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Wine Economics Research Centre

# Working Papers

Working Paper No. 0517

## How Much Wine is Really Produced and Consumed in China, Hong Kong and Japan?

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Revised March 2018

# How much wine is *really* produced and consumed in China, Hong Kong and Japan?\*

Kym Anderson<sup>a</sup> and Kimie Harada<sup>b</sup>

## Abstract

Statistics on the wine market in countries where it is not traditionally produced or consumed are estimates using simple methods. In northeast Asia those statistics are exaggerated for a combination of several reasons. One is a labelling issue: imported bulk wine is able to be added to domestically produced wine without the front label having to declare the bottle may contain foreign product. Similar freedom applies to wine made from imported grape juice concentrate. A second (particularly in China) is a double-counting issue: domestic wine produced in one region of the country may be blended with wine produced in and packaged for final sale from another region, with both regions claiming it as their contribution to national wine output. A third possibility is a smuggling issue: some wine imports are unrecorded. These possibilities of the wine market being exaggerated are significant for firms seeking to sell in such countries, especially in the fast-growing ones of northeast Asia. This paper shows the extent to which estimates for the region could change for such indicators as per capita wine consumption, wine self-sufficiency and the region's share of global wine consumption, when alternative assumptions are made in response to these issues. (JEL classifications: F14, L66, Q13, Y10)

**Keywords:** Apparent wine consumption; blending imported bulk wine and local wine; wine from imported grape juice concentrate; wine smuggling

\*The authors gratefully acknowledge helpful comments from Professor Huiqin Ma of China Agricultural University in Beijing, from anonymous referees, and from participants in a seminar at Kyoto University and a session of the AARES Annual Conference (Adelaide, 7-9 February 2018).

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## I. Introduction

Statistics on the grape wine market in countries where such wine is not traditionally produced or consumed are often weak or non-existent. If domestic production is insignificant, consumption is usually assumed to be equal to imports less any re-exports (plus net changes in stocks if such data area available). Where there is enough domestic production for wine output statistics to be collected, however, there is a risk those statistics are exaggerated, for two possible reasons. One is if imported bulk wine or wine made from imported concentrated grape juice is able to be added to domestically produced wine without having to declare on the bottle's front label that the product in the bottle is of mixed or foreign origin (a labelling issue). The other (particularly in China) is a double-counting issue. It can occur when domestic wine produced in one region of the country is blended with wine produced in and packaged for final sale from another region: if both regions report that inter-regionally traded wine as a product of their region, there will be a degree of double counting in the national wine output data. When domestic production is so exaggerated, and domestic consumption is assumed (most obviously by analysts outside the country who are handicapped by a language barrier) to be domestic production plus net imports, then consumption also is overstated for that country.

It is also possible that apparent consumption estimates will be inaccurate to the extent that wine exports or imports are unrecorded when transported from one customs territory to another. This smuggling issue is more likely to occur, the greater the difference between those territories' wine taxes.

A further confusion can arise if rice 'wine' consumption data are added to the data for grape wine consumption, as Euromonitor International does in its wine industry reports. Rice 'wine' is made in numerous Asian countries but each under a different name (sake in Japan, miji in China, cheongju in Korea, ...). Typically it is at least 15% alcohol, is brewed differently than beer, and looks and is drunk like a clear spirit. If it is not to be put in a separate category, then for the purpose of analysing grape wine markets it could be included in the spirits category. In the rest of this paper the term 'wine' refers just to that made from fresh grapes or grape juice concentrate.<sup>1</sup>

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<sup>1</sup> In the Harmonized System of the United Nations (2018), grape-based wines are classified in trade statistics as HS 2204 ("Wines of fresh grapes, including fortified wines, and grape must"). Grape juice concentrate is part of

The possibility of wine production and/or consumption ‘data’ being overstated is significant for several reasons. Obviously statistical agencies have an interest in ensuring the accuracy of their published data. Firms seeking to evaluate prospects for selling wine or other beverages in such countries also require accurate data. Furthermore, those concerned with health and social issues associated with excessive alcohol consumption want accurate data on both the aggregate quantity and – since social costs associated with excess consumption typically differ across beverage types – the mix of alcohols consumed.

Now is a good time to focus on this issue because a new wine regulation in Japan, made in 2015, comes into force in October 2018;<sup>2</sup> and China has been reviewing and revising its wine-related regulations as well. This year also is the tenth anniversary of the decisions by China’s special administrative regions (SARs) of Hong Kong and Macao to eliminate – in February and August 2008, respectively – their taxes on wine and beer (Yoon and Lam 2012), thereby distinguishing those customs territories from mainland China where wine attracts an import tariff of 14% (or 20% if in containers larger than two litres) plus a consumption tax of 10% and a value-added tax of 17%, cumulating to close to 50%. This is pertinent because the most important emerging grape wine markets in the present decade are in greater China (Anderson and Wittwer 2015), and that policy reform has made it more lucrative for China’s SARs to illicitly re-export wine to mainland China. The incentive for such illicit trade is beginning to diminish though, as more wine-exporting countries sign free trade agreements with China (most recently Australia following Chile and New Zealand, whose wine will be imported duty free by the end of this decade, and prospectively the European Union).

This paper reports grape wine production, consumption and trade estimates currently available for (mainland) China, Hong Kong, Macao and Japan, and then offers an alternative set of estimates to show how they change such indicators as per capita wine consumption, wine self-sufficiency, the share of wine in total alcohol consumption, and the region’s share of global wine production and consumption. Those indicators are important because our alternative estimates suggest they are even lower than is commonly believed. This underscores the very considerable potential for growth in wine exports to greater China and

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HS2009, defined as “Fruit juices (including grape must) and vegetable juices, unfermented and not containing added spirit”.

<sup>2</sup> Japan’s new standards on labelling and geographical indications for wine, sake and other alcohol beverages are detailed in National Tax Agency (2015) and Uytzel (2015).

Japan, and has implications for wine sales in Hong Kong and Macao versus imports to those territories for re-export to mainland China.

The next section of the paper summarizes the commonly used statistics for the wine markets of these countries. Section III reports possible amendments to those statistics, showing how they would change under certain assumptions, and what those changes imply for various summary indicators of wine market trends over the past two decades in this important region. The final section draws out implications of the findings, especially for exporters of wine to northeast Asia.

## II. Common sources of wine data for northeast Asia

International analysts without northeast Asian language skills typically rely on wine production data for the region from the UN's Food and Agriculture Organization ([www.fao.org/faostat/en](http://www.fao.org/faostat/en)) and, for estimates of the latest updates, the Paris-based International Organisation of Vine and Wine ([www.oiv.int](http://www.oiv.int)). Trade data also are available from the FAO and, more comprehensively and with all bilateral flows, from the UN's Statistical Office (<https://comtrade.un.org/data>), again with estimated updates from the OIV. All those sets of annual data are reliant on national government statistics being submitted to these international agencies. Commercial data providers such as the Global Trade Atlas ([www.ihs.com/Global-Trade/Atlas](http://www.ihs.com/Global-Trade/Atlas)) assemble the most-recent trade data on an ongoing monthly basis, but access is not free. An Italian group produces updates of wine import volume and value data every six months and allows free downloads at [www.winebynumbers.it](http://www.winebynumbers.it)

Wine consumption data are far more difficult to come by internationally. The OECD provides total alcohol consumption data for its member countries (hence Japan and the Republic of Korea) from the early 1960s and for major emerging economies (including China, India and Indonesia) from 2000 ([www.oecd.org/health/health-statistics.htm](http://www.oecd.org/health/health-statistics.htm)). The WHO provides those same data for all UN member countries disaggregated into wine, beer, spirits and other beverages (see <http://apps.who.int/gho/data/node.main.A1026?lang=en?showonly=GISAH>). Again both international agencies rely on national government statistics being submitted to them. Commercial providers with more up-to-date data for subscribers, or for a fee, include Euromonitor International ([www.euromonitor.com](http://www.euromonitor.com)) and International Wine and Spirit Research (<https://www.theiwsr.com>).

