices on the Intercontinental Exchange (sugar, no. 11 contract) at 15 February 2011 was US31c a pound for March 2011 delivery, declining to US24.7c a pound for October 2011 delivery and US20.3c a pound for October 2012 delivery. One factor putting downward pressure on future prices is the expected size of the next Brazilian sugar cane harvest, which is due to start in March 2011. Brazilian sugar production is forecast to increase by 8 per cent this season.

World sugar indicators

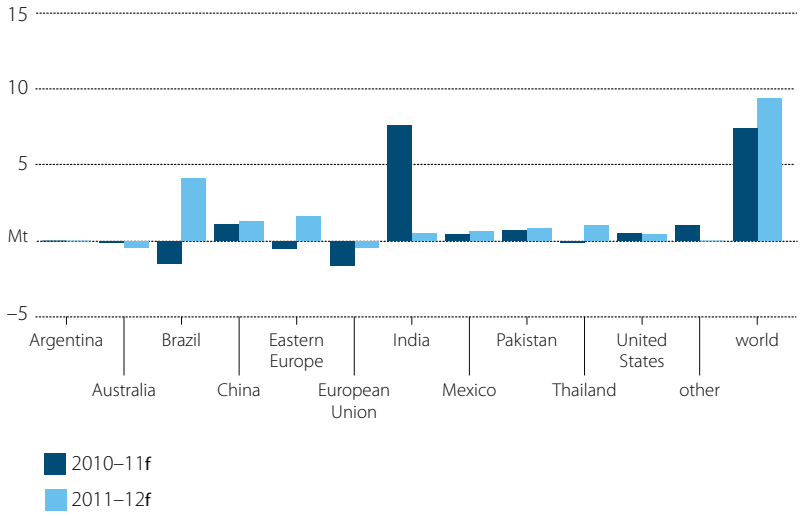


In 2011–12 the world sugar balance (production less consumption) is forecast to return to a surplus of around 6 million tonnes. The world sugar indicator price is forecast to decline to US20.5c a pound in 2011–12 in response to the expected increase in world stocks.

Higher world sugar production in 2010–11 and 2011–12

World sugar production in 2010–11 is forecast to be 168 million tonnes, 7.4 million tonnes higher than in 2009–10. This increased world production is expected to occur in response to high world sugar prices, although production increases were limited by adverse weather conditions in many producing countries, including Australia, Brazil, China, Pakistan and Thailand.

Forecast changes in world sugar production, by region

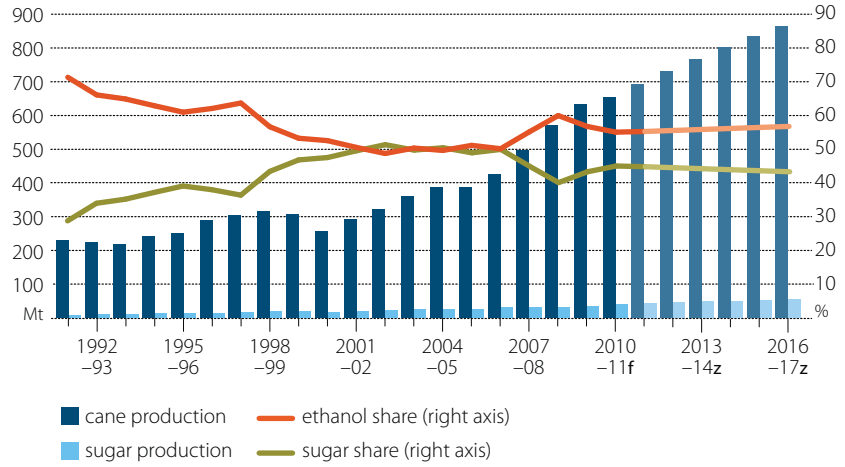


World production is forecast to increase by a further 9.4 million tonnes in 2011–12, to a record 177.3 million tonnes. This forecast reflects an expected increase in sugar production in both Brazil and India that together account for around 40 per cent of world sugar production. Higher production is also forecast for Thailand, Pakistan and China.

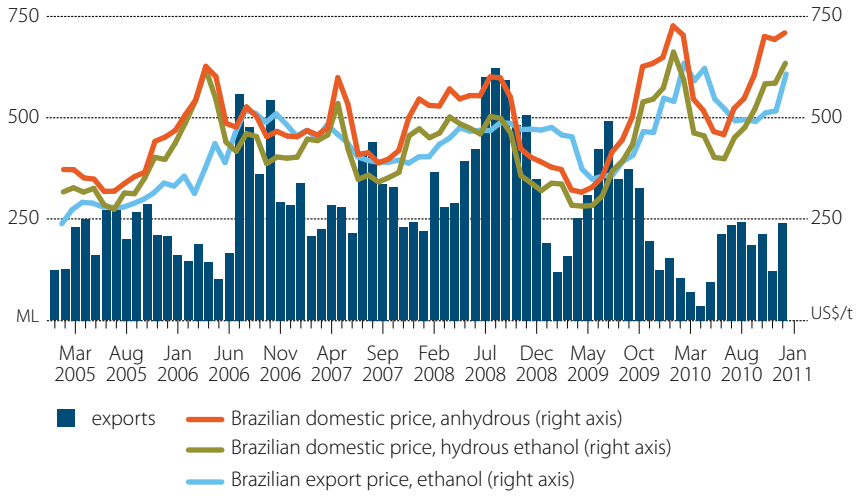
Ethanol prices in Brazil are an important determinant of whether Brazilian sugar cane is allocated to sugar or ethanol production. Like sugar prices, ethanol prices have also risen rapidly since the middle of 2010, driven by strong demand for ethanol for Brazil's growing fleet of flexifuel vehicles and the need to attract sugar cane away from sugar production.

Adverse weather limited Brazilian sugar cane production in 2010 but high cane and ethanol prices are expected to encourage strong growth in sugar cane production in Brazil in 2011 and 2012. The sharp decline in Brazilian ethanol exports in 2010 shows that price relativities between sugar and ethanol in Brazil have favoured a higher proportion of cane allocated to sugar production.

Brazilian cane production and allocation



Brazilian ethanol prices and exports



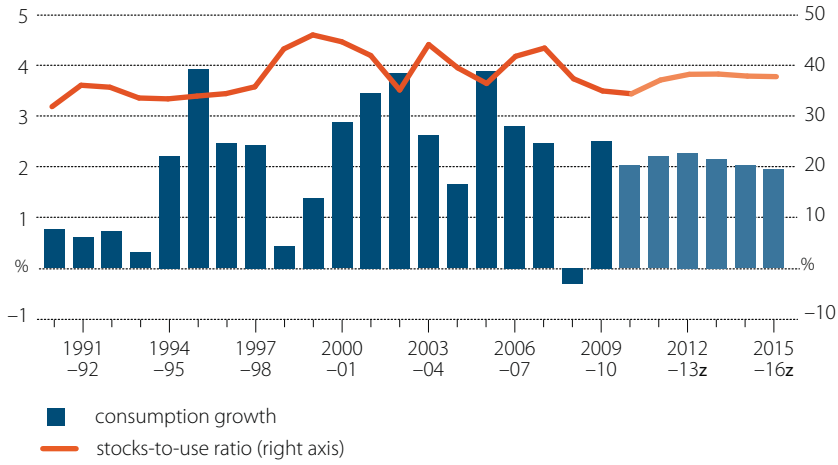
In response to high sugar prices, Indian sugar production in 2010–11 is forecast to be around 28 million tonnes, 7.5 million tonnes higher than in 2009–10.

Steady growth in world sugar consumption in 2011 and 2012

Demand for sugar has not been very responsive to the recent high world indicator price because sugar is a staple food in most countries and the prices paid by consumers in some major countries are partially insulated from world price changes by government policies. Consumption tends to respond more strongly to changes in income, especially in developing

countries, as shown by the decline in consumption in 2008–09 in response to the global financial crisis. World sugar consumption growth is forecast to be 2 per cent in 2010–11 and to increase slightly to 2.2 per cent in 2011–12.

World sugar consumption growth and stocks-to-use ratio



World exports of sugar are forecast to decrease by 2 million tonnes in 2010–11, to 48 million tonnes, as Indian import demand declines because of its higher 2010–11 sugar harvest. So far in 2010–11 the Indian Government has approved sugar exports of 500 000 tonnes, but if forecast Indian production of 28 million tonnes is realised for this year this would allow sugar exports to increase to around 3 million tonnes.

World closing stocks to remain low

The ratio of world sugar closing stocks to use is forecast to decline slightly to 34.3 per cent in 2010–11 compared with 34.9 per cent in 2009–10. If realised, this will be the lowest since 1995–96. Although the stocks-to-use ratio is forecast to recover to 37.1 per cent in 2011–12, this would still be below the average of around 40 per cent over the 10 years to 2009–10.

Weather adversely affects short-term Australian sugar production

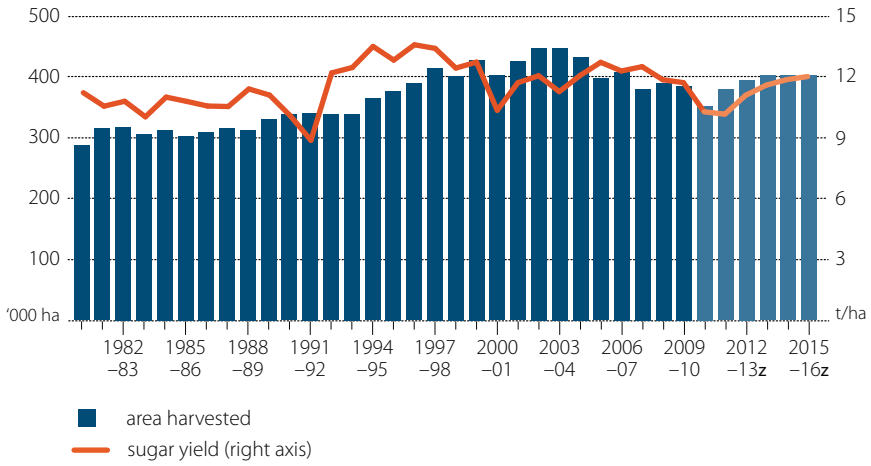
Australian sugar production in 2010–11 is estimated to be 3.6 million tonnes, 0.9 million tonnes lower than in 2009–10 and the lowest output since 1991–92. The Australian cane harvest (June to December) was severely hampered by excessive rainfall in late 2010. An estimated 5.7 million tonnes of sugar cane intended to be harvested in 2010–11 was stood over (not harvested). The sugar content of cane was also down sharply in 2010–11 as a result of the excessive rain.

The indicative return for the seasonal pool in 2010–11 of Queensland Sugar Limited is $455 to $465 a tonne IPS (International Polarity Scale), down from $508 a tonne IPS in 2009–10. The stronger Australian dollar has weighed on export returns in 2010–11 despite higher world prices.

Expected returns for cane growers are favourable for 2011–12. Forward prices on offer to Australian cane growers at 16 February 2011 for 2011–12 production were around $49.17 a tonne for cane, commercial contained sugar of 14.32 per cent. This is equivalent to around $548 a tonne of actual sugar.

Australian sugar production is forecast to recover only modestly in 2011–12, to around 3.85 million tonnes. Excessive rainfall in Queensland in February to April 2010 prevented some new plantings, damaged some existing cane areas, and reduced yield potential. In early February 2011, Tropical Cyclone Yasi is estimated to have reduced yield potential further, by around 30 per cent, in a region that accounts for around 20 per cent of Australian sugar production. At this stage there is uncertainty about the effect on sugar yields from having some cane stood over from 2010–11.

Australian area harvested of sugar cane and sugar yield



Key policy developments in 2010

A 2009 US court ruling, which was upheld in August 2010, sought to prevent plantings of genetically modified (GM) beet sugar until an appropriate environmental impact statement is submitted by the US Department of Agriculture. This would have included plantings of stecklings, the young sugar beets that are planted in summer to be transplanted in autumn or spring. However, the US Department of Agriculture issued an interim decision in early February 2011 permitting US farmers to plant GM sugar beet in 2011–12 until a full environmental impact assessment is completed around May 2012, providing certain crop management conditions are met. GM sugar beet varieties were introduced in the United States in 2005 and account for around 95 per cent of US sugar beet plantings and more than half of US sugar production. A similar US court ruling in 2007 prevented further plantings of GM alfalfa (lucerne), but the ruling was subsequently lifted in late 2010 after the US Department of Agriculture submitted an appropriate environmental impact statement in late 2009.

Tariffs on ethanol imports are applied in both the United States and the European Union. In the case of the United States, a tariff surcharge of US54c a gallon is also applied on US ethanol imports. This surcharge was due to expire at the end of 2010 but has been extended to the end of 2011.

Medium-term outlook

World sugar prices

The world sugar indicator price is projected to decline from its current highs over the medium term, as world carryover stocks of sugar gradually recover. Continued strong growth in world sugar consumption, fuelled by growing per person incomes in developing countries, especially India and China, is expected to provide support for prices. In real terms, the world sugar indicator price is projected to remain well above the lows of the late 1990s and early 2000s.

One concern with the current high world sugar prices is that they could inadvertently lead to overinvestment in sugar production capacity throughout the world. Once planted, a sugar cane crop can be harvested annually for up to seven years in some countries. While there is a relatively high cost with the initial plantings, the cost of harvesting in subsequent years is relatively low. This has been an important factor behind the history of short price spikes in the world sugar market, followed by longer periods of relatively low prices.

World sugar production to increase over the medium term

World sugar production is projected to increase to 187.4 million tonnes by 2015–16, 19.5 million tonnes higher than the record of 167.9 million tonnes produced in 2010–11. The size of the Brazilian cane sugar production and its allocation between sugar and ethanol production are key determinants of world sugar production over the medium term. Government policies that intervene in the sugar market in India and the European Union will also be important determinants of world sugar production.

Demand for ethanol as a replacement for oil-based fuels is increasing rapidly and being encouraged in a number of countries through a range of government policies. These policies include targets for biofuel use and tax concessions for producers. The feedstocks for ethanol are primarily corn, sugar cane and molasses. Brazil has been encouraging the use of sugar cane for ethanol production for more than 30 years. As well as meeting a growing domestic demand for ethanol as a vehicle fuel, Brazil accounts for around 40 per cent of world trade in ethanol. Research is underway around the world into using cellulosic sources such as switchgrass or cane trash to produce ethanol, but ethanol production from these sources is unlikely to reach significant levels over the outlook period.

Brazil is expected to remain the dominant player in the world sugar market over the medium term. Given relatively low production costs and the potential to bring substantial areas into cane production, Brazilian sugar cane production is projected to expand significantly over the medium term. The proportion of sugar cane used in Brazil for ethanol production is forecast to decline in 2010–11, owing to high sugar prices in relation to ethanol prices, but is projected to resume rising gradually throughout the remainder of the outlook period, as ethanol prices

respond to higher projected oil prices and increasing demand for ethanol for use in Brazil's growing fleet of flexifuel cars.

Despite the expected higher use of sugar cane in ethanol production, Brazilian sugar production is projected to reach nearly 52 million tonnes by 2015–16, compared with a forecast 41 million tonnes in 2010–11.

Indian sugar production is projected to average around 29 million tonnes a year over the period to 2015–16, compared with an average of 23.4 million tonnes over the five years to 2009–10.

Reforms to the Common Market Organisation for sugar in the European Union are largely complete. The measures include lower guaranteed minimum prices to beet growers, lower market intervention (guaranteed) prices and reduced quotas to which the guaranteed prices apply. The sugar quota is set at 14.5 million tonnes but there is the possibility of increased out-of-quota sugar beet production over the next few years in response to higher world sugar prices. Some of this out-of-quota sugar is expected to be used to make ethanol but most is expected to be exported. If this sugar is in receipt of export subsidies it would be subject to the European Union's World Trade Organization annual sugar export subsidy limit of 1.37 million tonnes.

Increased sugar production is expected in many other smaller producing countries over the outlook period. For example, Indonesia has recently announced plans to increase domestic sugar production to bring its domestic sugar consumption and production into balance by 2014.

Strong growth in world sugar consumption

World sugar consumption increased at an average rate of 2.5 per cent a year over the 10 years to 2009–10, faster than the rate of growth of world population of 1.2 per cent. Reflecting higher projected real prices compared with the past decade, world sugar consumption is projected to grow at a slightly lower average rate of 2.1 per cent a year over the medium term.

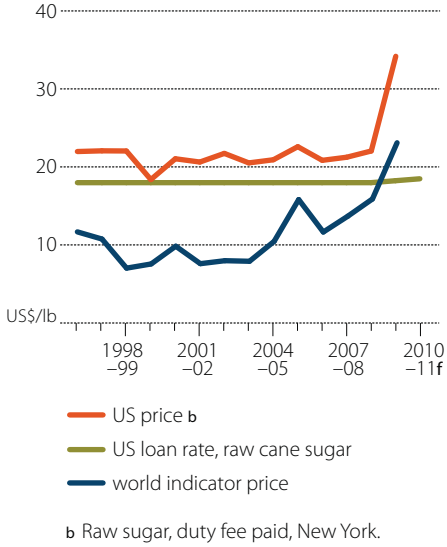
As mentioned above, consumers in a number of countries are partially insulated from movements in world sugar prices by government policies. In the United States, for example, domestic sugar prices have been maintained at levels usually well above world sugar prices by tariff quotas on raw and refined sugar imports. India is another example that has sought to stabilise domestic prices through various import and export policies.

Factors affecting the demand for sugar are population growth; consumer incomes; and the prices of alternative sweeteners, particularly high-fructose corn syrup and, increasingly, a range of low-calorie artificial sweeteners. A characteristic of world sugar consumption is that per person consumption of sugar is declining in developed countries, but increasing in developing countries.

Domestic price support arrangements for sugar in the United States

Various arrangements under the US farm program act to support domestic prices for sugar above world parity prices. These arrangements include non-recourse loans, flexible marketing allotments and import tariff rate quotas for sugar.

US sugar price and the world indicator price

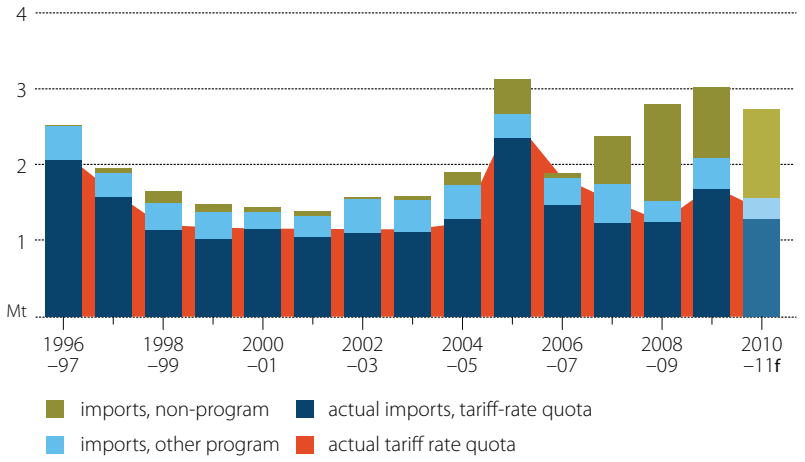


b Raw sugar, duty fee paid, New York.

Non-recourse loans are provided for sugar in the United States, but to millers rather than cane or beet growers. The current farm program to 2012–13 has a loan rate for raw cane sugar (refined beet sugar) set at US18.75c (24.09) a pound in 2010–11. Under the farm program, millers who take out a loan can forfeit their sugar to the government's Commodity Credit Corporation (CCC). However, in practice, there is an explicit clause in the farm program legislation that requires the program to be operated, to the maximum extent possible, at no cost to the US Government, by avoiding loan forfeitures to the CCC.

The first mechanism aimed at avoiding forfeitures is flexible market allotments, whereby shares of sugar sold for domestic human consumption by domestic processors of sugar cane and beet are allocated to processors on the basis of a prescribed set of rules. The government sets the overall allotment each year, subject to the conditions that domestic sugar prices remain above forfeiture (loan rate) levels and that domestic processors have at least an 85 per cent share of the domestic market for human consumption of sugar. Of the overall allotment, 54.35 per cent is allocated to refined beet sugar and 46.65 per cent to raw cane sugar.

US sugar imports and tariff quota



continued...

Domestic price support arrangements for sugar in the United States continued

The second mechanism employed to avoid forfeitures is the Feedstock Flexibility Program, where the US Secretary of Agriculture determines one month before the end of the market year (1 September) an amount of sugar to be purchased by the CCC and sold to ethanol producers.

A third mechanism involves separate tariff rate quotas for raw sugar and refined sugar. These are set at the start of each fiscal year (October to September) by the US Secretary of Agriculture. Under World Trade Organization obligations, the minimum levels for import quotas for raw sugar and refined sugar are 1.139 million tonnes and 22 000 tonnes, respectively. Country shares in the raw sugar quota are determined on the basis of their shares in the period 1975 to 1981. The in-quota tariff is bound at US0.625c a pound, while the tariff rate for out-of-quota imports is US15.36c a pound. The Secretary has the discretion under US farm legislation to increase the quotas if domestic supplies of sugar are deemed to be inadequate to meet domestic demand at reasonable prices.

There are also country-specific tariff quotas for signatories to the Dominican Republic – Central American Free Trade Agreement—described as 'other program' imports.

An emerging issue for these domestic support arrangements is increased sugar imports from Mexico—the bulk of 'non-program' imports—that have been entering the United States free of import duty and quantitative limits since January 2008 under the North America Free Trade Agreement.

According to the OECD, in their *Agricultural Policies in OECD Countries: At a Glance 2010* publication, the US domestic sugar price was estimated to have averaged 38 per cent higher than the world parity level over the period 2007 to 2009. This implied a producer support estimate for US cane and beet growers that averaged US$602 million a year over this period, representing a subsidy to US growers equivalent to 27.3 per cent of their gross returns.

World sugar stocks to rebuild over the medium term

World carryover stocks of sugar are projected to recover gradually over the medium term. By 2015–16 the sugar stocks-to-use ratio is projected to be 37.7 per cent, compared with 34.3 per cent in 2010–11.

Australian sugar production and prices to 2015–16

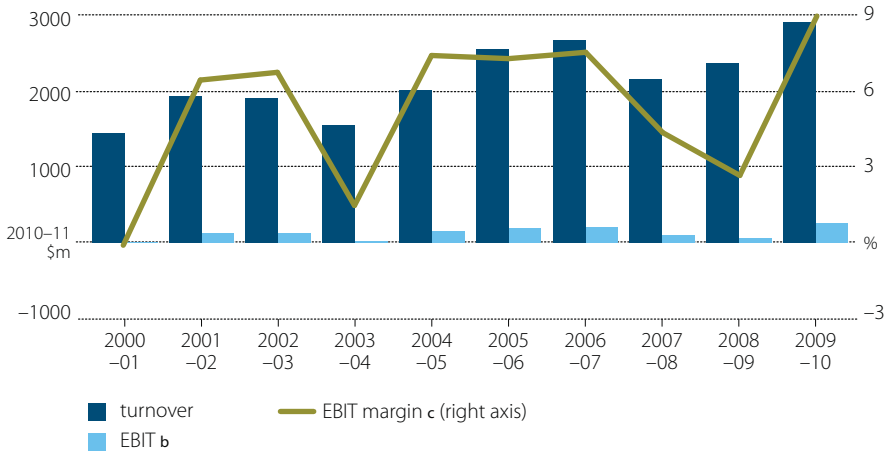
The area harvested of sugar cane in Australia is projected to increase to around 403 000 hectares by 2015–16, 50 000 hectares higher than the weather-affected harvest of 2010–11, but still 45 000 hectares less than the record harvest in 2002–03. A range of factors contributed to the decline in plantings over this period, including low prices at various times, drought, cyclones, sugar cane smut, urban encroachment, increased use of rotation crops (mainly soybeans and peanuts) and higher returns from production alternatives, particularly plantation forestry. Sugar production in the Ord River irrigation area also ceased in November 2007. At its peak, more than 4000 hectares of sugar cane were harvested annually in the area.

Modest growth in Australian cane and sugar yields is also projected for the medium term. The Australian and Brazilian sugar industries are experimenting with genetically modified (GM) varieties of sugar cane that have the potential to increase sugar yields and lower production costs. However, given the lead times with development and regulatory approval with GM crops, GM varieties of sugar cane are likely to be commercialised toward the end of the medium term at the earliest. Australian sugar production is projected to increase to around 4.8 million tonnes by 2015–16, compared with the weather-affected output of 3.6 million tonnes in 2010–11 and the record of 5.4 million tonnes in 2002–03.

In line with recent trends, the number of growers in Australia is expected to continue to decline, and cane farms are expected to increase in size. The number of cane growers in the Australian sugar industry has declined from around 6300 in 2000, to less than 4000 in 2010. Over the same period, cane production per grower has increased from 5000 tonnes to 9000 tonnes.

Although the profitability of Australian sugar millers and refiners has improved in recent years, boosted by high sugar prices, this has been offset to some extent by reduced mill throughputs. Policy changes in 2010 are expected to affect the profitability of the co-products produced by sugar mills, namely ethanol and cogeneration of electricity.

Aggregate financial performance of the Australian sugar processing industry



Note: Years ended 31 March for Sucrogen and Bundaberg Sugar, 30 June for others.
b EBIT is earnings before interest and taxation.
c EBIT margin is EBIT divided by sales revenue.
Sources: Company annual reports.

Changes in 2010 to the renewable energy target scheme by the Australian Government have addressed some sugar industry concerns over prices for renewable energy certificates (RECs) that the sugar industry earns through generating surplus electricity from bagasse and cane

waste. REC prices were being depressed by the increased uptake by households of solar hot water systems and photovoltaic cells that also earn RECs. From January 2011, the scheme is to be separated into two parts—the Small-scale Renewable Energy Scheme and the Large-scale Renewable Energy Target. Of the total target of 45 000 gigawatt hours originally set for 2020, 41 000 gigawatt hours will now be reserved for large-scale renewable electricity generation, the category into which sugar industry electricity generation falls.

Outlook for sugar

	unit	2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
World b									
Production	Mt	150.0	160.5	167.9	177.3	178.7	180.6	183.3	187.4
Consumption	Mt	160.3	164.3	167.7	171.4	175.3	179.1	182.7	186.3
Stocks c	Mt	59.8	57.3	57.6	63.5	67.0	68.5	69.1	70.3
Price									
– nominal	USc/lb	15.9	24.0	28.5	20.5	15.6	13.4	13.6	14.7
– real d	USc/lb	16.3	24.3	28.5	20.1	15.0	12.6	12.6	13.4
Australia e									
Production g	kt	4 634	4 519	3 620	3 852	4 377	4 669	4 781	4 841
Export volume	kt	3 268	3 506	2 429	2 476	2 934	3 233	3 343	3 384
Export value									
– nominal	A$m	1 338	1 887	1 367	1 413	1 238	1 112	1 099	1 201
– real h	A$m	1 408	1 940	1 367	1 372	1 169	1 025	988	1 053

b October–September years. **c** Historical estimates of closing stocks are based on individual country estimates of production, consumption, trade and stocks. Given possible under/over reporting of statistics in individual countries, changes in world closing stocks from year to year may not necessarily equal the difference in world production and world consumption. **d** In 2010–11 US dollars. **e** July–June years. **g** Raw tonnes actual. **h** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; International Sugar Organization.

Cotton

Outlook to 2015–16

Max Foster

A favourable outlook is projected for Australian cotton growers in the next few years in response to forecast higher world cotton prices and the recent replenishment of irrigation dams in Australia's cotton growing regions. These developments are expected to assist the industry to recover from the effects of drought conditions over most of the past decade and the recent floods in Queensland and northern New South Wales.

Short-term outlook

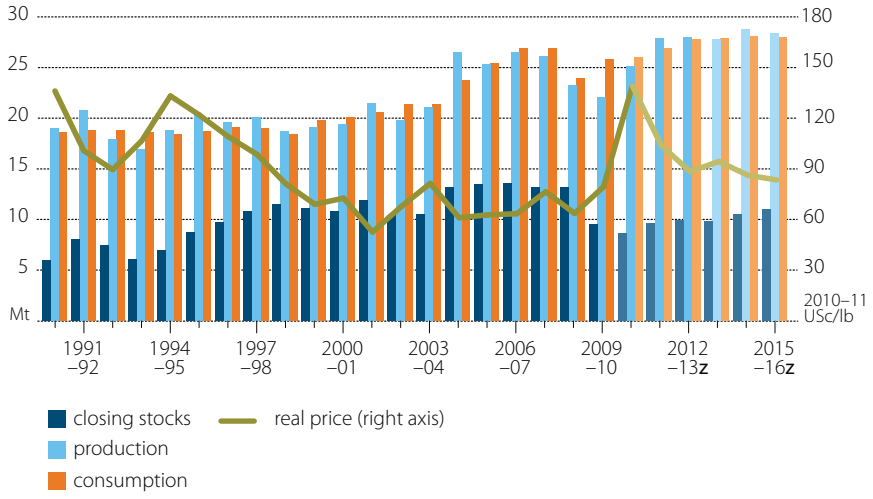
World cotton prices to remain high in 2011

The world indicator price for cotton (the Cotlook 'A' index) is forecast to average US139c a pound in 2010–11 (August to July), which is 79 per cent higher than in 2009–10. Cotton prices have increased markedly since mid-2010 because of strong demand and low world stocks, despite a forecast increase in world cotton production in 2010–11.

For the remainder of 2011 world cotton prices are forecast to ease gradually but remain very favourable in year average terms. Cotton futures prices on the Intercontinental Exchange (cotton, no. 2 contract) at 14 February 2011 declined from US186c a pound for March 2011 delivery to US123c a pound for December 2011 delivery. Expected record cotton crops in southern hemisphere producer—particularly Australia and Brazil—is one of the factors putting downward pressure on the futures price. Southern hemisphere cotton crops will become available on the market from March 2011.

Looking further ahead, the world cotton indicator is forecast to average US105c a pound in 2011–12, US34c a pound less than in 2010–11, as the forecast increase in world cotton production in 2010–11 is expected to lead to an increase in world stocks.

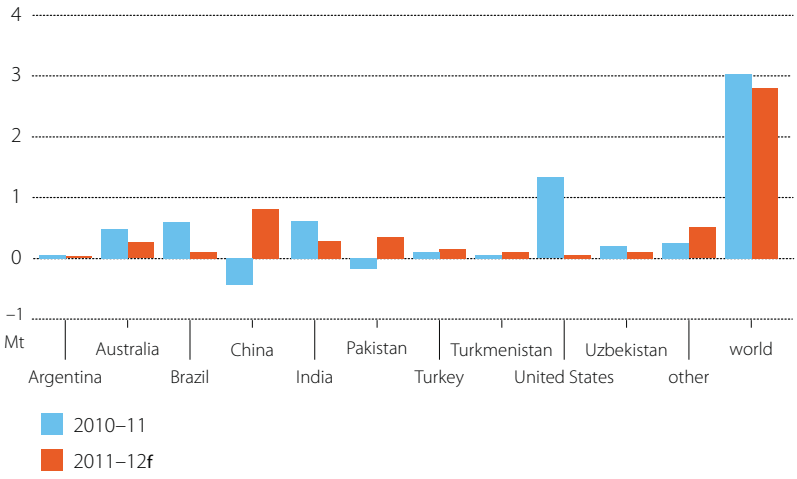
World cotton indicators



Higher world cotton production in 2010–11 and 2011–12

World cotton production in 2010–11 is forecast to be 25.1 million tonnes, which is around 3 million tonnes higher than in 2009–10. This increase in world production is forecast to occur in response to favourable world cotton prices, although the production response has been limited by adverse weather conditions in China and Pakistan.

Forecast changes in world cotton production, by country



World production is forecast to increase by a further 2.8 million tonnes in 2011–12, to a record 27.9 million tonnes. In many countries cotton competes for land with a number of other crops, mainly corn and soybeans. Forecast strong prices of these competing crops are likely to moderate, to some extent, the response of cotton production in the short term.

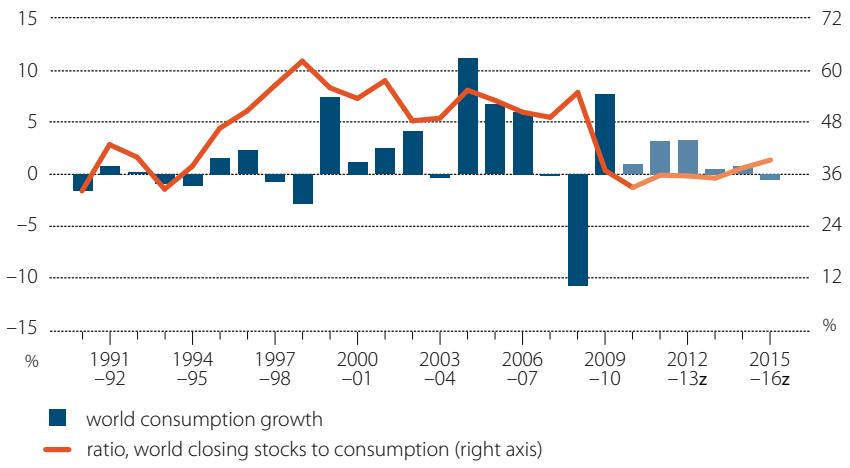
Growth in world cotton consumption constrained by higher prices in 2011

World cotton consumption is forecast to increase by 0.9 per cent in 2010–11 to 26 million tonnes. Growth in cotton consumption is expected to be constrained in the short term in response to high prices of cotton relative to alternative fibres, particularly polyester. The widening gap between world cotton and polyester prices is partially because of a worldwide overcapacity of polyester production.

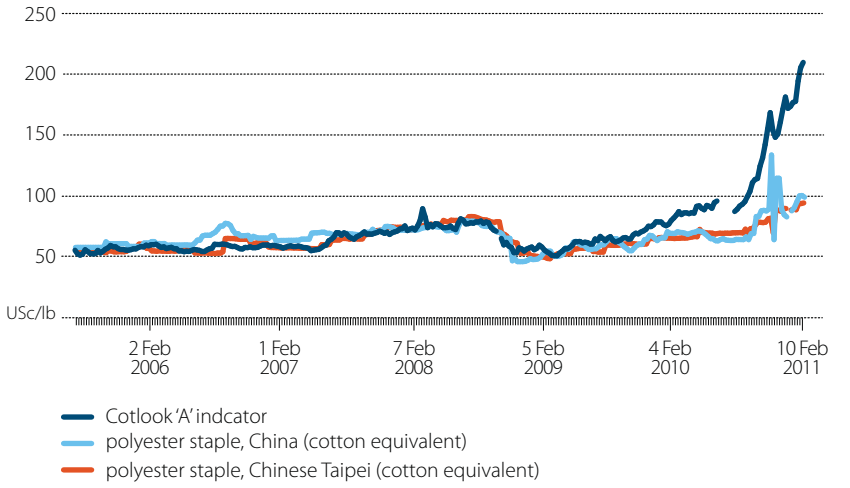
In 2011–12, growth in world cotton consumption is forecast to increase by 3.2 per cent, to 26.9 million tonnes, as the easing in cotton prices forecast by that time encourages demand.

The Indian Government announced an export quota for the 2010–11 marketing year of 1 million tonnes, which is lower than the 1.4 million tonnes exported in 2009–10, despite a 13 per cent increase in Indian cotton production in 2010–11. The export restrictions have the effect of lowering production costs for the Indian textile industry but at the same time reducing the returns to Indian cotton growers.

World cotton consumption growth and stocks to consumption ratio



World cotton and polyester prices
weekly



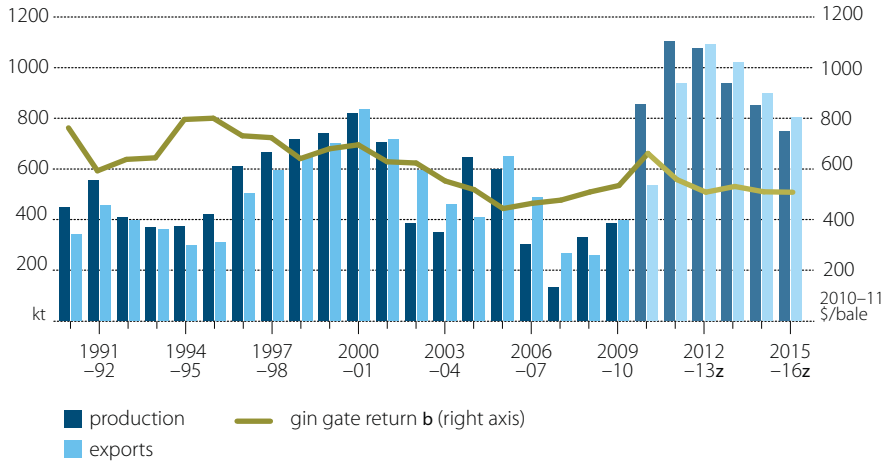
Low world closing stocks of cotton

The ratio of world cotton closing stocks to use is forecast to decline in 2010–11 to 32.9 per cent, the lowest level since 1994–95. The forecast increase in world cotton production in 2011–12 is expected to raise the stocks-to-use ratio to 35.8 per cent, which is still well below the average of the 10 years to 2009–10 of around 51 per cent.

Record Australian cotton production in 2010–11 and 2011–12

The returns to Australian cotton growers are forecast to average around $656 a bale (227 kilograms) in 2010–11, about $138 a bale higher than in 2009–10. Most Australian cotton production is forward sold, so the forecast returns can vary from the current prices being offered on the market. The forward price on offer at 14 February 2011 to Australian cotton growers for next season's production was $590 a bale, which is about 11 per cent higher than the returns expected in 2010–11.

Australian cotton production, exports and returns

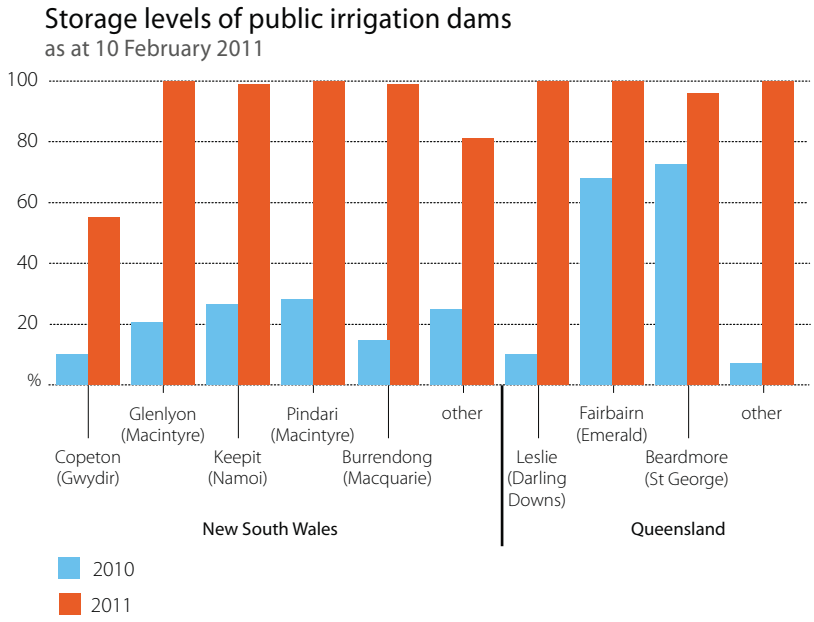


b Value of lint and cottonseed, less ginning costs.

Australian cotton production is forecast to reach a record 839 000 tonnes in 2010–11, 452 000 tonnes higher than in 2009–10 and 23 000 tonnes higher than the previous record, achieved in 2001–02. Markedly higher world cotton prices, combined with the effect of improved availability of irrigation water in the cotton growing regions of Australia this season, have driven the large increase in production.

While floods in some parts of Queensland in late 2010 and early 2011 destroyed an estimated 7 per cent of total Australian cotton plantings and lowered yield potential in some areas, these losses are expected to be offset by increased production in other regions, especially in New South Wales.

The public irrigation dams serving the cotton growing regions were, on average, at 90.3 per cent capacity on 10 February 2011. Only the Copeton Dam, serving the Gwydir region, was still well below full capacity. Given the availability of irrigation water and forecast high world cotton prices, Australian cotton production is forecast to reach a new record of 1.1 million tonnes in 2011–12.



Medium-term outlook to 2015–16

Favourable cotton prices to 2015–16

World prices for cotton are projected to ease over the medium term but will remain relatively favourable to producers. The cotton indicator price is forecast to average about US87c a pound in constant (2010–11) dollars from 2012–13 to 2015–16, compared with US68c a pound in the five years to 2009–10. Relatively low world stocks and continuing growth in world cotton demand, fuelled by growing consumer incomes in India and China, are the key factors underpinning this price outlook.

World cotton production to grow

Beyond 2010–11 world cotton plantings are projected to expand in response to forecast higher prices. Whereas in some countries strong competition for land from alternative crops, most notably corn and soybeans, is expected to constrain the increase in production, in the United States and the central Asian republics (mainly Uzbekistan and Turkmenistan, but also Tajikistan and Kazakstan) cotton production is expected to increase as cotton prices rise relative to grain prices.

Brazil has a large potential to respond to higher cotton prices by increasing cotton production. This will be assisted by their adoption of genetically modified (GM) cotton varieties that are more suited to Brazilian conditions and of innovations such as double cropping with soybeans.

While some growth in world cotton lint yields is also projected for the medium term, the rate of yield growth is expected to slow given that uptake of the current generation of GM has reached its full potential. The key GM traits under development for cotton include triple Bacillus thuringiensis (Bt) gene insect resistance (two years from commercialisation); dicamba

and glufosinate (herbicide) tolerance (two years away); lygus (insect) resistance (three years away); and drought tolerant varieties (four years away).

Growing world cotton demand to 2015–16

World mill consumption for cotton is projected to grow in the medium term at an average rate of 1.8 per cent a year. This compares with an average rate of 2.3 per cent in the 10 years to 2010–11. The main factors expected to influence the world demand for cotton over the medium term are the rate of economic and population growth and the price of cotton relative to the price of competing apparel fibres, particularly polyester.

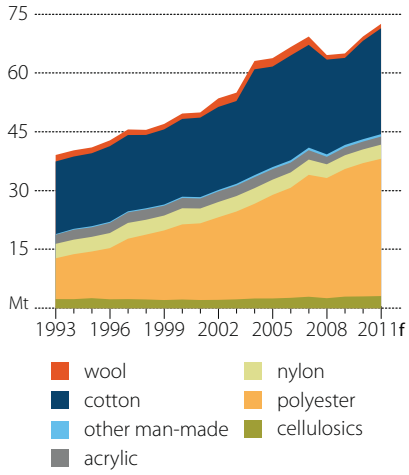
The cotton share of the world apparel fibre market has declined over the past 20 years. Over the outlook period, increases in cotton prices relative to polyester prices imply that cotton will continue to lose market share in world apparel fibre markets.

Trends in world apparel fibre use

Natural apparel fibres (mainly cotton, wool, mohair, cashmere and silk) began to be replaced from the 1920s by artificial fibres, mainly rayon and acetate. These artificial fibres were collectively called cellulosics because they were produced from cellulose mainly sourced from wood.

The first of the synthetic apparel fibres, nylon, became readily available from around 1940. This was followed by other forms of synthetic fibres, mainly modacrylics, olefins and acrylics from around 1950, and polyester from the mid-1950s. Synthetic fibres are produced mainly from petrochemicals.

World apparel fibre production, by type



A trend since 1989 has been the development of ultrafine forms of the artificial and synthetic fibres, called microfibres. The fineness of the fibres means they can be woven tightly, providing better protection against the elements and lowering drying times.

Initially, production of synthetic fibres took place in the United States and Western Europe, where the fibres were originally developed. Over time production has gravitated to countries where labour costs are low, particularly in Asia. Initially, the Asian countries were Japan, Chinese Taipei and the Republic of Korea; more recently China has emerged as the dominant producer.

The apparel fibres differ in their characteristics in terms of appearance, feel, weavability, dyeability, shrink resistance, fire retardant properties, washability, pleat retention, wickability and strength and durability. Most fibres that are used for apparel are also used extensively in industrial products, floor coverings and furnishings.

Blending fibre types is common in producing fabrics with altered appearance, performance and cost characteristics. For example, wool–polyester and cotton–polyester blends are common. Blend ratios are varied by fabric manufacturer according to the relative prices of the fibre types and their performance characteristics.

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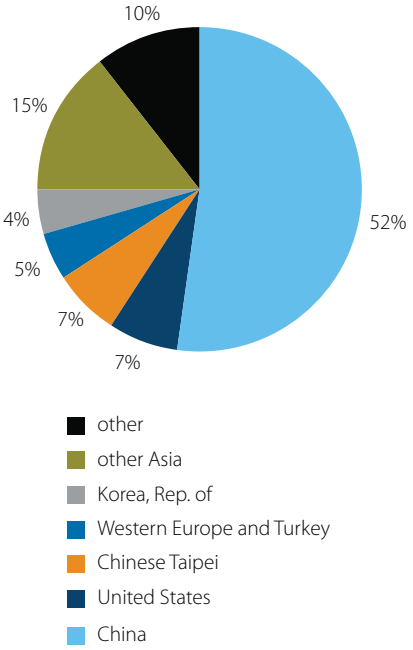
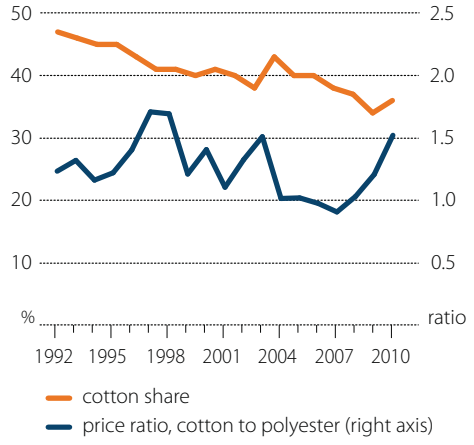
Trends in world apparel fibre use continued

Country shares of world artificial and synthetic fibre production
annual average, three years to 2009



Source: Fiber Organon.

Cotton share in world fibre production



The artificial and synthetic fibres have made inroads into the market shares of natural fibres because they can fairly closely mimic, or even improve on, the characteristics of natural fibres, but at a lower production cost. For example, nylon almost immediately replaced silk in the manufacture of stockings because a nylon stocking had similar characteristics to a silk stocking but cost much less to produce. Also, acrylic fibres have replaced some wool use in sweaters because of their similar warmth characteristics and lower weight and cost.

The polyester share of the world apparel fibre market in 2010 was around 60 per cent, compared with less than 10 per cent in the early 1990s. The cotton share has been gradually eroding, despite cotton declining in price relative to polyester prices. This trend broadly reflects improvements in the quality characteristics of synthetic fibres and growing acceptance of synthetic fibres at the expense of natural fibres such as cotton and wool.

One of the problems that natural fibres face is that some of their important quality characteristics can vary from season to season according to production conditions. Both the world cotton and wool industries have implemented elaborate fibre-testing systems so that processors can buy these fibres with reasonable certainty about their quality characteristics.

The Australian wool industry has responded to the competition from artificial and synthetic fibres in a number of ways. It is aiming its research and development at improving the quality characteristics of wool—for example, enabling wool to be machine washed and reducing the itchiness of wool. The wool industry in Australia funds extensive promotion of wool, based on its Woolmark logo, often emphasising 'naturalness'.

Low world cotton stock situation to ease over the medium term

The current world stock-to-use ratio for cotton is projected to recover over the medium term. By 2015–16 the cotton stock-to-use ratio is projected to approach 40 per cent, but this is still relatively low compared with the average ratio of 53 per cent in the 10 years to 2009–10.

Improved Australian price and production prospects to 2015–16

Returns to Australian cotton growers are forecast to be $552 a bale in 2011–12 and then decline gradually in the four years to 2015–16. However, the projected average return to Australian cotton growers of $526 a bale in constant (2010–11) dollars over the outlook period is still well above the average of $390 a bale (also in 2010–11 dollars) received in the five years to 2009–10.

Australian cotton production is projected to decline steadily from a peak in 2011–12 of 1.1 million tonnes to 748 000 tonnes by 2015–16 on the assumption that the irrigation dams return to more normal storage levels. Some improvements in lint yields in Australia are also forecast over the medium term. The long-term yield potential of irrigated cotton under Australian conditions is estimated to be around 17 bales a hectare, compared with the current typical average of around 10 bales a hectare.

Australian cotton exports are projected to peak at 1.09 million tonnes in 2012–13, before tapering off to around 803 000 tonnes by 2015–16, reflecting lower cotton production in 2014–15 and 2015–16. Virtually all of Australian cotton production is exported. Under the projected production over the medium term, Australia will again become the third largest exporter in the world, behind the United States and Uzbekistan.

Outlook for cotton

	unit	2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
World b									
Production	Mt	23.32	22.06	25.10	27.92	28.03	27.81	28.85	28.41
Consumption	Mt	23.94	25.80	26.04	26.88	27.76	27.91	28.11	27.96
Closing stocks	Mt	13.17	9.50	8.57	9.61	9.88	9.79	10.53	10.98
Stocks-to-consumption ratio	%	55.0	36.8	32.9	35.8	35.6	35.1	37.5	39.3
Cotlook 'A' index									
– nominal	USc/lb	61	78	139	105	91	99	92	91
– real c	USc/lb	63	78	139	103	88	94	85	83
Australia d									
Area harvested	'000 ha	164	208	590	550	525	450	400	346
Lint production	kt	329	387	839	1 106	1 075	938	849	748
Value of production									
– nominal e	A$m	693	876	2 427	2 773	2 518	2 355	2 097	1 887
– real g	A$m	730	901	2 427	2 691	2 378	2 170	1 885	1 655
Export volume	kt	260	395	528	926	1 092	1 022	899	803
Export value									
– nominal	A$m	500	755	1 502	1 915	2 418	2 408	2 070	1 877
– real g	A$m	526	776	1 502	1 858	2 284	2 219	1 861	1 646
Export unit value									
– nominal	Ac/kg	193	191	284	207	221	236	230	234
– real g	Ac/kg	203	196	284	201	209	217	207	205

b August–July years. **c** In 2010–11 US dollars. **d** July–June years. **e** Includes cottonseed value. **g** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; US Department of Agriculture.

Livestock

Beef and veal

Outlook to 2015–16

Peter Berry

The Australian weighted average saleyard price for beef is forecast to rise by 11 per cent in 2010–11 to 320 cents a kilogram and by a further 5 per cent in 2011–12 to 335 cents a kilogram. Higher saleyard prices in the short term mainly reflect the effect of strong competition for young restocker cattle between producers to rebuild herds and feedlotters and processors to meet export demand.

Looking further ahead, competition for young restockers is projected to continue to support saleyard prices for beef out to 2012–13. However, over the latter part of the projection period, saleyard prices are projected to decline (in real terms) as a result of the combined effects of an assumed winding down of herd expansion and increased competition in major export markets from the United States and Latin American beef suppliers. By 2015–16, the average saleyard price for beef is projected to be around 305 cents a kilogram, in 2010–11 dollars.

Herd expansion to continue

The Australian cattle herd is forecast to increase by more than 2 per cent in 2011–12 to around 27.9 million head. Significant rainfall since the beginning of 2010–11 has improved fodder availability in both south-eastern and northern Australia and has encouraged producers, particularly in south-eastern Australia, to rebuild herds.

Over the past several years, adverse seasonal conditions drove high rates of destocking in south-eastern Australia and, as a result, the national cattle herd declined by 4 per cent to 26.7 million head in 2009–10. Cattle numbers in northern Australia, which normally account for around one-third of the national herd, were less affected by adverse seasonal conditions over this period.

The recent flooding in eastern Australia resulted in considerable disruptions to the cattle industry in many regions. However, losses of cattle appear to have been small in relation to the national herd. The main effect of the flooding appears to have been associated with disruptions to transport and other infrastructure support. Damage to roads, bridges and rail lines restricted movement of cattle, resulting in some cattle sales being cancelled in early to mid-January. Saleyard prices were high for most grades of cattle during that period, with the eastern young cattle indicator closing at around 411 cents a kilogram (carcass weight) in mid-January, before easing gradually over late January and early February. In mid-February, the eastern young cattle indicator declined to around 393 cents a kilogram.

In the southern part of Western Australia, adverse seasonal conditions throughout 2010 and into early 2011 have resulted in significant destocking in that state, with most of the cattle shipped to South Australia for slaughter.

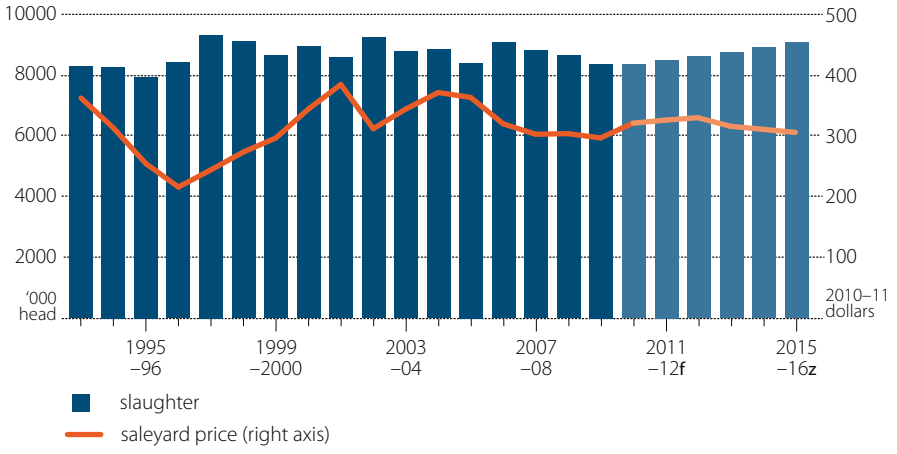
Assuming favourable seasonal conditions over the medium term, the national herd is projected to expand to around 28.7 million head by the end of 2015–16. If achieved, this would represent a cattle herd slightly larger than in 2005–06, the most recent peak in cattle numbers in Australia. The increase in the cattle herd is projected to occur despite a projected gradual rise in export demand for beef over the outlook period.

Slaughter and production

Australian beef production is forecast to increase by around 2 per cent in 2011–12 to 2.19 million tonnes. Beef cattle slaughter is forecast to be more than 2 per cent below the 10-year average, at 8.5 million head in 2011–12, largely in response to producers in south-eastern Australia expanding their herds. On the assumption of favourable pasture growth, the average carcass weight is forecast to increase by around 1 per cent in 2011–12 to 258 kilograms.

Over the medium term, beef production is projected to reach around 2.36 million tonnes by the end of 2015–16. A greater use of feedlotting to finish cattle is expected to be the main driver for higher carcass weights over the outlook period. In addition, the projected increase also reflects an assumed average rise of 1.6 per cent a year in the slaughter rate over the medium term.

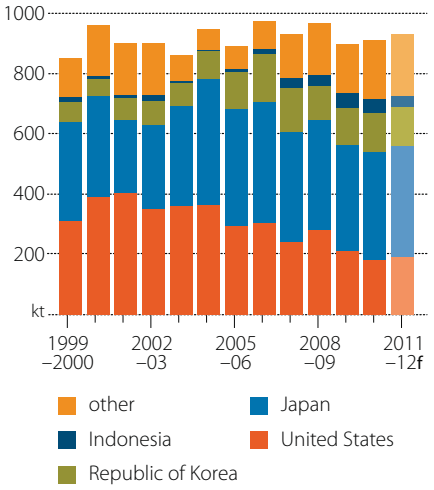
Australian cattle slaughter and prices



Beef exports to increase gradually over the medium term

Beef exports are forecast to increase by 2 per cent in 2011–12 to 930 000 tonnes. This forecast includes an increase in the share of beef exports destined to developing markets, such as the Russian Federation and those in South-East Asia.

Australian beef exports
by destination



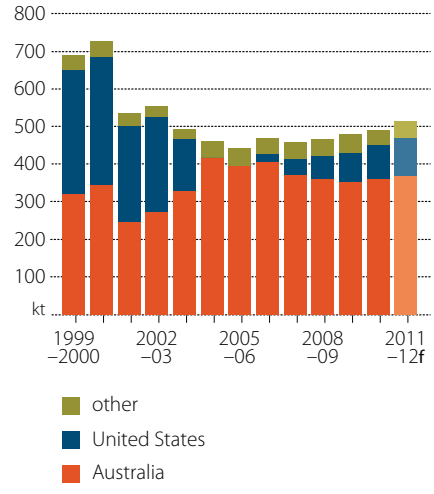
Over the five years to 2009–10, the share of Australian beef exports to developing markets increased from 8 per cent to almost 24 per cent of total exports. This change reflects higher income growth and an associated increase in demand for beef in these markets, compared with Australia's major OECD beef markets of Japan, the United States and the Republic of Korea. In 2011–12, continued growth in import demand in developing markets is expected to result in their share reaching around 26 per cent of total Australian beef exports.

Over the medium term, Australian beef exports are forecast to increase moderately to be around 1.03 million tonnes by 2015–16. Beef exports to the major OECD markets are expected to reach 768 000 tonnes by the end of the outlook period.

Australian beef exports to Japan

Australian beef exports to Japan are forecast to rise by 3 per cent in 2010–11 to 360 000 tonnes and by a further 2 per cent in 2011–12 to 368 000 tonnes. While Japan's total beef imports are forecast to increase over this period, most of the increase is expected to be met by US beef imports. In the Japanese market, the United States has been steadily regaining the market share it lost in the early 2000s.

Japan beef imports
by source



Over the period July to November 2010, Japan's total imports of beef grew year-on-year by 8 per cent to more than 225 000 tonnes. Over the same period, the United States achieved a year-on-year rise of 26 per cent in its beef exports to Japan to around 47 000 tonnes, while beef imports from Australia remained largely unchanged at around 152 000 tonnes. The share of grain-fed beef declined to 36 per cent of total imports from Australia over this period, compared with 38 per cent in 2009–10.

Current total beef consumption in Japan is 23 per cent smaller than it was in 2000, mainly as a result of health concerns following the discovery of bovine spongiform encephalopathy in both the Japanese and US herds in the early 2000s. These health concerns led Japanese consumers to reduce their beef consumption and increase their consumption of substitute meats such as pork and poultry. Japanese

beef consumption, on a per person basis, has recovered partially over the second half of the 2000s but still remains relatively low. Per person consumption of beef is estimated to have been around 9.5 kilograms in 2010, well below the 12.3 kilograms in 2000. Further recovery in per person consumption of beef is expected over the projection period. However, the effect on total beef consumption will be partially offset by a continued decline in the Japanese population.

Australian beef exports to Japan are projected to increase moderately over the medium term to reach around 390 000 tonnes by 2015–16. Underlying this projected increase is the assumption that Japan will continue to restrict US beef imports to beef from cattle less than 21 months of age. If this restriction is removed, there could be increased competition from US beef in the Japanese market.

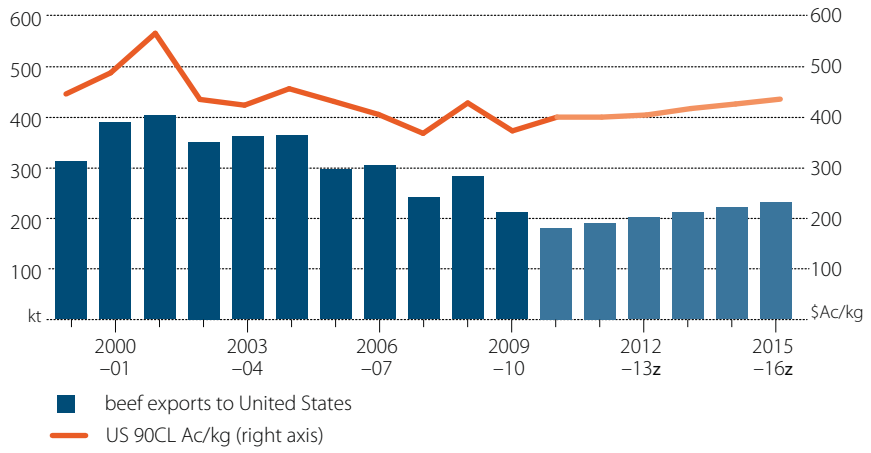
Australian beef exports to the United States

Australian beef exports to the United States are forecast to fall by around 15 per cent in 2010–11 to 180 000 tonnes, before increasing by 6 per cent in 2011–12 to 190 000 tonnes. Import demand in the United States for manufacturing beef is expected to rise in 2011–12, mainly reflecting constrained domestic supplies.

Currently, the US cattle herd is around 92 million head, its lowest in around 50 years. Notably, the rate of slaughter of young replacement cows in the United States has increased sharply in recent months, which suggests that the US herd may decline further in the short term. The United States Department of Agriculture forecasts that US beef production and exports will fall by 2 per cent and 3 per cent, respectively, in 2011.

Over the medium term, Australian beef exports to the United States are projected to increase to 230 000 tonnes by 2015–16. Export returns to the US market are projected to improve as strong US demand and limited domestic supplies are expected to drive US beef prices higher.

Australian beef exports to the United States and real prices

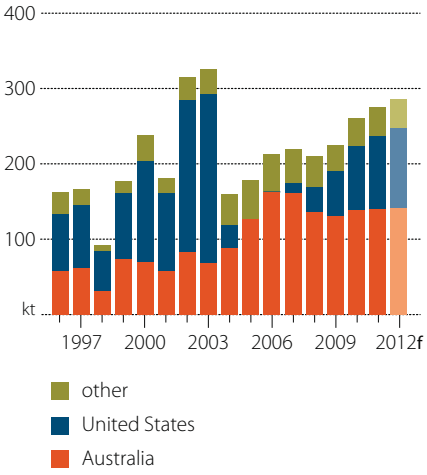


An assumed depreciation of the Australian dollar toward the end of the projection period is also expected to improve returns for Australian exporters.

Korean beef imports to grow

Australian exports of beef to the Republic of Korea are forecast to increase by 3 per cent in 2010–11 to 128 000 tonnes and by a further 3 per cent in 2011–12 to 132 000 tonnes. Imports of beef by the Republic of Korea have been growing steadily in response to economic recovery since the global economic downturn in 2009. Also contributing to increased imports has been an outbreak of foot and mouth disease in Korea's domestic herd that resulted in a cull of around 150 000 cattle.

Korea beef imports



Growth in Australian exports to the Republic of Korea is expected to be modest because the United States has been steadily regaining the market share it lost in the early 2000s. Between July and December 2010, Korean beef imports were up by 12 per cent year-on-year to more than 136 000 tonnes. While imports of US beef were up year-on-year by 33 per cent, to 47 000 tonnes, imports of Australian beef were up by only 5 per cent to 74 000 tonnes.

