



THE UNIVERSITY
of ADELAIDE

Wine Economics Research Centre

Working Papers

Working Paper No. 0415 ISSN 1837-9397

Impact of Australia's Free Trade Agreements with China, Japan and Korea: The Case of Wine

Kym Anderson and Glyn Wittwer

December 2015

© Kym Anderson and Glyn Wittwer

WINE ECONOMICS RESEARCH CENTRE

The Wine Economics Research Centre was established in 2010 by the School of Economics and the Wine 2030 Research Network of the University of Adelaide, having been previously a program in the University's Centre for International Economic Studies.

The Centre's purpose is to promote and foster its growing research strength in the area of wine economics research, and to complement the University's long-established strength in viticulture and oenology.

The key objectives for the Wine Economics Research Centre are to:

- publish wine economics research outputs and disseminate them to academia, industry and government
- contribute to economics journals, wine industry journals and related publications
- promote collaboration and sharing of information, statistics and analyses between industry, government agencies and research institutions
- sponsor wine economics seminars, workshops and conferences and contribute to other grape and wine events

Contact details:

Wine Economics Research Centre

School of Economics

University of Adelaide

SA 5005 AUSTRALIA

Email: wine-econ@adelaide.edu.au

Centre publications can be downloaded at: www.adelaide.edu.au/wine-econ/

Impact of Australia's Free Trade Agreements with China, Japan and Korea: The case of wine

Kym Anderson

Wine Economics Research Centre
School of Economics
University of Adelaide
Adelaide, SA 5005
kym.anderson@adelaide.edu.au

and

Glyn Wittwer

Centre of Policy Studies
Victoria University,
Melbourne, Vic, 3000
Glyn.Wittwer@vu.edu.au

December 2015

Impact of Australia's Free Trade Agreements with China, Japan and Korea: The case of wine

Introduction

The signing of the Australia-China Free Trade Agreement (ChAFTA) in mid-2015, following Australia's signing in late 2014 of FTAs with Japan and Korea, offer the prospect of Australia reversing the impact of the earlier signing by Chile and New Zealand of their FTAs with China (and by Chile of FTAs also with Japan and Korea). Trade diversion resulted from those earlier FTAs signed by agricultural-exporting countries whose producers are close competitors to Australia's farmers and agribusinesses in East Asian markets. As a result, Australia's share of imports into China rose less rapidly because of preferential access provided to Chile and New Zealand. Had Australia not negotiated the ChAFTA, its share of China's imports would have continued to grow less rapidly as the Chile and New Zealand FTAs with China continued to be phased in over the next few years.

For South Australia, one of the most important agricultural products that was being subjected to trade diversion is wine, since the vast majority of Australia's wine exports are from South Australian-based wineries. This paper therefore provides, as a case study, an analysis of that product's trade between Australia and China as it would have been to 2018 (a) without any of the above-mentioned FTAs, (b) with just Chile and New Zealand FTAs, and (c) with Australia's three recent FTAs as well. It makes sense to consider Australia's bilateral FTAs with Japan and Korea alongside its FTA with Japan because they will be implemented simultaneously – although, as we will see in the case of wine, China is by far the most-important East Asian market for Australia.

Rice wine is common in Asia, but wine made from grapes has had a very minor role traditionally. Prior to this century grape wine was consumed only by Asia's elite, and produced only in tiny quantities and mostly in just Japan and – from the late 1980s – China.¹ However, income growth and a preference swing towards this traditional European product have changed the consumption situation dramatically. China is also expanding its area of vineyards and is now the world's 6th largest producer of grape-based wine (hereafter called just wine), up from 14th as recently as 2001.² To date that supply expansion has not been able to keep up with China's growth in demand though, so wine imports have surged. Nor are those imports only of low quality. The average current US\$ price of Asia's wine imports grew at 7% per year between 2000 and 2009, compared with only 5.5% in the rest of the world. By 2009 Asia's average import price was nearly 80% higher than the world average (and more than four times higher in the case of Hong Kong and Singapore). Even the unit values of China's imports of both still bottled and sparkling wines were above the global average by 2009 (Anderson and Nelgen 2011). Meanwhile, shortly after removing its tariff on wine imports in February 2008, Hong Kong became the world's most important market for ultra-premium and iconic wines.

What is the future of Asia and especially China in the world's wine markets? What roles will preferential trade agreements play? And how much will China's austerity/anti-corruption drive, introduced rapidly through 2013, dampen conspicuous consumption of luxuries such as expensive wines? This paper addresses each of these questions, drawing on a recent paper by Anderson and Wittwer (2015). It first draws on comparative advantage theory, then looks at the recent history in more detail before presenting some projections for 2018 under various assumptions about economic growth, real exchange rates, bilateral trade agreements, and China's austerity measures. It concludes that is set to continue to change global markets for wines dramatically, and that Australia – especially South Australia – is going to be better placed to capture a greater share of China's wine import market as a consequence of ChAFTA.

¹ Winegrape production in China may have begun more than two millennia ago, but it would have been only for the ruling elite's pleasure (Huang 2000 (pp. 240-246); McGovern 2003, 2009). For developments in East Asian wine markets to the turn of this century, see Findlay et al. (2004).

² China is also the world's largest producer of table grapes. Its total vineyard area surpassed that of France in 2014, at 799,000 hectares compared with France's 792,000, and so is now 2nd only to Spain's 1.02 million hectares (OIV 2015).

Determinants of comparative advantage in wine

According to the workhorse theory of comparative advantage developed in the 20th century, we should expect agricultural trade to occur between relatively lightly populated economies that are well-endowed with agricultural land and those that are densely populated with little agricultural land per worker (Krueger 1977). Leamer (1987) developed this model further and related it to paths of economic development. If the stock of natural resources is unchanged, rapid growth by one or more countries relative to others in their availability of produced capital (physical plus human skills and technological knowledge) per unit of available labour time would tend to cause those economies to strengthen their comparative advantage in non-primary products. By contrast, a discovery of minerals or energy raw materials would strengthen that country's comparative advantage in mining and weaken its comparative advantage in agricultural and other tradable products, other things equal. It would also boost national income and hence the demand for nontradables, which would cause mobile resources to move into the production of nontradable goods and services, further reducing farm and industrial production (Corden 1984; Garnaut 2014; Freebairn 2015). As port etc. infrastructure is developed and costs of trading internationally fall for the country, more products move from the nontradable to the tradable category (Venables 2004).

At early stages of development of a country with a relatively small stock of natural resources per worker, wages would be low and the country is likely to have an initial comparative cost advantage in unskilled labour-intensive, standard-technology manufactures. Then as the stock of industrial capital grows, there would be a gradual move toward exporting manufactures that are relatively intensive in their use of physical capital, skills and knowledge. Natural resource-abundant economies, however, may invest more in capital specific to primary production and so would not develop a comparative advantage in manufacturing until a later stage of development, at which time their industrial exports would be relatively capital intensive.

The above theory of changing comparative has been used successfully to explain Asia's resource-poor first- and second-generation industrializing economies becoming more dependent

on imports of primary products from their resource-rich trading partners (see, e.g., Anderson and Smith 1981). But how helpful is that theory for explaining comparative advantage in wine?

Grape-based wine is dependent on winegrapes as an input, and they are too perishable to be transported internationally without at least the first stages of processing. The lowest-quality winegrapes and wine can be produced in less-than-ideal regions and sold as an undifferentiated commodity without a great deal of knowhow, but only at prices barely above the cost of production for most grapegrowers. To produce a higher-quality product that can be differentiated from other wines by consumers, and thus attract a higher price, requires far more technological knowledge and skills in grape growing, wine making and wine marketing in addition to access to high-quality vineyard land or at least grapes therefrom. To be economically sustainable the producer also needs ready access to financial capital to cover the very considerable up-front establishment costs and to finance the years when receipts fall short of outgoings, including the first seven years before cash income begins to exceed cash outlays. Secure property rights over the vineyard land are essential as well, since the lifetime of vines can be 30+ years.

Three determinants of particular importance to a country's competitiveness in producing wine rather than other farm products are terroir, traditions, and technologies.

Terroir refers to various pertinent aspects of climate, topography, soils, geology, etc. that determine the quality of the vine's growing conditions. Vineyard site selection therefore is crucial. Experience has determined the best sites and most-suitable grape varieties in long-established regions, whereas in new regions science has to be used to speed the process of approaching the potential of any region to produce quality winegrapes. The conventional wisdom is that winegrapes grow best between the 30° and 50° temperate latitude bands north and south of the equator, and where rain is concentrated in the winter and summer harvest times are dry. Lower latitudes typically result in lower-quality winegrapes. However, simultaneously moving to higher altitudes can help, because temperatures decline about 5° centigrade per 1000 metres of elevation (Gladstones 1992; Ashenfelter and Storchmann 2014).