A way to check on consumption volume data, or to fill gaps in historical series, or to avoid paying a fee to commercial data providers, is to add domestic production to imports net of exports. So long as there are no net changes in wine stocks over the period considered (e.g. a calendar year), this would be as reliable as the production and trade data. Indeed it may be what some countries do to obtain their official consumption statistics. It is also what Anderson and Pinilla (2017) did to fill gaps when unable to find official national consumption statistics, except they use not just current-year production but rather the average of that plus the two previous years' production. That calculation not only smooths the time series but also captures the reality that not all wine is consumed in the year of production. Especially in the case of reds it is common to let the wine mature first in barrels and then in bottles, and then even after sale from the winery it may be stored for some time by wholesalers, retailers, restaurants and even households before being consumed. For the relatively new China market, however, we assume below that wine is consumed in the year of domestic production or import.

### **III. Alternative wine market statistics for Japan, China and Hong Kong**

We begin with Japan, the most mature of these northeast Asian markets, before turning to the most important and fastest growing wine market in Asia, namely mainland China's.<sup>3</sup> Imports and exports of Hong Kong and Macao are also considered. Even though the latter are far smaller markets, they are related to China's via their re-exports, and they provide an indication of how other Asian countries' wine consumption might grow as their per capita incomes approach the high levels of those two customs territories.

#### ***A. Japan***

No less than 43 of Japan's 49 prefectures produce grape wine, mostly by small wineries that grow their own grapes and do not blend their product with material from other regions or abroad (Takahashi et al. 2017). While domestic wine produced in one region is seldom blended with wine produced in another region of Japan (see Appendix Table 1), wine is also 'produced' in a few prefectures with large ports (Kawasaki et al. 2011). Firms in the latter

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<sup>3</sup> Even in Japan, there is little economic research on its wine industry. Oda (2001) suggests topics for further wine industry research in countries where people did not drink wine on a regular basis but now enjoying rapid wine consumption growth.

prefectures bottle imported bulk wine and/or wine they make by adding sugar and yeast to imported unfermented grape juice concentrate (Shimamura 2008). The front label of these bottles of wine declare they are produced in Japan, and although the back label notes that they may contain imported material, that note can be in a tiny font.<sup>4</sup>

Official wine production data for Japan were not always reported to the UN's FAO, so for some years FAO inserted unofficial data (1969-73) or its own estimates (1974-76 and from 2010). However, data from the National Tax Agency (2016) provide estimates of official grape wine production (including that using imported material) from 1973 and official grape wine consumption from 1988. Leading up to the planned implementation of Japan's new wine labelling law in October 2018, official data also have been published for 2013 to 2015 that separate out wine produced solely from domestic grapes and that produced using imported product (see National Tax Office 2017 and earlier editions). Also available from official sources are wine import data by container, from which it is possible to get the share of total imports that come in bulk form (more than 2 litre containers) from 1988 (Ministry of Finance 2017).

The annual volumes of Japanese wine production, consumption and trade according to these official data are reported in Table 1(a). If we define 'apparent consumption' as the sum of net imports plus the 3-year average of production in that and the two preceding years, then it is shown in that table to be quite close to the National Tax Agency estimate of Japan's consumption. The 'apparent consumption' data suggest Japan's annual per capita consumption of wine has grown from below 0.3 litres as of 1975 (0.4 in 1975-79) to almost 3 litres by 2016. They also suggest Japan's wine self-sufficiency has fallen from 75% in 1975 (62% in 1975-79) to 28% by 2016.

[Table 1 about here]

Since the data in Table 1(a) overstate consumption and self-sufficiency to the extent imported material are included in the domestic production estimate, two adjustments need to be made. One is to make the very reasonable assumption that all wine imported in bulk containers is blended with domestic wine and/or sold in bottles front-labelled 'Product of Japan' and recorded as such by the statistician. That adjustment brings per capita

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<sup>4</sup> To date Japan has had no laws governing the labelling of wine made from grapes, only the industry's own regulations. New wine labelling guidelines have been proposed by the National Tax Agency (2015) and are scheduled to come into effect in October 2018. They define 'Wine of Japan' as wine made only from grapes harvested in Japan, as distinct from most other domestic wine which is produced using imported bulk wine or concentrated grape juice.

consumption down to 2.7 rather than 2.9 litres and self-sufficiency down to 23% rather than 28% for 2016 (Table 1(b)).<sup>5</sup>

Furthermore, it is necessary to separate domestic wine production wine made from imported grape juice concentrate from that derived by fermenting fresh local grapes. Precise estimates of wine production from local grapes are available for 2013, 2014 and 2015 (14.3, 15.1 and 16.9 ML, respectively – see National Tax Agency (2017) and earlier editions). Those volumes average just one-fifth of the volumes in Table 1(b) for those years. They do not alter the apparent consumption per capita estimate in Table 1(b), but they do bring down the 2013-15 self-sufficiency estimate from 22% to just 4% if it is assumed that the four-fifths difference is all due to wine made from imported concentrate. Had that same ratio of four-fifths been relevant for adjusting the production numbers in Table 1(b) for all years prior to 2013, then, as shown in Table 1(c), self-sufficiency is just 10% in 1975-79.<sup>6</sup> Low though these revised self-sufficiency estimates look, they are consistent with a claim, made two decades ago by JETRO (1998), that less than 10% of wine bottled in Japan is made from domestically produced grapes.

The extent of the impact of all these adjustments on estimates of Japan's wine consumption per capita and on its self-sufficiency in wine are shown graphically in Figure 1.

[Figure 1 about here]

### ***B. China (mainland)***

The annual volumes of wine production, consumption and trade according to official data, reported in Table 2(a), suggest China's per capita consumption has grown from below 0.2 litres up until the turn of the century to 1.28 litres by 2016. They also suggest China's wine self-sufficiency has fallen from 100% in 1995-96 to 64% by 2016.

Much of the wine that is imported by China in bulk containers is bottled as is or blended with domestic wine and sold in bottles labelled 'Product of China'. If all such imported bulk wine was recorded as Chinese production by the statistician, then per capita consumption would have reached just 1.17 rather than 1.28 litres by 2016, and self-

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<sup>5</sup> Most documents written in Japan, such as Takahashi et al. (2017), use official data and so their quoted per capita consumption and self-sufficiency numbers are the higher ones in Table 1. Takahashi et al. (2017) is the first introductory book in English on the Japanese wine industry and wineries.

<sup>6</sup> While data are available on unfermented (non-alcoholic) grape juice concentrate imports by Japan (Harmonised System code 200961 and 200969), the factor needed to convert those tonnes into litres of wine with 12% alcohol is impossible to know because it depends on the brix content of each shipment of concentrate. During 2010-16, the value of Japan's imports of grape juice concentrate averaged 7.4% of the value of its wine imports.



sufficiency would be 61% rather than 64% (Table 2(b)). These alternative numbers for this adjustment are lower-bound estimates because they have removed all of the imported bulk wine from the official ‘production’ data, whereas in practice some of that wine may have carried a correct country of origin label and not been counted as domestic production.

Furthermore, if there is double-counting of domestic wine production because it is internally traded between provinces in bulk before being bottled but counted as output in the source province as well as the destination province, per capita consumption and self-sufficiency would be even lower than official data suggest. For example, if domestic production is only two-thirds that recorded as official production, in addition to imported bulk wine being counted as product of China, then per capita consumption in 2016 would have reached only 0.89 litres rather than 1.28 litres and self-sufficiency would be 49% rather than 64% (Table 2(c)). This is close to the suggestion made by one of China’s leading wine reporters, having discussed the issue and its possible contributing factors with leading industry insiders (Boyce 2017).