Over the medium term, Australian beef exports to the Republic of Korea are projected to grow modestly, to around 148 000 tonnes in 2015–16. This projected growth in beef exports is expected to be driven mainly by growth in household incomes over the medium term. Nevertheless, strong competition from US beef is expected to continue, and this has the potential to weaken demand growth for Australian beef in the Korean market.

The Russian Federation

Australian exports to the Russian Federation are forecast to grow by more than 140 per cent in 2010–11 to around 60 000 tonnes and by a further 8 per cent in 2011–12 to around 65 000 tonnes. The growth in imports of Australian beef to this market mainly reflects higher beef demand as a result of rising incomes and lower beef imports from Brazil and Argentina.

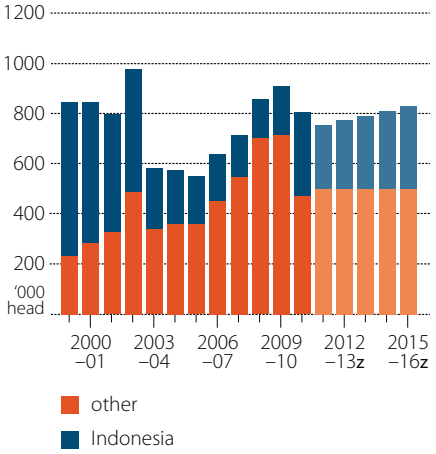
Imports of Australian beef are expected to increase over the next few years to reach 80 000 tonnes in 2015–16. Despite government programs aimed at increasing domestic beef production in the Russian Federation, growth in domestic consumption is expected to exceed growth in domestic production, leading to a continued increase in beef import demand.

Indonesia

The Indonesian Government advised in January 2011 its intention to limit Australian live exports to Indonesia to around 500 000 head in 2011. This represents a 30 per cent fall in live

exports to this market in 2010–11 compared with 2009–10. If this policy is strictly enforced (a review is expected in mid-2011), live cattle exports will remain at this level in 2011–12 and over the medium term.

Live cattle exports
by destination



In January 2011, the Indonesian Government also moved to limit total beef imports to 50 000 tonnes for 2011 from all sources. As a result, Australia's exports of beef to Indonesia are expected to fall by 6 per cent in 2010–11 to 47 000 tonnes, before declining by a further 25 per cent to 35 000 tonnes in 2011–12. Assuming this limit remains in place, Australia's beef exports to Indonesia will remain around 35 000 tonnes a year over the outlook period.

Any future growth in exports of beef and live cattle to Indonesia will depend on the removal of the above import restrictions. Over the past few years, the Indonesian market has become increasingly important for Australia's northern cattle industry. Given strong growth in Indonesian consumer demand for beef, these import restrictions represent a major hurdle for Australian beef and live exporters. Even with import restrictions in place, there remains a possibility that the Indonesia market will become more keenly contested by other beef exporting countries.

Outlook for beef and veal

	unit	2008 –09	2009 –10	2010 –11 f	2011 –12 f	2012 –13 z	2013 –14 z	2014 –15 z	2015 –16 z
Saleyard price b									
– nominal	Ac/kg	296	288	320	335	348	342	345	348
– real c	Ac/kg	311	296	320	325	329	315	310	305
Cattle numbers d	million	27.9	26.7	27.3	27.9	28.5	28.8	28.7	28.7
– beef	million	25.3	24.3	24.8	25.4	25.9	26.3	26.2	26.2
Slaughterings	'000	8 643	8 364	8 349	8 500	8 613	8 750	8 904	9 085
Production	kt	2 137	2 109	2 150	2 190	2 225	2 266	2 311	2 360
Consumption									
per person	kg	32.7	33.9	33.6	35.9	35.7	35.4	35.0	34.7
Export volume e	kt	968	899	910	930	950	975	1 000	1 025
– to United States	kt	282	211	180	190	200	210	220	230
– to Japan	kt	363	350	360	368	375	381	386	390
– to Korea, Rep. of	kt	113	124	128	132	136	140	144	148
Export value									
– nominal	A$m	4 857	3 953	4 121	4 306	4 465	4 622	4 820	5 043
– real c	A$m	5 111	4 065	4 121	4 178	4 217	4 258	4 333	4 423
Live cattle exports	'000	856	907	807	753	771	790	809	830

b Dressed weight. **c** In 2010–11 Australian dollars. **d** At 30 June. **e** Fresh, chilled and frozen, shipped weight. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Department of Agriculture, Fisheries and Forestries; Australian Bureau of Statistics.

Sheep meat

Outlook to 2015–16

Gwendolen Rees

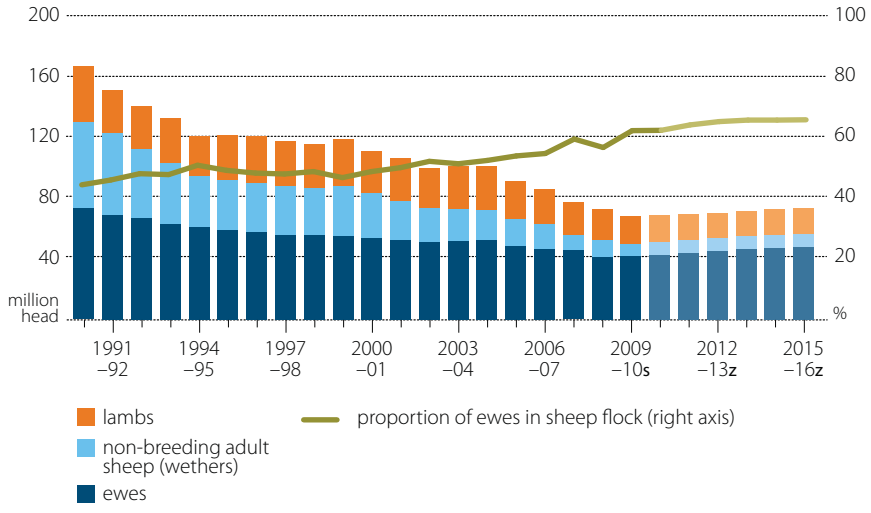
The reduced size of the Australian sheep flock, combined with strong demand for sheep meat, live sheep for export and lambs, has improved the returns to Australian sheep enterprises in recent years. It is expected that these factors will continue to have a strong influence on the sheep meat market over the next few years and returns for sheep enterprises are projected to remain favourable over the medium term. This situation is also expected to result in a gradual rebuilding of the sheep flock over this period, with an increased focus on meat production.

The Australian sheep flock is expected to stabilise in the short term, after declining to its lowest number since 1887 at 68 million head in 2009–10, and to increase gradually to around 72.9 million head in 2015–16. This represents an increase of 7 per cent relative to 2009–10.

The rise in sheep numbers is projected to be gradual because the desire to rebuild flocks and expand future production capacity is expected to be moderated by the incentive to increase slaughter rates and take advantage of high prices in the short term. Once the ewe base has expanded sufficiently, lamb markings and slaughter rates are expected to rise.

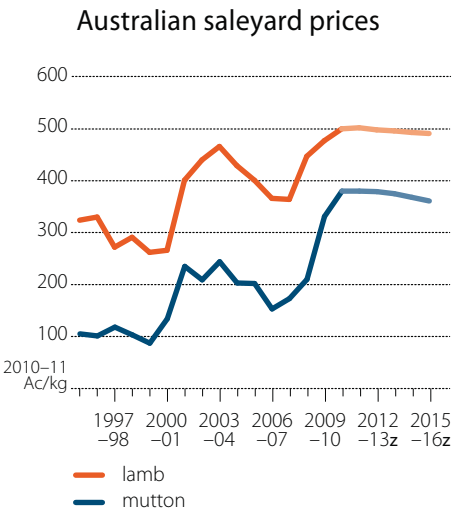
Although high lamb prices in recent years have provided an incentive for producers to increase flock numbers, adverse seasonal conditions in 2008–09 and 2009–10 in many parts of Australia, particularly Western Australia, prevented producers from expanding flocks. Rainfall so far in 2010–11 has encouraged significant restocking activity in the eastern states and this is expected to continue over the outlook period, assuming seasonal conditions remain favourable.

Australian sheep flock



Prices to remain high as producers restock

The Australian weighted average saleyard price of lambs is forecast to increase by around 3 per cent to average 517 cents a kilogram in 2011–12, following an expected rise of 8 per cent in 2010–11. This, in part, reflects lower lamb slaughter rates as producers continue to retain ewe lambs for flock rebuilding. Breeding ewe numbers, which have fallen sharply in recent years, will take several seasons to rebuild. Additionally, domestic and overseas demand for Australian sheep meat, particularly in major export markets such as the United States and China, is expected to remain relatively strong, despite forecast high prices and an assumed high value of the Australian dollar.



Although lamb supplies are projected to increase gradually toward 2015–16, strong demand for lamb is expected to continue, resulting in lamb prices remaining relatively high, in real terms, over the medium term.

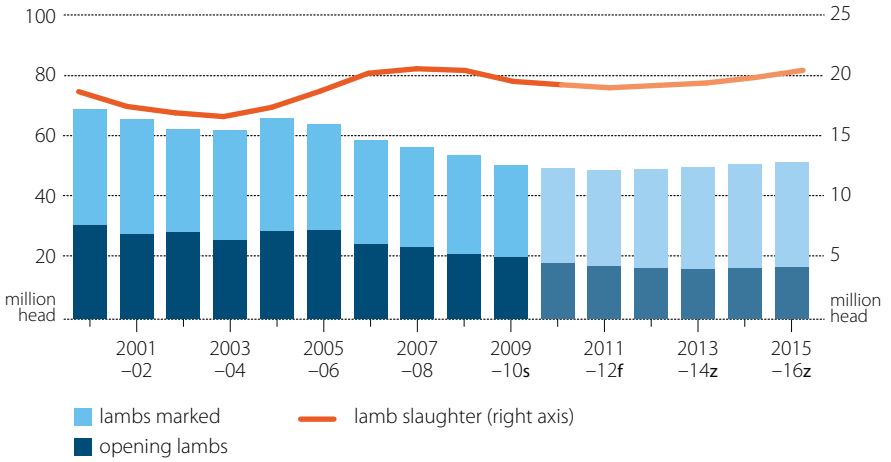
Sheep prices are forecast to increase by 3 per cent in 2011–12 to around 390 cents per kilogram, after an expected rise of 18 per cent in 2010–11. This reflects reduced sheep supplies as producers retain breeding stock to older ages in order to maximise lamb markings. Additionally, wether numbers are expected to be at historical lows. Over the medium term, the real price of sheep is projected to fall gradually as adult sheep numbers recover.

Rainfall so far in 2010–11 has encouraged significant restocking activity in the eastern states. The improved soil moisture conditions are expected to support pasture growth in many regions in eastern Australia, resulting in stock retention and rebuilding into 2011–12. There will also be increased supplies of feed grains in eastern Australia. In contrast, the less favourable conditions in Western Australia in 2010–11 resulted in significant interstate transfers of livestock. On the assumption that seasonal conditions will improve in 2011–12, it is forecast that sheep enterprises in Western Australia will also begin to rebuild sheep flocks in the coming season.

Lamb production to increase as flocks expand

Flock rebuilding is forecast to result in lamb slaughter falling by around 1 per cent in 2011–12 to just under 19 million head. However, over the medium term, lamb slaughter is projected to rise to around 20.4 million head by 2015–16 in line with an increase in lamb markings as ewe numbers increase. Producers are also expected to continue to improve flock management practices, resulting in higher ewe joining and lamb marking rates. Other likely improvements include better genetics, a larger focus on finishing lambs on grain, and supplementary feeding to improve ewe fertility and reduce lamb mortality rates.

Australian lamb flock and lamb slaughter



Lamb production is expected to follow the decline in slaughter in the short term and fall to around 405 000 tonnes in 2011–12. As lamb slaughter recovers over the medium term, an expected improvement in average carcass weights is expected to see lamb production increase more quickly than lamb slaughter. Average carcass weights are projected to improve in response to projected favourable saleyard prices (in real terms), which will allow producers to undertake improved feeding and management practices.

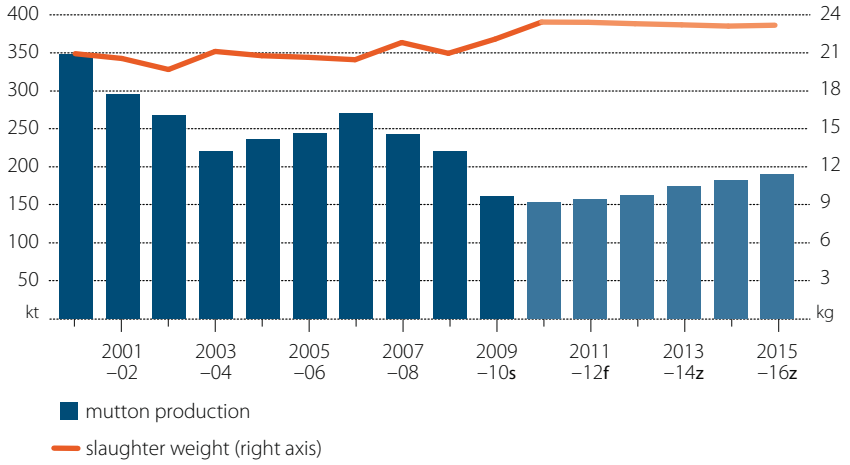
Mutton production to remain low throughout the medium term

Adult sheep slaughter is forecast to decline by 10 per cent in 2010–11 to around 6.6 million head and to remain around this historically low level in 2011–12, as producers rebuild flocks and increase lamb production capacity. Over the medium term, adult sheep numbers are expected to gradually rise and sheep slaughter is expected to increase by around 25 per cent, albeit from a low base, by the end of the projection period.

In the short term, mutton production is forecast to fall significantly, with reduced sheep slaughter expected to more than outweigh an increase in carcass weights. Improved pasture growth in the eastern states so far in 2010–11 has resulted in sheep carcass weights averaging more than 23 kilograms, which is considerably above the long-term average of around 21 kilograms.

Over the medium term, carcass weights are expected to fall slightly from current highs, under the assumption of a return to more average, but favourable, seasonal conditions. Compared with the expected conditions in 2011–12 (with significantly increased pasture growth and supplies of feed grains), it may not be economical for producers to maintain stock at higher weights over the medium term, given the projected price movements. Reflecting the projected increase in slaughter, mutton production is expected to rise by around 23 per cent over the next five years to around 190 000 tonnes in 2015–16.

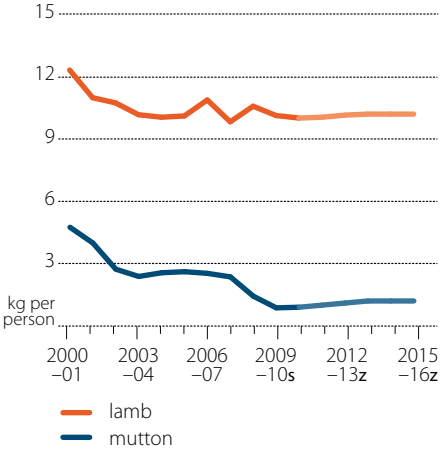
Mutton production and carcass weights



Domestic consumption to remain stable

Domestic per person consumption of lamb has declined only slightly, in trend terms, in response to a significant increase in retail lamb prices compared with other meats in the past few years. Over the medium term, domestic per person consumption for lamb and mutton is projected to remain relatively stable at around 10.2 kilograms and 1.2 kilograms, respectively. Per person consumption of mutton is expected to be slightly higher over the medium term compared with 2010–11, as real prices decline.

Australian sheep meat
per capita consumption



Export shipments to decline in the short term

Australian sheep meat exports are forecast to fall by around 3 per cent in 2010–11, and by a further 2 per cent in 2011–12, reflecting lower sheep meat production. During the first half of 2010–11, shipments of lamb and mutton exports fell year-on-year by 2 per cent and 20 per cent, respectively.

Over the medium term, the volume of Australian sheep meat exports is projected to recover, rising by an average rate of 3 per cent a year to 289 000 tonnes in 2015–16. The volume of mutton exports is expected to grow more significantly over the medium term, at an annual average of 4 per cent to 126 000 tonnes in 2015–16. Stronger demand for Australian mutton is projected in the Middle East and South-East Asia.

Outlook for sheep meat import demand

Global sheep meat demand is expected to grow strongly over the medium term despite projected relatively high prices. Key areas of growth are expected to be developing countries and regions, such as China, the Middle East and South-East Asia, where per capita income growth is expected to be higher than in developed economies. Total demand for sheep meat in the United States and the European Union is projected to increase slightly, in line with population growth, as per capita consumption of sheep meat is unlikely to increase significantly in these regions. Nevertheless, growth in import demand is still projected for these markets as a result of continued declines in domestic production.

In the first half of 2010–11, lamb exports to the United States declined year-on-year by 16 per cent, as average export prices to that country increased by around 13 per cent. The United States Department of Agriculture forecast that US imports of sheep meat will increase in the 2011 calendar year. The majority of this expected increase is likely to be sourced from Australia, as lamb exports from New Zealand are forecast to fall by around 7 per cent in 2010–11 (October–September).

Over the medium term, Australian exports to the United States are projected to increase by around 4 per cent a year to 37 000 tonnes in 2015–16. Although the importance of other export destinations, such as those in Asia, is expected to increase, the US market is expected to remain a valuable export destination over the medium term.

Increased competition from New Zealand

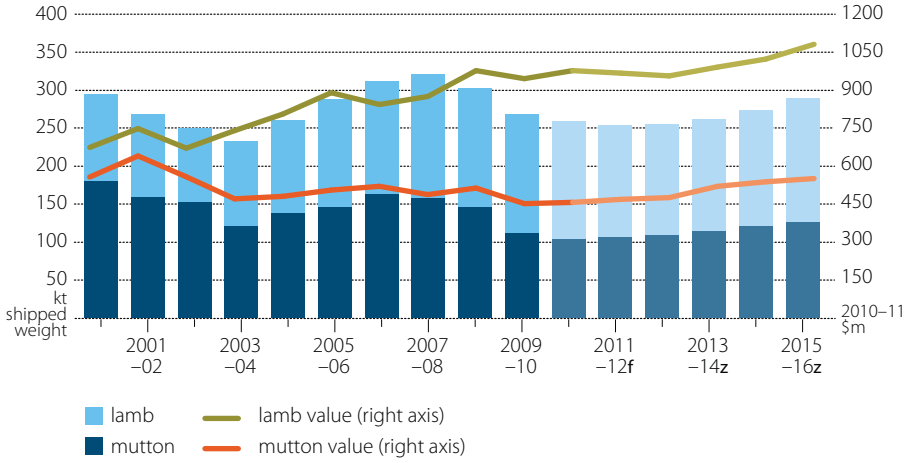
Increased competition from New Zealand is expected in major export destinations for Australian sheep meat over the next several years. Sheep numbers in New Zealand had been in decline, but are expected to recover over the medium term in response to improved prospects of international demand and prices.

New Zealand lamb production is projected to follow a similar path to Australian output, decreasing in the short term as producers hold stock for rebuilding, but recovering over the medium term. It is expected that there will be a sizeable increase in sheep meat exports from New Zealand over the medium term, which is likely to constrain demand increases for Australian sheep meat in key export markets, such as the United States.

Export value increases as high prices offset falls in export volumes

Earnings from lamb exports are forecast to rise by 2 per cent to around $994 million in 2011–12, following an expected rise of 6 per cent in 2010–11. In 2011–12, the value of mutton exports is forecast to increase slightly as higher export prices are expected to offset the forecast decline in export volumes. By 2015–16, earnings from lamb exports, in real terms, are projected to be around 10 per cent higher at around $1 billion. Similarly, earnings from mutton exports are projected to increase by 21 per cent, in real terms, in 2015–16 compared with 2010–11.

Australian sheep meat exports



Live exports

Live sheep exports are projected to gradually increase over the outlook period, from 3.06 million head in 2009–10 to around 3.5 million head in 2015–16. This growth is expected to occur in line with the projected recovery in sheep numbers in Western Australia. Prices for live sheep are expected to remain high over the short term, reflecting domestic saleyard competition between processors, live exporters and restockers. In the first six months of 2010–11, average live sheep export prices rose year-on-year by 19 per cent. Despite higher prices, export volumes increased by 3 per cent over the same period. Real prices are projected to decline toward the end of the outlook period, as sheep availability improves.

Outlook for sheep meat

	unit	2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
Saleyard price for sheep b									
– nominal	Ac/kg	199	322	380	391	401	407	409	411
– real c	Ac/kg	209	331	380	380	379	375	368	361
Saleyard price for lambs a									
– nominal	Ac/kg	424	464	500	517	528	538	549	560
– real c	Ac/kg	446	477	500	502	498	496	493	491
Sheep numbers d	million	73	68	68	69	70	71	72	73
Slaughterings									
Sheep	'000	10 501	7 333	6 580	6 750	7 000	7 500	7 900	8 200
Lamb	'000	20 395	19 478	19 200	18 950	19 150	19 350	19 800	20 400
Production e									
Mutton	kt	220	162	154	158	163	174	182	190
Lamb	kt	416	413	410	405	410	415	425	440
Consumption per person									
Mutton	kg	1.4	0.9	0.9	1.0	1.1	1.2	1.2	1.2
Lamb	kg	10.6	10.1	10.0	10.1	10.2	10.2	10.2	10.2
Exports									
Mutton exports g	kt	146	111	103	106	108	114	120	126
Lamb exports g	kt	156	157	156	148	147	148	153	163
– to United States	kt	38	35	32	31	32	33	34	37
Lamb export value									
– nominal	$m	925	916	975	994	1 010	1 073	1 136	1 232
– real c	$m	974	942	975	965	954	989	1 021	1 080
Live sheep exports	'000	4 064	3 055	3 100	3 100	3 200	3 300	3 400	3 500

b Dressed weight. **c** In 2010–11 Australian dollars. **d** At 30 June. **e** Carcass weight. **g** Fresh, chilled and frozen, shipped weight. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; Department of Agriculture, Fisheries and Forestry.

Pig meat

Outlook to 2015–16

Andrew Haylen and James Fell

The weighted average Australian saleyard price of pigs is forecast to decrease by 1 per cent in 2011–12 to 290 cents a kilogram. Coinciding with this are the expected lower feed grain prices in Australia, which will reduce the cost of pig meat production. The adverse weather conditions in eastern Australia leading up to, and during, the winter grain harvest have resulted in a significant increase in the supply of feed grains.

Over the medium term, the weighted average saleyard price of pigs (in 2010–11 dollars) is projected to fall to around 270 cents a kilogram by 2015–16, in line with projected lower real prices for other meats, including beef and sheep meat. Continued productivity improvements are expected to occur in the pig industry in response to competition from imports in the processed meat sector. Combined with projected lower feed grain prices, this is expected to lead to a decline in pig meat production costs in real terms toward 2015–16.

Domestic production to increase

Domestic pig meat production is forecast to increase in 2011–12 to around 338 000 tonnes. Relatively high retail prices for beef and lamb per kilogram are likely to support consumer demand for pig meat. Over the medium term, production is projected to increase by an annual average of around 1 per cent a year to 355 000 tonnes in 2015–16. While the average saleyard price for pigs is projected to decline in real terms toward 2015–16, producers' profit margins are expected to be maintained as feed grain prices in Australia are also projected to fall, leading to a gradual increase in breeding sow stocks. By 2015–16, the breeding sow inventory is forecast to increase to 329 000 head.

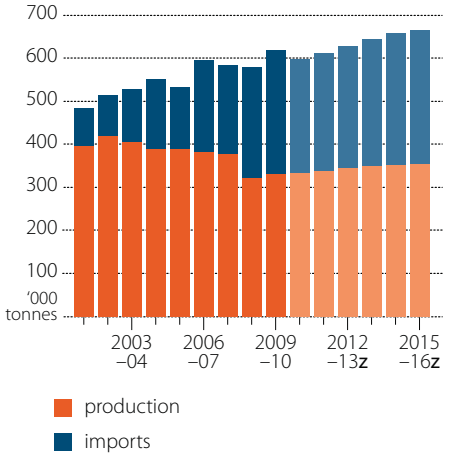
Import growth to slow

Pig meat imports have grown significantly over the past 20 years as amended quarantine arrangements have allowed imports to be sourced from more international suppliers. Under current arrangements, all imported pig meat must be used in the processed meat market.

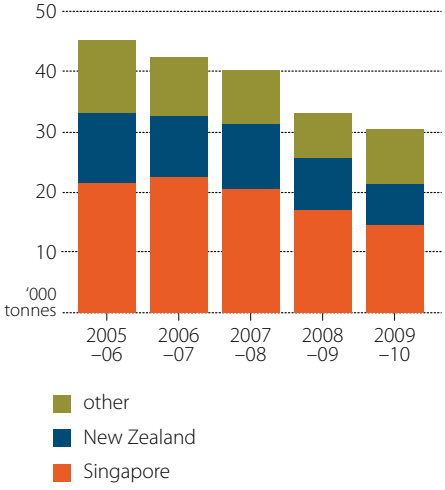
Over the short to medium term, the growth in pig meat imports is expected to continue, albeit at a slower pace, as the share of imports in the processed pig meat market is already high. Pig meat imports currently account for around 70 per cent of the processed pig meat market in Australia.

Imports of pig meat are forecast to increase by 4 per cent to around 138 000 tonnes in 2011–12 and to rise further to 155 000 tonnes by 2015–16. A relatively high Australian dollar assumed for the medium term is expected to maintain the competiveness of imports.

Australian domestic production and imports (carcass weight equivalent)



Australian pig meat exports



Exports

Pig meat exports are forecast to increase in 2011–12 to around 34 000 tonnes. For the remainder of the outlook period, exports are projected to increase only gradually to around 39 000 tonnes by 2015–16.

Singapore and New Zealand are major destinations for Australian pig meat exports. Australia has a freight cost advantage over competitors in these two markets. Singapore is Australia's largest pig meat export destination, comprising around 50 per cent of annual export shipments. Australia's major competitor in the Singapore market is Brazil, which accounts for around 34 per cent of Singapore's pig meat imports. Although Australia's pig meat shipments to Singapore have generally been lower than Brazil's (at around 27 per cent of Singapore's imports), Australian exporters receive higher unit returns than Brazilian exporters in that market.

Outlook for pig meat and poultry

	unit	2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
Pig meat									
Breeding sows **b**	'000	278	269	301	307	318	323	327	329
Saleyard price **c**									
– nominal	Ac/kg	330	309	292	290	294	297	301	308
– real **d**	Ac/kg	347	318	292	282	278	274	271	270
Slaughterings	'000	4 499	4 561	4 589	4 709	4 840	4 904	4 971	4 987
Production	kt	322	331	333	338	344	349	353	355
Consumption									
per person	kg	24.3	26.2	24.4	24.6	24.8	24.9	25.0	24.8
Imports **e**									
– fresh	kt	125.3	141.3	130.0	135.0	140.0	145.0	150.0	152.5
– preserved	kt	2.8	2.0	2.5	2.5	2.5	2.5	2.5	2.5
– total	kt	128.0	143.3	132.5	137.5	142.5	147.5	152.5	155.0
Export volume **eg**	kt	32.3	30.0	32.7	34.1	35.4	36.7	38.0	39.3
Export value									
– nominal	$m	123.7	109.0	109.6	113.2	121.9	128.6	136.1	143.7
– real **d**	$m	130.2	112.1	109.6	109.8	115.1	118.5	122.3	126.1
Poultry meat									
Production	kt	866	872	885	910	935	960	985	1 010
Consumption									
per person	kg	37.5	38.0	37.8	38.2	38.5	38.9	39.2	39.6
Export volume	kt	37.4	28.4	30.0	31.7	33.3	34.6	35.8	36.7

b Numbers at 30 June. **c** Dressed weight. **d** In 2010–11 Australian dollars. **e** Shipped weight. **g** Excludes preserved pig meat. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics.

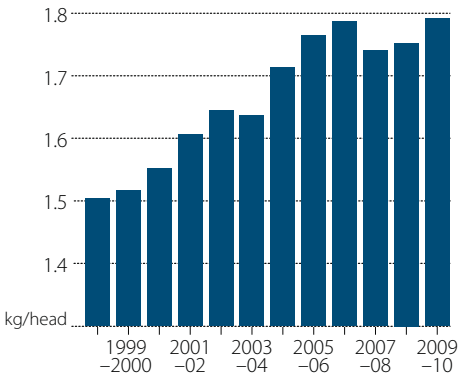
Poultry

Outlook to 2015–16

Andrew Haylen and James Fell

Poultry production is expected to increase in 2011–12 to 910 000 tonnes. This increase is in response to higher demand for poultry as a result of forecast price increases for red meats. Over the medium term, poultry production is projected to increase by 3 per cent a year to around 1 million tonnes by 2015–16. This is consistent with a projected easing of feed grain prices, a continuation of increasing slaughter weights as a result of productivity improvements and consumer preferences for poultry.

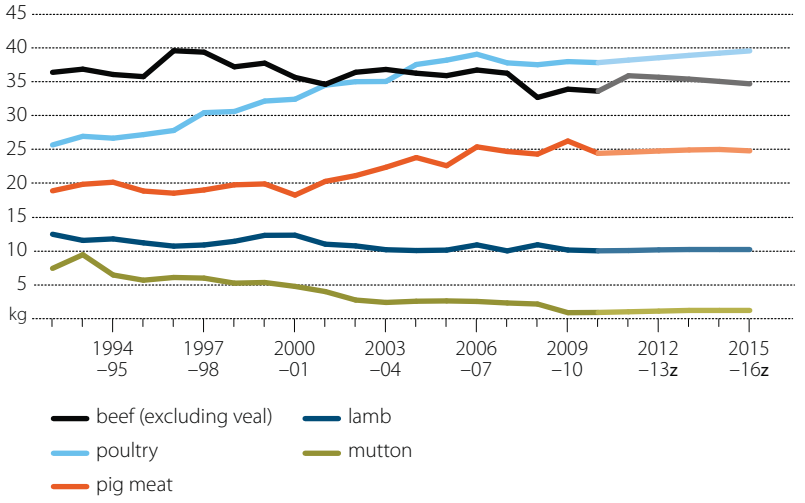
Chicken slaughter weights



Poultry consumption is forecast to rise by 1 per cent in 2011–12 to around 38 kilograms per person. Over the outlook period, consumption per person is projected to increase steadily to around 40 kilograms by 2015–16. Poultry is projected to maintain its position as the most consumed meat on a carcass weight equivalent basis.

Australian meat consumption per head per year

carcass weight equivalent



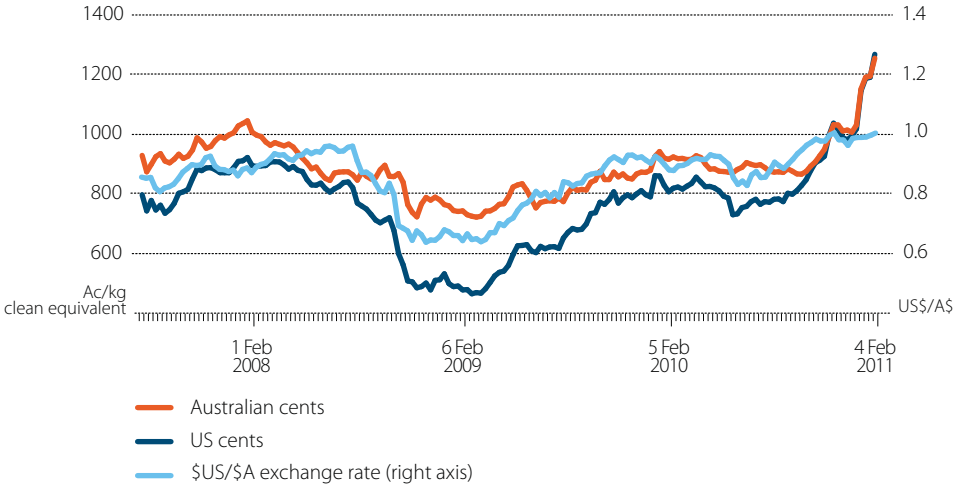
Wool

Outlook to 2015–16

Gwendolen Rees and Andrew Haylen

The Australian Eastern Market Indicator (EMI) price for wool is forecast to rise by 5 per cent in 2011–12, to around 1050 cents a kilogram clean. This follows an estimated price rise of 15 per cent in 2010–11. Global supplies of apparel wool are expected to remain low in 2011–12, while demand for wool products is forecast to strengthen over the next few years.

Australian eastern market indicator wool price
weekly, ended 4 February 2011



Over the medium term the EMI is expected to peak, in real terms, in 2012–13 before declining. This projection reflects the outlook for increased Australian wool production over the medium term, combined with a forecast of declining cotton prices from current highs, leading to some substitution away from wool.

The assumed high value of the Australian dollar over the outlook period presents a downside risk to the wool price projections. Although wool prices have increased recently in the presence of a strong Australian dollar, this situation is not expected to persist beyond the short term, particularly because of the projected increase in wool supplies over the medium term.

Australian wool production to gradually increase

Australian shorn wool production is estimated to be at a low of 335 000 tonnes in 2010–11. In 2011–12, the wool clip is forecast to increase by 2 per cent to 342 000 tonnes. Wool cut per head is expected to increase to around 4.45 kilograms per head, under the assumption of favourable seasonal conditions. The increased rainfall since early 2010 has significantly

improved pasture growth in many wool growing regions, despite some short-term disruptions caused by floods in some areas. The number of sheep shorn is forecast to increase in 2011–12 as the number of adult sheep increases because of ewe retention for flock rebuilding.

In some wool growing regions, such as north-central Victoria, increased incidence of flystrike and contamination of fleeces with vegetable matter and material deposited by flood waters could result in lower volumes of higher quality fleeces shorn in the 2010–11 season. The number of sheep losses owing to floods from late December 2010 to February 2011 appears to have been relatively small (in thousands) from a national perspective.

Australian wool production and wool price

Production of shorn wool is projected to rise gradually throughout the medium term to around 367 000 tonnes by 2015–16, around 10 per cent higher than the 2010–11 forecast. The Australian sheep flock is projected to grow by an average rate of around 2 per cent a year to around 73 million head by the end of the outlook period.

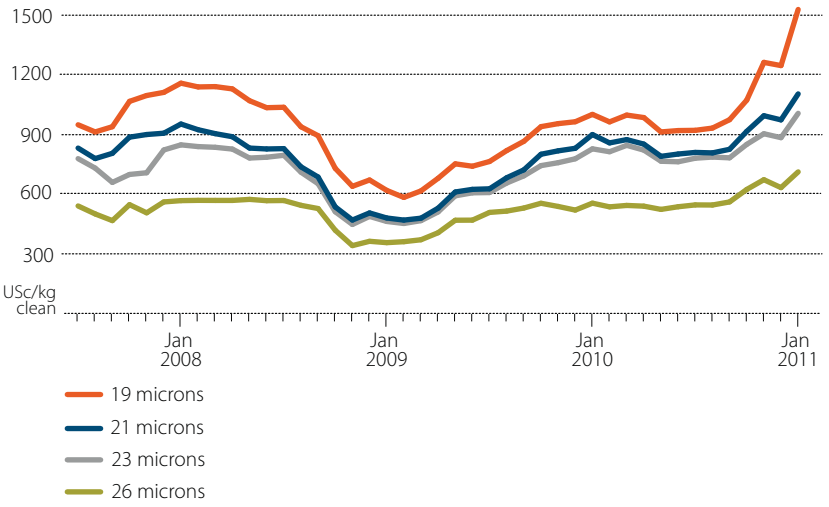
The effect on wool production of the projected increase in sheep numbers is expected to be modest because of the changing composition of the sheep flock that has occurred over the past several years. A stronger focus on meat production has resulted in an increased number of crossbred lambs and a lower number of wethers, which will lower the average wool cut per sheep. Sheep flocks that aim to maximise meat production are managed differently from those for wool production. The former usually consists of a higher proportion of ewes and lambs, with lower wool cut per head and a lower quality of wool produced compared with the latter.

Producer surveys released jointly by Meat & Livestock Australia and Australian Wool Innovation indicate that many producers are maintaining merino ewes as the base of their production, rather than breeding crossbred ewes. These producers will be in a more favourable position to respond to any sustained increase in wool prices. Over the medium term, wool cut per head is expected to remain relatively stable at just less than 4.5 kilograms.

Improved demand for wool and wool products

Demand for Australian wool has increased during 2010–11, particularly for fine and superfine wool. Demand from some European countries has improved after remaining relatively subdued because of the economic downturn in 2009–10. For example, exports to Italy and the Czech Republic increased year-on-year by around 110 per cent and 60 per cent, respectively, in the first half of 2010–11.

Wool prices by micron



Imports of wool products in the European Union have also increased. In the first four months of 2010–11, EU imports of wool and crocheted or knitted fabrics from China grew year-on-year by 108 per cent and 29 per cent, respectively. In the United States, imports of wool products increased year-on-year by 21 per cent in the first five months of 2010–11.

Chinese consumption of wool products is expected to increase in 2011–12 in line with rising incomes. For the 2010 calendar year, Chinese retail sales of garments and footwear grew year-on-year by 25 per cent, with continued growth in demand for wool apparel products. Over the medium term, consumption of apparel wool in China is expected to increase, particularly for luxury apparel.

Although domestic wool production in China is expected to grow over the outlook period, most of this increase will be in the coarse wool category, which is not suitable for production of luxury fabrics. To maintain the competitiveness of its exports of luxury fabrics and apparel in international markets, China's demand for high-quality Australian wool is expected to increase. In addition, China's domestic consumption of luxury apparel is also forecast to grow, as per person incomes continue to rise. Given the size of the Chinese domestic market, this represents a significant opportunity for Australian fine wool exports.

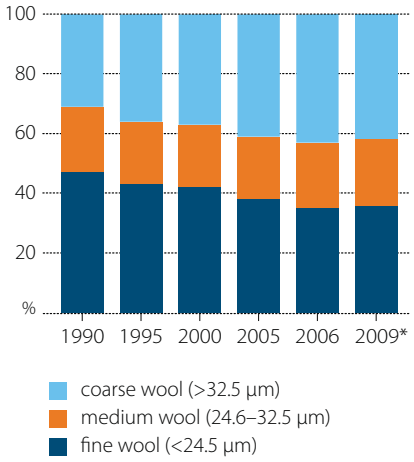
As demand from European processors improves, the share of Australian wool exports going to China is expected to decline slightly. China's share of total Australian wool exports increased to around 77 per cent in 2009–10 because of lower demand from Europe, but in 2010–11 the share is expected to fall back to around the average of 73 per cent over the past several years.

India has the potential to be an increasingly important market for Australian wool exports. In 2009–10, India was Australia's second largest wool export destination. The projected growth of India's processing sector is likely to increase competition with China for Australian raw and semi-processed wool, which has the potential to place upward pressure on wool prices.

Outlook for world wool supplies

The profile of the Australian wool clip has changed significantly in recent years. Fine, superfine (less than 20.6 microns) and strong (greater than 22.5 microns) wool production has increased as a proportion of the clip, and the share for mid-micron wools has declined.

World wool production by micron



***** IWTO provisional estimate.
Source: IWTO.

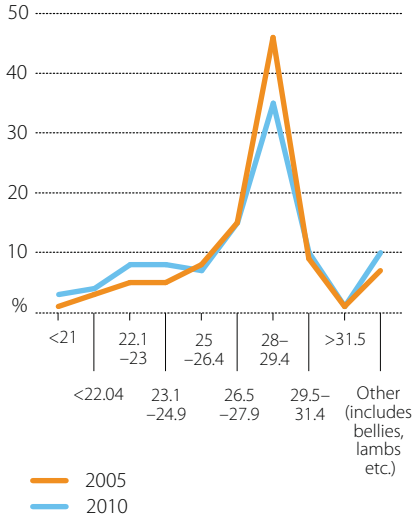
In contrast, the micron profile of global production has shifted toward coarser wool. Data from the International Wool Textile Organisation (IWTO) indicate that global wool production in the IWTO 'coarse' and 'medium' micron categories (greater than 24.5 microns) increased to more than 64 per cent of total wool production in 2009.

Aggregate wool production by Australia's key export competitors, Argentina, South Africa and Uruguay, is expected to remain largely unchanged in the short term, before increasing gradually toward the end of the medium term. Sheep numbers are estimated to have declined in these countries, but the positive global outlook for sheep meat and wool prices has encouraged flock rebuilding over the medium term. Wool production in Argentina is expected to rise by around 3000 tonnes to 57 000 tonnes greasy in 2010–11, while Uruguayan shorn wool production is forecast to fall slightly to 30 000 tonnes. Production in South Africa is forecast to remain largely unchanged at around 48 000 tonnes greasy.

Uruguayan exports in the past five years have shifted toward finer wool production. In 2005, 12 per cent of Uruguayan exports (by volume) were between 22–25 microns, compared with 19 per cent in 2010. Although the Uruguayan wool clip could become finer in coming years, the share of its finer wool production is expected to remain relatively low. In 2010, the share of wool between 22 and 25 microns in Uruguay is estimated to have been around only 3 per cent. There is a similar situation in Argentina.

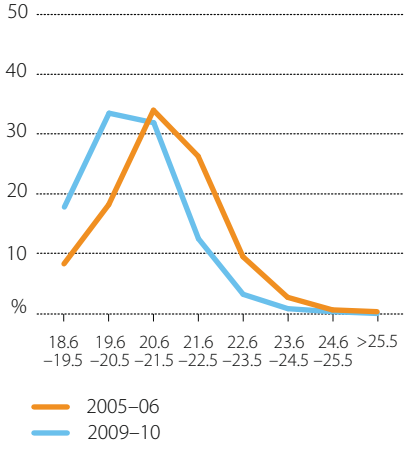
In South Africa wool offerings have also become finer. In 2005–06, wool classed in the range of 18.6–20.5 microns accounted for only 26.5 per cent of merino offerings, compared with 51 per cent in 2009–10. The share of medium wool (20.6–22.5 microns) decreased from 60 per cent in 2005–06 to 44 per cent in 2009–10. If this trend continues, competition with Australian wool could increase over time.

Micron distribution of Uruguayan wool exports



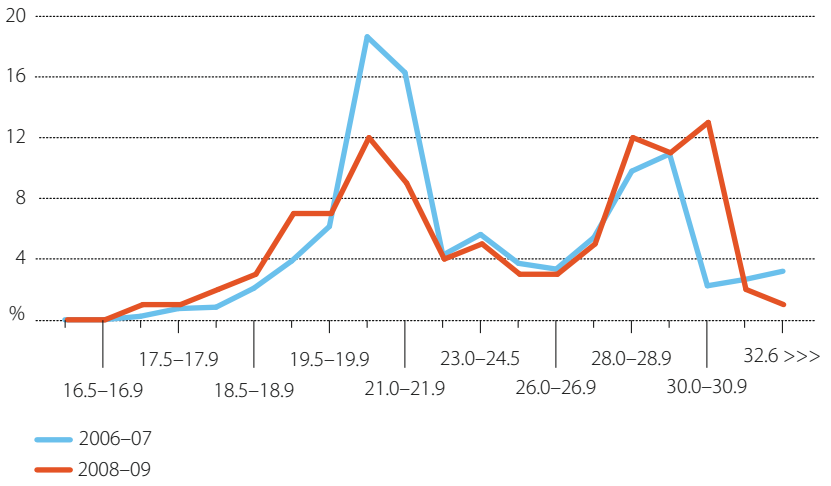
Source: Uruguayan Wool Secretariat.

Micron distribution of South African merino wool



Source: Capewools South Africa.

Micron distribution of Argentinian wool exports



Source: Argentine Wool Federation.

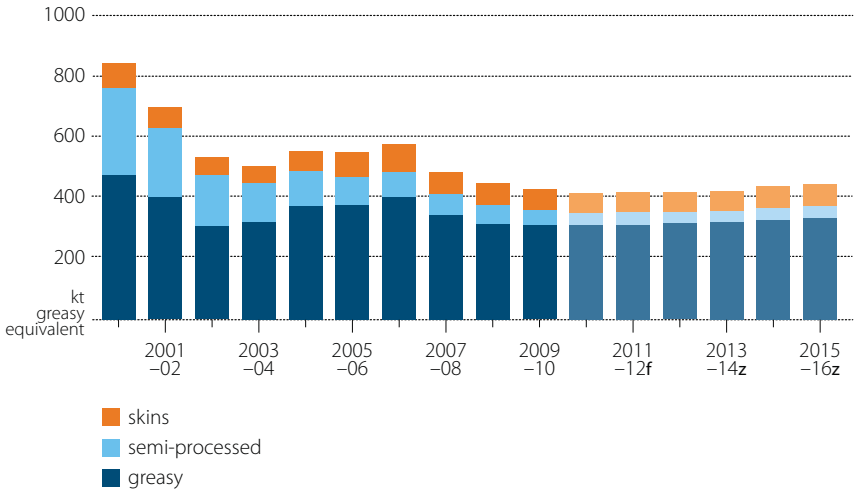
Wool exports to grow over the medium term

Despite a 3 per cent decline in the volume of exports, earnings from wool exports are estimated to rise by 9 per cent in 2010–11, reflecting the effect of higher prices. Total shipments of wool exports from Australia are forecast to increase by around 1 per cent in 2011–12. This, combined with higher export unit values, is forecast to lead to wool export values increasing by around 4 per cent in 2011–12.

Over the medium term, the volume of wool exports is projected to increase to 446 000 tonnes by 2015–16, in line with rising wool production.

The increase in demand for Australian wool is expected to continue into 2011–12, leading to higher export unit values and a higher EMI. The export unit values are projected to peak around 2012–13, before declining gradually in real terms. Combined with the projected increase in export shipments, the value of Australian wool exports (in real terms) is projected to be just less than $2.6 billion in 2015–16, 5 per cent higher than in 2010–11.

Australian wool export volumes



Outlook for wool

	unit	2008 –09	2009 –10	2010 –11 f	2011 –12 f	2012 –13 z	2013 –14 z	2014 –15 z	2015 –16 z
Eastern market indicator (clean)									
– nominal	Ac/kg	794	872	1 000	1 051	1 091	1 107	1 112	1 117
– real **b**	Ac/kg	835	896	1 000	1 020	1 030	1 020	1 000	980
Sheep numbers **c**	million	73	68	68	69	70	71	72	73
Sheep shorn	million	86	80	76	77	78	79	80	82
Cut per head	kg	4.30	4.30	4.41	4.45	4.46	4.46	4.48	4.48
Wool production (greasy)									
– shorn	kt	371	342	335	342	347	353	360	367
– other **d**	kt	50	70	67	67	68	70	73	75
– total	kt	420	412	402	409	415	423	433	442
Wool exports (balance of payments basis)									
– volume (greasy equivalent)	kt	446	428	414	417	419	423	437	446
– nominal value	A$m	2 322	2 307	2 525	2 633	2 761	2 829	2 935	3 010
– real value **b**	A$m	2 443	2 372	2 525	2 555	2 608	2 607	2 639	2 640

b In 2010–11 Australian dollars. **c** At 30 June. **d** Includes wool on sheepskins, fellmongered and slipe wool. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; Australian Wool Exchange.

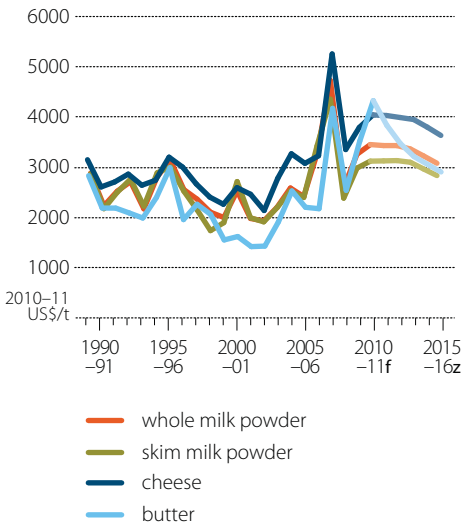
Dairy

Outlook to 2015–16

David Barrett

World dairy product prices were supported in the first half of 2010–11 by strong import demand, particularly from the Russian Federation and China. Although European Union and United States milk production increased in the second half of 2010, production in New Zealand and Australia was constrained by adverse weather conditions over the same period.

World dairy prices



World dairy prices to remain firm in 2011–12

World prices for most dairy products are forecast to remain firm through 2011–12. The forecast strong market is expected to reflect sustained import demand, particularly from China, the Russian Federation, the Middle East and developing Asia, and limited milk production increases in key exporting countries.

Medium-term outlook for world dairy prices

The demand for dairy products is expected to continue to grow over the medium term in line with further expected increases in consumer incomes in developing countries. However, toward the end of the outlook period, increases in world export supplies are expected to outpace the growth in import demand, resulting in world dairy prices falling in real terms. Nevertheless, world dairy products prices are projected to average around 30–40 per cent higher, in real terms, over the outlook period compared with the average prices over the five years to 2006–07.

World dairy product supplies to increase

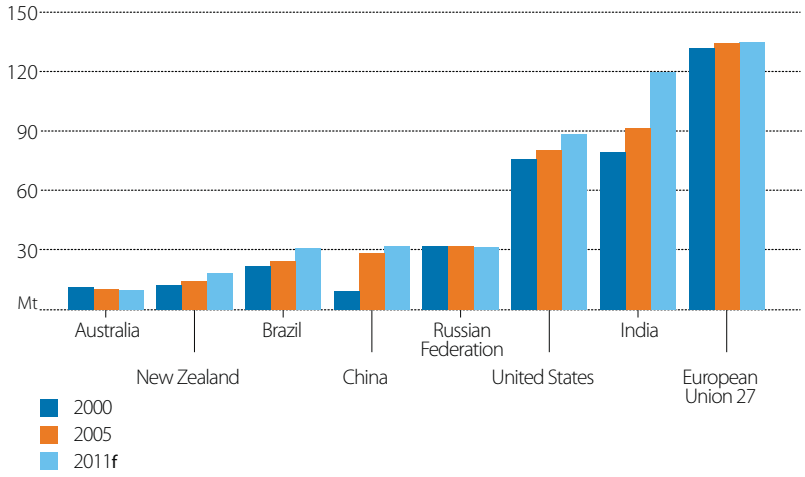
Global milk production is forecast to rise in 2011–12 as production expands in most of the major producing countries, particularly those in Asia, Europe and North America. However, forecast relatively high feed grain prices are likely to constrain growth in milk production, at least in the short term.

The expansion in EU milk production, which began in the 2010–11 marketing year (April to March) as a result of higher farmgate prices, is expected to continue in 2011–12. Most of the increase in milk production is expected in Germany, France, the Netherlands and the United Kingdom and is likely to be used for cheese manufacturing to meet export demand.

US milk output is forecast to increase by 1.8 per cent in 2011 to a record 88.9 million tonnes. Although milk prices in 2011 are forecast to remain close to the relatively high average prices in 2010, forecast higher feed costs are expected to constrain the increase in milk output by dampening the incentive of high prices to expand cow numbers and milk yields.

Adverse seasonal conditions constrained the growth in New Zealand milk production in 2010–11, but production is forecast to increase by around 2–3 per cent in 2011–12 in response to continuing relatively high farmgate milk prices. The New Zealand dairy herd is forecast to increase by 2 per cent to around 4.8 million head by 30 June 2011.

Milk production



Note: India includes buffalo milk.

Traditional dairy exporters to expand production

Over the medium term, global milk production is forecast to increase in the traditional dairy exporting countries as well as in the emerging countries of South America and Asia, particularly China and India.

In the European Union, milk production is projected to increase through to 2014–15 but to remain below quota. Quotas are due to be removed on 1 April 2015. The EU milk quota is set to rise by 1 per cent each marketing year through to 2015–16. In 2009–10, milk production in the European Union was around 7 per cent below the overall milk quota.

While EU farmgate prices for milk are expected to remain favourable over the next two to three years, a number of factors are likely to constrain the growth in EU milk output. Feed grain prices are projected to remain relatively high over this period, which is expected to increase the costs of intensive dairy farm operations. Furthermore, ongoing costs associated with meeting environmental regulations are likely to add to dairy farmers' costs of production. Over the medium term, milk production is forecast to rise in the Netherlands, Germany and France but continue to decline in Romania and Bulgaria, where dairying costs are higher.

As shown in 2010, the US dairy industry has the capacity to respond relatively quickly to favourable economic signals by increasing milk production. Over the medium term, US milk production is forecast to increase further as a result of projected favourable milk prices. However, similar to the situation in the European Union, expected continuing high feed grain prices over the next couple of years are likely to constrain the growth in US production. The prospect of lower feed grain prices in the second half of the outlook period is expected to improve dairying profitability, leading to stronger gains in milk production.

Given the relatively favourable price outlook, New Zealand milk production is projected to increase by around 2 per cent a year over the medium term. While milk yields are projected to rise over this period, there are also expected to be further conversions of beef and sheep farms to dairying in the South Island, which reflects the higher profitability of dairying compared with beef and sheep meat production. Most of the recent expansion in the national dairy herd has occurred in the South Island, which now accounts for around one-third of New Zealand's dairy herd. It is expected that the increased New Zealand milk production will be exported as dairy products such as whole milk powder, given the limited opportunities for expanding sales in its domestic market.

Milk production in Brazil is expected to increase over the medium term, as there is considerable scope to further increase productivity in the dairy sector. It is expected that nearly all the growth in Brazilian milk production will be used to satisfy a forecast rise in domestic demand. As a result, Brazil is expected to remain a small exporter of milk powders and condensed milk over the medium term.

Following recent investments in Argentina's dairy industry, milk production in that country is projected to continue to rise in the medium term. Higher milk production is expected to result in increased Argentine exports of milk powders. In 2011, Argentina's exports of whole milk powder are forecast to rise by 18 per cent to around 200 000 tonnes.

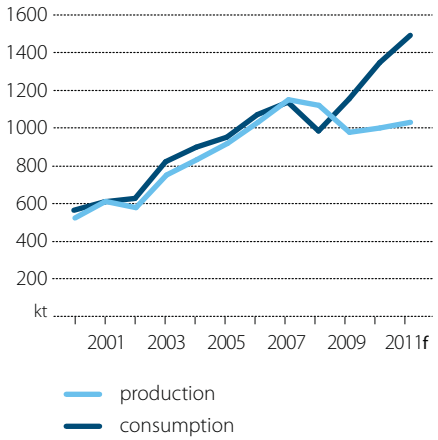
Global trade in dairy products to grow

Over the medium term continuing economic growth in the major dairy importing regions is expected to underpin demand and lead to increased trade in dairy products. In particular, increased import demand for dairy products is expected in the developing countries of Asia, North Africa and the Middle East. The rise in demand is expected to be driven by growth in per person incomes and an increase in the share of dairy products in diets. With limited scope to significantly increase domestic production in most developing countries, much of the expected increase in dairy product demand is likely to be met through higher imports.

Chinese import demand underpins global dairy trade

Chinese imports of whole milk powder have increased significantly since 2009 and are forecast to reach around 400 000 tonnes in 2011, around 25 per cent of global trade. Chinese imports of skim milk powder have also risen and are forecast to reach 100 000 tonnes in 2011. The increase in China's imports of milk powders reflects a sharp fall in Chinese milk production and consumers' concerns about the safety of domestically produced product following the melamine scare in 2008.

Whole milk powder production and consumption in China



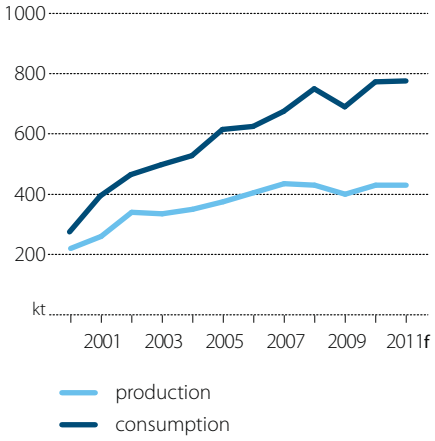
While the consumption of milk and dairy products in China has risen dramatically over the past 15 years, there is potential for further strong gains in consumption in China over the medium term and beyond. China's consumption of dairy products is still relatively low compared with consumption in other developed Asian countries, such as the Republic of Korea and Japan. Per person consumption of milk in Chinese urban areas was 14.91 kilograms in 2009 compared with 4.62 kilograms in 1995. Per person consumption of milk and processed dairy products is much lower in rural areas at 3.6 kilograms in 2009, although it had increased from an average of 0.6 kilograms in 1995.

Factors behind the recent growth in Chinese consumption of dairy products include higher disposable incomes, increasing health consciousness among the growing middle class and expanding retail outlets.

Although the growth in milk production in China was significant for much of the past decade, it has slowed considerably following the melamine scare in 2008. Nevertheless, China has the potential to further expand production over the medium term by increasing cow numbers and herd productivity. Despite this growth potential, it is unlikely that growth in domestic demand for milk and dairy products can be met by domestic production over the short to medium term.

Over the outlook period, China will continue to import significant quantities of milk powders. Given the size of the Chinese import market for milk powders, this development is likely to provide considerable support for world dairy product prices.

Cheese production and consumption in the Russian Federation



Large imports of dairy products by the Russian Federation

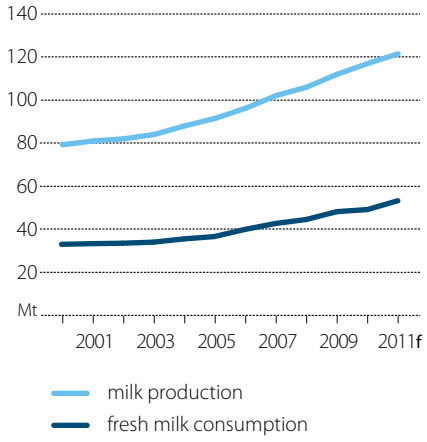
The Russian Federation is a large global importer of butter, cheese and milk powders. Imports of cheese by the Russian Federation increased by 20 per cent in 2010 to 365 000 tonnes while milk powders rose by 70 per cent to 240 000 tonnes, reflecting firm demand and lower domestic production. In 2010 milk production was adversely affected by a severe drought which resulted in farmers culling herds as domestic feed supplies in the Russian Federation were reduced considerably.

While dairy cow numbers in the Russian Federation are forecast to decline further in 2011, the national herd is expected to increase over the medium term. In

recent years the Russian government has introduced policies such as subsidised credit for the construction of new dairies to increase milk production.

Per person consumption of cheese in the Russian Federation is well below many Western European countries, and further growth in per person incomes is projected to lead to a rise in per person consumption of cheese over the medium term. Overall, the volume of dairy product imports in the Russian Federation is expected to remain largely unchanged over the next few years and could even contract slightly as domestic milk production recovers from the drought of 2010.

Milk production and consumption in India



Growth in Indian demand for milk and dairy products

Traditionally India has been self-sufficient in milk and dairy products, exporting small quantities of butter, skim milk powder and casein since the early 2000s. Relatively high import tariffs on a range of dairy products have protected the domestic dairy industry. However, domestic supply did not keep pace with demand in 2009 and this led to the import of 22 000 tonnes of butter and butter oil. In 2010, with slow growth in milk production, the government allowed the duty-free import of up to 30 000 tonnes of milk powder and 15 000 tonnes of butterfat.

Over the medium term the consumption of milk and dairy products in India is expected to grow strongly in response to population growth, higher household incomes and a strong preference for liquid milk as a protein source. The preference for liquid milk reflects its cultural significance as well as the tradition of vegetarianism. Despite higher milk prices in recent years, per person consumption of milk in India has continued to increase.

To maintain self-sufficiency in dairy products, milk production in India will need to keep pace with the growth in Indian demand for milk and dairy products. Indian milk production has been increasing by around 4 per cent a year since 2000 and is forecast to reach 121.5 million tonnes in 2011. While Indian milk yields are well below those achieved in the developed economies, production costs are very low with animal feeding relying on crop residues. In 2010, the Indian government developed a national dairy plan by which it intends to double the country's milk production by 2020. Such an outcome will depend on increasing milk productivity through the import of animal genetics to improve the dairy herd as well as improving feed quality. Overall, it is expected that India will remain largely self-sufficient in milk and dairy products over the medium term.

Prospects for key dairy products

Cheese market

Japan and the Russian Federation, which accounted for nearly 40 per cent of global cheese imports in 2010, are expected to remain the dominant importers of cheese over the medium term. In contrast, US cheese imports are expected to decline as a result of forecast higher domestic production and a relatively weak US dollar. The demand for cheese in the Republic of Korea, Mexico, South-East Asia, the Middle East and North Africa is expected to increase in response to higher disposable incomes and changing dietary patterns that include a greater share of livestock products.

Japanese imports of cheese are forecast to rise slightly to around 210 000 tonnes in 2011. In 2010, Australian and New Zealand cheese exports to Japan faced increased competition from US exports following depreciation of the US dollar relative to the Australian and New Zealand currencies.

Over the medium term, although domestic milk production in Japan is forecast to decline, an anticipated fall in fresh milk consumption is likely to result in more milk being diverted to the production of processed dairy products, such as cheese. Consequently, the prospect of higher domestic cheese production is expected to constrain the growth in Japanese cheese imports over the projection period.

Imports of cheese by the Republic of Korea are forecast to increase by 10 per cent to around 64 000 tonnes in 2011, reflecting continuing strong growth in domestic demand. Further growth in Korean consumption of cheese is expected over the medium term as consumers increasingly adapt to Western style foods, such as pizza and pastas.

World cheese prices are forecast to increase by around 1 per cent to US$4100 a tonne in 2011–12, following an expected rise of 8 per cent in 2010–11. Over the medium term, world cheese prices are projected to fall slightly in real terms until 2013–14, then decline more sharply to US$3632 a tonne (in 2010–11 US dollars) toward the end of the projection period.

Butter market

World butter prices are forecast to decline by 10 per cent in 2011–12 to US$3900 a tonne, following an expected increase of 24 per cent in 2010–11. Manufacturers are expected to increase butter production in response to relatively higher butter prices compared with other dairy products. If higher prices persist for a prolonged period, the end users, especially in the food processing sector, are expected to reduce their demand by reducing the butter fat content or substituting cheaper alternatives, such as vegetable oils, in their food products, placing downward pressure on prices.

Over the medium term world butter prices are projected to decline, in real terms, reaching US$2905 a tonne by 2015–16, partly reflecting higher supplies in the major exporting countries.

Milk powders market

Global trade in milk powders is expected to be underpinned by growing import demand from China, South East Asia and the emerging economies of the Middle East and North Africa.

New Zealand and the European Union are the dominant exporters of whole milk powder, with smaller volumes being supplied from Argentina and Australia. Most of the projected increase in import demand for whole milk powder is expected to be met by a further expansion in New Zealand exports. In recent years manufacturing milk in the European Union has been diverted from whole milk powder production to cheese production. It is likely that this trend will continue over the next two to three years. These developments are expected to provide strong support to milk powder prices over the medium term.

