

Mapping the local-global wine chain from Europe to China

Towards shared standards and benchmarks in wine traceability and authenticity

Silje Elde, Patrick Berg Sør Dahl, Marianne Svorcken, Thomas Nyrud, Celine Boechat, Cheryl Cordeiro & Petter Olsen





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The main office is located in Tromsø, and the research divisions are located in Bergen, Stavanger, Sunndalsøra, Tromsø and Ås.

Main office in Tromsø:

Muninbakken 9–13
P.O.box 6122 Langnes
NO-9291 Tromsø

Ås:

Osloveien 1
P.O.box 210
NO-1433 ÅS

Stavanger:

Måltidets hus, Richard Johnsgate 4
P.O.box 8034
NO-4068 Stavanger

Bergen:

Kjerreidviken 16
P.O.box 1425 Oasen
NO-5844 Bergen

Sunnalsøra:

Sjølsengvegen 22
NO-6600 Sunndalsøra

Alta:

Kunnskapsparken, Markedsgata 3
NO-9510 Alta

Company contact information:

Tel: +47 77 62 90 00

E-mail: post@nofima.no

Internet: www.nofima.no

Business reg.no.:

NO 989 278 835 VAT



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Report

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<p><i>Summary/recommendation:</i></p> <p>When investigating food authenticity and potential fraud, there are two main options. One approach is to focus on determining the chemical, physical, or sensory characteristics of the food samples themselves and check if they match the description provided; the other approach is to analyse the supply chain, and try to identify discrepancies in the recorded data. The work outlined in this report employs the latter approach to investigate wine exported from the Bordeaux region in France and imported to China. The mapping and analysis of the supply chain, and the indication of where fraud might happen was partly based on existing scientific literature, reports, and news stories, and partly on a number of interviews conducted with supply chain actors in France and in China.</p>	
<p><i>Summary/recommendation in Norwegian:</i></p> <p>Når man studerer autentisitet og potensiell svindel i matindustrien finnes det to tilnærminger. En tilnærming er å fastsette de kjemiske, fysiske eller sensoriske egenskapene til selve matvaren og se om de samsvarer med beskrivelsen av produktet. Den andre tilnærmingen er å analysere forsyningskjeden, og prøve å identifisere avvik i de registrerte dataene. Arbeidet som er skissert i denne rapporten bruker den sistnevnte tilnærmingen for å undersøke vin eksportert fra Bordeaux-regionen i Frankrike og importert til Kina. Kartleggingen og analysen av forsyningskjeden, og indikasjonen på hvor svindel kan forekomme, er delvis basert på eksisterende vitenskapelig litteratur, rapporter og nyhetssaker, og dels på en rekke intervjuer gjennomført med forsyningskjedeaktører i Frankrike og i Kina.</p>	

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1 Introduction

This study addresses a main challenge related to food product traceability, where there does not necessarily exist a connection between the actual property a food product has (e.g. the actual species used, origin of, or eco-label status of the product) and the claim made in the traceability system which in principle may be true or false. In establishing the veracity of traceability system claims current knowledge paradigms broadly employ two broad approaches. The first approach is based on DNA-based traceability and block chain technology. The second approach is based on detecting inconsistencies in recorded claims by undertaking a supply chain mapping and analysis. The latter approach is the focus of this study.

Using the example of Bordeaux wine produced in France and sold on the Chinese wine market, we identify inconsistencies between the amounts of wine produced in- and exported from Bordeaux, France, and imported to China. Further, through in-depth field studies, document studies and interviews with key people in the Bordeaux-China wine supply chain, we aim to identify factors that are conducive to the issue of fraud, its impact on supply chain actors, and possible preventive or mitigative measures.

This report is structured as follows: first, a general introduction to Bordeaux wine is given, describing its position both globally and in France. This is followed by a description of the Chinese wine market, including import volumes, consumption patterns and recent trends and development. We then provide an overview of the topic of fraud in the wine sector. This is followed by a description of the methodological approach used in the study. Chapter 4 presents the results of the empirical study, before we in chapter 5 discuss weak points in the supply chain, possible effects of wine fraud on supply chain actors, and possible mitigative or preventive measures.

2 Bordeaux Wine

Bordeaux is the largest wine growing region in France, accommodating 15% of the total vineyards in France and 1,5% of the total vineyards in the world (CIVB 2016). About 30 to 40 years ago, the vineyards in Bordeaux struggled economically, but now the situation has changed for the better. Average vintages produce over 700 million bottles of Bordeaux wine, ranging from everyday table wine to some of the most prestigious and expensive wines in the world (CIVB 2018). The 89% of Bordeaux-wine is red, followed by white wines and dry whites, and smaller quantities of rose and sparkling wines (CIVB, 2018; Figure 1).

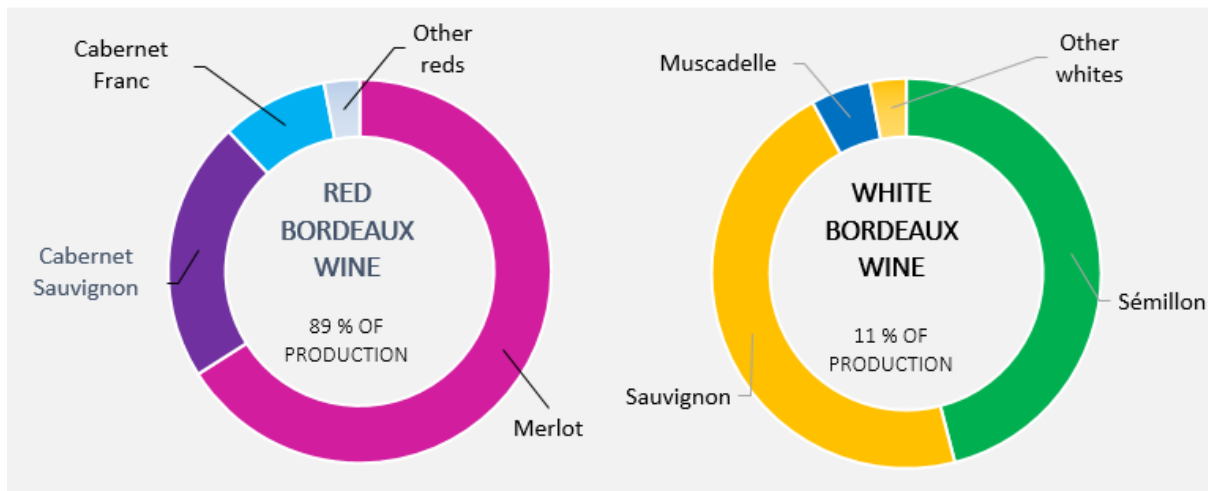


Figure 1 Areas of red and white wine planted in Bordeaux by grape variety, 2015 (CIVB/ Source: Customs)

Wine products with a value of 9 billion EUR, or 15,5 mhl, was exported from France to other markets in 2017, making it the largest export nation in the world in terms of value¹. About 56 % went to markets outside of the European Union. The largest export markets for French wine in terms of volume are Germany, China and the United Kingdom (representing 42 % of total export volume)². The most valuable export markets are, according to Trade Statistics, United States, United Kingdom and China (Table 1).