Traditions determine not only how a product is produced but also the extent of local consumer demand. This is important for wine because typically local demand is the easiest and least costly for producers to satisfy, as there are relatively high fixed costs of entry into new export markets. Stigler and Becker (1977) argue that economists should begin by assuming tastes

are stable over time and similar among people, and then focus on explaining differences in consumption patterns using standard determinants such as relative prices and real incomes. Social norms and religion can also influence interest in consumption of alcoholic beverages, and those can alter with economic integration/globalization (Aizenman and Brooks 2008).

As for technologies, there is always potential to improve the efficiency of traditional production, processing, entrepreneurship and marketing, be that by trial and error of practitioners over the generations or via formal investment in private and public research and development (R&D). The New World wine-producing countries have been more dependent on newly developed technologies and less on terroir than have producers in Western Europe, although both sets of countries have made major R&D investments – and expanded complementary tertiary education in viticulture, oenology and wine marketing – over the past half-century (Giuliana, Morrison and Rabellotti 2011). Those technologies potentially are transferrable to other countries, a process that has been greatly accelerated over the past two decades through two mechanisms. One is the emergence of fly-in, fly-out viticulturalists and winemakers from both Old World and New World wine-producing countries (Williams 1995). The other mechanism is via foreign direct investment joint ventures: by combining two firms' technical and market knowledge, the latest technologies can be diffused to new regions more rapidly.

New technologies in agriculture have long tended to be biased in favour of saving the scarcest factor of production, as reflected in relative factor prices. Hayami and Ruttan (1985) emphasize that the focus of R&D investments has been driven in part by changes in factor prices, and in particular by the rise in real wages. That has resulted in the development and/or adoption of labour-saving technologies such as mechanical harvesters and pruners for vineyards and super-fast (even robotic) bottling/labelling equipment for wineries in viticultural land-abundant, labour-scarce countries. The adoption of labour-saving technologies has helped countries with rapidly rising real wages retain their comparative advantage in what traditionally had been (at least at the primary stage of grape growing) a labour-intensive industry. This in turn means poorer countries need to find sources of comparative advantage other than just low wages.

Relative factor endowments affect the comparative advantage of a country in terms also of the *quality* of its exported products. New trade theory suggests richer, capital-abundant

countries will export higher-quality and hence higher-priced goods (Fajgelbaum, Grossman and Helpman 2011).

A further set of influences on comparative advantage that can be important at certain times relates to currency exchange rate movements. A macroeconomic shock such as Argentina's devaluation against the US dollar by two-thirds in late 2001, or a doubling in the Australian-US dollar exchange rate over the subsequent decade due largely to Australia's mining boom, have had major (and opposite) impacts on the international competitiveness of wineries in those two Southern Hemisphere countries (Anderson and Wittwer 2013).

Asia's wine production, consumption and trade to date

The previous section provides plenty of reasons for not expecting much winegrape production in most Asian countries. There is almost no tradition of wine consumption domestically, most people's incomes until very recently have been too low for wine to be a priority, there are very few regions with suitable terroir especially where it is not hot and/or humid, and in numerous Islamic Asian countries their religion frowns on alcohol. It is thus not surprising that the only Asian countries with a significant area of grapevines (of which only a small fraction is used in wine making) are parts of Japan, Korea and China. About 1% of South Korea's small crop area has been devoted to vines over the past two decades, and just 0.4% of Japan's since the 1970s, with little change in either country over those periods. By contrast, the share of crop area under vines in China has been growing rapidly, more than doubling since the turn of the century. Even so, that share in China is still not quite as high as in Japan, which suggests there is scope for substantially more expansion without encroaching very much on land used for food production (bearing in mind also that quality winegrapes grow better on poor slopes than on fertile flat land).³ China has been open to foreign direct investment in vineyards and wineries, and has welcomed flying vigneron consultants. It even seems to have found ways to provide adequate

³ Australia also had only 0.4% of its crop area under vines in 2008. By contrast, shares that year are as high as 4% in France, 6% in Spain and New Zealand, 8% in Italy and 14% in Portugal (Anderson and Nelgen 2011, Table 6). It should be noted that the quality of grape and wine data for China are lower than for the other countries mentioned in this paper, but they are the best the author has been able to assemble.

property rights for investors, notwithstanding the fact that farm land cannot be privately owned in China. Its vineyards are heavily focusing on red varieties (considered by Chinese people to be best for their health), especially ones originating in France.⁴

China's volume of wine production has been growing more than twice as fast as its area under vines. This has been possible not just because the share of domestically grown grapes destined for wine has risen but also because China imports a lot of wine in bulk and blends it with wine made from Chinese grapes. This is legally feasible because national labeling laws are such that a bottle marked 'Product of China' is required to have only 10% local content.

Turning to consumption, there are only five Asian countries plus Hong Kong and Taiwan where per capita grape-based wine consumption has yet to exceed 0.2 litres per year. In each of those countries the level in 2012 was well above that of 2000, but the most dramatic increase has been in China (Figure 1(a)). Since China is also the most populous country, its growth has overwhelmingly dominated Asia's overall increase in wine consumption, which has increased more than six-fold since 2000 (Figure 1(b)). China accounted for barely half of Asia's wine consumption in 2000, but now it accounts for all but one-fifth. Populous India, by contrast, has a wine industry that is less than one-fiftieth the size of China's, notwithstanding its double-digit growth during the past decade.

During the first decade of this century wine doubled its share of Asia's recorded consumption of alcohol, but that brought it to just 3%, or only one-fifth of wine's global share of recorded alcohol consumption. The same handful of Asian countries are the only ones in which wine's share is above the Asian average (Figure 2).

So despite the recent rapid growth in wine consumption in Asia, the potential for further expansion remains enormous, given the current very low level of per capita consumption and share of wine in total alcohol purchases. The rapid aging and educating of the populations in Asia's emerging economies also lends itself to a continuing expansion of demand for wine there. Certainly the new Chinese Government's austerity/anti-corruption drive has been discouraging

⁴ In 2010, 96% of China's winegrape area was planted to red varieties (mostly Cabernet Sauvignon), and the country of origin of 97% of the varieties is France (Anderson 2013, pp. 243 and 635).

consumption of expensive wines and other luxuries since 2014 but, as suggested below, that influence is much less on lower-quality wines – which are by far the most voluminous (Table 1).

No Asian country has yet produced grape-based wine for export in noticeable quantities. As for import dependence, it varied in 2009 from 15% in China (up from 8% in 2000-05) to 68% in Japan, 96% in Korea, and 100% for all other Asian countries (Anderson and Nelgen 2011, Table 54). Thus China's share of Asian wine imports is much less than its share of consumption, especially when expressed in value terms because the unit value of China's imports in 2009 was only half the Asian average. Even so, China together with Hong Kong (which re-exports perhaps one-fifth of its wine imports to China) dominates Asia's aggregate wine imports and their growth (Figure 3).⁵ Not surprisingly, therefore, Australia's exports to those two destinations have grown exponentially this century (Figure 4).

One needs to be careful not to diminish the role that some other Asian countries play as significant importers of high-quality wine though. As can be seen in Figure 3, the shares of those countries in the *value* of world imports far exceed their *volume* shares, reflecting the fact that the average price of their imports is well above that of most other countries. For small producers of super-premium wines, especially in nearby Australia, they are important and profitable markets.

Needless to say, Asian wine imports would be considerably larger if import tariffs and excise taxes on wine were less. In numerous Asian countries they exceed those for beer and spirits on a per-litre-of-alcohol basis (Table 2). The decision by Hong Kong to eliminate its tariff on wine imports in early 2008 is partly why its imports in Figure 3 are so much higher by the end than the beginning of the previous decade, and why Australia's wine exports to Hong Kong grew so rapidly over the past seven years (Figure 4).

Even without any reforms of those taxes, consumption and imports of wine in Asia are destined to rise over the years to come. How much they might rise, and how much domestic wine production might expand to satisfy at least some of that demand increase, is not easy to predict. A recent study nonetheless has focused on projecting the world's wine markets over the next few

⁵ For Google motion charts on the growth of China's wine imports during 1997 to 2011, see Lewis (2013).

years. The next section reports on its findings as they relate to Asia, and how recent policy changes could impact on Australia's wine exports.

Projecting the world's wine markets to 2018

Anderson and Wittwer (2013) have a model of the world's wine markets in which those markets are disaggregated into non-premium (including bulk), commercial-premium, and super-premium wines.⁶ Two types of grapes are specified, premium and non-premium. Non-premium wine uses non-premium grapes exclusively, super-premium wines use premium grapes exclusively, and commercial-premium wines use both types of grapes. The model divides the world into 44 individual nations and 7 composite regions.