World whole milk powder prices are forecast to remain relatively high over the next three years. Increased milk supplies in the major exporting countries toward the end of the projection period are expected to lead to lower real prices by 2015–16.

South-East Asia is an important market for Australian milk powder exports but Australian exporters are expected to face increased competition from the United States over the medium term. In the two years to 2010, the United States increased its exports of skim milk powder to 152 000 tonnes a year. The South-East Asian market now accounts for around 40 per cent of US exports of milk powder.

World skim milk powder prices are forecast to rise in real terms over the next three years. Toward the end of the outlook period, however, increased world exports, particular from the United States and New Zealand, are expected to lead to downward pressure on prices. While EU intervention stocks of skim milk powder were around 195 000 tonnes at the end of 2010, a large share of these stocks will be distributed within the European Union by charitable organisations to persons in need.

Prospects for the Australian dairy industry

While world dairy product prices are forecast to increase slightly in 2011–12, returns to Australian dairy exporters are expected to be offset, to some extent, by an assumed high Australian dollar.

The Australian average farmgate price for milk is forecast to average 38.8 cents a litre in 2011–12, around 1 per cent higher than the forecast average farmgate milk price in 2010–11. Farmgate prices for milk are projected to fall slightly over the outlook period and to reach 34.7 cents per litre (in 2010–11 dollars) in 2015–16, reflecting weaker international dairy prices towards the end of the outlook period.

Australian milk production to increase over the medium term

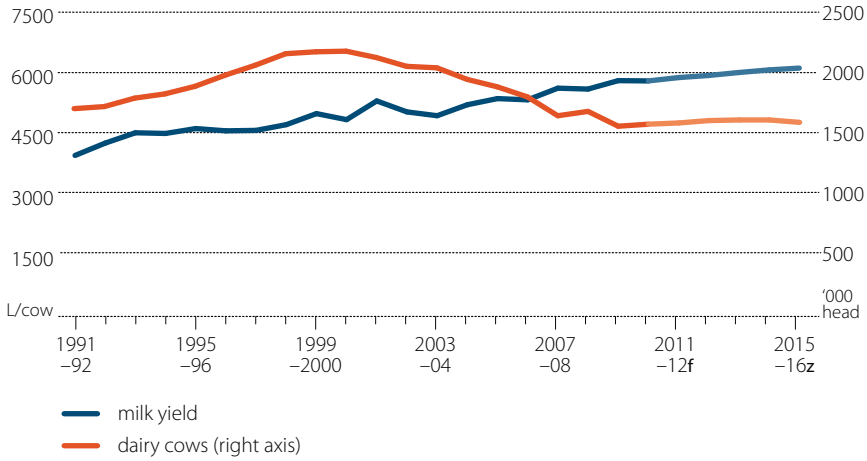
Although some dairying regions in Australia were affected by floods in early 2011, the overall impact on national milk production was minimal. Australian milk production is forecast to increase by 1 per cent to 9.11 billion litres in 2010–11, before rising again by 2.1 per cent to 9.30 billion litres in 2011–12. The forecast increases mainly reflect the effect of improved water availability in the main dairying regions.

Over the medium term, milk production is projected to rise gradually to reach a peak of 9.75 billion litres in 2014–15, driven largely by productivity increases.

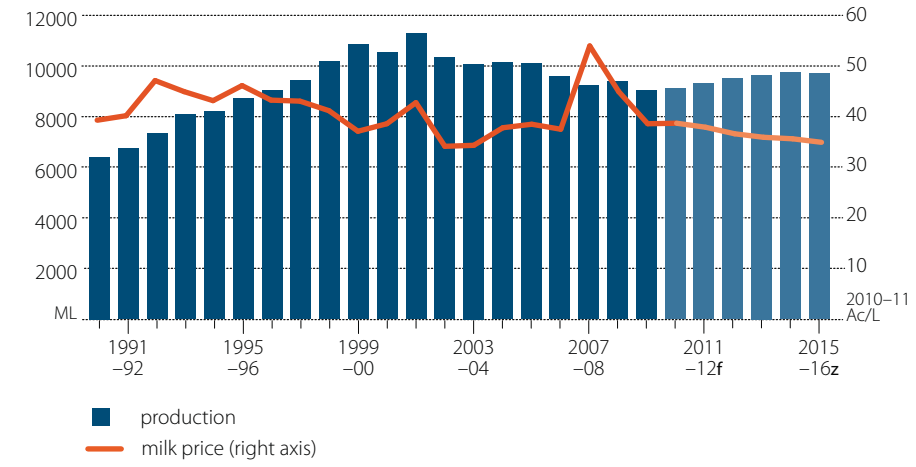
Over the 10 years to 2009–10, annual milk yields in Australia increased by 20 per cent to reach 5810 litres a cow. The rise in yields has been driven by improved herd genetics as well as advances in pasture management and increased feeding of grains and forage crops. It is expected that these trends will continue over the medium term, with milk yields projected to reach 6120 litres a cow by 2015–16.

Australian dairy cow numbers are projected to rise slightly over the outlook period to reach 1.61 million head by 2013–14, reflecting favourable returns to dairying and an assumption of improved seasonal conditions and availability of irrigation water.

Australian dairy cows and milk yield



Australian milk production and price



Over the 10 year period to 2009–10, reduced water availability for irrigation farms in northern Victoria and southern New South Wales led dairy farmers in these regions to reduce their cow herds and adopt management strategies to cope with the variable seasonal conditions.

Given the increase in water levels in the main irrigation dams during 2010 and early 2011, and assuming favourable seasonal conditions, water allocations for irrigation are likely to be well above those of recent years for at least the next two to three years. Consequently, dairy farmers in the irrigation areas of northern Victoria and southern New South Wales are likely to rely less on purchased feeds. Nevertheless, variability in seasonal conditions will continue to be a key issue for the Australian dairy industry over the medium to longer term.

Australian dairy exports to decline

The value of Australian dairy exports is forecast to decrease by 1 per cent to $2.2 billion in 2011–12, following a forecast rise of 8 per cent in 2010–11. Over the medium term the value of Australian dairy exports is projected to be around $2.0 billion (in 2010–11 dollars) in 2015–16, reflecting relatively lower projected world dairy product prices toward the end of the outlook period.

While Australian dairy manufacturers are expected to increase production of whole milk powder over the next few years in response to relatively strong export demand, cheese is expected to remain the predominant dairy product produced and exported. In recent years there has been a trend away from the production of cheddar cheeses to non-cheddar cheese types, reflecting changing demand in both domestic and export markets.

Supermarket price discounting for home brand milk

Around one-quarter of Australia's total milk production is consumed as market milk (drinking milk), with just over half of the volume being sold through major supermarkets. Other milk outlets include independent grocers, fast food outlets, corner stores and service stations.

Market milk processors are contracted by supermarkets to supply their generic branded milk (also known as 'home brand' milk), and contracts usually run for two to three years. Contracted processors' own branded products ('branded milk') are also sold by supermarkets. Home brand milk and branded milk are not identical—with branded milk having a wider range of products that are differentiated on fat, protein and calcium content—but there is likely to be a high degree of substitution.

Sales of home brand milk have been increasing in recent years. In 2009–10, home brand milk accounted for around half of the supermarket milk sales and around 7 per cent of overall milk produced. Home brand milk is normally sold at a discount compared with branded milk but some consumers continue to purchase branded milk, which suggests that they recognise some level of difference for which they are willing to pay a premium.

Since late January 2011, the major supermarket chains have reduced the retail price for their home brand fresh milk to $1 a litre, well below prices for branded milk. For example, Coles Brand 2 litre milk (full cream) was reduced from $2.47 a container to $2. In comparison, the price of a particular branded milk (full cream) at a major supermarket is currently $3.89 for a 2 litre container. Despite the reduced price of the home brand milk, the major supermarkets have pledged not to reduce the contract price to the processors for this milk.

continued...

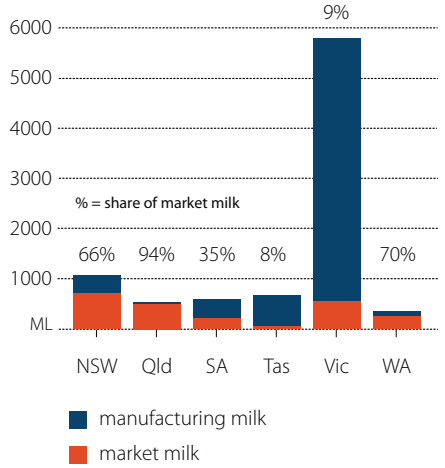
Supermarket price discounting for home brand milk continued

While it is too early to conclude the effect of this price discounting on consumption of milk, it is reasonable to expect that consumption of home brand milk will increase because of an increase in the quantity demanded for milk overall (due to the lower price) and substitution away from branded milk and toward home brand milk. Given that the consumer demand for milk is relatively price insensitive, it is unlikely that total milk consumption will increase significantly in response to the decline in the price of home brand milk, especially in the short term. However, it would be expected that consumers will substitute, at least to some extent, home brand milk for branded milk, and that consumption of branded milk would consequently decline. The degree of substitution will depend on the level of differentiation consumers perceive between the products and the additional price they are willing to pay for the attributes of branded milk.

In response to increased competition caused by the lowering of prices of branded milk, there is a possibility that processors could reduce branded milk prices in supermarkets and other retail outlets in order to protect their market share. Whether this will occur will depend on the difference in processors' profit margins on home brand milk and branded milk (under the assumption that the supermarkets will not reduce the contract price of home brand milk). There are three possibilities.

1. If the processors' profit margins are similar for these two categories of milk, the processors will simply increase the supplies of home brand milk and reduce branded milk supplies as long as the contract price for home brand milk is not reduced. Under this scenario, the prices for branded milk are unlikely to change, and little of the impact is expected to spill over to the price of milk at the farm gate.
2. If the processors' profit margins for branded milk are higher than for home brand milk, the reduction in sales of branded milk will lead to a decline in the processors' overall profits. In response, the processors could maintain market share by lowering retail prices and seek to pass this on by reducing the milk price offered to farmers. This could also apply to processors not supplying home brand milk.
3. If the processors' profit margins for branded milk are lower than for home brand milk, the prices for branded milk are unlikely to change, profits may increase because of higher sales of branded milk (and assuming that supermarkets maintain contract prices to processors) and some of this increased profit may be passed back to farmers in higher prices. However, it is unlikely that processor profit margins are higher for home brand milk.

Share of market and manufacturing milk, 2009–10



Uncertainty in the current situation also exists in terms of how long supermarkets will maintain the lower prices for home brand milk and, if they are maintained over a long period, whether the major supermarkets will maintain their commitment to the contract price for home brand milk. If the contract price falls, it can be expected that the processors will seek to pass on the lower price to dairy farmers.

continued...

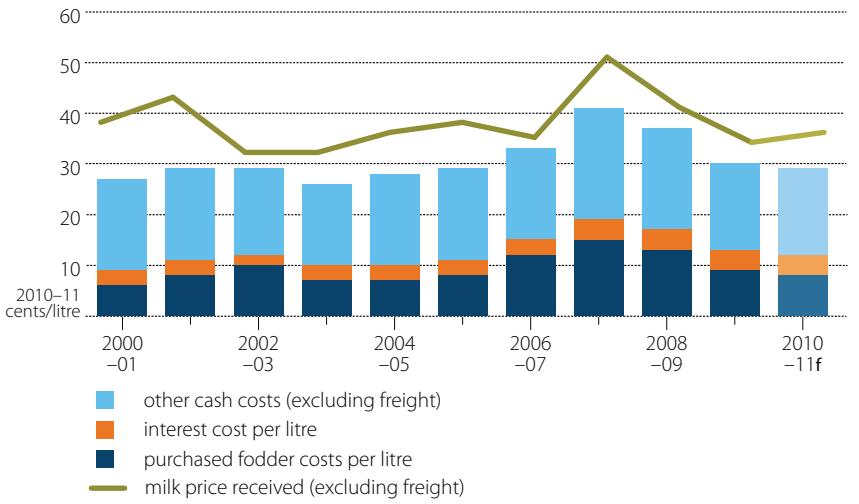
Supermarket price discounting for home brand milk continued

Should the processors seek to offer a lower price to farmers for market milk, the extent of the price reduction could vary between regions. In south-eastern Australia (especially Victoria, southern New South Wales, Tasmania and South Australia), the milk price paid by manufacturers for the export of dairy products sets a floor to the extent to which market milk price at the farm gate can fall.

In Victoria and Tasmania, where around 90 per cent of milk is used in manufacturing dairy products, the price paid to farmers for market milk will be closely linked to the price received by farmers for selling milk to dairy product manufacturers. Market milk processors will not be able to pay dairy farmers less than the price being offered by major dairy product manufacturers. Around 60 per cent of manufactured milk is exported in the form of processed products and so the price is determined largely by developments in the world market, rather than domestically.

According to ABARES farm surveys, the farmgate milk price in Victoria is expected to average around 36 cents a litre in 2010–11.

Average milk prices and farm cash costs per farm, Victoria



In northern New South Wales and Queensland, a very high proportion of milk production is used in the market milk sector. The average farmgate milk price in these regions is generally higher than that received by dairy farmers in the regions of south-eastern Australia (estimated at around 46 cents a litre in 2010–11). To a large extent, the farmgate milk price differentials reflect different farm costs for milk production and the cost of transporting milk between regions. In particular, the highest differential payable would reflect the transport costs of buying lower priced milk from the south plus any premium that may be required to secure a contract with dairy farmers in those regions.

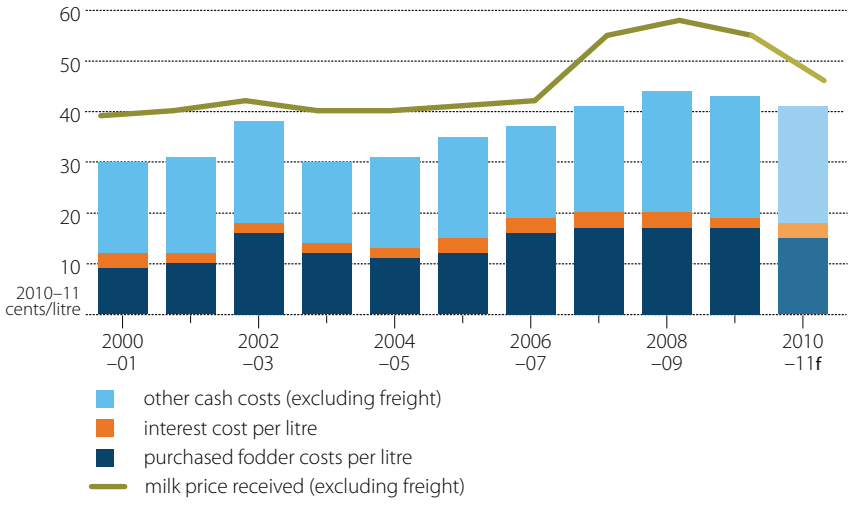
continued...

Supermarket price discounting for home brand milk continued

Should the processors attempt to lower milk prices to farmers in northern New South Wales and Queensland as a result of supermarket discounting, the lowest that the price could be reduced to, while still maintaining farmer viability in the short run, would be the cash costs of production—currently estimated to average around 40c a litre per farm in this region. Maintenance of farm production in the region in the long run would also need to cover farmers' depreciation costs, family labour cost and profit margin. Adding the first two costs would increase the estimated average cost of production to around 50c a litre, leaving no margin for price reductions without affecting average farm viability in the long term.

In Western Australia, a high proportion of sales of milk to the domestic market (around 70 per cent in 2009–10) and higher farmgate milk prices compared with south eastern Australia would suggest a similar situation as that for northern New South Wales and Queensland.

Average milk prices and farm cash costs per farm, Northern New South Wales and Queensland



Outlook for dairy

	unit	2008 –09	2009 –10	2010 –11 f	2011 –12 f	2012 –13 z	2013 –14 z	2014 –15 z	2015 –16 z
World									
Indicative price									
Butter									
– nominal	US$/t	2 485	3 477	4 325	3 900	3 600	3 400	3 300	3 200
– real **b**	US$/t	2 539	3 517	4 325	3 833	3 469	3 212	3 056	2 905
Skim milk powder									
– nominal	US$/t	2 333	2 948	3 120	3 180	3 250	3 280	3 200	3 120
– real **b**	US$/t	2 383	2 982	3 120	3 125	3 131	3 098	2 964	2 833
Cheese									
– nominal	US$/t	3 281	3 748	4 040	4 100	4 140	4 180	4 100	4 000
– real **b**	US$/t	3 351	3 791	4 040	4 029	3 989	3 949	3 797	3 632
Australia									
Cow numbers **c**	'000	1 676	1 553	1 570	1 580	1 600	1 605	1 605	1 585
Yield per cow	L	5 602	5 810	5 803	5 886	5 938	6 011	6 075	6 120
Production									
Total milk	ML	9 388	9 023	9 110	9 300	9 500	9 650	9 750	9 700
– Market sales	ML	2 229	2 269	2 300	2 333	2 371	2 410	2 450	2 492
– Manufacturing	ML	7 159	6 754	6 810	6 967	7 129	7 240	7 300	7 208
Butter **d**	kt	148	128	122	125	121	120	121	119
Cheese	kt	342	349	348	353	361	370	377	375
Skim milk powder	kt	212	190	191	196	189	187	190	186
Wholemilk powder	kt	148	126	137	139	143	144	143	141
Farmgate milk price **e**									
– nominal	Ac/L	42.5	37.3	38.5	38.8	38.5	38.8	39.4	39.5
– real **g**	Ac/L	44.7	38.4	38.5	37.7	36.4	35.7	35.4	34.7
Export volume									
Butter **c**	kt	70	74	62	62	58	56	54	52
Cheese	kt	146	168	164	167	174	180	184	178
Skim milk powder	kt	162	126	130	137	128	125	129	127
Wholemilk powder	kt	116	91	102	107	110	111	109	106
Export value									
– nominal	A$m	2 679	2 066	2 240	2 220	2 221	2 294	2 308	2 276
– real **g**	A$m	2 819	2 125	2 240	2 154	2 097	2 114	2 075	1 996

b In 2010–11 US dollars. **c** At 30 June. **d** Includes the butter equivalent of butteroil, butter concentrate, ghee and dry butterfat. **e** Includes freight from farm gate to processor in some states. **g** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; Dairy Australia.

Farm performance: broadacre and dairy farms – 2008–09 to 2010–11

Peter Martin and Paul Phillips

- The average financial performance of Australian broadacre farms is projected to improve markedly in 2010–11. At the national level, average farm cash income for broadacre farms is projected to increase from $58 900 a farm in 2009–10 to $82 000 a farm in 2010–11.
- Farm cash incomes are projected to increase in all eastern states because of increased crop and livestock production and higher prices for broadacre commodities. The largest projected increase in farm cash income is in South Australia, driven in part by record winter crop production.
- In contrast, reduced farm cash incomes are expected for broadacre farms in Western Australia as a consequence of severe drought in southern Western Australia.
- High rainfall and flooding in some areas damaged fences, roads, irrigation structures and farm buildings and are expected to result in increased expenditure on repairs.
- Abundant pasture growth and higher sheep, lamb and wool prices have increased farm cash incomes for sheep farms. Farm cash income for sheep industry farms are projected to average $80 000 a farm, the highest farm cash income recorded since 1989–90, in real terms.
- Farm cash income is projected to improve for dairy farms in southern regions in 2010–11 in response to a small increase in milk prices and increases in on-farm fodder production.
- Overall, broadacre and dairy farms had strong farm equity at 30 June 2010 and new investment in machinery, vehicles, plant and improvements was the highest recorded in more than 20 years in 2008–09 and 2009–10.

The financial performance of broadacre farms in eastern Australia is expected to improve in 2010–11, according to estimates for broadacre farms in the ABARES Australian agricultural and grazing industries survey.

Well above average rainfall across most of eastern and northern Australia, accompanied by higher prices for most broadacre commodities, are projected to result in average farm cash incomes in 2010–11 being the highest recorded in real terms since 2004–05. For broadacre farms, farm cash income is projected to increase to average $82 000 a farm in 2010–11, and for dairy farms, farm cash income is projected to increase to average $100 000 a farm.

However, extremely wet conditions in the eastern states and drought in southern Western Australia have resulted in wide variations in the financial performance of farms across states and industries.

In the eastern states, the combination of increased crop production, excellent pasture growth allowing increased livestock production, and higher prices for grains, sheep, lamb, wool and beef cattle is expected to result in increases in average farm cash incomes in 2010–11. Farm cash incomes projected for the eastern states in 2010–11 would have been higher were it not for the substantial reductions in grain quality as a result of the effect on winter crops of high and untimely rainfall at harvest, particularly in Queensland, New South Wales and Victoria. These reductions have been taken into account in ABARES forecasts.

Improvement in broadacre farm financial performance is projected for all states except Western Australia in 2010–11. Crop and livestock production in Western Australia has been sharply reduced by drought conditions and, despite higher commodity prices, farm cash incomes are projected to decline in that state in 2010–11.

Farm cash incomes for sheep farms are projected to improve in 2010–11 and to be the highest recorded since 1989–90, in real terms. Higher wool, sheep and lamb prices are expected to be the main drivers of this increase in farm cash income, given production remains constrained by low sheep numbers.

Financial performance of Australian farms

Broadacre and dairy farms account for 68 per cent of commercial-scale Australian farm businesses (ABS 2009). These farms are also responsible for the management of more than 90 per cent of the total area of agricultural land in Australia and account for the majority of Australia's family owned and operated farms. Located in all regions across Australia, these farms form a vital part of rural communities and local economies.

Each year ABARES interviews the operators of around 1600 broadacre farm businesses in its Australian agricultural and grazing industries survey (AAGIS) and 300 dairy farm businesses in the Australian dairy industry survey (ADIS), as part of its annual farm survey program. The AAGIS is targeted at commercial-scale broadacre farms—farms that grow grains or oilseeds, or run sheep or beef cattle and that have an estimated value of agricultural output exceeding $40 000. Broadacre industries covered in this survey include: wheat and other crops; mixed livestock–crops; sheep; beef and sheep–beef industries (box 1). The ADIS is targeted at commercial-scale milk producing farms.

The information collected provides a basis for analysing the current financial position of farmers in these industries and the expected changes in the short term. Data from the AAGIS and ADIS have been analysed to gain insights into the performance of Australian broadacre and dairy farms over the period from 2008–09, including projected farm financial performance in 2010–11 (table 1).

ABARES uses the latest data available in producing estimates from its surveys. This means that estimates are revised as new information becomes available. Preliminary estimates previously published are recalculated to reflect updated benchmark information obtained from the Australian Bureau of Statistics (ABS).

The 2010–11 projections are based on data initially collected in October and November 2010. Additional data was collected from all specialist cropping farms in the eastern states in early February 2011 to account for the effect on farm production, receipts and cash costs of high rainfall and flooding between November 2010 and February 2011.

box 1 **The broadacre sector of Australian agriculture is defined to include five industry types**

Wheat and other crops industry: representing the more specialised producers of cereal grains, coarse grains, pulses and oilseeds.

Mixed livestock–crops industry: representing those farms engaged in the production of sheep and/or beef cattle in conjunction with substantial activity in broadacre crops such as wheat, coarse grains, oilseeds and pulses.

Sheep industry: representing the more specialised producers of sheep and wool. Currently, sheep industry farms account for only 30 per cent of Australia's wool production. The majority of both wool and sheep meat production occurs on mixed enterprise farms, particularly on mixed livestock–crops industry farms.

Beef industry: representing properties engaged mainly in running beef cattle and which currently accounts for around 65 per cent of Australia's beef production. The beef industry contains a large number of small farms.

Sheep–beef industry: representing properties engaged in running sheep and beef cattle. As for the sheep and beef industries, this industry also contains a large number of small farms.

Farm production

2009–10

The total area sown to winter grain, oilseed and pulse crops increased in 2009–10 compared with the area planted in 2008–09. Wheat and canola area expanded as the area planted to barley was reduced.

However, yields in the major cropping regions of South Australia and Victoria were much higher than in 2008–09 as a result of above average rainfall through spring. Total winter crop production increased by 50 per cent in Victoria and by 45 per cent in South Australia. In contrast, winter crop production in Queensland and New South Wales was reduced by 20 and 30 per cent, respectively, because of dry seasonal conditions through spring. In Western Australia a dry finish to the season, particularly in the southern wheat belt, reduced yields and overall winter crop production was reduced by around 6 per cent relative to 2008–09.

Overall, total winter crop production on Australian broadacre farms increased by around 3 per cent in 2009–10 compared with 2008–09, with wheat production estimated to be around 2 per cent higher, barley production around 1 per cent lower and canola production 1 per cent higher.

Low rainfall in early summer in northern New South Wales and Queensland, combined with a reduction in the area available for summer crops because of large winter crop plantings, led to

a reduction in the area of grain sorghum in 2009–10. Late autumn rain delayed the harvest and total grain sorghum production was reduced by 40 per cent compared with 2008–09.

Low availability of irrigation water continued to severely constrain the area planted to rice and cotton. A small increase in the availability of irrigation water in the Murray–Darling and Murrumbidgee catchment areas led to an increase in the area planted to rice in 2009, but the area planted remained well below the long-term average. Similarly, cotton plantings on broadacre farms increased in 2009–10 but planted area remained well below longer term averages.

The late spring rains in 2009 in Victoria and South Australia boosted pasture growth and encouraged many farmers in these states to hold onto sheep and beef cattle. In contrast, spring in 2009 was extremely dry across northern and eastern Australia and remained dry until late summer when above average rainfall was received across most of northern Australia, extending into New South Wales. Grazing conditions across northern and eastern Australia improved and led to a reduction in cattle turn-off as farms retained stock and commenced herd and flock rebuilding.

Despite some improvement in seasonal conditions and increased availability of irrigation water, low farmgate prices for milk in southern regions led to farms reducing milk production in Victoria, Tasmania and South Australia in 2009–10. Between 2002–03 and 2009–10, milk production in the irrigation areas of northern Victoria and southern New South Wales declined markedly as a result of drought and low water allocations in the Murray–Darling irrigation system. With better rainfall in catchment areas in the spring of 2009, water allocations for 2009–10 improved, but still remained relatively low for many broadacre and dairy farms.

2010–11

The total area sown to winter grain, oilseed and pulse crops decreased by an estimated 4 per cent in 2010–11 compared with the area planted in 2009–10 because of relatively low prices at that time. The area planted to wheat is estimated to have been reduced by around 5 per cent and because of relatively low prices at the time the area planted to barley, canola and lupins also declined.

Good late summer rainfall in the eastern states was followed by widespread above average autumn rainfall, resulting in a strong start to the 2010–11 winter cropping season. Average to above average rainfall for July, August and September further boosted high winter crop yield expectations. In contrast, most cropping regions in Western Australia remained dry throughout winter, following on from a dry autumn and yield potential was low.

In the eastern states, the spring was the wettest on record and was followed by widespread heavy rainfall in December and January 2011, particularly in eastern Queensland, Western New South Wales and Victoria. Rain delayed the harvest, lowered the quality of grain harvested and resulting in crop losses through flooding and disease. Nevertheless, estimates of yields are near record in eastern states. Total winter crop production is estimated to be around 42.1 million tonnes, 19 per cent higher than 2009–10.

According to the February 2011 edition of the ABARES *Australian Crop Report, w*inter crop production in New South Wales is estimated to be almost double 2009–10 production; Victorian production is 34 per cent higher and South Australian production 38 per cent higher. In Queensland, where crop damage from rain and flooding has been most severe, total winter crop production is estimated to be around 2 per cent less than 2009–10 production. In Western Australia drought persisted throughout 2010 and total winter crop production is estimated to be around 40 per cent less than 2009–10 production.

A high proportion of the grain harvested in eastern states was downgraded in quality because of weather damage. For example, estimates provided by grain growers in the AAGIS survey in early February indicate that 50–60 per cent of wheat harvested in New South Wales and Victoria was feed grade, with a large proportion of growers reporting that almost their entire harvested tonnage was feed grade.

Well above average rainfall over spring and summer replenished irrigation dams and boosted soil moisture for summer crops. The total area planted to summer crops is estimated to have increased by around 70 per cent compared with 2009–10. The area planted to grain sorghum is forecast to increase by 23 per cent, despite plantings being restricted by continual rain in Central Queensland and the loss of some earlier planted areas. Yields are expected to be well above average. A large increase in cotton plantings is reported, with record production forecast for 2010–11. The area planted to rice is forecast to be more than four times last year's area and the largest area planted since 2005–06.

Well above average rainfall in eastern and northern Australia resulted in abundant pasture growth and has encouraged farmers in these areas to retain beef cattle and sheep and build herd and flock numbers. Lambing and calving rates are projected to rise, together with increasing sale weights for livestock and higher wool cut per head. Excess pasture has created strong demand for livestock from restockers and higher saleyard prices.

Despite improvement in grazing conditions and increased availability of irrigation water, milk production is forecast to increase by only around 1 per cent in 2010–11. A small increase is expected in Victoria and Tasmania, but lower production is forecast for most other states.

Farm receipts

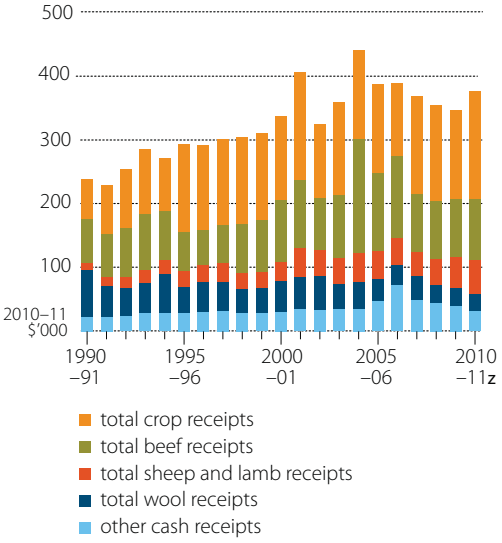
2009–10

In 2009–10, average crop receipts per farm fell 5 per cent compared with 2008–09, with increases in total crop production more than offset by lower grain, oilseed and pulse prices.

Higher saleyard prices for sheep and lambs, combined with an increase in numbers of sheep and lambs sold, resulted in an increase of around 13 per cent in average sheep and lamb receipts per farm.

Increases in wool prices resulted in average wool receipts per farm rising by 4 per cent in 2009–10, despite a reduction of around 4 per cent in wool sold per farm because of a further reduction in the number of sheep shorn and continued low wool cut per head resulting from dry seasonal conditions in 2009.

a Farm cash receipts, broadacre industries



Increases in the number of beef cattle sold by broadacre farms more than offset lower saleyard prices to result in a small increase in average beef cattle receipts per farm in 2009–10.

At the national level, average total cash receipts for broadacre farms fell by 2 per cent in 2009–10, with lower crop receipts more than offsetting increases in receipts from livestock and wool.

It should be noted that the change in number of livestock sold will differ from the change in slaughter numbers in the beef and sheep meat outlook sections of this publication. Sale numbers for broadacre farms include livestock sold to other farms. Transaction of livestock between farms typically accounts for around one-third of total broadacre cattle and sheep sale numbers and can be higher in years of high restocking activity such as 2009–10.

2010–11

Average total cash receipts for broadacre farms are projected to increase by 11 per cent nationally in 2010–11, with increased crop, sheep, lamb, wool and beef cattle receipts (figure a).

Despite low production in Western Australia, average crop receipts per farm are projected to increase around 10 per cent as a consequence of increased production of grains, oilseeds and pulses in eastern states.

A high proportion of wheat and barley harvested in the eastern states was downgraded in quality, resulting in lower prices than was received for higher quality grains, oilseeds and pulses. However, yields for harvested crops were high and total production of grains, oilseeds and pulses is estimated to have increased as a result. Increased production, in combination with an increase in price for milling-grade wheat, malting barley and high-quality oilseeds and pulses in 2010–11 compared with 2009–10, is projected to result in higher crop receipts in 2010–11.

Higher saleyard prices for sheep and lambs, combined with a small increase in numbers sold, is projected to result in an increase of around 12 per cent in average sheep and lamb receipts per farm.

Higher wool prices are projected to result in an increase in wool receipts of around 5 per cent despite a small reduction in wool sold per farm. Wool sold per farm is expected to fall slightly in spite of an expected increase in wool cut per head, because of a further reduction in the number of sheep expected to be shorn in 2010–11.

box 2 Major financial performance indicators

Farm cash income = total cash receipts – total cash costs

total cash receipts: total revenues received by the farm business during the financial year

total cash costs: payments made by the farm business for materials and services and for permanent and casual hired labour (excluding owner manager, partner and family labour)

Farm business profit = farm cash income + changes in trading stock – depreciation – imputed labour costs

Profit at full equity = farm business profit + rent + interest and finance lease payments – depreciation on leased items

(return produced by all the resources used in the farm business)

Rate of return = profit at full equity ÷ total opening capital x 100

(return to all capital used)

Off-farm income = wages off-farm + other business income + investment + social welfare payments

box 3 Farm survey methodology

ABARES surveys are designed, and samples selected, on the basis of a framework drawn from the Business Register maintained by the Australian Bureau of Statistics (ABS). This framework includes agricultural establishments in each statistical local area classified by size and major industry.

Data provided in this paper have been collected via on-farm interviews and incorporate detailed farm financial accounting information.

The estimates presented have been calculated by appropriately weighting the data collected from each sample farm. Sample weights are calculated so sample estimates of numbers of farms, areas of crops and numbers of livestock in various geographic regions and industries correspond as closely as possible to the most recently available ABS data as collected in its Agricultural Censuses and updated annually with data collected in Agricultural Commodity Surveys.

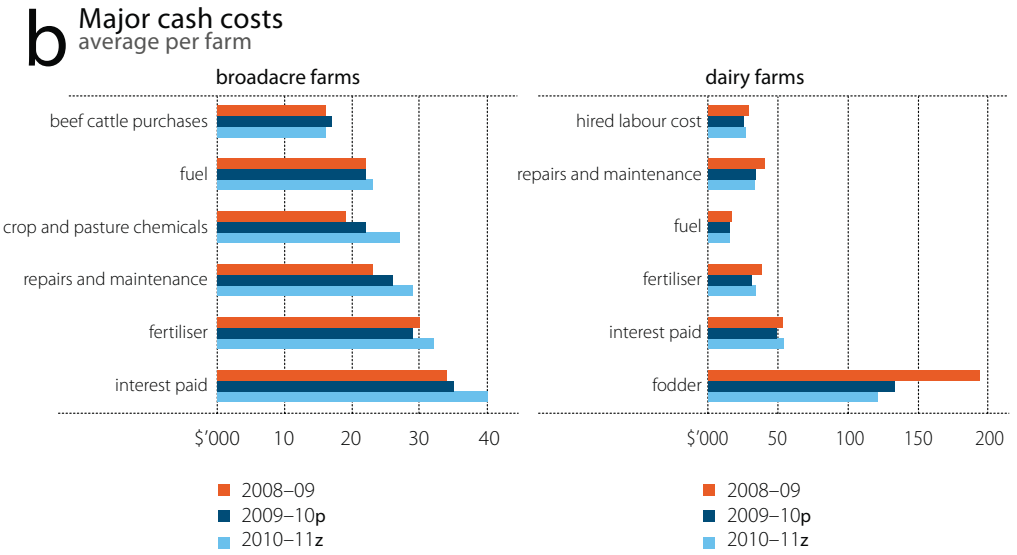
Estimates for 2008–09 and all earlier years are final. All data from farmers, including accounting information, have been reconciled. Final production and population information from the Australian Bureau of Statistics (ABS) has been included and no further change is expected in the estimates.

The 2009–10 estimates are preliminary based on full production and accounting information from farmers. However, editing and addition of sample farms may be undertaken and ABS production benchmarks may also change.

The 2010–11 projections are based on data collected via on-farm interviews and telephone interviews in the period October to December 2010. Data for eastern states cropping farms was updated by telephone in February 2011 to incorporate the effect of high-rainfall and flooding events over the summer of 2010–11. The estimates include crop and livestock production, receipts and expenditure up to the date of interview, together with expected production, receipts and expenditure for the remainder of the 2010–11 financial year. Modifications have been made to expected receipts and expenditure for the remainder of 2010–11 where significant price change has occurred post interview.

Higher saleyard prices are projected to result in increases in beef cattle receipts, despite a reduction in turn-off from broadacre farms of around 2 per cent in 2010–11.

Average total cash receipts for dairy farms are projected to increase by 5 per cent in 2010–11. For Victoria, receipts are projected to rise by around 7 per cent, with higher milk prices and a small increase in production. Total cash receipts are also projected to increase in Tasmania, South Australia and Western Australia. Lower milk prices are projected to reduce total cash receipts by 5 per cent in New South Wales and by slightly more in Queensland, where a reduction in milk production is also expected.



Farm costs

2009–10

For broadacre farms, average total cash costs increased 6 per cent in 2009–10, mainly as a result of increased expenditure on livestock purchases, crop and pasture chemicals, repairs and maintenance, contracts and hired labour. Interest payments also increased as rises in farm debt outweighed reductions in interest rates. The only item of farm expenditure to decline significantly was fodder, as a result of improved seasonal conditions in some regions combined with lower feed grain and hay prices. In addition, depreciation expense increased by 25 per cent because of high machinery, vehicles and farm structures expenditure in both 2008–09 and 2009–10.

Dairy industry total cash costs were reduced by 17 per cent in 2009–10, with reductions occurring in all categories of cash costs. Fodder expenditure was reduced by 36 per cent, with reductions in the quantity purchased and because of lower feed grain and hay prices. However, depreciation expense increased by 8 per cent as a result of increased expenditure on machinery, vehicles and farm structures in 2008–09 and 2009–10.

2010–11

For broadacre farms, average total cash costs are projected to increase by around 4 per cent in 2010–11, mainly as a result of increased expenditure involved in growing and harvesting the larger grain crop in the eastern states. Increases are projected in fertiliser, hired labour, contracting, harvesting, handling and freight costs. In addition, wetter seasonal conditions through summer in most regions are projected to result in increased expenditure on crop and pasture chemicals, while interest expenditure is expected to be higher because of increases in interest rates together with debt increases for some farms. Repairs and maintenance expenditure is expected to increase on farms with higher incomes, and large increases are expected on farms severely affected by flooding as farm infrastructure is repaired. These increases will be partially offset by a reduction in expenditure on fodder in eastern states and reduced expenditure on livestock purchases (mainly beef cattle) relative to the record high in 2009–10, largely because of the reduction in livestock offered for sale.

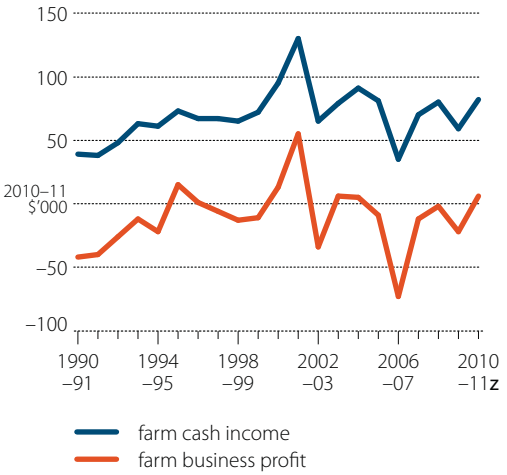
For dairy industry farms, fodder costs for farms in southern regions are expected to be lower as a result of reductions in the quantity of fodder purchased because of improved seasonal conditions and increased allocations of irrigation water. In contrast, fodder costs are projected to rise in Western Australia. Small increases are expected in most other categories of farm cash costs for the dairy industry overall and average total cash costs at the national level are projected to remain largely unchanged in 2010–11 compared with 2009–10.

Farm incomes and profits

The financial performance of Australian broadacre farms is projected to improve, on average, in 2010–11.

Nationally, average farm cash income for broadacre farms declined from $75 980 in 2008–09 to $58 900 in 2009–10 and is projected to increase to $82 000 in 2010–11 (table 1), which is around 5 per cent above the average for the 10 years to 2009–10 of $79 000 (in real terms) (figure c, table 1). Increased grain, oilseed and pulse production, combined with higher grain, livestock and wool prices, is projected to outweigh reductions in grain quality caused by high rainfall and increases in crop production expenses, repairs and interest payments.

C Financial performance, all broadacre industries



For the dairy industry, farm financial performance is projected to improve in 2010–11 because of higher average milk prices and reductions in expenditure on purchased fodder in southern dairying regions. Nationally, average farm cash income for dairy farms was $87 960 a farm in 2008–09, declined to $76 800 a farm in

2009–10 and is projected to increase to $100 000 in 2010–11 (table 5), which is around 9 per cent above the average for the 10 years to 2009–10 of $91 000 (in real terms) (figure f).

Farm cash income is a measure of the cash funds generated by the farm business for farm investment and consumption after paying all costs incurred in production, including interest payments but excluding capital payments and payments to family workers. It is a measure of short-term farm performance because it does not take into account depreciation or changes in farm inventories. A measure of longer term profitability is farm business profit, as it takes into account capital depreciation and changes in inventories of livestock, fodder, grain and wool.

1 Financial performance, all broadacre industries

average per farm

		2008–09	2009–10p		2010–11z
Total cash receipts	$	336 640	341 400	(13)	377 000
Total cash costs	$	260 660	282 500	(15)	295 000
Farm cash income	$	75 980	58 900	(10)	82 000
Farms with negative farm cash income	%	29	30	(6)	26
Farm business profit	$	–1 510	–20 500	(31)	6 000
Farms with negative farm business profit	%	68	70	(3)	61
Profit at full equity					
– excluding capital appreciation	$	36 640	19 900	(37)	53 000
– including capital appreciation	$	40 620	2 300	(1433)	na
Farm capital at 30 June **a**	$	3 800 320	4 005 500	(4)	na
Net capital additions	$	43 480	51 200	(46)	na
Farm debt at 30 June **b**	$	409 020	496 600	(7)	501 000
Change in debt – 1 July to 30 June **b**	%	4	8	(28)	1
Equity at 30 June **bc**	$	3 234 240	3 332 900	(4)	na
Equity ratio **bd**	%	89	87	(1)	na
Farm liquid assets at 30 June **b**	$	153 300	143 500	(10)	na
Farm management deposits (FMDs) at 30 June **b**	$	28 810	28 600	(12)	na
Share of farms with FMDs at 30 June **b**	%	22	20	(10)	na
Rate of return **e**					
– excluding capital appreciation	%	1.0	0.5	(35)	1.4
– including capital appreciation	%	1.1	0.1	(1432)	na
Off-farm income of owner manager and spouse **b**	$	35 820	32 200	(5)	na

a Excludes leased plant and equipment. **b** Average per responding farm. **c** Farm capital minus farm debt. **d** Equity expressed as a percentage of farm capital. **e** Rate of return to farm capital at 1 July. **p** Preliminary estimates. **z** Provisional estimates. **na** Not Available.
Note: Figures in parentheses are standard errors expressed as a percentage of the estimate provided.

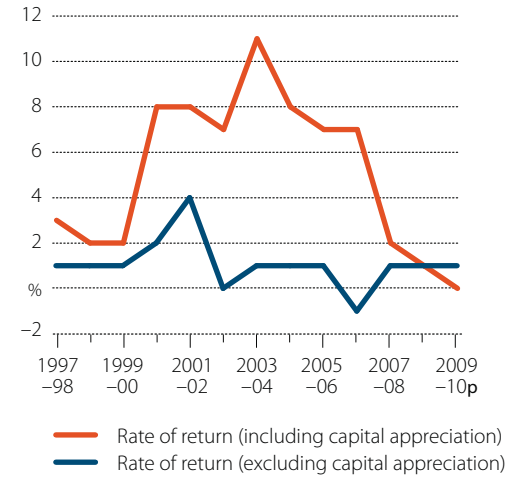
Average farm business profit in the broadacre industries is projected to increase by a larger amount in 2010–11 than the increase in farm cash income (table 1). This mostly reflects increases in the value of inventories of livestock and crops on farms in eastern states and northern Australia in 2010–11. Increases are projected in the number of beef cattle and, to a lesser extent, sheep on farms, together with increases in on-farm grain and fodder stocks.

However, the overall national increase will be tempered by a reduction in livestock numbers and grain and fodder stocks on farms in southern Western Australia.

Rates of return

The average rate of return to total farm capital including capital appreciation for broadacre farms was relatively high between 2000–01 and 2006–07 but declined after 2007–08 (figure d). Strong demand for rural land during most of the 2000s has resulted in a sharp increase in land values in most agricultural regions, which has raised the total capital value of farms. Rapidly rising farm capital values resulted in high rates of return, including capital appreciation. However, from 2007–08 increases in land values have been much smaller and reported values declined in some pastoral and high-rainfall regions in 2009–10. While small, the reduction in land values in 2009–10 has resulted in a lower estimate of average rate of return to total farm capital including capital appreciation for broadacre farms.

d Return on capital



Rates of return excluding capital appreciation for broadacre farms have been adversely affected in many regions by a number of poor profit years, resulting from poor seasonal conditions along with reduced grain prices in 2008–09 and 2009–10. Rises in total farm capital values as a consequence of increases in land values in recent years have also acted to reduce rates of return excluding capital appreciation. With higher farm business profits projected for broadacre farms in 2010–11, average rates of return excluding capital appreciation are expected to rise from 0.5 per cent in 2009–10 to 1.4 per cent in 2010–11 (figure d).

In 2009–10, the highest average rates of return excluding capital appreciation are estimated for South Australia, Western Australia, the Northern Territory and Victoria (table 2); and for cropping farms and sheep farms (table 4).

Performance, by state

Projected farm financial performance for 2010–11 and how this performance ranks in historical terms varies markedly across states and regions (tables 2 and 3, together with map 1).

2 Financial performance, broadacre industries, by state

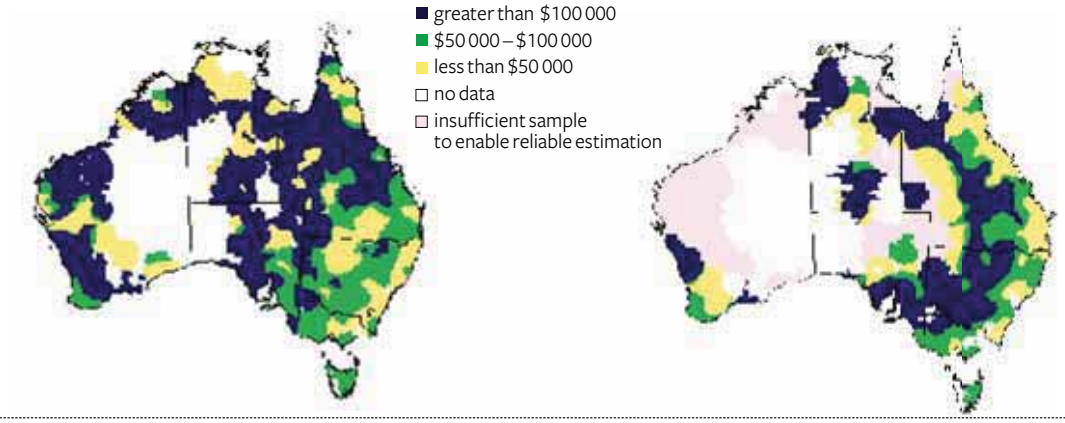
average per farm

	farm cash income			farm business profit a			rate of return excluding capital appreciation			rate of return including capital appreciation		
	2008–09	2009–10p	2010–11z	2008–09	2009–10p	2010–11z	2008–09	2009–10p	2010–11z	2008–09	2009–10p	2010–11z
	$	$	$	$	$	$	%	%	%	%	%	%
Broadacre industries												
New South Wales	50 840	45 800	88 000	–21 790	–40 600	26 000	0.5	0.0	2.1	0.5	–1.1	na
Victoria	40 820	46 500	63 000	–29 920	–8 500	5 000	–0.3	0.5	1.1	0.9	4.9	na
Queensland	82 610	59 400	66 000	19 830	–10 700	7 000	1.1	0.7	1.2	0.6	–1.4	na
Western Australia	216 610	97 700	82 000	96 160	–56 600	–85 000	3.2	0.2	–0.1	3.8	–1.7	na
South Australia	64 760	87 300	131 000	–19 850	27 300	42 000	0.5	2.0	2.5	0.2	2.9	na
Tasmania	39 440	53 600	80 000	–26 390	10 700	36 000	–0.1	0.8	1.6	0.6	2.0	na
Northern Territory	–101 400	–122 400	194 000	–112 560	78 900	21 000	0.4	1.4	1.5	–2.0	–5.5	na
Australia	75 980	58 900	82 000	–1 510	–20 500	6 000	1.0	0.5	1.4	1.1	0.1	na

a Defined as farm cash income plus build-up in trading stocks, less depreciation and the imputed value of operator partner and family labour. **b** Defined as profit at full equity, excluding capital appreciation, as a percentage of total opening capital. Profit at full equity is defined as farm business profit plus rent, interest and lease payments less depreciation on leased items. **p** Preliminary estimates. **z** Provisional estimates.

map 1 Farm cash income, broadacre and dairy farms

average, 10 years ending 2009–10 2010–11z



New South Wales

In New South Wales, higher farm cash incomes are projected in 2010–11 for almost all regions. On average, increases in farm cash incomes are expected in grain growing areas because of increased grain production. Increases in farm cash incomes for grain farms would have been higher except for reductions in grain quality resulting from high and untimely rainfall during the winter crop harvest period, and crop losses to flooding. Farm cash incomes for livestock farms are projected to increase in most regions, with higher sheep, lamb, wool and beef prices combined with higher sale weights for livestock and despite an expected reduction in the number of cattle sold.

On average, farm cash income of broadacre farms in New South Wales is projected to increase from $45 800 in 2009–10 to average $88 000 a farm in 2010–11, which is around 50 per cent above the average farm cash income recorded for the 10 years to 2009–10.

Farm cash incomes for broadacre farms in New South Wales and the other eastern states—Victoria and Queensland—are strongly influenced by income from livestock. On average, around 60 per cent of farm receipts are derived from the sale of beef cattle, sheep, lambs and wool and 75 per cent of broadacre farms generate less than 20 per cent of their receipts from crops. In contrast, many more South Australian and Western Australian broadacre farms are mainly reliant on receipts from crops rather than those from livestock.

Victoria

Victorian cropping farm cash incomes are also projected to increase in 2010–11, with higher rainfall leading to high yields and increased grain and oilseed production. Around half the tonnage of wheat and barley harvested is estimated to have been downgraded to feed quality and some areas of crop were lost because of flooding. Nevertheless, on average, receipts from crops are projected to increase by around one third compared with 2009–10.

3 Financial performance, by state, all broadacre industries

average per farm

		New South Wales				Victoria			
		2008–09	2009–10p		2010–11z	2008–09	2009–10p		2010–11z
Total cash receipts	$	292 830	311 400	(6)	392 000	199 240	199 700	(14)	235 000
Total cash costs	$	241 990	265 600	(6)	304 000	158 420	153 200	(17)	172 000
Farm cash income	$	50 840	45 800	(15)	88 000	40 820	46 500	(12)	63 000
Farms with negative farm cash income	%	33	37	(8)	26	27	27	(18)	25
Farm business profit	$	–21 790	–40 600	(20)	26 000	–29 920	–8 500	(65)	5 000
Farms with negative farm business profit	%	74	73	(5)	59	70	70	(5)	65
Profit at full equity									
– excluding capital appreciation	$	16 420	– 600	(1348)	73 000	–8 010	12 900	(66)	29 000
– including capital appreciation	$	17 500	–37 000	(137)	na	25 120	127 000	(67)	na
Farm capital at 30 June a	$	3 234 650	3 493 800	(5)	na	2 859 180	2 762 500	(12)	na
Net capital additions	$	30 440	29 400	(163)	na	26 900	63 300	(66)	na
Farm debt at 30 June b	$	407 640	502 200	(10)	483 000	225 790	247 000	(19)	232 000
Change in debt –1 July to 30 June b	%	3	4	(65)	–3	5	13	(55)	–5
Equity at 30 June bc	$	2 754 590	2 922 900	(5)	na	2 594 780	2 472 200	(11)	na
Equity ratio bd	%	87	85	(1)	na	92	91	(1)	na
Farm liquid assets at 30 June b	$	134 810	113 500	(15)	na	141 820	165 600	(14)	na
Farm management deposits (FMDs) at 30 June b	$	21 710	17 200	(22)	na	19 190	25 400	(34)	na
Share of farms with FMDs at 30 June b	%	19	13	(18)	na	22	24	(25)	na
Rate of return e									
– excluding capital appreciation	%	0.5	0.0	(1350)	2.1	–0.3	0.5	(58)	1.1
– including capital appreciation	%	0.5	–1.1	(137)	na	0.9	4.9	(65)	na
Off-farm income of owner manager and spouse b	$	43 070	38 000	(9)	na	38 270	36 500	(12)	na

continued...

3 Financial performance, by state, all broadacre industries continued

average per farm

		Queensland				Western Australia			
		2008–09	2009–10p		2010–11z	2008–09	2009–10p		2010–11z
Total cash receipts	$	338 040	362 700	(10)	377 000	708 060	649 600	(6)	583 000
Total cash costs	$	255 430	303 300	(9)	311 000	491 450	551 800	(5)	501 000
Farm cash income	$	82 610	59 400	(23)	66 000	216 610	97 700	(20)	82 000
Farms with negative farm cash income	%	28	26	(12)	28	28	33	(19)	32
Farm business profit	$	19 830	–10 700	(114)	7 000	96 160	–56 600	(30)	–85 000
Farms with negative farm business profit	%	62	74	(4)	65	52	69	(9)	74
Profit at full equity									
– excluding capital appreciation	$	61 980	37 900	(33)	64 000	160 160	10 600	(156)	–4 000
– including capital appreciation	$	32 610	–81 500	(42)	na	186 400	–98 000	(122)	na
Farm capital at 30 June a	$	5 452 780	5 572 500	(4)	na	5 001 180	5 736 500	(6)	na
Net capital additions	$	16 370	23 800	(115)	na	118 510	77 800	(124)	na
Farm debt at 30 June b	$	497 790	627 200	(11)	684 000	683 900	852 900	(10)	886 000
Change in debt –1 July to 30 June b	%	3	7	(41)	6	3	10	(46)	5
Equity at 30 June bc	$	4 688 630	4 671 000	(5)	na	4 012 930	4 463 100	(5)	na
Equity ratio bd	%	90	88	(1)	na	85	84	(2)	na
Farm liquid assets at 30 June b	$	153 030	125 300	(12)	na	207 770	201 100	(18)	na
Farm management deposits (FMDs) at 30 June b	$	35 170	33 100	(18)	na	57 050	59 400	(25)	na
Share of farms with FMDs at 30 June b	%	23	21	(15)	na	32	24	(24)	na
Rate of return e									
– excluding capital appreciation	%	1.1	0.7	(32)	1.2	3.2	0.2	(155)	–0.1
– including capital appreciation	%	0.6	–1.4	(41)	na	3.8	–1.7	(120)	na
Off-farm income of owner manager and spouse b	$	25 360	18 900	(9)	na	28 030	26 500	(12)	na

continued...

3 Financial performance, by state, all broadacre industries continued

average per farm

		South Australia				Tasmania			
		2008–09	2009–10p		2010–11z	2008–09	2009–10p		2010–11z
Total cash receipts	$	305 880	355 400	(4)	423 000	226 240	244 100	(6)	269 000
Total cash costs	$	241 120	268 100	(5)	292 000	186 810	190 400	(6)	189 000
Farm cash income	$	64 760	87 300	(12)	131 000	39 440	53 600	(19)	80 000
Farms with negative farm cash income	%	26	24	(20)	15	27	31	(23)	25
Farm business profit	$	–19 850	27 300	(39)	42 000	–26 390	10 700	(94)	36 000
Farms with negative farm business profit	%	70	54	(9)	44	70	61	(11)	47
Profit at full equity									
– excluding capital appreciation	$	14 240	68 800	(16)	88 000	–3 030	31 600	(30)	59 000
– including capital appreciation	$	5 660	97 500	(20)	na	19 130	74 000	(78)	na
Farm capital at 1 July a	$	3 104 060	3 572 600	(4)	na	3 352 650	3 810 400	(7)	na
Net capital additions	$	77 770	102 600	(27)	na	9 580	35 400	(106)	na
Farm debt at 30 June b	$	314 530	442 800	(9)	427 000	272 510	244 500	(16)	277 000
Change in debt –1 July to 30 June b	%	6	14	(57)	-5	10	1	(647)	2
Equity at 30 June bc	$	2 602 710	2 966 900	(5)	na	3 046 110	3 462 500	(8)	na
Equity ratio bd	%	89	87	(1)	na	92	93	(1)	na
Farm liquid assets at 30 June b	$	165 180	143 200	(14)	na	191 080	174 900	(26)	na
Farm management deposits (FMDs) at 30 June b	$	29 710	27 700	(24)	na	18 160	32 200	(43)	na
Share of farms with FMDs at 30 June b	%	22	26	(18)	na	16	17	(43)	na
Rate of return e									
– excluding capital appreciation	%	0.5	2.0	(15)	2.5	-0.1	0.8	(30)	1.6
– including capital appreciation	%	0.2	2.9	(20)	na	0.6	2.0	(80)	na
Off-farm income of owner manager and spouse b	$	34 210	31 600	(9)	na	36 100	37 500	(15)	na

continued...

3 Financial performance, by state, all broadacre industries continued

average per farm

		Northern Territory				Australia			
		2008–09	2009–10p		2010–11z	2008–09	2009–10p		2010–11z
Total cash receipts	$	1 692 160	1 428 800	(13)	1 020 000	336 640	341 400	(4)	377 000
Total cash costs	$	1 793 560	1 551 200	(11)	826 000	260 660	282 500	(4)	295 000
Farm cash income	$	–101 400	–122 400	(90)	194 000	75 980	58 900	(7)	82 000
Farms with negative farm cash income	%	59	51	(19)	22	29	30	(6)	26
Farm business profit	$	–112 560	78 900	(128)	21 000	–1 510	–20 500	(21)	6 000
Farms with negative farm business profit	%	64	62	(11)	64	68	70	(3)	61
Profit at full equity									
– excluding capital appreciation	$	62 340	229 100	(42)	190 000	36 640	19 900	(24)	53 000
– including capital appreciation	$	–346 170	–891 000	(22)	na	40 620	2 300	(1331)	na
Farm capital at 30 June a	$	17 089 680	15 633 900	(10)	na	3 800 320	4 005 500	(3)	na
Net capital additions	$	115 260	100 400	(60)	na	43 480	51 200	(44)	na
Farm debt at 30 June b	$	2 178 700	2 005 700	(26)	2 000 000	409 020	496 600	(5)	501 000
Change in debt –1 July to 30 June b	%	5	5	(144)	4	4	8	(23)	0
Equity at 30 June bc	$	11 184 460	8 244 200	(15)	na	3 234 240	3 332 900	(3)	na
Equity ratio bd	%	84	80	(4)	na	89	87	(1)	na
Farm liquid assets at 30 June b	$	78 840	78 400	(22)	na	153 300	143 500	(7)	na
Farm management deposits (FMDs) at 30 June b	$	25 710	14 500	(56)	na	28 810	28 600	(12)	na
Share of farms with FMDs at 30 June b	%	5	9	(57)	na	22	20	(10)	na
Rate of return e									
– excluding capital appreciation	%	0.4	1.4	(40)	1.5	1.0	0.5	(22)	1.4
– including capital appreciation	%	–2.0	–5.5	(19)	na	1.1	0.1	(1331)	na
Off–farm income of owner manager and spouse b	$	53 270	40 600	(32)	na	35 820	32 200	(5)	na

a Excludes leased plant and equipment. **b** Average per responding farm. **c** Farm capital minus farm debt. **d** Equity expressed as a percentage of farm capital. **e** Rate of return to farm capital at 1 July. **p** Preliminary estimates. **z** Provisional estimates. **na** Not Available.

Note: Figures in parentheses are standard errors expressed as a percentage of the estimate provided.

Receipts from beef cattle are projected to increase only slightly, with turn-off reduced slightly relative to 2009–10. Receipts from sheep, lambs and wool are projected to be higher this season because of higher saleyard prices and increased turn-off of lambs. As a result, farm cash incomes for producers mainly reliant on sheep are projected to increase further in 2010–11.

Farm cash costs are also projected to rise by around 10 per cent, reflecting the increased costs of harvesting and marketing the winter crop together with higher interest payments, increased expenditure on herbicides and pesticides, higher labour costs and increased expenditure on repairs and maintenance.

On average, farm cash incomes for broadacre farms in Victoria are projected to rise to $63 000 a farm in 2010–11 (tables 2 and 3), around 3 per cent above the average farm cash income recorded for the 10 years to 2009–10.

Queensland

Widespread heavy rainfall and flooding through summer in Queensland caused significant damage to summer crops including grain sorghum and cotton on broadacre farms. Although much of the winter crop was harvested before the flooding, the extremely wet conditions through the later part of the growing season and the harvest period resulted in some crops not being harvested and in a high proportion of the harvested crop being downgraded to feed quality, resulting in lower prices.

Despite the very wet conditions, receipts from crops on broadacre farms are projected to increase by 20 per cent compared with 2009–10 because of higher overall grain production, assuming that currently planted grain sorghum crops can be successfully harvested, together with increased receipts from cotton.

Receipts from beef cattle are projected to increase by around 4 per cent owing to increased saleyard prices, a small increase in turn-off and higher live weights for sale as a result of excellent pasture conditions in 2010–11. Receipts from beef cattle typically account for around 70 per cent of average total cash receipts in Queensland.

Average total cash costs are projected to rise by around 3 per cent in 2010–11, reflecting the increased cost of replanting and harvesting crops, higher chemical costs due to increased weed growth, increased interest payments and higher repairs and maintenance costs, particularly on flood-affected farms.

Overall, farm cash incomes for broadacre farms in Queensland are projected to rise to average $66 000 a farm in 2010–11, up from $59 400 a farm in 2009–10 (tables 2 and 3) but 25 per cent below the average farm cash income recorded for the 10 years to 2009–10 of $87 000.

Western Australia

Owing to drought conditions across much of southern Western Australia, including most grain growing areas, farm cash incomes are projected to fall in 2010–11. Farm cash income for Western Australian broadacre farms is projected to average $82 000 a farm in 2010–11, around

35 per cent below the average for the 10 years to 2009–10. Production of winter grains, oilseeds and pulses in Western Australia is estimated to be around 40 per cent lower this season than in 2009–10 and, despite the generally high quality of grains produced and increased prices, crop receipts are projected to fall by around 14 per cent for 2010–11. The reduction in crop receipts for 2010–11 would have been much larger if substantial pool payments for grain delivered in 2009–10 had not been received.