During 2017, Bordeaux wine export grew both in volume, nearing 2,2 million hl, and in value, reaching slightly over 2 billion EUR (CIVB, 2018). The top sales destination for Bordeaux AOC was China, both in terms of volume and value exported, with 632 thousand hl and about 400 million EUR respectively. In addition to China representing 30% of the total wine exports in 2017, the market has expanded rapidly with an average annual growth (CAGR) of above 30% during the last ten years³.

¹ European Commission. (2018). *Exchange of views on the WINE market 2017 Comext Wine Trade results*. Retrieved from: https://ec.europa.eu/agriculture/sites/agriculture/files/wine/statistics/wine-trade-2017_en.pdf

² European Commission. (2019). *International Trade Since 1988 by HS2,4,6 and CN8*. [Database]. Retrieved from: <http://epp.eurostat.ec.europa.eu/newxtweb/>

³ Delavallade, A. (2018). *Detailed export statistics from Bordeaux to China*. [Datasheet]. Provided for us from CIVB/Customs database. European Commission. (2019). *International Trade Since 1988 by HS2,4,6 and CN8*. [Database]. Retrieved from: <http://epp.eurostat.ec.europa.eu/newxtweb/>

Table 1 10 largest export markets for French wine, measured in volume

Export markets	Mhl	Share mhl	Billion EUR	Share value
Germany	2,3	15 %	0,7	8 %
China	2,1	14 %	0,8	8 %
United Kingdom	2,0	13 %	1,1	13 %
United States	1,6	10 %	1,6	18 %
Belgium	1,3	9 %	0,5	6 %
Netherlands	1,1	7 %	0,3	4 %
Canada	0,6	4 %	0,4	4 %
Japan	0,6	4 %	0,5	6 %
Switzerland	0,4	3 %	0,4	4 %
Sweden	0,4	3 %	0,2	2 %
Other markets	3,0	19 %	2,6	29 %
Total export	15,5		9,1	

2.1 The AOC System

The original Appellation d'origine contrôlée or AOC system was developed by producers as response to widespread fraud and depression within the wine sector (Charter, 2003). It mainly focuses on the origin of the grapes in order to signal quality to buyers, but it is also enhanced by other legal restriction on production methods intended to assure quality.

In the wine world in general, an appellation means a legally defined and protected geographical area used to identify where the grapes of wine were grown, and the appellation is based on the difference in terroir. In France, the term is more complicated. In addition to specifying a geographic area, the AOC-system also controls what grape varieties may be grown and how, and to what levels of alcohol a wine may be made (14% is the maximum) in a specific appellation. There are currently 60 appellations in Bordeaux, grouped into six overall categories by Bordeaux Wine Council/CIVB: Groups Bordeaux, Côtes, Médoc & Graves, St-Emilion/Pomerol/Fronsac, Blancs Secs and Blancs Doux (CIVB, 2018).

In 2012, France began a process of adapting to a new European Union classification system of wine quality. Rather than using the four tier system long used in France (Appellation d'origine contrôlée, Vin délimité de qualité supérieure, Vin de France, Vin de Table) wines will fall into one of three descending quality classifications (Appellation d'Origine Protégée, Indication Géographique Protégée, Vin de France).

In addition to the AOP system, it has other classifications developed by the powerful wine merchants and brokers that are based on the price of the wine attained in the market. The classifications are not based on the location of grape production, but it is a hierarchy of wines across a number of appellations (Charter, 2003). All of the higher classified wines of Bordeaux do also fulfill the AOC-rules and regulations. It is important to note that even though Bordeaux is heavily classified, the classified chateaux produce less than 5 % of the total volume. While the rankings still has a big influence on the market prices, these days it is not unusual to see a second-growth, or even a wine that is not classified, fetching high scores and prices (Charter, 2003). Cardebat and Figuet (2004) points out that the information asymmetry between the producer and the buyer may be large in Bordeaux, as the complex

classification system limits the producers and distributors possibility to signal their current wine quality to consumers.

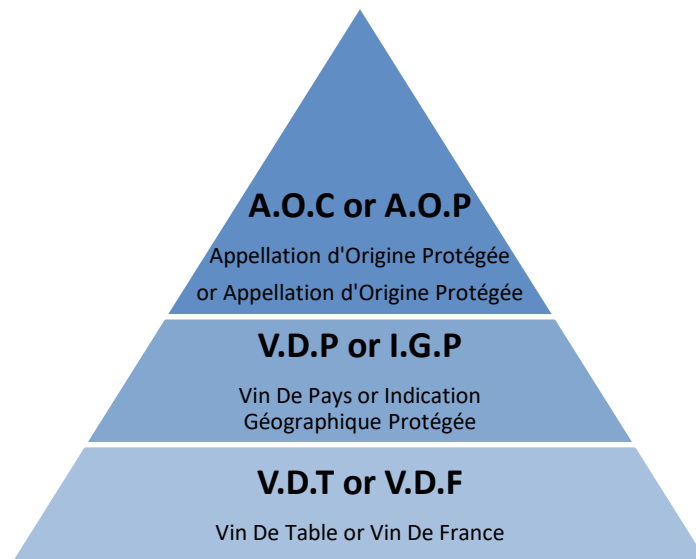


Figure 2 The classification system of wine quality in France

2.1.1 Appellation d'Origine Protégée (AOP)

AOP (PDO - Protected designation of origin) is the highest certification of a quality wine in the EU, replacing the old French AOC system. The system is controlled by the French governmental department INAO (Institut National de l'Origine et de la Qualité)⁴.

For a Bordeaux producer to sell wine using AOC or AOP on the label, the chateau and vineyards must be located inside the geographical boundaries of the appellation, and follow the specific rules and regulations for production. The system, however, has not always delivered all that it has promised. Basset (2000) argues that the typicality of a wine itself does not prove the quality of what one is drinking (as cited in Charter, 2003).

2.1.2 Indication Géographique Protégée (IGP)

IGP (PGI - protected geographical indications) is an intermediate category replacing Vin de Pays. The label is meant for wine producers where at least a step among production, transformation or development of this product must take place in the defined geographical area (INAO, 2019). While terroir still plays a key role with this designation, its central role has declined, due to reduced requirements. The IGP sign has been adopted by winemakers who wish to have some autonomy and freedom outside stricter winemaking laws.