The model's database is calibrated initially to 2009, based on the comprehensive volume and value data and trade and excise tax data provided in Anderson and Nelgen (2011, Sections V, VI and VII). It is projected forward in two steps. The first step involves using actual aggregate national consumption and population growth between 2009 and 2011, together with changes in real exchange rates (RERs). The second step assumes aggregate national consumption and population grow from 2011 to 2018 at the rates shown in Appendix Table 1, and that RERs over that period either (a) remain at their 2011 levels or (b) return half-way to their 2009 rates (except for China, whose RER is assumed to continue to slightly appreciate, by 2 percent per year between 2011 and 2018). In each of those steps, a number of additional baseline assumptions are made regarding preferences, technologies, and capital stocks.

Concerning preferences, there is assumed to be a considerable swing towards consumption of all wine types in China, as more Chinese earn middle-class incomes. Since aggregate wine consumption is projected by the major commodity forecasters to rise by 70 percent over that 7-year period, the increase in China's consumption is calibrated to that in the more-likely scenario in which exchange rates revert half-way back from 2011 to 2009 rates. That implies a rise in per capita consumption from 1.0 to 1.6 litres per year. This may be too

⁶ Commercial-premium still wines are defined by Anderson and Nelgen (2011) to be those between US\$2.50 and \$7.50 per litre pre-tax at a country's border or wholesale, with those below \$2.50 called non-premium and those above \$7.50 called super-premium. Sparkling wines are treated as an additional category, but traditionally they have been of very minor importance to Australia's wine exports.

conservative. Per capita wine consumption grew faster than that in several West European wine-importing countries in recent decades, and Vinexpo claims China's consumption was already 1.4 litres by 2012. True, annual per capita wine consumption in Hong Kong is only 3 litres, and Japan's is rarely above 2 litres; but with the number of middle class in China currently around 250 million and growing at 10 million per year (Kharas 2010; Barton, Chen and Jin 2013), and with grape-based wine still accounting for less than 4 percent of alcohol consumption by China's 1.1 billion adults, it is not unreasonable to expect large increases in volumes of wine demanded. However, if China's income growth were to grow slower than the rate assumed in the base case, and if that meant China's RER did not continue to appreciate slightly, wine import growth would be slower. As for the rest of the world, the long trend preference swing away from non-premium wines is assumed to continue.

Both grape and wine industry total factor productivity is assumed to grow at 1 percent per year everywhere, while grape and wine industry capital is assumed to grow net of depreciation at 1.5 percent per year in China but zero elsewhere. This means that China's production rises by about one-sixth, one-quarter and one-third for non-premium, commercial-premium and super-premium wines between 2011 and 2018 – which in aggregate is less than half that needed to keep up with the modeled baseline growth in China's consumption. Of course if China's wine production from domestic winegrapes were to grow faster than the rate assumed in the base scenario, wine imports would increase less.

Given the uncertainty associated with several dimensions of developments in China's wine markets, the more likely of the two main scenarios to 2018 (in which RERs for all but China revert half-way back from 2011 to 2009 rates, called Alternative 1) is compared with a third scenario (called Alternative 2) in which three dimensions are altered: China's aggregate expenditure growth during 2011-18 is reduced by one-quarter (from 7.8 to 5.6 percent per year), its RER does not change from 2011 instead of appreciating at 2 percent per year over that period, and its grape and wine industry capital is assumed to grow at 3 instead of 1.5 percent per year. Each of those three changes ensures a smaller increase in China's wine imports by 2018 in this Alternative 2 scenario. However, this should be considered a lower-bound import projection because, even if China's growth in GDP, industrialization and infrastructure spending were to slow down more than assumed in the Base and Alternative 1 scenarios, Chinese households nonetheless are being encouraged to lower their extraordinarily high savings rates and consume

more of their income. In addition, grape wine is encouraged as an alternative to the dominant alcoholic beverages of (barley-based) beer and (rice-based) spirits because of its perceived health benefits and because it does not undermine food security by diminishing foodgrain supplies.

This global model has supply and demand equations and hence quantities and prices for each of the grape and wine products and for a single composite of all other products in each country. Grapes are assumed to be not traded internationally, but other products are both exported and imported. Each market is assumed to have cleared before any shock, and to find a new market-clearing outcome following any exogenously introduced shock. All prices are expressed in real (2009) terms.

To project global wine markets forward, it is assumed that aggregate national consumption and population grow from 2011 to 2018 at the rates shown in Appendix Table 1 and that preferences, technologies, and capital stocks continue to change as described above, plus that RERs over that period either remain at their 2011 levels (the Base Scenario) or return half-way to their 2009 rates (except for China). The latter RER changes began to happen in mid-2013 and had been achieved by mid-2015, so the Alternative 1 scenario is more likely to be representative of the real world by 2018 than the Base Scenario. The third scenario (Alternative 2) presents a lower-bound projection of what might happen to Chinese wine import demand if China's economy slows by one-quarter, its RER ceases to appreciate, and simultaneously its domestic grape and wine production capital grows twice as fast. *In all three of these scenarios in this section of the paper, new FTAs and China's austerity drive are ignored, but are considered in the following section.*

Table 3(a) suggests China's production of grapes and wine would grow at similar rates in the first two scenarios: by one-sixth for non-premium wine and a bit over one-quarter for premium wines. In the third scenario those rises increase to one-quarter for non-premium wine and to more than one-third for premium wines.

The income, population and preference changes together mean that Asian consumption volumes grow dramatically over the period to 2018 except in Japan where the increase is confined to super-premium wine (Table 4). For China the increase is around two-thirds in the first two scenarios and a little less than one-half in the third (slower growth) scenario, whereas for other emerging Asian countries they increase only one-seventh or one-sixth. Given the vast differences between Asian countries in their 2011 consumption levels though, China dominates

the volume growth globally while Western Europe sees a decline in its consumption which dampens somewhat global consumption growth (Figure 5). The fall in Europe is mainly due to the hefty weight in its consumption of the declining non-premium wine sub-sector – continuing the trend in that region of the past three decades.

When combined with the changes projected in production, it is possible to get a picture of what is projected to happen to wine trade. Table 5 provides projections for the main wine-trading regions. In terms of volumes, world trade expands 6% by 2018 in the base scenario, and 7% in the Alternative 1 scenario in which RERs change. Virtually all of that increase in those two scenarios is due to China's import growth. In the Alternative 2 scenario, in which China imports less, global trade also expands less (by only 4%). In terms of the real value of global trade, however, the upgrading of demand elsewhere means that China accounts for smaller fractions of the growth in the global import value, namely 36%, 43%, and 30% in the Base, Alternative 1 and Alternative 2 scenarios, respectively. In all three scenarios China dominates Asian import growth, and the value of global wine trade rises by about one-sixth (last row of Table 5).

It is not surprising that China is such a dominant force in these projections, given the dramatic growth in its wine consumption over the past dozen years (Figure 1), the expectation of continued high growth in its income over the next five years (albeit somewhat slower than in the past five years), and the assumption that China's winegrape production growth cannot keep pace with domestic demand growth. As a result, China's share of consumption supplied domestically falls from its 2009 level of 85% to 57%, 54% and 67% in 2018 in the Base, Alternative 1 and Alternative 2 scenarios for 2018, respectively.

France is projected to remain dominant in imports by China, but in the more-likely Alternative 1 scenario with a part-reversal of recent exchange rate movements, the increase in China's imports from Australia is slightly greater than that from France in value terms and each of the other exporters' shares are less than one-third those of Australia and France in value terms (Figure 6).

Projected bilateral trade changes for Australia and Chile are summarized in Table 6 for the most-likely Alternative 1 scenario. They benefit greatly from China's burgeoning demands. In volume terms that is slightly at the expense of growth in their exports to other regions, although not in value terms because of the modeled upgrading of quality in those other markets. Projected growth in real export values in local currency terms is even larger than in the US\$ terms shown in

Table 6 due to the modeled real depreciation of the currencies of those two countries. For example, Australia's export value growth of US\$987 million converts to an Australian dollar increase of AUD1440 million. Australia's projected volume growth in this scenario is an extra 21ML of wine per year being exported to China during 2011 to 2018. That should be manageable, as it is the same rate of increase in Australia's sales to the United States during the first decade of this century.

Impacts on projections of recent policy developments: China's FTAs and austerity

The above results have not taken into account the signing of bilateral free-trade agreements (FTAs) with China, nor the austerity/anti-corruption drive that began in 2013 and has impacted heavily on official banqueting and expensive gift-giving.