Average receipts for sheep and beef cattle are projected to increase in 2010–11 in response to the dry conditions. Receipts for sheep and lambs are projected to increase by almost 30 per cent because of increased turn-off and relatively high prices, driven partly by strong demand from restockers in eastern states.

Farm cash costs are projected to be reduced on Western Australian broadacre farms, as the area planted to crops in 2010–11 is lower than in 2009–10 and grain marketing costs are expected to be lower because of reduced production. Cash costs are also expected to be reduced as farmers cut back on some expenditure, including labour and repairs and maintenance, in an attempt to reduce the decline in farm cash income.

South Australia

South Australian broadacre farm cash incomes are projected to increase to average $131 000 a farm in 2010–11 (tables 2 and 3), around 25 per cent above the average farm cash income recorded for the 10 years to 2009–10. This is the highest farm cash income recorded for South Australian broadacre farms since 2003–04. The rise in farm cash income is driven mainly by increased grain, oilseed and pulse receipts, along with a significant increase in sheep and lamb receipts. High yields for grain, oilseed and pulse crops resulted in record winter crop production for South Australia in 2010–11, although rain through the harvest period resulted in significant downgrading of crop quality and some crop losses, particularly in the eastern Mallee and Murray Valley regions.

Tasmania

Tasmanian broadacre farm cash incomes are projected to increase modestly to average $80 000 a farm in 2010–11 (tables 2 and 3), further building on the improvement recorded in 2009–10. This is around 30 per cent above the average farm cash income recorded for the 10 years to 2009–10.

Improved seasonal conditions in 2009–10 and 2010–11 have enabled small increases in sheep and beef cattle numbers and increases in wool production, following several years of dry seasonal conditions that constrained crop and livestock production. Most of the increase in average farm cash income for Tasmanian broadacre farms in 2010–11 is projected to result from increased turn-off of beef cattle, combined with increased wool production and higher wool prices. Turn-off of sheep is expected to be slightly reduced in 2010–11 as sheep numbers are further rebuilt.

Northern Territory

After several dry years in which cattle numbers were reduced, seasonal conditions improved in 2009–10, particularly in the drier southern Northern Territory. Improved grazing conditions led to a marked reduction in cattle turn-off, a decline in total cash receipts and an increase in farm expenditure as properties began to rebuild herd numbers. Average farm cash in 2009–10 declined to –$122 400, the lowest farm cash income recorded in over 20 years.

Above average rainfall occurred during the wet season of 2010–11. Current projections are for an increase in turn-off of beef cattle from properties in the Northern Territory leading to a rise in average farm cash income to $194 000 (tables 2 and 3), which is still around 30 per cent below the average for the previous 10 years. However, turn-off may be lower than currently projected if continued high rainfall results in further disruption to the operations of properties. The downturn expected in live cattle exports in 2010–11 will also have some effect. It is currently expected that reduced live export numbers will mostly be offset by some increased slaughter sales and sales to restockers in southern and eastern areas.

Performance, by industry

Summary information on financial performance in Australian broadacre and dairy industries is provided in table 4 and figures e and f.

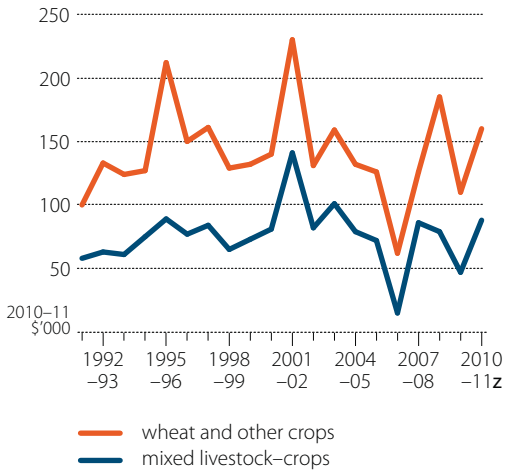
4 Financial performance, by industry

average per farm

	farm cash income			farm business profit p		
	2008–09 $	2009–10p $	2010–11z $	2008–09 $	2009–10p $	2010–11z $
Wheat and other crops	175 830	105 000	160 000	52 000	–19 200	17 000
Mixed livestock–crops	74 710	45 400	88 000	–4 880	–32 800	5 000
Beef industry	48 430	35 700	33 000	–13 660	–23 600	–14 000
Sheep	42 810	62 100	80 000	–22 910	3 100	32 000
Sheep–beef	60 890	79 900	85 000	–5 090	–14 100	22 000
All broadacre industries	75 980	58 900	82 000	–1 510	–20 500	6 000
Dairy	87 960	76 800	100 000	6 700	–1 900	5 000
	rate of return – excluding capital appreciation a			rate of return – including capital appreciation a		
	2008–09 %	2009–10p %	2010–11z %	2008–09 %	2009–10p %	
Wheat and other crops	2.9	1.2	2.3	3.3	-0.6	
Mixed livestock–crops	1.0	0.2	1.5	1.5	0.3	
Beef industry	0.4	0.1	0.5	0.1	-0.2	
Sheep	0.0	0.8	2.0	0.5	0.7	
Sheep–beef	0.6	0.4	1.4	0.0	1.7	
All broadacre industries	1.0	0.5	1.4	1.1	0.1	
Dairy	1.9	1.7	2.1	1.2	0.1	

a Defined as profit at full equity, excluding capital appreciation, as a percentage of total opening capital. Profit at full equity is defined as farm business profit plus rent, interest and lease payments less depreciation on leased items. **p** Preliminary estimates. **z** Provisional estimates.

e1 Farm cash income, grains industry



Wheat and other crops industry

Average farm cash income for the wheat and other crops industry fell in 2009–10 compared with 2008–09 because of lower grain and oilseed prices, together with reduced crop production in New South Wales and Queensland and higher expenditure on labour, crop chemicals, repairs and interest payments (figure e1).

In 2010–11, large increases in grain and oilseed production in New South Wales, Victoria, Queensland and South Australia, combined with higher grain and oilseed prices, are projected to result in average farm cash income rising. Grain production was substantially reduced in Western Australia as result of drought, and in eastern states the quality of crops was downgraded or crops were lost through high rainfall and flooding. It is estimated that in some states more than 50 per cent of wheat and barley harvested was downgraded to feed quality. However, grain and oilseed yields in New South Wales, Victoria, Queensland and South Australia were high and feed grain prices held up, resulting in better than expected receipts for weather damaged crops.

Total cash costs are projected to rise in 2010–11, reflecting the increased cost of harvesting and marketing a larger crop, higher chemical costs due to increased weed growth, higher labour costs, higher contract expenditure, increases to interest payments and higher repairs and maintenance costs, particularly for flood-affected farms.

Farm cash income is projected to average $160 000 a farm in 2010–11 which is around 16 per cent above the industry average for the previous 10 years, when many farms were affected by drought (tables 4 and 5, figure e1).

Wheat and other crops industry farms are projected to record the highest rates of return on average among the surveyed industries in 2009–10 (table 4), although there is substantial variation across the states.

Mixed livestock–crops industry

Average farm cash income for mixed livestock–crops industry farms fell in 2009–10 compared with that recorded in 2008–09. Crop production increased in Victoria and South Australia, and beef cattle, sheep, lamb and wool receipts increased in all states. However, these increases were not sufficient to offset lower grain prices received, a larger increase in livestock purchases expenditure and higher interest payments.

In 2010–11, crop receipts are projected to increase by around 50 per cent as a consequence of large increases in production of grains, oilseeds and pulses in the eastern states combined

with higher prices for good quality crops. Increases in crop receipts would have been much higher had it not been for the downgrading of grain quality and crop loss due to high rainfall and flooding. In addition, receipts from sheep and lambs are projected to increase by around 15 per cent as a result of higher saleyard prices, and receipts from beef cattle and wool receipts are expected to improve slightly to result in an overall increase of around 25 per cent in average total cash receipts per farm.

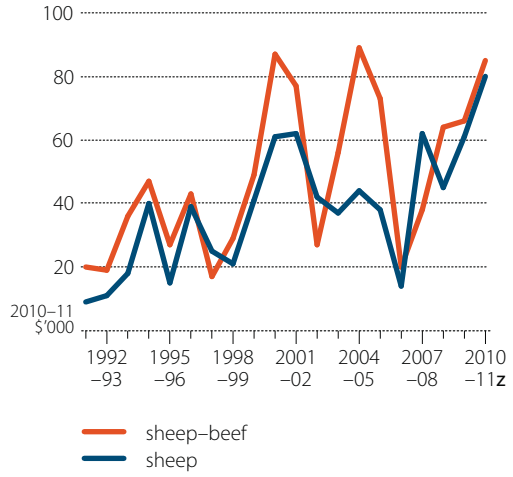
Total cash costs are projected to increase by around 10 per cent because of increases in expenditure required to harvest and market the larger grain crop, increased expenditure on herbicides and farm chemicals, and higher labour and repairs expenditure, partially offsetting higher farm receipts. Expenditure on livestock purchases is expected to remain high and similar to 2009–10 mainly because of high saleyard prices for livestock together with the relatively high number of animals expected to be purchased.

Average farm cash income for mixed livestock–crops industry farms is projected to increase to average $88 000 in 2010–11, which is around 14 per cent above the industry average for the previous 10 years (figure e1).

Sheep industry

In 2009–10, there was a substantial increase in lamb and sheep receipts resulting from higher saleyard prices, together with a small increase in wool receipts. As there was only a small rise in farm expenditure, mainly as a result of increased sheep purchases and higher labour costs, farm cash income rose for the sheep industry (tables 4 and 5, figure e2).

e2 Farm cash income, sheep industries



In 2010–11, farm cash income for sheep industry farms is projected to increase to average $80 000 a farm (table 4 and figure e2), which is around 75 per cent above the average for the past 10 years. If achieved, this would be the highest farm cash income for the sheep industry since 1989–90.

This increase is mainly because of increases in lamb and sheep receipts resulting from higher saleyard prices, together with an increase in wool receipts as a consequence of both higher wool prices and a small increase in wool production on sheep industry farms as wool cuts per head increase. Total cash receipts are projected to increase by around 12 per cent, while total cash costs are projected to increase by only around 5 per cent, due mainly to higher interest, labour and repairs expenditure.

Sheep–beef industry

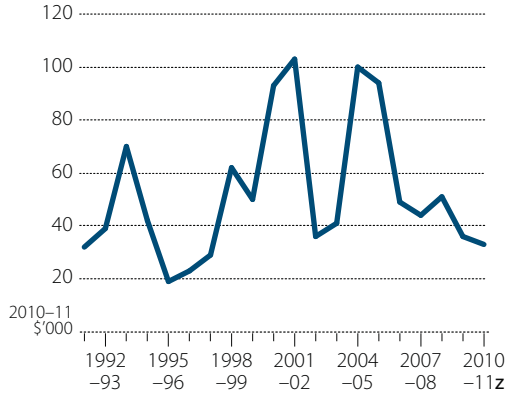
In 2009–10, beef cattle turn-off increased on sheep–beef farms in New South Wales, south-eastern Queensland and Western Australia in response to dry conditions. This increased beef receipts and, in combination with higher sheep, lamb and wool prices, resulted in farm cash income rising to average $79 900 a farm in 2009–10 (table 4).

In 2010–11, with improved seasonal conditions through the eastern states, turn-off of both beef cattle and sheep is expected to be reduced as herd and flock numbers are rebuilt but, because of increases in saleyard prices, receipts from the sale of beef cattle, sheep and lambs are projected to rise slightly. Wool receipts are also projected to rise as a result of higher prices received, despite a small reduction in expected production. Farm expenditure is projected to increase by around 3 per cent, with increased expenditure on interest, labour, repairs and fertiliser. Farm cash income is projected to average $85 000 a farm in 2010–11 (table 4), which is around 40 per cent above the average for the previous 10 years.

Beef industry

With higher rainfall, beef cattle turn-off slowed in 2009–10 and herd numbers increased in central and northern regions. Lower beef cattle turn-off, in combination with a reduction in prices received for cattle sold, resulted in average total cash receipts for beef industry farms falling by around 8 per cent. Cattle purchases expenditure was relatively high, but total cash costs nevertheless fell with significant reductions in fodder expenditure and slightly lower interest payments. Farm cash incomes were reduced and averaged $35 700 a farm.

e3 Farm cash income, beef industry



Much improved pasture conditions are projected to result in further reductions in beef cattle turn-off in eastern Australia in 2010–11 as farms rebuild cattle numbers. In contrast, turn-off is projected to increase in Western Australia because of dry conditions, and in some northern regions where herd numbers have increased in recent years. With strong demand from restockers, saleyard prices are forecast to increase and turn-off weights for cattle are also expected to increase because of the improvement in grazing conditions. However, on balance, the reduction in turn-off is expected to result in average receipts for beef industry farms remaining relatively similar to those in 2009–10. There are, however, significant differences between regions, and turn-off may increase in some regions beyond current expectations in the autumn and early winter period. Total cash costs are also expected to rise only slightly, with increases in interest payments and repairs and maintenance mostly

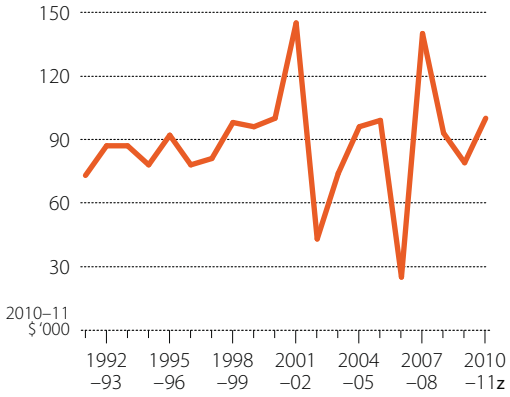
offset by much lower fodder expenditure, as well as some reduction in beef cattle purchase expenditure. Farm cash income is forecast to be reduced to average $33 000 a farm for the beef industry in 2010–11, which is around 45 per cent below the average farm cash income for the previous 10 years (table 4 and figure e3).

While farm cash income is projected to be reduced in 2010-11, an increase in beef cattle numbers is projected to boost the value of on-farm inventories and result in a small improvement in farm business profit and rate of return in 2010-11 (table 4).

Dairy industry

Farm cash incomes for dairy farms in southern dairying regions of Victoria, Tasmania and southern New South Wales fell sharply in 2008–09 and 2009–10 as milk prices fell in regions that produce mainly manufacturing milk. The effect of lower prices in these regions was compounded by increases in expenditure on purchased fodder caused by drought and low allocations of irrigation water, particularly in the southern Murray–Darling Basin. Average farm cash income in Victoria fell to $51 400 a farm in 2009–10, around 40 per cent below the average for the previous 10 years.

f Farm cash income dairy industry



In contrast, average milk prices received were maintained in northern New South Wales and Queensland in 2008–09 and 2009–10, but declined slightly in South Australia and Western Australia in 2009–10. Farm cash income in 2009–10 remained above the average for the previous 10 years in these states.

In 2010–11, improved pasture growth and increased availability of irrigation water are expected to favourably affect dairy farm incomes in southern Australia. The financial performance of dairy farms is projected to improve in the southern dairying region of New South Wales and in Victoria, Tasmania and South Australia as a result of higher prices paid for milk used for manufactured dairy products, combined with a reduction in total cash costs as improved seasonal conditions reduce expenditure on purchased fodder and irrigation water purchases.

In contrast, in northern dairying regions in Queensland and in northern New South Wales lower milk prices and largely unchanged milk production are projected to result in a reduction in average farm cash incomes.

Nationally, average farm cash income for dairy farms is projected to increase to $100 000 in 2010–11 (table 5 and figure f), which is around 9 per cent above the average for the 10 years to 2009–10 of $91 000. Average farm cash income in Victoria is projected to be $92 000, around 2 per cent above the average for the previous 10 years.

5 Financial performance, dairy industry

average per farm

		2008–09	2009–10p		2010–11z
Total cash receipts	$	611 810	509 400	(4)	533 000
Total cash costs	$	523 840	432 600	(5)	433 000
Farm cash income	$	87 960	76 800	(16)	100 000
Farms with negative farm cash income	%	26	24	(23)	22
Farm business profit	$	6 700	–1 900	(589)	5 000
Farms with negative farm business profit	%	52	59	(10)	55
Profit at full equity					
– excluding capital appreciation	$	69 630	59 300	(18)	74 000
– including capital appreciation	$	45 150	2 800	(1191)	na
Farm capital at 30 June a	$	3 714 710	3 614 400	(4)	na
Net capital additions	$	168 820	73 800	(26)	na
Farm debt at 30 June b	$	663 190	667 300	(7)	664 000
Change in debt – 1 July to 30 June b	%	11	9	(34)	1
Equity at 30 June bc	$	3 071 730	2 966 600	(5)	na
Equity ratio bd	%	82	82	(2)	na
Farm liquid assets at 30 June b	$	104 430	118 400	(11)	na
Farm management deposits (FMDs) at 30 June b	$	23 470	21 200	(24)	na
Share of farms with FMDs at 30 June b	%	20	18	(24)	na
Rate of return e					
– excluding capital appreciation	%	1.9	1.7	(17)	2.1
– including capital appreciation	%	1.2	0.1	(1192)	na
Off-farm income of owner manager and spouse b	$	24 030	20 300	(22)	na

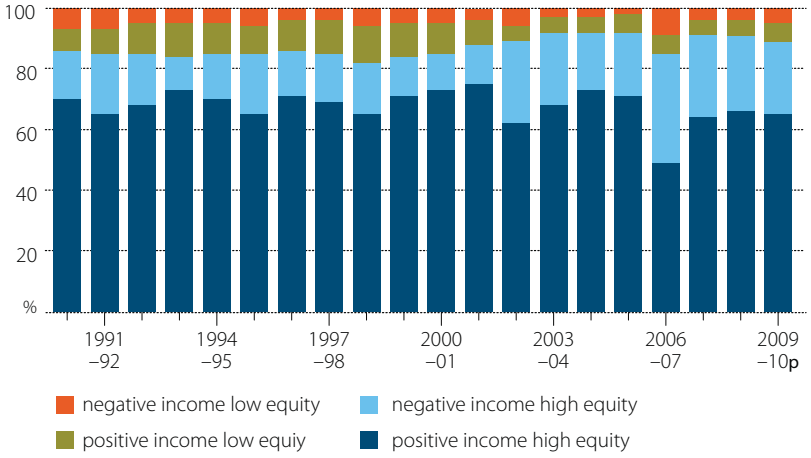
a Excludes leased plant and equipment. **b** Average per responding farm. **c** Farm capital minus farm debt. **d** Equity expressed as a percentage of farm capital. **e** Rate of return to farm capital at 1 July. **p** Preliminary estimates. **z** Provisional estimates. **na** Not Available.
Note: Figures in parentheses are standard errors expressed as a percentage of the estimate provided.

Farm equity

On average, farm business equity remains strong for broadacre and dairy farms, although farm equity is estimated to have fallen slightly in 2009–10. The proportion of broadacre and dairy farms estimated to have a farm business equity ratio of greater than 70 per cent declined from 91 per cent in 2008–09 to 89 per cent in 2009–10, but the proportion of these farms recording negative farm cash incomes declined slightly from 25 per cent in 2008–09 to 24 per cent in 2009–10 (figure g). The proportion of farms recording both an equity ratio of less than 70 per cent and negative farm cash income increased from 4 per cent in 2008–09 to 6 per cent in 2009–10.

The proportion of broadacre farms recording negative farm cash income and therefore potentially needing to borrow working capital is projected to decline from 30 per cent in 2009–10 to 26 per cent in 2010–11. The proportion of broadacre farms in South Australia, New South Wales, Victoria and the Northern Territory recording negative farm cash incomes is projected to fall, but an increase is expected in Queensland and Western Australia (table 2). The proportion of dairy industry farms recording negative farm cash income is projected to fall from 24 per cent in 2009–10 to 22 per cent in 2010–11 (table 5).

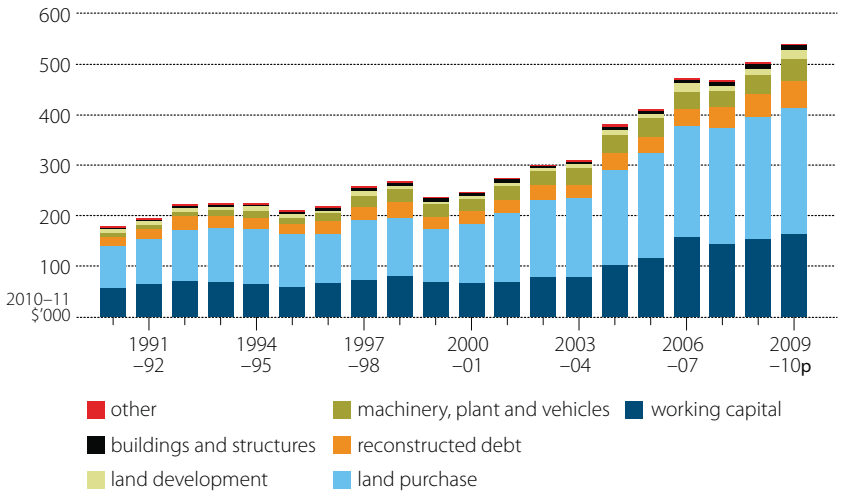
g Distribution of farms by equity and farm cash income broadacre and dairy industries



Farm debt

Average debt per farm business has increased markedly for broadacre and dairy farms over recent years (figure h). There are a number of factors behind the growth in debt over this period, including the effects of lower interest rates, increases in farm size, changes in commodities produced and reduced farm incomes in the 2000s as a consequence of widespread and extended drought conditions.

h Composition of farm debt, broadacre and dairy farms



Throughout much of the 2000s, interest rates were historically low, reducing the cost of servicing debt and encouraging borrowing for farm investment. Provision of interest rate subsidies as drought assistance to many farms also supported borrowing.

Structural adjustment has resulted in producers both changing the mix of commodities produced and increasing farm size. The largest contribution to increases in farm debt on broadacre and dairy farms has been borrowing to fund new investment, particularly borrowing to fund purchase of land, machinery and vehicles and to develop land and farm improvements. Debt to fund purchase of land accounts for the largest share of debt on broadacre and dairy farms, around 46 per cent in 2008–09 (figure h). Debt to fund land purchase increased by 300 per cent in real terms between 1990–91 and 2009–10. However, in percentage terms, it is borrowing to finance the purchase of machinery, plant and vehicles that has increased most over the past 20 years, rising 500 per cent since 1990–91, in real terms. Borrowing to finance farm buildings and structures has increased by 400 per cent and borrowing to fund land development by 300 per cent.

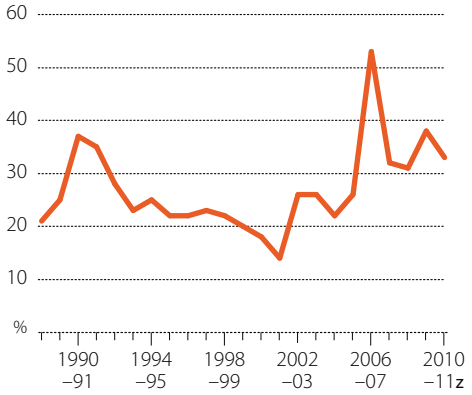
During this period there was also a significant movement of resources away from less input-intensive wool production to more intensive cropping and prime lamb activities, requiring substantial new investment in machinery and borrowing to purchase inputs. Expansion of cropping activities and increased use of inputs such as herbicides and fertiliser contributed to the increase in farm debt as producers borrowed to purchase annual inputs. In addition, deregulation of grain markets led to increased investment in on-farm grain storage.

During the 2000s, adverse seasonal conditions depressed farm cash incomes in many regions and led to increased borrowing to meet working capital requirements. Working capital debt increased by 300 per cent between 1990–01 and 2009–10, accelerating rapidly after widespread drought began in 2002–03. In 2009–10, working capital debt accounted for 30 per cent of average farm debt, second only to land purchase debt.

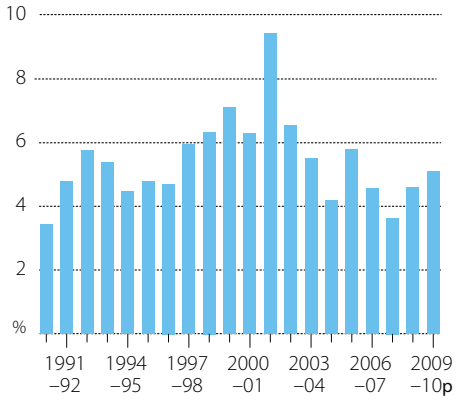
Increases in land purchase debt are confined to a relatively small proportion of farms each year, typically 5 to 7 per cent. In recent years, increased borrowing for working capital has occurred for around 25 to 30 per cent of farms each year. In 2009–10, land purchase accounted for almost half the increase in average farm debt on broadacre and dairy farms compared with working capital, which accounted for 30 per cent. There was also a substantial increase in the proportion of restructured debt as relatively low interest rates for some categories of loans in 2009–10, and concern about expected future interest rate increases encouraged restructuring.

Financial institutions lend to farm businesses on the basis of both the capacity of farm businesses to service increased debt and the equity (or security) farmers have in their business. In recent years, there has been a very large increase in the value of agricultural land that has boosted the equity that most farmers have in their farm businesses. Therefore, despite increases in farm debt over the past decade, average farm equity remains relatively high. At 30 June 2010, the average equity ratio for broadacre farms was estimated to be 87 per cent, and the average equity ratio for dairy farms 82 per cent (tables 1 and 5).

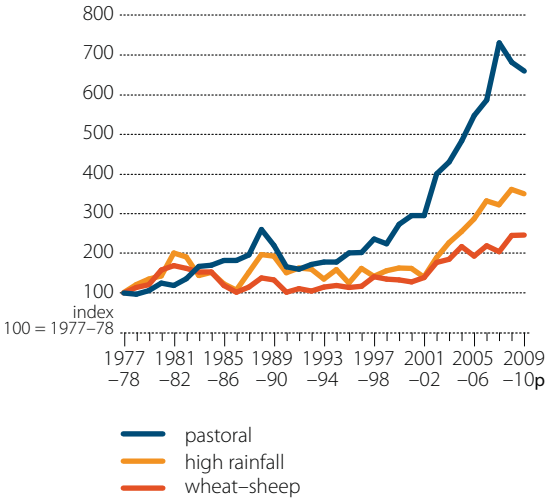
i Debt servicing ratio for broadacre and dairy farms



j Proportion of farms acquiring land



k Land prices for broadacre farms



Debt servicing

The proportion of farm cash income needed to meet interest payments on farm debt (debt servicing ratio) has trended upward since 2001–02 (figure i). Interest rates rose throughout the period 2001–02 to 2007–08, and farm cash incomes have been highly variable since 2001–02. They were particularly low in 2002–03 and 2006–07, when the debt servicing ratio rose sharply. Partially offsetting the increase in interest paid in the period 2001–02 to 2007–08 were increases in interest rate subsidies paid to farm businesses via exceptional circumstances assistance. However, notwithstanding these factors, most of the increase in the debt servicing ratio between 2001–02 and 2009–10 was due to increases in farm debt.

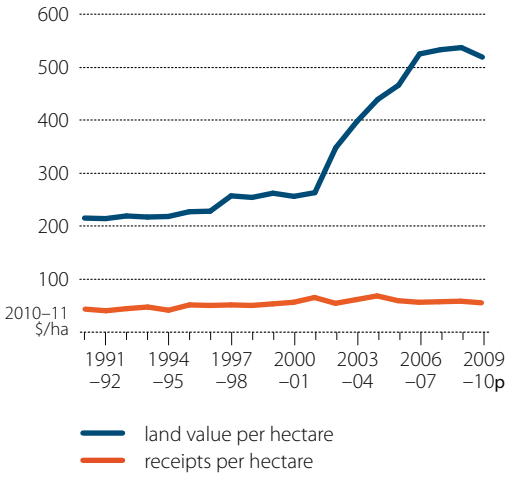
Despite increases in interest rates, in 2010–11 higher farm cash incomes are projected to result in the debt servicing ratio falling slightly this financial year but nevertheless remaining relatively high in historical terms. The increase in the overall level of farm debt for broadacre and dairy farms has been the main driver of the increase in the proportion of farm cash income needed to service interest payments on debt over the past decade, rather than increases in interest rates.

Land values

The proportion of broadacre and dairy farms acquiring land increased slightly to 5 per cent in 2009–10 but remained below the average for the previous 10 years of 6 per cent (figure j).

Growth in reported land values slowed in 2008–09 and 2009–10 and a reduction in values was reported in some pastoral and high-rainfall regions (figure k). Established farmers purchasing land appear to be paying greater attention to farm profitability and perceived levels of risk than to expectations of long term capital gain (Herron Todd White 2011).

l Land prices and receipts per hectare, broadacre farms



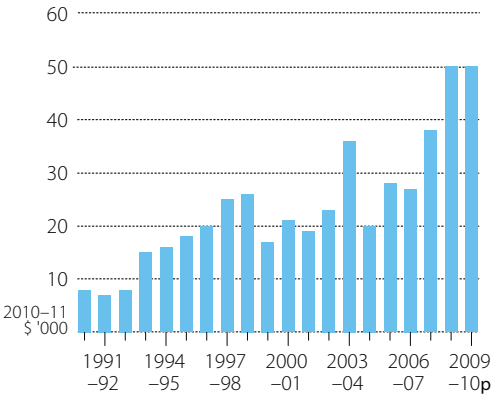
Average land prices for broadacre farms increased sharply relative to the cash receipts per hectare generated by farming activity between 2001–02 and 2006–07, but have remained relatively flat since (figure l).

The ratio of average land price per hectare to total cash receipts per hectare doubled from around 5:1 before 2001–02 to around 9:1 in 2009–10 on broadacre farms (figure n). The increase in this ratio is relatively similar across all agricultural zones and industries.

Farm investment

While investment in land has been lower than it was earlier in the decade, there was a large increase in the acquisition of non-land farm capital in 2008–09 and 2009–10. The value of additions of non-land capital, including vehicles, plant, machinery and farm improvements, was the highest in the past 20 years, in real terms (figure m).

m Additions of non-land capital, broadacre and dairy industries

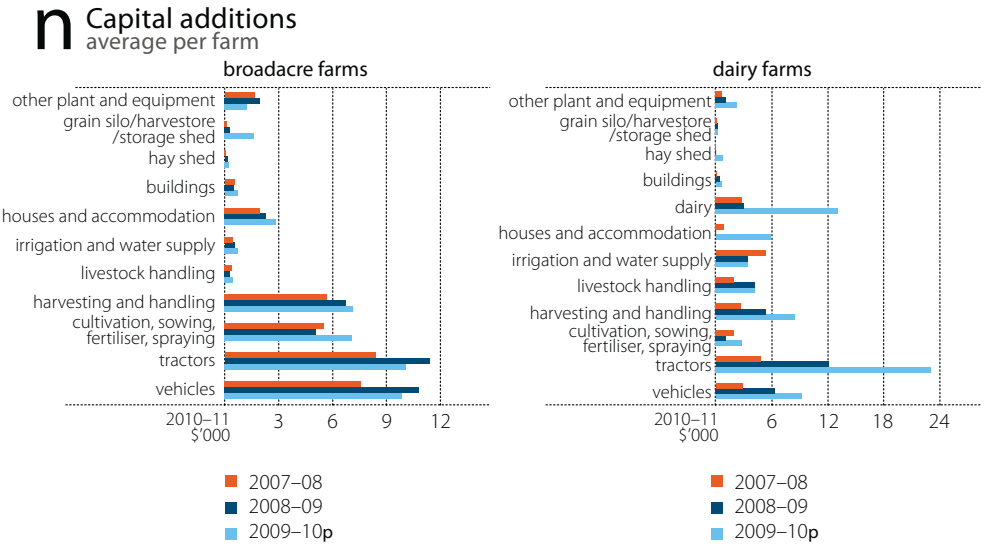


The investment allowance offered to businesses between December 2008 and December 2009 as part of the Australian Government's Nation Building and Jobs Plan to support economic activity in the face of the global financial crisis is likely to have contributed to increased investment in plant, machinery and farm improvements in 2008–09 and 2009–10. High levels of new investment have also been a response to improved cash flow for some farms, continued expansion in crop enterprises, lower interest rates and lower prices for imported machinery, vehicles and plant as a result of a high Australian dollar.

The reduction in the number of farms acquiring additional land and increased on-farm investment may also indicate that farmers may be aiming to improve the productivity of their existing land base rather than to purchase additional, relatively high-priced land.

ABARE surveys indicate that the largest category of new capital expenditure on both broadacre and dairy farms in 2008–09 and 2009–10 was tractors, followed closely by motor vehicles for broadacre farms (figure n). Crop harvesting and handling machinery was another major item

of expenditure for both farm types, and expenditure on farm houses and accommodation was also high, particularly in 2009–10. For broadacre farms, additions of cultivation, sowing, fertiliser and spraying equipment were also high, and expenditure on grain silos and grain storage facilities increased in 2009–10. For dairy farms, expenditure on dairy sheds was high in 2009–10.



Top performing farms

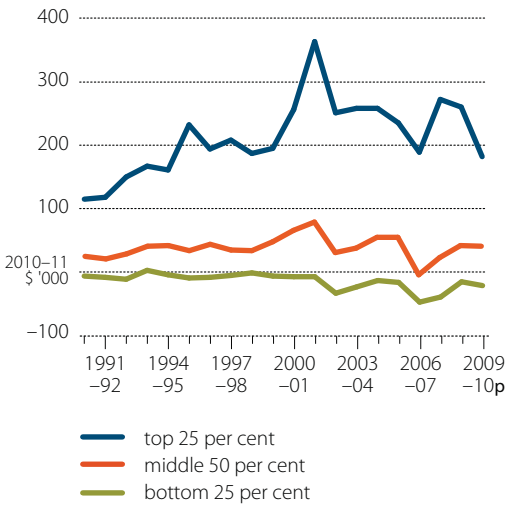
Average farm incomes and rates of return on investment in agricultural industries are usually low when reported across a whole industry or state. However, low average returns are partly a consequence of the generally high proportion of small farms in many industries, particularly the beef and sheep industries. The presence of these small farms masks the much higher incomes and returns from better performing and larger farms that generate the majority of each industry's output.

The bottom 25 per cent of broadacre farms, ranked by a moving average of rate of return to capital excluding capital appreciation, have struggled to generate positive farm incomes over the past two decades, and it appears that the trend in farm cash income for the bottom group is at best flat.

In contrast, the top 25 per cent of farms have consistently generated cash incomes of more than $100 000 a year (in real terms) over the past two decades (figure o). The trend in farm cash incomes for these farms has mostly been up but does appear to have slowed in the last decade.

Slower rates of growth in agricultural productivity over the past decade (Nossal et al. 2009) have been a significant factor constraining improvement in farm cash incomes in recent

O Farm cash income, broadacre farms



years. While poor seasonal conditions have contributed to reduced growth in agricultural productivity, there is evidence that there has also been a slowdown in the rate of technical progress in the past decade (Hughes et al. 2011). In addition, productivity growth for Australian broadacre farms appears to have been mainly achieved through change in production technology (Sheng, Zhao and Nossal. 2011). The top 25 per cent of farms account for 55 per cent of expenditure on additions of non-land capital in 2008–09 and 2009–10. In contrast, the bottom 25 per cent of farms accounted for just 10 per cent of new investment.

The top 25 per cent of farms generated average rates of return excluding capital appreciation of 4 per cent over the five years ending 2009–10 and rates of return including capital appreciation of 7 per cent. These farms also accounted for 58 per cent of the gross value of broadacre farm production over this period and 85 per cent of farm business profits.

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Energy and minerals overview

Outlook to 2016

Kate Penney, Clare Stark, Rubhen Jeya and Robert New

- Prices for energy and mineral commodities are forecast to remain high in the short term, supported by strong economic growth, a weak US dollar, and supply disruptions. Beyond 2012, prices are generally projected to decline in real terms, but remain above historical averages.
- Strong increases in demand in China and developing economies will continue to drive growth in energy and minerals commodity markets over the medium term.
- Supply capacity is projected to increase, although there could be some constraints such as rising marginal costs and sovereign risk.
- Australian energy and mineral export earnings are forecast to increase by 33 per cent to around $186 billion in 2010–11, and by a further 18 per cent to around $219 billion (in 2010–11 dollars) in 2015–16, as higher export volumes and an assumed lower value of the Australian dollar offset the effect on export revenue of lower world prices.

Global price outlook

The short-term price outlook for energy and mineral commodities is positive, as assumed world economic growth is expected to underpin demand, and supply growth continues to be affected by disruptions. The continued weakness of the US dollar against other major international floating currencies has encouraged investors to purchase commodities such as gold, oil and copper as a hedge against the US dollar, resulting in considerable support for prices.

Over the medium term, supply expansions for most mineral and energy commodities are expected to place downward pressure on prices. However, prices for most commodities are projected to remain high in historical terms, in line with rising production costs.

Despite the generally positive outlook for commodity prices, there are a number of risks to the projections. A key risk is the strength of the assumed recovery in economic activity. If economic growth is slower (or more rapid) than currently assumed, prices are likely to be lower (or higher) than projected. Another risk is the rate at which new capacity is commissioned. The projected easing in commodity prices relies on the timely development of new capacity. Significant delays to planned developments present an upside risk to the price projections. Finally, the increased use of exchange traded funds (ETFs, see box) has the potential to create price volatility for some metals.

Commodity exchange traded funds (ETFs)

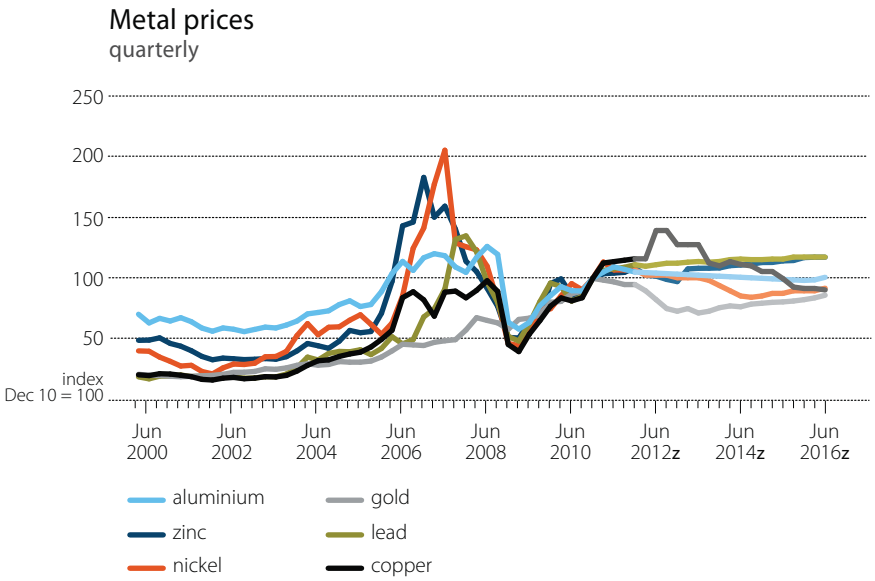
Interest in ETFs has increased significantly since the introduction of commodity-backed ETFs in the early 2000s. ETFs were initially introduced for precious metals. However, as investment funds seek to broaden their investment portfolios, ETFs based on industrial metals such as copper and nickel are currently being introduced. ETFs based on aluminium and zinc and other base metals are likely to be introduced in 2011 as investment companies compete with each other to introduce more funds for commodities.

Commodity ETFs allow investors to have exposure to commodity price movements without trading directly in futures or taking physical delivery of the commodity. There are two types of commodity-backed ETFs—futures-backed and physically backed.

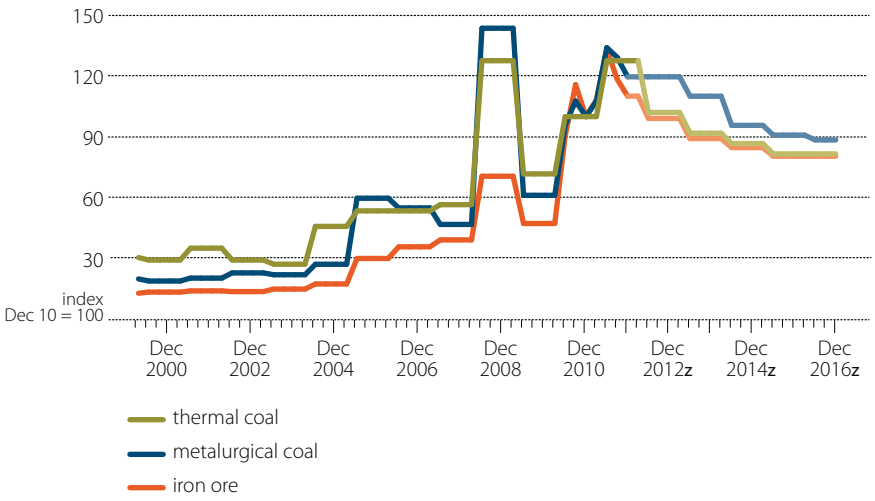
ETFs based on commodity futures track either an individual commodity or a related index. When an ETF buys a futures contract, it pays for the delivery of a commodity in the future. In general, the forward price is higher than the current spot price as it takes into account the cost of storing the commodity and the opportunity cost of the funds being unavailable for other investment. This is often referred to as 'contango'. The opposite situation is referred to as 'backwardation' and this can happen if the spot market is experiencing a temporary shortage in supplies. Futures-based ETFs will make a profit (or loss) if the spot price at the maturity date is higher (or lower) than the contract price.

Physically backed ETFs track the spot price of the commodity and will usually offer partial ownership of the commodity held within the ETF's portfolio. Profitability of physically backed ETFs is linked to movements in the spot price. The fund will increase in value if commodity prices increase sufficiently to offset the cost of storage and administrative charges. The first physically backed ETFs were based on precious metals including gold and had the advantage of low storage costs since gold could be stored within a small space. The increasing interest of ETFs in commercial and more voluminous commodities such as copper could reduce the return on investment because of increased costs associated with storage.

The introduction of ETFs is expected to increase price volatility as a result of greater speculation. The overall effect on prices will differ across commodities, and will depend on the volume of stocks, the timing of transactions, and expectations of future pay-offs.



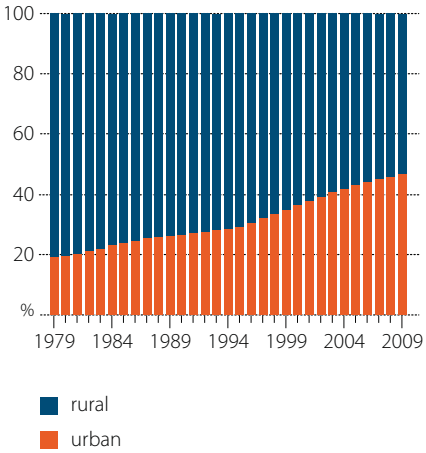
Bulk commodity prices
quarterly



Global demand outlook

Assumed growth in world economic activity and industrial production is expected to provide a solid platform for growth in the consumption of energy and mineral commodities over the outlook period. China will continue to be the major contributor to increased demand because of the scale of its economic growth and the energy and minerals intensive nature of its urbanisation and industrialisation. Other developing economies will also contribute to demand growth over the medium term. While consumption in these economies is expected to grow considerably, it is from a much lower base, and absolute increases in consumption will be smaller than in China.

Urbanisation in China



Source: United Nations.

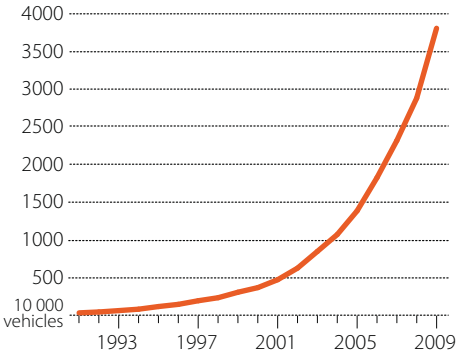
China and developing economies to drive growth in demand

China is an important player in the global market for energy and mineral commodities. It is the world's largest consumer of aluminium, copper, nickel, zinc, iron ore, coal, lead, and tin, and in 2010 overtook the United States to become the world's largest consumer of energy. China is set to remain the key driver of growth in global commodity demand because of continued growth in industrialisation and urbanisation, both of which are resource-intensive.

The rapid expansion of industrial production in China has supported growth in energy and minerals consumption over recent years. This is

expected to be maintained over the medium term, in line with the expansion of resource-intensive industries such as electricity generation and steel, pig iron and cement production. The growth in industrial production has also encouraged the transfer of labour from rural to urban areas. It is estimated that around 51 per cent of the Chinese population will live in urban areas in 2015, compared with 47 per cent in 2009. This will support large-scale investment in new housing and infrastructure over the outlook period. For example, the Chinese Government intends to increase rail capacity by 20 000–30 000 kilometres by 2020. In addition, electricity generation capacity is expected to increase by a reported 1760 gigawatts by 2020.

Ownership of passenger vehicles, China

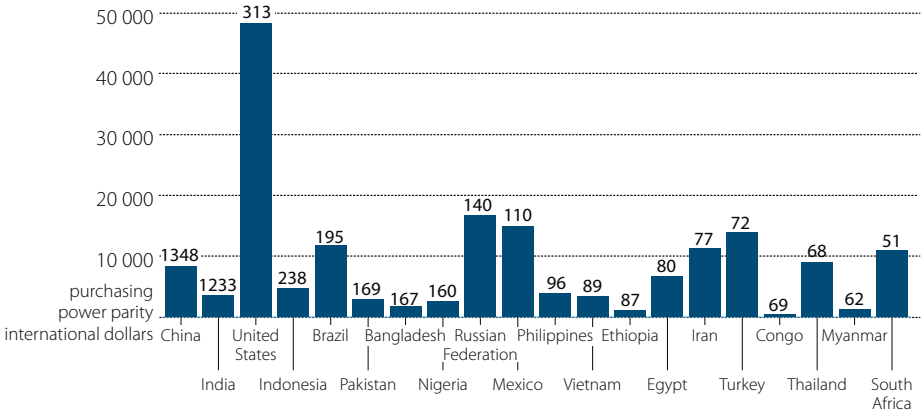


Source: NBS China.

The Chinese Government has implemented measures to curb growth in energy-intensive industries. For example, subsidies provided to the aluminium, steel and zinc industries in the form of low-cost electricity have been removed. Slower growth in these industries could potentially reduce demand for energy and mineral commodities and presents a downside risk to the consumption outlook.

China's strong economic growth has resulted in rising per person income and an expanding middle class. Demand for consumer durables, such as motor vehicles and electronics, which are resource-intensive in both production and use, has risen. For example, despite a relatively low ratio of cars to people, China became the world's largest car market in 2010. Because of the size of China's population, even small increases in per person consumption will have large implications for demand. China's passenger vehicle ownership is expected to continue to grow over the medium term, supporting further growth in consumption of energy and mineral commodities.

2011 GDP per person



Note: Estimates for 2011, the bolded numbers above each bar represent the population in millions.
Source: International Monetary Fund, World Economic Outlook Database, October 2010.

While China is the major driver of demand for energy and mineral commodities, many other developing economies have the potential to contribute to growing demand over the medium term. The developing economies depicted in the chart on the previous page have relatively large populations (more than 50 million) and low per person consumption of energy and mineral commodities compared with developed economies. The low intensity of use, combined with the large and increasing populations of these economies, suggests that even small increases in per person consumption will translate into large increases in overall consumption.

Possibility for increased substitution

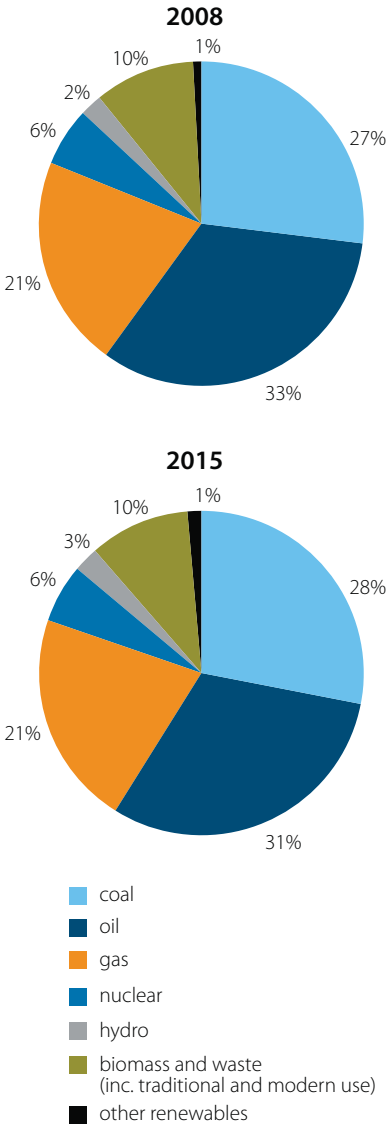
Each metal has special characteristics that result in their dominance in certain applications. However, some metals have similar properties that allow for substitution in some applications. With rising and diverging prices among the mineral commodities and changing legislation, consumers are beginning to explore the possibilities for substitution, particularly among the base metals. This decision will largely be determined by the ease of substitution and the relative prices.

For example, aluminium is increasingly being used instead of steel in car manufacturing to improve fuel efficiency and reduce carbon dioxide (CO_2) emissions in response to new legislation. The weight of a car affects the volume of emissions produced—a heavier car reduces fuel efficiency. Aluminium is much lighter than steel, so cars built using aluminium will use less fuel and hence emit less CO_2.

Metals and major substitutes

metal	properties	major substitutes
Aluminium	Light, electrically conductive, reflective, malleable, ductile	**Steel**: motor vehicles, packaging and construction **Copper**: electrical applications
Copper	Electrically conductive, conductive of heat, malleable, ductile	**Aluminium**: power cables, electrical equipment, cooling and refrigeration tubes and automobile radiators **Steel:** heat exchangers
Iron and steel	Conductive of heat, can be magnetised, malleable, ductile	**Aluminium**: motor vehicles, construction and packaging
Lead	Heavy, malleable, ductile	**Aluminium**: packaging and coatings **Tin**: solder
Nickel	Hard, ductile, malleable, takes on high polish, electrically conductive, conductive of heat	Low-nickel and nickel-free stainless steels
Tin	Malleable, non-corrosive	**Aluminium**: packaging
Zinc	Reasonably electrically conductive, non-corrosive	**Aluminium**: to protect steel from corrosion, die-casting **Steel**: instead of galvanised sheet

World energy mix, IEA New Policies Scenario



Source: International Energy Agency World Energy Outlook 2010.

Countries announce changes to their energy mix

Recently, a number of countries have made commitments to reduce CO_2 emissions from energy production and to improve energy intensity. Many of these commitments promote renewable energy sources which are generally capital-intensive. These commitments may also affect investment decisions being made in upstream industries such as coal, gas and oil. Although these commitments are expected to change the fuel mix in the long term, there is not expected to be a material change in the energy mix over the medium term.

Global supply outlook

Production to expand considerably over the medium term...

In 2010, world production of many mineral and energy commodities increased. Stronger economic activity, growing demand and higher prices encouraged producers to expand capacity and restart existing operations that were closed in response to falling demand in 2008 and 2009. However, a number of operations were affected by supply disruptions such as energy availability, weather-related events and labour disputes, which limited production growth for some commodities. Over the medium term, the supply of mineral and energy commodities is projected to increase.

...but there remain constraints

While growth in production is projected to be strong over the outlook period, a number of factors could adversely affect the level, timing, and location of investment in new capacity and have the potential to significantly lower the rate of expansion.

Production costs are rising

The development of large-scale projects across most of the energy and mineral commodities over the medium term is expected to increase competition for inputs such as raw materials, equipment, labour and energy, and contribute to higher production costs. This is expected to affect the profitability of some operations and has the potential to reduce output.

For some commodities, most of the low-risk, low-cost development opportunities have been exhausted. As a result, resource extraction is becoming more challenging and expensive, as companies attempt to access lower ore grades in some mines and develop oil and gas projects in deeper water. For example, as copper grades decline, more water is required to produce copper concentrates. This has the potential to increase costs and constrain production growth at some operations. Companies with projects in areas with limited water availability, such as Chile, are being forced to consider using sea water or desalinating sea water from coastal areas and pumping it to the site for use. These options have added considerably to operating and capital costs.

More projects are being developed in areas subject to sovereign risk

Sovereign risk affects companies exploring for and developing deposits in countries where the profitability of operations can be adversely affected by the potential for changes to legislation, regulations and taxation; inadequate enforcement of property rights; and security (see box). Over the medium term, a considerable volume of new capacity is scheduled to be developed in countries with a perceived high sovereign risk.

The role of sovereign and security risks

Significant supply expansions are planned for development over the outlook period. However, many of these proposed developments are in countries located in regions with a high perceived risk, such as Africa, South America and the Middle East. Disputes over property rights and labour conditions, sudden changes to legislation and physical security threats are good examples of sovereign and security risks.

Rio Tinto's Simandou development in Guinea has faced several challenges. In 2006, the Government of Guinea granted Rio Tinto a mining concession to develop the site. However, in 2008 the government ordered the company to hand over control of the northern half of the project to BSG Resources Ltd and in 2010 Rio Tinto's possession of the remaining resources was reportedly once again challenged.

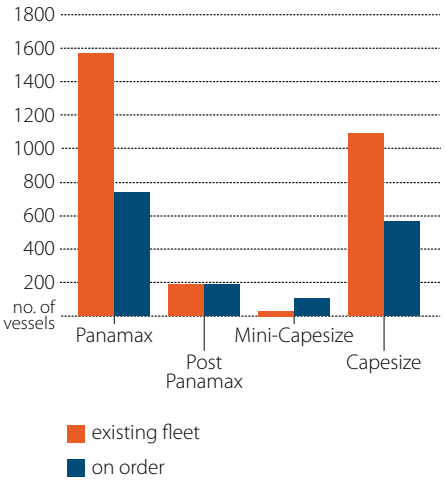
Labour shortages and disputes are affecting copper production in Chile, which presents a deterrent to future investment in the country's mining sector. In addition to skilled labour shortages, many companies are facing escalating union action from their subcontractors. For example, Codelco—the world's largest producer of copper—was forced to cease production at some of its mine operations on numerous occasions over the past five years because of violent protests by subcontractors. More recently, operations at Collahuasi declared force majeure in 2010, when subcontractors used burning tyres and rocks to block access to all of the mines. As a result of incidents like these, many companies are reportedly increasing their precautionary stocks to enable them to meet their commitments in the face of protests.

Physical security threats also present a deterrent to investment in some countries. For example, the Hungarian company Mol's Maramzai well in northern Pakistan faces ongoing physical security threats. In January 2010, production ceased following an attack by unidentified gunmen resulting in the kidnapping of two workers and the death of six others. Mol evacuated their workers from the area, and will not resume operations until authorities rescue the kidnapped employees and can guarantee the safety and security of all employees.

Declining freight rates are increasing competition in seaborne trade

The competitiveness of seaborne trade of bulk commodities (iron ore and coal) is affected by movements in international freight rates. Lower freight rates reduce transport costs, which increases the competitiveness of low-cost producers against high-cost domestic production in importing countries.

Global shipping fleet
2010



Source: Braemar Seascope.

International freight rates have declined sharply since 2008 following a decline in demand during 2009 and early 2010 for ships used to transport bulk commodities. While greater trade in bulk commodities is expected to increase demand for shipping services over the medium term, the large volume of ships being constructed will ensure that freight rates will remain low, particularly during 2011 and 2012. Over the next five years there are 564 Capesize vessels (more than 80 000 deadweight tonnes), 738 Panamax vessels (60 000 to 80 000 deadweight tonnes) and 190 Post Panamax vessels (around 50 000 deadweight tonnes) on order.

Beyond 2012, a recovery in the freight market will largely depend on economic activity and the effect on bulk commodity demand, the disposal of existing ships and the cancellation of orders for new ships. If ordered capacity enters the market as scheduled, freight rates are likely to remain low, which will encourage growth in seaborne trade of bulk commodities.

Australian energy and minerals outlook

Forecast higher prices and rising global demand in 2010–11 are expected to increase the profitability of producers and contribute to higher Australian production. The volume of Australian mine production is forecast to rise by 7 per cent in 2010–11, stemming primarily from growth in energy commodities.

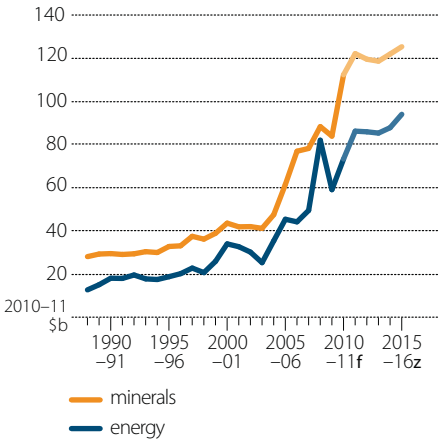
Production of metals and other minerals is forecast to increase by 10 per cent in 2010–11, reflecting higher iron ore production (up 6 per cent). In 2011–12, production of metals and other minerals is forecast to increase by around 6 per cent as higher production is expected from a number of commodities including iron ore, gold and copper. Production of energy commodities is forecast to increase by around 4 per cent in 2010–11, with increased production of thermal coal despite disruptions caused by the Queensland floods. Production of energy commodities is forecast to increase by a further 11 per cent in 2011–12, supported by a forecast increase in metallurgical and thermal coal production.

Australian mine production

Over the medium term, Australian energy and minerals production is projected to increase by around 29 per cent in 2015–16 from 2010–11, as new mine capacity is commissioned and infrastructure expansions, including the Abbot Point port in Queensland and the Pilbara in Western Australia, are completed. Metal and mineral production is projected to increase by an average of 4 per cent a year over the period to 2015–16, while energy production is projected to increase by around 6 per cent a year over the same period.

Export earnings from Australia's energy and minerals commodities in 2010–11 are forecast to increase by 33 per cent to around $186 billion, driven by forecast higher export prices and volumes for most commodities.

Australian export earnings



Export earnings from energy commodities are forecast to increase by 28 per cent to $73 billion in 2010–11 as higher contract prices offset lower volumes of metallurgical coal. The heavy rains in major coal-producing regions of Queensland are expected to affect Australia's production and exports of metallurgical coal. As a result, Australia's metallurgical coal exports are forecast to decline by around 1 per cent to 156 million tonnes in 2010–11. In 2011–12, energy export earnings are forecast to increase by 21 per cent to $89 billion. Export earnings from metals and other minerals are forecast to increase by 38 per cent in 2010–11 to $112 billion and by a further 12 per cent to $126 billion in 2011–12, supported by forecast higher earnings from iron ore.

Over the medium term, increased export volumes are projected to more than offset the combined effect of a projected decline in prices and an assumed weaker Australian dollar. Reflecting this, the value of energy and minerals exports is projected to be $219 billion (in 2010–11 dollars) by 2015–16.

Australian minerals and energy exports

		volume				value		
		2009–10	2015–16	average annual growth %		2009–10	2015–16	average annual growth %
Oil	ML	18 064	20 031	1.7	$m	9 805	11 687	3.0
LNG	Mt	18	41	15.0	$m	8 010	18 488	15.0
Thermal coal	Mt	135	242	10.2	$m	12 224	21 431	9.8
Uranium	kt	7 555	17 450	15.0	$m	772	2 942	25.0
Iron ore	Mt	390	582	6.9	$m	35 494	68 266	11.5
Metallurgical coal	Mt	157	213	5.2	$m	25 221	36 170	6.2
Gold	t	335	384	2.3	$m	13 364	13 743	0.5
Alumina	kt	16 653	20 322	3.4	$m	5 110	7 319	6.2
Aluminium	kt	1 624	1 760	1.4	$m	3 946	3 962	0.1
Nickel **b**	kt	222	228	0.5	$m	3 985	3 832	–0.7
Copper **b**	kt	785	1 091	5.6	$m	6 690	9 026	5.1
Zinc **b**	kt	1 481	1 674	2.1	$m	2 277	2 785	3.4

b Quantities refer to total metallic content of all ores, concentrates, intermediate products and refined metal.

Oil

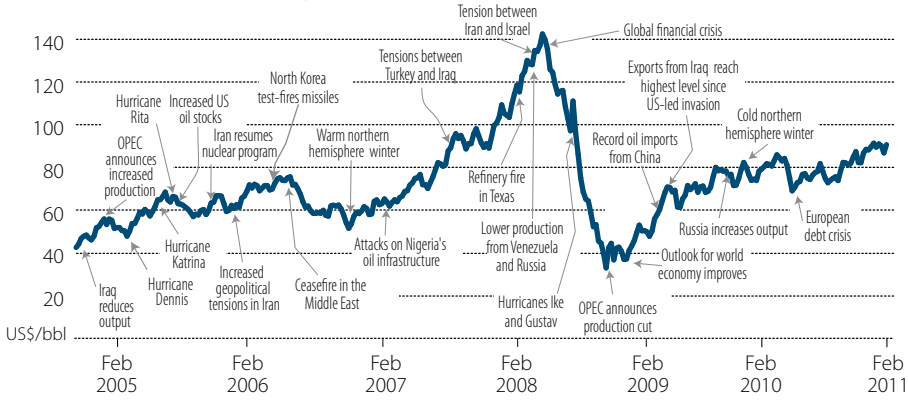
Outlook to 2016

Clara Cuevas-Cubria and Alan Copeland

World oil prices on an annual basis are projected to remain around $90-95 a barrel over the outlook period, as oil demand increases in line with stronger economic growth, particularly in non-OECD economies. Non-OECD demand is projected to be the key driver of world oil demand growth over the medium term and will be underpinned by rising incomes associated with continued economic growth and industrialisation, particularly in China, India and the Middle East.

In 2010, oil prices in West Texas Intermediate (WTI) terms averaged around US$79 a barrel. In the last quarter of 2010, oil prices averaged around US$85 a barrel and increased to a high of US$94 in late January 2011. The recent increase in prices reflects colder than normal winter weather in the Northern Hemisphere, strong demand in China and market concern that civil unrest in Egypt could spread to other countries in the Middle East and disrupt oil supply.

Weekly oil prices
WTI prices ended 6 February 2011



Higher oil prices over the medium term

In 2011, WTI oil prices are forecast to average US$91 a barrel, which is an increase of 15 per cent from the 2010 average of US$79 a barrel. In 2012, oil prices are forecast to increase by 5 per cent to US$96 a barrel. Stronger oil consumption growth, associated with an assumed increase in world economic growth, is expected to lead to higher oil prices in 2012. In addition, speculative demand in anticipation of a strengthening in economic growth could contribute to a larger than expected increase in oil prices in both 2011 and 2012.