⁴ INAO. (n.d.) PDO – AOC. Retrieved from: <https://www.inao.gouv.fr/eng/Official-signs-identifying-quality-and-origin/PDO-AOC>

2.1.3 Vin de France

VDF is a table wine category basically replacing 'Vin de Table', but allowing grape varietal and vintage to be indicated on the label⁵. The wines can be made from grapes grown anywhere in France, thus, no appellation nor the region is specified in the label. This designation incorporates all wines that do not fall into the other two categories and has no geographical indication at all. As wines can be blended from any specific area.

2.2 Wine Market in China and Bordeaux Wine

China's approximately 7000-years long history in producing and consuming alcohol in the form of baijiu based on rice (Shen & Antonopoulos, 2017; Shen & Wang, 1998), and its current emerging taste and preference for imported grape wines has catalyzed global interests in the Chinese wine market. Being the globe's most populous country, with an expected 1.4 billion in population by 2020, China is the fifth largest wine market in the world. It is expected that in the next 4 years, China will be the second largest wine market on the globe, coming close to consumer demand to the European Union for wines (EUSME Centre, 2017).

China's current development in its wine market both in its domestic production of red wines, as well as general consumption pattern is most likely influenced by China's opening up in the 1980s, in the period of reformation and embracing a new Chinese perspective market economy. With a loosening of agricultural controls and enterprise, China made foreign investments attractive by various policy measures. From 1980 onwards, landmark joint ventures in the wine industry were forged with foreign know-how and expertise in wine making in collaboration with local network connections, labour and market access (Wang, 2019). In terms of production in the grape-wine category, China is expected to be the globe's largest producer in the next half century. It currently places in the top ten producer by volume and has the largest planting area of Cabernet Sauvignon vines. Chinese made red wines however, cater mostly to its domestic market.

The consumption patterns of wine in China are bolstered by a young, increasingly affluent and mobile population, China's annual consumption of alcohol has steadily increased in the past five years (Yu et al., 2009). In 2019, the annual consumption of alcohol was approximately 64 billion litres, with an expected consumption of 65 billion litres of alcohol by 2020 (Statista, 2019).

Table 2 shows the 2018 forecast for imported wine into China. Since its notable interest in imported wine in 2009, China's wine import market continues its 2-digit growth in volume and value. 2017 reported a 17.4% increase in volume and an 18.3% increase in value over 2016. The typical import wine into China is a 3-month oaked, young red wine. Sparkling wine, considered a niche market at less than 5% import in volume, had a 33% increase in value between 2016 and 2017, making it the product that currently sees most value increase on the China wine market (Jimenez, 2018). As China's taste in the wine market develops, the demand for less commercial brands is expected to increase in favour of boutique sparkling wines and Champagne houses. This wine segment is expected to grow in the next 5 to 10 years (EUSME, 2017).

⁵ The Wine Guy (2017). AOP. Retrieved from. <http://www.wineguy.co.nz/index.php/81-all-about-wine/320-aop>

Table 2 2018 Forecast for imported wines into China (Source: Jimenez, 2018 p.11)

Imports	Volume M hl	Bulk M hl	Bottled M hl	Value M USD	Bulk M USD	Bottled M USD
2017	7.5	1.81	5.69	2,800	159	2,641
2018	8.7	2.2	6.52	3,237	194	3,043
2018/2017	+16%	+21%	+14.6	+15.6	+22%	+15.2

Imported wines hold the highest volume share in the combined 1st-tier⁶ cities of Beijing, Guangzhou, Shanghai and Shenzhen. These cities account for approximately 53% volume of imported wine sales with on-trade channels representing 80% of total sales (AGR Canada, 2016). The strong presence of expatriates and internationally educated young professionals and consumers are part of the contributing reasons to the high interest in imported wines. Consumer knowledge in China about wine is increasing in part because of Chinese tourism to wine drinking countries, and the number of foreign trips is expected to reach 200 million by 2020 (AGR Canada, 2016).

Wine imports are both from old and new world wine producing regions. 2017 statistics indicate that the top old-world countries of wine import for China are France, Spain and Italy. New world regions include Australia, Chile, South Africa and New Zealand (Table 3).

Table 3 2017 top 10 countries for China wine imports, including bulk wines (EUSME Centre, 2017)

Country	Value USD
France	1,103,713,142
Australia	727,719,244
Chile	328,748,510
Spain	193,816,802
Italy	161,752,554
South Africa	29,538,440
New Zealand	29,392,107
Portugal	23,532,546
Argentina	22,267,983
Germany	21,094,604

The Chinese wine market can be further segmented into bulk and bottled wines, the former being more competitive on the market with a CIF (cost, insurance and freight) price of around EUR. 0.6 per liter. Bulk wines are led by Chile, Spain and Australia. Chinese wineries most interested in bulk wines are located in the Yantai area, Shangdong province and wineries by Shacheng in Hebei province. Bottled wines have a higher average CIF price of EUR 2.6 per liter in the first half of 2017. This higher price might prove a challenge for the average Chinese consumer household (particularly in 3rd and 4th tier cities) due to what disposable income allows (EUSME Centre, 2017; SCMP, 2016). 3rd and 4th tier cities are however home to more than one million residents each, and are seen as opportunities for the wine market growth in China.

⁶ China's cities are ranked in a 4-tier system based on Gross Domestic Product (GDP), ranging from USD 350 trillion to USD 20 billion. All 1st-tier have a GDP over USD 300 billion. Most 4th-tier cities have a GDP below USD 17 billion (SCMP, 2016).

China’s Bordeaux market has evolved since the late 1990s. China and Hong Kong are currently the most important markets for Bordeaux wines. In 2012, Bordeaux wines represented 20% of China’s imports for wine with 17% in value of all Bordeaux exports. Hong Kong had positioned itself in the same time, as the number one place for fine wine from Bordeaux representing 5% in volume and 18% in value of all Bordeaux exports in 2011 (Le Monde, 2012). The top five countries of France, Australia, Chile, Spain and Italy make 90% of wine imports for China, with France. Beginning with bottled red wines from around 2005, France has in the past few years gotten into the bulk wines segment. In 2017, French bulk wine exports increased threefold to China at +252% (EUSME, 2017). Figure 3 illustrates how the Chinese import wine market has grown considerably since the early 2000s.