The pertinent FTAs involve the gradual lowering of tariffs on China's wine imports from wine-exporting countries. The general tariffs in 2008 were 14% on sparkling and still bottled wine and 20% on bulk wine. They have since been phased down to zero by 2012 for New Zealand and will be zero by 2016 for Chile. They will also be zero for Australia by 2016 for bottled wine and by 2018 for bulk wine.

To model the impact of those FTAs, we do so in two steps, starting with the Alternative 1 scenario from the previous section. In the first step we send to zero by 2018 the China tariffs on wine from Chile and New Zealand, they being the earlier FTAs (signed in 2006 and 2008, respectively). In the second step we then also phase out tariffs on China's wine imports from Australia, it being the most-recent country to sign a bilateral FTA with China (in 2015).

Tables 3(b) and 7 reveal that these FTAs will have almost no discernible impacts on grape and wine production or on wine consumption in China, especially compared with the changes between 2011 and 2018 expected from the Alternative 1 projections shown in the first column of those tables.

The FTAs' impacts on international trade in wine are somewhat more significant, but still not large. Table 8(b) suggests that Chile and New Zealand have been gaining market share in China (especially in volume terms for Chile), partly at Australia's expense; but with the signing

of the Australia-China FTA those trade gains for Chile and New Zealand are to be somewhat reduced while Australia's export gain will more than offset the reduction it otherwise would have suffered from those two earlier-signed FTAs. From China's viewpoint it benefits more in volume than value of wine imports from the earlier two FTA's, in contrast to adding the FTA with Australia which boosts value much more than volume of its wine imports.

The impact of the three FTAs on bilateral trade patterns is summarized in Table 9. China's imports from its new FTA partners in the Southern Hemisphere will grow at the expense of its imports from the United States and Europe, and those FTA partners' wine exports to countries other than China will shrink – although by less than the increase in their exports to China. That is, global trade creation outweighs trade diversion from these FTAs in the case of wine, according to these results, as also confirmed in the bottom rows of Tables 8(a) and 8(b).

The other policy development of significance to wine is China's austerity drive. That is simulated with a leftward shift in China's domestic demand for super-premium wines sufficient to reduce the projected expansion during 2011-18 in those quality wines by 9.2% (see Table 7). That has very little impact on China's grape and wine production (last column of Table 3), and only a minor influence on the overall *volume* of wine imports by China. However, the austerity drive's impact on the *value* of China's wine imports and of France and Australia's wine exports to China is non-trivial, because the drive is depressing the prices of super-premium wines. As a result, the estimated value of China's imports will be \$80 million less in 2018, with Australia and France bearing most of that fall: their exports are lower by about 2%, or \$19 million and \$46 million, respectively (Table 10).

Summary and implications

China has already become by far the most important wine-consuming country in Asia, and the above projections point to the enormous speed with which China may become an even more dominant market for wine exporters, with a projected extra 620-940 ML to be added by 2018 to its consumption of 1630 ML in 2011. Since China's domestic production is projected to increase by 'only' about 210-290 ML by 2018, its net imports are projected to rise by between 330 and

740 ML – or 50ML more once the full impact of the three FTAs with Southern Hemisphere countries are felt. Certainly the recent austerity drive is going to dampen the growth in super-premium and iconic wine sales in China, but because those quality wines are still only a small share of the total sales volume the drive's impact on China's aggregate wine consumption and imports is very minor.

While the recent and projected rates of increase in per capita wine consumption in China are no faster than what occurred in several northwestern European countries in earlier decades, it is the sheer size of China's adult population of 1.1 billion – and the fact that grape wine still accounts for less than 4 percent of Chinese alcohol consumption – that makes this import growth opportunity unprecedented. It would be somewhat less if China's own winegrape production increases faster, as in the Alternative 2 scenario above, but certainly in as short a period as the next five years that is unlikely to be able to reduce the growth in China's wine imports very much, especially at the super-premium end of the spectrum and notwithstanding that country's recent austerity drive.

Of course these projections are not predictions. Where exchange rates move, and how fast various countries' wine producers take advantage of the projected market growth opportunities in Asia, will be key determinants of the actual changes in market shares over the coming years. Not all segments of the industry are projected to benefit, with non-premium producers in Australia and elsewhere facing falling prices if demand for their product continues to dwindle as projected above. But Australia's exporting firms willing to invest sufficiently in building relationships with their Chinese importer/distributor – or in grapegrowing or winemaking as joint venturers within China – may well enjoy long-term benefits from such investments, and more so because of ChAFTA.

References

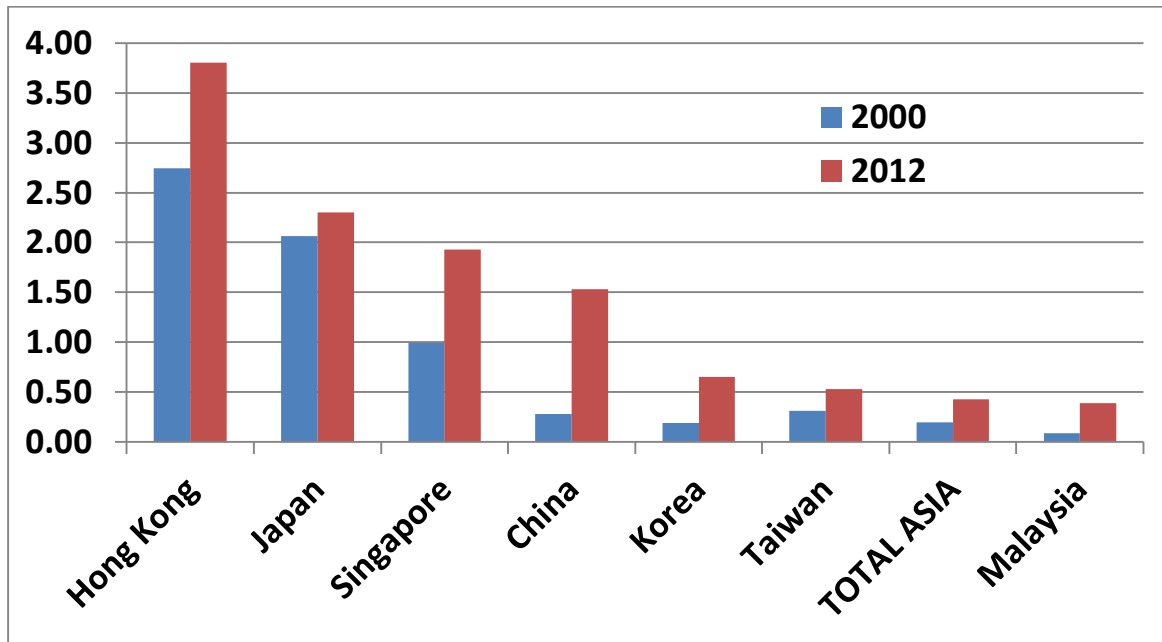
- Aizenman, J. and B. Brooks (2008), 'Globalization and Taste Convergence: the Cases of Wine and Beer', *Review of International Economics* 16(2): 217-33.
- Anderson, K. (2010), 'Excise and Import Taxes on Wine vs Beer and Spirits: An International Comparison', *Economic Papers* 29(2): 215-28, June.

- Anderson, K. (2013), *Which Winegrape Varieties are Grown Where? A Global Empirical Picture*, Adelaide: University of Adelaide Press.
- Anderson, K. and S. Nelgen (2011), *Global Wine Markets, 1961 to 2009: A Statistical Compendium*, Adelaide: University of Adelaide Press. Freely accessible as an e-book at www.adelaide.edu.au/press/titles/global-wine and as Excel files at www.adelaide.edu.au/wine-econ/databases/GWM
- Anderson, K. and B. Smith (1981), “Changing Economic Relations Between Asian ADCs and Resource-Exporting Developed Countries”, in *Trade and Growth in the Advanced Developing Countries*, edited by W. Hong and L. Krause, Seoul: Korea Development Institute Press.
- Anderson, K. and A. Strutt (2012), ‘The Changing Geography of World Trade: Projections to 2030’, *Journal of Asian Economics* 23(4): 303-23, August.
- Anderson, K. and G. Wittwer (2013), ‘Modeling Global Wine Markets to 2018: Exchange Rates, Taste Changes, and China’s Import Growth’ *Journal of Wine Economics* 8(2): 131-58.
- Anderson, K. and G. Wittwer (2015), ‘Asia’s Evolving Role in Global Wine Markets’, *China Economic Review* 35: 1-14, September.
- Ashenfelter, O. and K. Storchmann (2014), ‘Wine and Climate Change’, AAWE Working Paper No. 152, March. www.wine-economics.org
- Barton, D., Y. Chen and A. Jin (2013), ‘Mapping China’s Middle Class’, *McKinsey Quarterly*, June. www.mckinsey.com/insights/consumer_and_retail/mapping_chinas_middle_class
- Corden, W.M. (1984), “Booming Sector and Dutch Disease Economics: Survey and Consolidation”, *Oxford Economic Papers* 36(3): 359-80, November.
- Fajgelbaum, P., G.M. Grossman and E. Helpman (2011), ‘Income Distribution, Product Quality and International Trade’, *Journal of Political Economy* 119(4): 721-65, August.
- Findlay, C.F., R. Farrell, C. Chen and D. Wang (2004), ‘East Asia’, Ch. 15 in Anderson, K. (ed.), *The World’s Wine Markets: Globalization at Work*, Cheltenham UK: Edward Elgar.
- Freebairn, J. (2015), ‘Mining Booms and the Exchange Rate’, *Australian Journal of Agricultural and Resource Economics* 59 (forthcoming).
- Garnaut, R. (2014), ‘Australia and Resources in the Asian Century’, *Australian Journal of Agricultural and Resource Economics* 58(3): 301-13, July.