From 2013 to 2016, oil prices are forecast to gradually decline to US$92 a barrel in real terms, in line with an assumed gradual easing of world economic growth. The availability of spare

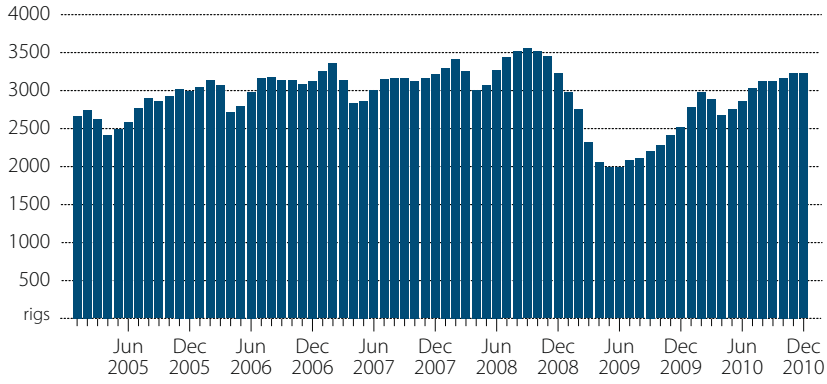
oil production capacity in OPEC is expected to limit significant increases in oil prices in the medium term, because it will be able to meet unexpected increases in demand or disruptions in supply. Despite world supply being increasingly sourced from OPEC, OPEC's spare production capacity is expected to remain relatively high in historical terms over the next five years. OPEC spare production capacity is projected to be above 4 million barrels a day between 2013 and 2016, compared with 6 million barrels a day in 2010 and 3 million barrels a day in 2008.

Another factor potentially limiting significant increases in oil prices is the presence of high oil stocks in OECD economies. In November 2010, OECD stocks were at 2742 million barrels, representing 59 days of consumption. This compares with stocks of 2745 million barrels in November 2009 and 2693 million barrels in November 2008. Stocks are forecast to remain relatively high over the outlook period, and can be used as an additional source of supply in the event of unforseen supply disruptions or demand increases, thereby limiting prolonged oil price increases.

Exploration and development to continue at a higher cost

Over the medium term, high oil prices are expected to result in increased exploration and development activity, leading to new oil field developments and underpinning growth in world oil production. Investment in oil exploration, as measured by the Baker Hughes worldwide drilling count, has been increasing and was at 3227 in December 2010. This is still below the peak of 3557 in September 2008 but well above the low of 1983 in May 2009. While oil exploration and project development activity is expected to continue, development and production from new oil fields are likely to be at a higher cost relative to fields currently in operation. The majority of new oil field developments, particularly in the non-OPEC region, are further below the seabed and a greater distance from shore than existing fields. As a result, most new oilfields are characterised by higher development and production costs and hence companies are likely to require greater confidence that oil prices will remain above production costs on a long-term basis before committing to development.

Worldwide drilling rig count
monthly, ended December 2010



Source: Baker Hughes.

Moderating oil demand growth in the medium term

In 2010, world oil consumption is estimated to have averaged 87.8 million barrels a day, a 3.3 per cent increase from the 2009 average. Growth in oil demand in 2010 largely reflects improved world economic growth, supported by higher consumption for electricity generation associated with an unseasonally hot summer in Japan and a colder than average winter in the Northern Hemisphere.

In 2011, world oil consumption growth is forecast to moderate to 1.6 per cent, as economic growth is assumed to ease in the major consuming economies of the United States, China and the European Union. Over the medium term, world oil consumption is projected to increase at an average rate of 1.3 per cent a year, to reach 95 million barrels a day in 2016. This projected modest increase in world oil consumption reflects the effect of continued strong non-OECD oil consumption growth being partially offset by falling OECD oil consumption growth.

Oil demand growth in non-OECD countries to remain strong

In 2010, oil consumption in non-OECD economies increased by 5 per cent to 41.7 million barrels a day, underpinned by strong economic growth, particularly in developing Asia. Strong economic growth is projected to continue to drive non-OECD oil consumption growth over the outlook period, increasing at an average rate of 2.7 per cent a year, to 49.3 million barrels a day in 2016.

China's oil consumption increased strongly over the second half of 2010, driven partly by government-enforced shutdowns of coal-fired power stations, which resulted in increased use of backup oil generators as an alternative source of electricity supply. For 2010 as a whole, oil consumption in China is estimated to have increased by 12 per cent to 9.4 million barrels a day. In 2011, China's oil consumption growth is forecast to moderate, increasing by 6 per cent to 9.9 million barrels a day, as less oil is expected to be used for power generation and economic growth is expected to be weaker following government measures to cool the economy.

Over the medium term, China's oil consumption is projected to increase at an average rate of 5 per cent a year, to average 12.7 million barrels a day in 2016. Rising incomes are expected to support increased demand for oil in the transport and industrial sectors. The use of petroleum fuels for motor vehicles has increased strongly in recent years, in line with a rapidly expanding car fleet, which is estimated to have more than doubled over the past three years.

In non-OECD Asia (excluding China), a rapidly growing transport sector will continue to underpin strong growth in oil demand, aided by increasing incomes and domestic price controls on petroleum fuels. By 2016, oil consumption in the non-OECD Asian countries (excluding China) is projected to reach an average of 11.6 million barrels a day, which is a 13 per cent increase from the 2010 average.

In India, oil consumption is estimated to have increased by 2.5 per cent in 2010, to 3.3 million barrels a day. In 2011, India's oil consumption is forecast to increase by a further 3.5 per cent, underpinned by consumption of petroleum fuels for transport. The structure of the Indian petroleum market and relevant government policies will influence India's oil consumption. The

Indian Government removed official price ceilings on petrol in June 2010 but retained a price ceiling on diesel, which accounts for around 37 per cent of India's consumption of petroleum products. India's use of petroleum fuels is forecast to remain strong over the medium term, with consumption projected to reach 4 million barrels a day in 2016. This represents a projected average rate of growth of 3.1 per cent a year over the medium term.

In the Middle East, oil consumption is projected to continue growing strongly. Over the past eight years, high oil prices have contributed to strong economic growth in the region, supporting higher oil consumption in the manufacturing and air transport industries. In addition, the subsidisation of oil prices in domestic markets has supported the use of oil in electricity generation and for transport. These factors are expected to continue to lead to strong oil consumption in the Middle East over the outlook period, with consumption projected to increase at an average rate of 2.9 per cent a year, to reach 8.9 million barrels a day in 2016.

OECD demand to decline over the outlook period

In the OECD, oil consumption declined steadily between 2005 and 2009, but rose in 2010, by 1.5 per cent to 46.1 million barrels a day. The falling OECD oil consumption reflects lower energy consumption associated with efficiency improvements, and a substitution towards relatively low-cost gas as a source of electricity. This trend is expected to continue over the outlook period, especially in Japan and Europe, with OECD oil consumption declining by 0.2 per cent a year to 45.7 million barrels a day in 2016. In Europe, oil consumption declined by nearly 1 per cent in 2010, to 14.4 million barrels a day. Over the outlook period, oil consumption is projected to decline further in response to assumed weak economic growth, continued energy efficiency improvements and increased use of cleaner energy sources such as gas. By 2016, oil consumption in OECD Europe is projected to average 14.1 million barrels a day, 2 per cent lower than in 2010.

North America is projected to be the only OECD region that will achieve growth in oil consumption over the medium term. Assumed economic recovery, particularly in the latter half of the outlook period, is expected to lead to higher demand for oil. Nevertheless, regional oil consumption is projected to increase only modestly because expansion in transport consumption will largely be offset by increasingly stringent fuel efficiency standards and the substitution away from oil in industry and electricity generation. Oil consumption in North America is projected to average 24 million barrels a day in 2016.

In the Pacific region, oil demand is projected to remain relatively flat over the outlook period. While oil consumption is projected to increase in Australia, New Zealand, and the Republic of Korea, these increases are expected to be offset by a decline in oil use in Japan. Increases in vehicle fuel efficiency and the substitution of oil for gas and nuclear power in electricity generation will drive lower oil consumption in Japan. Japan's oil consumption is projected to decline at an average rate of 1 per cent a year to 4 million barrels a day in 2016. Oil consumption in the Pacific region as a whole is projected to remain relatively stable over the outlook period at around 7.6 million barrels a day.

Slowing oil production growth

Over the outlook period, a growing proportion of world oil supply is projected to be sourced from OPEC countries. Following an estimated 2.5 per cent increase in total world oil production in 2010, growth in oil production is projected to slow to 1.3 per cent a year over the medium term, to total 95 million barrels a day in 2016.

OPEC to take a growing share of world supply

OPEC production is estimated to have increased by 3 per cent in 2010, to 34.5 million barrels a day. The majority of this increase came from growth in production of natural gas liquids. In 2011, OPEC's total liquids production is forecast to increase by 3.5 per cent to 35.7 million barrels a day. Production of natural gas liquids is forecast to increase by 10 per cent in 2011.

Over the medium term, a number of new projects are expected to result in an increase in OPEC's crude oil production capacity to around 37 million barrels a day by 2016. Saudi Arabia, the United Arab Emirates and Iraq will account for the largest increases in production capacity over this period, and planned expansions in Angola, Nigeria and Libya will also contribute. Production of natural gas liquids and condensate is projected to grow strongly, with Qatar contributing most significantly. OPEC's natural gas liquids and condensate production capacity is projected to increase at an average rate of 5 per cent a year, to average 7.3 million barrels a day in 2016.

The biggest project that will support higher OPEC oil production is in Saudi Arabia. The 1.2 million barrels a day Khurais field, which was completed in 2009, will be the main source of growth in oil supply in the next few years as its production reaches capacity. In Iraq, oil production is estimated to have declined by 3 per cent to 2.4 million barrels a day in 2010. However, Iraq's production in 2011 is expected to increase as existing fields, such as the Rumaila field and the Zubair development, increase production following repairs. Iraq's crude oil production capacity is projected to increase to around 3.5 million barrels a day by 2016.

Outside the Middle East, several projects planned for completion over the next few years are expected to support increases in OPEC production. In Nigeria, the Usan (180 000 barrels a day) and Egina (200 000 barrels a day) fields are expected to begin production in 2013 and 2014, respectively. However, there are potential risks to these planned projects. In Nigeria, oil production in 2009 was significantly affected by rebel attacks on oil production facilities in the Niger Delta. Although the situation improved in 2010, rebels have threatened to resume attacks in the lead-up to the election in early 2011. Further political instability could affect the outlook for oil production in Nigeria. Another risk relates to policies in some member countries to increase local employment in oil production facilities. These policies have recently led to project delays as a result of shortages of qualified personnel in Angola, Libya and Nigeria.

Modest growth in non-OPEC production

Non-OPEC production is expected to be limited as higher production from new projects will be largely offset by declining output from mature fields over the outlook period. Increases in production are expected in Brazil and the Caspian region, but these increases are expected to be largely offset by declines in production in the United States, Mexico and the North Sea after 2012.

In North America, oil production is estimated to have increased by 3 per cent to 14 million barrels a day in 2010. Increasing production in Canada is not projected to be sufficient to offset reduced outputs in the United States and Mexico, leading to North American production declining at an average rate of 0.5 per cent a year, to 13.5 million barrels a day by 2016.

Declining production in the United States is expected as a result of project delays in the Gulf of Mexico. Oil production in the Gulf of Mexico is forecast to decline by around 200 000 barrels a day in both 2011 and 2012. Beyond the short term, increases in production depend on the development of new deepwater projects in the Gulf of Mexico. United States oil production is projected to be around 5.2 million barrels a day by 2016, a decline of 5.6 per cent compared with 2010 output.

The National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling released its report on 12 January 2011. The report recommends that regulatory oversight of leasing, energy exploration, and production requires reforms beyond those already initiated since the Deepwater Horizon accident. New regulations enforced by the Bureau of Ocean Energy Management, Regulation and Enforcement have caused delays in new approvals since the official moratorium on deepwater drilling was lifted in October 2010. The additional regulations recommended by the commission may lead to further project delays and higher development costs. As such, considerable uncertainty remains in the outlook for oil production in the United States.

Canada's oil production is projected to increase at an average rate of 3 per cent a year over the outlook period, to reach 4 million barrels a day in 2016. The main factor underpinning this increase is the significant expansions from non-conventional sources, notably oil sands. New oil sands projects such as Long Lake (200 000 barrels a day) and Kai Kos Dehseh (120 000 barrels a day) will support growth in oil production over the outlook period. The success of the Keystone XL Pipeline project (500 000 barrel a day capacity), which involves building a pipeline for the export of crude oil from non-conventional sources in Canada to the United States, will be an important factor for the development of several oil sands projects. The pipeline is currently scheduled for completion in early 2013, but still requires US Government approvals.

In Brazil, oil production is projected to increase at an average rate of 7 per cent a year over the medium term. This is a modest slowdown from forecast growth of 9 per cent in 2011. The 200 000 barrels a day Tupi field, which started production in October 2010, is expected to provide the majority of production growth in the short term. The Cachalote and Peregrino fields, which each have a production capacity of 100 000 barrels a day, are also expected to begin production by 2013. Continued development of oil discoveries in pre-salt layers, with projects such as the Jupiter field, is also likely to contribute to higher oil production over the outlook period to 3.3 million barrels a day by 2016.

Oil production in the Russian Federation is expected to be limited by increased development costs in remote regions of eastern Siberia and uncertainty over domestic taxation frameworks. In 2010, uncertainty over taxation for new oil projects resulted in delays to new projects. The Russian Government is scheduled to introduce new taxation arrangements for oil by mid-2011.

New projects proposed for development in the Russian Federation are primarily in eastern Siberia, and these have high development costs and long lead times. As a result, Russian production is projected to increase only marginally over the outlook period, to around 10.6 million barrels a day in 2016.

Kazakhstan's oil production is forecast to increase modestly over the medium term and will be supported by the completion of the Caspian Pipeline Consortium pipeline, which is planned to more than double current export capacity to 1.35 million barrels a day by 2015. The completion of this infrastructure will primarily be used to export rising production from new expansions to oil production capacity, including the Tengiz, Karachaganak and Kashagan fields. However, there remain hurdles to the timely development of some of these expansions. For example, the second phase of the Kashagan field, which proposes to more than double production to 1 million barrels a day by 2012, has not yet been approved by the Kazakhstan Government.

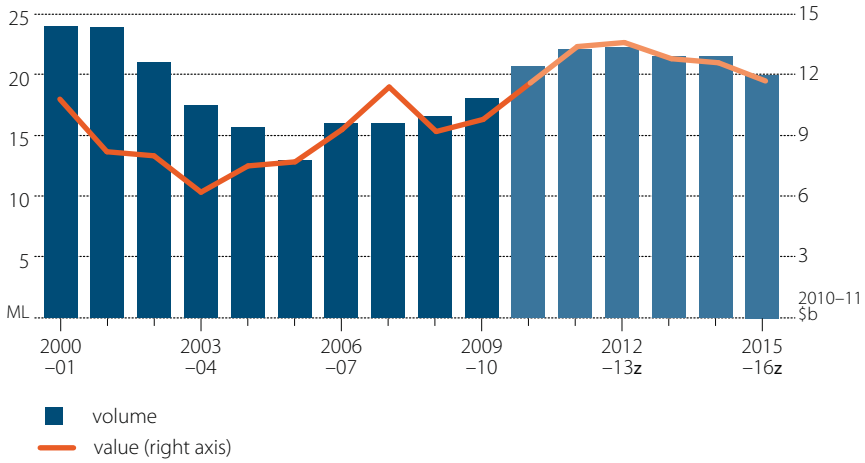
Australian production to increase

In 2010–11 Australia's crude oil and condensate production is forecast to increase by 9 per cent to 27.8 gigalitres. The ramp-up of the Pyrenees and Van Gogh fields in the Carnarvon Basin has supported increasing oil production since the second half of 2010. In 2011–12, several new oil projects that are scheduled for completion in the second half of 2011, such as Kitan (35 000 barrels a day) and Montara/Skua (35 000 barrels a day), are forecast to lead to an 8 per cent increase in production to 30.1 gigalitres. Oil production is forecast to increase modestly in 2012–13 to 30.2 gigalitres, as new projects ramp-up production. Beyond 2012–13, Australia's oil production is projected to decline gradually to 26.9 gigalitres in 2015–16, as maturing fields outweigh increases in production from new projects such as Turrum (11 000 barrels a day), and Kipper (10 000 barrels a day).

Australia's oil exports over the outlook period are projected to follow a similar profile to production. Exports are forecast to increase by 15 per cent in 2010–11 and by a further 7 per cent in 2011–12 to reach 22 gigalitres. These forecast increases in exports reflect an assumption that a significant proportion of production from fields in the Bonaparte, Browse and Carnarvon basins will be exported, given their proximity to Asian refineries. Beyond 2012–13, oil exports are projected to decline to 20 gigalitres by 2015–16.

The value of Australia's oil exports is forecast to increase from 2010–11 to 2012–13, reflecting a forecast increase in export volumes and higher expected prices. By 2012–13 the value of oil exports is forecast to reach $13.6 billion, before declining gradually to $11.7 billion by 2015–16 (in 2010–11 dollars).

Australian crude oil and condensate exports



Outlook for oil

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Production **b**	mbd	85.2	87.3	89.2	90.6	91.8	92.8	93.9	95.0
Consumption	mbd	85.0	87.8	89.2	90.6	91.8	92.8	93.9	95.0
Trade weighted crude oil price **c**									
– nominal	US$/bbl	61	78	89	95	96	97	97	99
– real **d**	US$/bbl	62	79	89	94	93	91	90	90
West Texas intermediate crude oil price									
– nominal	US$/bbl	62	79	91	98	99	99	99	101
– real **d**	US$/bbl	64	80	91	96	95	93	92	92
		2008 –09	2009 –10	2010 –11 f	2011 –12 f	2012 –13 z	2013 –14 z	2014 –15 z	2015 –16 z
Australia									
Crude oil and condensate									
Production **b**	ML	26 950	25 572	27 802	30 077	30 221	29 266	29 122	26 923
Export volume	ML	16 588	18 064	20 705	22 085	22 341	21 462	21 525	20 031
Export value									
– nominal	A$m	8 757	9 534	11 622	13 758	14 398	13 860	13 990	13 326
– real **e**	A$m	9 215	9 805	11 622	13 351	13 598	12 771	12 576	11 687
Imports	ML	24 302	27 284	30 000	29 156	29 402	29 613	29 959	30 803
LPG									
Production **g**	ML	3 930	4 096	4 066	4 109	4 077	4 132	4 098	4 165
Export volume	ML	2 500	2 776	2 549	2 578	2 557	2 594	2 573	2 618
Export value									
– nominal	A$m	1 044	1 105	1 059	1 174	1 211	1 231	1 228	1 279
– real **e**	A$m	1 098	1 136	1 059	1 139	1 144	1 134	1 104	1 122
Petroleum products									
Refinery production	ML	39 546	37 200	37 979	38 017	38 150	38 284	38 420	38 558
Other **h**	ML	3 013	3 073	3 131	3 176	3 207	3 208	3 135	3 136
Exports **i**	ML	1 164	850	793	823	826	829	832	835
Imports	ML	19 697	19 967	18 336	19 115	19 649	20 102	20 532	20 981
Consumption – total net **j**	ML	58 119	57 905	58 559	59 643	60 566	61 429	62 370	63 225

b One megalitre a year equals about 17.2 barrels a day. **c** Official sales prices or estimated contract terms for major internationally traded crude oils. **d** In 2011 US dollars. **e** In 2010–11 Australian dollars. **g** Primary products sold as LPG. **h** Refinery swells and losses, stock changes, petrochemical byproducts and naturally occurring LPG for domestic consumption. **i** Excludes LPG. **j** Liquid petroleum products including refinery fuel, feedstocks and losses, and international ships and aircraft stores. **f** ABAREs forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; International Energy Agency; Energy Information Administration (US Department of Energy).

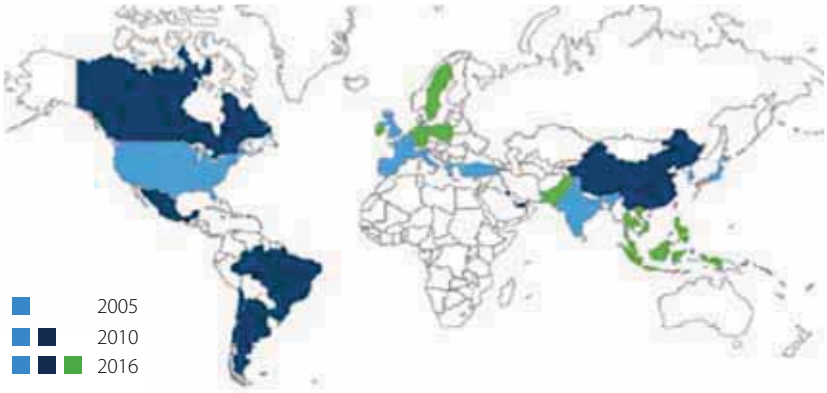
Gas

Outlook to 2016

Farah Beaini, Akitsugu Kubota and Alan Copeland

Over the outlook period, global natural gas consumption is projected to increase significantly, with a number of economies placing increased emphasis on energy security and on the environmental competitiveness of gas relative to other fossil fuels. Liquefied Natural Gas (LNG) will be an important source of gas for economies with insufficient domestic reserves or seeking to diversify supply sources. By 2016, world LNG trade is projected to increase by an average annual growth rate of 2 per cent to 283 million tonnes.

Expanding LNG import markets



Australia has significant reserves of gas, including natural and Coal Seam Gas (CSG), which far exceed domestic consumption requirements. However, given Australia's geographic distance from gas-importing economies, its contribution to gas trade is in the form of LNG. Over the next five years, Australia's LNG exports are projected to increase at a rate of 19 per cent a year, underpinned by a number of new projects under construction. This expected growth reflects Australia's attractiveness as a location for investment given its perceived lower security and political risks compared with competitors such as those in the Middle East or West Africa.

World LNG trade – the defining years

World LNG trade has historically been characterised by two distinct import markets—the Asia–Pacific and the Atlantic markets. The Asia–Pacific import market includes Japan, the Republic of Korea, China and Chinese Taipei, while the Atlantic market includes European and North American LNG importers. In 2010, the Asia–Pacific market accounted for around 63 per cent of world trade and the Atlantic market accounted for 34 per cent. The rise of new LNG markets is reflected in the growth of the Middle East as an import market, which accounted for 3 per cent of world trade in 2010.

In total, world LNG trade in 2010 is estimated to have increased by around 19 per cent to 212 million tonnes. The significant expansion in LNG capacity in the past few years that coincided with the global economic downturn has resulted in significantly lower LNG spot prices in 2010. As a result, the volume of LNG traded on spot markets increased rapidly throughout 2010, particularly in price sensitive markets such as China, India and Europe. Stronger gas demand, associated with economic recovery in north Asia, also contributed to higher imports during the year.

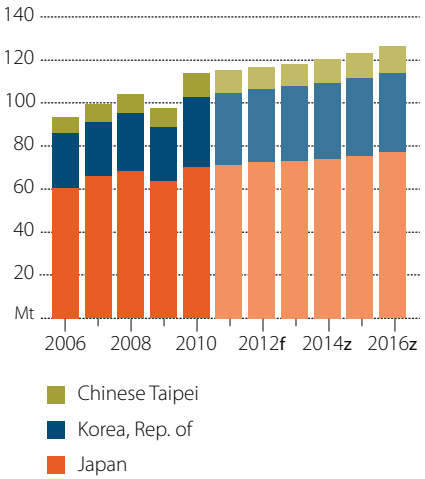
In 2011, world LNG trade is forecast to increase by a further 9 per cent to 230 million tonnes. Growth in LNG trade will be supported by stronger gas-fired electricity generation and higher industrial and domestic consumption in a number of large LNG importing economies. The growth in gas demand in many economies also reflects its relative competitiveness against other fuels for electricity generation, with significant increases in LNG production capacity maintaining downward pressure on prices. The increased LNG trade will use LNG supplied to existing regasification terminals throughout Asia and Europe, as well as LNG from new regasification terminals in China, Thailand, Spain and Italy.

Over the medium term, gas consumption in many countries is expected to increase, supported by a range of factors including energy diversity and security, and the cost and environmental competitiveness of gas compared with other fuels. In many of these economies, especially those in Asia and Europe, increased gas consumption will require additional LNG imports. By 2016, world LNG trade is projected to increase by an average growth rate of 2 per cent a year to 283 million tonnes.

Imports by north Asian market to show slight increase in 2011

In 2011, LNG imports into traditional north Asian markets (Japan, the Republic of Korea and Chinese Taipei) are forecast to increase by 1 per cent to 115 million tonnes, as assumed slower economic growth reduces gas consumption. By 2016, north Asian LNG imports are projected to reach 126 million tonnes, underpinned by government policies that encourage a higher proportion of gas consumption in the total energy mix.

LNG imports in north Asia market



In 2011, Japan, the world's largest LNG importer, is forecast to import 71 million tonnes of LNG, a 2 per cent increase from 2010. Increased imports in 2011 partly reflect the price competiveness of gas against other energy sources, such as coal. In addition, the start-up of Kansai Electric's 800 megawatt Sakaiko power plant, which commenced operations in late 2010, is expected to support increased LNG imports in 2011.

Beyond 2011, LNG imports by Japan are projected to grow at an annual average of 2 per cent to reach 77 million tonnes by 2016. Increasing imports over the medium term are expected to be underpinned by government policy aimed at increasing the share of gas in Japan's energy mix. The Japanese Government

has encouraged higher consumption of gas because it is more cost-effective than oil as an electricity generation fuel and has lower greenhouse gas emissions compared with coal. A significant proportion of Japan's increased LNG imports over the outlook period will be consumed in new gas-fired power stations, with an additional 7800 megawatts of capacity scheduled to enter operation. New capacity includes Tokyo Electric's 500 megawatt Kawasaki (2013), Chubu Electric's 2400 megawatt Joetsu (2012–2014), Kansai Electric's 2900 megawatt Himeji (2013–2015), and Okinawa Electric's 500 megawatt Yoshinoura power plant (2012–2013).

LNG imports by the Republic of Korea are forecast to increase by 2 per cent to 33 million tonnes in 2011. Relatively strong economic growth in 2011 is expected to underpin increased consumption of gas for electricity generation and in the industrial and residential sectors.

Beyond 2011, LNG imports by the Republic of Korea are projected to increase by 2 per cent a year to 37 million tonnes by 2016. Over the outlook period, government policies aimed at reducing dependence on oil and encouraging use of gas will support gas consumption growth. Increased LNG imports will be supported by the start-up of KOGAS's 2 million tonnes a year Samcheok regasification terminal in 2013. However, the Korean Government is also encouraging the use of nuclear power generation, with six nuclear reactors scheduled to be in operation by 2016. The expansion of nuclear power generation capacity represents a downside risk to LNG imports as it may limit significant increases in gas consumption over the outlook period.

In Chinese Taipei, LNG imports by 2016 are projected to increase by around 2 per cent a year to 12 million tonnes. Increased imports will be underpinned by higher gas consumption in electricity generation. This increase reflects government policies that promote gas consumption because it has lower greenhouse gas emissions than coal.

Imports in China and India to grow...

Since China received its first LNG shipment in 2006, imports have grown rapidly, totalling 9 million tonnes in 2010. China' s LNG imports have been underpinned by government policies that encourage gas consumption for energy diversity reasons and, more recently, to take advantage of relatively low LNG spot prices.

In 2011, China's LNG imports are forecast to increase by 17 per cent to 11 million tonnes, supported by the start-up of regasification terminals at Jiangsu (3.5 million tonnes a year) and Dalian (3 million tonnes a year) as well as the ramp-up of capacity at the Fujian and Shanghai terminals, which were opened in 2009.

Over the outlook period, China's gas consumption is projected to increase as the government seeks to diversify energy sources and lower the economy's energy intensity. China's growing gas demand is expected to be met by higher domestic gas production, increased pipeline imports from central and South-East Asia and increased LNG imports.

Increases in China's gas production over the outlook period are expected to come from a combination of conventional and non-conventional sources, supported by a number of onshore and offshore natural gas fields scheduled to be developed. Toward the end

of the outlook period and beyond, coal seam gas and shale gas could make a significant contribution to China's gas supply. China's coal seam gas and shale gas industries are largely at a developmental stage and still require exploration, resource delineation and adaptation of production technologies. However, a number of international oil companies are working with Chinese oil companies to develop and expand China's gas production from unconventional sources.

Despite this increase in domestic supply, production is expected to be insufficient to meet China's growth in gas demand. Over the outlook period, the gap between China's gas consumption and domestic production will come from imports, both pipeline and LNG. Increased gas pipeline imports in 2011 will be associated with the ramp-up of gas through the 30 billion cubic metre a year China–Turkmenistan pipeline which started operation in late 2009, and the development of the 12 billion cubic metre Sino–Burma pipeline, which is scheduled to be operational in 2013. LNG imports will also play an important role in meeting China's gas demand, particularly in south-eastern China. LNG imports are assumed to be more competitive than gas imported from central Asia given the pipeline transport distance.

With three LNG terminals currently in operation and a further six under construction, LNG imports by China are projected to increase by 17 per cent a year to 24 million tonnes in 2016. LNG imports will be underpinned by long-term contracts with producers in Australia, Malaysia, Indonesia and Qatar.

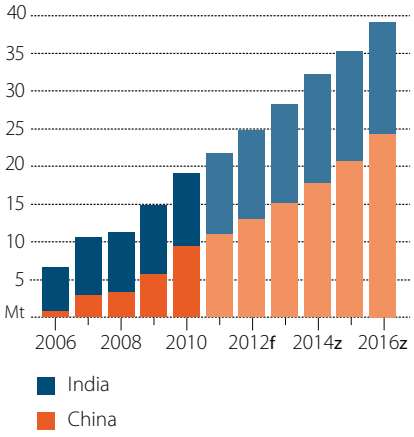
China's current and potential LNG supply agreements

imports		supplier		contract		
company	terminal	country	project	volume mtpa	start	duration years
CNOOC	Guangdong	Australia	North West Shelf	3.3	2006	25
CNOOC	Fujian	Indonesia	Tangguh	2.6	2009	25
CNOOC	various	Qatar	Qatargas III	2*	2009	25
CNOOC	Shanghai	Malaysia	Malaysia Tiga	3	2009	25
CNOOC	various	various	Total portfolio	1	2010	15
PetroChina	various	Qatar	Qatargas IV	3**	2011	25
PetroChina	various	Australia	Gorgon/Shell portfolio	2	na	20
PetroChina	various	Australia	Gorgon (Exxon)	2.25	na	20
CNOOC	various	Australia	Curtis LNG/BG portfolio	3.6	2014	20
Sinopec	Shandong	PNG	PNG LNG	2	na	20
CNOOC	various	various	GDF SUEZ portfolio	2.6	2013	4

* 5–7 mtpa from 2013. ** 5 mtpa from 2015.

Over the medium term, India's natural gas consumption is projected to increase, underpinned by consumption for electricity generation and in the industrial sector. The growth in gas demand will be met by a combination of imported gas and domestic production. India's domestic production in 2011 and 2012 is expected to increase rapidly, associated with supply from the Krishna–Godavari Basin. Gas production, which started in the basin in 2009, is expected to reach a production plateau of 30 billion cubic metres (equivalent to around

LNG imports in China and India



22 million tonnes of LNG) in 2012. Despite the size of the basin, production is expected to be insufficient to meet India's growth in gas demand. By 2016, India's LNG imports are projected to reach 15 million tonnes, an increase of 6 per cent a year.

...with potential growth from South-East Asia

Imports of LNG in the Asia–Pacific region over the outlook period are expected to be supported by imports into emerging Asian economies such as Thailand, Singapore, the Philippines, Bangladesh and Pakistan. In these economies, increasing energy demand will in part be met by gas being imported in the form of LNG. The extent to which some of these economies import LNG over the outlook period will depend on the timely planning, approvals and construction of regasification terminals.

Potential new LNG importers in developing Asian economies

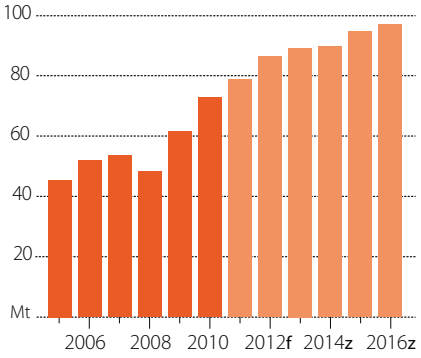
country	import project (location)	capacity mtpa	planned start-up	status
Thailand	Map Ta Phut	5	2011	under construction
Bangladesh	Floating LNG	5	2012	planned
Vietnam	Floating LNG	1.5	2012	planned
Pakistan	Floating LNG	3.5	2012	proposed
Malaysia	Melaka	3.8	2012	proposed
Singapore	Jurong Island	3.5	2013	under construction
Philippines	Bataan	1.5	2015	proposed

Over the outlook period, Malaysia, the world's second largest LNG exporter, is expected to commence importing LNG, replacing pipeline gas it receives from Indonesia with LNG. The regasification terminal, located in Melaka, will be supplied by a 20-year contract worth 3.5 million tonnes a year from the Gladstone coal seam gas LNG plant, starting in 2014.

Higher Atlantic imports to be underpinned by new entrants and low LNG prices

In 2011, Atlantic imports are forecast to increase by 8 per cent to 79 million tonnes. Underpinning increased LNG imports is the anticipated continuation of relatively low LNG spot prices associated with the expansion of regasification and storage capacity. LNG imports by France are expected to increase with the commissioning of the Fos Cavaou LNG terminal (annual capacity of 6.1 million tonnes). Other expansions to European LNG import terminals scheduled to be in operation in 2011 include the Isle of Grain terminal (4.4 million tonnes a year) in the United Kingdom and Sagunto LNG terminal (1.3 million tonnes a year) in Spain.

LNG imports into the Atlantic market



Beyond 2011, Atlantic LNG imports are projected to grow at an average annual rate of 3 per cent, reaching around 97 million tonnes in 2016. Gas consumption in Europe is expected to increase, underpinned by policies which encourage increased gas use in heating and electricity generation. LNG import growth will also be supported by the expected decline in output from the North Sea, which currently supplies a significant proportion of Europe's gas demand.

In addition to the traditional Atlantic importers, increased LNG imports are expected by emerging economies, particularly in Latin America. Concerns about security of natural gas supply, as well as declining production from long-term supplier Argentina, have encouraged the development of LNG regasification terminals in the region. A number of countries, including Brazil, Argentina and Chile, have already begun importing LNG and are expected to increase their use of gas for electricity generation as their economies grow over the outlook period. In total, LNG demand from Latin America is expected to grow by 12 per cent a year to 5 million tonnes by 2016.

New markets established in the Middle East...

The Middle East represents a relatively new LNG import market. Gas consumption throughout the Middle East (particularly the Gulf) has increased rapidly over the past decade, associated with gas-fired electricity generation and industrial use. While the Middle East sits on some of the largest gas reserves in the world, the region's growing long-term gas export commitments limit gas available for domestic consumption. This presents the Middle East with the challenge of maintaining a gas supply–demand balance amid competing domestic and export interests. The anticipated continuation of growth in gas-intensive industries, such as the steel, aluminium and petrochemicals sectors, is likely to increase demand for gas over the medium term. While Turkey began importing LNG in 1994, other Middle Eastern countries such as Kuwait and the United Arab Emirates have recently commissioned LNG re-gasification terminals, which are expected to support increased LNG imports into the region over the medium term.

Middle East regasification terminals

country	terminal	company	volume (mtpa)	start-up
Turkey	Marmara Ereglisi	BOTAS	4.8	1994
Turkey	Aliaga, Izmir	EgeGaz	4.4	2006
Kuwait	Mina Al-Ahmadi	Excelerate Energy	2.2	2009
Dubai	Jebel Ali Port - FSRU	DUSUP	3.0	2010
Israel	offshore, Mediterranean Sea	Golar Energy	3.0	2013

...amid growing and more diversified LNG supply

While the world LNG import market can be split into two regions, there are three broad LNG supply regions: the Asia–Pacific, the Atlantic and the Middle East. An increasing proportion of LNG exports into the Asia–Pacific market, Australia's key export market, are being sourced from the Atlantic and the Middle East. Developments in these alternative supply regions are likely to influence demand for Australia's LNG exports. For this reason, supply of LNG to the Asia–Pacific needs to be viewed from a global perspective.

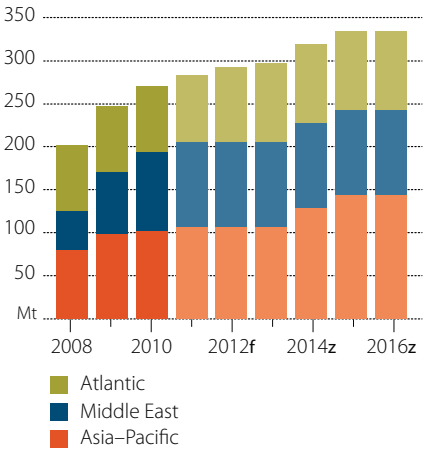
In 2010, LNG liquefaction capacity increased by 9 per cent to around 271 million tonnes. A large proportion of this increase is associated with the 15.6 million tonne expansion of Qatar's RasGas and Qatargas projects. LNG liquefaction capacity during the year also increased with the start-up of the Peru LNG (annual capacity of 4.4 million tonnes) and of the second train at Yemen LNG (3.4 million tonnes).

Global liquefaction capacity in 2011 is expected to increase by 4 per cent to 283 million tonnes. LNG projects scheduled to commence production and exports in 2011 include the first train of Woodside's Pluto project (annual capacity of 4.3 million tonnes) in Australia and the seventh train of the Qatargas LNG project (7.8 million tonnes). By the end of 2011, Qatar will have an LNG liquefaction capacity of 77 million tonnes, almost three times the capacity of Malaysia, the world's second largest LNG exporter in 2009.

Beyond 2011, approximately 52 million tonnes of LNG liquefaction capacity that is currently under construction is scheduled to be completed by 2016. Approximately 60 per cent of this new capacity is in Australia. The largest LNG project currently under construction is the Gorgon project in Western Australia (annual capacity of 15 million tonnes), which is scheduled to start operations in 2014. Two LNG projects which use coal seam gas as a feedstock are under construction near Gladstone in Queensland. These are the BG Group's Curtis Island LNG (8.5 million tonnes a year) and Santos, Total and PETRONAS joint venture's Gladstone LNG (7.8 million tonnes a year). Both are scheduled to start up in 2014–15. Other projects under construction include PNG LNG (annual capacity of 6.6 million tonnes) in Papua New Guinea, Skikda LNG (4.5 million tonnes) and Gassi Touil (4.7 million tonnes) in Algeria, and ALNG (5.2 million tonnes) in Angola.

There are a number of projects, with a potential capacity of 120 million tonnes, that are scheduled to be in operation before the end of the outlook period but for which a final investment decision is yet to be made. Given the four to five-year construction timeframe, it is unlikely that any project not currently under construction will make any significant contribution to global LNG supply before the end of the outlook period.

World LNG supply capacity



Australia's gas production to increase on the back of LNG projects and new fields

In 2010–11, Australia's gas production is forecast to increase by 11 per cent to 54 billion cubic metres. Most this increase is associated with higher coal seam gas production from the Spring Gully and Talinga, with gas to be supplied to the Darling Downs power station and Rio Tinto's Yarwun alumina refinery in Gladstone. In addition, the ramp-up of production at a number of fields that commenced operations in 2010, including the Longtom (annual capacity of 0.7 billion cubic metres), is also expected to contribute to higher production during the year.

In 2011–12, Australia's gas production is forecast to increase by a further 17 per cent to 63 billion cubic metres. This increase is underpinned by the commencement of production at the Xena and Pluto fields, which will supply the Pluto LNG project. Increased production will also be supported by the commissioning of a number of fields, including the Halyard (0.7 billion cubic metres a year) and Reindeer (1 billion cubic metres) gas fields located in the Carnarvon Basin.

Over the remainder of the outlook period, Australia's gas production is projected to increase at an average annual rate of 20 per cent, to reach around 130 billion cubic metres by 2015–16. Increased gas production will be underpinned by new LNG capacity as well as demand for gas from the electricity generation, industrial and residential sectors. Gas fields not linked to LNG projects scheduled to commence operation between 2012–13 and 2015–16 include the Kipper and Turrum gas fields (combined annual capacity of 2.8 billion cubic metres) in the Gippsland Basin, and the Macedon gas field (2 billion cubic metres) in the Carnarvon Basin.

Australia's LNG exports to benefit from increased Asia–Pacific trade...

In 2010–11, Australia's LNG exports are forecast to increase by 4 per cent to 19 million tonnes, supported by the anticipated higher demand from Australia's major export destinations, including Japan, the Republic of Korea and China.

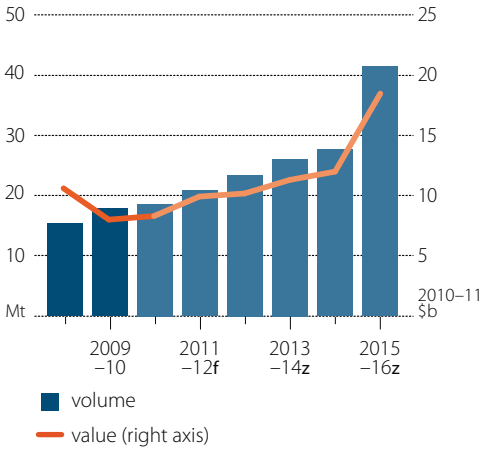
In September 2011 Australia's third LNG project, Woodside's Pluto (annual capacity of 4.3 million tonnes), is scheduled to begin operation, with the majority of production expected to be exported to Japan. The start-up of the Pluto project is forecast to underpin a 12 per cent increase in LNG exports in 2011–12 to 21 million tonnes.

...with significant increases to capacity toward the end of the outlook period

Beyond 2011–12, Australia's LNG exports are projected to increase at an average rate of 19 per cent a year, reaching around 41 million tonnes by 2015–16. Australia's LNG exports are expected to be underpinned by the start-up of projects currently under construction, including the Gorgon project (annual capacity of 15 million tonnes) in 2014–15 and Gladstone LNG (7.8 million tonnes) and Curtis LNG (8.5 million tonnes) in Queensland in 2014–15.

There is potential for Australia's LNG exports to continue to increase after 2015–16. Feasibility and design studies are continuing on a number of conventional natural gas projects off the north-west coast of Australia, such as Ichthys, Wheatstone and Browse, and Pluto's second and third trains, as well as the Australia Pacific LNG coal seam gas project in Queensland. Some of these projects could be given a final investment decision during 2011. However, given the four to five-year construction timeframe, they are not expected to significantly add to Australia's LNG export until after the outlook period.

Australian LNG exports



Export earnings to rise

LNG prices under long-term contracts are usually determined by a formula linked to oil prices. In 2010–11, forecast higher oil prices and export volumes are expected to underpin a 6 per cent increase in the value of Australia's LNG exports to $8 billion. The value of LNG exports (in 2010–11 dollars) is projected to grow at an average rate of 27 per cent a year, reaching $18 billion in 2015–16. The increase in export earnings reflects the growth of export volumes and projected higher oil prices.

Outlook for gas

	unit	2008 –09	2009 –10	2010 –11 f	2011 –12 f	2012 –13 z	2013 –14 z	2014 –15 z	2015 –16 z
Australia									
Production	Gm^3	44.5	49.0	54.3	63.3	65.4	70.9	91.9	129.4
LNG export volume	Mt	15.4	17.9	18.6	20.8	23.4	23.8	27.6	41.4
LNG export value									
– nominal	A$m	10 079	7 789	8 305	9 223	10 803	11 192	13 352	21 081
– real **b**	A$m	10 606	8 010	8 305	8 950	10 203	10 312	12 003	18 488

b In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.

Sources: ABARES.

Thermal coal

Alan Copeland and Rubhen Jeya

Over the outlook period, world thermal coal trade is projected to increase by 4 per cent a year to 962 million tonnes in 2016. The strong growth will reflect increasing imports into developing economies, particularly China and India. Import growth into traditional markets such as Japan and the European Union are projected to be limited. The higher demand will be met by increased supply from Australia, Indonesia and Colombia. Thermal coal prices over the medium term are assumed to remain high, reflecting strong import demand and increasing production costs.

Thermal coal prices to increase in the short term...

For much of 2010, thermal coal spot prices traded around US$90–100 a tonne, but prices began to rise during the last quarter of 2010, when production in a number of key exporting countries was affected by rain. In mid-January, thermal coal spot prices traded at US$135 a tonne after coal production and export capacity was damaged by heavy rainfall and flooding in Queensland. By mid-February, when production and exports from Queensland resumed, spot prices had eased to US$125 a tonne.

For Japanese Fiscal Year 2011 (JFY, April 2010 to March 2011), thermal coal contract prices are assumed to settle at around US$125 a tonne. If achieved, this would be around 25 per cent higher than the JFY 2010 contract prices. The increase in prices reflects a combination of anticipated strong import demand by China and India and the lingering effects of the Queensland floods, which could continue into the June quarter 2011.

...and remain high over the medium term

Over the outlook period to 2016, thermal coal contract prices are expected to remain high, although they are assumed to decline in real terms to US$80 a tonne in JFY 2016. This would be significantly higher than average prices between 1990 and 2007, reflecting rising supply costs in China, the world's largest producer of thermal coal, and in Australia and Indonesia, the largest exporters. Production costs are expected to increase over the medium term as companies develop coal deposits that are deeper underground and further away from existing infrastructure. In Australia, increased export capacity associated with new infrastructure projects is expected to have a significantly higher unit cost than existing infrastructure.

World trade to grow rapidly...

Over the outlook period, world thermal coal trade is projected to increase at an average rate of 4 per cent a year to 962 million tonnes in 2016. Growth in thermal coal trade is projected to be underpinned by strong import growth in developing Asia, particularly China and India. As economies in developing Asia grow and per capita income increases, a significant proportion of increased electricity demand is expected to be supplied by coal-fired power stations. In contrast, exports into traditional markets such as Japan and Europe are projected to remain relatively flat, reflecting weaker economic growth. In addition, the share of electricity generated from coal is expected to decline as government policies encourage the use of gas, nuclear and renewables.

...underpinned by China and India...

In 2010, China's thermal coal imports are estimated to have totalled 119 million tonnes, an increase of 29 per cent from 2009. The growth in China's imports over the past two years reflects an inability of China's coal production growth to match increased demand. It also reflects the competitiveness of imported coal because of high domestic coal prices and low international freight rates.

In 2011, China's thermal coal imports are forecast to decrease by around 3 per cent to 115 million tonnes. The fall in imports reflects lower electricity consumption growth associated with assumed weaker economic growth and lower domestic coal prices, which could ease with increased mine production and infrastructure capacity. The downward pressure on China's domestic prices has coincided with an increase in international prices because of weather-related production and export disruptions in a number of key supply countries.

Over the medium term, the ability of domestic production and infrastructure growth to keep pace with demand for thermal coal will be a key driver of China's imports. China's thermal coal production will continue to increase over the period to 2016, though higher production costs could limit growth. Production costs at new projects are expected to increase relative to those at existing mines because the coal is generally deeper below ground and further away from existing infrastructure. In addition, there is an increasing emphasis on safety and environmental protection.

Coal transport costs over the outlook period are also expected to place upward pressure on delivered prices for domestic coal in China. A significant proportion of China's coal production is located in the northern part of the country, distant from the large consuming regions on the south-east coast. The increasing geographic distance between large production and consumption centres is expected to place upward pressure on transport costs, which will increase the competitiveness of imported coal.

The higher production and transport costs associated with domestic coal supply are projected to result in China's thermal coal imports increasing to 130 million tonnes in 2016 from 115 million tonnes in 2011.

Over the past five years, China's coal exports have declined rapidly to an estimated 18 million tonnes in 2010. This compares with exports of around 81 million tonnes in 2004. The fall in exports reflects strong domestic demand and policies which are aimed at ensuring sufficient supply for domestic consumers. Weak import demand in important markets such as Japan has also contributed to falling exports. Over the outlook period, China's exports are projected to remain around 15–20 million tonnes, reflecting strong domestic demand and weak import demand in north Asia.

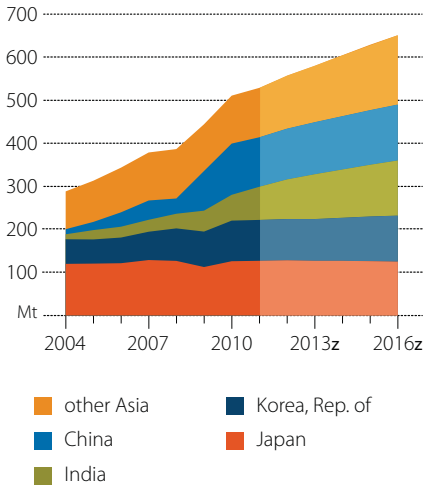
India is expected to remain one of the fastest growing consuming and importing regions over the outlook period, with imports projected to increase from around 60 million tonnes in 2010 to 128 million tonnes in 2016. The increase in India's thermal coal consumption is underpinned by recent and planned expansions of coal-fired electricity generation capacity. Part of the Ministry of Power 11th Power Plan (2007 to 2012) dictates that rate of electrification across the

country should increase. Coal-fired electricity generation is favoured in India because of its security of supply and abundant domestic resources.

In order to increase India's electricity generation capacity, a number of ultra mega power projects are under construction. These include three Reliance Power projects with a total of capacity of 12 000 megawatts and one Tata Power project with a capacity of 4000 megawatts. The four projects, which could each consume 15 million tonnes a year of coal, are scheduled to be in operation by 2016. They are expected to burn a mix of imported and domestic coal. There are also a number of smaller coal-fired power stations under construction which will contribute to increased coal consumption and imports over the outlook period.

India is the world's second-largest coal producer and, although production is forecast to increase, the rate of growth is anticipated to be slower than demand, leading to increasing imports.

Asian thermal coal imports



A significant proportion of additions to India's coal-fired electricity generation capacity are expected to be in the heavily populated coastal regions. The location of these power stations contributes to the competitiveness of using imported coal. Also contributing to increasing imports is the reliability and cost of transporting domestically produced coal from the centre of the country to the coast.

...while north Asian and European imports remain relatively flat

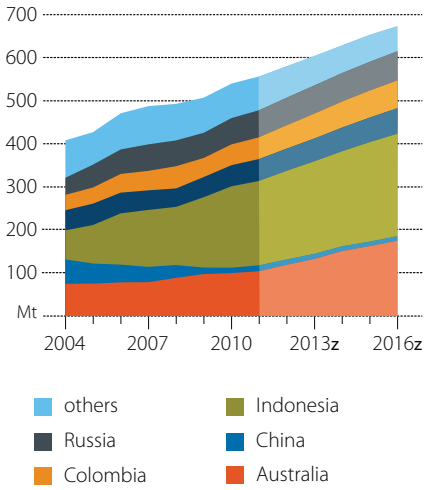
Over the medium term, Japan's thermal coal imports are projected to remain steady at around 125 million tonnes. While Japan's electricity demand is expected to increase over the outlook period, most of it will be met by increased electricity generation from natural gas, nuclear or renewables. In 2011, increased electricity supply is likely to be sourced from the phased restart of the Kashiwazaki–Kariwa nuclear power plant (8.2 gigawatts of annual capacity). Beyond 2011, gas-fired and nuclear power stations scheduled to commence operation are expected to support increased electricity generation. Renewable energy is also expected to increase its share of electricity generation in Japan, in part because of proposed tax increases on oil, gas and coal. Starting in 2011 and progressively increasing until 2015, taxes on oil, gas and coal imports will increase by 37 per cent, 72 per cent and 96 per cent, respectively. Despite a falling market share, thermal coal imports are expected to remain an important part of Japan's energy mix because it is relatively low cost and can be imported from a number of countries.

In 2010, the Republic of Korea's thermal coal imports increased by 15 per cent to 94 million tonnes as growth in electricity demand was met by increased output from coal-fired power stations that commenced operations in 2008 and 2009. In 2011, the Republic of Korea's thermal coal imports are forecast to increase by a further 1 per cent to 95 million tonnes. The Republic

of Korea's thermal coal imports are projected to remain steady at around 96 and 97 million tonnes in 2012 and 2013, respectively, before increasing in the second half of the outlook period. In 2014, a total of 2740 megawatts of electricity generation capacity is scheduled to start operation, supporting thermal coal import growth between 2014 and 2016. By 2016, the Republic of Korea's thermal coal imports are projected to reach 107 million tonnes.

In the European Union, coal imports are forecast to increase by 3 per cent to 152 million tonnes in 2011. Thermal coal imports are expected to increase because of a forecast return of hydro power utilisation to more average levels in southern Europe, following above average utilisation in 2010 that lowered coal-fired electricity generation and import demand. However, thermal coal import growth will be limited by the availability of gas for electricity generation to the region.

Thermal coal exporters



Over the medium term, thermal coal imports into the European Union are projected to increase to 174 million tonnes in 2016. Higher thermal coal consumption and imports are projected in response to the construction of new coal-fired power stations in Bulgaria and Romania and the conversion of an oil-fired power station to coal in Italy. A projected increase in gas prices in the second half of the outlook period will enhance the competitiveness of coal for electricity generation. Toward 2016, coal production in Germany is expected to decline, before ceasing completely in 2018. Germany's coal production is projected to decline to 6 million tonnes in 2016 from an estimated 13 million tonnes in 2010.

While thermal coal imports into the European Union are projected to increase over the medium term, the actual outcome depends on further policy initiatives aimed at reducing greenhouse gas emissions and increasing the share of renewable in the energy mix over the longer term.

Global supply to increase over the medium term

Over the outlook period, growth in world trade is projected to be supported by higher exports from Indonesia, Australia, Colombia and South Africa. Expansion plans are well underway in these countries to support increased exports.

Indonesia to remain the largest thermal coal exporter

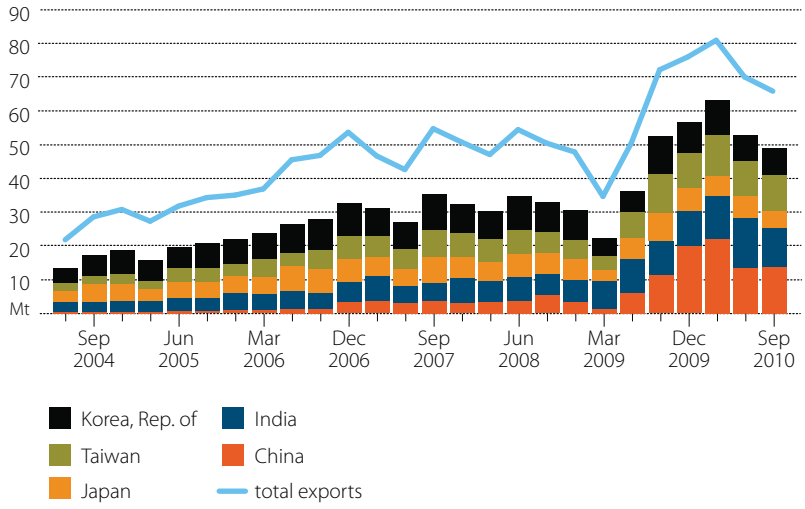
In 2010, Indonesia's thermal coal exports are estimated to have increased to 270 million tonnes, an increase of 16 per cent from 2009. The increase in exports reflects strong demand from China and India and relatively dry weather in the first half of the year which enabled higher rates of production. Indonesia's thermal coal exports in 2011 are forecast to increase by a further 4 per cent to 280 million tonnes, underpinned by continued growth in exports to China and India.

Over the remainder of the outlook period, exports are projected to increase to 340 million tonnes in 2016. Growth in exports will be supported by production capacity expansions at a number of Indonesia's largest mines, including Kaltim Prima Coal, Arutmin and Adaro.

Over the next six years, Indonesia's domestic coal demand is projected to increase following significant expansions to coal-fired electricity generation capacity. Under Indonesia's power expansion program, 10 gigawatts of coal-fired electricity generation capacity is scheduled to start up by 2014, with a further 10 gigawatts scheduled by 2017. However, despite the expected increase in domestic coal demand, Indonesia's coal industry is expected to be able to support growth in both export and domestic markets.

The projected growth in Indonesia's thermal coal production reflects its coal industry being largely unconstrained by transport and port capacity. A significant proportion of coal in Indonesia is transported along rivers by barges to the open sea for loading on to larger vessels.

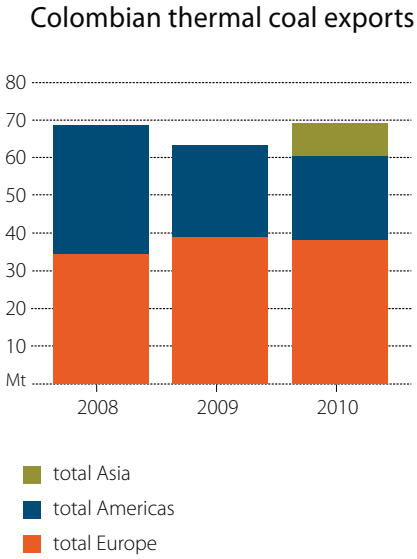
Indonesia's thermal coal exports



Colombian and South African exports to increase

In 2010, Colombia's thermal coal exports are estimated to have increased by 9 per cent to 69 million tonnes. The increase in exports largely reflected a significant increase in exports into Asia which was enabled by a large decline in freight rates and weak demand from the Atlantic market. In 2011, Colombia's thermal coal exports are forecast to increase by a further 4 per cent. This increase reflects continued growth in exports to Asia—as freight rates remain low—and growth in European imports remaining relatively weak.

Over the medium term, Colombia's thermal coal exports are projected to increase to 92 million tonnes in 2016. The increase in exports reflects significant planned investment to expand production. In addition to its relatively low cost of production Colombian coal has desirable



characteristics such as high energy and low sulphur content. Colombia's exports to Asia are projected to continue growing over the medium term, although they could slow towards the end of the outlook as freight rates increase and reduce their competitiveness.

South Africa's thermal coal exports in 2010 were estimated to be around 70 million tonnes, an increase of 4 per cent from 2009. In 2012, thermal coal exports from South Africa are expected to increase by 4 per cent from 2011 to 73 million tonnes, underpinned by stronger import demand in Europe and growing demand from China and India. The increase in exports will be supported by the expansion of rail infrastructure and increased capacity at the Richards Bay Coal Terminal.

Over the remainder of the outlook period, South Africa's exports are projected to increase by around 4 per cent a year, reaching 85 million tonnes in 2016. The increase in exports will be supported by a number of new mine and infrastructure developments. However, there are a number of risks to the outlook for South Africa's coal exports, including energy supply disruptions at mine sites and infrastructure bottlenecks. In addition, increasing domestic demand could limit the availability of coal for export.

Australian export earnings to increase

In 2010–11, Australia's thermal coal exports are forecast to increase by 10 per cent to around 148 million tonnes. This reflects increased demand for thermal coal in the Asian market and is supported by recently completed projects such as Cameby Downs (annual capacity of 1.4 million tonnes a year) and the Narrabri Coal Project (1.5 million tonnes a year). Increased exports associated with the start-up of new mines will be partially offset by lost exports as a result of heavy rain in Queensland and northern New South Wales in December and January. Flood damage to mines and rail infrastruce have resulted in 5 million tonnes of lost exports. This is discussed further in a box in the Metals section of this report.

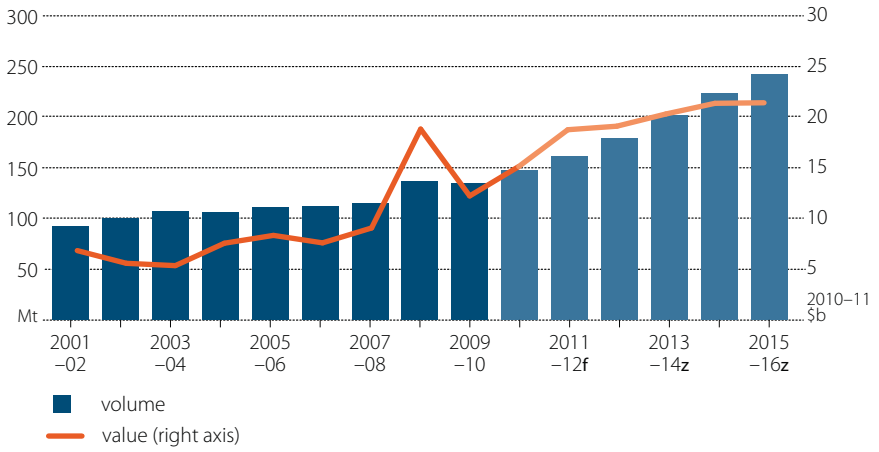
In 2011–12, Australia's coal exports are forecast to increase by 9 per cent to 161 million tonnes. Mine production scheduled to commence in 2011, including Moolarben and Mangoola, will underpin this expansion.

Between 2012–13 and 2015–16, Australia's thermal coal exports are forecast to grow at an average annual rate of 11 per cent to total 242 million tonnes in 2015–16. Encouraged by sustained high prices and strong demand, mining companies are expected to invest in expanding capacity. For example, Xstrata's Ulan West (7 million tonnes a year) and Ravensworth North mines (8 million tonnes a year) and Rio Tinto's Mount Pleasant (10 million tonnes a year) are scheduled to be commissioned during the outlook period. In addition, it is assumed that expansions to the Narrabri coal project, Mount Arthur opencut and Moolarben will contribute to increased production and exports over the medium term.

In 2010–11 and 2011–12, increased mine production capacity will be supported by recently completed infrastructure projects. These include the first stage of the Newcastle Coal Infrastructure Group (NCIG) terminal (30 million tonnes a year) and an upgrade of the Kooragang Island terminal (20 million tonnes a year) at Newcastle. Both projects were completed in 2010 and are assumed to operate at full capacity in 2011–12. Over the medium term, infrastructure capacity will continue to increase. Capacity at Kooragang Island will increase by 20 million tonnes in 2012 and a second stage NCIG terminal is under construction and scheduled for completion in 2013. A number of rail projects in the Hunter Valley that are under construction or at an advanced stage of planning will complement increased mine and port capacity. In Queensland, a number of port and rail projects are likely to start operation within the outlook period which will also increase export capacity. These include coal terminals at Wiggins Island and Balaclava Island, expansions at Abbot Point and the Goonyella – Abbot Point rail expansion and the Surat Basin Rail.