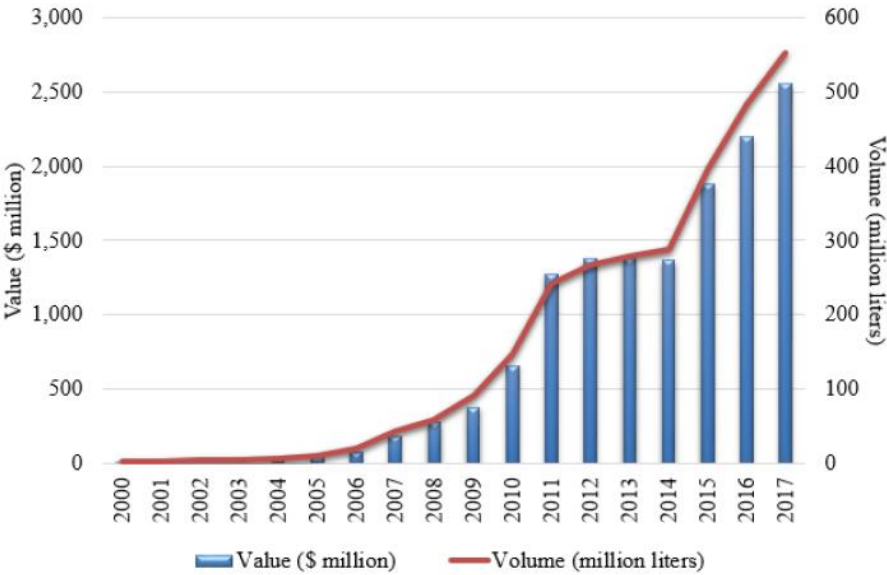


Figure 3 China wine imports 2000 to 2017 (Countryman & Muhammad, 2018, p.1)

2.2.1 Phases of development 2005 – 2017

In the span of less than 2 decades, three distinct phases of growth can be identified for the Chinese import wine market (Countryman & Muhammad, 2018). The first phase from 2005 to 2009 marks the emergence of the China imported wine market, with France as main supplier to the Chinese market. Wines from the region of Bordeaux were first movers into the Chinese wine market, and as such, enjoyed a competitive market position for some years. The access and sourcing of fine wines into mainland China is also due to structural changes such as opening of the market in Hong Kong, and the reduction in excise duties in 2008 (Masset *et al.*, 2016).

The second phase from 2009-2014 has some nuance to its development due to various influencing factors, not the least, the changing political environment of the country. According to Simon Zhou, founder of Ruby Red, a wine import company headquartered in Shanghai, China, there was considerable hype surrounding high-end Bordeaux wines, e.g. Château Lafite or Château Mouton, which were being purchased as gifts due to their perceived status. This contributed to increased prices, with some vintages increasing six-fold in a few years. However, in 2012, with Xi Jinpings anti-corruption policies and cuts in government spending on luxury items, the sales of high-ends wines went down

considerably, and the imports dropped dramatically from 2012 to 2013, and remained stable through 2014, returning to a "real market" (Zhou, 2015).

This 'real market' described by Zhou has since then matured, giving rise to the third phase of development shown in Figure 3 beginning in 2015. In 2015, only about 65% of wine consumers in China were aware of Australia as a wine-producing country, compared to 90% for France, 81% for China and 69% for Italy (Corsi et al., 2016). Studies on consumer preferences for wines in China indicate that the Chinese market has its own distinct curve of sensory evolution (Williamson et al., 2018). Chinese wine consumers differ from their western counterparts in the way that they respond to wine attributes. Apart from wanting to enjoy the sophistication and relaxation that the experience of wine consumption brings, Chinese wine consumption behaviour is deeply rooted in the knowledge and use of traditional Chinese medicine (TCM) and the use of traditional medical systems in Asia (Jiang & Quave, 2013).

The grape wine, from being something only wealthy businessmen would purchase as a gift or for extravagant banquets without sensory or taste consideration (Lockshin *et al.*, 2017), is increasingly being consumed by the Chinese middle-class as a way of living healthy. Consumers also focus more on the flavours of the wine consumed in order to make informed decisions on their purchases (Williamson et al., 2018).

2.3 Wine Fraud

Wine can be an attractive target for fraud due to the potentially high prices associated with it, and several factors can be conducive to fraud: French wine has a large market with many different customer-segments, and it is a market leader which enjoys a price-premium, meaning it might attract more fakes than other "brands". Other factors, such as a limited supply, a diminishing supply of older vintages, and increasing demand as a function of increased global wealth and a growing customer-base, can cause prices to increase (Sokolin, 2008). Further, owners of IPRs have on average 28% higher revenues per employee than non-owners (OHIM, 2015). IPR thus contributes to higher prices, and this effect is particularly strong for small and medium sized companies, which comprises the bulk of the French wine-industry.

As well as the abovementioned factors, which all contribute to potentially high profits for fraudsters, there are also several factors that reduce the risk of detection: There might be limited knowledge among buyers about what to expect from a given wine in terms of taste and appearance, especially in newer markets, e.g. China. The same goes for labels, bottle-types etc., due to issues such as the complexity of labels, variety of terms used to identify different wines, and lack of brand identity (Viot and Passebois-Ducros, 2010). This might give counterfeiters more "wobble-room", and obvious fakes might go undetected by the consumer due to lack of a reference-point. It might also be difficult for the producers themselves to be aware of counterfeit versions of their own products due to the large market and multitude of different wines.

Lastly, due to the complexity of the supply chain, it is difficult to determine how much of a certain wine is supposed to be in circulation. Wine travels large distances and often changes hands. There are no records of what has been consumed, and the record keeping in production is sometimes poor (Hellmann, 2009). This makes it difficult to disprove authenticity of well-done counterfeits. There might potentially also be some degree of social acceptance, especially if it gives access to more expensive

wines at a cheaper price (either through cheap well-done counterfeits or through an overall lowering of the price that the supply of counterfeits gives).

As with many other types of illegal activity, estimating the true economic scope of fraud in the food and drinks sector is highly difficult, though estimates have been made. Claims have been made that the value of counterfeit wine in circulation "easily exceeds several billion [US] dollars" (Micallef, 2018), and the estimates of the scope of fraud at fine wine auctions ranges from 5% to 20% (Gittleson, 2014; Shaw, 2013), though this is disputed (Taylor, 2013). As for wines from certain producers or areas, it has been speculated that the 80% of Burgundy wines allegedly from before 1980 are fraudulent (Cumming 2016), and that half the Chateau Lafite sold in China is fake (Kevany, 2014).

2.3.1 Types of fraud

Terms and concepts in the world of food fraud might differ depending on who addresses the issue. The CEN Standard "Authenticity and fraud in the feed and food chain - Concepts, terms, and definitions" (SN-CWA 17369:2019) defines food fraud as "*intentionally causing a mismatch between food product claims and food product characteristics*". Food fraud refers to implicit claim violation, record tampering or product tampering (see the SN-CWA 17369:2019 concept hierarchy in Appendix 3. CWA 17369 Food fraud concept hierarchy). Implicit claim violation exists if actors refrain from declaring something that should be declared if present. Record tampering is deliberately changing explicit food product claims so that they no longer match the known characteristics. Product tampering refers to deliberately changing food product characteristics so that they no longer match the implicit or explicit claims associated with the product. The key difference between record- and product tampering is that in the former, nothing has been done to the product itself.