Finally, in addition to some recorded imports to Hong Kong and Macao being subsequently recorded as re-exported to China, it is believed that a portion also is transported to the mainland without being recorded, that is, it is smuggled so as to avoid one or more of China’s three taxes on wine consumption. If the extent of such smuggling amounted to half as much again as Hong Kong has been re-exporting officially,<sup>7</sup> that would mean 2% higher consumption in China but the self-sufficiency rate would be an extra percentage point lower (compare Table 2(c) and Table 2(d)).

The extent of the impact of these adjustments on estimates of China’s wine consumption per capita and on its self-sufficiency in wine are shown in Figure 2 (where the adjustment including some smuggling is not shown as it is very close to the heavy black lines); and the extent of their impact on estimated production in China of wine if narrowly defined to be made from local grapes are shown in Figure 3 (along with similarly adjusted production estimates for Japan).

[Table 2 and Figures 2 and 3 about here]

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<sup>7</sup> The extent of such smuggling is unknowable, but informed commentators believe it has been non-trivial. See, for example, the comments by numerous key players in the Hong Kong market that were collated by Robinson (2018) on the 10<sup>th</sup> anniversary of the decision to abolish Hong Kong’s wine imports taxes. The reduction in Hong Kong’s wine import tariff from 80% up to February 2006 down to 40% from March 2007 and zero from March 2008, and of Macao’s from 15% to zero from 27 August 2008, would have increased the incentive to smuggle imported wine from those territories to the mainland.

### *C. Hong Kong and Macao*

If Hong Kong's wine exports to China are in fact larger than shown in official records, it makes a much bigger difference to Hong Kong's apparent wine consumption per capita than to China's. To use the previous example, if the extent of such smuggling amounted to half as much again as Hong Kong has been re-exporting officially, then Hong Kong's apparent consumption is only 3.0 instead of 4.9 litres per capita in 2015-16 (Table 3). That is much closer to the average annual consumption level in Singapore in recent years of 2.4 litres.

[Table 3 about here]

Macao has less than one-tenth the population and hence a much smaller economy than Hong Kong, but it has had a similarly high and rapidly rising per capita income and demand for wine imports, and a similar proximity to mainland China. It abolished its 15% wine import tax in August 2008, six months after Hong Kong. Its apparent per capita consumption of wine, when defined as recorded net imports, have been about twice that of Hong Kong's over the past two decades. However, its recorded re-exports have been a far smaller proportion of its reported imports than is the case for Hong Kong (Table 3). If there is no smuggling out of Macao, then it has by far the highest per capita wine consumption in Asia at more than twice Hong Kong's, three times Japan's, and four times Singapore's. That seems unlikely, however, notwithstanding the possibly considerable consumption by high-income gambling tourists in Macao (most of whom come from the mainland). A more-likely explanation for these comparative data is that a large share of Macao's wine imports have been smuggled to mainland China. That would be consistent with the rapid growth in China's demand for fine wine imports during 2005-12 and its subsequent slowdown following the austerity and anti-corruption measures Beijing introduced in December 2012 (Tables 2(a) and 4), as well as with the rapid rise in the average price of wine imports into greater China during 2005-12 and their plateauing thereafter – in contrast to the rest of the world where average import prices fell from 2008 because of the global financial crisis (Figure 4).

[Figure 4 about here]

## **IV. Implications of revised statistics for wine exporters**

These alternative estimates of wine market statistics for northeast Asia alter non-trivially the estimates of the share of wine in the region's alcohol consumption. Those shares are already presumed to be very low by world standards, but the above adjustments mean they may be

even lower than previous estimates suggest. Nonetheless, since the turn of the century, even these alternative estimated shares have doubled for China, and gone up by about 50% for Hong Kong and Japan, at a time when wine's share of alcohol consumption in the rest of the world has shrunk by about one-quarter (Table 4). Little wonder that the world's wine exporters are paying close attention to sales in this region, which is one of the fastest growing globally (Anderson and Wittwer 2015).

[Tables 4 and 5 about here]

The more-than-doubling of apparent per capita consumption in Hong Kong and Macao based on official trade statistics, following the abolition of their wine import tariffs in 2008, imply very high price elasticities of demand for wine though – especially in Macao where the tariff had been just 15% before being abolished. This lends support to the claims by insiders of non-trivial informal or smuggled trade in wine to the mainland.

These alternative estimates mean foreign suppliers may face considerably less competition in the Chinese and Japanese markets from local producers than official data imply. They also suggest the potential for increased per capita consumption in the region is even greater than previously thought, including in Hong Kong. True, these alternative estimates also suggest the rise in the share of the region in global wine consumption since the turn of the century has been overstated. That increase, from 2.9% to 8.4%, becomes one from 2.2% to 6.3% using these alternative estimates (Table 5). Even so, that amended increase in the combined share for these three economies is still huge compared with the proportional increase in their share of global income, which rose from 18% to 22% between 2000 and 2016 (World Bank 2017). The scope for further growth in northeast Asia's wine consumption and imports would still seem very considerable though, when its 6-8% share of global wine consumption is compared with its 22% share of global income.