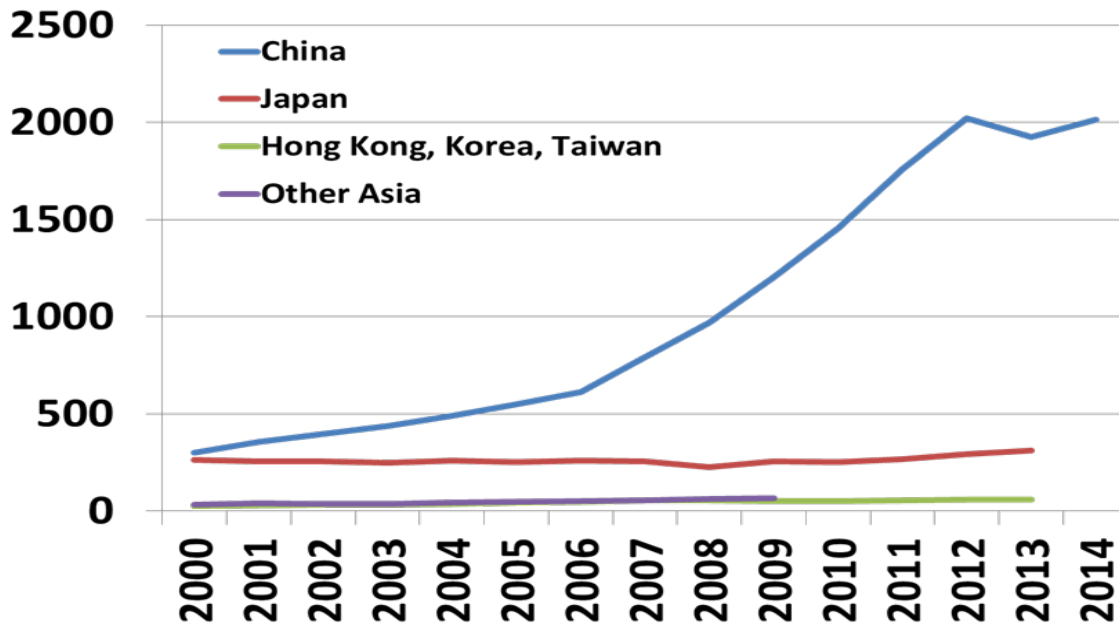
- Giuliana, E., A. Morrison and R. Rabellotti (eds.) (2011), *Innovation and Technological Catch-up: The Changing Geography of Wine Production*, Cheltenham UK: Edward Elgar.
- Gladstones, J. (1992), *Viticulture and Environment*, Adelaide: Winetitles.
- Hayami, Y. and V.W. Ruttan (1985), *Agricultural Development: An International Perspective*, Baltimore MD: Johns Hopkins University Press.
- Huang, H.T. (2000), *Biology and Biological Technology, Part 5: Fermentations and Food Science*, Volume 6 in the series of books on Science and Civilization in China, Cambridge and New York: Cambridge University Press.
- Kharas, H. (2010), 'The Emerging Middle Class in Developing Countries', Working Paper 285, OECD Development Centre, Paris, January.
- Krueger, A.O. (1977), *Growth, Distortions and Patterns of Trade Among Many Countries*, Princeton, NJ: International Finance Section.
- Leamer, E.E. (1987), "Paths of Development in the Three-Factor, n-Good General Equilibrium Model", *Journal of Political Economy* 95(5): 961-99.
- Lewis, G. (2013), 'Winners and Losers in the Global Wine Industry', Google motion charts at <http://23inhouse.com/wine-data/charts.html>.
- McGovern, P. (2003), *Ancient Wine: The Search for the Origins of Viticulture*, Princeton NJ: Princeton University Press.
- McGovern, P. (2009), *Uncorking the Past: The Quest for Wine, Beer, and Other Alcoholic Beverages*, Berkeley CA: University of California Press.
- OIV (2015), *World Vitiviniculture Situation 2015*, Paris: Organisation Internationale de la Vigne et du Vin, July.
- Stigler, G.J. and G.S. Becker (1977), 'De Gustibus Non Est Disputandum', *American Economic Review* 67(2): 76-90, March.
- Venables, A.J. (2004), 'Small, Remote and Poor', *World Trade Review* 3(3): 453-57, November.
- Williams, A. (1995), *Flying Winemakers: The New World of Wine*, Adelaide: Winetitles.

Figure 1: Per capita^a and total consumption of grape wine in Asia, 2000 to 2014

(a) Per capita consumption (litres)



(b) Total wine consumption (ML)

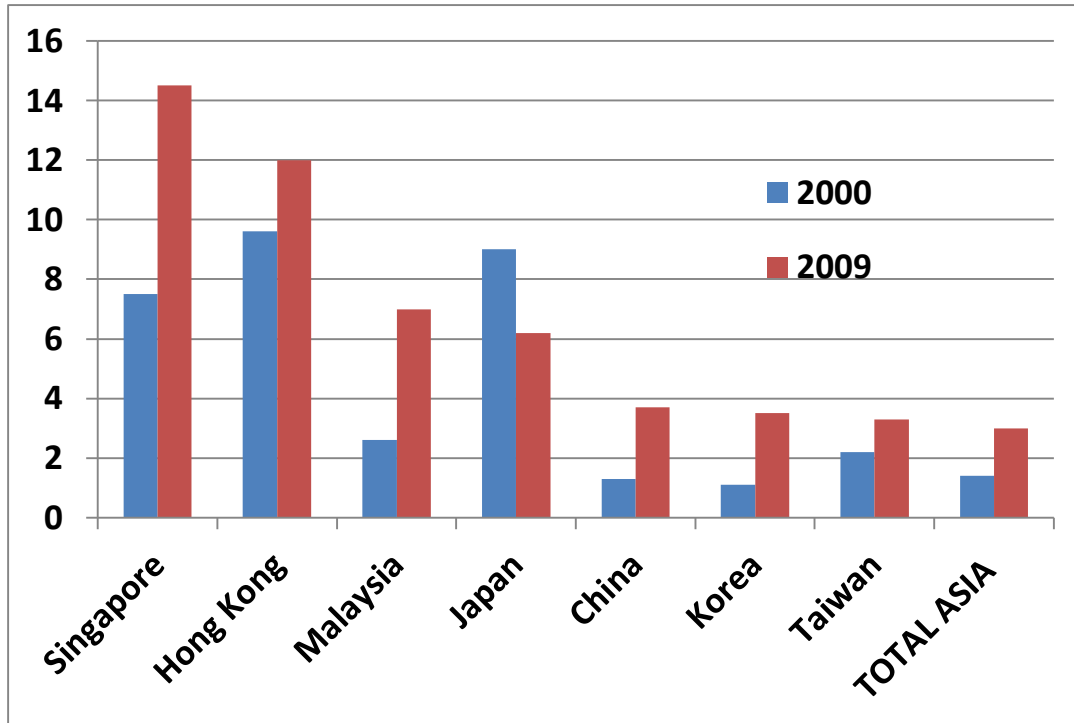


^a All other Asian countries consume less than 0.2 litres per capita per year

Source: Updated from Anderson and Nelgen (2011) using Euromonitor International

Figure 2: Wine's share of total alcohol consumption in Asia,^a 2000 and 2009

(percent)