The term wine fraud is a general term referring to the food fraud definition of wine producers *intentionally causing a mismatch between the product claim and the wine characteristics*. However, there are several ways of committing the fraud. As the drivers for fraudulent behavior might differ between the different ways, there will also be different approaches for identifying the fraud and developing preventive measures (Lord *et al.*, 2017). In this report we will therefore distinguish between different types identified through literature, interviews and observations.

Maureen Downey, a wine fraud expert⁷, claims that the main forms of counterfeits include refilling authentic bottles and copying. Another common method is investment fraud or making "unicorns," which are bottles that exist only in the mind of the counterfeiter (Micallef, 2018).

Holmberg (2010) makes the distinction based on different types of consumers and separates between consumption- and collector fraud. According to Holmberg, consumption fraud is "aimed at the general consumer level" and involves larger quantities of wine meant for consumption. For example, the police in Shanghai uncovered roughly 3.000 cases of counterfeit Californian wine 'Carlo Rossi' that was meant to be sold during the Chinese New Year as demand for wines usually spikes at this time (Wang, 2017). Collector fraud, however, involves smaller quantities of expensive high-end wines bought mainly as an investment, and not necessarily for consumption. Well-known incidents include a selection of bottles passed off as having belonged to Thomas Jefferson, and the infamous Kurniawan affair (Lecat *et al.*, 2016).

⁷ <http://www.chaiconsulting.com/about-us/maureen-downey/>

2.3.2 Cost of fraud

It is very difficult to estimate the economic effects of wine fraud, with estimates varying considerably and being plagued by uncertainty. EUIPO (2016) studies the economic impact of counterfeited spirits & wine in the EU-market. For the wine industry, they estimate lost sales in 2013 of €530 million (at producer prices). As a percentage of total wine sales in EU, this equals 2.3%, with between-country variations from over 10% in Romania and Bulgaria, to 1% or less in Sweden, Denmark and Finland. For wine & spirits combined, the study further estimates the lost revenue of French producers to €136 million, which gives a lost employment of 545 persons. When including the French supply sectors, these numbers increase to €492 million and 2 553 persons. Only part of these revenue and job losses are attributed to the wine sector in France but considering the high ex-EU share in French wine exports, we can assume that the total cost of counterfeiting is substantial.

2.3.3 Wine fraud detection: Tools and methods

The techniques used to detect wine fraud can be divided in two main groups: one based on analysis of physical product characteristics, requiring specialized equipment, and one based on analysis of recorded data, such as analysis of product flows and in-depth contextual analysis.

We begin with an overview of analytical methods requiring a wine sample:

Each wine grape grows in a specific location. The specificity of the soil, climate and geology create a unique type of wine. A method is exploiting this particularity in order to geographically locate a bottle of wine using inductively coupled plasma mass spectrometry (ICP-MS) followed by multivariate statistics Linear Discrimination Analysis. ICP-MS separate elements based on their physical properties and measure their presence and quantity in a given sample. The outcome of a study using this method performed by Pepi and Vaccaro on Prosecco wine shows reliable correlation between soil component and chemical composition of wine (Pepi & Vaccaro, 2017) especially for three elements: B, Ca and Sr. One drawback of this method is the need of soil sample in addition of wine sample or at least a good cartography of the soil component all around vineyards to be able to attribute a wine to a geographical location.

Another way to identify geographical origin of a wine is based on isotopic ratio of deuterium/hydrogen (D/H), isotopic ratio $^{13}\text{C}/^{12}\text{C}$ ($\delta^{13}\text{C}$) and isotopic ratio $^{18}\text{O}/^{16}\text{O}$ ($\delta^{18}\text{O}$). These three methods are officially recognized by the EC regulation 2676 and 555.

Isotopic ratio of deuterium/hydrogen is used for “detecting enrichment of grape musts, concentrated grape musts, rectified concentrated grape musts and wines by application of nuclear magnetic resonance (NMR)” (Regulation EC, 2676/90, 1990). The deuterium is naturally present in sugar and water in grapes. During the fermentation process it will be redistributed into four other molecular forms. In addition to help distinguish different grape variety, this method can detect if an external sugar addition took place by analyzing the distribution of these four molecular forms which would be a fraud indicator. NMR method is exploiting the atomic structure of deuterium, also known as heavy hydrogen, compare to hydrogen itself to establish a D/H ratio. Analysis of $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ is performed by isotope ratio mass spectrometry (IRMS) and give information about ratio of water for the first and ratio of ethanol for the second. A study combined these methods in order to geographically locate the wine based on the origin of the sugar, the climatic and geographical information given by these three isotopic ratios (F. Camin, 2014). Their results show that $\delta^{18}\text{O}$ followed by D/H have a strong correlation

with climate and location of wines analyzed. A major limitation of this method is the need of climatic characteristic database in order to compare the ratio founded with geographic places.

With the pervious methods we mainly can identify the origin of a wine based on geographical correlation. We also can have indication about the water and ethanol content using respectively $\delta^{18}\text{O}$ and $\delta^{13}\text{C}$ isotope ratio and last, we can track a sugar addition using D/H ratio. All this help prevent fraud such as water addition, ethanol content alteration, sugar alteration and origin mislabeled.

Wine fraud can also come from modifying the wine's color by berries of colorant addition. To identify this type of fraud, high-performance liquid chromatography (HPLC) is used to analyze and differentiate wine base on their anthocyanin pigment (Berente, 2000). This method consists of injected the sample into the chromatographic column. The different anthocyanins present in the sample will interact with the adsorbent material present into the column and will have different elution time. The eluate passes through a UV detector which measure the presence of anthocyanin in function of time. The different picks obtained, and their intensity correspond to the different anthocyanin and their quantity in the initial sample. Use of this method implicate good preservation of samples before analysis because the anthocyanin degraded relatively fast at room temperature and then will be less detectable. It also required a comparison chromatogram to be able to detect potential anthocyanin addition or external colorant adjunction.

The previous methods all analyze components of wine. Therefore, they all give partial information about the wine analyzed. Identifying an exact type on wine is possible trough DNA analysis.

High Resolution Melting (HRM) is a growing method used for food traceability. This method uses a fluorescent dye which bond the DNA when double strained. The dye is highly fluorescent when bonded while shows low emission when unbonded. The DNA sample is heated up to denature it (double strained to single strained). The HRM method detects variation between different sample in the curve of fluorescence at the time where 50% of the de DNA are single strained (melting temperature) based of genetic variation. Two different samples will then be distinguished according to their proper curve (Pereira, 2017). This method has some limitations. Chemically, the DNA present in the wine bottle could be altered due to the fermentation process. Practically, to identify the sample, the curve obtained must be compare to a database of reference.

