

Major Developments in Global and Regional Beef Markets

Scott Waldron and Brian S Fisher

Australia - Indonesia Policy Dialogue¹

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Executive summary and conclusions

Global beef supply

Global beef supply is increasing but is being outstripped by demand growth in developing countries

Global annual supply of bovine meat is currently 60 million tonnes (Mt) and is projected to increase by 8 Mt between 2015 and 2024. Nearly 80% of this increase will come from developing countries, primarily Brazil, China and India. However, supply in developing countries is not keeping up with domestic demand growth. Globally and regionally, supply-side constraints are likely to be tighter into the future than demand-side constraints.

The United States is the world's largest beef producer, the world's largest importer, and the world's fourth largest exporter. Accordingly, fluctuations in US supply and demand have significant impacts globally. India is the world's largest beef exporter, with sales into the Middle East, north Africa, China and Southeast Asia, but the value of exports is as it is predominantly buffalo.

Most beef is consumed domestically – only 16% of production is traded internationally - but trade volumes continue to increase significantly

Beef price fluctuations in the global market will be less volatile the more liberal are trade policies. Trade liberalisation allows markets to respond relatively effectively to supply-side shocks and demand side growth.

Market integration results in flow on effects from one market to others as suppliers adjust their export destinations to meet demand. Trade and sanitary-phytosanitary policies have a direct impact on world beef trade, with liberal policies facilitating trade and resulting in less price volatility.

Trade flows tend to be north-south/ south-north in the Americas, between Europe and Africa, and between Australia/NZ and Asia. Trade in the Atlantic basin is dominated by beef exported from Brazil and trade in the Pacific basin is dominated by exports from Australia and New Zealand.

Global beef demand

Per person demand for beef in high income countries is stable or declining

High levels of beef consumption in developed countries have plateaued, while consumption in developing countries have increased rapidly from a low level, driven by population growth, urbanisation and income growth. Consumption growth is checked by the relatively high price of beef in retail markets, the prices of substitute products, such as chicken and fish, and

cultural factors. Annual per person consumption varies dramatically among countries: Argentina 100 kg, South Korea 22 kg, Indonesia 2.5 kg.

Growth in demand in developing countries has outstripped supply, leading to increased prices and imports.

China, Southeast Asian and Australian beef industries

Despite declining cattle numbers, regional beef production continues to increase due to improved production systems

Cattle numbers across the China–Southeast Asia region have declined by 1 per cent since 2000, partly due to the reduced use of cattle for draught and uptake of off-farm work in numerous countries from China to Myanmar. However, beef production has increased by 1.5 per cent due to more commercialised systems, especially in Vietnam, China and Indonesia. There have been similar trends in Australia due to an extended drought.

Growth in demand in the region will continue to exceed growth in domestic supply resulting in increased imports

Demand growth of 1.9 per cent annually – driven primarily by China, Indonesia and Vietnam – has consistently exceeded growth in domestic supply. This trend is expected to continue as urban populations and incomes rise, resulting in an ongoing requirement to import beef and live cattle. For example, in the 15-year period through to end 2014, China has gone from being a net exporter of beef to importing 1.33 Mt of bovine meat (carcass weight equivalent). The supply gap has been partially met by Australia and Myanmar, but primarily by India, Brazil and US with beef channelled through Vietnam and Hong Kong into China. Indonesia imports 0.2 Mt of carcass weight equivalent, predominantly as live cattle, which makes up 28 per cent of bovine meat consumed. In percentage terms, Indonesia's imports have grown modestly since 2000 when imports were 24 per cent of consumption.

Regionally, beef prices have increased by an average of 6.5 per cent in the period 2007 to 2014, but increases have not been consistent among countries. Prices in China increased by 10 per cent, in Myanmar, Vietnam and Thailand by 6 per cent, and in Indonesia by 2.6 per cent. Beef prices in Australia declined by 2.0 per cent over the period.

Price integration analysis suggest that beef prices in China affect prices in Vietnam, and prices in Australia affect prices in Indonesia. A 10 per cent rise or fall in Australian prices leads to a 2.5 per cent rise or fall in Indonesian prices, which declines to 1.8 per cent after 6 months as alternative supply sources enter the market.

Implications for Indonesia and Australia

Despite growing imports and upward pressure on beef prices in Indonesia, prices have not grown as fast as other countries in the China-Southeast Asian region. However, as a consequence of long-term economic development and population growth, beef consumption in Indonesia continues to rise steadily, and faster than increases in domestic production. Indonesia has responded by increasing supply from all sources – both domestic and overseas.

Increasing commercialisation of the smallholder sector and other commercial structures continue to improve domestic production but is unlikely to keep pace with growing demand. Given that significant beef importation will continue, stable trade policy and sanitary-phytosanitary (SPS) protocols in both Indonesia and supply countries will be important in maintaining supply and minimising price shocks.

In Australia, declining per person domestic beef consumption means that the beef industry has become increasingly dependent on export markets. In response, Australia is seeking to increase productivity and lower costs to better compete on global markets. Challenges include: regular and prolonged drought, competition from lower cost countries, and fluctuations in the global trading environment / market access. While the Australian beef industry was beset by drought and low prices for an extended period, structures in the global beef industry provide cause for optimism.

Discussion points and questions arising

- 1 What global trends (supply, demand, trade and prices) are likely to affect the Indonesia-Australia cattle and beef trade?
- 2 What global drivers (population, urbanisation, incomes, rural incomes, mechanisation etc.) are likely to affect the Indonesian and Australian beef industries?
- 3 Are these global forces likely to have an impact on Indonesia and Australia differently to the (well-established) patterns in other countries?
- 4 What is the comparative advantage of Indonesia and Australia in evolving global and regional supply chains (resources, transport, cow-calf production, fattening, slaughter)?
- 5 What policies, tools and research can be used to capitalise on this comparative advantage?
- 6 What lessons – successful and unsuccessful – have been learnt from previous experiences in Indonesia, Australia and other countries?
- 7 Given the inter-dependency of Australia and Indonesia in the beef sector, what more can be done to ensure an effective and efficient trading partnership?

