Journal of Wine Economics, Volume 13, Number 2, 2018, Pages 199–220
doi:10.1017/jwe.2018.13

How Much Wine Is *Really* Produced and Consumed in China, Hong Kong, and Japan?*

Kym Anderson [a] **and Kimie Harada** [b]

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 re-exports and imports are unrecorded. These possibilities of the wine market being exaggerated are significant for firms seeking to export to and sell in such countries, especially in the fast-growing ones of northeast Asia. This article 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.

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

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

[a] Wine Economics Research Centre, School of Economics, University of Adelaide, Adelaide SA 5005; and Crawford School of Public Policy, Australian National University, Canberra, ACT 2600; e-mail: kym.anderson@adelaide.edu.au (corresponding author).
[b] Chuo University, Tokyo, Japan; and Visiting Fellow, Crawford School of Public Policy, Australian National University, Canberra, ACT 2600; e-mail: kimie.hara.harada@gmail.com.

insignificant, consumption is usually assumed to be equal to imports less any re-exports (plus net changes in stocks if such data are 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. The first reason is if imported bulk wine or wine made from imported concentrated grape juice can 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 second reason, particularly in China, is a double-counting issue. Double counting occurs 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 inter-regionally traded wine as a product of their respective regions, 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 (typically 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 re-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 (e.g., sake in Japan, mijiu in China, cheongju in Korea). Typically, it is at least 15% alcohol, 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 article the term "wine" refers just to that made from fresh grapes or grape juice concentrate.[1]

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—because social costs associated with excess consumption typically differ across beverage types—the mix of alcohols consumed.

[1] In the Harmonized System of the United Nations (2018), grape-based wines are classified in trade statistics as Harmonised System 2204 ("Wines of fresh grapes, including fortified wines, and grape must"). Grape juice concentrate is part of Harmonised System 2009, defined as "Fruit juices (including grape must) and vegetable juices, unfermented and not containing added spirit."

Now is a good time to focus on this issue because of a new wine regulation in Japan, drafted in 2015 and effective from October 2018,[2] and also because China has been reviewing and revising its wine-related regulations. This year marks the tenth anniversary of the decisions by China's special administrative regions (SARs) of Hong Kong and Macau to eliminate—in February and August 2008, respectively—their taxes on wine and beer (Yoon and Lam, 2012). That has distinguished 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 and Georgia following Chile and New Zealand, all of whose wine will be imported duty free by the end of this decade; and prospectively the European Union).

This article reports grape wine production, consumption, and trade estimates currently available for (mainland) China, Hong Kong, Macau, 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 considerable potential for growth in wine exports to greater China and Japan, and has implications for wine sales in Hong Kong and Macau versus imports to those territories for re-export to mainland China.

The next section of the article 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 lacking northeast Asian language skills typically rely on wine production data for the region from the United Nations' Food and Agriculture Organization (FAO) (www.fao.org/faostat/en) and, for estimates of the latest

[2] Japan's new standards on labelling and geographical indications for wine, sake, and other alcohol beverages are detailed in National Tax Agency (2015) and Uytsel (2015).

updates, the Paris-based International Organisation of Vine and Wine (OIV) (www.oiv.int). Trade data also are available from the FAO and, more comprehensively and with all bilateral flows, from the United Nations'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.ihsmarkit.com/maritime-global-trade-atlas.html) 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

Wine consumption data are far more difficult to come by internationally. The Organisation for Economic Co-operation and Development (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). The World Health Organization (WHO) provides those same data for all United Nation 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) and International Wine and Spirit Research (https://www.theiwsr.com).

A way to check on consumption volume data, 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; even after sale from the winery it may be stored for some time by wholesalers, retailers, restaurants, and even households before consumption. For the relatively new China market, however, we assume 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.[3] Imports and exports of Hong Kong and Macau 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 higher 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 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 may be in a smaller size font.[4]

Official wine production data for Japan were not always reported to the United Nations' FAO, so for some years FAO has inserted unofficial data (1969–1973) or its own estimates (1974–1976 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 effective October 2018, official data also have been published for 2013 to 2015 that separate 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 two 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 three-year average of production in that year and the two preceding years, then Table 1(a) shows it to be quite close to the

[3] 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 enjoy rapid wine consumption growth.

[4] 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 from 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.