The major drawback of all the methods is the need of a wine sample which involves opening the bottle. However, there are techniques that can be used to collect information without opening the bottle. One of them (Fahrni, 2015) consist of creating a vacuum to the top of the bottle and collect the gases that diffuse through the cork. Focusing on the Carbon-14 content of the gases, the wine can be dated without need of a reference sample. This method has two main limitations: first, the gas must be extracted in enough quantity which is sometimes not the case due to corks with low permeability. Secondly the progressive flattening of the bomb curve of wine from 1990 make the dating more difficult. The outcome of this study shows best results for dating wine from 1955 to 1990.

These methods require highly specialized equipment and is usually only available for specialized labs. However, certain methods are applicable by the customer directly. In addition of chemical methods to opposed wine fraud, some companies developed another approach to ensure wine integrity. WISEKey is one of them. This company creates device based on field magnetically coupled using two metal surfaces facing each other on the region of interest which would be the cork in this case.

The insertion of something into the cork for instance a corkscrew would damage the circuit between the two metal surfaces. The customer can scan the label on the cork with a near field communication (NFC) using his smartphone and directly see if the device is intact and have information about the product (Figure 4).



Figure 4 WISeNey wireless device (WISeKey, 2019)

Some other companies also surf on digital methods to identify wine. EY combine blockchain technology and QR code. By scanning this code, the customer sees all production step, allowing him to trace the origin of the wine but also other information such as the type of treatment applied on the wine, the quality of the sulfites, etc. The main problem when the quality control of the wine is on the bottle is that it does not prevent the bottle to be open and refill with another content. The QR code would still indicate all data from the original wine.

Blockchain technology is not an analytical method to test the product but is a method to increase its traceability. To track every production step from raw material to finish product could be challenging when the process includes lot of actors and goes through many transformations. The purpose of blockchain is to reference each of these step and transformations in network nodes which cannot be altered once recorded. It could help detecting fraud when coupled to Material flow analysis (MFA). This method relies on the principle of matter conservation such as the input and the output mass should be equal. Using these two methods together we could easily detect an abnormal number of bottle ready for sale for a wine compare to what the production steps indicate as produced and conclude that some of them have been added and are false.

3 Research Methodology

Data gathered for this study comes from both primary and secondary sources in a mixed method approach (Table 4). The process of data collection and data analysis was looping and iterative, where respondents were contacted more than once to verify sources of references, or if there were more questions to be clarified in the course of investigation.

Table 4 Quantitative methods, mixed methods and qualitative methods. Adapted from Creswell (2014, p. 45).

Quantitative methods	Mixed methods	Qualitative methods
Pre-determined	Both pre-determined and emerging methods	Emerging methods
Instrument based questions	Both open- and closed-ended questions	Open-ended questions
Performance data, attitude data, observational data and census data	Multiple forms of data drawing on all possibilities	Interview data, observation data, document data, audio-visual data
Statistical analysis	Statistical and text analysis	Text and image analysis
Statistical interpretation	Across databases interpretation	Themes, patterns interpretation

The primary data sources are first-hand interviews with respondents, gathered in both Bordeaux, France and Shanghai and Chengdu, China between 2018 and 2019. There were a total of 15 interview respondents (4 in Bordeaux, France, and 11 in Shanghai and Chengdu, China) that either worked in different parts of the wine supply chain, some of whom held different executive organization roles, from management to policy making in larger national and supranational organizations, or who were experts in the field.

Each interview followed a semi-structured interview guideline created for the purposes of this study to illicit open-ended and closed-ended answers. This is in order to tailor for the perspectives of the respondents based on their main role played along the wine supply chain. The semi-structured interview gave a flexible framework to which the main purpose was to encourage the respondents to share their insights on the wine trade between Bordeaux and China, highlighting the challenges they faced, and if there were any means used by their own organizations to address those challenges. In addition to the 15 in-depth interviews, 7 shorter impromptu interviews were conducted in Chengdu.

Field trips were also conducted to France and China for data gathering. These included visiting food and wine trade fairs as well as individual farms/vineyards to meet with the farmers/owners of the vineyard. The field trips proved insightful for the gathering of contextual information, where researchers/investigators to this study could experience first-hand, the daily uncertainties and reality of the business context, including how networking was done in this sector.

The primary data collected was complemented by secondary data that included information available from both print and online media. Organization webpages, annual reports, as well as video and audio material were collected, retrieved on the basis of relevance to the subject of investigation.

Prior to the Bordeaux field study, an online survey was carried out, in order to elicit the view of different supply chain actors on the main challenges in regard to wine authenticity, see Appendix 5. Questionnaire. The online survey, hosted through Netigate.se, contained a total of 17 questions, and

was constructed in English, before being translated to French. The survey was distributed both via email to possible interview subjects beforehand.

Both quantitative and qualitative data analysis frameworks were used in analysing collected data. In particular, text analysis applied a corpus driven method of analysis, using systemic functional linguistics (SFL) (Halliday & Matthiessen, 2014) in combination with the use of a word concordance software program called AntConc version 3.4 (Anthony, 2013; 2018). SFL allows for a systematic and rigorous manner in which text analysis is conducted. This is bolstered by the concordance software, in which the transcribed interviews were uploaded into AntConc as a corpus database in order to retrieve word frequency counts (that uncovered salient themes from the respondents or from the secondary data text) as well as do keyword-in-context (kwic) analyses. A kwic analysis allows for an understanding of how the word was used in context, thus uncovering any accompanying or frequently occurring word collocations that reveal respondent attitudes, feelings and urgency towards the situation.

4 Findings & Discussion

The following chapter is based on the analysis of trade data, and the results from the interviews carried out in France and China with organisation representatives, producers, traders, and importers. Figure 5 shows the overview of the product flow based on calculations using data retrieved from the International Organisation of Vine and Wine (OIV), Bordeaux Wine Council (CIVB), EU and UN for the year 2017.