Australia-Indonesia Policy Dialogue

Developments in Global and Regional Beef

1 Major developments in global beef supply chains

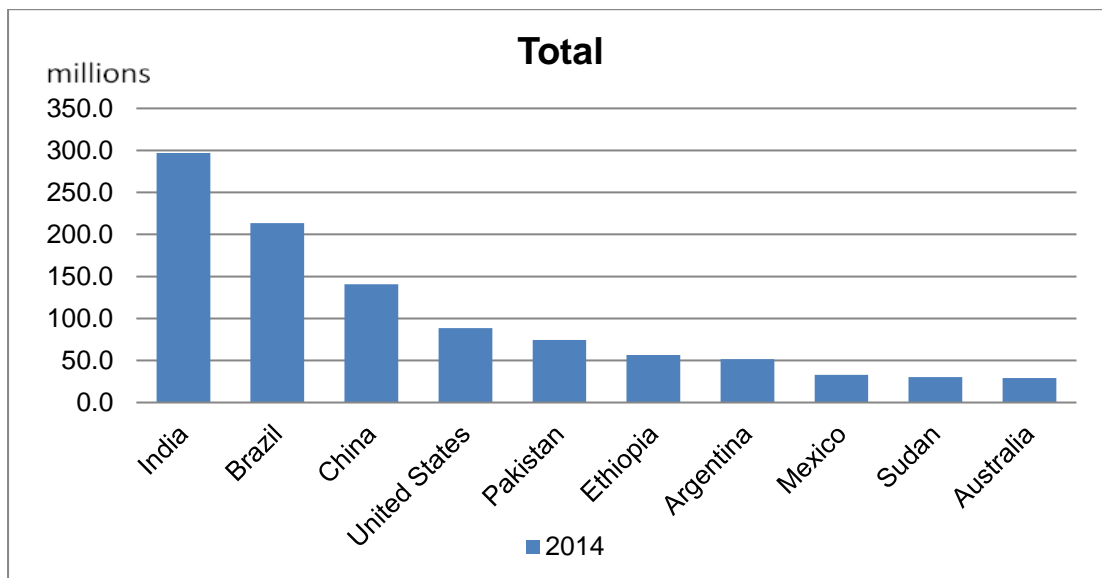
1.1 Developments in major beef producing countries

World cattle numbers grew from 1.3 billion in the year 2000 to 1.48 billion in 2014, a growth rate of 0.9 per cent per year. Over the same period, buffalo numbers grew at a rate of 1.2 per cent a year from 164 million in 2000 to 195 million in 2014 (FAO statistics). Regional cattle numbers tend to fluctuate with environmental conditions, particularly drought, and global beef prices, but the long-term trend is modest growth.

Annual global bovine meat supply is currently approximately 60 million tonnes (Mt). The United States was the largest producer with 10.8Mt (USDA statistics). The OECD/FAO (2015) projects that between 2015 and 2024 an additional 8Mt of bovine meat will be added to annual world supply. Of this additional supply, 79 per cent is projected to be produced in developing countries, primarily Brazil, China and India .

The world's largest cattle herds occur in India, Brazil, China, the United States and the European Union and account for 82 per cent of the world's cattle (Figure 1.1). In terms of cattle numbers, Australia ranks 7th and Indonesia ranks 20th among countries globally.

Figure 1.1 Cattle and buffalo numbers in major producing countries, 2014

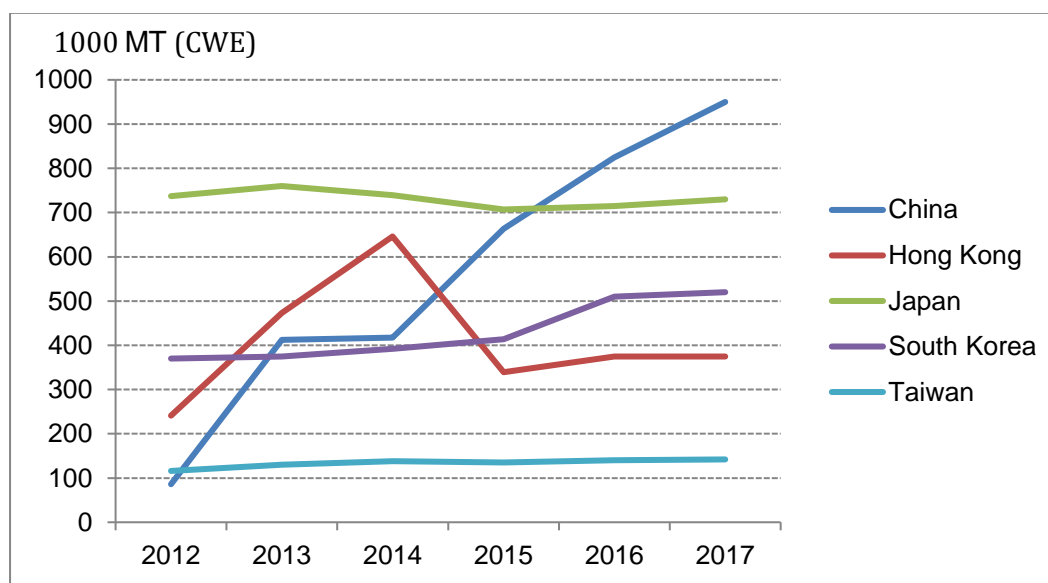


The US cattle sector has an important influence on world market prices due to the size of its herd and its comparative advantage in the production of grain-fed beef. The United States is also an important demand source for beef. The US cattle herd and production is expected to continue to grow slowly over the coming decade, putting downward pressure on domestic US beef prices (USDA 2016). Over the past five years, cattle numbers have been trending down in Mexico and have remained relatively flat in Canada. In Brazil, which has almost 80 per cent of the cattle in South America, numbers have been growing strongly over the past five years and are likely to continue to grow in the medium term.

Cattle numbers have declined over the past three years in Australia but the sector has now entered a herd rebuilding phase which will limit production growth in the short term but provide a stronger base for increased exports in the medium term.

Cattle numbers in China have declined over the past five years whereas numbers in South Korea and Japan have remained very stable². The rapid growth of incomes in China, combined with a declining domestic herd imply that Chinese beef imports will continue to grow, at least in the short to medium term, a trend established over the past five years (Figure 1.2). The longer term trend in Chinese beef imports will have significant implications for world trade patterns.

Figure 1.2 East Asian imports of beef and veal*



* Data for "China" relates to mainland China only, including informal imports through Hong Kong