In 2010–11, thermal coal export earnings are forecast to increase by 24 per cent to $15.1 billion, reflecting higher prices and an increase in exports. In 2011–12, the value of thermal coal exports is forecast to increase by a further 28 per cent to $19.3 billion. From 2012–13, higher export volumes are projected to be the key driver of an increase in export earnings to $21.4 billion (in 2010–11 dollars) in 2015–16.

Australian thermal coal exports



Outlook for thermal coal

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Contract prices b									
– nominal	US$/t	70	98	125	115	110	105	97	90
– real c	US$/t	71	98	123	111	104	97	88	80
Coal trade	Mt	725	771	792	829	863	899	933	962
Imports									
Asia	Mt	444	511	529	557	580	604	629	651
China	Mt	92	119	115	118	121	124	127	130
Chinese Taipei	Mt	59	62	63	63	65	67	69	70
India	Mt	49	60	77	92	104	112	120	128
Japan	Mt	113	126	127	128	127	127	126	125
Korea, Rep. of	Mt	82	94	95	96	97	100	104	107
Malaysia	Mt	16	16	17	18	19	20	20	21
other Asia	Mt	33	33	36	42	47	55	62	70
Europe	Mt	207	187	193	198	205	214	220	223
European Union d	Mt	170	148	152	155	161	167	173	174
other Europe	Mt	37	40	41	43	45	47	47	49
Other	Mt	74	73	70	74	78	80	84	88
Exports									
Australia	Mt	139	142	149	170	189	215	232	250
China	Mt	22	18	20	18	17	16	15	15
Colombia	Mt	63	69	72	77	82	86	89	92
Indonesia	Mt	233	270	280	294	307	315	330	340
Russian Federation	Mt	84	87	90	92	94	95	96	97
South Africa	Mt	67	70	73	74	76	79	82	85
United States	Mt	20	22	25	22	21	20	19	18
Other	Mt	97	92	84	82	77	72	71	65
		2008 –09	**2009 –10**	**2010 –11 f**	**2011 –12 f**	**2012 –13 z**	**2013 –14 z**	**2014 –15 z**	**2015 –16 z**
Australia									
Production	Mt	209.7	202.9	217.0	232.0	251.8	277.4	300.9	320.7
Exports									
Volume	Mt	136.4	135.0	147.9	161.0	178.8	202.4	224.0	242.0
Value									
– nominal	A$m	17 885	11 886	15 131	19 341	20 240	22 060	23 780	24 437
– real e	A$m	18 821	12 224	15 131	18 768	19 116	20 327	21 377	21 431

b Japanese Fiscal Year, starting April 1, fob Australia basis, ABARES Australia–Japan average contract price assessment. For steaming coal with a calorific value of 6700 kcal/kg (gross air dried. **c** In JFY 2010 US dollars. **d** Regarded as 27 countries for all years. **e** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.

Sources: ABARES; International Energy Agency; Coal Services Pty Ltd; Queensland Department of Mines and Energy.

Uranium

Outlook to 2016

Rebecca Petchey

Over the medium term, uranium prices are projected to increase, reaching an annual average of around US$81 a pound (in 2011 US dollars) by 2016. Strong demand for uranium, particularly after 2013, and slower growth in supply are projected to support increasing uranium prices over the outlook period. In Australia, strong production growth and high uranium prices are projected to increase uranium export values to almost $3 billion by 2015–16 (in 2010–11 dollars).

Uranium prices to remain high in 2011...

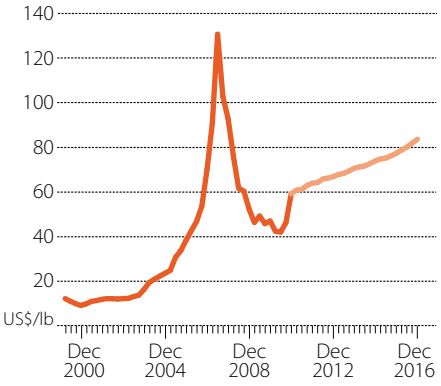
In 2010, the uranium spot price averaged around US$47 a pound, an increase of 1 per cent from the 2009 average price. However, in the last quarter of 2010, the average uranium price increased by around 26 per cent compared with the previous quarter, ending the year at around US$63 a pound. In January 2011, the average uranium price increased by a further 11 per cent to US$70 a pound. The recent price increase is largely a result of higher demand from China, as it built fuel stocks ahead of an expansion to nuclear power capacity.

In the first half of 2011, the uranium price is expected to continue to be supported by stock building in China. However, with stock building expected to ease in the second half of 2011, prices may decline. For 2011 as a whole, uranium prices are forecast to average US$62 a pound, an increase of 33 per cent compared with 2010.

...and to increase further over the medium term

Over the medium term, uranium prices are projected to increase as demand growth outpaces supply. World consumption is projected to increase rapidly, underpinned by expansions to nuclear-generating capacity. Production is projected to increase, particularly in Africa and Kazakhstan, which will offset lower supplies of uranium from secondary sources following the completion of the US–Russian Federation highly enriched uranium (HEU) purchase agreement. In 2016, the uranium price is projected to average around US$81 a pound (in 2011 US dollars), an average annual increase of 5 per cent over the outlook period.

Uranium spot price, real
base quarter March 2011



Large-scale uranium producers sell most of their output through long-term contracts rather than on the spot market. Long-term contract prices vary between companies because of differences in contract lengths, volumes and market conditions at the time of signing. In Australia, the average long-term contract price has historically been lower than the world spot market price as contracts were signed at a time of lower world prices. As a result, there are considerable differences between world spot prices and Australian unit export prices for uranium. However, as companies renegotiate contracts, Australian unit export prices are expected to move closer to world spot prices.

Uranium consumption to grow strongly over the medium term

The only commercial use for uranium is as a fuel in nuclear power reactors. As at January 2011, there were 444 operating nuclear power plants globally, with a total generating capacity of around 435 gigawatts electric. Commissioning a reactor typically requires around 600 tonnes of uranium for its initial core (based on a 1 gigawatt electric light water reactor), after which uranium requirements are lower as the reactor reaches a steady state level of operation.

New capacity to be commissioned over the outlook period

	country	number of reactors	total capacity (MWe net)
2011	Argentina	1	692
	Canada	2	1 500
	China	1	1 080
	Chinese Taipei	1	1 300
	India	2	2 000
	Iran	1	950
	Japan	1	1 373
	Pakistan	1	300
	Republic of Korea	1	1 000
	Russian Federation	1	1 000
2012	China	3	2 810
	Chinese Taipei	1	1 300
	India	1	500
	Republic of Korea	1	1 000
	Russian Federation	2	1 280
	Slovakia	1	440
2013	China	6	6 650
	Finland	1	1 550
	France	1	1 750
	Republic of Korea	2	2 350
	Russian Federation	2	1 200
	Slovakia	1	440
2014	China	10	11 400
	Japan	1	1 383
	Republic of Korea	1	1 350
	Russian Federation	2	1 980
2015	Brazil	1	1 270
	China	10	9 500
	India	1	700
	Republic of Korea	1	1 350
2016	Bulgaria	1	950
	China	11	12 900
	India	1	700
	Japan	2	2 738
	Republic of Korea	1	1 350
	Romania	1	720
	Russian Federation	5	4 820
	Ukraine	1	1 000
Total		84	86 576

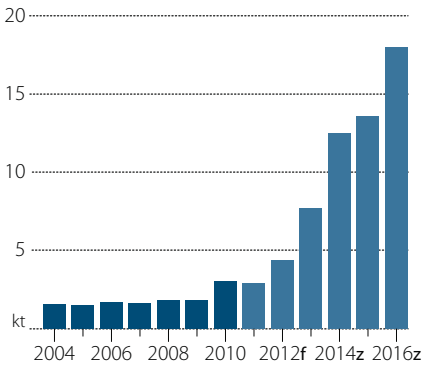
In 2011, world uranium consumption is forecast to increase by 6 per cent to 86 800 tonnes, supported by the start-up of 13.3 gigawatts electric of nuclear-generating capacity. This includes the restart of Bruce units 1 and 2 in Canada (total net capacity of 1500 megawatts electric), Kalinin unit 4 in the Russian Federation (net capacity of 1000 megawatts electric) and Kudankulam units 1 and 2 in India (total net capacity of 2000 megawatts electric).

Over the outlook period, growth in uranium consumption is projected to average 4 per cent a year, reaching 107 300 tonnes in 2016. Between 2012 and 2016, 72 new nuclear reactors with a total net capacity of 75.4 gigawatts electric are scheduled to commence operations. Around half of these are in China.

China to be world's third largest user of nuclear power

The main contributor to growth in world uranium demand is expected to be China, where uranium consumption is projected to grow at an annual average rate of 44 per cent to 18 000 tonnes in 2016. The expansion of China's uranium consumption is underpinned by government policy, which has targeted 80 gigawatts electric of nuclear capacity by 2020. Nuclear power generation is being encouraged because it can provide large quantities of baseload electricity generation capacity with lower greenhouse gas emissions than other fuel sources. This policy

China's uranium consumption



is expected to result in nuclear-generating capacity increasing from 10.3 gigawatts electric in 2010 to 54.6 gigawatts electric in 2016. This will make China the world's third largest generator of nuclear power, after the United States and France.

In the European Union, uranium consumption is projected to peak at 25 000 tonnes in 2013, reflecting the start-up of several reactors. These include Slovakia's Mochovche units 1 and 2 (total net capacity 880 megawatts electric) in 2012 and 2013, Finland's Olkiluoto unit 3 (net capacity 1550 megawatts electric) and France's Flamanville unit 3 (net capacity 1750 megawatts electric) in 2013.

In the second half of the outlook period European uranium consumption is projected to ease, reflecting the decommissioning of reactors in the Russian Federation and the United Kingdom. In the Russian Federation, seven reactors with a total capacity of 6.5 gigawatts electric are scheduled to be retired, while in the United Kingdom, six reactors with a capacity of 3.1 gigawatts electric could be decommissioned.

In Asia (including the subcontinent but excluding China), uranium consumption is projected to increase to 22 000 tonnes in 2016, an average increase of 3 per cent a year. Between 2011 and 2016, 19 reactors with a total capacity of 20.9 gigawatts electric are scheduled to start operation. Six reactors in the Republic of Korea, five in India and four in Japan account for most of this new capacity.

Secondary supplies to decline over the outlook period...

Uranium supply can be divided into two categories: primary mine production and secondary sources. Secondary sources of uranium include spent nuclear fuel, down-blended HEU from nuclear weapons and mixed oxide fuels.

Between the late 1950s and 1989, uranium production consistently exceeded requirements for energy demand, with the excess primarily used for military purposes and uranium inventories. However, since 1990, uranium requirements for energy use have exceeded mine production, with the shortfall met by secondary sources. The proportion of uranium supplied from secondary sources peaked at nearly 50 per cent in 1999. It has declined sharply in recent years, reflecting strong growth in uranium demand which has been met by increased mine production. In 2010, secondary supplies of uranium accounted for around 30 per cent of uranium requirements.

In 2010, around 19 000 tonnes of uranium from secondary sources was supplied to the market. The largest source of secondary supplies was from the US–Russian Federation HEU purchase agreement, which accounted for around 8000 tonnes. Uranium supply from secondary sources is expected to continue until 2013 when the US–Russian Federation HEU purchase agreement concludes. In 2014 and for the remainder of the outlook period, secondary supplies are

projected to decline to 8000 tonnes, being sourced from reprocessing of spent nuclear fuel and mixed oxide fuels. The decline in secondary supplies and a significant increase in nuclear-generating capacity are likely to cause uranium prices to increase after 2013.

The outlook for secondary supplies beyond 2013 assumes that the US–Russian Federation HEU purchase agreement is not renewed. If the agreement were renewed, secondary supplies would be higher than projected and, all else being equal, downward pressure on prices would result.

...while mine production increases

In 2011, world uranium mine production is forecast to increase by 10 per cent to 59 400 tonnes uranium oxide (U_3O_8). This is expected to be mainly supported by increased production in Africa, Kazakhstan, the United States and Australia. Over the outlook period, world uranium production is projected to increase at an average annual rate of 9 per cent to 90 200 tonnes U_3O_8 in 2016. Increased production will be supported by mine developments in Africa, Kazakhstan, Canada and Australia.

Mines commissioned in Kazakhstan since 2007

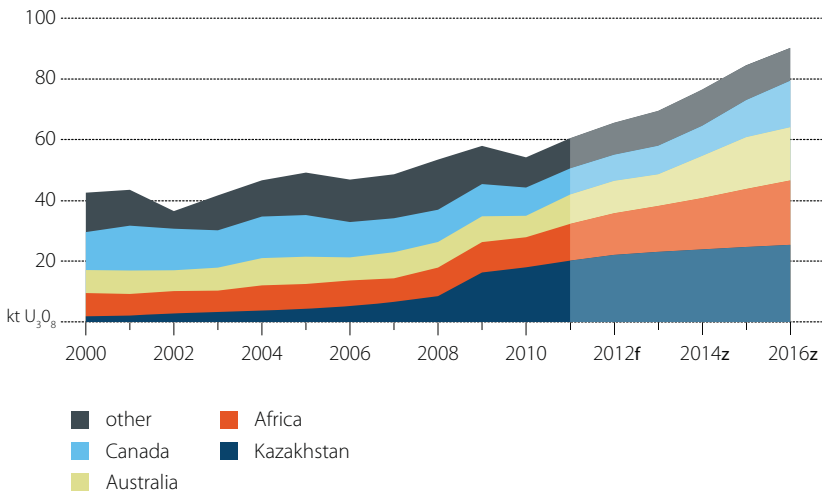
mine	commissioned	capacity (t U_3O_8)
Inkai	2007	2 000
South Inkai	2007	2 000
Budenovskoye 1	2007	2 000
Central Mynkuduk	2007	2 000
Western Mynkuduk	2007	1 000
Zarechnoye	2007	1 500
N. Kharasan 1	2008	1 700
Budenovskoye 2	2009	2 000
Irkol	2009	750
N. Kharasan 2	2009	1 500
Semisbai	2009	500

Kazakhstan's uranium production is projected to grow at an average rate of 5 per cent a year to 25 400 tonnes U_3O_8 by 2016. Large-scale uranium mines such as those commissioned in Kazakhstan over the past three years can take up to five years to reach full capacity. While no new mines are scheduled to start up over the outlook period, increasing production from recently started mines is expected to support growing production over most of the outlook period.

Uranium production in Africa is projected to grow at an average rate of 12 per cent a year to 21 200 tonnes in 2016. This growth is expected to be underpinned by the start-up of new mines, including Azelik (annual capacity of 770 tonnes U_3O_8) and Imouraren (annual capacity of 3000 tonnes U_3O_8) in Niger, Trekkopje (annual capacity of 1900 tonnes U_3O_8) and Rossing South (annual capacity of 2000 tonnes U_3O_8) in Namibia, and Buffelsfontein (annual capacity of 200 tonnes U_3O_8) in South Africa. An expansion at the Rossing mine (600 tonnes additional capacity) in Namibia is also expected to contribute to increasing uranium production.

In the United States, uranium production is projected to increase at an average rate of 14 per cent a year to 4100 tonnes U_3O_8 in 2016. Supporting the growth in production is the start-up of several new mines, including Nichols Ranch/Hank (annual capacity of 500 tonnes U_3O_8), Hobson (annual capacity of 900 tonnes U_3O_8) and Moore Ranch (annual capacity of 1000 tonnes U_3O_8).

Uranium production, by major producer



Canada's uranium production is forecast to decline by 8 per cent in 2011 following a fall of 12 per cent in 2010. This reflects the closure of the McClean Lake mine (annual capacity of 1500 tonnes U_3O_8) in 2010. Over the remainder of the outlook period, Canada's uranium production is projected to increase, underpinned by the start-up of the Cigar Lake project (annual capacity of 4000 tonnes U_3O_8) in 2013. Development of the Cigar Lake mine has been delayed several times by flooding. An expansion at the McArthur River mine (additional annual capacity of 1000 tonnes U_3O_8) is also expected to boost production. Partially offsetting these production increases will be the closure of the Rabbit Lake mine in 2014. Canada's uranium production is projected to increase at an average rate of 9 per cent a year to 15 300 tonnes U_3O_8 in 2016.

Start-up of new mines to boost Australia's uranium production

In 2010–11, Australia's uranium mine production is forecast to be around 8700 tonnes U_3O_8, an increase of 21 per cent compared with 2009–10. The start-up of UraniumOne's Honeymoon mine (300 tonnes U_3O_8 annual capacity) and the return to full capacity of BHP Billiton's Olympic Dam following outages during 2009–10 are expected to support this increase. Partially offsetting this is lower production in the first quarter of 2011 at Energy Resources of Australia's Ranger mine, where production at the processing plant is being suspended because of higher than usual rainfall.

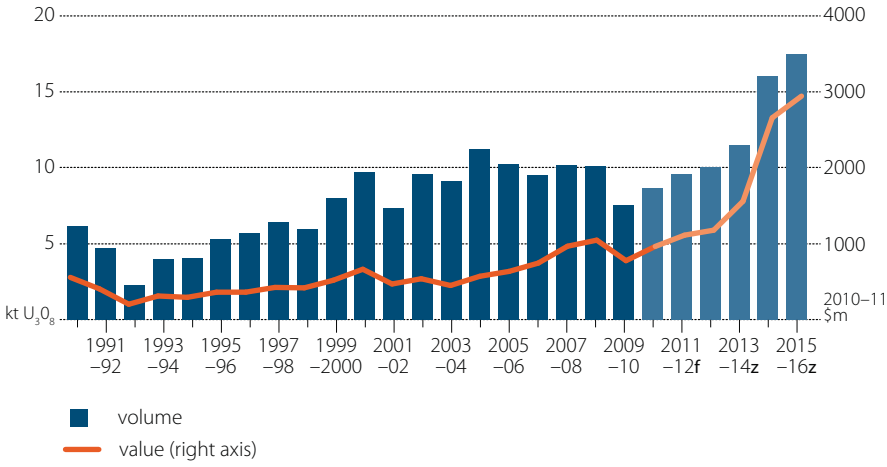
Over the medium term to 2015–16, Australia's uranium mine production is projected to increase at an average rate of 15 per cent a year to 17 450 tonnes U_3O_8 in 2015–16. This reflects the commissioning of new mines currently planned to start during this period, including Toro Energy's Wiluna operation (800 tonnes U_3O_8 annual capacity), Energy and Metals Australia's Mulga Rocks operation (1200 tonnes U_3O_8 annual capacity), Mega Uranium's Lake Maitland mine (1000 U_3O_8 tonnes annual capacity) and BHP Billiton's Yeelirrie operation (3500 tonnes U_3O_8 annual capacity) in Western Australia, and Energy Metals' Bigrlyi mine (600 tonnes U_3O_8 annual capacity) in the Northern Territory. However, a number of these projects are yet to receive company or government approvals or are undergoing feasibility studies and, as a result, project capacities or schedules could still change, resulting in actual production deviating from forecasts.

Australia's uranium export volume and value to increase

In 2010–11, Australia's uranium export volume is forecast to increase by 15 per cent to 8700 tonnes U_3O_8 as a result of higher production. The value of uranium exports is forecast to increase by 28 per cent to $960 million, supported by higher export volumes and higher expected uranium prices in the first half of 2011.

Over the outlook period, growth in Australia's uranium export volumes is projected to reflect production growing at an average rate of 15 per cent a year. In 2015–16, export volumes are projected to reach 17 450 tonnes U_3O_8. Uranium export values are projected to grow at an annual rate of 25 per cent a year, as export volumes increase and contracts between Australian uranium producers and consumers are renegotiated. In real terms (2010–11 dollars), export values are projected to be almost $3 billion in 2015–16.

Australian uranium exports



Outlook for uranium

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Production	kt	58.0	54.2	59.4	65.0	69.5	76.5	84.5	90.2
Africa **b**	kt	10.0	9.9	12.1	13.7	15.1	16.9	19.1	21.2
Canada	kt	10.6	9.3	8.6	8.6	9.4	9.9	12.2	15.3
Kazakhstan	kt	16.3	18.0	20.2	22.1	23.1	23.9	24.7	25.4
Russian Federation	kt	4.2	3.9	4.2	4.4	4.7	4.9	5.2	5.2
Consumption	kt	77.2	82.0	86.8	86.2	92.0	95.7	96.6	107.3
China	kt	1.8	3.0	2.9	4.4	7.7	12.5	13.6	18.0
European Union **c**	kt	24.8	24.6	24.7	24.8	24.9	24.5	24.0	23.0
Japan	kt	10.1	12.0	11.8	10.8	9.8	10.8	10.1	12.0
Russian Federation	kt	4.1	4.8	5.0	5.4	5.6	6.3	5.1	8.3
United States	kt	24.5	24.5	24.6	24.8	25.6	25.2	25.2	25.2
Spot price	US$/lb	46.3	46.9	62.2	67.1	71.8	76.8	82.2	89.6
– real **d**	US$/lb	47.6	47.5	62.2	65.8	69.0	72.4	75.9	81.1
		2008 –09	**2009 –10**	**2010 –11 f**	**2011 –12 f**	**2012 –13 z**	**2013 –14 z**	**2014 –15 z**	**2015 –16 z**
Australia									
Production	t	10 311	7 156	8 682	9 575	10 050	11 460	16 025	17 450
Export volume	t	10 114	7 555	8 682	9 575	10 050	11 460	16 025	17 450
– nominal value	A$m	990	751	960	1 143	1 244	1 689	2 955	3 355
– real value **e**	A$m	1 042	772	960	1 109	1 175	1 556	2 657	2 942
Average price	A$/kg	97.9	99.4	110.6	119.3	123.7	147.4	184.4	192.2
– real **e**	A$/kg	103.0	102.2	110.6	115.8	116.9	135.8	165.8	168.6

b Includes Niger, Namibia, South Africa, Malawi and Zambia. **c** Regarded as 27 countries for all years. **d** In 2011 US dollars. **e** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; DRET; Ux Consulting.

Metals

Steel and steel-making raw materials

Outlook to 2016

Robert New

Assumed strong economic growth in developing Asian economies and continued economic recovery in most developed economies are expected to underpin demand for steel over the short to medium term. Growth in steel consumption in developing Asian economies will form the backbone of world steel demand growth, reflecting the development of infrastructure and rising incomes in these economies. In comparison, demand growth in developed economies will be moderate, as spending associated with various government stimulus packages is concluded and economic growth returns to rates more consistent with long-term averages. Over the next few years, a significant supply expansion from major iron ore and metallurgical coal producers is expected to place some downward pressure on prices. However, prices for both iron ore and metallurgical coal are forecast to remain well above historical averages.

Steel

World steel outlook

	2009	2010 s	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
Crude steel consumption (Mt)								
European Union 27	129	147	155	161	166	170	176	181
United States	62	81	87	92	94	97	100	103
Brazil	21	25	26	28	30	31	32	33
Russian Federation	28	29	31	33	35	36	38	40
China	565	616	647	705	768	837	913	995
Japan	57	62	65	67	69	71	73	75
Korea, Rep. of	47	52	54	56	58	60	62	64
Chinese Taipei	14	15	16	16	17	17	18	18
India	58	66	75	81	89	97	105	115
World steel consumption	1 209	1 336	1 410	1 504	1 600	1 703	1 796	1 916
Crude steel production (Mt)								
European Union 27	139	173	180	187	192	197	203	209
United States	58	81	89	98	102	104	107	109
Brazil	27	33	36	40	44	48	53	58
Russian Federation	60	67	70	72	75	78	82	85
China	568	627	671	721	775	833	895	963
Japan	88	110	121	125	128	130	134	138
Korea, Rep. of	49	58	63	66	69	72	75	78
Chinese Taipei	16	20	21	22	22	23	23	24
India	57	67	74	80	87	94	102	111
World steel production	1 220	1 413	1 512	1 609	1 700	1 785	1 887	1 996

In 2011, world steel consumption is forecast to increase by 6 per cent to 1.4 billion tonnes, driven by a combination of recovering private consumption and consumption stemming from the construction of infrastructure projects in many developing economies. Over the remainder of the outlook period, world steel consumption is forecast to increase at an annual average of 6 per cent, to reach 1.9 billion tonnes in 2016. Steel consumption growth in OECD economies is projected to be modest, largely mirroring assumed moderate growth in economic activity. In contrast, growth in non-OECD steel consumption is projected to be more rapid, supported by strong economic growth, rising household incomes and continued industrialisation.

Developing economies to dominate steel consumption growth

Developing economies, particularly China, India and Brazil, are expected to account for an increasing proportion of global steel consumption over the outlook period. In 2011, steel consumption in these economies is estimated to account for 53 per cent (748 million tonnes) of world consumption. By the end of the outlook period, this share is projected to increase to 60 per cent (1.1 billion tonnes), representing average annual growth in consumption of 8 per cent to 2016. Higher consumption in these countries largely reflects higher rates of urbanisation and increasing incomes. This will underpin growth in demand for steel-intensive infrastructure such as transport networks and housing in urban areas, and for steel-intensive consumer durables such as whitegoods, automobiles and televisions.

China is currently the world's largest consumer of steel, accounting for an estimated 46 per cent of world consumption in 2010. Strong growth in 2009 and 2010 (25 per cent and 9 per cent, respectively) was supported by significant government investment in steel-intensive infrastructure such as highways and rail networks, particularly in less-developed provinces in western China. In 2011, the combination of infrastructure construction and growth in private consumption is forecast to result in a further 5 per cent increase in steel consumption to 647 million tonnes.

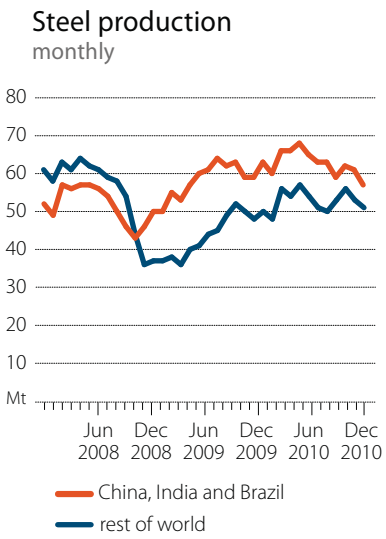
Over the medium term, China's steel consumption is projected to increase at an average rate of 8 per cent a year to reach 995 million tonnes in 2016. China's steel consumption growth will be underpinned by construction of housing and infrastructure and growth in the manufacturing sector.

In 2011, India's steel consumption is forecast to increase by 14 per cent to 75 million tonnes, and is projected to increase at an annual average of 10 per cent over the remainder of the outlook period, to reach 115 million tonnes in 2016. Government efforts to increase the coverage and quality of social infrastructure, and the gradual increase in consumption of consumer durables in response to rising incomes are the main factors underpinning the projected increase in steel consumption.

Brazil's steel consumption is also projected to grow strongly over the outlook period, increasing at a projected average rate of 5 per cent a year. The construction of infrastructure to host the FIFA World Cup in 2014 and the Olympic Games in 2016 is expected to provide strong support for steel consumption growth.

OECD steel consumption growth relatively slow

Steel consumption in OECD economies is projected to increase at an annual average of 4 per cent over the outlook period. In the United States, the European Union and Japan, steel consumption is projected to increase at 4 per cent, 4 per cent and 3 per cent a year, respectively. The slower OECD growth rate compared with non-OECD economies primarily reflects weaker assumed economic growth and less need for rapid development of infrastructure.



Rapid steel production growth in China and India

In 2011, world steel production is forecast to increase by 7 per cent to 1.5 billion tonnes. Over the outlook period, global steel production is projected to grow at an average rate of 6 per cent a year, to reach 2.0 billion tonnes in 2016. This projected growth reflects both a return to full production capacity in many OECD economies and strong growth in production in developing economies.

The majority of additional production capacity is expected to occur in developing economies, particularly China and India. Strong domestic demand, relatively low production costs and, in some cases, large domestic reserves of raw material inputs are the main factors behind an increasing concentration of steel production in these economies. The share of world production in developing economies is projected to increase from 49 per cent in 2010 to 54 per cent in 2016.

In 2011, China's steel production is forecast to increase by 7 per cent to 671 million tonnes. Continuing strong domestic demand and moderate growth in key export markets in developed economies will provide support for steel producers. However, if continued cost pressures, especially from raw material inputs, result in sharp increases in steel prices in the short term, consumption could be lower than currently forecast. China's steel production is projected to grow to 963 million tonnes in 2016, representing average growth of 7 per cent a year over the outlook period.

India's steel production is projected to increase at an annual average of 9 per cent, to reach 111 million tonnes in 2016. The increase in steel production is expected to come from both the public and private sectors. For example, government-owned corporations such as the Steel Authority of India Limited (SAIL) and Rashtriya Ispat Nigam Limited (RINL) have significant expansion plans in the next several years. SAIL is undertaking a modernisation and expansion program to increase production capacity by around 11 million tonnes to almost 25 million tonnes by 2013, and RINL is planning to increase production capacity by around 3.4 million tonnes to over 6 million tonnes annually by 2012. In addition, the Indian Government is encouraging foreign investment, which has attracted responses from major international

companies, including ArcelorMittal and South Korea's POSCO. However, potential project delays caused by problems such as land access present a possible deterrent and downside risk to the projection of India's steel production.

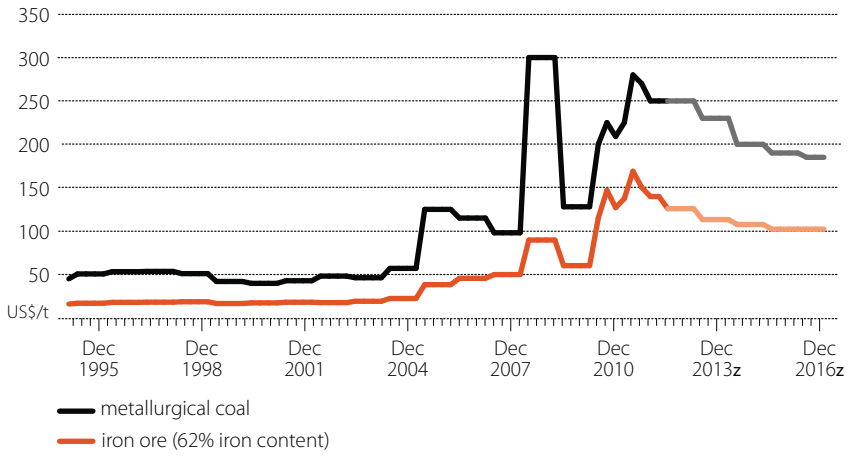
In OECD economies, steel production is projected to increase modestly over the outlook period. This growth primarily reflects higher utilisation of existing capacity after significant cuts in late 2008 and 2009. Steel production in the United States, Japan and the European Union is projected to grow at an annual average of 5 per cent, 4 per cent and 3 per cent, respectively, over the period to 2016.

Raw materials

Raw materials prices

Beginning in the Japanese Fiscal Year 2010 (JFY, April 2010 to March 2011), pricing for the majority of iron ore and metallurgical coal contracts switched from an annual to a quarterly basis. This was largely in response to demand from producers to allow contract prices to be adjusted more rapidly according to changing market fundamentals.

Steel-making raw material contract prices
fob Australia



In 2010, iron ore contract prices increased strongly, averaging 66 per cent higher than in 2009. Spot prices reached record highs in late January 2011 in response to a number of factors, including higher steel production and strategic stockpiling ahead of the winter season in Asia, possible production disruptions as a result of adverse weather conditions in Western Australia and Brazil, and a shortfall of iron ore exports in India. Iron ore prices are forecast to ease over

the next several months as steel producers consume stocks and recently completed iron ore projects continue to ramp up to full capacity. Contract prices for 2011 are forecast to average US$149 a tonne (on a 62 per cent iron content basis, free-on-board Australia), compared with an average of US$112 in 2010.

Over the remainder of the outlook period, contract prices are expected to ease gradually, averaging US$93 a tonne (in 2011 US dollars) by 2016. The projected fall in prices largely reflects the effect of considerable supply expansions scheduled for completion over the outlook period.

In early 2011, prices for metallurgical coal increased sharply, largely because of flooding in Queensland, which resulted in significant production cuts and disruptions to rail and port infrastructure (see box). As a result, contract prices for premium metallurgical coal for 2011 are forecast to remain high, averaging US$256 a tonne, which would be the second highest annual price on record (in real terms). Assuming a return to normal seasonal conditions for the remainder of the outlook period, contract prices are projected to ease modestly as supply from new operations in Australia, Canada, Mozambique and Mongolia increase production. By 2016, hard coking coal contract prices are projected to fall to US$169 a tonne (in 2011 US dollars).

The effect of the Queensland floods on metallurgical coal exports

The recent floods in Queensland have had a significant effect on the state's coal industry, which in 2009–10 accounted for around 56 per cent of Australia's black coal production and 62 per cent of Australia's coal exports. Production and sales of thermal and metallurgical coal will be affected because Queensland produces large quantities of both coal types.

It is estimated that the recent heavy rain, which caused damage to coal mines and associated infrastructure, could result in Queensland coal exports between December 2010 and March 2011 being 15 million tonnes lower than previously anticipated. It is estimated that the value of the lost exports could be around $2–2.5 billion. Of the 15 million tonne shortfall in coal exports, approximately two-thirds are estimated to be metallurgical coal, accounting for around three-quarters of lost export revenue.

The estimated loss in export shipments reflects a combination of reduced coal production and transport capacity associated with flooded mines, potential difficulties sourcing labour and mining supplies because of short-term disruptions, and damaged rail networks. By late January, most port and rail networks affected by the floods were operating; however, most were operating below capacity (see figure).

Coal production

Above average rainfall in spring resulted in some companies declaring force majeure at a number of mines in early December. Force majeure is a legal clause in a contract that temporarily releases a party from its obligation to perform its part of the contract because of circumstances beyond its control. Following heavy rain in late December, force majeure was declared at a significant number of mines in Queensland's Bowen Basin (where the vast majority of Queensland's coal mines are located).

continued...

The effect of the Queensland floods on metallurgical coal exports continued

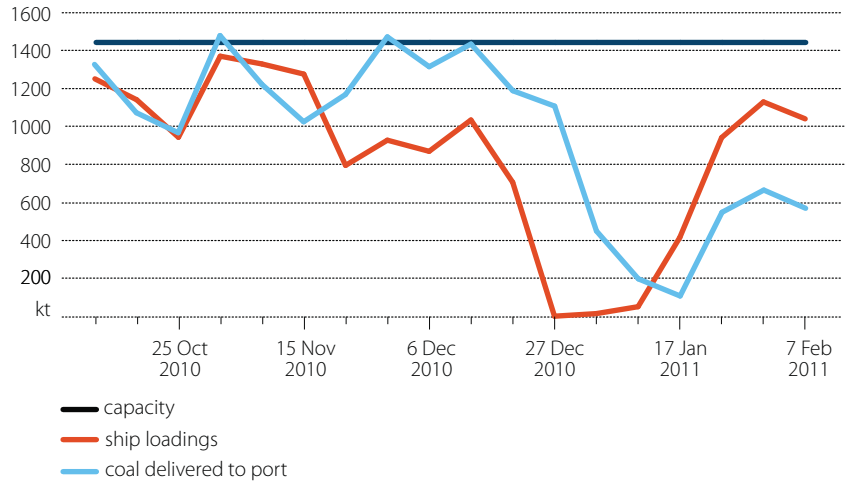
Coal production was lower in January because of a number of factors, including flooded pits and difficulties in removing the water, and a lack of access to mine sites because of flooded roads. In addition, some mines operated with reduced staff for a period as some employees were stranded, were personally affected by floodwaters or participated in the recovery efforts of local communities. Heavy rain has also affected coal production in northern New South Wales. In late December, Whitehaven Coal reported that its production for 2010–11 would be 700 000 tonnes below the previous forecast, as heavy rain affected production at its four mines. Further south, coal production in the Hunter Valley has not been significantly affected by wet weather.

Rail

Parts of the Queensland rail network that link coal mines to ports were severely affected by the flooding, which will also result in reduced coal exports. The Goonyella rail network, which connects mines in the Bowen Basin to the Hay Point and Dalrymple Bay coal terminals, was closed from 24 to 30 December. The 130 million tonne a year rail network resumed operations on 30 December, although at a reduced rate, reflecting coal availability and a reduction in train speeds.

The Blackwater rail system (annual capacity of 66 million tonnes), which delivers coal to the Port of Gladstone, was closed on 27 December and partially reopened on 20 January. The last section of the Blackwater line that remains unopened (as at 19 January) is the rail spur to Xstrata's Rolleston mine.

Gladstone port coal throughput
monthly



On 10 January, the western rail network, which links coal mines in southern Queensland to Brisbane, was shut down following heavy rain and flooding on the Toowoomba Range. The 8 million tonne a year network was extensively damaged, which will significantly affect coal transport and exports from southern Queensland. On 19 January, QR National announced that it could take as long as three months to rebuild bridges and tracks to return the system to full capacity.

continued...

The effect of the Queensland floods on metallurgical coal exports continued

Ports

Ports in Queensland have not sustained any significant damage because of the heavy rains and floods; however, all ports operated well below capacity for several weeks as a result of lower coal receivals. Where possible, port stocks were used to load ships; however, coal stocks at most ports were run down significantly.

Price

In early December 2010, contract prices for the March quarter 2011 for high-quality metallurgical coal were settled at US$225 a tonne. Reflecting the tight market balance created by the floods in Queensland, spot price indicators for high-quality metallurgical coal were above US$300 a tonne in mid-February 2011. Upward price pressure could ease gradually over time as production and export resume to capacity.

Prices for thermal coal have also recently increased, as thermal coal makes up a significant proportion of lost sales from Queensland. Before the flooding, spot thermal coal prices were trading at around US$100 a tonne, similar to contract prices with Japanese power utilities for Japanese Fiscal Year 2010 (JFY, April 2010 to March 2011). In mid-January, thermal coal spot prices were trading at around US$135 a tonne before easing to $US125 a tonne in mid-February.

Iron ore

In 2011, world trade of iron ore is forecast to increase by 5 per cent to 1.1 billion tonnes. Over the medium term, world iron ore trade is projected to increase at an annual average of 5 per cent, reaching 1.4 billion tonnes in 2016. China's imports are projected to continue to grow strongly and the major growth in iron ore supply is expected to come from Australian and Brazilian producers.

Outlook for world iron ore trade (Mt)

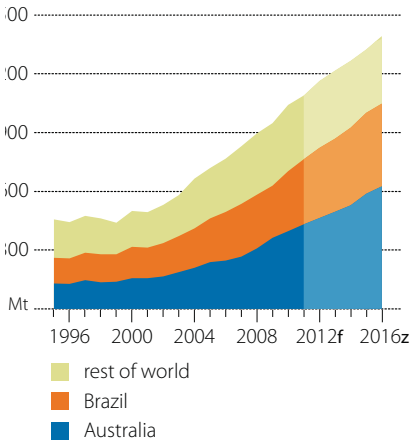
	2009	2010 s	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
Iron ore imports								
European Union 27	92	133	145	154	158	163	168	173
Japan	106	133	144	150	154	157	160	163
China	628	623	634	687	724	761	804	857
Korea, Rep. of	42	53	57	60	63	65	68	72
Chinese Taipei	12	15	16	17	17	17	18	18
World imports	948	1 041	1 089	1 163	1 216	1 266	1 324	1 392
Iron ore exports								
Australia	363	403	425	462	497	527	565	599
Brazil	266	308	332	358	373	396	416	436
India	116	104	102	101	98	90	88	85
Canada	31	34	35	36	36	36	36	37
South Africa	45	47	52	56	60	64	68	72
Sweden	16	14	15	15	16	16	17	17
World exports	948	1 041	1 089	1 163	1 216	1 266	1 324	1 392

China's reliance on imports to increase

China is the world's largest importer of iron ore, and will continue to be so over the medium term. In 2011, China's imports of iron ore are forecast to increase by 2 per cent to 634 million tonnes. Over the outlook period, Chinese steel producers are expected to increase their reliance on imported ore for a number of reasons: available domestic reserves are of declining quality and are mostly in remote areas; an increasing number of steel mills are located in coastal regions with easy access to ports; and efforts are being made to increase the average grade of steel produced in China, which will underpin increased demand for relatively high-quality iron ore from Australia and Brazil. Over the period 2011 to 2016, China's imports are projected to increase at an annual average of 5 per cent to reach 857 million tonnes. This is projected to account for approximately 62 per cent of domestic iron ore consumption, compared with an estimated 57 per cent in 2010.

Imports to other major iron ore consumers, such as the Republic of Korea, the European Union and Japan, will continue to increase, in line with projected steady growth in steel production. Over the outlook period, imports to these three economies are projected to grow at average rates of 5 per cent, 4 per cent and 4 per cent a year, respectively.

Major iron ore exporters



Supply expansions to remain concentrated in Australia and Brazil

The majority of supply capacity expansions to be completed over the medium term are expected to occur in the world's two largest producing countries, Australia and Brazil. The large reserves and the existence of infrastructure networks will support future expansions that are more cost-effective than greenfield developments.

Australia's exports of iron ore are forecast to increase at an annual average of 7 per cent over the outlook period, supported by several large additions to capacity scheduled for completion. Rio Tinto has plans to expand their annual capacity by more than 50 million tonnes by 2013 to 283 million tonnes annually. Further expansions are planned, with annual capacity to reach 330 million tonnes by 2015. Stages five and six of BHP Billiton's Rapid Growth projects are scheduled to supply an additional 90 million tonnes by 2013, and Fortescue Metals Group is scheduled to complete the development of more than 100 million tonnes of additional capacity by mid-2014.

A raft of other projects at various stages of planning and development could potentially contribute to Australia's exports over the outlook period, many of which will depend on the completion of shared rail and port infrastructure. For example, the expansion of Port Hedland and Dampier Port and the development of Anketell Point Port—a new port in Western Australia's Pilbara region proposed for development by a consortium of mining companies—

would allow for a significant increase in exports from the Pilbara region. In addition, the completion of the Oakajee Port and Rail network would allow for more rapid development of Western Australia's mid-west region, and the development of Port Bonython and Sheep Hill port in South Australia would facilitate greater exports from that state.

Brazil's exports are forecast to increase steadily over the outlook period, growing at an annual average of 6 per cent to reach 436 million tonnes in 2016. A significant proportion of these exports are expected to be sourced from expansions to Vale's Brazilian operations. Several incremental expansions are scheduled for completion over the next few years, primarily concentrated in the Carajas and south-east systems. The largest of these projects is the 90 million tonne annual capacity Serra Sul project, which could be in operation toward the end of the outlook period. This proposal is larger than any existing mine in Brazil; however, it has yet to receive final government and board approvals.

There are several large iron ore projects proposed for development in western Africa, including Rio Tinto's Simandou project in Guinea, Sundance Resources' Mbalam project in Cameroon, and ArcelorMittal's Yekepa project in Liberia and Faleme project in Senegal. The largest of these is Rio Tinto's proposed Simandou mine. This is planned to produce 95 million tonnes of high grade fines annually, which will be railed 650 kilometres to the western coast for export. However, several challenges could potentially delay development projects in western Africa. The construction of greenfield projects requires supporting port and rail infrastructure to be built, which is both capital and time-intensive. Therefore, the construction period is expected to be longer than an equivalent development in a mature mining province. In addition, the requirement to develop a legislative framework that satisfies both the foreign investors and the relevant governments will further add to the lead time between project planning and operation. While western Africa is a positive long-term prospect for future iron ore supply, it is not expected to contribute significantly to the world seaborne traded iron ore market by 2016.

Metallurgical coal

In 2011, world metallurgical coal trade is forecast to increase by 4 per cent to 264 million tonnes. World metallurgical coal trade is projected to increase at an annual average of 5 per cent to reach 341 million tonnes in 2016. Traditional importers such as Japan, the Republic of Korea and the European Union are projected to grow steadily, while India and China are projected to be the fastest growing importers of metallurgical coal. Expansions in Australia's export capacity are scheduled for completion over the outlook period, as well as greenfield developments such as those in Mozambique and Mongolia.

India and China to underpin growth in metallurgical coal demand

Historically important importers of metallurgical coal, such as the Republic of Korea, Japan and the European Union, are projected to steadily increase imports in line with rising steel production, after sharp declines in 2009. Over the six years to 2016, these countries are projected to increase metallurgical coal imports at average rates of 6 per cent, 3 per cent and 3 per cent a year, respectively.

Outlook for world metallurgical coal trade (Mt)

	2009	2010s	2011f	2012f	2013z	2014z	2015z	2016z
Metallurgical coal imports								
European Union 27	41	46	48	50	51	52	54	56
Japan	46	53	57	59	61	62	63	65
China	34	44	43	44	50	56	64	73
Korea, Rep. of	15	23	26	27	28	29	30	32
Chinese Taipei	4	6	6	7	7	7	7	7
India	23	25	28	32	36	41	46	52
Brazil	9	11	13	14	16	17	19	21
World imports	211	254	264	275	286	304	322	341
Metallurgical coal exports								
Australia	135	159	163	174	179	194	207	219
Canada	22	25	25	27	30	31	32	33
United States	34	51	45	42	40	38	37	35
Russian Federation	13	17	20	21	23	24	24	25
World exports	211	254	264	275	286	304	322	341

India's imports of metallurgical coal are forecast to increase at an annual average of 13 per cent over the outlook period to reach 52 million tonnes in 2016. The projected expansion of India's steel production capacity will rely on imported metallurgical coal as there are few high-quality domestic coal reserves.

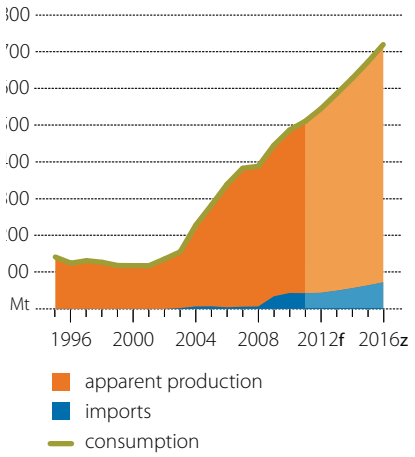
Over the outlook period, China is expected to increase its reliance on imports relative to domestically produced coal. Import demand is expected to grow strongly over the medium term for several reasons: the decreasing quality and increasing cost of domestic coal production; the increasing desire for higher quality coal for the production of higher value steel products; and the increasing number of steel mills located in coastal regions in close proximity to port infrastructure. In addition, new steel mills built in western provinces will increasingly rely on metallurgical coal imported from Mongolia. Despite rapid growth in its imports in 2009 and 2010, China's imports of metallurgical are still estimated to have accounted for only 9 per cent of consumption in 2010. Therefore, small percentage changes in domestic metallurgical coal production have the potential to significantly affect the volume imported. While China's imports are projected to increase at an average rate of 9 per cent a year to reach 73 million tonnes in 2016, there will be fluctuations because of swings in domestic production.

Steady growth in world exports

In 2011, disruptions in Australian exports are expected as a result of flooding in major coal producing regions of Queensland. Despite this, Australia's exports in 2011 are forecast to increase by 3 per cent to 163 million tonnes.

Over the outlook period, Australia's exports of metallurgical coal are projected to increase at an average rate of 5 per cent a year to reach 219 million tonnes in 2016. This will be supported by expansions to port and rail capacity on the Queensland coast, including expansions to the Abbot Point and Hay Point ports.

China's metallurgical coal consumption



In 2011, Canada's exports of metallurgical coal are forecast to remain largely unchanged at 25 million tonnes, as modest growth from new capacity is offset by weather-related supply disruptions. In early January, Teck, Canada's largest producer of metallurgical coal, declared force majeure because rail transport was affected by adverse weather conditions. Also in January, a mechanical failure at the Westshore coal terminals (21 million tonne annual capacity) on Canada's west coast reduced coal-handling capacity for around two weeks. Over the remainder of the outlook period, Canada's exports are forecast to increase at an annual average of 5 per cent to reach 33 million tonnes in 2016. This projected growth will come from incremental expansions planned by Teck, including expansions at the Fording River and Elkview operations and the scheduled completion of the Quintette project in 2013.

The projected easing of metallurgical coal prices over the medium term will depend on the completion of several greenfield projects. In Mozambique, Vale is scheduled to complete its 11 million tonne annual capacity (8.5 million tonne metallurgical coal) Moatize project in 2011, and Riversdale is scheduled to complete its 5.3 million tonne run-of-mine annual capacity Benga project in 2011, with potential for a further expansion to 20 million tonnes annually. However, given that these are greenfield projects, they are likely to take two to three years to ramp up to full capacity. In 2016, Mozambique's exports are projected to reach 10 million tonnes.

Mongolia's exports of metallurgical coal are projected to increase over the outlook period, from an estimated 4.5 million tonnes in 2010 to 9 million tonnes by 2016. Mongolia has significant reserves of high-quality coal and is located in close proximity to Chinese and Russian steel-makers. However, the significant overland distances from mine to port or steel mill, and the lack of existing infrastructure represent challenges to the rapid development of this new coal frontier. Furthermore, the development of a legislative framework for cooperation between the Mongolian Government and foreign investors is required for significant development of the region.

Australian export earnings boosted by high prices

In 2010–11, Australia's export earnings from iron ore are forecast to increase by 64 per cent to $57 billion. This reflects both a 7 per cent increase in export volumes, to 418 million tonnes, and 73 per cent higher average contract prices compared with the previous year.

Selected Australian metallurgical coal projects scheduled for completion by 2016

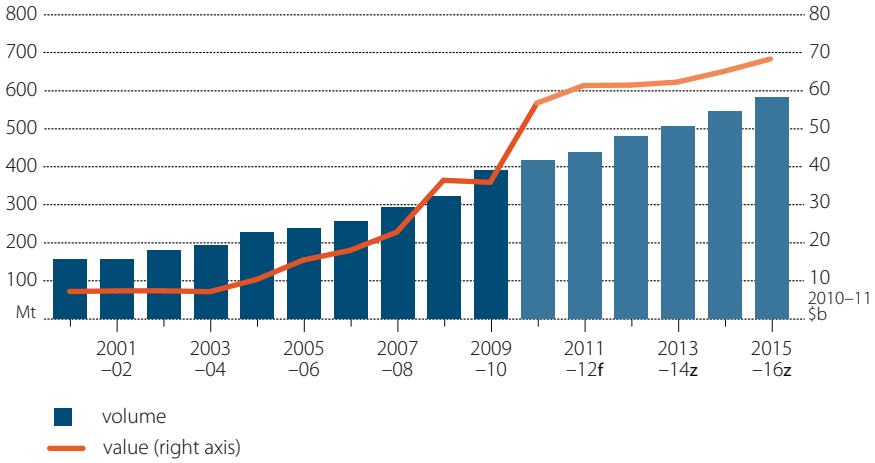
project	company	expected startup	new capacity
Advanced projects			
Curragh Mine	Wesfarmers	2011	increase to 8.5 Mt
Integrated Isaac Plains Project	Aquila Resources / Vale	na	1.6 Mt coking and thermal
Kestrel	Rio Tinto	2012	1.7 Mt coking
Middlemount (stage 1)	Macarthur Coal / Gloucester Coal	2012	1.8 Mt coking (ROM)
Newlands Northern Underground	Xstrata	2011	3 Mt
Less advanced projects			
Belvedere underground	Aquila Resources / Vale	2016	7 Mt hard coking
Byerwen Coal Project	QCoal / JFE Steel Corporation	2012	10 Mt coking
Caval Ridge (Peak Downs expansion)	BHP Billiton Mitsubishi Alliance (BMA)	2013	5.5 Mt coking
Daunia	BHP Billiton Mitsubishi Alliance (BMA)	2011	4 Mt coking
Denham	Peabody Energy	2014	5–6 Mt coking
Hail Creek expansion	Rio Tinto	2011	2.5 Mt hard coking
Jellinbah East	Jellinbah Resources	2014	1–2 Mt coking
Middlemount (stage 2)	Macarthur Coal / Gloucester Coal	2013	3.6 Mt coking (ROM)
Moranbah South project	Anglo Coal Australia / Exxaro	2014	6.5 Mt coking

Sources: ABARE–BRS, *Minerals and energy: major development projects – October 2010 listing.*

The positive effect on export earnings of growth in export volumes will be partly offset by projected declines in contract prices over the remainder of the outlook period in response to significant supply expansions. By 2015–16, export earnings from iron ore are projected to increase to $68 billion (in 2010–11 dollars), representing average growth of 4 per cent a year over the outlook period.

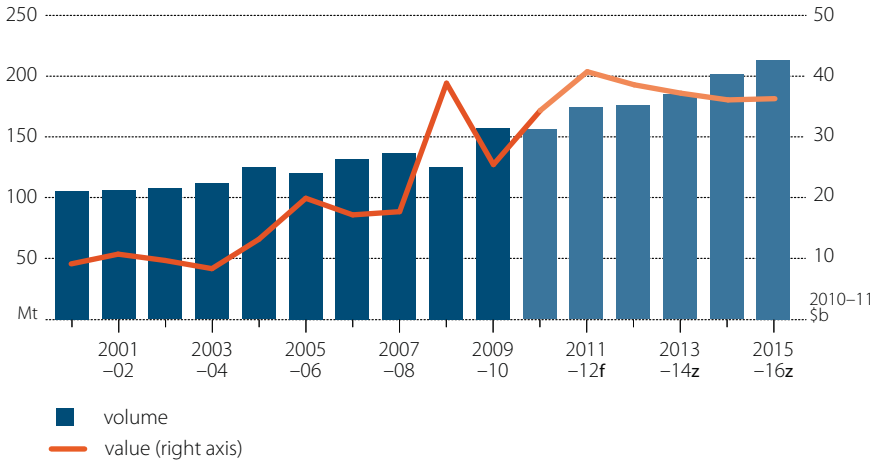
Australia's metallurgical coal export earnings in 2010–11 are forecast to increase by 39 per cent to $34 billion. Floods in Queensland have had a significant effect on export volumes, and have been the main factor offsetting growth in capacity, resulting in exports shipments remaining largely unchanged at 156 million tonnes. A forecast increase of 61 per cent in contract prices will contribute to the projected increase in export earnings.

Iron ore exports



Over the medium term, export volumes are forecast to rise by 6 per cent a year to 213 million tonnes in 2015–16. Australia's export earnings from metallurgical coal are projected to reach $36 billion (in 2010–11 dollars) in 2015–16, representing average growth of 1 per cent a year over the outlook period.

Metallurgical coal exports



Outlook for steel and steel-making raw materials

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Contract prices b									
Iron ore c									
– nominal	US$/t	68	112	149	129	116	109	104	102
– real d	US$/t	70	114	149	127	112	103	96	93
Metallurgical coal e									
– nominal	US$/t	171	191	256	250	235	208	193	186
– real d	US$/t	176	193	256	245	226	196	178	169
		2008–09	**2009–10**	**2010–11 f**	**2011–12 f**	**2012–13 z**	**2013–14 z**	**2014–15 z**	**2015–16 z**
Australia									
Production									
Iron and steel gs	Mt	5.57	6.89	7.70	7.98	7.98	7.98	8.08	8.10
Iron ore	Mt	353	423	448	470	511	538	581	619
Metallurgical coal	Mt	130	163	162	180	182	191	208	220
Exports									
Iron and steel gs	Mt	1.74	1.55	1.99	1.84	1.65	1.81	1.96	1.98
Nominal value	A$m	1 363	1 120	1 359	1 295	1 141	1 261	1 362	1 377
Real value h	A$m	1 434	1 152	1 359	1 257	1 078	1 162	1 224	1 208
Iron ore	Mt	324	390	418	440	481	508	548	582
Nominal value	A$m	34 239	34 515	56 534	63 068	64 927	67 416	72 261	77 840
Real value h	A$m	36 030	35 494	56 534	61 202	61 320	62 117	64 958	68 266
Metallurgical coal	Mt	125	157	156	174	176	185	201	213
Nominal value	A$m	36 813	24 526	34 209	41 889	40 737	40 235	40 008	41 242
Real value h	A$m	38 739	25 221	34 209	40 649	38 474	37 073	35 964	36 170

b fob Australian basis, ABARES Australia–Japan average contract price assessment. **c** Fines contract, 62% iron content basis. **d** In 2011 US dollars. **e** High-quality hard coking coal. For example, Goonyella export coal. **g** Includes all steel items in ABS, *Australian Harmonized Export Commodity Classification*, chapter 72, 'Iron and steel', excluding ferrous waste and scrap and ferroalloys. **h** In 2010–11 Australian dollars. **f** ABARES forecast. **s** ABARES estimate. **z** ABARES projection.
Sources: ABARES; International Iron and Steel Institute; Coal Services Australia; Queensland Coal Board; United Nations Conference on Trade and Development.

Gold

Outlook to 2016

Andrew Schultz

The annual average gold price is forecast to peak at US$1320 an ounce in 2011 before falling, in real terms, to around US$975 an ounce in 2013, then rising gradually to average US$1064 an ounce in 2016. In the short term, gold price movements are forecast to be influenced by changes in investment demand. After 2013, robust investment and jewellery demand, weaker average scrap sales and flat mine production growth are projected to support the gold price.

In 2010, the gold price averaged US$1225 an ounce, which represented a 26 per cent increase on the 2009 average of US$973 an ounce. In real terms, the annual average gold price has risen for the past nine years and in 2010 was almost four times higher than in 2001. Despite this significant rise, the average gold price in 2010 was still below the peak of US$1620 an ounce (in 2011 US dollars) recorded in 1980.

Gold price
monthly, ended January 2011

Investment demand provided the strongest support for the gold price in 2010. The increase in public sector debt in many developed economies encouraged investors to buy gold as a store of value. Expansionary monetary policy measures in the United States and ongoing concerns over the need for more bailout assistance for economies in the European Union reinforced this investor sentiment toward gold. A recovery in demand for gold jewellery and modest purchases of gold by central banks also placed upward pressure on the gold price in 2010.

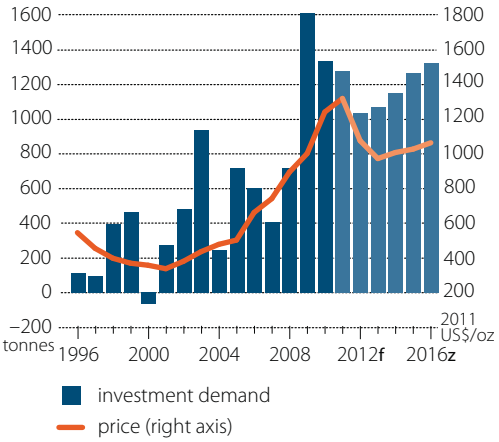
In 2011, the gold price is forecast to increase by 8 per cent to US$1320 an ounce. This growth is expected to stem from continued investment demand for gold, encouraged by uncertainty surrounding the outlook for economic growth and fiscal stability in some major world economies. This economic uncertainty could also undermine the value of some of the major international currencies, such as the euro and the US dollar, leading to an increase in the

appeal of gold as a store of value. On the downside, the appeal of gold in relation to other asset classes could weaken during the second half of 2011 and 2012, if economic conditions in the United States improve as currently assumed and there is an associated increase in the prospects of monetary policy tightening in that country.

Appeal of gold to moderate under assumed world economic recovery

The gold price is forecast to fall by 18 per cent in real terms to around US$1075 an ounce in 2012, before declining by a further 10 per cent to average US$973 an ounce in 2013. The assumption of world economic recovery over the next few years is expected to lead to a reduction in speculative investment demand for gold. As the United States is assumed to gradually raise interest rates above current historical lows starting from 2012, the relative return on gold will fall compared with low-risk assets such as cash and bonds. Additionally, the appetite for higher risk assets such as shares and property is likely to increase, leading to a moderation in investment demand for retail gold, such as gold bars and coins. Any significant improvement in the fiscal positions of European economies could also help to dampen speculative demand for gold.

Gold price and investment demand



Between 2014 and 2016, the real gold price is projected to increase modestly, rising from US$1008 an ounce in 2014 to US$1064 an ounce in 2016. Jewellery demand growth in China and India and weak global mine production and recycled gold sales growth are projected to support a gradual rise in the real gold price. However, there are significant risks associated with this price outlook because gold price movements are sensitive to unexpected macroeconomic developments. For example, the strength and composition of economic growth across major world economies can significantly influence the risk profile of investors, which in turn will affect the investment demand for gold as a hedge against economic and financial market uncertainty.

Gold fabrication demand steady over medium term

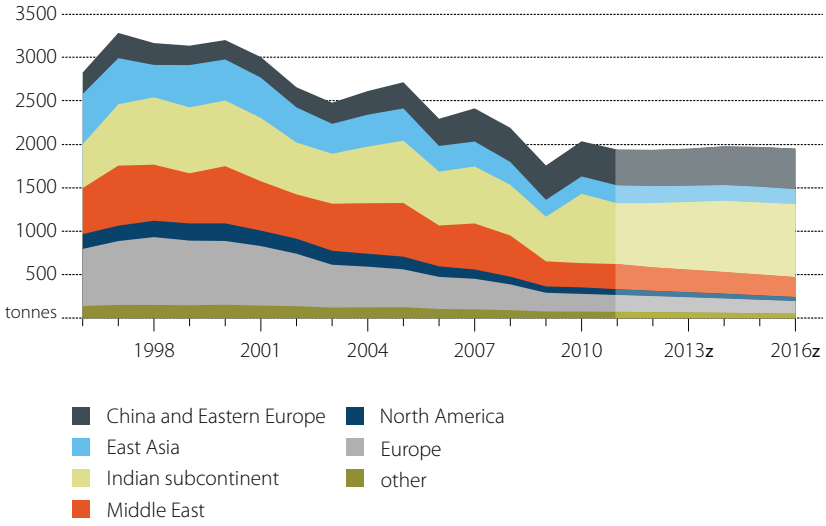
Gold fabrication consists of gold used in jewellery, electronics, dental applications, medals, coins and other industrial uses. Following the sharp decline experienced in 2009 as a result of the global economic downturn, gold fabrication demand recovered in 2010, rising by 13 per cent to 2741 tonnes. Gold used in jewellery, the largest component of gold fabrication, is estimated to have risen by 16 per cent in 2010, reflecting more than 50 per cent growth in demand in the major market of the Indian subcontinent.

Gold fabrication is forecast to fall by 4 per cent to 2639 tonnes in 2011. A higher forecast gold price is expected to lead to a moderation in jewellery demand in India, partly offset by stronger jewellery demand in China. Demand growth in the Middle East is forecast to be

modest, reflecting this market's reliance on gold jewellery exports to developed economies. Jewellery demand in the United States and the European Union is unlikely to increase in the short term, especially in the presence of a markedly higher gold price.