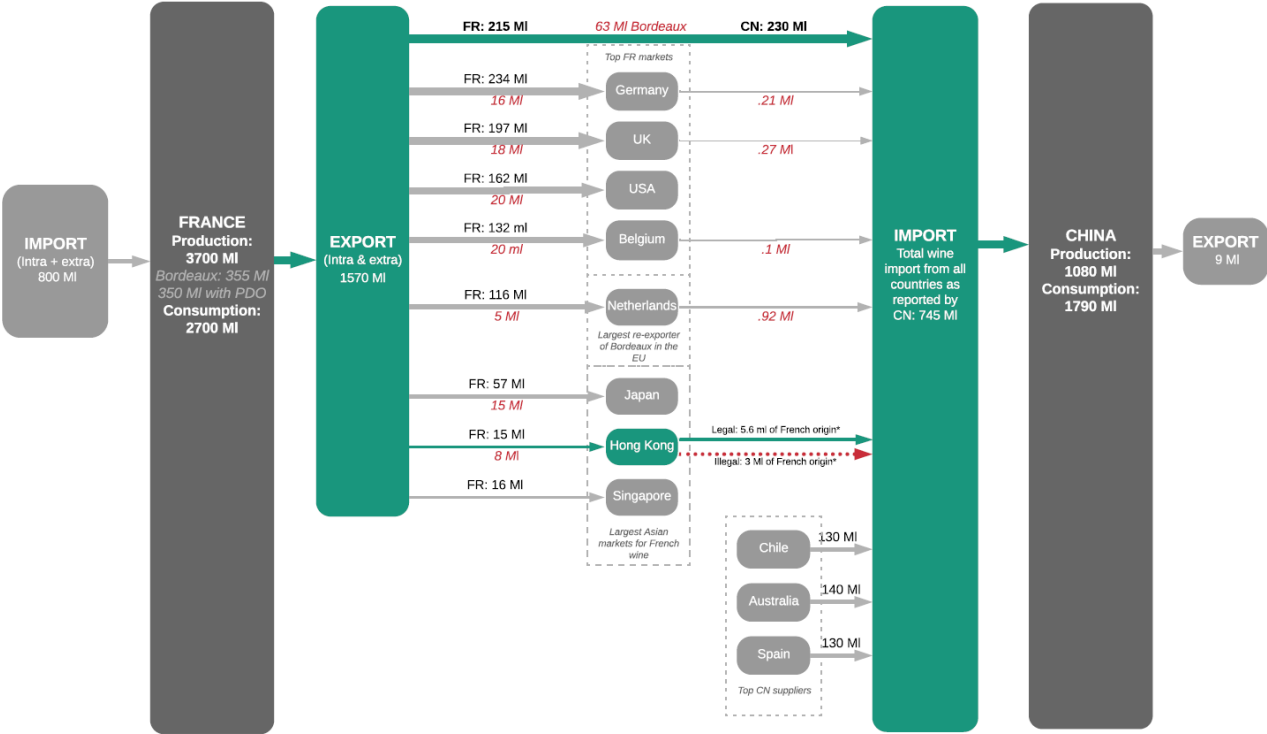


Figure 5 Supply Chain Map of wine products in 2017 with a focus on France and China. Based on data from OIV, CIVB, EU and UN. HS number: 2204 (wine of fresh grapes) and 22042922, 22042942, 22042912, 22042142, 22042112, and 22042222 (Bordeaux PDO) *estimates

4.1 The Wine Supply Chain from Bordeaux, France, to China

4.1.1 Producers

The Bordeaux region consist of mainly small and medium sized producers that are conservative and careful with sharing information. Over the past 20 years the number of grape growers in all of Gironde has fallen by half, reaching about 6 300 in 2017 (CIVB, 2018). Along the movement towards concentration, the average estate size had doubled from 9 hectares to 18 hectares for AOC growers alone. Large estates (20 hectares and more) now account for about 71% of the area planted in the AOC. In 2017, there were 30 wine cooperatives and 4 cooperative unions in Gironde (CIVB, 2018).

According to CIVB (2018), less than 60% of all grapes harvested are used to produce bottled wine at a Chateau. The remaining 40% are sold to wine merchants or négociants, cooperatives and to larger estates in bulk to produce branded wines.

4.1.2 Distribution and B2B sales

The distribution channel for Bordeaux wine will vary according to the classification, reputation, and price of the bottle. About 70% of the wine produced in the region is sold to négociants, which through their own unique sales network resell it to national or international customers (CIVB, 2018). In addition to selling, they also perform different roles including selecting wines, blending, bottling, holding stocks, and aging wines for future release. All specialize in different types of wines and markets. Each wine producer works with a different number of négociants, some may sell to five companies, while others may sell to more than a hundred. The négociant will in most instances not be located in Bordeaux, but all over the world, as London, Singapore, or other large cities. Most wine producers sell the wine to the négociants through Courtiers. Courtiers are the brokers that regulate the negotiations, earning 2% of each completed transaction (Chauvin, 2013).

In 2016 to 2017, there were about 7 000 négociants in 300 firms, selling approximately 70% of the wines produced in the region (CIVB 2016; 2018). According to SIP Wine Blog, 25 of the largest trading companies (Castel, Grand Chai de France, Ginestet, CIVBG) represented 80% of the total business in 2012 (SIP Wine Blog 2012). In 2016 to 2017, about 76 % of bulk wine sales were carried out through 76 courtiers (CIVB, 2018). There are over 120 active courtiers, but the number of courtiers working with the top properties are small. Less than 20 courtiers are actively working with the most famous estates.

The Place de Bordeaux is a wine trade network unique to Bordeaux. It is not a physical place, but an idea and a system that is located in the business district of the city (Smith, 2020). There are three main wine types sold on the Place de Bordeaux: all the most famous Grands Crus, some smaller individual vineyards who sell their own bottled wines, and also bulk wines branded by merchants. The system operates in different ways for the different types of wines.

The Elite wines, the Grands Crus, are often sold as futures (Cauvin, 2013). The futures system is based upon an advance payment, allowing buyers to speculate on wine prices, and producers to get early returns on their investments (Cauvin, 2013). Wine purchased as futures will be bottled and delivered between 18 and 24 months after their sale. The wine is still in oak barrels when they are purchased by the négociants. According to Allan Sichel, President of the Association of Bordeaux Wine Merchants (UMB), it is possible, on paper for the elite producers to bypass The Place de Bordeaux, but there is no logic in doing so (SIP Wine Blog, 2012). At the Place de Bordeaux, the Grands Crus producers are the ones in power. It is important for the négociants to stay within this system.

According to SIP Wine Blog (2012), about 85% of the estate-bottled wine at smaller vineyards are sold via the Place de Bordeaux. The vineyards are not required to sell through négociants, but few producers have the ability to sell their entire production on their own. Many chose to sell wine through multiple distribution networks and communicate and educate the market themselves.

Direct sales can give both the elite and smaller producers a possibility to benefit on higher prices for their wine by cutting out the intermediary, i.e. négociants (with a 15–20% margin). E-commerce is gradually becoming a more and more important direct sales channel. The %age of Bordeaux wines sold directly through the web is difficult to estimate, but according to CIVB some claim that it is close to 5%. E-commerce for sales may be used by the local producer, international négociant, or a Chinese wholesaler, therefore the %age might be an underestimation. To initiate cooperation with a large e-commerce actor, like Alibaba, has proven to be very challenging for a small Bordeaux wine producer.

4.1.3 Foreign ownership

Over the past decade, Asian investors have acquired several companies in Bordeaux, and it is estimated that China now owns 2% of the vineyards in the region and over 140 properties (Economist 2018; The Local 2018). A respondent iterated that the Chinese investors in most instances respect the French tradition of winemaking, sales and marketing. Some Chinese owners do export bulk wine to China for bottling. Due to the strict labelling laws in France, some change the name of the old French vineyard in order to be more appealing to consumers in China. One example is Chateau Senilhac, which has been renamed Chateau Antilope Tibetaine, meaning Tibetan Antelope. According respondents in the trade business, Chinese investors have also bought négociant firms that trade in Bordeaux wine. Respondent insight have correlated with online news sources. In June 2012, Diva, a large négociant with reported sales of 33 million EUR, sold 70% of its shares to Chinese investors. The buyer is Shanghai Sugar Cigarette and Wine, a subsidiary of the Chinese state owned company Bright Food (Greenblat, 2012).