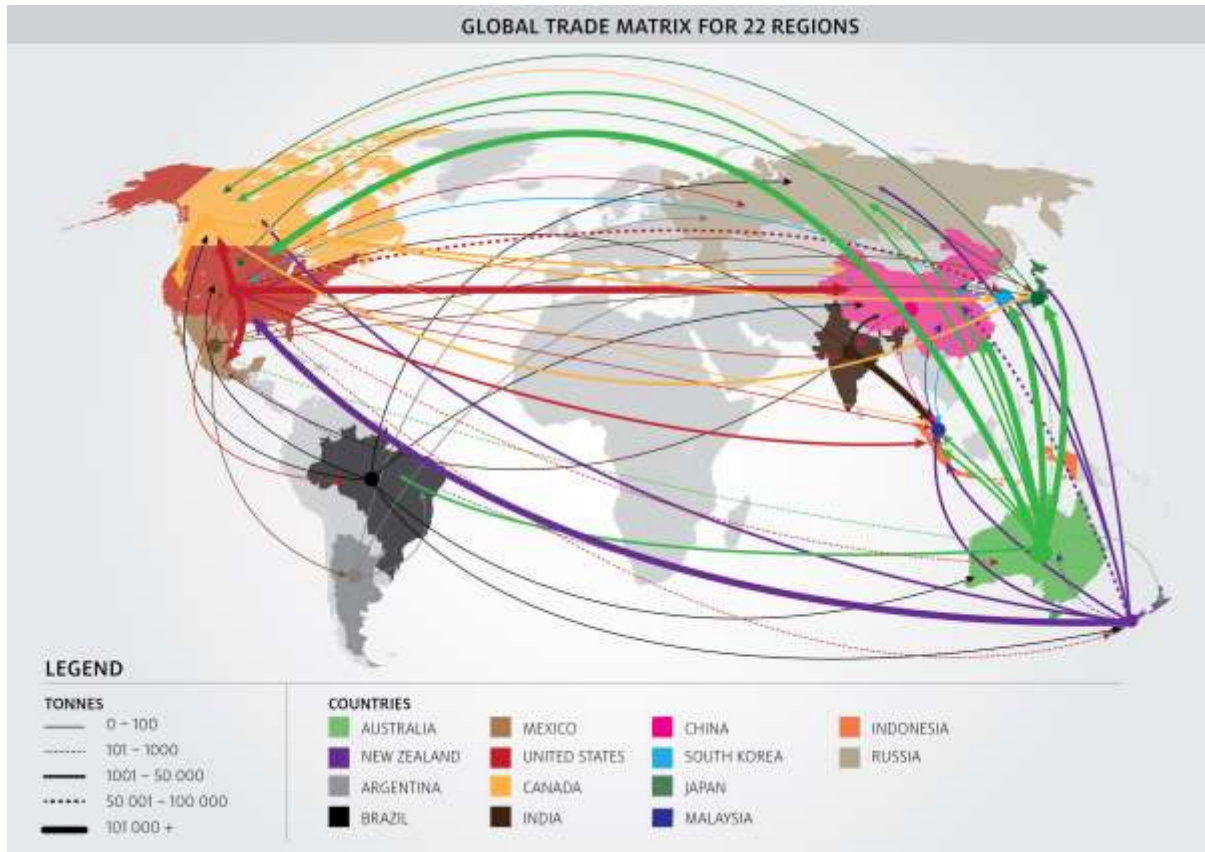
1.2 Global Trade Patterns

The major trade flows in the world beef market are illustrated in Figure 1.3 which shows that the world beef market is complex. Only about 16 per cent of world production is traded, less than most other agricultural commodities, largely due to sanitary-phytosanitary (SPS) disease-related constraints. Trade volumes are increasing substantially from this low base. Some countries are both producers as well as major importers and exporters of the same commodity.

² See <https://apps.fas.usda.gov/PSDOnlinev2/app/index.html#/app/statsByCommodity>.

For example, the United States is the world's largest beef producer and the world's largest importer as well as being the world's fourth largest exporter. Brazil is the world's second largest beef producer and exporter but imports insignificant amounts of beef.

Figure 1.3 Trade flows in world beef markets



Trade in the Atlantic basin is dominated by beef exported from Brazil destined for the European Union, the Middle East and north Africa, Russia and to a lesser extent, the United States. Trade in the Pacific basin is dominated by exports from Australia and New Zealand destined for North Asia and the United States. On a volume basis, India has recently become the world's largest beef exporter (largely carabeef) with product flowing both west into the Middle East and North Africa and east into China and South-east Asia. Although very significant on a volume basis, Indian exports are less important on a value basis given the low value of the buffalo product. The latest USDA forecasts suggest that Brazil is about to resume its place as the world's largest beef exporter in the coming year, especially as it increases access to export markets around the world.

The overall global trade pattern is driven by a number of underlying factors. First, demand for beef (and red meat more generally) per person in high income countries is stable or declining. In combination with very slow, or even declining, population growth, this has resulted in aggregate beef demand being stable in some countries. Second, supply in the traditional beef exporting countries is dependent on each country's position in the cattle cycle. Australia is currently in a herd rebuilding phase, while the US cattle cycle is projected by FAPRI to peak in 2019 with cattle numbers then declining out to 2025. The recent upswing in US cattle

numbers follows a long decline from 2006 to 2015. Overall, supply is growing in developing countries but the pace of income growth has been such that domestic demand growth has outpaced domestic supply growth, resulting in growing imports in these countries in aggregate. This pattern is set to continue.

Trade and SPS policies also have an important impact on world beef trade patterns. For example, for the 2016 year Australia has duty free access to the US beef market for 418,214 tonnes of beef under existing WTO and FTA agreements, but then any over quota exports will attract a tariff of 19.36 per cent. The over-quota tariff will be phased to zero by 2022 and the quota restriction will be lifted from 2023 and thereafter under present agreements, improving Australia's competitiveness in the US market. Brazil's vaccination programs to attain FMD-free status in specific areas has enabled its beef producers to access markets in China, Indonesia and the United States.

There is a general tendency for trade patterns in many goods to show a geographical north-south bias largely due to the influence of transport costs and beef is no exception. Beef trade flows north-south and vice versa in the Americas and also between Africa and Europe. Similarly, it is advantageous for Australia to trade with South-east and North Asia. This natural trade pattern is modified by the need to trade in specialised goods produced in other regions of the world and also by the distortions caused by existing trade restrictions.

Factors affecting one market will have some influence on beef prices in other markets. In general, the more freely products can move between markets the less price volatility will be generated by an unexpected supply disruption in a particular country. Where a product can be exported freely an alternative source of supply can often be found to substitute for the lost production from an existing supplier, thus reducing the overall impact on aggregate supply and price. The observation that the liberalisation of food and trade policies will reduce the instability in food prices is not new and has been illustrated in many trade modelling studies (as one example see Anderson (1990)). One practical example of this was the downward pressure on feed grain prices in Australia during the drought years of the 2002-03 as a consequence of the Australian Government's earlier decision to allow feed wheat imports.

1.3 The demand for beef – the key drivers

To estimate future aggregate demand it is necessary to forecast both per person demand and population growth.

Per person demand for beef is determined by income level, the price of beef in retail markets, the prices of substitute products, such as chicken and fish, and cultural factors. Cultural factors largely determine why Argentines consume almost 100kg of beef per person a year whereas South Koreans consume about 22 kg per person a year, and Indonesians and Indians consume only 2.5 kg per year.