Table 1(a)
Japan's Official Wine Production, Official Consumption, Imports, Exports and Apparent Consumption, 1975 to 2016 (Kilolitres, Litres, and %)

	Prod'n (KL)	*Imports (KL)*	*Exports (KL)*	*Prod'n + Net Imports (KL)*	*Official Consm. (KL)*[b]	*Official Consm. p.c. (L)*[a]	*SSR (%)*[a]
1975–1979	27,800	20,446	203	45,044	na	0.40	62
1980–1984	47,000	39,543	87	82,323	82,200	0.69	57
1985–1989	57,400	58,065	112	112,552	109,200	0.92	51
1990	68,000	86,025	253	152,772	134,000	1.24	45
1991	62,000	75,223	229	141,994	127,000	1.14	44
1992	60,000	68,370	184	131,519	124,000	1.05	46
1993	58,000	65,048	244	124,804	108,000	1.00	46
1994	64,000	89,707	276	150,098	123,000	1.20	43
1995	75,000	107,669	302	173,034	144,000	1.38	43
1996	84,000	107,351	265	181,420	159,000	1.44	46
1997	119,000	145,185	582	237,269	225,000	1.88	50
1998	146,000	321,392	421	437,304	298,000	3.46	33
1999	120,000	188,635	533	316,435	278,000	2.50	38
2000	103,000	165,746	859	287,887	266,000	2.27	36
2001	101,000	169,144	842	276,302	253,000	2.18	37
2002	105,000	167,938	328	270,610	259,000	2.13	39
2003	89,000	161,182	448	259,068	237,000	2.03	34
2004	80,000	166,543	413	257,463	226,000	2.02	31
2005	99,000	158,034	372	246,996	238,000	1.94	40
2006	81,000	166,243	462	252,448	229,000	1.98	32
2007	81,000	166,664	347	253,317	230,000	1.99	32
2008	83,000	171,760	370	253,057	227,000	1.99	33
2009	83,000	180,740	367	262,707	240,000	2.07	32
2010	88,000	193,853	222	278,298	262,000	2.18	32
2011	95,000	208,345	252	296,760	290,000	2.32	32
2012	99,000	257,126	174	350,952	321,000	2.75	28
2013	88,293	263,244	237	357,104	332,000	2.80	25
2014	95,098	270,425	208	364,347	351,000	2.87	26
2015	100,921	280,071	284	374,557	370,000	2.96	27
2016	102,000	268,639	226	367,753	na	2.90	28

National Tax Agency's 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 1975–1979) to almost three litres by 2016. They also suggest Japan's wine self-sufficiency has fallen from 75% in 1975 (62% in 1975–1979) to 28% by 2016.

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

Furthermore, it is necessary to separate domestic wine production 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 2013–2015 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 1975–1979.[6] Low though these revised self-sufficiency estimates appear, 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.

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 the turn of the century from below 0.2 litres to 1.28 litres by 2016. They also suggest China's wine self-sufficiency has fallen from 100% in 1995–1996 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-sufficiency would be 61% rather than 64% (Table 2, panel (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"

[5] 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 both English and Japanese languages on Japan's wineries.

[6] 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 2010–2016, the value of Japan's imports of grape juice concentrate averaged 7.4% of the value of its wine imports.

Table 1(b)

Japan's Wine Production, Apparent Consumption and Self-Sufficiency, Assuming All Imported Bulk Wine Is Bottled in and Sold as a Product of Japan, 1975 to 2016 (Kilolitres, Litres, and %)

	Bulk % of Imports[c]	*Prod'n (KL)*	*Prod'n + Net Imports (KL)*	*Apparent Consumption Per Cap. (L)*[a]	*SSR (%)*[a]
1975–1979	35	18,070	36,364	0.32	50
1980–1984	35	30,550	67,320	0.57	45
1985–1989	33	38,434	93,818	0.77	41
1990	30	47,693	132,360	1.07	36
1991	32	42,298	122,245	0.98	35
1992	26	44,194	112,914	0.91	39
1993	25	43,385	108,096	0.86	40
1994	19	51,534	135,802	1.08	38
1995	24	57,032	158,017	1.26	36
1996	24	63,755	164,526	1.31	39
1997	24	89,955	214,850	1.71	42
1998	21	115,117	410,579	3.25	28
1999	27	87,731	285,703	2.26	31
2000	18	83,989	260,500	2.06	32
2001	15	85,951	254,192	2.00	34
2002	14	89,880	254,217	2.00	35
2003	15	76,095	244,710	1.92	31
2004	14	68,880	244,415	1.92	28
2005	15	84,447	234,136	1.84	36
2006	16	68,202	239,624	1.88	28
2007	16	68,364	239,988	1.88	28
2008	17	68,973	239,903	1.88	29
2009	18	68,475	248,977	1.96	28
2010	19	71,720	263,354	2.07	27
2011	18	78,090	280,855	2.20	28
2012	17	81,873	334,180	2.62	24
2013	19	71,694	340,226	2.67	21
2014	20	76,269	346,829	2.74	22
2015	21	80,131	355,818	2.81	23
2016	22	79,866	347,169	2.74	23

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 desination province, per capita consumption and self-sufficiency would be even lower than official data suggest. For example, if domestic production is only two-thirds of that recorded as official production, in addition to imported bulk wine being counted as a product of China, then per capita consumption in 2016 would have reached only 0.89 litres rather then 1.28 litres and self-sufficiency would be 49% rather than 64% (Table 2, panel (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, 2018).