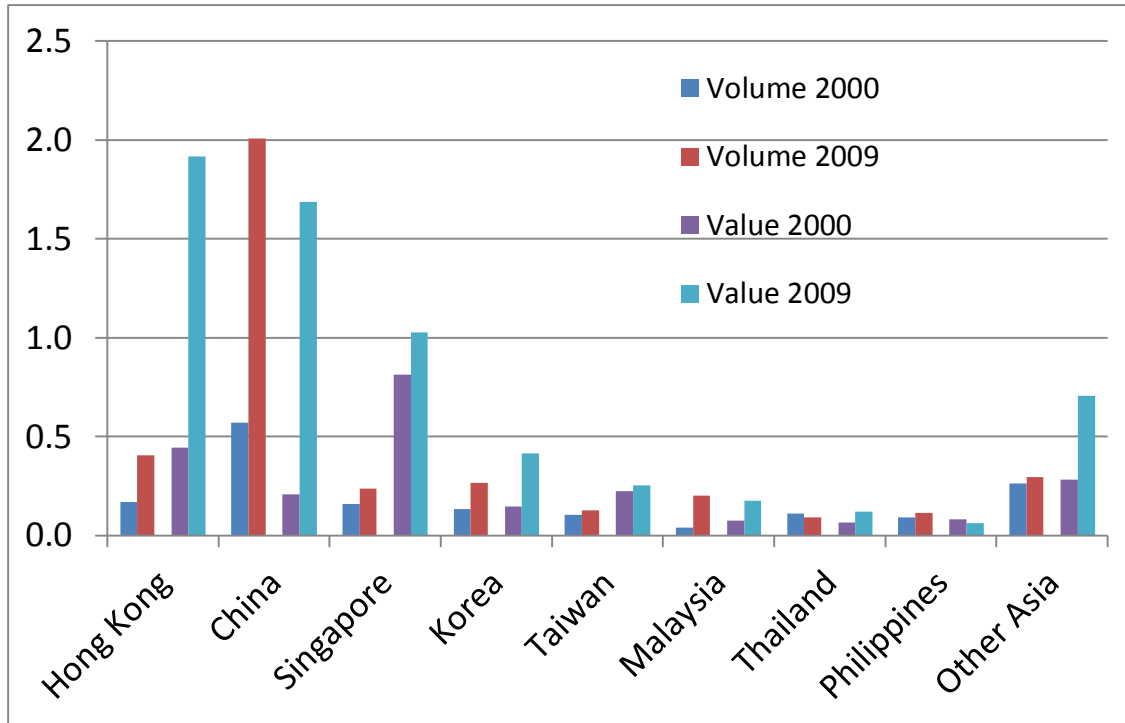


^a For all other Asian countries wine's share of alcohol consumption is less than 3%

Source: Anderson and Nelgen (2011)

Figure 3: Shares in the volume and value of global wine imports, developing Asia, 2009

(%)



^a Japan's volume (value) shares are 5.8% (5.3%) in 2000 and 3.9% (2.1%) in 2009

Source: Anderson and Nelgen (2011)

Figure 4: Value of Australia's wine exports to China and Hong Kong, 2001 to 2015

(AUD million)

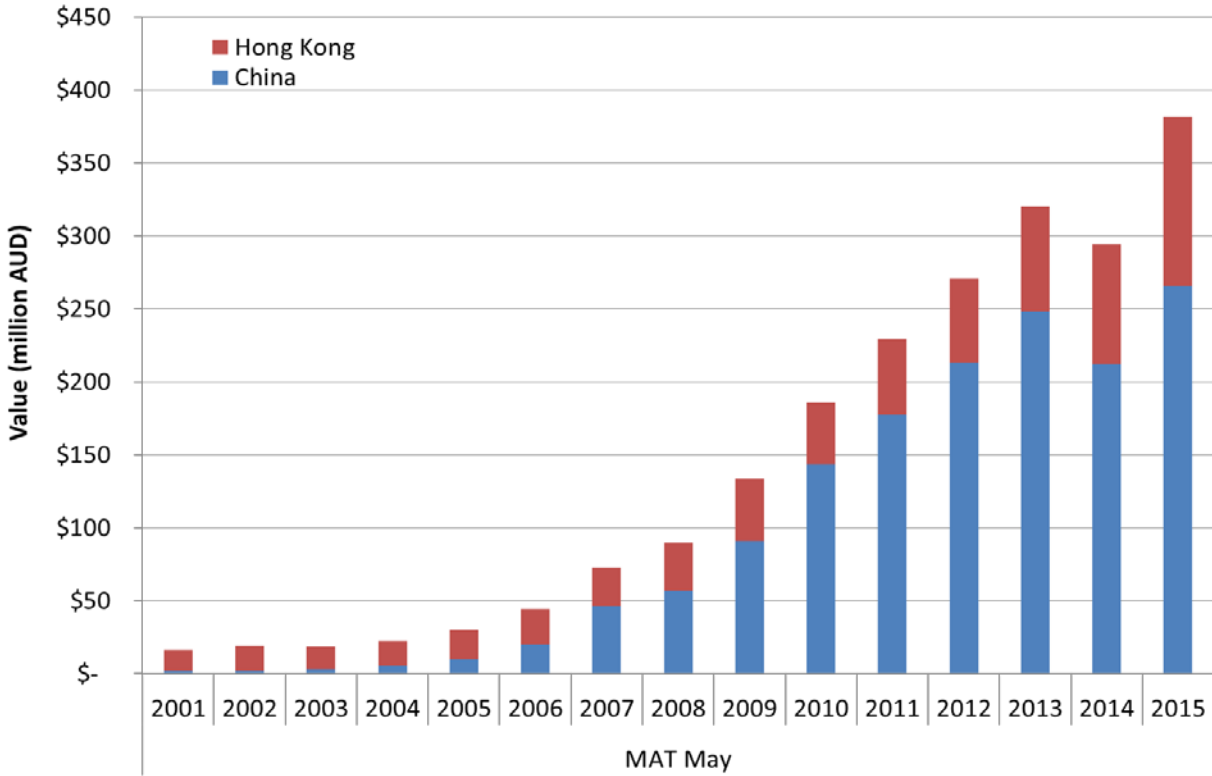
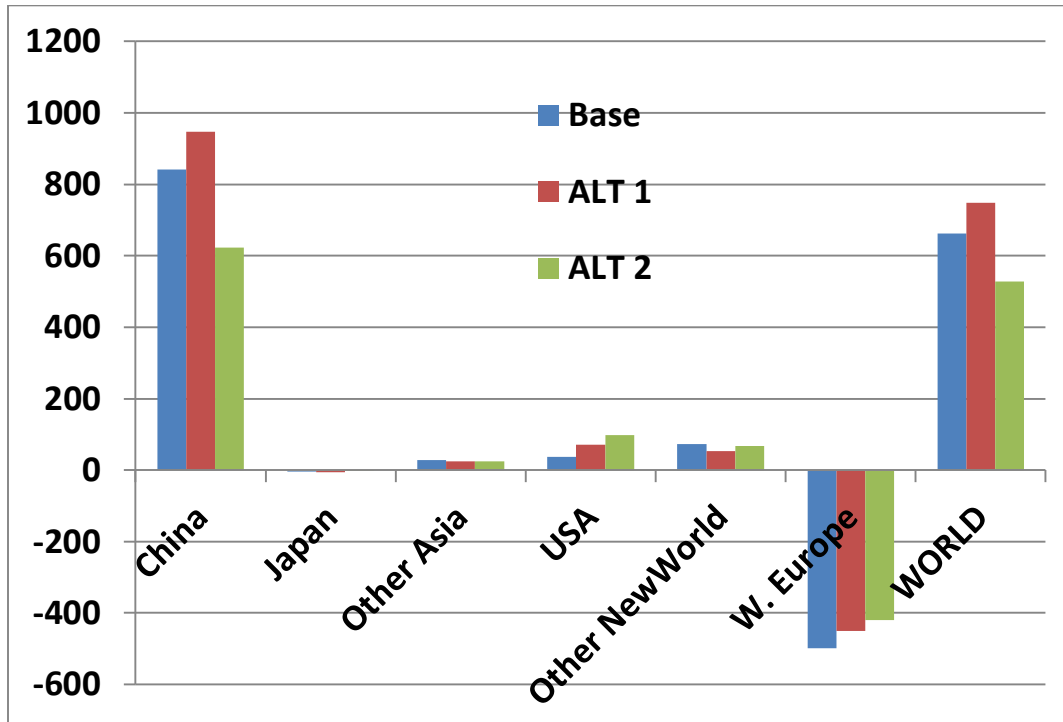
Source: Wine Australia (see its Winefacts website at www.agwa.net.au)

Figure 5: Projected changes in consumption of all wines, 2011-2018^a

(ML)