Beef products tend to be consumed in Indonesia only on special occasions by the general population, with higher consumption by higher income urban households and lower consumption in rural households. These characteristics are broadly reflected in the available estimates of price and income elasticities of demand, which measure the responsiveness of

demand to changes in prices and incomes respectively³. The most recently available estimates of the income elasticity of demand for meat products of around unity imply that a 1 per cent increase in household income will lead to approximately a 1 per cent increase in meat demand. If real per person income growth continues at around 4 per cent in the medium term, consistent with recent trend growth, this implies that the underlying demand for meat per person will also grow at around 4 per cent a year.

2 Regional beef industries

How are developments in global supply chains (above) affecting the Asia-Pacific region, and what are the trends and drivers? This section telescopes down to look at beef production, consumption, trade and price patterns in six countries in the region⁴. This regional and comparative analysis may help understand developments in Indonesia and the Indonesia-Australia beef trade relationship.

The structures of the beef industries are highly variable. Countries such as Australia and Myanmar have large cattle herds compared to consumption, so are net exporters. Three of the countries in the region – China, Vietnam and Indonesia – have relatively large and commercialised beef industries but are also large beef consumers and net importers. Malaysia has a small industry and high consumption so is a large net importer.

2.1 Cattle and beef production

For most countries in the China and Southeast Asian region the majority of beef consumed is produced domestically, so objectives of food security depend most fundamentally on domestic production. However, in countries undergoing rapid economic development like Indonesia, imports also make up a significant and growing portion of beef consumption. Developments in large beef production countries – especially China and Australia (Figure 2.1) – have a large impact on supply-demand alignments in the region.

The cattle herd in China, Southeast Asia and Australia has fluctuated but not experienced any sustained growth since 2000. The China and Southeast Asian region has experienced a total decline of 1 per cent. There are several reasons for this. In China and other areas undergoing rapid development, farmers have given up cow-calf production for more lucrative off-farm work. In all areas, cattle previously used for draught and transport, are being replaced by

³ For useful definitions see <http://www.ers.usda.gov/data-products/commodity-and-food-elasticities/glossary> and for a discussion of the concepts see Tomek and Robinson (1990).

⁴ Data in sections 2 and 3 draw on the project 'Regional Beef Markets and Trade in China and Southeast Asia' funded by the Australian Centre for International Agricultural Research. Production statistics (Figure 1, Figure 2, Figure 3, Figure 4) are drawn from respective countries (not FAO), revised to reflect realistic biological values for China, Myanmar and Vietnam. Production statistics for Malaysia are not able to be verified. Trade statistics (Figure 3, Figure 4, Table 1, Table 2) are drawn from UNComtrade (accessed November 2016) and estimates on informal cattle and beef trade for China, Vietnam and Myanmar. Price data are drawn from country sources including from the Vietnam Ministry of Agriculture and Rural Development (monthly), the Australian Bureau of Statistics (quarterly) and the China Livestock Yearbooks (China). Weekly price data since 2001 are drawn from Buletin Analisis Perkembangan Harga Komoditas pertanian, Pusat Data dan Sistem Informasi Pertanian, Departemen Pertanian (Ministry of Agriculture, RI). Demographic and inflation data are derived from World Bank databases.

machinery. In all areas, small-holder producers rarely produce cattle to maximise productivity and profit, but as a source of 'savings'. The Australian herd has been affected by a combination of drought, beef prices and trade policy decisions and is currently in a rebuilding phase.

While growth in herd numbers may be low, beef industries are becoming more commercialised. This is reflected in increasing slaughter numbers (and therefore higher slaughter rates) throughout the region (Figure 2.2). This is particularly the case in Myanmar where farmers are selling off draught animals for export, and in Vietnam, China and Indonesia where systems are more productive due to reduced calving intervals and mortalities, more specialised feeding systems, and increased growth rates. Also reflecting commercialisation, beef production has increased as a result of higher average carcass weights. This holds throughout the region but especially Indonesia (with higher productivity and increased live imports). Beef production statistics of Malaysia are very high but not able to be verified. Turnoff rates have been high in Australia due to drought until recently.

Figure 2.1 Beef and bovine meat production in selected countries, 2014 (thousand tonnes)

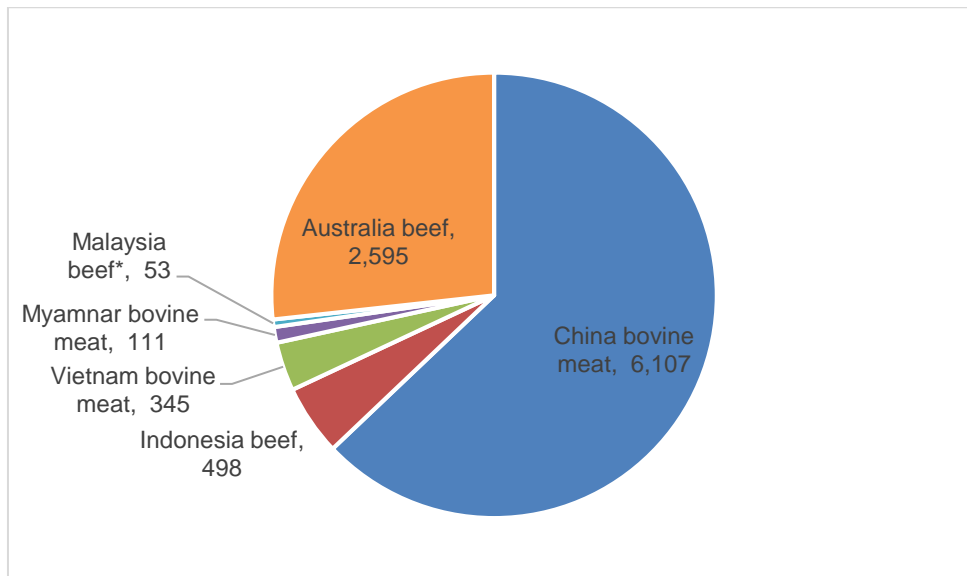
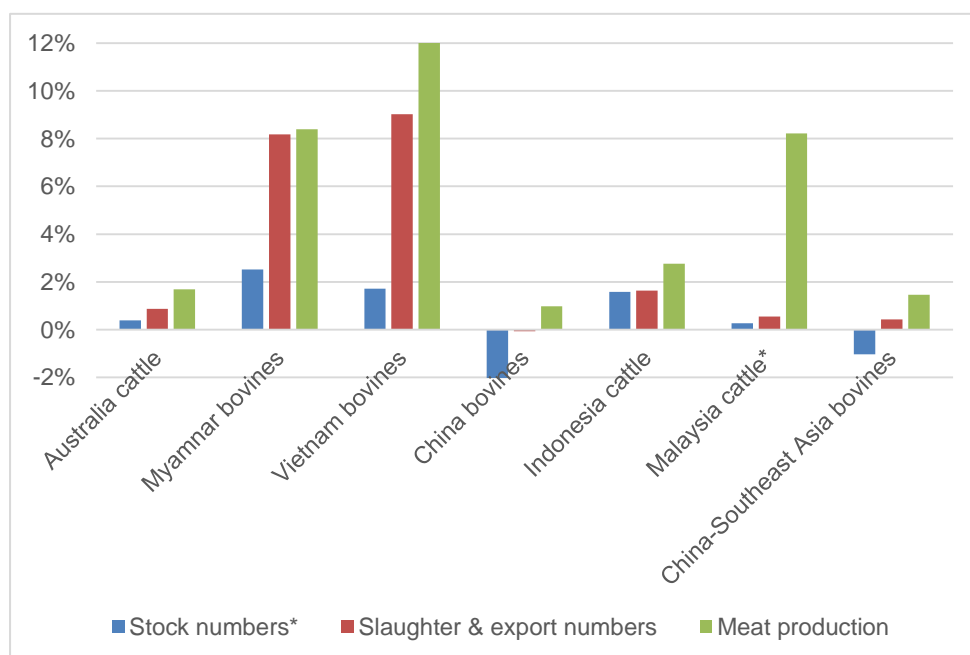