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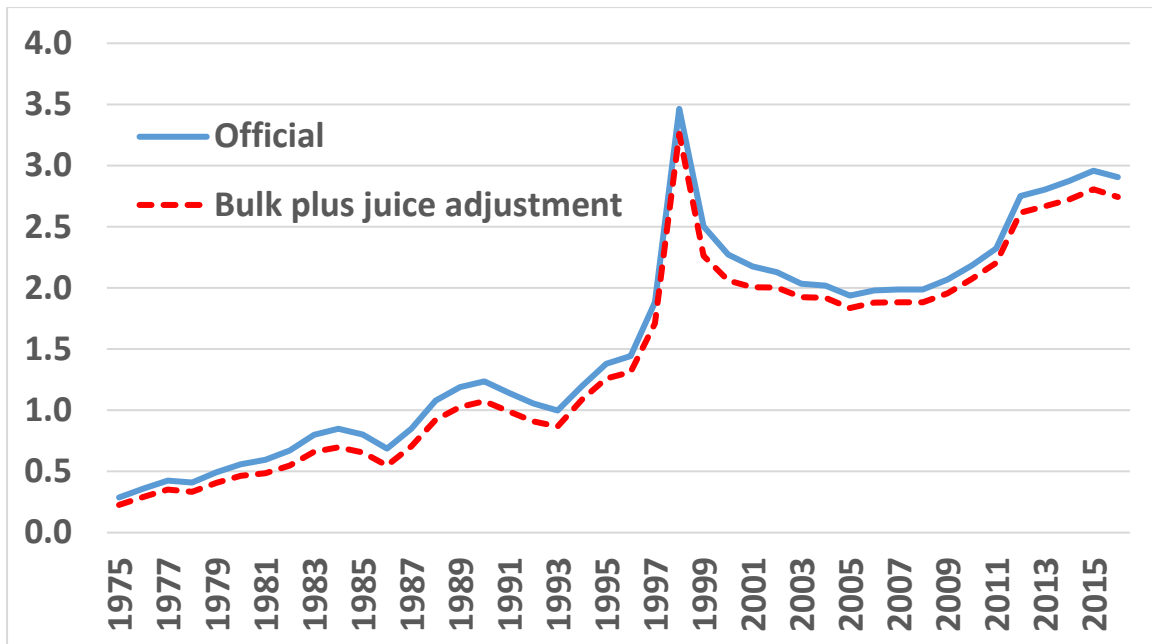
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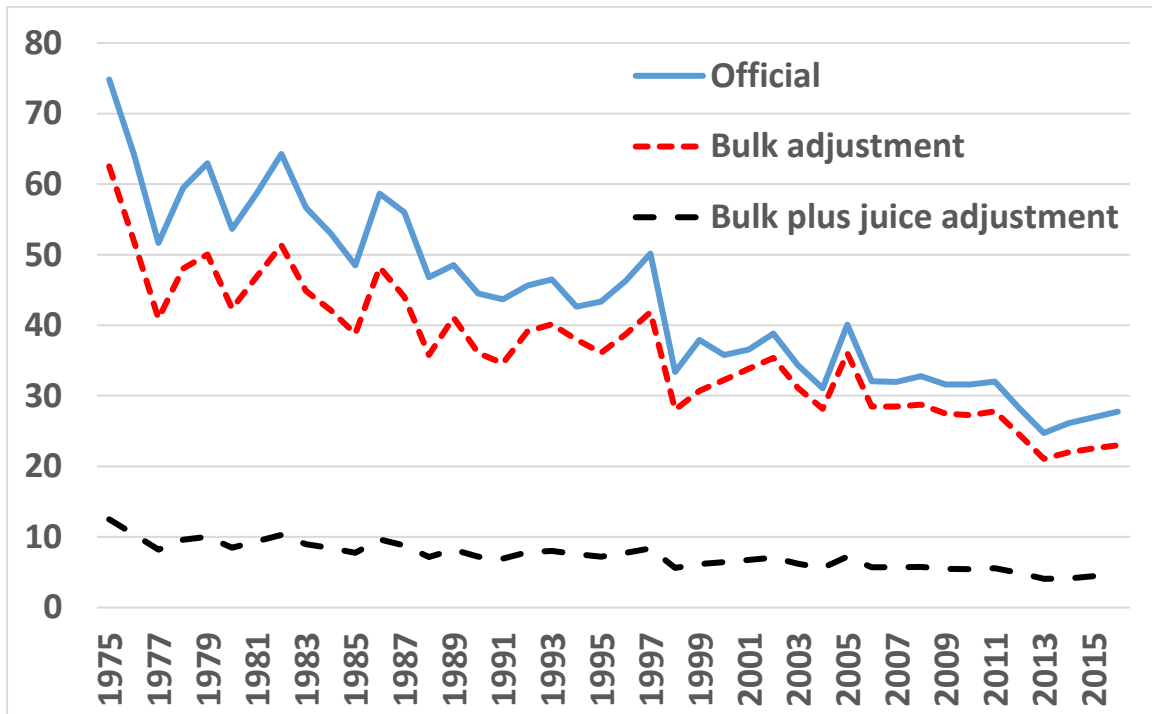
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Figure 1: Japan's estimated wine consumption per capita and wine self-sufficiency under alternative assumptions,<sup>a</sup> 1975 to 2016 (litres and %)

(a) Wine consumption per capita (litres)



(b) Wine self-sufficiency (%)

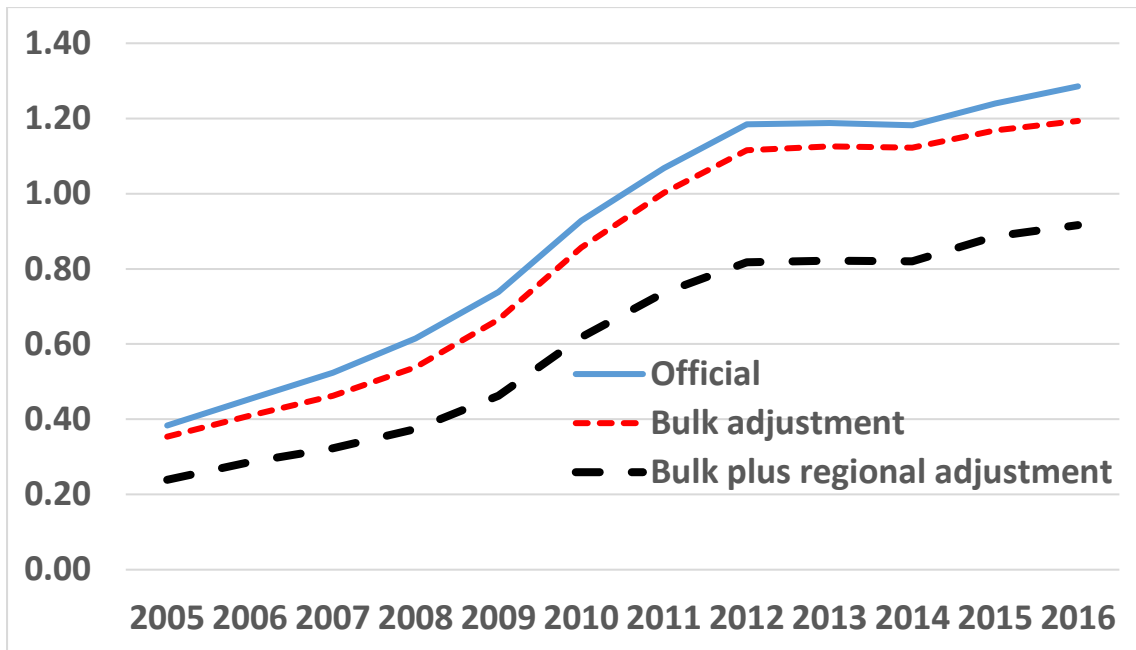


<sup>a</sup> The middle line assumes all of Japan's imported bulk wine each year is sold as Product of Japan; and the lowest line assumes in addition that a portion of the grape juice concentrate imported into Japan is converted into wine.

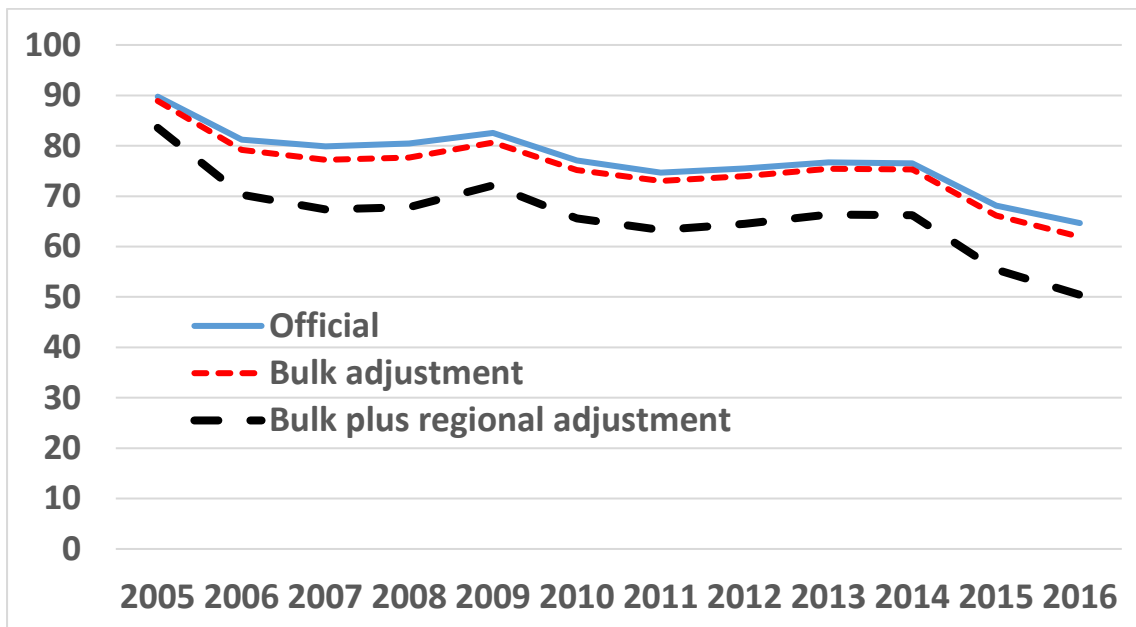
Sources: See Table 1.