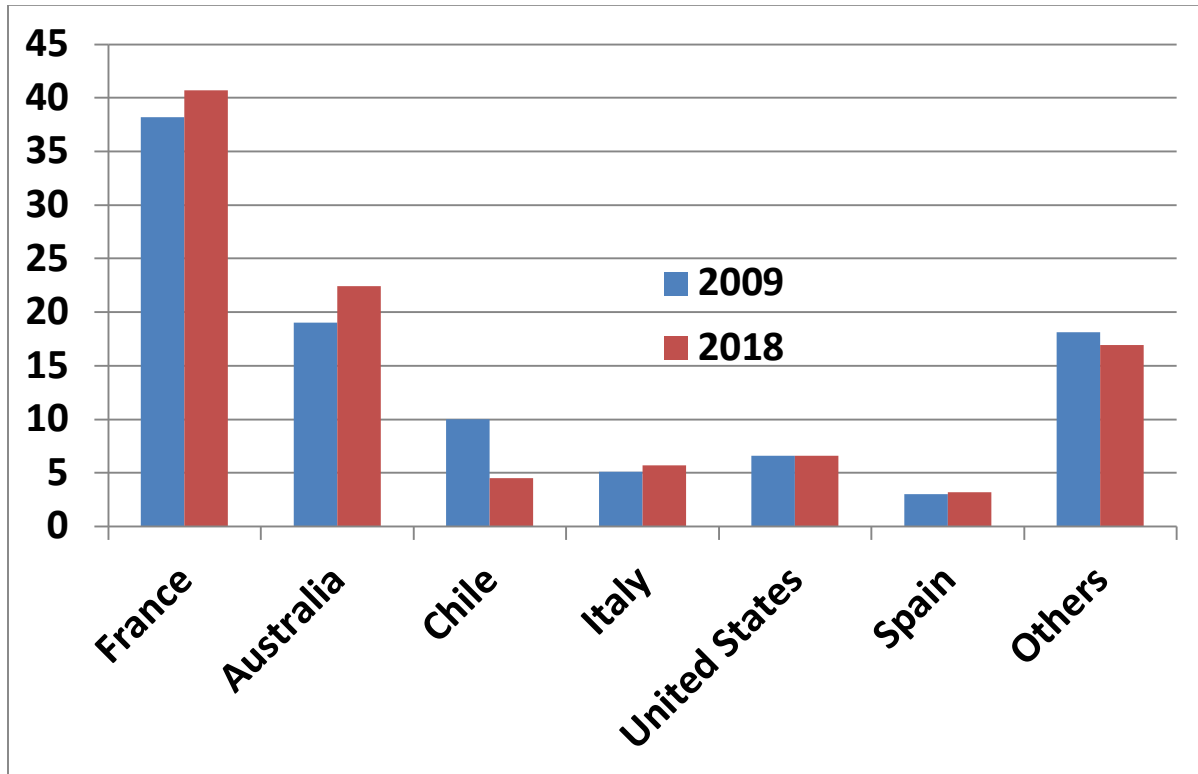


^a 'Base' refers to the simulation assuming there are no changes in real exchange rates between 2011 and 2018; 'Alt. 1' assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa; and 'Alt. 2' assumes China's RER does not change from 2011, and its aggregate expenditure grows one-quarter less while its grape and wine capital grow twice as fast as in 'Alt. 1'.

Source: Anderson and Wittwer (2013)

Figure 6: Shares of China's wine import value, by source, 2009 and projected 2018^a

(percent)



^a 'Base 2018' refers to the simulation assuming there are no changes in real exchange rates between 2011 and 2018; 'Alt. 1' assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa; and 'Alt. 2' assumes China's RER does not change from 2011, and its aggregate expenditure grows one-quarter less while its grape and wine capital grow twice as fast as in 'Alt. 1'.

Source: Anderson and Wittwer (2013)

Table 1: China's wine production, consumption and trade, by quality categories, 2009
(ML)

	Production	Imports	Consumption	<i>Self-sufficiency</i> (%)
Non-premium	600	80	680	88
Commercial premium	344	86	430	80
Super premium	18	7	25	72
TOTAL	962	173	1135	85

Source: Anderson and Nelgen (2011, Section VI).

Table 2: Ad valorem consumer tax equivalent^a of excise plus import taxes on alcoholic beverages, 2008.
(%)

	Non-premium wine (A\$2.50/litre)	Commercial premium wine (A\$7.50/litre)	Super premium wine (A\$20/litre)	Beer (A\$2 /litre)	Spirits (A\$15 /litre)
China	32	25	25	18	21
Japan	32	11	4	0	12
Hong Kong	0	0	0	0	100
India	165	155	152	100	151
Korea	46	46	46	124	114
Philippines	22	12	9	10	35
Taiwan	23	14	12	2	23
Thailand	232	117	81	51	52
Vietnam	88	88	88	96	115

^a At the prices shown in the column headings (expressed in Australian dollars), excluding VAT/GST.
Vietnam rates refer to 2012

Source: Anderson (2010), expanded to include China and Vietnam.

Table 3: Projected grape and wine output volume changes for China, 2011 to 2018^a

(a) Core scenarios to 2018

(%)

	BASE	ALT 1	ALT 2
Non-premium wine	18	17	24
Commercial-premium wine	26	25	35
Super-premium wine	29	29	39
Premium grapes	20	20	31
Non-premium grapes	18	17	27

(b) Policy change scenarios: impacts relative to ALT 1 in 2018

	ALT 1	FTAs with NZ and Chile (% from ALT 1 base)	FTA with Australia (% from NZ+Chile FTAs scenario)	Austerity scenario (% from 3 FTAs scenario)
Non-premium wine	17.1	-0.1	-0.1	0.1
Commercial-premium wine	25.1	-0.1	-0.1	0.1
Super-premium wine	28.8	0.0	-0.1	-0.1
Premium grapes	19.9	0.0	-0.1	0.0
Non-premium grapes	17.4	0.0	-0.1	0.0

^a ‘Base’ refers to the simulation assuming there are no changes in real exchange rates between 2011 and 2018; ‘Alt. 1’ assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China’s which appreciates 2%pa; and ‘Alt. 2’ assumes China’s RER does not change from 2011, and its aggregate expenditure grows one-quarter less while its grape and wine capital grow twice as fast as in ‘Alt. 1’. ‘FTA’ refers to removing the tariffs on China’s wine imports from the country(-ies) mentioned with whom it has signed a bilateral Free Trade Agreement. The ‘Austerity’ simulation assumes China’s demand for super-premium wines expands by one-eleventh less than in the simulation involving the 3 FTAs.

Source: Anderson and Wittwer (2015)

Table 4: Projected changes in quantities of wine consumed in Asia, 2011 to 2018

(%)

(a) **Base scenario** (assuming no RER changes from 2011)

	CHINA	JAPAN	OTHER ASIA
Non-premium wines	29	-14	0
Commercial-premium wines	87	-3	10
Super-premium wines	87	9	27
All wines	62	-1	17

(b) **Alternative 1** (assuming RERs return half-way from 2011 to 2009 rates)

	CHINA	JAPAN	OTHER ASIA
Non-premium wines	31	-14	1
Commercial-premium wines	95	-4	9
Super-premium wines	100	9	27
All wines	70	-2	16

(c) **Alternative 2** (assuming also slower Chinese import growth)

	CHINA	JAPAN	OTHER ASIA
Non-premium wines	26	-14	-1
Commercial-premium wines	73	-3	10
Super-premium wines	69	9	25
All wines	46	-1	14

Source: Anderson and Wittwer (2013)

Table 5: Projected change in global wine import and export volumes and values, 2011 to 2018^a.

(a) Imports

	Volume (ML)			Value (US\$m)		
	Base	Alt. 1	Alt. 2	Base	Alt. 1	Alt. 2
China	627	739	334	1948	2309	1178
Japan	-10	-13	-10	262	235	230
Other Asia	30	24	26	615	520	539
United Kingdom	-54	-36	-29	98	179	93
North America	-23	11	37	961	1106	1015
Other Europe	-122	-176	-140	1012	740	552
Other	152	151	141	498	259	318
WORLD	600	700	359	5394	5548	3925

(b) Exports

	Volume (ML)			Value (US\$m)		
	Base	Alt. 1	Alt. 2	Base	Alt. 1	Alt. 2
Australia	0	92	59	336	987	675
Other New World	78	222	75	469	965	597
Old World	521	387	224	4370	3537	2653
WORLD	600	702	359	5394	5602	3925
	(6%)	(7%)	(4%)	(17%)	(17%)	(15%)

^a 'Base' refers to the simulation assuming there are no changes in real exchange rates between 2011 and 2018; 'Alt. 1' assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa; and 'Alt. 2' assumes China's RER does not change from 2011, and its aggregate expenditure grows one-quarter less while its grape and wine capital grow twice as fast as in 'Alt. 1'.