Table 1(c)

Japan's Wine Production, Apparent Consumption and Self-Sufficiency, Assuming All Imported Bulk Wine and Some Concentrate Is Made into Wine,[d] 1975 to 2015 (Kilolitres, Litres, and %)

	Prod'n from Imported Grape Juice Concentrate (KL)[d]	*Prod'n from Local Grapes (KL)*[d]	*Prod'n + Net Imports* (KL)	*Apparent Consumption Per Capita (L)*[a]	*SSR (%)*[a, e]
1975–1979	14,456	3,614	36,364	0.32	10
1980–1984	24,440	6,110	67,320	0.57	9
1985–1989	30,748	7,687	93,818	0.77	8
1990	38,154	9,539	132,360	1.07	7
1991	33,839	8,460	122,245	0.98	7
1992	35,355	8,839	112,914	0.91	8
1993	34,708	8,677	108,096	0.86	8
1994	41,227	10,307	135,802	1.08	8
1995	45,625	11,406	158,017	1.26	7
1996	51,004	12,751	164,526	1.31	8
1997	71,964	17,991	214,850	1.71	8
1998	92,093	23,023	410,579	3.25	6
1999	70,185	17,546	285,703	2.26	6
2000	67,191	16,798	260,500	2.06	6
2001	68,761	17,190	254,192	2.00	7
2002	71,904	17,976	254,217	2.00	7
2003	60,876	15,219	244,710	1.92	6
2004	55,104	13,776	244,415	1.92	6
2005	67,558	16,889	234,136	1.84	7
2006	54,562	13,640	239,624	1.88	6
2007	54,691	13,673	239,988	1.88	6
2008	55,178	13,795	239,903	1.88	6
2009	54,780	13,695	248,977	1.96	6
2010	57,376	14,344	263,354	2.07	5
2011	62,472	15,618	280,855	2.20	6
2012	65,498	16,375	334,180	2.62	5
2013	57,388	14,306	351,300	2.76	4
2014	61,196	15,073	365,315	2.88	4
2015	63,212	16,919	380,708	3.01	4

[a] The final two columns assume consumption equals net imports plus the average of production in that and the previous two years.

[b] The official consumption estimates are from the National Tax Agency (2016).

[c] The share of bulk in total wine imports in 1975–1987 is assumed to be 35%, the same as in 1988.

[d] 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 2013–2015, the only years for which actual data are available from the National Tax Agency (2016).

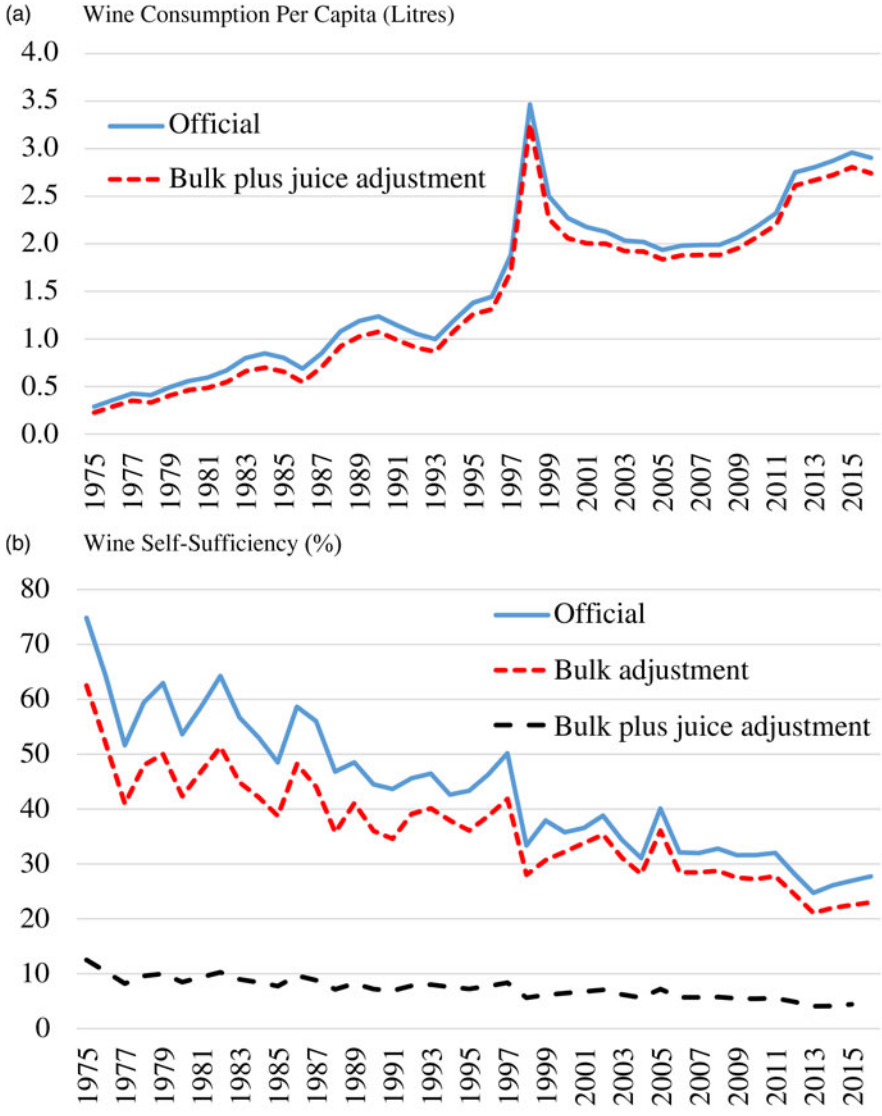
[e] In Table 1(c) self-sufficiency is production from local grapes as a percent of apparent consumption (with the latter including wine made from imported grape juice concentrate).