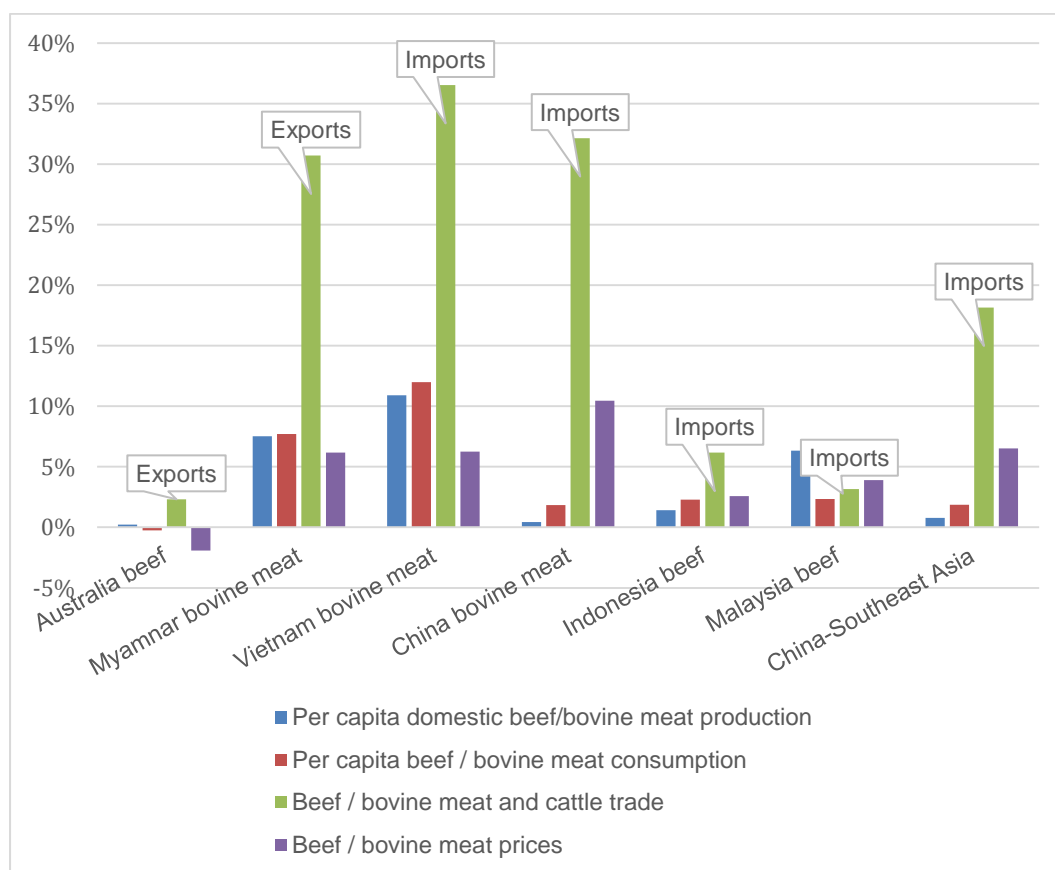
Figure 2.2 Average annual growth in cattle and beef production, 2000-2014



2.2 Production, consumption and trade

While beef production in the China-Southeast Asian region has increased (by 1.5 per year), aggregate annual beef consumption has increased at a higher rate (1.9 per cent) (Figure 2.3 and Table 2.1). The shortfall is made up by large increases in trade (annual growth of 18 per cent), consisting of imports by China, Indonesia and Vietnam, and exports from Australia and Myanmar. However, Australia and Myanmar have supplied only a small part of the increased consumption in China. The majority has been supplied through re-exports from India, Brazil and the United States through Vietnam and Hong Kong to mainland China. The alignment of production, consumption and trade has increased beef/bovine meat prices in the region by an average of 6.5 per cent over the period 2000 to 2014 (Figure 2.3).

Figure 2.3 Growth in beef & bovine meat production, consumption, trade and prices



Beef consumption

There is a lack of quality independent data on beef consumption in the region. Household surveys are conducted in China (urban and rural), Vietnam and Indonesia to report per person consumption levels⁵. The surveys under-report consumption levels and growth, especially SUSENAS surveys in Indonesia. As a result, this paper does not draw on these surveys, but highlights the need to fill the information gap on consumption levels and patterns.

To examine consumption patterns, the paper uses the 'per person supply method', also used by FAO as a proxy for consumption. This represents domestic production + net (including informal) trade per person.

⁵ Per person consumption is highest in Vietnam (4.5kg) and fastest-growing (4.9 per cent a year from 2000-2014) (Vietnam Household Living Standards Survey). Urban Chinese consume 2.4kg with an increase of 0.7 per cent while rural Chinese consume 0.8kg with an increase of 2.9 per cent (household surveys reported in the China Statistical Yearbook). Large household surveys are conducted by SUSENAS (The Indonesia Social and Economic Survey) but show very low per person consumption (0.26kgs) and a decline of 5.8 per cent between 2000 and 2014.