Source: Anderson and Wittwer (2013)

Table 6: Changes in export volumes and values of Australia and Chile in the Alternative 1 scenario, 2011 to 2018.^b

(a) Volumes (ML)

<i>Exporter:</i>	Australia	Chile
<i>Importer:</i>		
United Kingdom	-24	-10
United States	-15	-9
Canada	-3	-3
New Zealand	-2	0
Germany	-2	-7
Other W. Europe ^a	-9	-18
China	150	194
Japan	-1	-2
Other Asia	0	1
Other countries	-2	1
WORLD	92	147

(b) Values (US\$m)

<i>Exporter:</i>	Australia	Chile
<i>Importer:</i>		
United Kingdom	50	1
United States	114	22
Canada	38	6
New Zealand	9	0
Germany	0	-4
Other W. Europe ^a	33	-2
China	662	237
Japan	6	4
Other Asia	51	8
Other countries	24	43
WORLD	987	325

^a Other W. Europe = Belgium, Denmark, Finland, Ireland, the Netherlands, Sweden and Switzerland

^b The 'Alternative 1' scenario assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa.

Source: Anderson and Wittwer (2013)

Table 7: Policy-induced wine consumption volume changes for China, 2018^a

(%)

	ALT 1 (% change from 2011)	FTAs with NZ and Chile (% from ALT 1 base)	+FTA with Australia (% from NZ+Chile FTAs scenario)	Austerity scenario (% from 3 FTAs scenario)
Non-premium wine	31	0.2	0.2	0.0
Commercial-premium wine	95	0.3	0.5	0.0
Super-premium wine	100	0.3	0.9	-9.2
ALL WINES	70	0.3	0.4	-0.2

^a 'Alt. 1' assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa. 'FTA' refers to removing the tariffs on China's wine imports from the country(-ies) mentioned with whom it has signed a bilateral Free Trade Agreement. The 'Austerity' simulation assumes China's demand for super-premium wines expands by one-eleventh less than in the simulation involving the 3 FTAs.

Source: Anderson and Wittwer (2015)

Table 8: Policy-induced changes in global wine import and export volumes and values, 2018

(a) Imports

	Volume (ML)			Value (US\$m)		
	ALT 1 (ML change from 2011)	FTAs with NZ and Chile (ML from ALT 1 base)	+FTA with Australia (ML from NZ+Chile FTAs scenario)	ALT 1 (\$m change from 2011)	FTAs with NZ and Chile (\$m from ALT 1 base)	+FTA with Australia (\$m from NZ+Chile FTAs scenario)
China	739	52	4	2309	34	86
Japan	-13	0	0	235	0	0
Other Asia	24	0	0	520	0	1
United Kingdom	-36	-1	-2	179	3	7
North America	11	-5	-9	1106	0	0
Other Europe	-176	-1	-1	740	4	1
Other	153	0	0	313	0	0
WORLD	702	43	-6	5602	43	104

(b) Exports

	Volume (ML)			Value (US\$m)		
	ALT 1 (ML change from 2011)	FTAs with NZ and Chile (ML from ALT 1 base)	+FTA with Australia (ML from NZ+Chile FTAs scenario)	ALT 1 (\$m change from 2011)	FTAs with NZ and Chile (\$m from ALT 1 base)	+FTA with Australia (\$m from NZ+Chile FTAs scenario)
Australia	92	-1	10	987	-11	135
Other New World	222	44	-11	965	60	-18
Old World	387	0	-5	3537	-5	-12
WORLD	702	43	-6	5602	43	104

^a 'Alt. 1' assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa. 'FTA' refers to removing the tariffs on China's wine imports from the country(-ies) mentioned with whom it has signed a bilateral Free Trade Agreement.

Source: Anderson and Wittwer (2015)

Table 9: Marginal impact of three FTAs on changes in export volumes and values of wine-exporting countries in the Alternative 1 scenario, 2011 to 2018^b

(a) Volumes (ML)

<i>Importer:</i>	<i>Exporter:</i> Australia	Other Southern Hemisphere	United States	Western European exporters
United Kingdom	-10	-2	1	7
United States	-13	-5	0	3
Canada	-2	-1	1	2
New Zealand	-1	0	0	0
Germany	-1	-2	0	1
Other W. Europe ^a	-4	-3	0	5
China	42	54	-6	-30
Japan	0	-1	0	1
Other Asia	-1	0	0	1
Other countries	-1	-4	1	3
WORLD	9	36	-3	-7

(b) Values (US\$m)

<i>Importer:</i>	<i>Exporter:</i> Australia	Other Southern Hemisphere	United States	Western European exporters
United Kingdom	-15	-1	2	22
United States	-23	-5	0	23
Canada	-5	-1	2	6
New Zealand	-1	0	0	1
Germany	-1	-1	0	3
Other W. Europe ^a	-7	-5	1	13
China	187	76	-23	-104
Japan	-2	-1	0	2
Other Asia	-7	-2	1	6
Other countries	-2	-2	1	11
WORLD	125	58	-16	-17

^a Other W. Europe = Belgium, Denmark, Finland, Ireland, the Netherlands, Sweden and Switzerland

^b The 'Alternative 1' scenario assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa.

Source: Anderson and Wittwer (2015)

Table 10: Impact of China's austerity drive on global wine import and export volumes and values, 2018^a.

(a) Imports

	Volume (ML)		Value (US\$m)	
	ALT 1 (ML change from 2011)	Austerity scenario (ML from ALT 1 base)	ALT 1 (\$m change from 2011)	Austerity scenario (\$m from ALT 1 base)
China	739	-3	2309	-80
Other Asia	11	1	755	-6
UK + Other Europe	-212	0	919	-3
North America	11	1	1106	2
Other	151	0	313	0
WORLD	702	-1	5602	-87

(b) Exports

	Volume (ML)		Value (US\$m)	
	ALT 1 (ML change from 2011)	Austerity scenario (ML from ALT 1 base)	ALT 1 (\$m change from 2011)	Austerity scenario (\$m from ALT 1 base)
Australia	92	0	987	-19
Other New World	222	0	965	-10
France	185	-1	2657	-46
Other Old World	202	0	880	-12
WORLD	702	-1	5602	-87

^a 'Alt. 1' assumes real exchange rates revert half way back from 2011 to 2009 rates by 2018 except for China's which appreciates 2%pa. The 'Austerity' simulation assumes China's demand for super-premium wines expands by one-eleventh less than in the simulation involving the 3 FTAs.

Source: Anderson and Wittwer (2015)

Appendix Table 1: Cumulative consumption and population growth, 2011 to 2018

(percent)					
	Aggregate consumption	Population		Aggregate consumption	Population
France	10.0	0.7	Australia	17.8	7.3
Italy	10.0	0.7	NewZealand	15.4	5.9
Portugal	10.0	0.7	Canada	14.2	5.6
Spain	10.0	0.7	United States	15.5	5.2
Austria	10.0	0.7	Argentina	30.0	4.9
Belgium	10.0	0.7	Brazil	27.3	3.8
Denmark	10.0	0.7	Chile	23.4	5.0
Finland	10.0	0.7	Mexico	22.0	4.6
Germany	10.0	0.7	Uruguay	25.6	7.3
Greece	10.0	0.7	Other L. Am	25.6	7.3
Ireland	10.0	0.7	South Africa	23.1	3.0
Netherlands	10.0	0.7	Turkey	31.8	9.1
Sweden	10.0	0.7	North Africa	31.8	9.1
Switzerland	10.0	0.7	Other Africa	55.8	15.1
United Kingdom	10.0	0.7	Middle East	31.8	9.1
Other W. Europe	10.0	0.7	China	69.0	2.7
Bulgaria	23.1	1.9	Hong Kong	23.7	4.7
Croatia	23.1	1.9	India	63.1	7.0
Georgia	23.1	1.9	Japan	7.1	-1.3
Hungary	23.1	1.9	Korea	22.0	0.7
Moldova	23.1	1.9	Malaysia	34.4	8.2
Romania	23.1	1.9	Philippines	34.4	9.8
Russia	20.6	-1.7	Singapore	18.6	5.6
Ukraine	23.1	1.9	Taiwan	34.6	2.3
Other E. Europe	23.1	1.9	Thailand	36.0	2.6
			Other Asia	32.2	11.2

Source: Projections from global economy-wide modeling by Anderson and Strutt (2012).