Source: See text.

Finally, in addition to some recorded imports to Hong Kong and Macau 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

Figure 1

Japan's Estimated Wine Consumption Per Capita and Wine Self-Sufficiency under Alternative Assumptions,[a] 1975 to 2016 (Litres and %)



[a] 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.

Source: See Table 1.

Table 2

China's Wine Production (Official, and under Alternative Assumptions), Trade and Apparent Consumption, 1995 to 2016 (Kilolitres, Litres, and %)

	(a) Official Data						*(b) Assuming All Bulk Imports Are Blended with Chinese Wine*				
	Prod'n (KL)	*Imports (KL)*	*Exports (KL)*	*Consm.[a] (KL)*	*Consm.[a] p.c. (L)*	*SSR (%)*	*Bulk (%) of Imports*	*Prod'n (KL)*	*Consm. (KL)*	*Consm. p.c. (L)*	*SSR (%)*
1995	220,000	712	2,622	218,090	0.18	101	37	219,737	217,827	0.18	101
1996	180,000	4,355	2,900	181,455	0.15	99	31	178,638	180,093	0.15	99
1997	190,000	33,578	2,779	220,799	0.18	86	58	170,422	201,221	0.16	85
1998	210,000	46,227	3,268	252,959	0.20	83	83	171,413	214,372	0.17	80
1999	230,000	43,658	4,531	269,127	0.21	85	91	190,232	229,359	0.18	83
2000	330,000	34,571	4,200	360,371	0.29	92	92	298,171	328,542	0.26	91
2001	355,000	29,220	2,967	381,253	0.30	93	91	328,467	354,720	0.28	93
2002	370,000	30,224	2,287	397,937	0.31	93	86	344,071	372,008	0.29	92
2003	399,000	41,404	2,004	438,400	0.34	91	88	362,431	401,831	0.31	90
2004	449,000	44,105	2,038	491,067	0.38	91	83	412,336	454,403	0.35	91
2005	498,000	53,971	2,712	549,259	0.42	91	80	454,935	506,194	0.39	90
2006	502,000	115,507	3,789	613,718	0.47	82	82	407,562	519,280	0.40	78
2007	653,000	148,240	9,285	791,955	0.60	82	71	548,290	687,245	0.52	80
2008	812,000	164,861	5,378	971,483	0.73	84	64	706,325	865,808	0.65	82
2009	968,840	172,881	1,483	1,140,238	0.86	85	46	888,644	1,060,042	0.80	84
2010	1,088,810	286,040	1,450	1,373,400	1.03	79	48	951,774	1,236,364	0.92	77
2011	1,156,860	365,535	1,916	1,520,479	1.13	76	33	1,036,603	1,400,222	1.04	74
2012	1,376,620	394,282	2,038	1,768,864	1.31	78	31	1,255,052	1,647,296	1.22	76
2013	1,178,360	377,541	1,900	1,554,001	1.14	76	24	1,089,076	1,464,717	1.08	74
2014	1,160,990	383,431	3,670	1,540,751	1.13	75	21	1,079,206	1,458,967	1.07	74
2015	1,148,000	552,088	8,221	1,691,867	1.23	68	26	1,002,768	1,546,635	1.12	65
2016	1,137,400	638,000	9,950	1,765,450	1.28	64	23	993,563	1,621,613	1.17	61

Continued

Table 2
Continued

	(c) Assuming Production Is Two-Thirds of Official, and All Bulk Imports Also Blended				*(d) Assuming Also Smuggling from HK*[b]				
	Prod'n (KL)	*Consm. (KL)*	*Consm. p.c. (L)*	*SSR (%)*	*Extra HK Exports to China (KL)*	*Consm. (KL)*	*Consm. p.c. (L)*	*SSR (%)*	*Unrecorded as % of China's Recorded Wine Imports*
2000	187,656	218,027	0.17	86	487	219,052	0.18	86	1.4
2001	210,128	236,381	0.19	89	504	236,867	0.19	89	1.7
2002	220,512	248,449	0.19	89	518	248,953	0.20	89	1.7
2003	229,426	268,826	0.21	85	512	269,343	0.22	85	1.2
2004	262,662	304,729	0.24	86	849	305,241	0.24	86	1.9
2005	288,935	340,194	0.26	85	1,024	341,042	0.27	85	1.9
2006	240,228	351,946	0.27	68	1,788	352,969	0.28	68	1.5
2007	330,618	469,573	0.36	70	2,882	471,361	0.37	70	1.9
2008	435,658	595,141	0.45	73	3,466	598,023	0.46	73	2.1
2009	565,696	737,094	0.55	77	4,247	740,560	0.57	76	2.5
2010	627,190	911,780	0.68	69	6,168	916,026	0.70	68	2.2
2011	686,436	1,050,055	0.78	65	9,246	1,0562,23	0.81	65	2.5
2012	822,725	1,214,969	0.90	68	9,338	1,224,214	0.93	67	2.4
2013	710,820	1,086,461	0.80	65	9,556	1,095,799	0.83	65	2.5
2014	697,691	1,077,452	0.79	65	11,167	1,087,007	0.82	64	2.9
2015	619,582	1,163,449	0.85	53	13,671	1,174,616	0.88	53	2.5
2016	598,767	1,226,817	0.89	49	13,579	1,240,488	0.92	48	2.1