Table 2.1 Per person supply of bovine meat and beef, 2000-2014

	Australia	Myanmar ¹	Vietnam ¹	China ¹	Indonesia	Malaysia	China-Southeast Asia
Beef supply							
Beef supply (kg/person 2014)	62.7 ¹	2.1	4.3	5.4	2.7	7.2	4.7
Annual growth 2000-2014 (per cent)	-0.3%	7.7%	12.0%	1.8%	2.3%	2.3%	-0.3%
Demographics (annual growth 2000-2104)							
Population growth	1.5%	0.8%	1.0%	0.5%	1.3%	1.8%	0.7%
Urbanisation rate	0.2%	1.5%	2.1%	3.1%	1.7%	1.3%	2.8%
GDP per person	1.5%		5.2%	9.2%	4.0%	3.0%	5.3%

¹ includes all bovine meat

Like many developed countries around the world, beef consumption in Australia is high but slowly declining. Moderately high consumption levels in Malaysia have continued to grow, mainly due to increased household incomes. Bovine meat consumption levels in China are relatively high, especially amongst urban residents. Out-of-home consumption (banqueting) accounted for more than 30 per cent of beef consumption in China (Bai *et al.*, 2012) but was curtailed with the anti-corruption measures of 2013. While the consumption growth rate appears low for China, the size of the population has an enormous impact on aggregate demand, trade and prices in the region. Beef consumption in Vietnam has increased significantly due to rising incomes and urbanisation. The data suggest that beef consumption per person in Indonesia is low in comparative terms, but has grown steadily. Both population and income growth in Indonesia and Malaysia are driving aggregate consumption growth but income growth is more important than population growth.

Trade

Higher levels of beef consumption than domestic production in most countries have increased trade flows, both for cattle and beef products (Table 2.2).

Table 2.2 Trade patterns in bovine meat and cattle, 2000-14

	Australia	Myanmar	Vietnam	China	Indonesia	Malaysia	China-Southeast Asia
Net trade bovine meat (thousand tonnes 2014)**	-1,352		16	1,279	70	138	1,371
Annual growth 2000-2014 (per cent)	2%		45%	26%	7%	3%	23%
Net trade slaughter cattle head, 2014)**	-1,298,000	-300,000	192,000	294,000	730,000	141,000	837,000
Annual growth 2000-2014 (per cent)	3%	33%	From 2,000 head exported in 2000	From 165,000 head exported in 2000	6%	6%	8%
Net trade cattle and beef, carcass weight equivalent 2014 (thousand tonnes)*	-1,579	-52	49	1,330	198	162	1,517
Annual growth 2000-2014 (per cent)	2%	33%	40%	35%	7%	3%	20%

*Calculated on the basis of 175kg cwe. ** Negative numbers indicate exports (i.e. subtraction from per person supply). Estimates in Indonesia and Malaysia do not account for the informal trade in buffalo meat or cattle.

The data allow calculation of ‘trade dependency levels’ – the proportion of trade to domestic production, shown in Figure 2.3. The Australian beef industry is highly reliant on export markets, which account for at least 61 per cent of cattle and beef output⁶. Myanmar has capitalised on developments in the region with an export of live cattle mainly to China, but also to other Mekong basin countries.

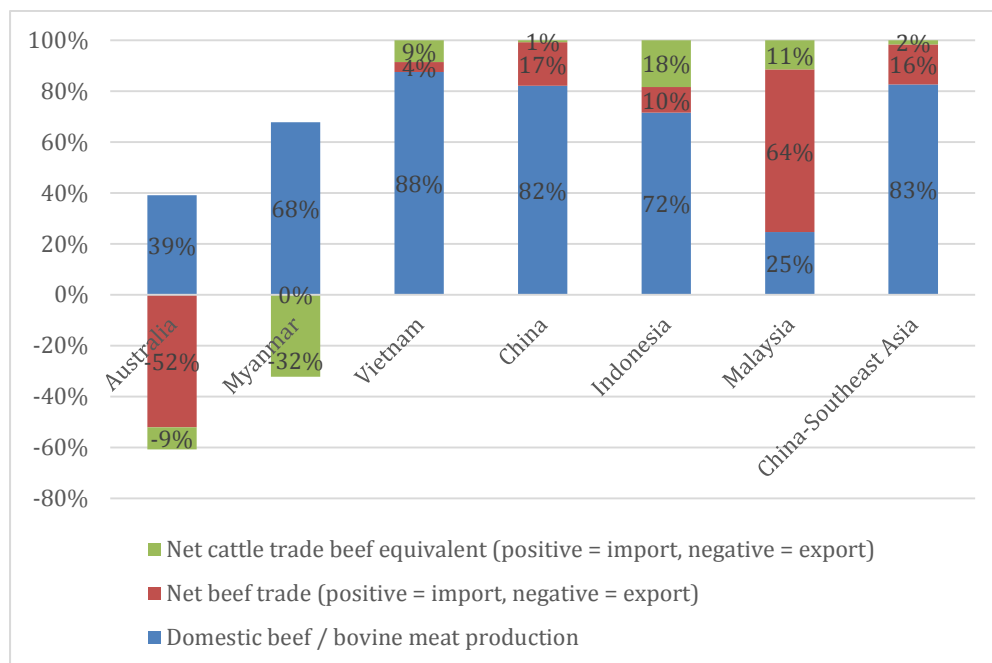
From being a net exporter of cattle and beef in 2000, China imported 1.33 million tonnes of bovine meat (carcass weight equivalent) in 2014, an annual increase of 35 per cent. Imports now make up 18 per cent of beef consumed. The vast majority of the imports into mainland China (at least one million tonnes) was through Vietnam and Hong Kong from third countries, supplemented by an informal cattle trade (from Myanmar and the Mekong). Live cattle imports through formal channels may increase with a trade protocol with Australia introduced in 2015.

Vietnam’s imports (49,000 tonnes) have increased by 40 per cent per year but from a low starting point, to make up 13 per cent of beef consumed. The increase in imports is partly through informal live cattle from Mekong countries, but mainly from formal imports of live cattle from Australia.

Indonesia imports approximately 200,000 tonnes of carcass weight equivalent, 65 per cent of which is in the form of live cattle, predominantly from Australia. Imports account for about 28 per cent of bovine meat consumed. These trade flows have changed only modestly since 2000, when the ‘trade dependency rate’ was 24 per cent. This contrasts with Malaysia where imports account for 75 per cent of beef consumed.

⁶ This figure may be understated because of the assumption that export cattle have an average carcass weight of 175kgs to comply with Indonesian regulations, but is understated for other export markets.