Figure 2: China's estimated wine consumption per capita and wine self-sufficiency under alternative assumptions,<sup>a</sup> 2005 to 2016 (litres and %)

(a) Wine consumption per capita



(b) Wine self-sufficiency

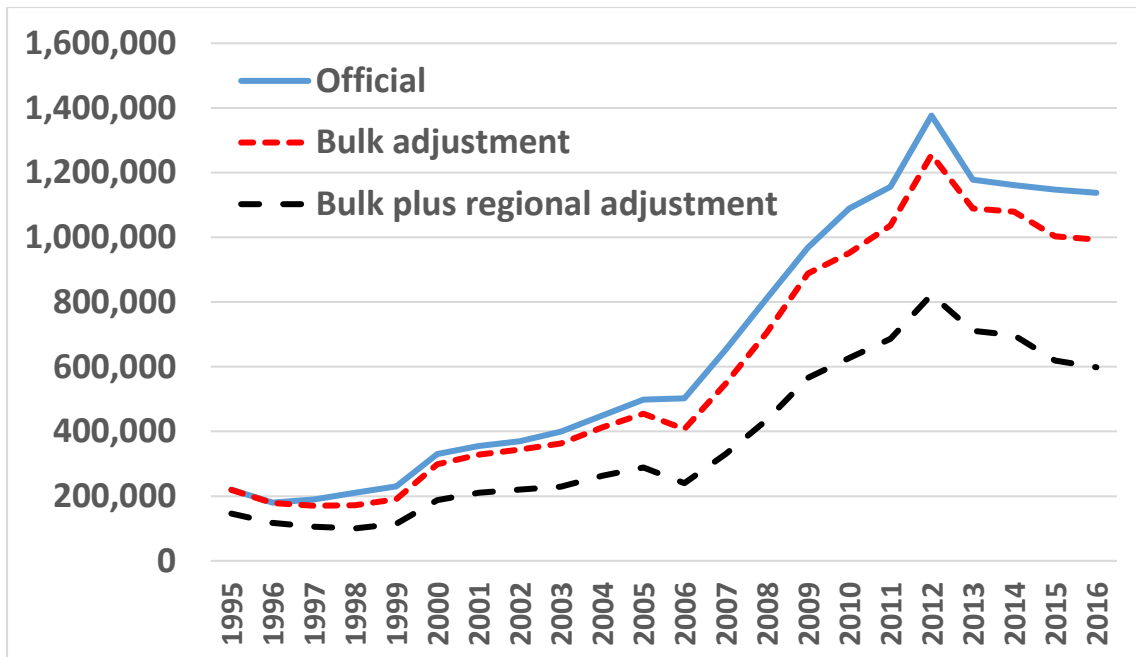


<sup>a</sup> 'Import blend' assumes all of China's bulk imports each year are blended with domestically produced wine before being bottled and sold as Product of China; 'Import and regional blend' assumes domestically produced wine is only 2/3<sup>rd</sup>s of the official amount because of double counting due to wine of one region being blended in another region and counted by both regions, before imported bulk wine is blended into the mix prior to bottling.

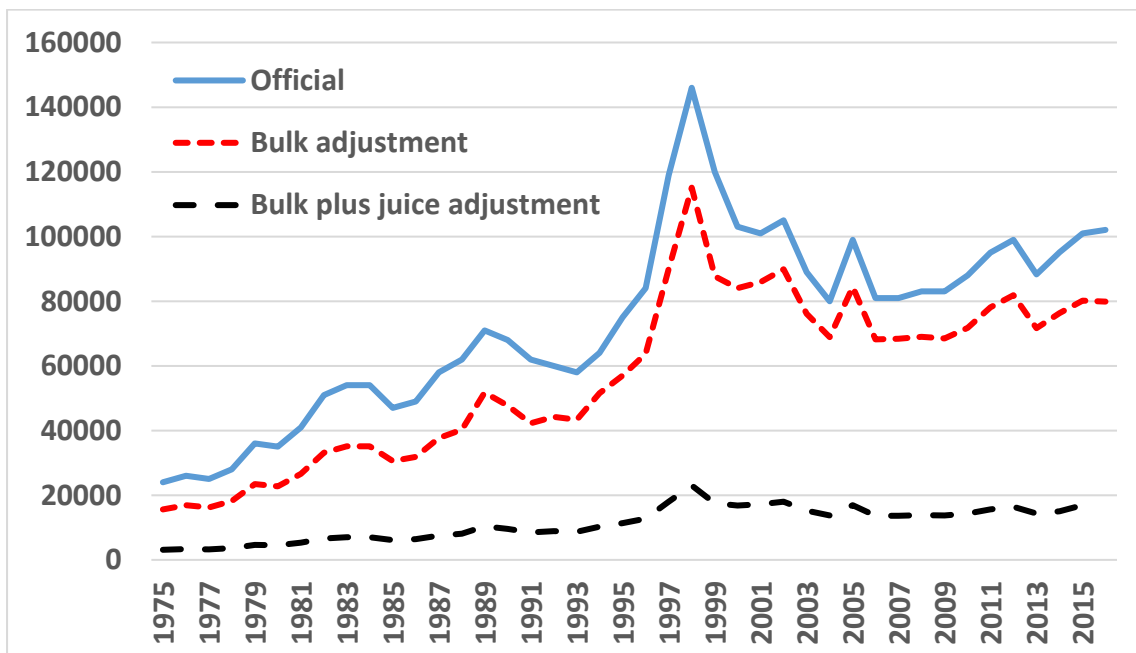
Source: See Table 2.

Figure 3: Estimated wine production in China and Japan's under alternative assumptions,<sup>a</sup> 1975 to 2016 (kilolitres)

(a) China



(b) Japan

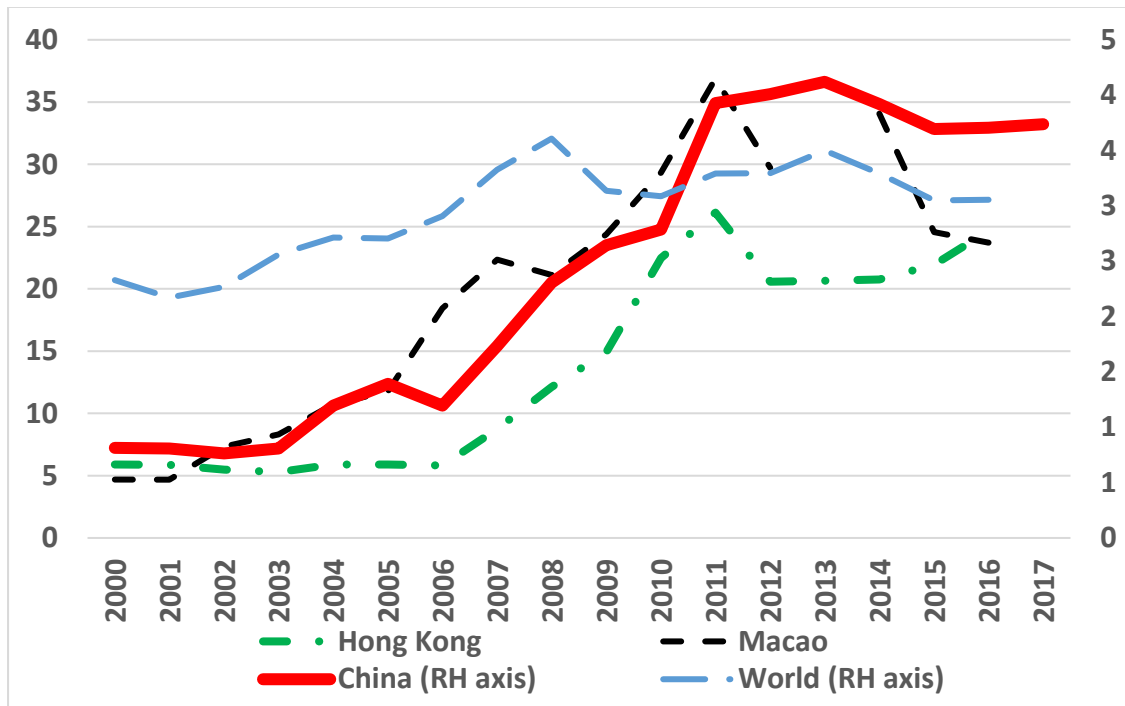


<sup>a</sup> For explanation of assumptions, see note <sup>a</sup> of Figures 1 and 2.