[a] 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).

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

Sources: Authors' calculations, starting with official production and trade numbers reported by the FAO, WHO, and OIV.

re-exporting officially,[7] that would mean 2% higher consumption in China but the self-suffiency rate would be an extra percentage point lower (compare Table 2, panel (c) and Table 2, panel (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). 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).

C. *Hong Kong and Macau*

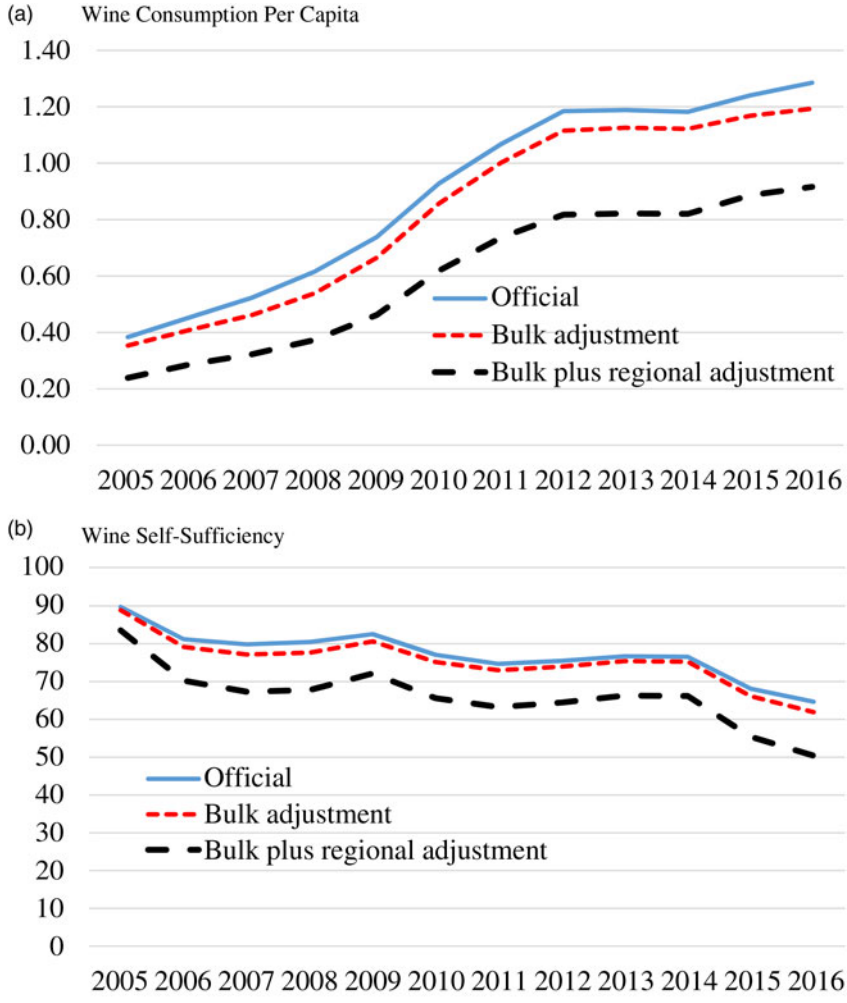
If Hong Kong's wine exports to China are in fact more than what are documented in official records, it makes a much bigger difference to Hong Kong's apparent wine consumption per capita than to China's. To use the previous example, if the extent of such smuggling amounted to half as much again as Hong Kong has been officially re-exporting, then Hong Kong's apparent consumption is only 3.0 litres instead of 4.9 litres per capita in 2015–2016 (see Table 3). That is much closer to the average annual 2.4 litres consumption level in Singapore in recent years.

Macau has less than one-tenth of the population and hence a much smaller economy than Hong Kong, but it has had a similarly higher 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 Macau, then it has by far the highest per capita wine consumption in Asia at more than twice that of Hong Kong's, three times that of Japan's, and four times that of Singapore's. That seems unlikely, however, notwithstanding the possibly considerable consumption by high-income gambling tourists in Macau (most of whom come from the mainland). A more likely explanation for these comparative data is that a large share of Macau'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 2005–2012 and its subsequent slowdown following the austerity and anti-corruption measures Beijing introduced in December 2012 (Table 2, panel

[7] 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 tenth anniversary of the decision to abolish Hong Kong's wine import taxes. The reduction in Hong Kong's wine import tariff from 80% in February 2006 down to 40% starting in March 2007 and zero from March 2008, and of Macau's from 15% to zero after 27 August 2008, would have increased the incentive to smuggle imported wine from those territories to the mainland.