Figure 2.3 Trade as a proportion of domestic production, 2014



3 Prices

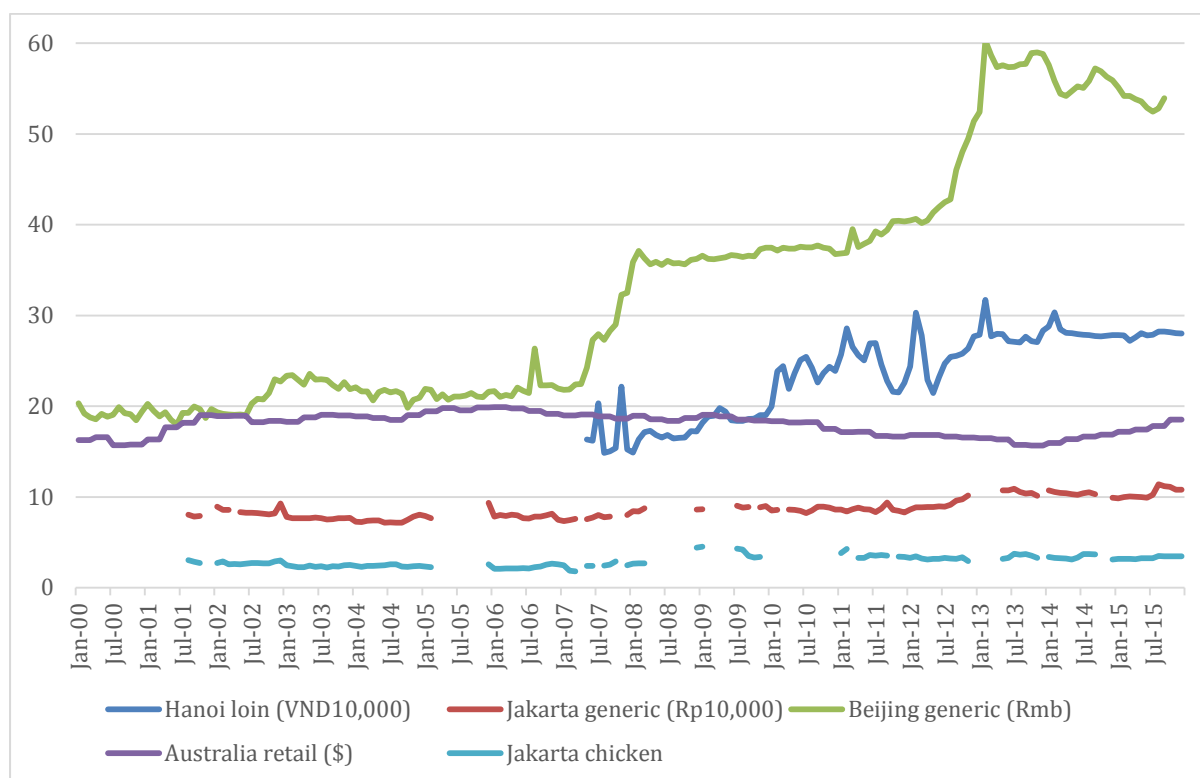
Prices are formed as a result of the production, consumption and trade patterns described above. In general, higher levels of consumption than production have led to buoyant prices in Asia between 2000 and 2014, but with numerous variations and movements.

3.1 Long term regional price movements

Annual price data (adjusted for inflation in local currencies) show that between 2007 and 2014 (when data for all countries are available), bovine meat and beef prices increased by 11 per cent in Cambodia, 10 per cent in China, 6 per cent in Myanmar, Vietnam and Thailand, and 4 per cent in Malaysia. Price growth has been relatively low in Indonesia at 2.6 per cent and negative in Australia (-2 per cent).

Price changes are further explored in Figure 3.1 for countries where more disaggregated (weekly, monthly and quarterly) price data are available. These are also adjusted for inflation and expressed in local currencies, sometimes for different cuts of bovine meat, so price levels are not directly comparable across countries. The major features of the figure are that the international food price spike in 2007-08 extended to beef prices in most countries, but especially China and Vietnam, while another spike occurred in China in 2012-13. These patterns were not followed by Australia, with a long term decline in real retail prices that began a recovery in 2014.

Figure 3.1 Real beef prices in local currency units, 2000-2015. (2015=100)



3.2 Short term prices in Indonesia

Long term movements in prices mask important shorter term movements. Growth rates by five-year period in Jakarta presented in Table 3.1 show that price growth has accelerated from negative levels in 2001-2005, to low levels in 2006-2010, to reach 3.9 per cent in the 2011-15 period.

Table 1.1 Growth rates in Jakarta beef prices and inflation by five-year period, 2001-15. Source: MoA

	Nominal beef price inflation	Average inflation	Real beef price inflation
2001-2005	10.8%	9.3%	0.3%
2006-2010	6.3%	7.8%	-0.2%
2011-2015	10.0%	5.8%	3.9%
2000-2015	8.6%	7.6%	1.2%

Note: nominal prices, inflation and real prices do not always align because of the selection of specific time points (June of each year) and the conversion of weekly data to five-year periods.

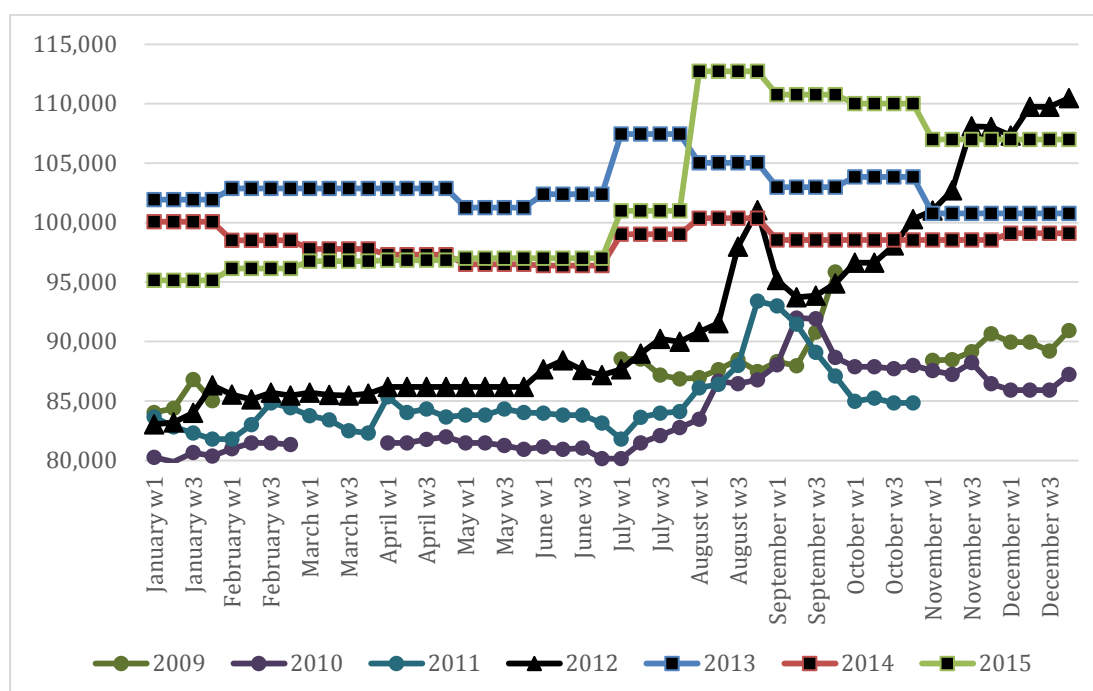
The growth in real beef prices in Indonesia from 2011-15 is relatively high compared to the main substitute protein source, chicken (-2.4 per cent) and to countries like Vietnam (which increased 0.8 per cent in the period because prices peaked in 2009-10). However, price growth in Indonesia in the 2011-15 period has been lower than in China (8.5 per cent), Thailand (9 per cent) and Cambodia (7 per cent).