Sources: See Tables 1 and 2.



Figure 4: Average price of wine imports, China, Hong Kong, Macao and the world, 2000 to 2017 (current US\$ per litre)



Source: United Nations (2018).

Table 1(a): Japan's official wine production, official consumption, imports, exports and apparent consumption, 1975 to 2016 (KL, litres and %)

	Prod'n (KL)	Imports (KL)	Exports (KL)	Prod'n + Net Imports (KL)	Official consm (KL) <sup>b</sup>	Official consm p.c. (L) <sup>a</sup>	SSR (%) <sup>a</sup>
1975-79	27800	20446	203	45044	na	0.40	62
1980-84	47000	39543	87	82323	82200	0.69	57
1985-89	57400	58065	112	112552	109200	0.92	51
1990	68000	86,025	253	152772	134000	1.24	45
1991	62000	75,223	229	141994	127000	1.14	44
1992	60000	68,370	184	131519	124000	1.05	46
1993	58000	65,048	244	124804	108000	1.00	46
1994	64000	89,707	276	150098	123000	1.20	43
1995	75000	107,669	302	173034	144000	1.38	43
1996	84000	107,351	265	181420	159000	1.44	46
1997	119000	145,185	582	237269	225000	1.88	50
1998	146000	321,392	421	437304	298000	3.46	33
1999	120000	188,635	533	316435	278000	2.50	38
2000	103000	165,746	859	287887	266000	2.27	36
2001	101000	169,144	842	276302	253000	2.18	37
2002	105000	167,938	328	270610	259000	2.13	39
2003	89000	161,182	448	259068	237000	2.03	34
2004	80000	166,543	413	257463	226000	2.02	31
2005	99000	158,034	372	246996	238000	1.94	40
2006	81000	166,243	462	252448	229000	1.98	32
2007	81000	166,664	347	253317	230000	1.99	32
2008	83000	171,760	370	253057	227000	1.99	33
2009	83000	180,740	367	262707	240000	2.07	32
2010	88000	193,853	222	278298	262000	2.18	32
2011	95000	208,345	252	296760	290000	2.32	32
2012	99000	257,126	174	350952	321000	2.75	28
2013	88293	263,244	237	357104	332000	2.80	25
2014	95098	270,425	208	364347	351000	2.87	26
2015	100921	280,071	284	374557	370000	2.96	27
2016	102000	268,639	226	367753	na	2.90	28

Table 1(b): Japan's wine production, apparent consumption and self-sufficiency, assuming all imported bulk wine is bottled in and sold as product of Japan, 1975 to 2016 (KL, litres and %)

	Bulk % of imports <sup>c</sup>	Prod'n (KL)	Prod'n + Net Imports (KL)	Apparent consumption per cap (L) <sup>a</sup>	SSR (%) <sup>a</sup>
1975-79	35	18070	36364	0.32	50
1980-84	35	30550	67320	0.57	45
1985-89	33	38434	93818	0.77	41
1990	30	47693	132360	1.07	36
1991	32	42298	122245	0.98	35
1992	26	44194	112914	0.91	39
1993	25	43385	108096	0.86	40
1994	19	51534	135802	1.08	38
1995	24	57032	158017	1.26	36
1996	24	63755	164526	1.31	39
1997	24	89955	214850	1.71	42
1998	21	115117	410579	3.25	28
1999	27	87731	285703	2.26	31
2000	18	83989	260500	2.06	32
2001	15	85951	254192	2.00	34
2002	14	89880	254217	2.00	35
2003	15	76095	244710	1.92	31
2004	14	68880	244415	1.92	28
2005	15	84447	234136	1.84	36
2006	16	68202	239624	1.88	28
2007	16	68364	239988	1.88	28
2008	17	68973	239903	1.88	29
2009	18	68475	248977	1.96	28
2010	19	71720	263354	2.07	27
2011	18	78090	280855	2.20	28
2012	17	81873	334180	2.62	24
2013	19	71694	340226	2.67	21
2014	20	76269	346829	2.74	22
2015	21	80131	355818	2.81	23
2016	22	79866	347169	2.74	23

Table 1(c): Japan's wine production, apparent consumption and self-sufficiency, assuming all imported bulk wine and some concentrate is made into wine,<sup>d</sup> 1975 to 2015 (KL, litres & %)

	Prod'n from imported grape juice concentrate (KL) <sup>d</sup>	Prod'n from local grapes (KL) <sup>d</sup>	Prod'n + net imports (KL)	Apparent consumption per capita (L) <sup>a</sup>	SSR (%) <sup>a, e</sup>
1975-79	14456	3614	36364	0.32	10
1980-84	24440	6110	67320	0.57	9
1985-89	30748	7687	93818	0.77	8
1990	38154	9539	132360	1.07	7
1991	33839	8460	122245	0.98	7
1992	35355	8839	112914	0.91	8
1993	34708	8677	108096	0.86	8
1994	41227	10307	135802	1.08	8
1995	45625	11406	158017	1.26	7
1996	51004	12751	164526	1.31	8
1997	71964	17991	214850	1.71	8
1998	92093	23023	410579	3.25	6
1999	70185	17546	285703	2.26	6
2000	67191	16798	260500	2.06	6
2001	68761	17190	254192	2.00	7
2002	71904	17976	254217	2.00	7
2003	60876	15219	244710	1.92	6
2004	55104	13776	244415	1.92	6
2005	67558	16889	234136	1.84	7
2006	54562	13640	239624	1.88	6
2007	54691	13673	239988	1.88	6
2008	55178	13795	239903	1.88	6
2009	54780	13695	248977	1.96	6
2010	57376	14344	263354	2.07	5
2011	62472	15618	280855	2.20	6
2012	65498	16375	334180	2.62	5
2013	57388	14306	351,300	2.76	4
2014	61196	15073	365,315	2.88	4
2015	63212	16919	380,708	3.01	4

<sup>a</sup> The final two columns assume consumption equals net imports plus the average of production in that and the previous two years.

<sup>b</sup> The official consumption estimates are from the National Tax Agency (2016).

<sup>c</sup> The share of bulk in total wine imports in 1975-87 is assumed to be 35%, the same as in 1988.

<sup>d</sup> Production from local grapes, once grape juice concentrate is taken into account, is assumed to be one-fifth of production shown in Table 1(b), the same as the average share in 2013-15, the only years for which actual data are available from the National Tax Agency (2016).

<sup>e</sup> In Table 1(c) self-sufficiency is just production from local grapes as a % of apparent consumption (with the latter including wine made from imported grape juice concentrate).

Sources: see text.