Over the medium term, gold fabrication consumption is forecast to be steady. Reflecting a longer term change in preferences away from traditional gold jewellery, demand in the United States and the European Union is expected to fall. Offsetting this fall will be steady growth in jewellery fabrication demand in India and China, although a relatively high gold price over the outlook period has the potential to place some downward pressure on jewellery demand.

Jewellery fabrication demand, by region



Sales of gold scrap to moderate

In 2010, the supply of gold scrap, largely sourced from recycled jewellery, remained largely unchanged at historical highs. While sales were mainly driven by a high gold price, marketing campaigns by dealers in developed countries also contributed to a higher supply of used jewellery and other physical gold from the retail sector.

The historically high sales of gold scrap in recent years are likely to have reduced the remaining stocks of used gold jewellery and other physical gold available to be sold. Despite a higher gold price forecast in 2011, gold scrap sales in the year are forecast to decline by 21 per cent to 1300 tonnes. Gold scrap sales are expected to fall further to 1000 tonnes in 2012 and 950 tonnes in 2013, in line with the forecast decline in the real gold price. Toward 2016, scrap sales are projected to recover gradually, reaching 1150 tonnes by the end of the outlook period.

Limited activity by the official sector

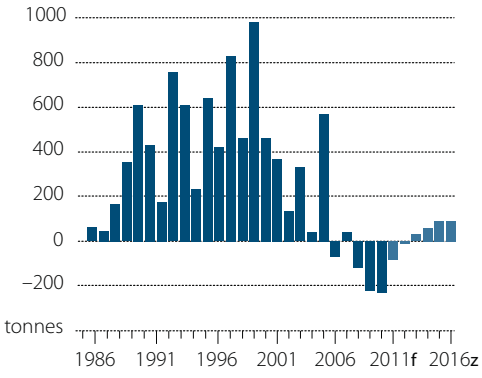
In 2010, the official sector became a net gold purchaser (around 90 tonnes) for the first time since 1988. While gross purchases of gold by the official sector increased in 2010, the main factor underlying the shift in the net position was a greater decline in gross sales of gold by European central banks. The change in the official sector moving from being a source of net supply to net demand indicates an increase in the demand for gold as a strategic reserve asset in the presence of increased volatility in the value of major international reserve currencies such as the US dollar and the euro.

As the appeal of gold as a store of value moderates over the outlook period, the official sector is expected to return to being a modest net seller of gold, with net purchases forecast to be 65 tonnes in 2011, before becoming a net seller of around 120 tonnes by 2016. As official sector gold sales depend on policies of gold-holding countries, considerable uncertainty remains in the outlook for official sector gold sales.

Producer dehedging to diminish in importance

Producer hedging involves gold producers borrowing gold from central banks and selling it onto the spot market, to reduce exposure to the risk of lower gold prices at the time of actual production. As a result, the value of future mine production of gold is effectively brought forward.

Producer hedging and official sector sales



Dehedging, through the buying back or unwinding of these hedged positions, has largely occurred because of producers' expectations of a higher gold price in the future. Net dehedging, occurring when gold repayments to central banks exceed gold borrowing from central banks, imposes upward pressure on the current gold price through the reduction of gold supplied to the spot market.

In 2010, the outstanding hedge positions of global gold producers were reduced by an estimated 145 tonnes, which was a fall of 42 per cent compared with dehedging in 2009. AngloGold Ashanti, the remaining large gold producer with notable outstanding hedge positions, was the main contributor to dehedging activity during the year. The limited size of remaining hedged positions is expected to result in dehedging activity continuing to fall, with around 20 tonnes forecast to be returned to central banks by gold producers in 2011.

Weak growth forecast for world mine production

In 2010, world gold mine production is estimated to have risen by 3 per cent to 2653 tonnes, the highest annual production on record. Australia, Latin America, China and Africa (excluding South Africa) contributed the most to this growth, rising by a combined 7 per cent

to 1444 tonnes. Mine production fell by 7 per cent to 304 tonnes in Asia, mainly because of the scheduled mining of lower ore grades at Indonesia's Grasberg mine.

In 2011, world gold production is forecast to increase by 2 per cent to 2703 tonnes. In the United States, mine production is forecast to grow by 2 per cent to 239 tonnes as production from the Cortez Hills project approaches full capacity. A return to the mining of higher ore grades at Freeport McMoRan's Grasberg mine is forecast to result in Asia's mine production rising by 5 per cent to 318 tonnes. China's gold mine production is forecast to increase by a further 6 per cent to 344 tonnes as the gold mining industry continues to mature and expand its operations. Technical issues and declining ore grades are expected to persist in South Africa, leading to a decline in gold production of 5 per cent to 196 tonnes.

Over the medium term, global gold mine production is projected to grow at an annual average rate of 0.6 per cent. In Africa, production growth is projected to come from the start-up of a number of operations, including Newmont Mining's Akyem project in Ghana (15 tonnes a year) and Perseus Mining's Central Ashanti project (6 tonnes a year). In Latin America, new operations including Barrick Gold / Goldcorp's Pueblo Viejo project in the Dominican Republic (31 to 34 tonnes a year), Barrick Gold's Pascua-Lama project in Chile (23 to 25 tonnes a year) and Newmont's Conga project (22 tonnes a year) are expected to lead to growth in gold production in Latin America.

Largely offsetting the production growth from new operations is projected decreases from mature gold-producing countries such as the United States, Canada and South Africa. Falling production in these countries reflects a combination of factors such as declining ore grades, safety and labour issues, and a lack of new deposits to replace those resources that are being exhausted. While China is projected to remain the largest gold producer, some smaller operations in that country could become unprofitable under the projected lower gold price over the medium term.

Australian gold production to rise in the short term...

In 2010–11, Australian gold mine production is forecast to increase by 14 per cent to 274 tonnes. Supporting this growth is the ramping up of Newmont's $3 billion Boddington redevelopment in Western Australia, which is expected to produce around 25 tonnes in 2010–11. Several other new projects are forecast to contribute to production, including Crocodile Gold's Union Reefs (4 tonnes a year), Regis Resources' Duketon project (3 tonnes a year) and Navigator Resources' Bronzewing project (3 tonnes a year). While floods and above average rainfall are forecast to have a limited effect on Australian gold production in 2010–11, annual output is expected to be negatively affected at operations including Newcrest Mining's Cadia Valley in New South Wales.

Australian gold mine production is forecast to increase by 3 per cent to 282 tonnes in 2011–12. Several medium-sized operations in Western Australia, including Matsa Resources' Norseman project (3 tonnes a year), Navigator Resources' Leonora operations and Ramelius Resources' Mt Magnet project (each more than 1 tonne a year), are forecast to contribute to production growth. Moderately lower production is forecast from Newmont's Jundee and Tanami projects and Barrick Gold's Kanowna mine as these operations move closer to the end of their expected life spans.

...before stabilising over the medium term

Australian annual gold mine production is projected to grow by 3 per cent in 2012–13 and a further 8 per cent to 314 tonnes in 2013–14. AngloGold Ashanti / Independence Group's Tropicana Joint Venture project (10 to 13 tonnes a year) is projected to be the largest contributor to the growth in 2013–14. Gold production is also projected to increase as a result of the start-up of new projects including Mungana Goldmines' Chillagoe project in Queensland and Tanami Gold's Central Tanami project in the Northern Territory (both 5 tonnes a year).

By the end of the outlook period, annual gold production is expected to equal around 315 tonnes as the ramping up of the projects mentioned above is largely offset by lower production from existing mines that are closer to exhausting gold reserves. Development projects such as Newcrest Mining's Cadia East underground mine and Vista Gold's Mt Todd have the potential to support gold production in the medium term.

Continued strength in gold exports over medium term

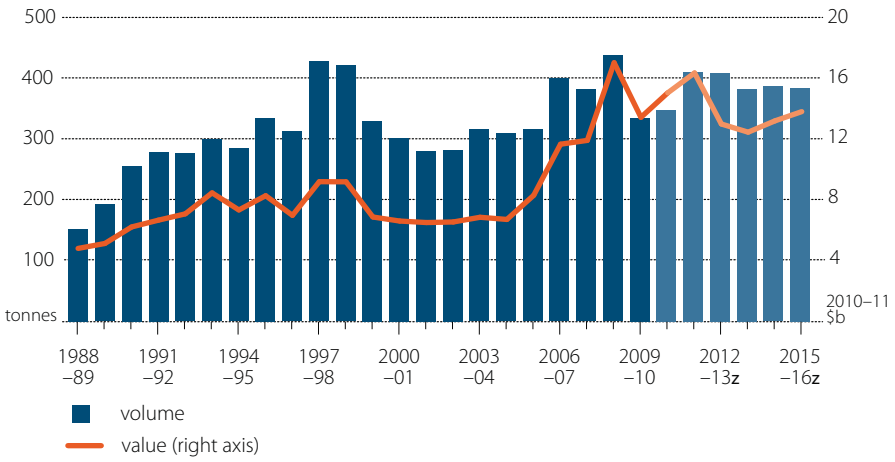
Australian gold export volumes in 2010–11 are forecast to rise by 4 per cent to 348 tonnes. This reflects an increase of exports of Australian mined gold, partly offset by a lower volume of imported gold to be refined in Australia and re-exported.

In 2011–12, increases in exports of both Australian-produced and overseas-sourced gold are forecast to result in export volumes rising by 18 per cent to 410 tonnes. Toward the end of the outlook period, Australian gold exports are projected to remain relatively stable at less than 400 tonnes a year.

The value of Australian gold exports is forecast to rise by 15 per cent to $15.0 billion in 2010–11, in response to a significantly higher Australian dollar denominated gold price and the modest increase in export volumes. In 2011–12, the value of gold exports is forecast to rise by a further 12 per cent to $16.8 billion as the rise in export volumes is partly offset by a lower gold price.

With the real gold price projected to decline in 2012–13, the value of gold exports is projected to fall to $12.9 billion in real terms, before rising gradually toward the end of the outlook period. By 2015–16, the real value of gold exports is projected to reach around $13.7 billion.

Australian gold exports



Outlook for gold

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Fabrication consumption	t	2 416	2 741	2 639	2 647	2 684	2 727	2 721	2 708
Mine production	t	2 572	2 653	2 703	2 693	2 771	2 766	2 796	2 762
Scrap sales	t	1 674	1 654	1 300	1 000	950	1 050	1 100	1 150
Residual net stock	t	(1831)	(1566)	(1364)	(1046)	(1038)	(1089)	(1174)	(1204)
official sector	t	30	(87)	(65)	0	30	60	90	120
private sector	t	(1609)	(1334)	(1279)	(1036)	(1068)	(1149)	(1264)	(1324)
producer hedging	t	(252)	(145)	(20)	(10)	0	0	0	0
Price **b**									
– nominal	US$/oz	973	1 225	1 320	1 098	1 013	1 070	1 113	1 175
– real **c**	US$/oz	1 002	1 241	1 320	1 076	973	1 008	1 028	1 064
		2008–09	**2009–10**	**2010–11 f**	**2011–12 f**	**2012–13 z**	**2013–14 z**	**2014–15 z**	**2015–16 z**
Australia									
Mine production	t	218	240	274	282	291	314	315	315
Export volume	t	437	335	348	410	409	383	386	384
Export value									
– nominal	A$m	16 146	12 996	14 991	16 810	13 682	13 433	14 606	15 670
– real **d**	A$m	16 991	13 364	14 991	16 312	12 922	12 378	13 129	13 743
Price									
– nominal	A$/oz	1 186	1 236	1 362	1 278	1 041	1 092	1 176	1 271
– real **d**	A$/oz	1 248	1 271	1 362	1 241	983	1 006	1 057	1 115

b London Bullion Market Association AM price. **c** In 2011 US dollars. **d** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.
Note: Net purchasing and dehedging shown in brackets.
Sources: ABARES; Gold Fields Mineral Services; Australian Bureau of Statistics; London Bullion Market Association.

Aluminium

Outlook to 2016

Kate Penney, Michael Lampard and Clare Stark

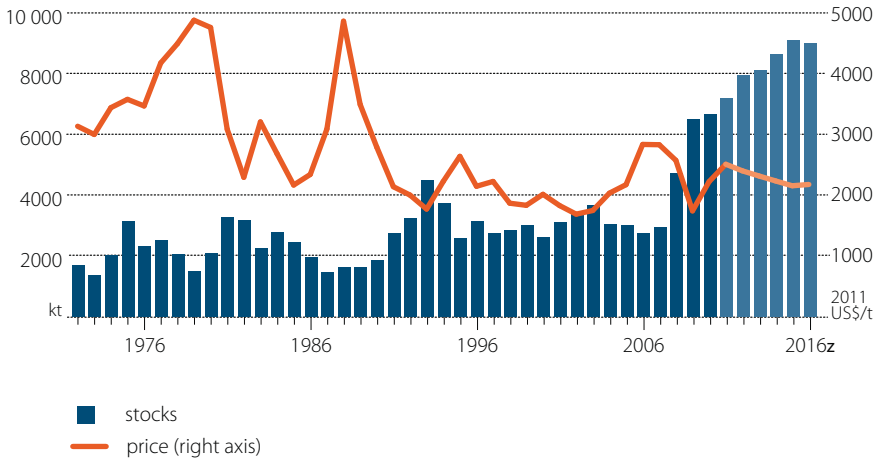
The short-term outlook for aluminium prices is positive, reflecting assumed strong global consumption and temporarily lower production in China, the world's largest aluminium producer. Over the medium term, growth in consumption is projected to remain robust, supported by strong growth in key aluminium-consuming economies. Despite this, excess capacity and high inventories are expected to place downward pressure on aluminium prices.

Prices to moderate over the medium term

Aluminium prices averaged around US$2170 a tonne in 2010, 30 per cent higher than the average for 2009. Prices increased toward the end of 2010, supported by strong world consumption growth, restocking activity and lower Chinese production (China accounts for around 39 per cent of world production). Cold weather in China raised power demand in the residential and commercial sectors, forcing utilities to reduce the volume of electricity available to smelters. This caused the closure of some capacity (particularly in Henan, Guangxi, Guizhou and Hunan provinces) and delayed the start-up of new capacity. As a result, there were sharp declines in registered and unregistered warehouse stocks. While power availability in China is likely to improve in early 2011, it will take some time before production returns to capacity, placing upward pressure on prices.

For 2011 as a whole, the aluminium price is forecast to average around US$2490 a tonne, which is an increase of 15 per cent from 2010. Consumption is forecast to grow at a faster rate than production, resulting in stocks falling relative to consumption from an estimated 8.7 weeks of consumption at the end of 2010 to 8.6 weeks at the end of 2011.

Aluminium stocks and prices



Over the medium term, additions to aluminium production capacity are projected to be sufficient to satisfy growth in consumption. Stocks are projected to rise gradually, which is expected to lead to a general decline in prices. However, difficulties in securing long-term, low-cost access to electricity, alumina and bauxite have raised the cost of aluminium production, and are expected to limit the decline.

Consumption to grow strongly over the outlook period

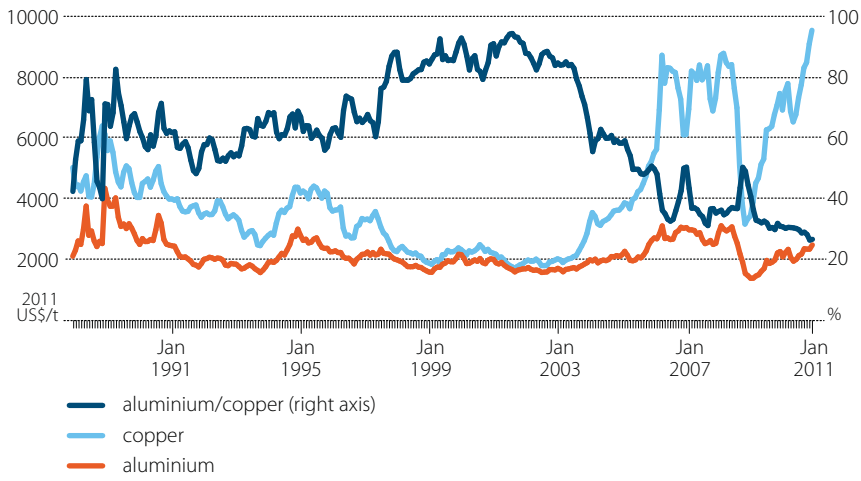
World aluminium consumption is estimated to have increased by 14 per cent in 2010 to 39.6 million tonnes following strong growth in major consuming countries, particularly the OECD economies. The recovery in aluminium consumption has been robust relative to other base metals because it has not been as strongly influenced by the construction sector, which has been relatively weak in developed economies. Instead, it has benefited from steady growth in the packaging and transport sectors.

In 2011, consumption is forecast to increase by a further 10 per cent to 43.4 million tonnes, mainly reflecting continued strong consumption growth in China stemming from growth in construction and manufacturing activities.

Over the medium term, world aluminium consumption is forecast to increase by an average of 6 per cent a year to around 59 million tonnes in 2016. This growth is expected to be underpinned by a strong outlook in key sectors such as automobile manufacturing and ultra-high voltage (UHV) electricity transmission. An increased global focus on energy efficiency and reducing carbon emissions will also support demand for aluminium over the projection period. Aluminium is durable, lightweight, recyclable and versatile, making it ideal for use in transport, building and thermal applications.

Aluminium could benefit from its cost-competitiveness relative to other base metals, particularly copper, for which it can be substituted in some applications. Aluminium prices in the past have typically been around 80 per cent of prices for copper. However, since June 2002, aluminium prices have declined relative to copper prices, and have recently fallen to around one-quarter of those for copper. Aluminium can be substituted for copper in applications such as radiators, air conditioning, plumbing, electrical transformers and long-distance electricity transmission cables. Aluminium is also picking up market share from other metals in consumer electronics applications. If this substitution continues to occur on a large scale, aluminium consumption could grow at a faster rate than projected, thus presenting an upside risk to the projection.

Aluminium/copper price differential



China to remain the major driver of consumption growth

In 2010, China's aluminium consumption is estimated to have increased by 14 per cent to 16.3 million tonnes. China's aluminium consumption is forecast to increase by a further 18 per cent in 2011 to 19.2 million tonnes, as non-residential construction continues to expand and domestic demand for aluminium-intensive manufacturing, such as motor vehicles, grows.

Over the medium term, China, which accounted for 41 per cent of world consumption in 2010, is expected to continue to be a major player in the aluminium market. A key driver of growth in aluminium demand in China is strong growth in infrastructure development, which itself is being driven by rapid industrialisation and urbanisation.

Strong growth in the production of motor vehicles in China is also expected to support aluminium demand (a standard car contains approximately 120 kilograms of aluminium). China's growing domestic market for automobiles has encouraged manufacturers to increase production for both the domestic and export markets.

In addition, the State Grid Corporation of China has announced plans to build a network of UHV electricity transmission lines in northern, eastern and central China to improve transmission capacity. Both direct current (DC) and alternating current (AC) UHV long-distance power lines use aluminium cables. Construction is expected to take place during China's 12th Five Year Plan period (2011–15).

Moderate growth in OECD demand

Aluminium consumption in OECD economies is estimated to have risen by 19 per cent to 15.6 million tonnes in 2010. Increased economic activity, particularly during the first half of 2010, supported greater aluminium use in the manufacture of consumer durables and automobiles. This growth was driven by increased consumption in Germany, Japan and the United States.

In 2011, growth in OECD consumption is forecast to moderate, increasing by 2 per cent to 16 million tonnes. This reflects assumed weaker economic growth in most major developed economies. Consumer restocking that occurred throughout 2010 is expected to cease, which will also contribute to weaker growth. Over the medium term, OECD aluminium consumption is projected to increase at a rate of around 3 per cent a year to reach 18.1 million tonnes in 2016.

Production projected to expand

World aluminium production is estimated to have increased by 10 per cent to 40.9 million tonnes in 2010, with China and the Middle East accounting for most of this growth. In 2011, world production is forecast to increase by a further 8 per cent to 44 million tonnes as large additions to capacity in China, India and the Middle East are completed or approach full capacity.

Over the medium term, world aluminium production is projected to increase by an average of 6 per cent a year, to around 59 million tonnes in 2016. Forecast higher prices in the short term and the strong consumption outlook are expected to stimulate investment in new capacity.

China is projected to account for more than one-third of the increase in production over this period. However, rising production costs may limit the growth and present a downside risk to the production outlook. Electricity accounts for around one-quarter of production costs. Rising coal prices and the Chinese Government's intention to curb growth in energy-intensive industries through increased electricity tariffs will contribute to higher aluminium production costs. Costs of other inputs including labour, alumina, anodes, caustic soda and bauxite have also been rising. Rising marginal costs of production have reduced the profitability of some smelters.

Outside China, the largest expansion in production capacity is expected to occur in the Middle East, where producers can take advantage of long-term, low-cost energy supply contracts. Governments are also keen to diversify away from their large oil and gas-based industries. In the United Arab Emirates, the second phase of the EMAL smelter joint venture between Dubai Aluminium and Mubadala (capacity of 1.5 million tonnes a year) is scheduled for completion in 2013. In Saudi Arabia, the Ras Az Zawr smelter (740 000 tonnes a year) and the Jazan Economic City smelter (1 million tonnes a year) are expected to be completed in 2013 and late 2014, respectively. These developments in the Middle East are projected to contribute to increasing aluminium production in the region, reaching 8.5 million tonnes in 2016.

Aluminium production growth in the OECD is projected to be relatively subdued. Rio Tinto Alcan has announced plans to proceed with longstanding greenfield and brownfield projects in Canada. The first phase of its Saguenay plant (a replacement for the 170 000 tonne Arvida smelter) with capacity of 60 000 tonnes a year is expected to be completed in 2013. In addition, Rio Tinto Alcan intends to modernise its Kitimat smelter which will increase capacity by more than 48 per cent to around 420 000 tonnes from 2014.

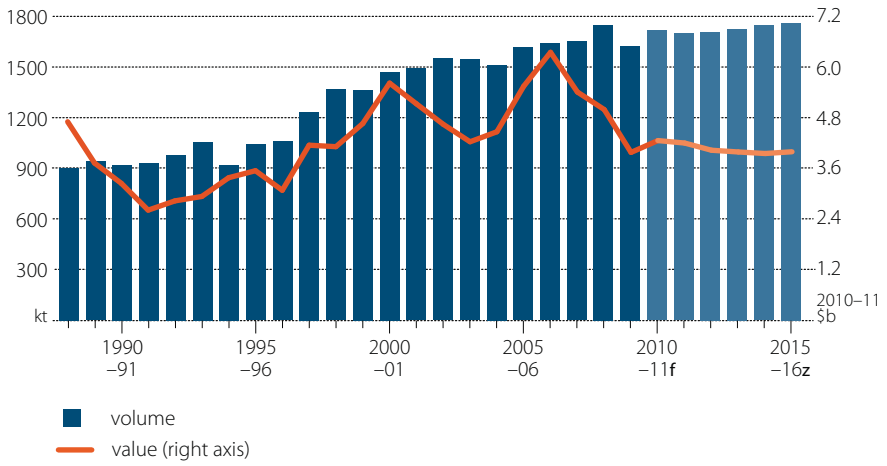
Australian aluminium production remaining steady over the outlook period

No major additions to aluminium smelter capacity in Australia are expected over the outlook period, reflecting relatively higher electricity and labour costs. The only Australian aluminium project currently under construction or in the planning stage is Rio Tinto Alcan's Boyne Island Smelter upgrade. The Boyne Island Smelter, located near Gladstone in Queensland, is Australia's

largest aluminium smelter and has been in operation since 1982. The upgrade project involves the replacement of cranes, runways and carbon bake furnaces on two of the three pot lines at the smelter. The project is scheduled for completion over 2011 and 2012, but the upgrades will not add to the smelter's existing capacity.

Although no new smelter capacity is expected to be commissioned in Australia over the outlook period, ongoing efficiency improvements are projected to result in aluminium production in Australia increasing slowly, from 1.96 million tonnes in 2010–11 to 2.07 million tonnes in 2015–16. Australia is a small consumer of aluminium and most Australian production is exported. Australian exports of aluminium are projected to increase from 1.72 million tonnes in 2010–11 to 1.76 million tonnes in 2015–16. The value of aluminium exports is forecast to total $4.2 billion in 2010–11 and decline in real 2010–11 dollar terms to $4.0 billion in 2015–16.

Australian aluminium exports



Alumina

In 2010, the spot price of alumina averaged around US$345 a tonne, 39 per cent higher than prices in 2009. This reflects strong demand for alumina stemming from growth in aluminium production.

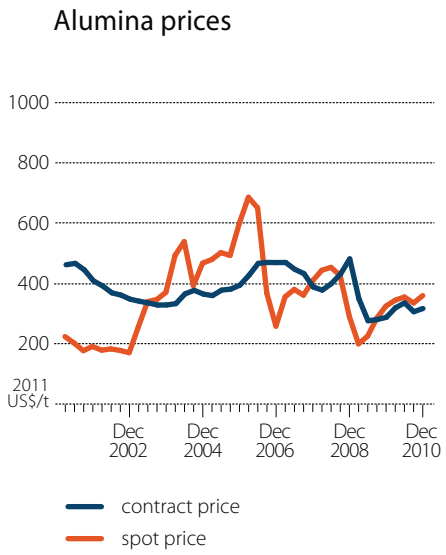
During 2010, a number of large alumina producers announced their intention to sell output on the spot market rather than traditional contracts linked to the aluminium price (see box). This trend is expected to persist over the medium term and the number of contract-based sales is likely to decline.

In 2011, alumina spot prices are forecast to increase by 12 per cent to average around US$390 a tonne. World consumption of alumina is forecast to rise, supported by the construction of new smelters in China and the Middle East.

Over the medium term, prices are projected to rise to US$400 a tonne in 2012 before easing gradually to US$290 a tonne in 2016 (in 2011 US dollars). The demand for alumina is expected to remain strong as a result of increased aluminium production. Higher alumina prices at the beginning of the projection period are expected to provide an incentive to invest in new capacity. While production is projected to increase over the outlook period, supply constraints arising from the high capital cost of increasing refining capacity and limited availability of high quality bauxite are expected to limit the decline in prices.

Alumina – spot prices versus contract prices

Alumina has traditionally been sold through long-term contracts set to a fixed percentage of the London Metal Exchange price for aluminium. In general, aluminium is produced by vertically integrated companies to ensure security of supply and to realise cost savings. Consequently, alumina production is determined by internal requirements rather than external demand. Reflecting this structure, alumina spot trade has historically been low. However, following changes to market and cost structures, companies have recently begun to consider the use of spot pricing.



Over the past few years a number of independent aluminium producers, particularly in China and the Middle East, have been purchasing alumina from integrated producers. The volumes purchased have been in excess of internal requirements, creating spot and short-term markets for alumina. China's share of the global alumina market has been increasing, which in turn has been driving the importance of, and volume of, trade on the spot market.

Some alumina producers argue that alumina prices based on the pricing of aluminium do not reflect market fundamentals for alumina, largely because of the different cost drivers. The cost of producing alumina is mainly affected by the cost of bauxite (including transport, handling and waste disposal), while electricity costs dominate the cost of producing aluminium. Accordingly, these producers, and some of the larger integrated companies, are pushing for the exclusive use of spot pricing. For example, UC Rusal has announced its intention to use a spot index after current contracts expire. A number of alumina spot price indexes have been developed over the past six months including those of CMAXX, Metal Bulletin and Platts.

The difference between spot and contract prices has been significant. In response, some producers have moved to increase the fixed percentage used in contracts to compensate. In some cases contract prices have increased from the traditional 12–13 per cent to around 15–17 per cent.

Australian production to increase significantly

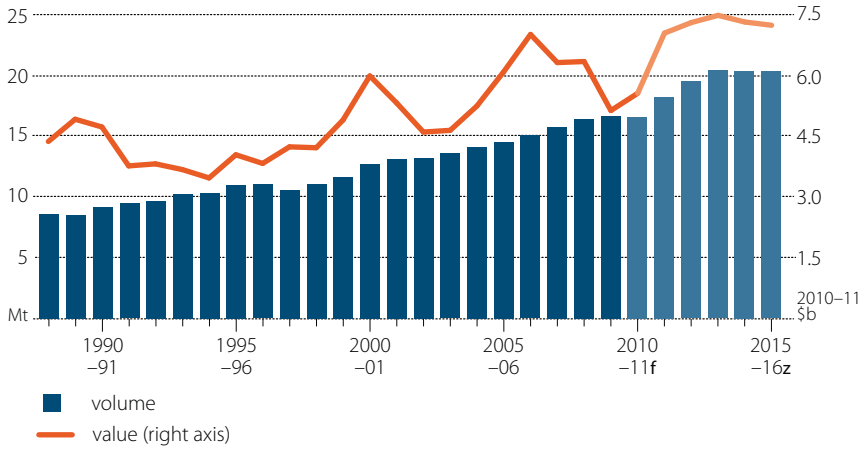
Australia's production of alumina is forecast to increase by 1 per cent to 20.2 million tonnes in 2010–11, mainly as a result of expected higher production at the Gove refinery in the Northern Territory and the Worsley refinery in Western Australia.

Over the medium term, Australia's production of alumina is projected to increase significantly, supported by a number of capacity expansions. The expansion of BHP Billiton's Worley alumina refinery in Western Australia is scheduled to be completed in the first half of 2011. The expansion will increase refining capacity to 4.6 million tonnes a year, from 3.5 million tonnes a year. Rio Tinto's Yarwun refinery expansion in Queensland is expected to increase production to 3 million tonnes a year by 2012. As a result, Australian alumina production is projected to increase to around 24.4 million tonnes by 2015–16.

Because of expected gradual increases in domestic aluminium production, the strong increase in alumina production will translate into rapid increases in alumina exports over the outlook period. Alumina export volumes are projected to increase from 16.6 million tonnes in 2010–11 to around 20.3 million tonnes in 2015–16.

With higher expected export volumes and prices, the value of Australian alumina exports is forecast to increase from $5.5 billion in 2010–11 to $7.3 billion in 2011–12 (in nominal terms). Toward the end of the outlook period, export earnings are projected to remain at around $7.3 billion (in 2010–11 dollars) by 2015–16, as projected higher export volumes and an assumed depreciation of the Australian dollar offset lower projected prices.

Australian alumina exports



Outlook for alumina and aluminium

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Production									
Primary aluminium	kt	37 180	40 871	43 945	46 992	49 607	53 270	56 039	58 509
Consumption									
Primary aluminium	kt	34 811	39 620	43 405	46 247	49 447	52 733	55 572	58 613
Closing stocks									
Primary aluminium **b**	kt	6 485	6 654	7 194	7 939	8 099	8 636	9 102	8 998
– weeks consumption	wks	9.7	8.7	8.6	8.9	8.5	8.5	8.5	8.0
Prices									
World aluminium **c**									
– nominal	US$/t	1 663	2 170	2 488	2 425	2 385	2 345	2 305	2 375
	USc/lb	75	98	113	110	108	106	105	108
– real **d**	US$/t	1 712	2 199	2 488	2 377	2 292	2 210	2 129	2 151
	USc/lb	78	100	113	108	104	100	97	98
Alumina									
– nominal spot	US$/t	249	345	386	400	380	350	325	320
– real spot **d**	US$/t	257	349	386	392	365	330	300	290

		2008–09	2009–10	2010–11 f	2011–12 f	2012–13 z	2013–14 z	2014–15 z	2015–16 z
Australia									
Production									
Primary aluminium	kt	1 974	1 918	1 962	1 997	2 009	2 029	2 052	2 071
Alumina	kt	19 597	20 057	20 170	22 100	23 420	24 360	24 360	24 360
Bauxite	Mt	64	67	68	70	74	82	90	91
Consumption									
Primary aluminium	kt	312	312	296	300	301	304	308	311
Exports									
Primary aluminium	kt	1 748	1 624	1 716	1 698	1 708	1 725	1 744	1 760
Nominal value	A$m	4 724	3 838	4 230	4 297	4 234	4 294	4 361	4 518
Real value **e**	A$m	4 972	3 946	4 230	4 170	3 999	3 957	3 920	3 962
Alumina	kt	16 395	16 653	16 587	18 205	19 503	20 403	20 358	20 322
Nominal value	A$m	6 015	4 969	5 507	7 257	7 736	8 127	8 143	8 346
Real value **e**	A$m	6 330	5 110	5 507	7 042	7 306	7 488	7 320	7 319
Bauxite	kt	7 470	8 023	8 232	6 535	7 793	13 517	21 581	23 081
Nominal value	A$m	192	178	206	153	183	317	507	542
Real value **e**	A$m	203	183	206	149	173	292	455	475
Total value									
– nominal	A$m	10 932	8 985	9 943	11 707	12 153	12 738	13 011	13 405
Real value **e**	A$m	11 504	9 240	9 943	11 361	11 478	11 737	11 696	11 756

b Producer and LME stocks. **c** LME cash prices for primary aluminium. **d** In 2011 US dollars. **e** In 2010–11 Australian dollars.
f ABARES forecast. **z** ABARES projection.
Sources: ABARES; London Metal Exchange; World Bureau of Metal Statistics.

Nickel

Outlook to 2016

Robert New

Over the outlook period, nickel prices are forecast to decline from current levels of around US$29 000 a tonne in response to increased supply. From 2013, output from several new projects is expected to approach full capacity, which is expected to place downward pressure on prices. By 2016, nickel prices are projected to average around US$19 100 a tonne (in 2011 US dollars), 25 per cent lower than the 2011 forecast of around US$25 400.

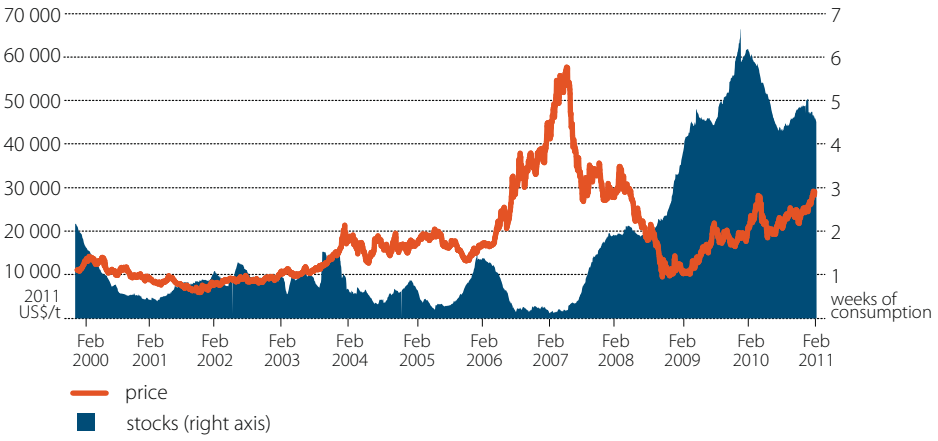
Prices to ease from current highs

In 2010, nickel prices averaged 49 per cent higher than in 2009, at around US$21 700 a tonne, reflecting a strong recovery in demand and a production increase that was insufficient to fully offset upward pressure on prices.

In 2011, nickel prices are forecast to average around US$25 400 a tonne, representing a 17 per cent increase on the 2010 average. This is largely attributable to a forecast increase in demand for nickel from production of nickel-containing stainless steel and expected relatively weak growth in nickel production. Although a number of projects are scheduled to begin production in 2011, these are unlikely to make a substantial contribution to world nickel production until they reach full production capacity in 2013.

Beyond 2013, the combination of higher production from the restart of several operations in Canada and Australia and increased production from new projects that are scheduled to commence is expected to outpace growth in world consumption, placing downward pressure on prices. Over the remainder of the outlook period, production from several nickel laterite projects across South-East Asia and Brazil is projected to contribute to an easing in prices. The nickel price is projected to be around US$19 100 a tonne (in 2011 US dollars) in 2016.

Nickel prices and stocks



Source: London Metal Exchange.

Increasing production costs underpin prices

The increasing scarcity of high nickel content (20 to 40 per cent) sulphide deposits and the resulting reliance on low nickel content (2 to 4 per cent) laterite deposits will continue to support prices above US$19 000 a tonne. The world nickel development pipeline is largely composed of high-cost nickel laterite projects, which are expected to keep prices high by historical standards. However, the relative abundance of nickel laterite deposits, and the significant production capacity scheduled for completion over the medium term will reduce the likelihood of prices exceeding US$27 000 a tonne for an extended period of time.

World consumption to grow strongly over the medium term

In 2010, world nickel consumption increased by 13 per cent to 1.4 million tonnes, as an improvement in economic conditions following the global economic slowdown spurred government and private investment in nickel-intensive construction.

Nickel consumption (kt)

	2009	2010s	2011f	2012f	2013z	2014z	2015z	2016z
China	443	500	555	616	684	739	798	861
Chinese Taipei	71	75	77	80	82	84	87	90
European Union 27	288	328	350	366	370	379	382	392
India	32	34	36	39	42	46	50	53
Japan	121	150	153	155	156	158	159	161
Republic of Korea	67	71	72	74	75	77	78	80
United States	90	116	120	124	127	130	132	135
World nickel consumption	1 241	1 401	1 506	1 596	1 683	1 762	1 838	1 931

Growth in stainless steel production will be the primary driver of nickel consumption over the outlook period, as approximately two-thirds of nickel is used in the manufacture of stainless steel. In 2011, world consumption of nickel is forecast to increase by 7 per cent to 1.5 million tonnes.

In 2011, nickel consumption in non-OECD economies is forecast to increase strongly, supported by robust growth in developing Asia. Consumption in China and India will be supported by the rapid expansion of urban infrastructure and housing development, which is required to support ongoing industrialisation and urbanisation. In addition, infrastructure construction in China's western provinces will provide support for nickel demand in the short term. As a result, 2011 nickel consumption in China and India is forecast to increase by 11 per cent, to 555 000 tonnes, and 6 per cent, to 36 000 tonnes, respectively.

Although nickel consumption will be strongly supported by growth in stainless steel production, the effect on nickel demand will be partly offset by continued substitution away from nickel-intensive stainless steels. Production of 300 series stainless steels, which have the highest nickel contents (9–10 per cent), is expected to gradually decline. This production is expected to be replaced by 200 series and 400 series stainless steels, which increase the

content of other minerals, such as manganese and chromium, to achieve the strength and anti-corrosive qualities otherwise lost because of lower nickel content.

The construction of nickel-intensive infrastructure and growth in private consumption of nickel-containing consumer durables will contribute toward growth in demand for nickel. Most of this growth is forecast to occur in developing Asian economies, particularly China and India. Higher rates of urbanisation and rising incomes will underpin demand for improved urban infrastructure and growth in consumption of modern appliances such as white goods and televisions.

Over the medium term, growth in world nickel consumption is projected to average 5 per cent a year, reaching 1.9 million tonnes in 2016. Growth will continue to be underpinned by increasing consumption of stainless steels in developing economies. Given these economies' low nickel consumption per person compared with many developed economies, there remains significant growth potential in developing economies over the medium term.

The continuing demand for urban infrastructure and housing in developing economies will be the main driver of nickel consumption over the medium term. In 2016, nickel consumption is projected to reach 861 000 tonnes in China and 53 000 tonnes in India, representing average growth of 9 per cent and 8 per cent a year, respectively.

Over the remainder of the outlook period, OECD nickel consumption is projected to grow steadily, supported by a recovery in private consumption of nickel-intensive goods. By 2016, nickel consumption is projected to grow at an average rate of 3 per cent a year in the European Union, to reach 392 000 tonnes; 3 per cent a year in the United States, to reach 135 000 tonnes; and 1 per cent a year in Japan, to reach 161 000 tonnes.

Mine production to expand in response to high prices

In 2011, world nickel mine production is forecast to increase by 10 per cent to 1.7 million tonnes. This will largely be supported by increased mine production in Canada following the resolution of labour disputes in 2010, and modest increases in Australian production as mines are redeveloped or restarted following closures associated with weak prices in late 2008 and 2009.

Canada's nickel mine production is forecast to increase by 38 per cent in 2011 to 200 000 tonnes. This assessment assumes uninterrupted production at Vale's operations for the full year, following two years of labour-related supply disruptions at the Sudbury and Voisey's Bay operations. By the end of 2010, these operations had resumed production at close to full capacity, and they are expected to contribute significantly to growth in world mine production in 2011.

Vale began production at the 58 000 tonne Onça Puma mine in Brazil in late 2010, and is scheduled to commence operation of the VNC project (60 000 tonne annual capacity) in New Caledonia in early 2011. These are the first of a number of projects scheduled to commence in the next two years. However, many of these projects are expected to increase production over a period of around two years, and will not reach full capacity until 2013.

Over the medium term, most expansions to production capacity are expected to be new nickel laterite operations, particularly in Brazil, Indonesia, the Philippines and New Caledonia. The increasing scarcity of high-quality, easily accessible sulphide deposits suggests that the trend toward higher utilisation of laterite reserves will continue into the future. Reflecting this, mine production is forecast to increase in Brazil (average annual rate of 17 per cent to reach 140 000 tonnes in 2016), Indonesia (2 per cent to 270 000 tonnes), New Caledonia (5 per cent to 175 000 tonnes) and the Philippines (3 per cent to 198 000 tonnes). By 2016, world nickel mine production is projected to reach 2.1 million tonnes, representing average growth of 5 per cent a year over the outlook period.

Over the remainder of the outlook period, Canada's mine production is projected to increase to reach the record level of 2007. While there are relatively few expansions planned for development in Canada, the underutilised capacity in the system suggests there is considerable room for production increases over the medium term. By 2016, Canada's mine production is projected to reach 280 000 tonnes, representing average growth of 12 per cent a year over the outlook period.

Production increases in Australia are also expected to contribute to increases in world nickel mine production. The redevelopment of the Ravensthorpe nickel laterite mine by new owners First Quantum, and the restart of production at many of Norilsk Nickel's Australian operations will be the main sources of the increase. Over the outlook period, Australian nickel mine production is projected to increase at an annual average of 4 per cent a year to reach 207 000 tonnes in 2016.

World mine production (kt)

	2009	2010s	2011f	2012f	2013z	2014z	2015z	2016z
Australia	166	167	191	199	201	201	204	207
Canada	137	145	200	240	245	250	270	280
Indonesia	203	234	240	240	250	250	260	270
Russian Federation	262	265	270	275	280	280	280	285
Philippines	119	170	172	170	175	180	189	198
World mine production	1 347	1 539	1 700	1 799	1 889	1 932	2 007	2 053

Nickel laterite projects planned for completion

project	company	capacity	expected start-up
Brazil			
Barro Alto	Anglo American	36 kt	2011
Onça Puma	Vale	58 kt	commenced 2010
Indonesia			
PT Inco	PT Inco	18 kt	2011
New Caledonia			
VNC	Vale	60 kt	2011
Goro	Goro Nickel	60 kt	2011
Koniambo	Xstrata Nickel/SMSP	60 kt	2012
Papua New Guinea			
Ramu	MCC	30 kt	2011
Philippines			
various	various	120 kt	
Turkey			
Çaldağ	European Nickel	20.4 kt	2011
Madagascar			
Ambatovy	Sherritt, Sumitomo Corporation	60 kt	2011

World refined nickel production to increase on higher mine supply

Over the medium term, growth in refined nickel production is expected to largely mirror growth in mine production. The restart of operations in Canada and Australia and the large projected increase in China's nickel pig iron refining capacity are projected to underpin average growth of 5 per cent a year over the outlook period. By 2016, world refined nickel production is projected to reach 1.9 million tonnes.

Refined nickel production (kt)

	2009	2010s	2011f	2012f	2013z	2014z	2015z	2016z
Australia	131	114	129	134	136	136	140	142
Canada	117	100	130	143	144	146	147	149
China	254	320	355	387	422	460	501	547
Finland	41	42	40	41	42	42	43	44
Japan	144	160	162	165	168	171	175	178
Norway	89	90	91	92	93	94	95	96
Russian Federation	254	260	260	260	265	276	281	287
World refined production	1 331	1 407	1 522	1 638	1 694	1 766	1 827	1 892

In Canada, refined nickel production in 2011 is forecast to increase by 30 per cent to 130 000 tonnes, under the assumption that mine and refinery production at the Sudbury and Voisey's Bay operations will not be interrupted. Over the remainder of the outlook period, refined nickel production is

projected to grow in line with expansions to mining capacity, to reach 149 000 tonnes in 2016. This projected production represents average growth of 7 per cent a year over the outlook period.

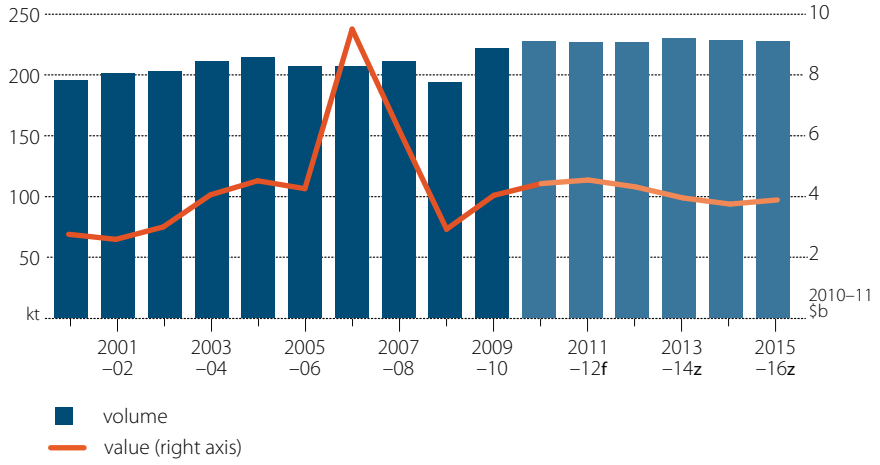
In Australia, the redevelopment of First Quantum's Ravensthorpe mine, and the expected restart of Norilsk Nickel's Australian operations underpin projected 4 per cent annual growth over the outlook period to reach 142 000 tonnes by 2016. Several development projects that have the potential to add to Australia's mine and refined production are scheduled for completion over the medium term. However, these projects are still in the early stages of planning, and there remains considerable uncertainty about their development timelines. Therefore, these uncommitted projects are unlikely to contribute significantly to Australia's nickel production within the outlook period.

China has been rapidly expanding its nickel refining capacity, and is expected to continue to do so over the medium term. Nickel pig iron accounts for the largest proportion of this additional capacity, which utilises the vast nickel laterite ore reserves mined in the Pacific region. China's refined nickel production is forecast to increase by 11 per cent in 2011 to 355 000 tonnes, and to grow by a further 9 per cent a year over the remainder of the outlook period to reach 547 000 tonnes in 2016.

Australia's nickel export earnings to increase

In 2010–11, Australia's export earnings from nickel are forecast to increase by 13 per cent to $4.4 billion. This reflects an increase in export volumes, up 2 per cent to 226 000 tonnes, and prices that are forecast to be 24 per cent higher than in 2009–10. The increase in export volumes is driven largely by higher production from existing operations, including higher production at Western Areas' Spotted Quoll operation.

Australian nickel exports



Over the remainder of the outlook period, Australia's nickel export earnings are projected to decline gradually to $3.8 billion (in 2010–11 dollars) by 2015–16, as modest increases in export volumes are more than offset by projected declines in world prices. The projected increase in export volumes will rely on the successful redevelopment of Ravensthorpe, and the restart of Norilsk Nickel's Australian operations.

Outlook for nickel

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Production									
– mine	kt	1 347	1 539	1 700	1 799	1 889	1 932	2 007	2 053
– refined	kt	1 331	1 407	1 522	1 638	1 694	1 766	1 827	1 892
Consumption	kt	1 241	1 401	1 506	1 596	1 683	1 762	1 838	1 931
Stocks	kt	234	240	256	297	309	313	302	262
– weeks consumption		9.8	8.9	8.8	9.7	9.6	9.2	8.5	7.1
Price IME									
– nominal	US$/t	14 642	21 746	25 382	23 875	23 000	20 188	20 750	21 125
	Usc/lb	664	986	1 151	1 083	1 043	916	941	958
– real **b**	US$/t	15 076	22 029	25 382	23 407	22 107	19 023	19 170	19 134
	Usc/lb	684	999	1 151	1 062	1 003	863	870	868
		2008 –09	2009 –10	2010 –11 f	2011 –12 f	2012 –13 z	2013 –14 z	2014 –15 z	2015 –16 z
Australia									
Production									
– mine **cs**	kt	185	160	178	203	200	200	203	206
– refined	kt	111	120	124	131	134	136	137	142
– intermediate	kt	21	43	46	48	49	49	50	56
Export volume **ds**	kt	194	222	226	227	227	230	229	228
Export value									
– nominal **s**	A$m	2 717	3 875	4 374	4 631	4 515	4 231	4 109	4 370
– real **es**	A$m	2 859	3 985	4 374	4 494	4 264	3 898	3 693	3 832

b In 2011 US dollars. **c** Nickel content of domestic mine production. **d** Includes metal content of ores and concentrates, intermediate products and nickel metal. **e** In 2010-11 Australian dollars. **f** ABARES forecast. **s** ABARES estimate. **z** ABARES projection.
Sources: ABARES; Australian Bureau of Statistics; International Nickel Study Group; London Metal Exchange; World Bureau of Metal Statistics.

Copper

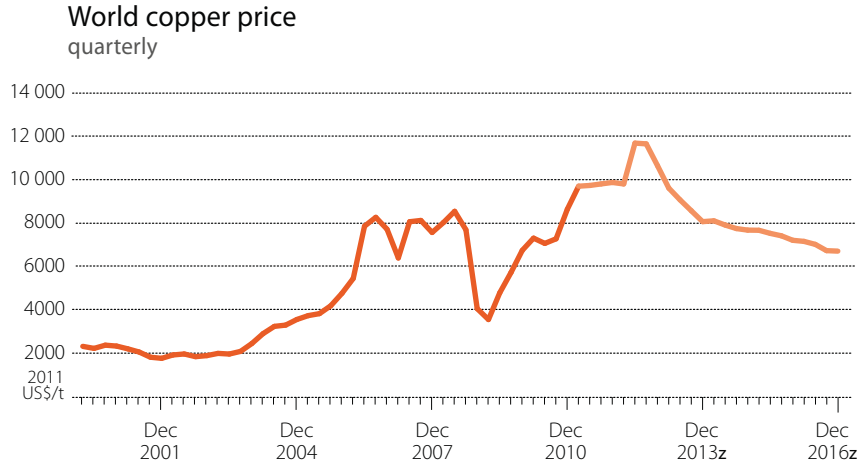
Outlook to 2016

Rebecca Petchey

The copper price is forecast to rise to an average of US$11 030 a tonne in 2012 (in 2011 US dollars), before declining to around US$6950 a tonne in 2016. Copper consumption is projected to exceed production up to 2012, after which new production capacity is scheduled to be commissioned. In Australia, production is projected to grow strongly as new mines are completed. Earnings from Australia's copper exports are projected to be $9 billion (in 2010–11 dollars) in 2015–16.

Copper price to peak in 2012

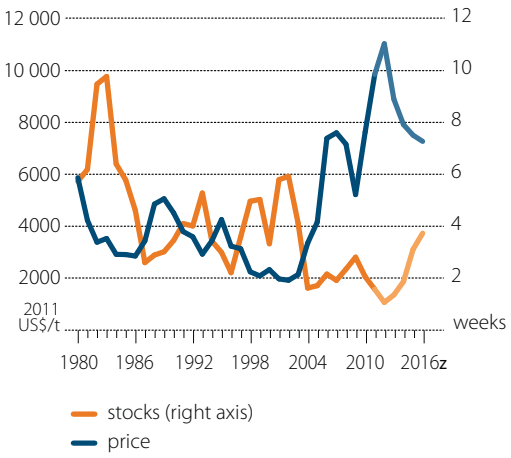
The copper price averaged US$7529 a tonne in 2010, an increase of 49 per cent compared with the 2009 average. This increase was driven by strong world consumption and relatively weak production. In addition, copper prices were supported by a decline in the value of the US dollar, in which the copper price is denominated. With consumption exceeding production, world copper stocks at the end of 2010 are estimated to have declined to 2.1 weeks of consumption, from 2.8 weeks at the end of 2009.



In 2011, the world copper price is forecast to average US$9850 a tonne, an increase of 31 per cent compared with the 2010 average. While consumption growth is forecast to moderate in 2011 in line with assumed slower world economic growth, production growth is forecast to be even slower. Consequently, world copper stocks are expected to decline further to 1.6 weeks of consumption by the end of 2011.

Copper prices are projected to peak at US$11 030 a tonne (in 2011 US dollars) in 2012, and to fall gradually over the remainder of the outlook period. Consumption growth is projected to

World copper stocks and prices



exceed production growth until 2013, when new production capacity is scheduled to begin operation. Reflecting this, copper stocks are projected to fall to 1.1 weeks of consumption by the end of 2012, but to steadily increase to around 3.7 weeks of consumption at the end of 2016. Copper prices in 2016 are projected to average around US$6950 a tonne (in 2011 US dollars).

The strong volatility recently observed in the copper price is expected to continue in the short to medium term, particularly during the remainder of 2011 and in 2012. Growth in production largely depends on new capacity being completed on schedule and existing mines operating without significant disruptions. With the market projected to remain tight over the outlook period, any production disruptions or surges in demand are likely to result in significantly higher prices than projected.

Growth in copper consumption to moderate over the medium term

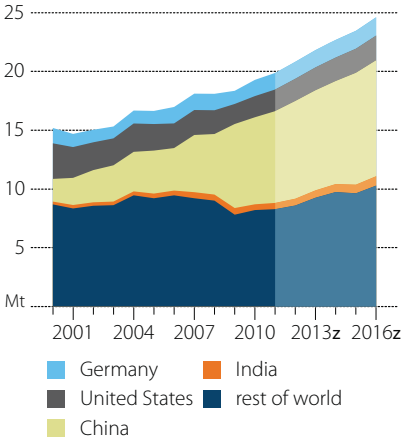
In 2010, world copper consumption increased by 5 per cent to 19.3 million tonnes, supported by stronger economic growth following the global economic downturn. World copper consumption is forecast to increase by 3 per cent to 19.9 million tonnes in 2011. The slower rate of consumption growth relative to 2010 reflects the assumption of weaker economic growth in large copper consuming economies, particularly the United States and China.

Over the medium term, world copper consumption is projected to increase at an annual average of 4 per cent to 24.6 million tonnes in 2016. World copper consumption is forecast to increase at a faster rate in 2012 than in 2011, supported by growth in demand from both developing and developed economies. Since copper is a major component in manufacturing activities—including the production of consumer durables and motor vehicles—and in housing and infrastructure, higher economic growth in 2012 is expected to support higher growth in copper consumption.

A risk to growth in copper consumption over the medium term is the extent to which copper can be substituted with lower cost materials, particularly aluminium. Recently, high copper prices (relative to other base metals) have resulted in aluminium being substituted for copper in some electric motors, housing wire and electrical transmission infrastructure. Sustained higher copper prices (relative to aluminium) may result in increased substitution of copper by aluminium, presenting a downside risk to the consumption and price projections.

China's copper consumption is forecast to increase by 3 per cent to 7.6 million tonnes in 2011, after increasing by 4 per cent in 2010. In the second half of 2010, the Chinese Government took measures to slow the high rate of economic growth; the effect of these measures will be more obvious in 2011, with economic growth assumed to ease to 9 per cent for the year as a whole.

Major copper consumers



The measures undertaken to slow economic growth could affect manufacturing production and housing construction, leading to an easing of strong growth in copper consumption.

Over the remainder of the outlook period, movements in China's copper consumption are expected to remain an important factor in the growth of world copper demand. China's copper consumption accounted for around 40 per cent of world copper consumption in 2010, and is projected to grow at an average rate of 5 per cent a year to 9.9 million tonnes by 2016. This is expected to be underpinned by continuing industrialisation and urbanisation, where copper is used in electricity infrastructure and housing construction. Growth in China's copper consumption is also expected to be supported by growth in exports for copper-intensive goods such as televisions and air conditioners.

In the OECD, copper consumption in 2011 is forecast to increase by 2 per cent to 8.4 million tonnes, after increasing by around 10 per cent in 2010. Over the outlook period, copper consumption in the OECD is projected to increase at an average rate of 3 per cent a year to reach 9.7 million tonnes by 2016. This is expected to be underpinned by consumption growth in major copper consuming economies, including the United States and Germany. However, the possibility of lower than expected economic growth in the OECD economies presents a downside risk to this forecast.

India's copper consumption is projected to grow at an average rate of 8 per cent a year to 800 000 tonnes in 2016, one of the fastest rates of copper consumption growth around the world. However, India's consumption growth is occurring from a much lower base, and absolute increases in consumption will be lower than those projected for China. Rapid economic growth, combined with increasing motor vehicle manufacture, is expected to support higher copper consumption.

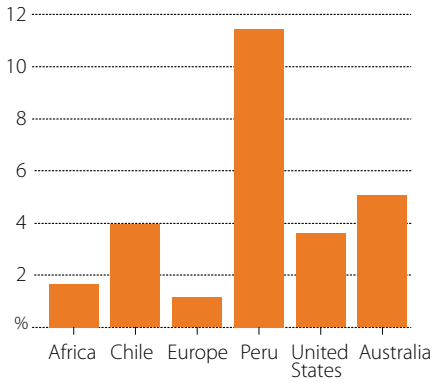
Higher production over the medium term...

In 2011, world copper mine production is forecast to increase by 2 per cent to 16.7 million tonnes, supported by expanding production capacity in Africa and Chile. Copper production in Africa is forecast to increase by 8 per cent to 1.5 million tonnes, underpinned by an expansion at Anvil Mining's Kinsevere operation in the Democratic Republic of the Congo (60 000 tonnes annual capacity). In Chile, production is forecast to increase by 3 per cent to 6 million tonnes as expansions completed in 2010 approach full capacity, including Codelco's Andina (additional 70 000 tonnes annual capacity) and Xstrata's Collahuasi (additional 350 000 tonnes annual capacity) operations.

...supported by rapid expansion in Peru

The fastest growth in copper mine production is projected to occur in Peru, increasing at an average annual rate of around 11 per cent to 2.3 million tonnes in 2016. This is expected to be underpinned by the start-up of a number of new mines, including Xstrata's Antapaccay (160 000 tonnes annual capacity) and Las Bambas (300 000 tonnes annual capacity) projects, Southern Copper's Pilares mine (40 000 tonnes annual capacity), and Anglo American's Quellaveco project (220 000 tonnes annual capacity). Also supporting higher production over the projection period are planned expansions at Southern Copper's Toquepala (100 000 tonnes additional capacity) and Cuajone projects (72 000 tonnes additional capacity).

Average annual growth in production for major copper producers 2011 to 2016



In Chile, copper mine production is projected to grow at an average rate of 4 per cent a year to 7.5 million tonnes in 2016. New mines scheduled to be commissioned over the outlook period are expected to support this increase, including Antofagasta's Esperanza mine (195 000 tonnes annual capacity) and Minera Lumina Copper Chile's Caserones project (150 000 tonnes annual capacity). Planned expansions at Codelco's Andina (380 000 tonnes additional capacity) and Codelco Norte (250 000 tonnes additional capacity) operations, and at Freeport-McMoRan's El Abra mine (135 000 tonnes additional capacity) will also contribute to higher production.

Copper mine production in the United States is projected to grow at an average rate of around 4 per cent a year to 1.5 million tonnes by 2016. The restart of existing mines during 2011, including Freeport-McMoRan's Morenci (56 000 tonnes annual capacity) and Miami (45 000 tonnes annual capacity) mines, is expected to support this increase. Also contributing to the projected increase is the planned restart of Freeport-McMoRan's Chino mine (90 000 tonnes annual capacity) in 2012, and the start-up of Rosemont Copper's Rosemont project (100 000 tonnes annual capacity) in 2013.

Production disruptions in the form of labour disputes or adverse weather presents a downside risk to these projections. South America, including Chile and Peru, is prone to flooding and earthquakes, which have disrupted production in the past. Labour disputes and strikes in South America and Africa have also disrupted production over the past five years, often for months at a time. The possibility of delays to project timelines, particularly in politically sensitive areas such as Africa, also presents a risk to the projections.

New refinery capacity in China to boost refined production

In 2011, refined copper production is forecast to increase by 3 per cent to 19.7 million tonnes. This is expected to be supported by increased solvent extraction – electrowinning (SX–EW) capacity in Africa and Chile, including an expansion at Anvil Mining's Kinsevere operation

(60 000 tonnes additional annual capacity) in the Democratic Republic of the Congo, and an expansion at Teck's Andocollo mine (55 000 tonnes additional annual capacity) in Chile.

Over the medium term, refined copper production is projected to increase at an average annual rate of 5 per cent to 25 million tonnes. This is expected to be mainly supported by increased capacity in China, Chile and Mexico. China plans to increase refining capacity by around 10 per cent a year until 2016. Refineries scheduled for commissioning include Jinchang (400 000 tonnes annual capacity) in 2012 and Shindong Xiangguang (400 000 tonnes annual capacity) in 2013. Also contributing to higher projected refined production are expansions at Freeport-McMoRan's El Abra SX–EW (135 000 tonnes additional capacity) in Chile and Southern Copper's Cananea SX–EW (82 000 tonnes additional capacity) in Mexico.

Australia's copper mine production to grow strongly

In 2010–11, Australia's copper mine production is forecast to increase by 12 per cent to 916 000 tonnes (in copper content terms). The expansion at Rio Tinto's Northparkes operation (2 million tonnes additional ore processing capacity), completed in the September quarter 2010, is expected to support this increase. Several mines placed on care and maintenance during 2008 are expected to restart in early 2011, including CST Mining Group's Lady Annie SX–EW operation (20 000 tonnes annual capacity).