Long term movements in prices mask important shorter term movements. Growth rates by five-year period in Jakarta presented in Table 3.1 show that price growth has accelerated from

negative levels in 2001-2005, to low levels in 2006-2010, to reach 3.9 per cent in the 2011-15 period.

Further investigation of price movements in the 2011-15 period (and showing the effects of Idul Fitri), Figure 3.2 shows that much of the price growth in Indonesia occurred in 2012, when imports of cattle were cut by quota/permit restrictions by 60 per cent over 2009 levels and 50 per cent for beef. Despite another spike for Idul Fitri in 2015, growth in Indonesian beef prices between June 2013 and June 2015 levelled out at 1.2 per cent. This followed other Asian markets, but were contrary to Australian prices, which increased 3.2 per cent in the period.

Figure 3.2 Real beef prices in Jakarta, 2009-15



Note: Weekly price data were reported by the MoA to 2012, followed by monthly data, shown as discrete steps

3.3 Drivers and integration with Australia

Analysis above suggests that real beef prices in Indonesia have not increased to the same extent as many other Asian countries (with the exception of 2012). This is due to relatively low increases in consumption and relatively high levels of imports.

With regard to beef and cattle imports, price integration analysis was conducted to show how price changes in each of the four countries (China, Vietnam, Indonesia, Australia) affect each other, the extent of impacts, and which countries 'lead' or 'lag' others⁷. This is useful in examining how trade with particular partners affects domestic prices.

⁷ The analysis used methods including co-integration, granger, vector error correction model and impulse response function tests. To be presented in Dong et al. (2017).

The analysis identified significant relationships in two cases only. Chinese prices affect prices in Vietnam⁸ and Australian prices affect prices in Indonesia. Prices in Australia lead prices in Indonesia because of the large trade flows (92 per cent of Indonesia's cattle and beef imports and 27 per cent of Indonesia's cwe supply). A 10 per cent rise or fall in Australian prices brings about a 2.5 per cent rise or fall in Indonesian prices with a peak between the first and second quarterly periods (3-6 months). With higher prices, beef from other sources enters the market and price stabilises around 1.8 per cent higher. These results will help policy-makers to forecast price changes in Indonesia.

4 Implications of global developments for Indonesia and Australia

4.1 Developments in the global and regional beef sector

Section 1 of the paper showed that world cattle and beef production can be expected to increase modestly into the mid- and longer term future. Major beef producing countries (the United States and Brazil among others) can be expected to increase production into the medium term as they emerge from drought but already have high levels of productivity. Developing countries like China and India have higher potential to increase productivity, but run into other limitations to herd expansion, especially from rising costs of labour, farm mechanisation and 'cultural' approaches to cattle production by small-holders. Countries such as Brazil are expected to increase production and are expected to gain increasing access to export markets as they solve disease and SPS problems.

There is limited scope to increase already high beef consumption levels in most developed countries and demand has stabilised or is falling in some cases. However, per person beef consumption in developing countries is increasing from low levels due to income growth and changes in dietary patterns arising from increasing urbanisation, among other factors. Aggregate consumption in these countries is further driven by population growth. Despite these positive drivers, growth in beef consumption in developing countries will slow as pressure on supply drives prices higher putting an automatic brake on consumption.

The increasing divergence between beef production and consumption in different parts of the world has led to a strong increase in international trade in cattle and beef with growth a little above 3 per cent per year over the period 2000 to 2014. Nowhere have these trends been more clearly represented than in the Asia-Pacific region. The emerging trends appear clear, but are far from smooth and linear, and vary substantially for specific countries.

⁸ Prices in China 'lead' prices in Vietnam and have a large impact. If prices in China rise or fall by 10 per cent, prices in Hanoi will rise or fall by 3.2 per cent. This is because some of the large 're-exported' flows of beef and informal flow or cattle through Vietnam into China is 'leaked' into the Vietnamese market. Thus, price increases in China put upward pressure on demand and force up prices in Vietnam].

4.2 For Indonesia

Indonesia's success in bringing about long-term economic development has been accompanied by population growth and urbanisation. It is precisely these factors that have led to increased beef consumption. The recent growth in consumption can be expected to continue given strong income growth and modest price increases. Domestic beef prices spiked significantly following Australia's trade policy changes in 2012 that dramatically affected the availability of imported live cattle. However, despite growing imports and upward pressure on beef prices in Indonesia, prices have not grown as fast as in some neighbouring countries.

Indonesia has responded to the steadily increasing demand for beef by increasing supply from both domestic and external sources. Indonesia has taken measures to increase domestic production, both through supporting the smallholder sector that dominates production, but also by supporting commercial structures that may contribute significantly to supply in the long term. There is widespread recognition of the challenges in increasing domestic production both in terms of the physical and capital constraints, but also in balancing the desire of producers for higher cattle prices with that of consumers for lower beef prices.

With regard to trade policy, Indonesia has committed to low or lowering tariffs, to increasing or abolishing quotas, and has revised disease and SPS protocols that facilitate trade. These measures will assist Indonesia to source a stable supply of imported beef and live cattle to augment its domestic supply.

4.3 For Australia

These regional and global factors have important impacts on the Australian beef industry, but not always as expected. With domestic beef consumption dropping, Australia has become increasingly dependent on export markets which now take a large majority of Australia's cattle and beef. Growth in demand in global markets is unconditionally beneficial to exporters such as Australia. However, a country's ability to capitalise on the opportunities that arise from growth in demand depend on its ability to supply new markets and to compete with other exporters. Factors affecting the Australian industry's recent export performance include: drought induced increases in supply from Australia, increased market access by Brazil and other suppliers, and domestic and recipient country trade policy resulting in periodic exclusion from some markets (Indonesia and Russia). The latter resulted in falling saleyard prices between 2001-02 and 2013-14. The downward price trend has turned around since 2014-15 as herd rebuilding has commenced.

While the Australian beef industry was beset by drought and low prices for an extended period, structures in the world beef industry provide cause for optimism. Australia has a strong interest in promoting and participating in an increasingly integrated global industry. In this regard, Australia is under intense pressure to increase competitiveness – both through increased productivity and lowering costs to better compete on global markets. Given Australia's high reliance on exports, market access and stable trade policy are crucially important to growth of the sector.

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