Table 2: China's wine production (official, and under alternative assumptions), trade and apparent consumption, 1995 to 2016 (KL, litres and %)

	(a) Official data							(b) Assuming all bulk imports are blended with Chinese wine				
	Prod'n (KL)	Imports (KL)	Exports (KL)	Consm <sup>a</sup> (KL)	Consm <sup>a</sup> p.c. (L)	SSR (%)	Bulk (%) of imports	Prod'n (KL)	Consm (KL)	Consm p.c. (L)	SSR (%)	
1995	220,000	712	2622	218,090	0.18	101	37	219,737	217,827	0.18	101	
1996	180,000	4355	2900	181,455	0.15	99	31	178,638	180,093	0.15	99	
1997	190,000	33578	2779	220,799	0.18	86	58	170,422	201,221	0.16	85	
1998	210,000	46227	3268	252,959	0.20	83	83	171,413	214,372	0.17	80	
1999	230,000	43658	4531	269,127	0.21	85	91	190,232	229,359	0.18	83	
2000	330,000	34571	4200	360,371	0.29	92	92	298,171	328,542	0.26	91	
2001	355,000	29220	2967	381,253	0.30	93	91	328,467	354,720	0.28	93	
2002	370,000	30224	2287	397,937	0.31	93	86	344,071	372,008	0.29	92	
2003	399,000	41404	2004	438,400	0.34	91	88	362,431	401,831	0.31	90	
2004	449,000	44105	2038	491,067	0.38	91	83	412,336	454,403	0.35	91	
2005	498,000	53971	2712	549,259	0.42	91	80	454,935	506,194	0.39	90	
2006	502,000	115507	3789	613,718	0.47	82	82	407,562	519,280	0.40	78	
2007	653,000	148240	9285	791,955	0.60	82	71	548,290	687,245	0.52	80	
2008	812,000	164861	5378	971,483	0.73	84	64	706,325	865,808	0.65	82	
2009	968,840	172881	1483	1,140,238	0.86	85	46	888,644	1,060,042	0.80	84	
2010	1,088,810	286040	1450	1,373,400	1.03	79	48	951,774	1,236,364	0.92	77	
2011	1,156,860	365535	1916	1,520,479	1.13	76	33	1,036,603	1,400,222	1.04	74	
2012	1,376,620	394282	2038	1,768,864	1.31	78	31	1,255,052	1,647,296	1.22	76	
2013	1,178,360	377541	1900	1,554,001	1.14	76	24	1,089,076	1,464,717	1.08	74	
2014	1,160,990	383431	3670	1,540,751	1.13	75	21	1,079,206	1,458,967	1.07	74	
2015	1,148,000	552088	8221	1,691,867	1.23	68	26	1,002,768	1,546,635	1.12	65	
2016	1,137,400	638000	9950	1,765,450	1.28	64	23	993,563	1,621,613	1.17	61	

Table 2 (continued): China's wine production (official, and under alternative assumptions), trade and apparent consumption,<sup>a</sup> 1995 to 2016 (KL, litres and %)

	Prod'n (KL)	Consm (KL)	Consm p.c. (L)	SSR (%)	(c) Assuming production is 2/3 <sup>rds</sup> of official, & all bulk imports also blended				(d) Assuming also smuggling from HK <sup>b</sup>	
					Extra HK exports to China (KL)	Consm (KL)	Consm p.c. (L)	SSR (%)	Unrecorded as % of China's recorded wine imports	
2000	187656	218027	0.17	86	487	219052	0.18	86	1.4	
2001	210128	236381	0.19	89	504	236867	0.19	89	1.7	
2002	220512	248449	0.19	89	518	248953	0.20	89	1.7	
2003	229426	268826	0.21	85	512	269343	0.22	85	1.2	
2004	262662	304729	0.24	86	849	305241	0.24	86	1.9	
2005	288935	340194	0.26	85	1024	341042	0.27	85	1.9	
2006	240228	351946	0.27	68	1788	352969	0.28	68	1.5	
2007	330618	469573	0.36	70	2882	471361	0.37	70	1.9	
2008	435658	595141	0.45	73	3466	598023	0.46	73	2.1	
2009	565696	737094	0.55	77	4247	740560	0.57	76	2.5	
2010	627190	911780	0.68	69	6168	916026	0.70	68	2.2	
2011	686436	1050055	0.78	65	9246	1056223	0.81	65	2.5	
2012	822725	1214969	0.90	68	9338	1224214	0.93	67	2.4	
2013	710820	1086461	0.80	65	9556	1095799	0.83	65	2.5	
2014	697691	1077452	0.79	65	11167	1087007	0.82	64	2.9	
2015	619582	1163449	0.85	53	13671	1174616	0.88	53	2.5	
2016	598767	1226817	0.89	49	13579	1240488	0.92	48	2.1	

<sup>a</sup> Consm is apparent consumption in KL, calculated as production plus imports minus exports; Consm p.c. (litres per capita) is apparent consumption divided by total population; and SSR, the self-sufficiency ratio, is shown as production divided by apparent consumption (expressed as a percentage).

<sup>b</sup> The volume smuggled into China is assumed to be equal to an extra 50% of Hong Kong's total official re-exports.

Source: Authors' calculations, starting with official production & trade numbers reported by FAO, WHO or OIV.

Table 3: Wine imports, re-exports and consumption, Hong Kong (under alternative assumptions<sup>a</sup>) and Macao, 2000 to 2016 (KL and litres)

	Hong Kong						Macao						
	Imports recorded (KL)	Re-exports recorded (KL)	Net imports recorded (KL)	Consm <sup>b</sup> per cap. (litres)	Re-exports as % of import volume	Assumed extra HK exports to China (KL)	Amended net imports (KL)	Amended consm <sup>b</sup> per cap. (litres)	Imports recorded (KL)	Re-exports recorded (KL)	Net imports recorded (KL)	Consm <sup>b</sup> per cap. (litres)	Re-exports as % of import volume
2000	10135	973	9162	1.38	10	487	8676	1.30	905	53	852	1.97	6
2001	10798	1007	9791	1.46	9	504	9288	1.38	963	14	949	2.17	1
2002	10925	1035	9890	1.46	9	518	9373	1.39	1193	33	1160	2.61	3
2003	11200	1023	10177	1.49	9	512	9666	1.42	1197	50	1147	2.54	4
2004	13440	1697	11743	1.71	13	849	10895	1.59	1463	26	1437	3.13	2
2005	15124	2047	13077	1.90	14	1024	12054	1.75	1551	23	1528	3.26	2
2006	18336	3576	14760	2.13	20	1788	12972	1.87	1919	21	1898	3.95	1
2007	23357	5763	17594	2.52	25	2882	14713	2.11	2654	78	2575	5.22	3
2008	30327	6932	23395	3.33	23	3466	19929	2.84	3518	225	3293	6.49	6
2009	34837	8493	26344	3.73	24	4247	22098	3.13	4826	247	4579	8.79	5
2010	39984	12336	27648	3.94	31	6168	21480	3.06	6128	589	5539	10.37	10
2011	48197	18491	29706	4.20	38	9246	20461	2.89	7710	777	6933	12.69	10
2012	50525	18675	31850	4.45	37	9338	22513	3.15	6839	na	na	na	na
2013	50122	19111	31011	4.31	38	9556	21456	2.99	na	na	na	na	na
2014	52514	22334	30180	4.18	43	11167	19013	2.63	5355	740	4615	7.99	14
2015	63390	27342	36048	4.95	43	13671	22377	3.07	6011	44	5966	10.14	1
2016	62935	27157	35778	4.87	43	13579	22200	3.02	5932	554	5378	8.97	9

<sup>a</sup> Unrecorded re-exports to the mainland are assumed to be 50% of Hong Kong's total recorded re-exports.