Figure 2

China's Estimated Wine Consumption Per Capita and Wine Self-Sufficiency under Alternative Assumptions,[a] 2005 to 2016 (Litres and %)

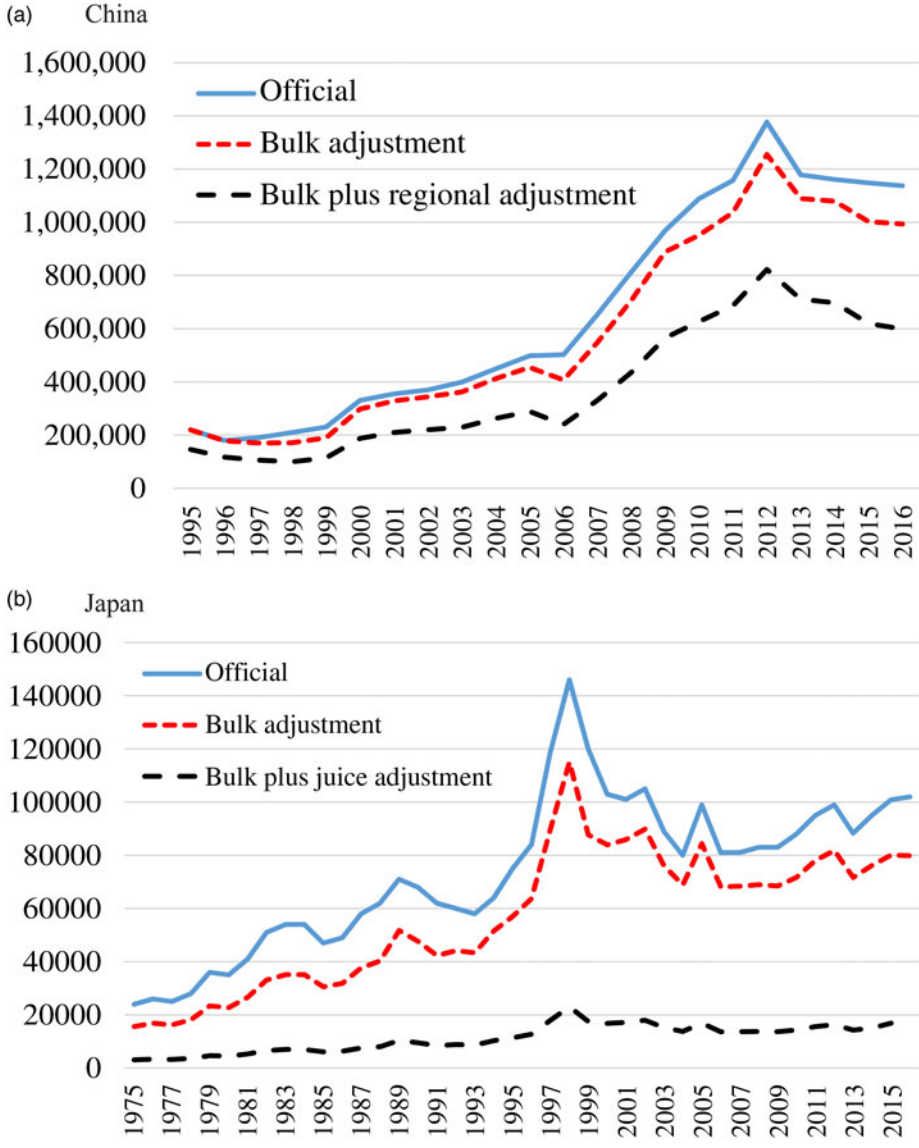


[a] "Bulk adjustment" assumes all of China's bulk imports each year are blended with domestically produced wine before being bottled and sold as a Product of China; "Bulk plus regional adjustment" assumes domestically produced wine is only two-thirds of the official amount because of double counting 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,[a] 1975 to 2016 (Kilolitres)



[a] For explanation of assumptions, see note a of Figures 1 and 2.

Sources: See Tables 1 and 2.