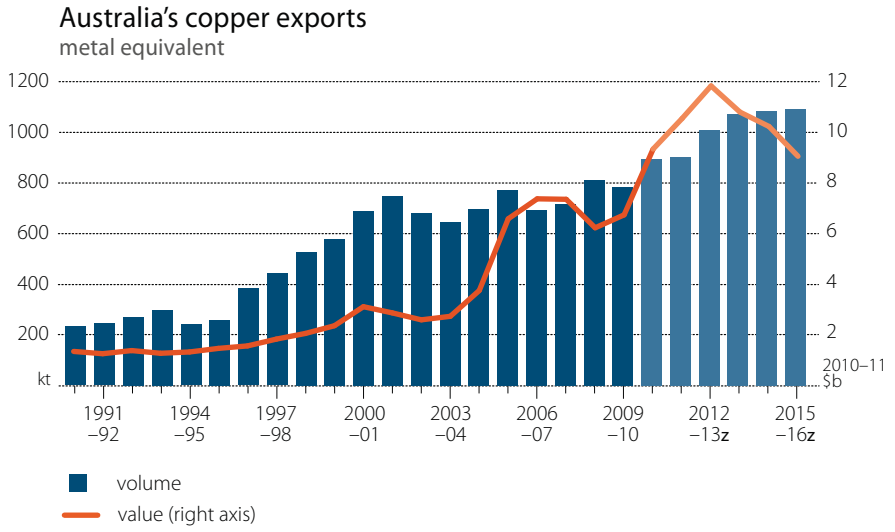
Over the medium term, Australia's copper mine production is projected to grow at an average rate of 6 per cent a year to 1.3 million tonnes (in copper content terms) in 2015–16. This will be supported by the commissioning of several copper mines, including Universal Resources' Roseby project (annual capacity 40 000 tonnes) and Venturex Resources' Pilbara VMS project (annual capacity 15 000 tonnes) in 2012; Redbank Mines' Redbank project (annual capacity 30 000 tonnes) in 2013; and Golden Cross Resources' Copper Hill project (annual capacity 20 000 tonnes) in 2015. Also supporting increased mine production over the medium term will be several expansions at existing mines, including OZ Minerals' Antaka Underground development at the Prominent Hill mine (25 000 tonnes additional capacity), and Xstrata's Ernest Henry underground operation (50 000 tonnes additional capacity).

Refined copper production is forecast to increase by 22 per cent to 483 000 tonnes in 2010–11. Production at BHP Billiton's Olympic Dam mine has returned to full capacity following a mechanical failure that disrupted production in late 2009 and early 2010. The restart of the Lady Annie SX–EW operation and Cape Lambert's Leichhardt SX–EW operation is also expected to support the forecast increase in refined copper production. Refined copper production is projected to remain stable at around 500 000 tonnes after 2011–12, as no new refining capacity has been planned.

Australia's copper exports to increase over the outlook period

In 2010–11, Australia's copper export volumes are forecast to increase by 14 per cent to 893 000 tonnes (in copper content terms), supported by higher exports of refined copper. Reflecting higher export volumes and prices, the value of copper exports in 2010–11 is forecast to increase by 43 per cent to $9.3 billion.

Over the medium term, copper export volumes are projected to increase at an average of 3 per cent a year to 1.1 million tonnes (in copper content terms) in 2015–16. This largely reflects increases in the volume of exports of ores and concentrates, as exports of refined copper are projected to remain steady in line with production. The value of copper exports is projected to reach $11.8 billion (in 2010–11 dollars) in 2012–13, before declining to $9 billion in real terms (2010–11 dollars) by 2015–16, as higher export volumes are offset by a decline in forecast export prices in real terms.



Outlook for copper

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Production									
– mine	kt	15 839	16 414	16 723	17 972	18 980	19 608	20 812	21 641
– refined	kt	18 596	19 052	19 705	20 745	22 056	22 922	24 041	24 964
Consumption	kt	18 349	19 280	19 867	20 916	21 913	22 678	23 454	24 600
Closing stocks	kt	990	762	599	428	570	814	1 400	1 764
– weeks consumption	wks	2.8	2.1	1.6	1.1	1.4	1.9	3.1	3.7
Price LME									
– nominal	US$/t	5 067	7 529	9 850	11 250	10 300	9 500	8 400	7 675
	USc/lb	229.9	341.5	446.8	510.3	467.2	430.9	381.0	348.1
– real b	US$/t	5 217	7 627	9 850	11 029	9 900	8 952	7 760	6 951
	USc/lb	236.7	345.9	446.8	500.3	449.1	406.1	352.0	315.3
		2008–09	**2009–10**	**2010–11 f**	**2011–12 f**	**2012–13 z**	**2013–14 z**	**2014–15 z**	**2015–16 z**
Australia									
Mine output	kt	890	819	916	1 005	1 161	1 225	1 235	1 253
Refined output	kt	499	395	483	506	509	509	509	509
Exports									
– ores and conc. c	kt	1 797	1 928	1 917	2 028	2 416	2 653	2 693	2 721
– refined	kt	361	271	380	354	356	356	356	356
Nominal value	A$m	5 863	6 506	9 312	10 851	12 525	11 704	11 360	10 292
Real value d	A$m	6 169	6 690	9 312	10 530	11 829	10 784	10 212	9 026

b In 2011 US dollars. **c** Quantities refer to gross weight of all ores and concentrates. **d** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.

Sources: ABARES; Australian Bureau of Statistics; International Copper Study Group; World Bureau of Metal Statistics.

Zinc

Outlook to 2016

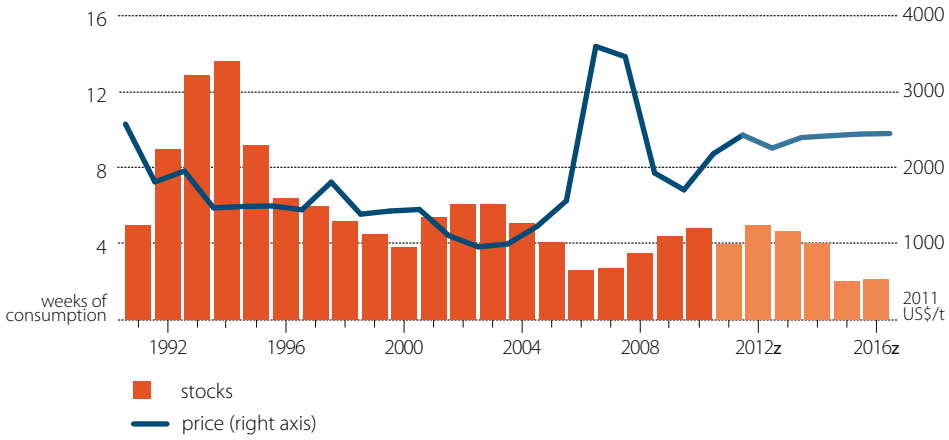
Farah Beaini

With developing economies accounting for an increasing share of global zinc consumption, growth in zinc demand over the outlook period will depend on the pace of economic activity and infrastructure development in these economies. Assumed strong economic growth in these economies is expected to underpin a rapid increase in demand for zinc. While growth in zinc supply is expected to outpace demand in the short term, a number of mine closures toward the end of the outlook period could place upward pressure on prices.

Price to exhibit volatility in the short term

In 2010, world zinc prices averaged around US$2150 a tonne, a 30 per cent increase from the 2009 average. This reflected recovering steel demand, a major end use of zinc, as well as improved market sentiments. Prices were highly volatile during 2010, ranging from US$2575 a tonne in early January to US$1741 a tonne in early June. In addition to increased price volatility, zinc stocks were historically high, with stocks held in London Metal Exchange warehouses reaching around 700 000 tonnes in late December 2010.

World zinc prices and stocks



Despite this apparent surplus, the zinc metal market remains tight. The emergence of a zinc carry trade has resulted in large volumes of metal being used as security for bank lending, effectively limiting zinc stock available to meet increases in consumption or to offset potential supply disruptions. This has led to higher zinc premiums and provided support for zinc prices over the year.

The anticipated introduction of a physically backed zinc exchange-traded fund (see Energy and minerals overview) in 2011, coupled with increased demand from developing economies,

is expected to provide further support for zinc prices. In 2011, zinc prices are forecast to average US$2425 a tonne, a 13 per cent increase from the previous year.

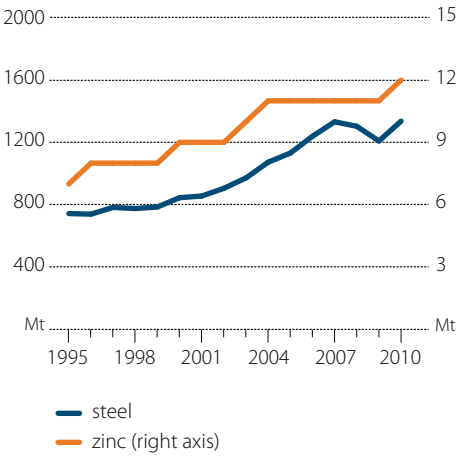
In 2012, expansions to mine and refined zinc capacity are expected to ease pressure on world zinc prices, which are forecast to decline by 5 per cent to average US$2300 (or US$2255 in 2011 US dollars).

Beyond 2012, zinc prices (in year average terms) are projected to gradually increase to around US$2445 a tonne (in 2011 US dollars) in 2016. Strong growth in refined zinc consumption, particularly from developing economies, is projected to outpace growth in mine and refined zinc production, which will support higher prices. While zinc mine production is projected to increase over the second half of the outlook period, there are risks to this forecast. A number of projects that would underpin world mine production are yet to be given a final investment decision and, as such, any significant delays to the timing of these projects presents an upside risk to the price forecast.

World refined zinc consumption to grow...

Around half of global zinc consumption is used in galvanising steel, which helps prevent corrosion. Galvanised steel is primarily used in the construction and automobile industries; hence, demand for zinc is highly responsive to activity in these industries.

Steel and refined zinc consumption



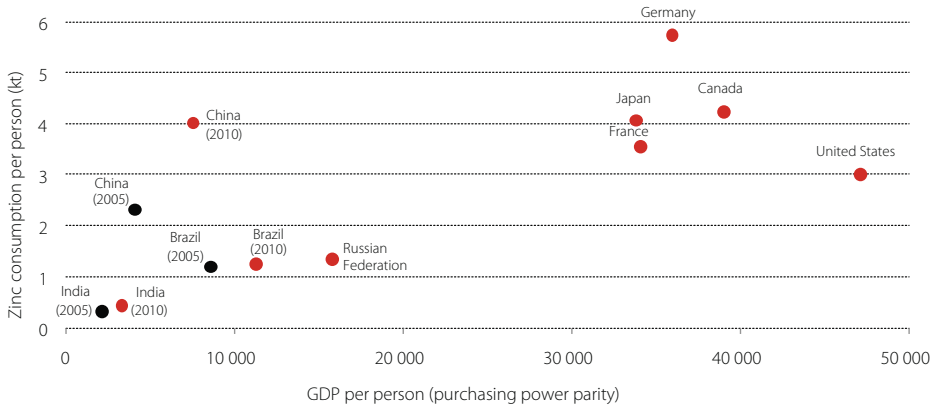
World refined zinc consumption is estimated to have increased by 15 per cent to 12.5 million tonnes in 2010, in line with higher galvanised steel production and strong growth in manufacturing in China and India.

In the short term, increased activity in the manufacturing and construction sectors led by developing economies and supported by recovering US and European markets, is expected to contribute to increased world refined zinc consumption. Refined zinc consumption is forecast to increase by 6 per cent to 13.2 million tonnes in 2011, and by a further 2 per cent to 13.5 million tonnes in 2012. Over the medium term, refined zinc consumption is projected to grow by around 3 per cent a year, to reach 15.4 million tonnes in 2016.

...supported by strong growth in emerging economies...

Over the outlook period, robust demand from developing economies is expected to support world zinc consumption, with growth particularly strong in China and India. Zinc consumption per person remains relatively low in many developing economies, and is expected to increase with urbanisation and development of associated infrastructure, such as roads, railways and telecommunication. Given this, as well as the use of zinc in many consumer durables, demand for zinc is expected to increase as incomes in these economies rise.

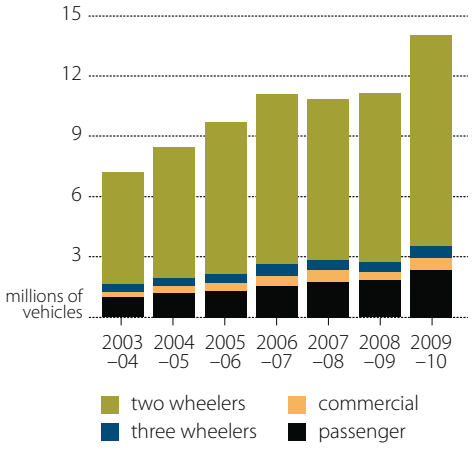
Zinc consumption per person, 2010



In China, zinc demand growth in 2011 is expected to be supported by the construction of zinc-intensive infrastructure and higher demand for consumer durable goods such as automobiles and white goods. Reflecting this increased demand, refined zinc consumption in China is forecast to increase by 9 per cent to 5.7 million tonnes in 2011, and a further 7 per cent to 6.1 million tonnes in 2012.

Over the outlook period, China's refined zinc consumption is projected to increase by 6 per cent a year to 7.6 million tonnes in 2016. In addition to use for construction and manufacturing purposes, China's zinc consumption will be supported by expansion of electricity networks. For example, galvanised steel will be used in high tension electrical towers under the national grid program, which will connect major grid points throughout the country to improve transmission capacity.

Indian motor vehicle production



Over the outlook period, India is projected to be one of the fastest growing zinc consumers, albeit from a low base, relative to China and the United States. Underpinning this strong growth is higher motor vehicle production, as well as investment to modernise and expand existing power generation and transport infrastructure. India's zinc consumption is forecast to rise by 8 per cent to around 605 000 tonnes in 2011 and a further 8 per cent to 653 000 tonnes in 2012. Over the medium term, India's zinc consumption is projected to rise at an average rate of around 7 per cent a year to 860 000 tonnes in 2016.

...with slow growth in the United States, Europe and Japan

The United States, Europe and Japan account for approximately 60 per cent of galvanised steel production and, as such, are important zinc consumers. Demand in these economies in 2010 had not yet fully recovered from the global economic downturn, with refined zinc consumption remaining 10 per cent below 2008 levels.

In the short term, an expected recovery in the manufacturing and construction sectors will contribute to higher demand for refined zinc in the United States, Europe and Japan. In 2011, refined zinc consumption in the United States and Europe is forecast to rise by 4 per cent to 980 000 tonnes and 5 per cent to 2.6 million tonnes, respectively. Japan's refined zinc consumption is expected to grow at a lower rate of 2 per cent to 530 000 tonnes, reflecting assumed relatively weaker economic growth.

Over the remainder of the outlook period, refined zinc consumption in the OECD is projected to grow more modestly. Compared with developing economies, the slower rate of growth reflects a combination of slower economic growth and the high level of zinc-intensive infrastructure already in place. Refined zinc consumption in the United States, Europe and Japan is projected to grow at an average annual rate of around 2 per cent, to 1.1 million tonnes, 2.9 million tonnes and 595 000 tonnes, respectively, over the period to 2016.

World zinc mine production to increase upon improved price outlook...

China and India are becoming more important to world zinc production. Of the 1 million tonne combined refined zinc and mine capacity added in 2010, 29 per cent and 20 per cent were located in China and India, respectively. This trend is set to continue in 2011, with China expected to account for 32 per cent of world zinc production, as production at newly commissioned mines, including the Lanping mine (100 000 tonnes a year) and JCC zinc mine (100 000 tonnes a year), approaches capacity. While India represents only 6 per cent of world mine production, the expansion of Hindustan Zinc's Rampura Agucha zinc–lead mine (additional annual capacity of 100 000 tonnes) and the expansion of the Sindesar Khurd mine (annual capacity of 75 000 tonnes) account for a significant proportion of increased world capacity in 2011.

Aside from India and China, growth in world mine production in 2011 will be supported by increased production at the recently recommissioned Iscaycruz mine in Peru (174 000 tonnes a year) and Nyrstar's Tennessee operations in the United States (combined annual capacity of 130 000 tonnes). In total, world zinc mine production in 2011 is expected to increase by 7 per cent to 13.3 million tonnes, and by a further 1 per cent in 2012 to 13.5 million tonnes.

...but to slow down over the medium term with mine closures

Over the medium term, world zinc mine production is expected to grow at a more moderate pace, increasing by around 3 per cent a year to 15 million tonnes in 2016. The slower rate of growth reflects production increases being partially offset by the closure of a number of large mines. Mines expected to close during the outlook period include the Century mine in Australia (500 000 tonnes a year), and the Perseverance (114 000 tonnes a year) and Brunswick (275 000 tonnes a year) mines in Canada.

Over the outlook period, world zinc mine production could increase in a number of countries in response to projected higher zinc prices. In Canada, production could increase with the commissioning of new projects, including Hackett River (160 000 tonnes a year), Izok Lake (150 000 tonnes a year) and Howard's Pass (280 000 tonnes a year). Zinc mine production in Mexico could increase by 146 000 tonnes a year with the development of the Miguel Auza, San Felipe, San Nicolas and Santa Francisca mines. Other significant additions to mine production are likely to come from the Citronen mine in Greenland (180 000 tonnes a year), the Accha and San Gregorio mines in Peru (combined annual capacity of 180 000 tonnes), and the Ozernoye mine in the Russian Federation (380 000 tonnes a year). However, many of these zinc projects are yet to be given a final investment decision and so there is some uncertainty over when they will start production.

Selected world zinc mine projects under consideration

country	project(s)	combined capacity (kt)
Canada	Hackett River, High Lake, Howard's Pass (Selwyn), Izok Lake, Kutcho Creek	637
China	Jiawula, Mengya	43
Greenland	Citronen	180
India	Ambaji	25
Indonesia	Dairi	120
Iran	Mehdiabad, Yazd	400
Kazakhstan	Severnoe	10
Mexico	Miguel Auza, San Felipe, San Nicolas, Santa Francisca	146
Peru	Accha, San Gregorio	180
Russian Federation	Berezitovy, Chebachye, Ozernoye	414
South Africa	Gamsberg	350
Spain	Mazarron	20

Significant increases to refined capacity

World refined zinc production is forecast to increase by 6 per cent in 2011 to around 13.2 million tonnes and by a further 4 per cent in 2012 to reach 13.8 million tonnes. The strong growth in refined production is expected to come from the 650 000 tonnes of capacity commissioned in 2010. In addition, around 200 000 tonnes of refined capacity is scheduled to start up in China in 2011.

Over the medium term, refined zinc production is expected to increase as new capacity comes on stream. These refineries include Onsan in the Republic of Korea (180 000 tonnes a year), Nordenham (157 000 tonnes a year) in Germany, and the restart of La Oroya zinc refinery (80 000 tonnes a year) in Peru, which was suspended in June 2009 because of financial and environmental concerns. By 2016, world refined zinc production is projected to reach 15.4 million tonnes a year, an increase of 3 per cent a year.

Australian production to increase in the short term...

In 2010–11, Australia's zinc mine production is forecast to increase by 10 per cent to around 1.50 million tonnes. Supporting this increase will be expansions and productivity

improvements at the Mount Isa and McArthur River mines in Queensland, where zinc concentrate production capacity increased during late 2010. In addition, higher production is expected from CBH Resources' Endeavor mine in New South Wales (80 000 tonnes a year) and MMG's Golden Grove mine in Western Australia (141 000 tonnes a year) as they approach full capacity. Mine production will also benefit from the commencement of operations at Bass Metals' Hellyer mine (30 000 tonnes a year) in early 2011.

In 2011–12, Australia's mine production is forecast to increase by 2 per cent to total around 1.54 million tonnes. Supporting this higher production is the commissioning of the Rasp lead and zinc mine development (30 000 tonnes a year) in April 2011, as well as higher production at the Hellyer mine as it approaches full capacity.

...but to plateau over the remainder of the outlook period

Over the medium term, Australia's mine production is expected to rise to more than 1.6 million tonnes in 2013–14, then remain relatively steady over the remainder of the outlook period. The relatively steady rate reflects the scheduled closure of a number of large mines, such as the Terramin mine (46 000 tonnes a year) in 2014, Century mine (500 000 tonnes a year) in 2015 and MMG's Golden Grove (141 000 tonnes a year) in 2016.

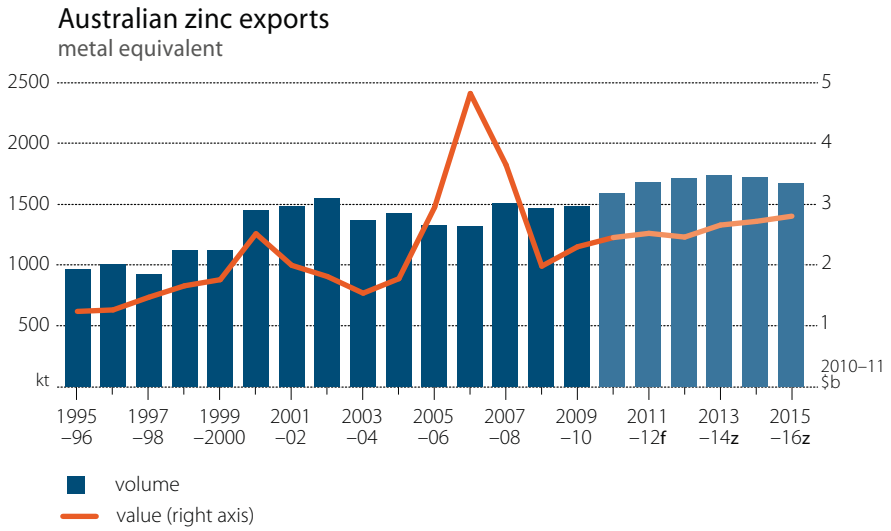
This decline is expected to be offset by planned expansions at Xstrata's Mt Isa operations, including Black Star Deeps (120 000 tonnes a year) and Handlebar Hill (50 000 tonnes a year) in 2011, and George Fisher (60 000 tonnes a year) in 2013. In addition, there are a number of developments yet to receive a final investment decision that could be developed over the latter part of the outlook period. These developments include Xstrata's Lady Loretta (125 000 tonnes a year) in Queensland and an expansion to McArthur River (180 000 tonnes a year). Other potential projects include MMG's Dugald River zinc–lead mine in Queensland (200 000 tonnes a year) and Jabiru's Stockman project (206 000 tonnes a year) in Victoria. In total, Australia's zinc mine production is projected to remain at around 1.6 million tonnes in 2015–16.

Refined zinc production in Australia is projected to remain around 450 000 tonnes in 2015–16, as no major expansions or new refineries are scheduled to commence over the outlook period.

Australian export earnings to ease over the medium term

Australia's exports of zinc ores and concentrates are estimated to increase by 6 per cent in 2010–11 to around 2.4 million tonnes, in line with higher mine production. Exports of refined zinc are forecast to increase by 6 per cent to around 449 000 tonnes in 2010–11. The total value of zinc exports is forecast to increase by 10 per cent to around $2.4 billion, with higher forecast prices and export volumes expected to more than offset the effect of an assumed strong Australian dollar.

Over the medium term, exports of zinc ores and concentrates are projected to increase to 2.7 million tonnes by 2015–16, while exports of refined zinc are projected to remain relatively stable at around 450 000 tonnes over the outlook period. In real terms (2010–11 dollars), the total value of zinc exports is projected to be around $2.8 billion in 2015–16.



Outlook for zinc

	unit	2009	2010	2011 f	2012 f	2013 z	2014 z	2015 z	2016 z
World									
Production									
– mine	kt	11 296	12 509	13 333	13 480	14 005	14 426	14 570	15 000
– refined	kt	11 306	12 533	13 234	13 763	14 039	14 600	15 250	15 400
Consumption	kt	10 873	12 469	13 217	13 476	14 070	14 716	15 292	15 397
Closing stocks	kt	923	1 156	1 004	1 292	1 260	1 145	603	626
– weeks consumption	wks	4.4	4.8	4.0	5.0	4.7	4.0	2.0	2.1
Price lme									
– nominal	US$/t	1 657	2 152	2 425	2 300	2 490	2 565	2 640	2 700
	USc/lb	75	98	110	104	113	116	120	122
– real **b**	US$/t	1 706	2 180	2 425	2 255	2 393	2 417	2 439	2 445
	USc/lb	77	99	110	102	109	110	111	111
		2008 –09	**2009 –10**	**2010 –11 f**	**2011 –12 f**	**2012 –13 z**	**2013 –14 z**	**2014 –15 z**	**2015 –16 z**
Australia									
Mine output	kt	1 411	1 362	1 505	1 540	1 573	1 630	1 621	1 603
Exports									
Ore and conc. **c**	kt	2 101	2 271	2 408	2 567	2 621	2 717	2 702	2 671
Refined	kt	451	425	449	445	448	448	446	445
Total value									
– nominal	A$m	1 858	2 214	2 431	2 577	2 582	2 863	3 002	3 176
– real **d**	A$m	1 956	2 277	2 431	2 500	2 438	2 638	2 699	2 785

b In 2011 US dollars. **c** Quantities refer to gross weight of all ores and concentrates. **d** In 2010–11 Australian dollars. **f** ABARES forecast. **z** ABARES projection.

Sources: ABARES; Australian Bureau of Statistics; International Lead Zinc Study group; World Bureau of Metal Statistics.

Improving productivity—the incentives for change

Emily Gray, Yu Sheng, Katarina Nossal, Max Oss-Emer and Alistair Davidson

Summary

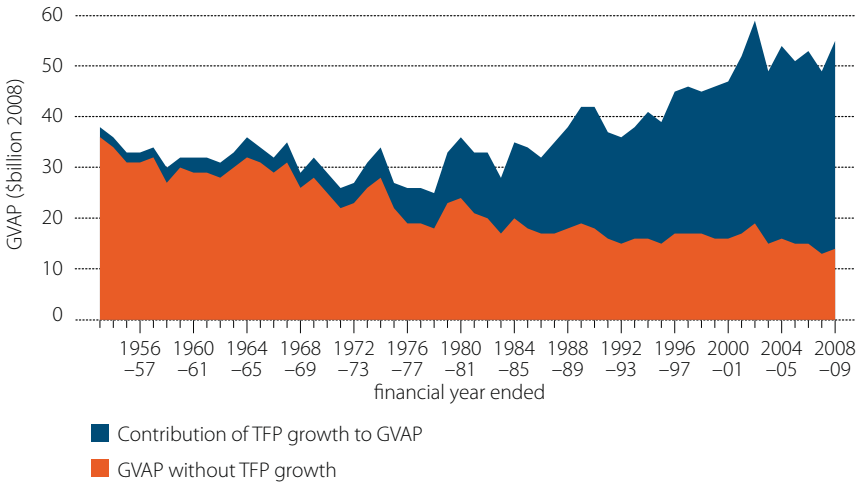
- Productivity growth has been the main means by which Australian farmers have increased agricultural production and maintained international competitiveness.
- Total factor productivity (TFP) growth for the broadacre farm sector (non-irrigated crops, beef and sheep) averaged 1.3 per cent a year between 1977–78 and 2008–09. Over this period, productivity growth rates differed between the main farm types: 1.9 per cent a year for cropping; 1.3 per cent a year for beef and 0.4 per cent a year for sheep. However, productivity growth (predominantly in cropping) has declined since the mid-1990s, beyond what is attributable to poor seasonal conditions.
- Dairy industry productivity growth has averaged 0.8 per cent a year since 1988–89, although this rate has also waned in recent years.
- At an industry level, there are three main pathways to productivity growth: technical change (best practice farms getting better); changes in technical efficiency (average farms catching up to best practice farms); and structural adjustment (less efficient businesses exiting farming).
- Productivity growth is enabled by a wide range of factors, such as investments in R&D, infrastructure and education. However, without well-aligned policy incentives to encourage the adoption of new developments, the rate of farm innovation may be impeded.

Importance of agricultural productivity growth

For decades, productivity growth has been the dominant means by which overall Australian agricultural output has increased. Ongoing improvements in the efficiency with which producers have combined market inputs to produce outputs have more than offset the effects on productivity of a declining use of total inputs and adverse seasonal conditions. In recent years, around two-thirds of the gross value of agricultural production (GVAP) can be attributed to productivity growth (figure a).

In addition to increasing agricultural production, productivity growth has helped to ease the effects on farmers' incomes of a persistent decline in their terms of trade (prices received for outputs relative to prices paid for inputs) (figure b). Further, productivity growth has also helped maintain the competitiveness of agricultural exporters and enabled export volumes to recover and expand following periods of decline (Roberts et al. 2009).

a Contribution of total factor productivity growth to the gross value of agricultural production, 1952–53 to 2007–08



Sources: Sheng et al. (2010b), adapted from Mullen and Crean (2007).

b Broadacre total factor productivity and the farmer terms of trade, 1977–78 to 2008–09

Note: Although the farmer terms of trade covers all Australian agriculture, total factor productivity shown here relates to broadacre (non-irrigated) agriculture only.

Although international competitiveness depends on the quantity and quality of resource endowments, agricultural policies and institutional arrangements, productivity growth relative to that of competitors is also important (see box 1). Therefore, with some major developing and transition economies (such as Brazil, China and the former Soviet Union) continuing to reform their agricultural sectors (Fuglie 2010), and the declining availability of key agricultural resource inputs (in particular, arable land and drier climatic conditions), continued productivity growth that enables Australian agriculture to stay internationally competitive remains an issue of prime importance to policymakers and industry.

Beyond the farm sector, agricultural productivity growth contributes strongly to the growth of the economy as a whole. Moreover, together with other policy measures aimed at increasing Australia's workforce participation rates and skills base, agricultural productivity growth is central to maintaining growth in rural living standards in the light of an ageing farm population (Treasury 2010).

box 1 **International competitiveness and productivity growth**

The ability of farmers to compete on international markets is vital to ensuring their capacity to attract the resources needed to produce, process, and market agricultural outputs. Few of Australia's domestically traded products are significantly insulated from prices determined on world markets and around 60 per cent of farm production is exported (Penm and Thompson 2010).

The extent to which farmers are able to maintain or improve their international competitiveness is largely contingent on their productivity relative to producers in other countries. World agricultural markets are intensely competitive and, over time and excluding seasonal factors, above average productivity improvements may lead to a greater market share, all other things being equal.

Government policies can contribute to improved productivity and, in turn, competitiveness, by: affecting the allocation of existing resources (principally, land, labour and capital) within the industry; and improving the efficiency with which resources are used for the production of those goods that reflect a country's comparative advantage. In the former, for example, education can improve the quality of the labour force; appropriate macroeconomic settings can create a favourable environment for investing in infrastructure, machinery and other capital; and well-defined property rights can encourage entrepreneurship. In the latter, the efficiency of resource flows can be improved through more efficient markets and transmission of price signals, and policy reforms that, among other things, reduce the extent to which business support measures are capitalised into land values.

Trends in agricultural productivity

Total factor productivity (TFP) is the key indicator used by ABARES to measure agricultural productivity. TFP compares the total outputs produced (crops and livestock) relative to the total inputs used (the main types being land, labour, capital, materials and services). Although partial factor productivity (PFP) measures (such as yield per hectare) can be useful in understanding how output varies according to a single input factor, they are also likely to be affected by changes in other production inputs.

ABARES estimates TFP as the ratio of a quantity index of total market outputs relative to a quantity index of market inputs. Multiple outputs and inputs are aggregated separately using a Fisher index (see Gray et al. 2010). Annual TFP growth rates (percentage change over time) are calculated by fitting an exponential trend line. ABARES regularly publishes TFP growth rates for the broadacre and dairy industries, which account for the majority, but not all, of Australian agriculture (see box 2).

box 2 **Coverage of ABARES agricultural productivity research**

ABARES has published statistics and analyses on the productivity performance of Australia's broadacre (non-irrigated cropping and grazing) and dairy industries since the early 1990s, using data collected through its national farm survey program. Broadacre farms have been surveyed annually and in a consistent format since 1977–78, and dairy farms since 1988–89.

Together, the broadacre and dairy industries account for almost 70 per cent of the number of commercial-scale farm businesses in Australia, the majority of family-owned and operated farms, and more than 90 per cent of the total area of agricultural land in Australia. In addition, the broadacre and dairy industries accounted for nearly three-quarters (62 per cent and 10 per cent, respectively) of Australia's gross value of agricultural production in 2008–09.

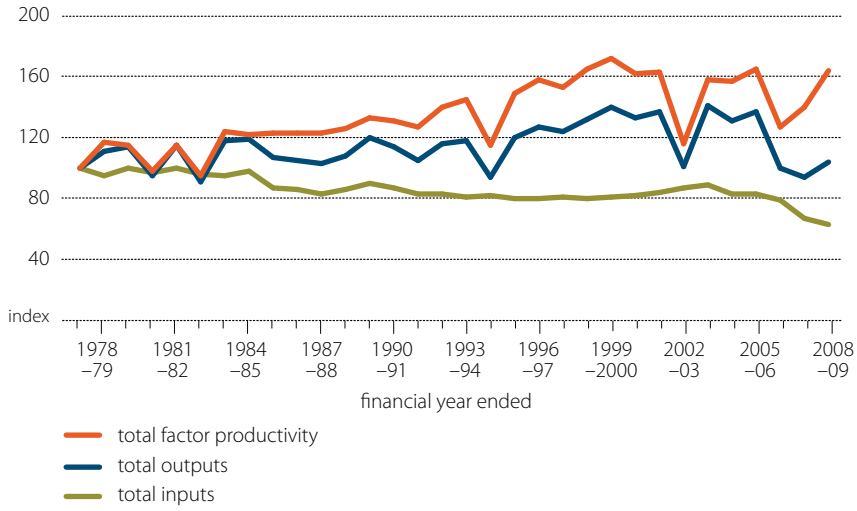
There is little detailed knowledge of the productivity performance of the rest of the sector, including some high-value, fast-growing industries such as horticulture, and irrigated agriculture. The major constraint to further analysis in these areas is the availability of detailed survey data. However, ABARES is currently examining the productivity performance of irrigated broadacre, dairy and horticulture farms in the Murray–Darling Basin, using survey data for the period 2006–07 to 2008–09. Although the series is not yet long enough to capture long-term productivity growth trends, the study will provide insights into the productivity effects of recent water policy reforms and water scarcity.

Broadacre productivity growth

Over the 32-year period to 2008–09, TFP growth in the broadacre sector averaged around 1.4 per cent a year (figure c). Australian broadacre farms have reduced their total use of inputs by around 0.9 per cent a year, while outputs have increased by 0.5 per cent a year on average. Although the broadacre industry's productivity growth is considered strong relative to many other sectors of the economy, comparing this long-term figure with earlier periods suggests that productivity growth in broadacre agriculture has slowed (Nossal and Gooday 2009) (see box 3).

There have been significant differences in productivity growth among broadacre industries and states over the past three decades (table 1). Productivity growth in the cropping industry has exceeded that in livestock industries. Annual productivity growth on cropping farms averaged around 1.9 per cent between 1977–78 to 2008–09, significantly higher than beef (1.3 per cent), sheep (0.4 per cent) and mixed cropping–livestock (1.4 per cent) farms.

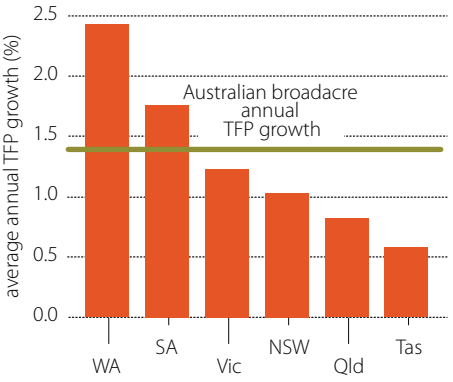
C Trends in broadacre total factor productivity, total inputs and total outputs 1978–79 to 2008–09



1 Average annual broadacre productivity growth by industry, 1977–78 to 2008–09 (%)

	all broadacre	cropping	mixed cropping–livestock	beef	sheep
Total factor productivity	1.3	1.9	1.4	1.3	0.4
Inputs	–0.9	0.9	–1.8	–0.1	–2.1
Outputs	0.5	2.8	–0.4	1.2	–1.7
Partial productivity					
Land	1.3	1.6	1.0	1.6	–0.1
Labour	2.4	3.2	2.3	1.9	1.2
Capital	2.1	3.4	2.5	0.9	1.6
Materials and services	–1.6	–1.3	–1.2	–2.1	–1.5
Input use					
Land	–0.9	1.2	–1.4	–0.4	–1.6
Labour	–1.9	–0.5	–2.6	–0.7	–2.9
Capital	–1.6	–0.7	–2.9	0.3	–3.3
Materials and services	2.0	4.1	0.8	3.3	–0.2

d Broadacre productivity growth by state, 1977–78 to 2008–09



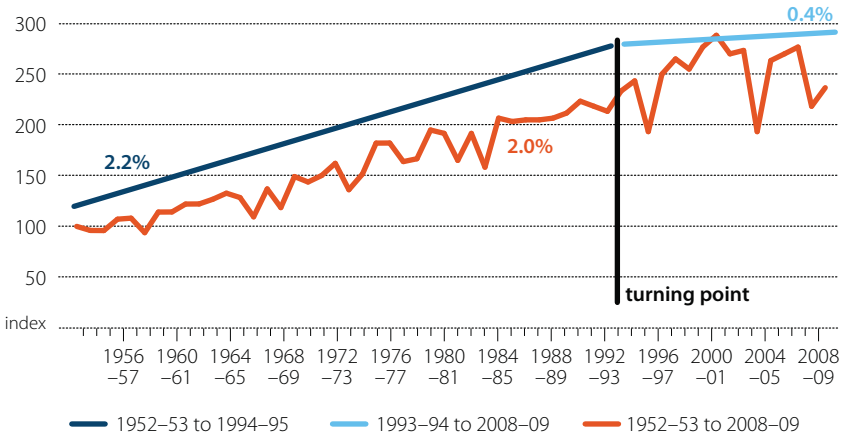
Broadacre productivity growth was higher than the national average in Western Australia and South Australia, but lower in New South Wales, Victoria, Queensland and Tasmania (figure d). Some of the key differences between states related to varying enterprise mix and climate. For example, in New South Wales a greater proportion of land is devoted to cropping relative to grazing than in Queensland, thus contributing to higher observed productivity growth.

box 3 Broadacre productivity growth is slowing

ABARES statistical analysis identified a significant break in the productivity trend in the mid-1990s (Sheng et al. 2010a) (figure e). Following this break, productivity growth slowed to an average of 0.4 per cent between 1993–94 and 2006–07, compared with the 2.2 per cent average between 1952–53 and 1993–94. The slowdown was concentrated in the cropping and mixed cropping–livestock industries (as discussed in Nossal et al. 2010).

There is nothing to suggest that the shift toward slower productivity growth is permanent. However, efforts to return to historical rates of productivity growth in the long term are likely to be affected by climate change in the form of higher temperatures, reduced rainfall and more frequent extreme weather events, as well as by natural resource degradation and environmental stewardship requirements. Moreover, given that research investments take a long time to affect production, stagnant public investment in agricultural research since the late 1970s and a shift in research priorities away from farm production may continue to affect agricultural productivity.

e Average annual broadacre productivity growth



2 Annual average cropping productivity growth by region, 1977–78 to 2008–09 (%)

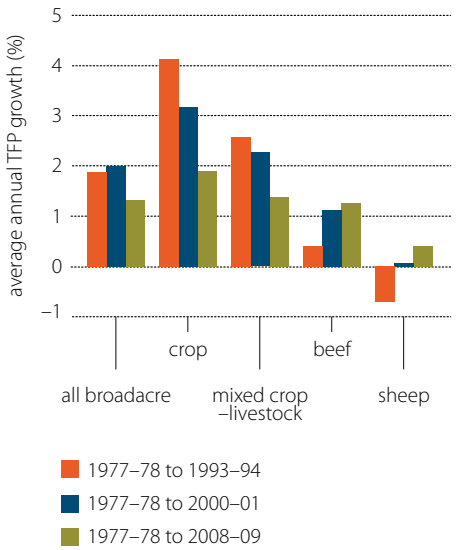
	productivity growth	output growth	input growth
All regions	1.9	2.8	0.9
Western	2.4	4.2	1.9
Northern	2.0	1.3	–0.8
Southern	1.8	3.2	1.4

Cropping industry productivity

Among GRDC agroecological regions, productivity growth in cropping continues to grow more strongly in the western region of Australia (2.4 per cent a year) compared with the northern region (2.0 per cent) and the southern region (1.8 per cent a year) (table 2). The relatively stronger performance in the western region is largely due to its more consistent climate and even topography, which have enabled more intensive cropping. This is reflected in the higher growth of input use in the western region.

Across all regions, productivity growth in cropping has been driven by significant improvements in crop technology and production methods. However, the suitability, adoption and frequency of use of technologies varies across regions, resulting in an uneven distribution of long-term productivity gains. For example, although the vast majority of growers (more than 90 per cent) have adopted no-till seeding practices, use varies widely across regions. While it is common for farmers to use some traditional cultivation in the northern and southern regions, most western region farms are 100 per cent no-till (Llewellyn and D'Emden 2010).

f Broadacre productivity growth by industry, 1977–78 to 2008–09



Notwithstanding the long-term productivity growth experienced in cropping, its rate of growth has slowed in recent times across all regions (figure f). The precise factors that have directly affected the slowdown remain uncertain; however, both drought and diminished public R&D intensity are likely to have played a role (Sheng et al. 2010a). For example, many years of drought have led some farm managers to change practices (such as adopting lower-input strategies that better manage climate risk) to cope with uncertainty and climate variability. In addition, there may have been fewer of the 'breakthrough' technologies of the 1980s and 1990s (for example, larger and more sophisticated machinery, more efficient fertilisers and chemicals, and greater disease resistance of crop varieties) to provide significant opportunities for technological advance. The substantial cropping productivity gains of the 1980s and 1990s may not be repeated without significant innovation.

Livestock industry productivity

Although not performing as well as the cropping sector, the beef and sheep industries have both lifted productivity over the past 30 years (tables 3 and 4). The growth in productivity in the beef industry has been greatest in the northern region and is likely to be, in part, related to better pastoral conditions, economies of size and specialisation. In the southern region, the beef industry is dominated by smaller farms that are typically more diversified than their northern counterparts.

In addition, productivity growth in the southern region has been more variable than in the northern region (figure g). In part, this is likely to have occurred because drought conditions have affected southern production systems to a greater extent.

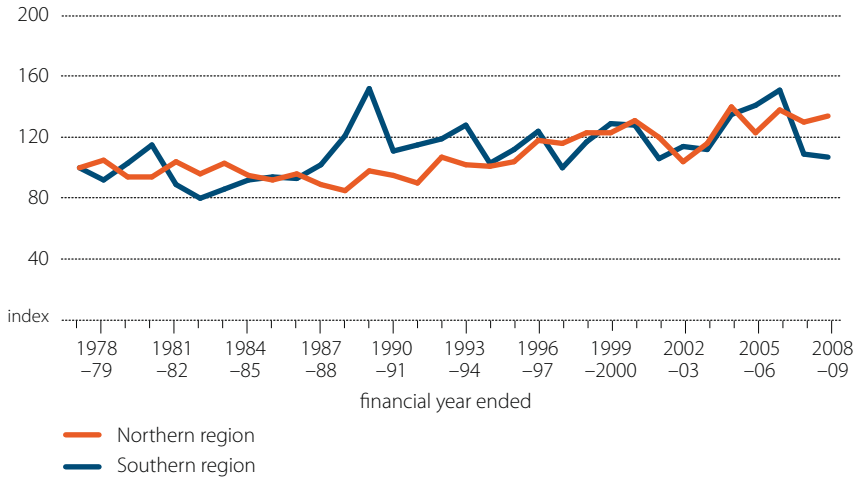
3 Annual average beef productivity growth by region, 1977–78 to 2008–09 (%)

	productivity growth	output growth	input growth
All beef	1.3	1.2	–0.1
Northern	1.2	1.1	–0.1
Southern	1.0	1.4	0.4

4 Annual average sheep productivity growth by region, 1977–78 to 2008–09 (%)

	productivity growth	output growth	input growth
All sheep	0.4	–1.7	–2.1
Pastoral	0.5	–1.1	–1.6
Wheat–sheep	1.0	–0.7	–1.6
High rainfall	0.4	–2.7	–3.1

g Beef productivity by region, 1977–78 to 2008–09

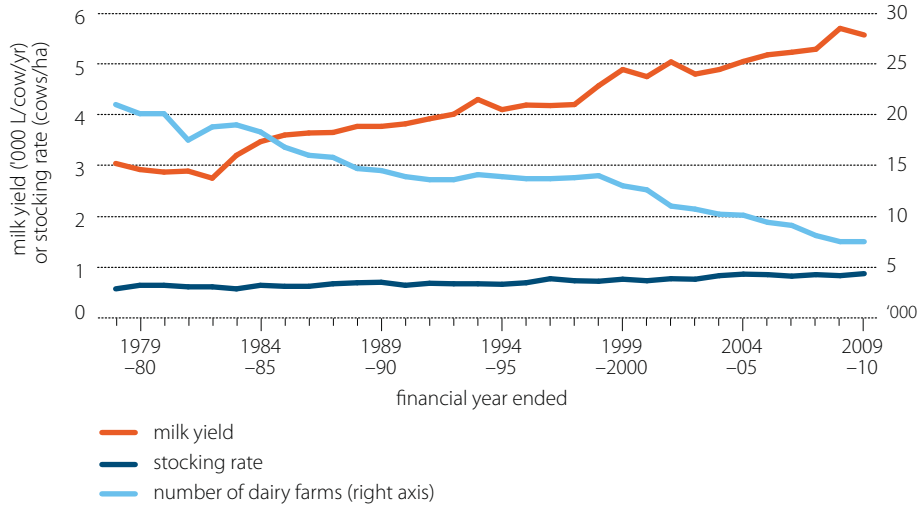


The sheep industry has achieved modest long-term productivity gains over the past 30 or so years (table 4). However, since the dismantling of the Wool Reserve Price scheme in 1990–91, productivity growth has exceeded the longer-term average, largely reflecting exits from sheep into cropping and enterprise change from wool to prime lambs (figure g). Cross-breeding, which characterises the prime lamb industry, has delivered significant productivity gains through first-cross vigour and greater twinning. Continued development of technologies and management systems associated with feeding, nutrition and genetics are expected to contribute to further increases in lambing rates and carcass weights and to deliver further productivity gains.

Dairy productivity growth

Ongoing structural change (much of which predated deregulation in July 2000) has transformed Australia's dairy landscape. For example, between 1978–79 and 2009–10 the number of dairy farms fell by around two-thirds (from 20 952 to 7514), the average stocking rate increased by more than 50 per cent (from 0.57 cows per hectare to 0.87 cows per hectare), and the average annual milk yield increased by more than 80 per cent (from 3037 litres to 5566 litres per cow) (figure h).

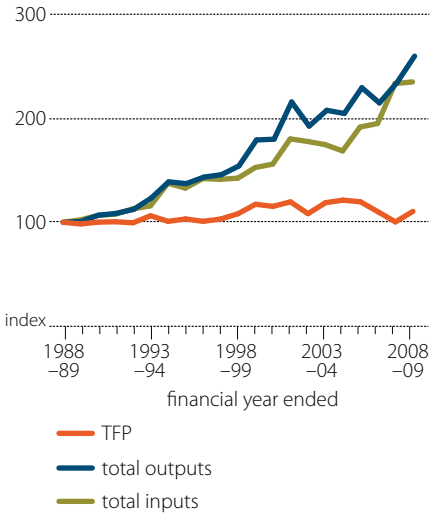
h Trends in dairy farms, stocking rates and yields, 1978–79 to 2009–10



Source: Australian dairy industry survey (ADIS), ABARE, 1978–2010.

Despite the huge growth in milk yield, TFP growth in the dairy industry has averaged a modest 0.8 per cent a year over the past two decades (figure i), placing it between the beef (1.3 per cent a year) and sheep (0.4 per cent a year) industries. This growth has not been steady—the TFP value briefly dropped to the 1988–89 level in 2007–08. In addition, and in contrast to broadacre TFP trends, there has been substantial output and input growth.

i Trends in dairy total factor productivity, outputs and inputs, 1988–89 to 2008–09



Dairy industry output growth has averaged 4.9 per cent a year since 1988–89. Output growth has, to a significant extent, been paid for through dairy input growth, which averaged 4.1 per cent a year since 1988–89 (table 5).

According to Ashton and Mackinnon (2008), much of this growth has been spurred by changes in production practices and technologies, including improved milking sheds and equipment, increased use of automatic cup removers and larger capacity sheds, and increased use of soil fertility testing for pastures. However, more recently, the trend toward higher intensity production methods, a run of poor seasonal conditions and low or zero water allocations have necessitated dairy farmers substituting purchased fodder for on-farm feed supplies to meet milk supply contracts, as reflected in the relatively strong growth of the materials and services use index (table 5).

These effects, in tandem with the prevalence of different production systems, have contributed to the significant variation in dairy industry productivity growth among the states (table 6). In particular, the average TFP growth rate of NSW dairy farms (1.7 per cent a year) has been substantially higher than for dairy farms in the other major dairying state, Victoria (0.1 per cent a year). The high growth rate for New South Wales reflects, to a large extent, the greater scope for productivity gains prior to deregulation compared with the already efficient Victorian industry. Before deregulation, the relatively high milk price paid to NSW dairy farmers insulated them to a far greater extent from the competitive pressures likely to drive strong productivity growth. Following deregulation, much New South Wales dairying shifted from small coastal operations producing milk all year round to larger inland ones characterised by lower-cost seasonal production systems.

5 Dairy industry input use and partial factor productivity, 1988–89 to 2008–09

average annual percentage growth

	input use	PFP b
Total inputs	4.1	na
Land	2.4	2.5
Labour	1.1	3.8
Capital	2.4	4.6
Materials and services	6.8	–1.9

b Partial factor productivity indexes are calculated by dividing the total output index by each input index.

6 Dairy industry total factor productivity, output and input by state, 1988–89 to 2008–09

annual percentage growth

	TFP growth	output growth	input growth
Australia	0.8	4.9	4.1
NSW	1.7	5.5	3.8
Vic	0.1	4.3	4.2
Qld	1.4	4.4	3.0
SA	1.1	8.0	6.9
WA	1.7	4.8	3.0
Tas	0.9	6.0	5.1

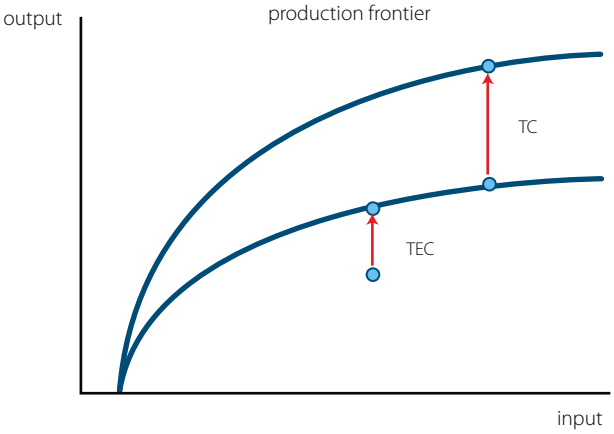
Pathways to productivity growth

The slowdown in broadacre and dairy productivity growth has focused attention on the factors likely to influence agricultural productivity. A better understanding of the main mechanisms or 'pathways' that lead to productivity growth in an industry can assist stakeholders and governments to improve productivity growth by enabling efficient movement of resources within the farm sector and by helping to formulate appropriate policy responses.

There are three main pathways that can lead to an improvement in long-term productivity growth at the industry level (Coelli et al. 2005; Hughes et al. 2011):

- technical change (TC) by individual farm businesses
- technical efficiency change (TEC) by individual farm businesses
- structural adjustment within an industry (SA).

j The pathways to productivity change



Note: For simplicity, these pathways have been illustrated for a production technology that converts a single input into a single output and exhibits diminishing returns. Here, the production frontier indicates where the best practice farms are operating.

In the long term, agricultural productivity growth will mostly include gains from technical change, technical efficiency change and structural adjustment. Changes in the size and mix of farm enterprises can also have an effect (Hughes et al. 2011).

Technical change

Technical change is the improvement in best practice through adoption of new technologies and more efficient farming systems by individual farm businesses—that is, the best farms getting better. At an industry level, growth in productivity from technical change reflects the aggregate influence of the farms that define the production frontier, and can be diagrammatically illustrated by the expansion of the production frontier (TC) in figure j. The production frontier can also be affected by environmental and climatic condiditions.

In the cropping industry, for example, technical change has been the main driver of long-term TFP growth. Between 1977–78 and 2007–08, technical change among cropping specialists and mixed cropping–livestock farms averaged 1.53 per cent a year across all regions in Australia

(Hughes et al. 2011). An expanding production frontier is evidence that, at least for some cropping farms, market competition provides a sufficient incentive to innovate and to improve competitiveness.

However, the rate of technical change in the Australian broadacre cropping industries has been declining over time. Adverse seasonal conditions over the past decade, particularly in 2002–03 and 2006–07, have been a contributing factor (Sheng et al. 2010a). Nevertheless, after controlling for the effects of climate, the rate of productivity growth (a rough measure of technical change) dropped from 1.9 per cent over the period 1977–78 to 1999–2000 to just 0.4 per cent over the period 1999–2000 to 2007–08 (Hughes et al. 2011).

It is likely that slower growth in public agricultural R&D expenditure since the late 1970s has contributed to the decline in technical change in the cropping industry and, more generally, the slowdown in broadacre productivity growth (Sheng et al. 2010b). A principal objective of agricultural R&D is to improve farm performance and productivity, and to this extent, public investment in R&D, along with private R&D, has been an important source of new technologies and farming system knowledge in Australia.

Publicly funded R&D (domestic and foreign) is estimated to have accounted for a significant proportion (49 per cent) of annual productivity growth in the broadacre industry between 1952–53 and 2006–07. This is equivalent to average TFP growth of 0.96 per cent a year, with domestic R&D generating a rate of return that could be as high as 28 per cent a year (Sheng et al. 2010b). Given the centrality of R&D to productivity growth and the dominance of Australia's public sector in agricultural research, an efficient public R&D system is important for continued productivity gains through technical change.

In Australia, the share of agricultural R&D funded by the private sector has generally been less than 10 per cent of total agricultural R&D, although by 2007 its share had increased to 20 per cent (Mullen 2010). While there is little evidence to suggest that public R&D is crowding out private R&D, some regulations may be creating disincentives for private investment, such as those that obstruct commercialisation of new technologies. For example, inconsistencies between some state governments' and the Australian Government's regulation of genetically modified crops may have reduced industry investment in this area (Agriculture and Food Policy Reference Group 2006; Statutory Review Panel 2006).

Further, some government interventions may be distorting farmers' incentives to pursue technical change. Although governments have largely withdrawn from interventions affecting commodity output prices, predominately through dismantling the major statutory marketing arrangements and industry price-support schemes, opportunities remain to review statutory marketing arrangements that persist in some industries, such as rice (New South Wales Rice Marketing Board) and potatoes (for example, the WA Potato Marketing Corporation).

Technical efficiency change

Technical efficiency change captures improvements in productivity arising from 'slower moving' farms adopting currently available technologies and knowledge. It is represented by

a movement of farms toward the production frontier (TEC in figure j). In the long term, growth in industry productivity via technical efficiency change reflects the aggregate influence of 'average' farms catching up to the best-performing farms.

Notwithstanding the obvious importance of technical efficiency to productivity growth, its contribution has been gradually diminishing. Since 1977–78, cropping TEC has declined at an average annual rate of 0.3 per cent Australia-wide, in turn offsetting some of the productivity growth arising from technical change. This suggests that there is a widening gap between the best-performing farms and average farms. That is, while the productivity of cropping farms is improving overall, average farms have not been able to improve at the same rate as the best-performing farms (Hughes et al. 2011).

While firms typically pursue long-term productivity improvements for the reasons discussed earlier, temporary declines in productivity can also occur in profit maximising, although the reasons may differ between various sectors of the economy. For example, around one-third of the decline in mining TFP in recent years is likely to be a result of the long lead times between investment in new capacity and the associated output response (Topp et al. 2008). However, in agriculture, rational farmers may, in the short run, sacrifice productivity by maximising outputs in order to take advantage of improvements in commodity prices that are expected to be temporary (see box 4).

box 4 **Terms of trade induced productivity declines**

While improvements in technical efficiency will always increase productivity and farm profit, size and mix efficiency movements may cause productivity and profitability to move in opposite directions in the short term. This is because changes in farm size and mix are expected to be a function of the profit-maximising behaviour of farm managers, which depends on prevailing input and output prices (O'Donnell 2010).

For this reason, changes in the terms of trade may, in the short run, induce farmers in profit-maximising to choose combinations of inputs and outputs that reduce their overall productivity (O'Donnell 2010; Productivity Commission 2008). For example, farmers may expand cropping into relatively marginal land in response to expected increases in output prices.

ABARES research has found that TFP is negatively correlated with the farmers' terms of trade. Sheng et al. (2010b) found that the elasticity of broadacre TFP with respect to the terms of trade was around −0.27, indicating that a 1 per cent improvement in the farmer terms of trade would, on average, lead to a 0.27 per cent fall in productivity, all other things being constant. Similarly, Hughes et al. (2011) showed that the size and mix efficiency component of cropping farms' TFP growth was inversely related to the farmer terms of trade.

Capacity constraints

A gap between the best performing and average farms may indicate the presence of constraints to the timely and effective adoption of new technologies. This could arise through, for example, a lack of business acumen, financial resources or information technology skills. Some grain growers participating in GRDC workshops in 2010 suggested that knowledge constraints are hampering farmers' adoption and integration of new innovations into existing farming systems (Jackson 2010).

Improved access to private and public extension services may serve to increase farmers' adoption of more efficient technologies and business management skills. Public investment in extension activities in the broadacre industry accounted for average TFP growth of 0.27 per cent a year over the period 1952–53 to 2006–07. Moreover, past public expenditure on extension has generated internal rates of return that could be as high as 47 per cent a year (Sheng et al. 2010b), twice that of research and development. With increasing private sector investment in extension-related fields, it would appear that the withdrawal of the public sector from this area is being compensated for, at least in part.

However, unless farm businesses also face incentives to improve productivity, extension and/or policy initiatives that focus on enabling farmers' adoption of available technologies are unlikely to generate productivity gains (Hilmer 2010). The decision to adopt will depend on the relative advantage of an innovation—the perceived superiority to the idea or practice that it supersedes (Pannell et al. 2006)—which is itself dependent on (among other things) the effect of the innovation on short, medium and long-term profits; likely adjustment costs; and the effect of the innovation on the riskiness of production (Marsh 2010; Pannell et al. 2006).

Further, even with the likelihood of increased profits, a variety of off-farm business objectives may reduce farmers' willingness to innovate or make significant changes to their existing farm systems. In many instances, factors that reflect the close financial and social ties between farm families and farm businesses are likely to be important in explaining under-utilisation of some technologies. For example, a decision to invest in a new technology could affect short-run to medium-run family plans (such as children's education), net wealth on retirement, or succession intentions (where the next generation wants to do things differently).

Structural adjustment constraints

Exit by technically inefficient farm businesses may increase industry productivity to the extent that it frees up resources for use by more efficient farms. It is likely that a range of factors acts to delay structural adjustment through the closure of less efficient farm businesses. These factors include financial disincentives to exiting agriculture, as well as non-financial reasons such as inadequate formal recognition of transferable skills and management experience gained while farming and a reluctance to move away from the family home and local community (Productivity Commission 2009).

Institutional factors may also constrain structural adjustment. For example, past reviews of drought policies have highlighted the distortionary effects of business-support measures under drought-assistance programs. Such measures can distort the decisions that farmers might otherwise make to pursue productivity gains or to implement strategies to manage climate risk, and can delay farmers' decisions to exit (Elliston and Glyde 2008).

One such measure, the Exceptional Circumstances Interest Rate Subsidies (ECIRS) program, aims to assist farmers with otherwise viable farms that are experiencing short-term liquidity problems. However, the incentives created by the ECIRS program may have the perverse effect of discouraging farmers from adopting self-reliant strategies that enable them to better cope with drought conditions, in the expectation that government will provide support during drought (Productivity Commission 2009).

Further, if business-support measures that reduce income risk are being capitalised into land values, not only may farmers face incentives to delay adjustment decisions, but 'artificially' high land prices may be a disincentive to more efficient operations wishing to expand and thereby realise improved productivity. For example, between 2002–03 and 2006–07, real average land values per hectare in Exceptional Circumstances declared areas increased at a greater rate than those in non-Exceptional Circumstances declared areas, contrary to what might be expected if land values represent the present value of the income stream that land can generate (Productivity Commission 2009). A consequence of a widening gap between land values and production is that farmers' reliance on land ownership as part of their farming business may become an impediment to structural adjustment (ABARE 2010).

The way forward

Productivity growth has been the main means by which Australian farmers have increased agricultural production and maintained international competitiveness. While productivity has been increasing, productivity growth appears to be slowing in some industries, most notably in cropping and dairy. In the long term, raising agricultural productivity to historically high growth rates will require continual adjustments along the three main 'pathways': individual farm businesses improving best practice (technical change) or moving toward best practice (improvements in technical efficiency), and structural adjustment within the sector.

Governments can influence productivity growth along each of these pathways in several key ways; namely, by ensuring an efficient public R&D system, enhancing the capacity of farmers to improve existing farming systems, and reducing impediments to innovation. To date, much of the attention has focused on the contribution (and future role) of public R&D and extension in improving productivity through technical change. However, unless farmers also face incentives to adopt new technologies and management practices, the payoffs from public (and private) investments in R&D and extension activities and other policy initiatives directed at enabling greater adoption are unlikely to be maximised.

As a priority, government should act to ensure that farm businesses face clear and undistorted incentives to improve productivity and increase self-reliance.

For example, current drought arrangements that provide both household income support and farm business support may distort the decisions farmers make to pursue efficiency gains in managing drought and climate risk or to exit farming.

In addition, governments should also seek to ensure that regulation of GM crops is science-based and that a clear pathway to market provides the private sector with the incentive to invest in developing GM varieties suited to Australian conditions. Genetic modification techniques (and GM crops in particular) have the potential to transform agricultural productivity. Their adoption continues to increase overseas, including in the United States, Canada, China, Argentina and Brazil (James 2009). Although consumer opposition persists in some markets, because of concerns about the perceived safety of GM crops and their equivalence to conventionally bred varieties, inconsistent regulation remains a significant

constraint. State moratoriums on commercial release have reduced private sector investment in developing GM varieties adapted to local conditions and, more broadly, have reduced the ability of farmers to adopt GM crops with regulatory approval. Under current state moratorium arrangements, prohibitions remain on all GM food crops in South Australia and Tasmania and, except for canola, in New South Wales and Western Australia.

Finally, governments should improve farmers' operating flexibility by revising regulations that inappropriately restrict the range of management practices available to farmers. Although governments use a range of regulatory instruments to realise broader environmental objectives, in some instances alternative approaches may achieve the desired outcomes more efficiently and with lower distributional and transaction costs. For example, controls on clearing native vegetation may constrain productivity growth by inhibiting the introduction of new technologies, restricting changes in land use and reducing the efficiency of normal farm-management practices. In contrast, more flexible policy approaches—for example, market-based instruments such as environmental auctions and biodiversity tenders—may provide a given level of ecosystem services at lower cost.

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