<sup>b</sup> Apparent consumption per capita, assumed to be net imports divided by population.

Source: Authors' calculations, starting with official trade numbers reported in Anderson and Pinilla (2017).

Table 4: Grape wine's share of total alcohol consumption, China, Hong Kong and Japan, 2000 to 2015 (%)

	China base	China amended <sup>a</sup>	Hong Kong base	Hong Kong amended <sup>b</sup>	Japan base	Japan amended <sup>c</sup>	WORLD AVERAGE
2000	1.4	0.8	10.9	10.4	4.4	4.0	16.1
2001	1.6	0.9	11.4	10.8	4.2	3.9	16.2
2002	1.7	1.0	11.2	10.7	4.2	3.9	16.6
2003	1.8	1.1	11.3	10.8	4.0	3.8	16.4
2004	1.9	1.1	12.5	11.7	4.0	3.8	16.5
2005	2.1	1.2	13.3	12.4	3.8	3.6	15.8
2006	2.2	1.3	14.4	12.9	3.9	3.7	15.2
2007	2.1	1.3	16.4	14.1	3.9	3.7	14.7
2008	2.2	1.3	20.3	17.8	4.0	3.8	14.0
2009	2.3	1.4	21.9	19.1	4.0	3.8	13.3
2010	2.4	1.6	22.3	18.2	4.2	4.0	12.8
2011	2.9	2.0	23.1	17.1	4.5	4.2	12.7
2012	3.1	2.1	23.8	18.1	5.2	5.0	12.8
2013	3.1	2.1	23.0	17.1	5.2	5.1	12.6
2014	3.0	2.1	22.4	15.4	5.4	5.4	12.7
2015	na	na	na	na	5.4	5.4	na

<sup>a</sup> Assuming China's wine production is 2/3<sup>rds</sup> of official estimate, and all bulk imports into China are blended with local wine, and the volume of wine smuggled into China is equal to an extra 50% of Hong Kong's total official wine re-exports.

<sup>b</sup> Assuming the volume of wine smuggled from Hong Kong to China is equal to an extra 50% of Hong Kong's total official wine re-exports.

<sup>c</sup> Assuming all imported bulk wine is bottled in and sold as product of Japan.

Source: Base estimates are from Anderson and Pinilla (2017); other estimates are based on the assumptions in Tables 1, 2 and 3 above.



Table 5: Shares of China and Japan in global wine production and consumption, official and alternative estimates, 2000 to 2016 (%)

## (a) Production

	China base	China amended	Japan base	Japan amended	China + Japan, base	China + Japan, amended
2000	1.18	1.07	0.37	0.06	1.55	1.13
2001	1.32	1.22	0.38	0.06	1.70	1.28
2002	1.44	1.34	0.41	0.07	1.85	1.41
2003	1.50	1.36	0.33	0.06	1.83	1.42
2004	1.47	1.35	0.26	0.05	1.73	1.40
2005	1.77	1.62	0.35	0.06	2.12	1.68
2006	1.77	1.44	0.29	0.05	2.06	1.49
2007	2.47	2.08	0.31	0.05	2.78	2.13
2008	3.00	2.61	0.31	0.05	3.31	2.66
2009	3.56	3.26	0.30	0.05	3.86	3.31
2010	4.05	3.54	0.33	0.05	4.38	3.59
2011	4.25	3.81	0.35	0.06	4.60	3.87
2012	5.27	4.81	0.38	0.06	5.65	4.87
2013	4.11	3.80	0.31	0.05	4.42	3.85
2014	4.24	3.94	0.35	0.06	4.59	4.00
2015	4.16	3.63	0.37	0.06	4.53	3.69
2016	4.26	3.72	0.38	0.06	4.64	3.78

## (b) Consumption

	China base	China amended	Japan base	Japan amended	China + Japan, base	China + Japan, amended
2000	1.59	0.97	1.27	1.15	2.86	2.12
2001	1.66	1.03	1.20	1.11	2.86	2.14
2002	1.72	1.08	1.17	1.10	2.89	2.18
2003	1.87	1.15	1.11	1.05	2.98	2.20
2004	2.03	1.26	1.07	1.01	3.10	2.27
2005	2.36	1.46	1.06	1.00	3.42	2.46
2006	2.62	1.51	1.08	1.02	3.70	2.53
2007	3.32	1.98	1.06	1.01	4.38	2.99
2008	4.13	2.54	1.08	1.02	5.21	3.56
2009	4.88	3.17	1.12	1.07	6.00	4.24
2010	5.82	3.88	1.18	1.12	7.00	5.00
2011	6.20	4.31	1.21	1.14	7.41	5.45
2012	7.06	4.89	1.40	1.33	8.46	6.22
2013	6.32	4.46	1.45	1.43	7.77	5.89
2014	6.27	4.42	1.48	1.49	7.75	5.91
2015	6.77	4.70	1.50	1.52	8.27	6.22
2016	6.98	4.90	na	na	na	na

Source: Estimates are based on the assumptions in Tables 1(c) and 2(b) above plus the global estimated production and consumption in Anderson and Pinilla (2017).

Appendix Table 1: Winegrape production in Japan, by growing region and crushing region, March 2016 (tonnes)<sup>a</sup>

Place of wine making \ Place of production	Place of production													Grape used for wine making
	Sapporo, Hokkaido	Sendai, Fukushima pref. (Yamagata prefecture)	Kanto area (Nagano prefecture)	Tokyo area (Yamanashi prefecture)	Kanazawa, Ishikawa prefecture	Nagoya, Aichi prefecture	Osaka	Hiroshima prefecture	Takamatsu, Kagawa prefecture	Fukuoka prefecture	Kumamoto prefecture	Okinawa prefecture		
Sapporo, Hokkaido	3,364	232 (162)	-	61 (61)	153	-	5	-	8	-	35	-	3,858	
Sendai, Fukushima (Yamagata prefecture)	-	2,460 (1,555)	3 (-)	24 (-)	-	-	-	-	-	-	-	-	2,487 (1,572)	
Kanto area (Nagano prefecture)	169 (129)	159 (1)	6,566 (6,137)	589 (193)	17 (2)	1 (1)	15 (3)	48 (48)	-	-	-	-	7,566 (6,516)	
Tokyo (Yamanashi prefecture)	8 (8)	348 (244)	448 (437)	7,442 (7,432)	-	12 (12)	4 (4)	2 (1)	-	-	-	-	8,263 (8,249)	
Kanazawa, Ishikawa prefecture	20	4 (4)	1 (1)	29 (29)	171	-	9	-	-	-	-	-	234	
Nagoya, Aichi prefecture	-	-	33 (33)	25 (25)	-	55	9	1	-	-	-	-	122	
Osaka	-	194 (171)	54 (54)	148 (147)	3	-	496	-	10	-	-	-	905	
Hiroshima prefecture	147	15 (-)	-	170 (170)	-	-	3	638	1	-	-	-	974	
Takamatsu, Kagawa prefecture	-	-	-	-	-	-	-	-	46	-	-	-	46	
Fukuoka prefecture	X	X	X	X	X	X	X	X	X	X	X	X	X	
Kumamoto prefecture	-	48 (30)	-	82 (82)	-	-	14	4	7	0	596	-	750	
Okinawa prefecture	X	X	X	X	X	X	X	X	X	X	X	X	X	
Productuin volume of wine grapes	3,708	3459 (2428)	7105 (6704)	8597 (8586)	345	68	554	693	73	21	631	-	25,254	

<sup>a</sup> “-” and “X” stand for “not applicable” and “protected information”, respectively. Information is protected for regions with just a few wineries. Source: National Tax Agency (2016).