Table 3

Wine Imports, Re-exports and Consumption, Hong Kong (under Alternative Assumptions[a]) and Macau, 2000 to 2016 (Kilolitres and Litres)

	Hong Kong								*Macau*				
	Imports Recorded (KL)	*Re-exports Recorded (KL)*	*Net Imports Recorded (KL)*	*Consm.[b] Per Cap. (litres)*	*Re-exports as % of Import Volume*	*Assumed Extra HK Exports to China (KL)*	*Amended Net Imports (KL)*	*Amended Consm.[b] Per Cap. (Litres)*	*Imports Recorded (KL)*	*Re-exports Recorded (KL)*	*Net Imports Recorded (KL)*	*Consm.[b] Per Cap. (Litres)*	*Re-exports as % of Import Volume*
2000	10,135	973	9,162	1.38	10	487	8,676	1.30	905	53	852	1.97	6
2001	10,798	1,007	9,791	1.46	9	504	9,288	1.38	963	14	949	2.17	1
2002	10,925	1,035	9,890	1.46	9	518	9,373	1.39	1,193	33	1,160	2.61	3
2003	11,200	1,023	10,177	1.49	9	512	9,666	1.42	1,197	50	1,147	2.54	4
2004	13,440	1,697	11,743	1.71	13	849	10,895	1.59	1,463	26	1,437	3.13	2
2005	15,124	2,047	13,077	1.90	14	1,024	12,054	1.75	1,551	23	1,528	3.26	2
2006	18,336	3,576	14,760	2.13	20	1,788	12,972	1.87	1,919	21	1,898	3.95	1
2007	23,357	5,763	17,594	2.52	25	2,882	14,713	2.11	2,654	78	2,575	5.22	3
2008	30,327	6,932	23,395	3.33	23	3,466	19,929	2.84	3,518	225	3,293	6.49	6
2009	34,837	8,493	26,344	3.73	24	4,247	22,098	3.13	4,826	247	4,579	8.79	5
2010	39,984	12,336	27,648	3.94	31	6,168	21,480	3.06	6,128	589	5,539	10.37	10
2011	48,197	18,491	29,706	4.20	38	9,246	20,461	2.89	7,710	777	6,933	12.69	10
2012	50,525	18,675	31,850	4.45	37	9,338	22,513	3.15	6,839	na	na	na	na
2013	50,122	19,111	31,011	4.31	38	9,556	21,456	2.99	na	na	na	na	na
2014	52,514	22,334	30,180	4.18	43	11,167	19,013	2.63	5,355	740	4,615	7.99	14
2015	63,390	27,342	36,048	4.95	43	13,671	22,377	3.07	6,011	44	5,966	10.14	1
2016	62,935	27,157	35,778	4.87	43	13,579	22,200	3.02	5,932	554	5,378	8.97	9

[a] Unrecorded re-exports to the mainland are assumed to be 50% of Hong Kong's total recorded re-exports.

[b] 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, Japan, and the World 2000 to 2015 (%)

	China Base	*China Amended*[a]	*Hong Kong Base*	*Hong Kong Amended*[b]	*Japan Base*	*Japan Amended*[c]	*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

[a] Assuming that China's wine production is two-thirds of the official estimate, 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.

[b] 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.

[c] Assuming all imported bulk wine is bottled in and sold as a product of Japan.

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

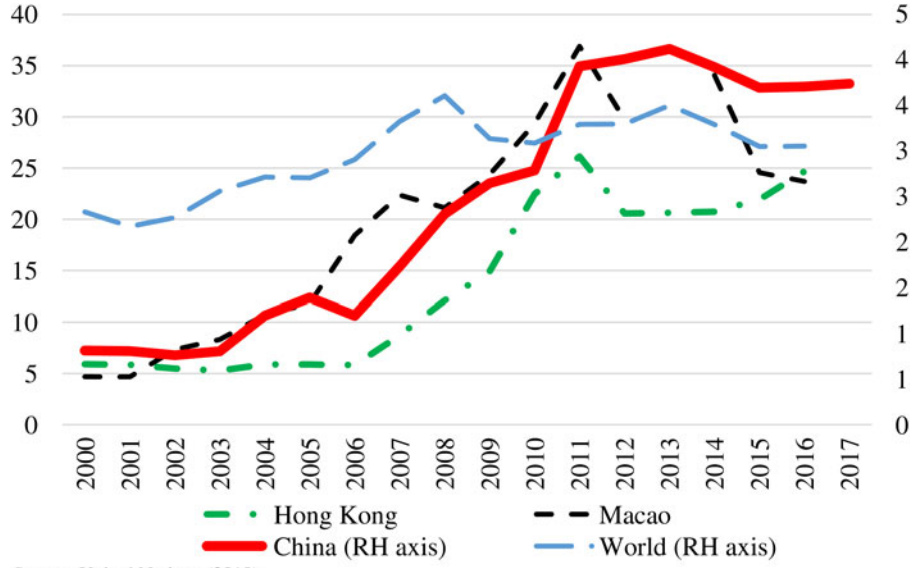
(a) and Table 4), as well as with the rapid rise in the average price of wine imports into greater China during 2005–2012 and their plateauing thereafter—in contrast to the rest of the world where average import prices fell from 2008 because of the global financial crisis (Figure 4).

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 earlier noted 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).

Figure 4

Average Price of Wine Imports, China, Hong Kong, Macau and the World, 2000 to 2017 (Current US$ Per Litre)



Source: United Nations (2018).

The more-than-doubling of apparent per capita consumption in Hong Kong and Macau based on official trade statistics, following the abolition of their wine import tariffs in 2008, imply very high price elasticities of demand for wine—especially in Macau 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.

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

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

Continued

Table 5
Continued

(b) Consumption

	China Base	*China Amended*	*Japan Base*	*Japan Amended*	*China + Japan, Base*	*China + Japan, Amended*
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

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

References

Anderson, K., and Pinilla, V. (with the assistance of A.J. Holmes) (2017). *Annual Database of Global Wine Markets, 1835 to 2016*. Wine Economics Research Centre, University of Adelaide, posted at www.adelaide.edu.au/wine-econ/databases (accessed 29 November 2017).

Anderson, K., and Wittwer, G. (2015). Asia's evolving role in global wine markets. *China Economic Review*, 35, 1–14.

Boyce, J. (2017). China wine watch: Have imports already overtaken local production? Grape Wall of China, posted at http://www.grapewallofchina.com/ (accessed 20 May 2017).

Boyce, J. (2018). Do imported wines now have a majority of the market? Grape Wall of China, posted at http://www.grapewallofchina.com/2018/03/22/imports-top-local-wines-china-market/ (accessed 24 March 2018).

JETRO. (1998). *Japanese Market Report, Regulations and Practices: Wine*. Report No. 15, March, Tokyo: Japan External Trade Organization.

Kawasaki, N., Nagatani, T., Yamakawa, R., Nakamura, Y., Iba, H., Ueda, N., Ochiai, K., and Oda, S. (2011). An empirical analysis on the sustainable business of a regional small winery, from the viewpoint of product portfolio based on potential sources of grape. *Journal of ASEV Japan*, 22(1), 22–30.

Ministry of Finance. (2017). *Trade Statistics of Japan*. http://www.customs.go.jp/toukei/info/index.htm (accessed 28 September 2017).

National Tax Agency (of Japan). (2015). Notice on establishing labelling standards for manufacturing process and quality of wine. Notice No.19, Tokyo: National Tax Agency, October. http://www.nta.go.jp/shiraberu/zeiho-kaishaku/kokuji/151030_3/index.htm and in English at http://www.nta.go.jp/foreign_language/sake/geographical/01.htm and http://sakefanworld.info/ja/sake_GI/pdf/GI_en.pdf (accessed 28 September 2017).

National Tax Agency (of Japan). (2016). 2016 Factsheet [Kajitsushi Seizogyo no Gaikyo]. http://www.nta.go.jp/shiraberu/senmonjoho/sake/shiori-gaikyo/seizogaikyo/kajitsu/pdf/h27wine-shosai.pdf (accessed 28 September 2017).

National Tax Agency (of Japan). (2017). 2017 Factsheet [Kajitsushi Seizogyo no Gaikyo]. http://www.nta.go.jp/shiraberu/senmonjoho/sake/shiori-gaikyo/seizogaikyo/kajitsu/pdf/28wine.pdf (accessed 9 March 2018).

Oda, S. (2001). Targets and topics for wine industry research. *Natural Resource Economics Review* [Seibutsu Shigen Keizai Kenkyu, Kyoto University], 21, 197–215.

Robinson, J. (2018). Hong Kong celebrates 10 duty-free years. *Jancis Robinson blog*, 27 February. Available at https://www.jancisrobinson.com/articles/hk-celebrates-10-duty-free-years (accessed 27 February 2018).

Shimamura, A. (2008). *Kanzen Kokusan Shugi*. Tokyo: Toyo Keizai.

Takahashi, T., Harada, K., Saito, H., and Kobayashi, K. (2017). *Wines of Japan*. Tokyo: Ikaros Publications.

United Nations. (2018). *COMTRADE database*. United Nations, Department of Economic and Social Affairs, Statistics Division, Trade Statistics, posted at https://comtrade.un.org/data/ (accessed 5 March 2018).

Uytsel, S.V. (2015). Geographical indications in Japan. Rochester, NY: SSRN. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2692450 (accessed 28 September 2017).

World Bank. (2017). *World Development Indicators*. Washington, DC: World Bank. http://databank.worldbank.org/data/reports.aspx?source=WDI-Archives (accessed 28 September 2017).

Yoon, S., and Lam, T.-H. (2012). The alcohol industry lobby and Hong Kong's zero wine and beer tax policy. *BMC Public Health*, 12(717), 1–12.

Appendix Table 1

Winegrape Production in Japan, by Growing Region and Crushing Region, March 2016 (Tonnes)[a]

Place of production / Place of wine making	Sapporo, Hokkaido	Sendai, Fukushima pref. (Yamagata prefecture)	Kanto area (Nagano prefecture)	Tokyo area (Yamanashi prefecture)	Kanazawa, Ishikawa prefecture	Nagoya, Aichi prefectire	Osaka	Hiroshima prefecture	Takamatsu, Kagawa prefecture	Fukuoka prefecture	Kumamoto prefecture	Okinawa prefecture	Grape used for wine making
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, Aichiprefecture	-	-	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, Kagawaprefecture	-	-	-	-	-	-	-	-	**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

[a] "–" 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).