4.1.4 Market and prices

About 56% of the wine produced in Bordeaux is sold to the domestic market. The remaining 44% are sold by négociants to 170 markets all over the world (CIVB, 2018; CIVB, 2017). Most markets were located outside of the European Union (56%). Bottled shipment represents about 97% of total exports, while exports of bulk wine (more than 2 liters) tend to disappear over time. Among bottled exports, wines priced at less than or equal to 6 EUR per liter accounted for 71% of quantities exported, but only 26% of the value (CIVB, 2018).

According to the website, The Wine Cellar Insider (thewinecellarinsider.com), a well-known source for Bordeaux wine news, the vast majority, 71%, of Bordeaux wine is priced between 3 to 15 EUR per bottle. The website notes that producers selling Bordeaux wine for less than 3 EUR per bottle, representing approximately 26% of the region, are in financial troubles due to decreased demand of the lowest price range. Only 3% of the entire production of Bordeaux sell for more than 15 Euros per bottle. Bordeaux and Bordeaux Superieur are the cheapest AOC labelled wines from the region. Respondents explained that there currently is an overproduction of cheap wines, adding that reduced production and increased prices, combined will create a higher value of the bottles.

On the other side of the price bracket, there are the Bordeaux Elite 50s. According to the website Wine Auction Prices, one of the most expensive wines producers, Lafite-Rotschild, sold a bottle for up to 234 thousand dollars in the period from 2004 to 2019. The average price per bottle in the period was 1 844 dollars.

Table 5 Top five producers in terms of average price, 01 jan 2004 – 01 jan 2019 (Source: Wine Auction Prices (n.d.))

Vineyard	Appellation	Average (\$)	High (\$)	Low (\$)
Chateau Petrus	Pomerol	3 259	123 375	50
Le Pin	Pomerol	2 850	31 070	185
Lafite-Rotschild (1 st)	Haut-Médoc	1 844	233 990	26
Chateau Lafleur	Pomerol	1 835	59 963	23
Chateau Cheval-Blanc	Saint-Émilion	1 552	135 125	14

4.2 Chinese Wine Market and Wine Fraud

4.2.1 Chinese wine market

The respondents regard the wine market in China as having undergone changes over the last decade. The average Chinese wine consumers' knowledge about wine is growing, and the focus of importance is turning more towards the actual quality of the wine, and away from factors such as the shape of the bottle, beautiful logos, etc. This change towards quality is by one of the Chinese wine importers partly attributed to the low barrier of entry into the import business. Increased competition in the Chinese market through more importers and a wider selection of wines has led to reduced prices and thus lower margins, and it is stated that in order to survive importers should not compete on price, but rather on quality and "*remind the consumer that what's in the bottle is more important*". There has also been a change in the drinking pattern, where more wine is thought to be consumed at home than previously.

However, the diversification of available wines on the Chinese market and growing consumer knowledge has had an adverse effect for Bordeaux wines. Bordeaux wine is regarded as not traditionally suited for novices, and as more easy-to-drink wines from countries such as Australia and Chile have become increasingly available, consumers have moved away from Bordeaux and towards other foreign wines. White wines have also enjoyed an increased share, at the expense of red wines.

Still, even though the average consumer is becoming more and more educated, the Chinese market is such a large market, that there will still be a substantial amount of people who can be targeted and duped by fraudsters.

However, both Bordeaux wines and French wines in general still have a significant market share, due in a large part to the perceived quality and status associated with Bordeaux wines. As one respondent iterated, if Chinese people want to buy a car, they would go for a German brand, if they wanted to buy a watch, they would buy one from Switzerland and if they wanted to buy wine, it would be a French wine. Respondents were in general agreement that there exist promising market opportunities for French wines in China, in large part due to the alluring French wine narrative and branding of France as a romantic country that produces quality wines. It is this romanticized view of Bordeaux that has to a large extent, driven Chinese investors to acquire a portfolio of Bordeaux vineyards.

4.2.2 Wine fraud

The interviews conducted in France and China indicated that wine fraud was regarded as a common problem and it was nothing too surprising too that wine fraud was highly visible in the Chinese market. Respondents were aware of the issue and saw it as something that needed to be managed by the larger coalition or government organizations. Producers in themselves saw little room for a role in acting against counterfeit production of their own wines. Counterfeit wine occurs in all the purchase channels, and both low-, medium and high-priced wines are subject to fraud.

Respondents saw the situation as challenging to manage, with certain reservations towards the use of new technologies or other measures to prevent or mitigate fraud. According to one trader, technologies such as QR-codes and NFC-tags (Near Field Communication) generate large amounts of data that are difficult to manage and can easily be copied by fraudsters. There is also a considerable cost associated with the introduction of new technology. Despite the apparent prevalence of the

problem and the difficulty of countering it, not exporting products to China is not a viable option as the Chinese market is very important. They are also seemingly reserved with regards to the Chinese authorities' willingness to devote enough resources to monitoring and control, as even though food safety is high on the agenda in China, wine fraud is a minor problem compared to other foodstuffs.

Due to the many steps in the supply chain, and the difficulty of tracking a wine further along the supply chain than one step up and one step down, the wine producer might in many instances be unaware of where their wine has ended up. Even if the wine is sold directly to wholesalers in China without middlemen, as was the case for the producers and traders interviewed in France, they have little or no knowledge of what happens when it enters the Chinese market.

During the interviews, three ways of counterfeiting were in special focus when talking about wine fraud that include: (i) copying and imitation, (ii) mislabelling, and (iii) smuggling. Based on the results from the interviews and the observations made, we give a more detailed description of the different types of fraud mentioned as most common and that was highlighted as most problematic for French wine in China.

(i) Copying and imitation

According to several respondents, the most serious issue faced by the wine industry regarding fraud is imitations of genuine wines. There were however, differing opinions amongst respondents, where a Chinese importer remarked that they did not see that it was a problem, but rather defined counterfeit wine production as a phenomenon that needed to be managed, whether by rule of law or by proper taxes or other disincentives. Imitations are purposefully made to closely resemble a genuine wine, usually by either having a highly similar logo or name so as to take advantage of more renowned brands and their branding narratives by close association. Examples mentioned during the interviews were wines marketed in China under names such as "Lafite Empire" or "Lafite Dynasty", similar to the well-known and highly prized Lafite Rothschild. Whereas pure copying involves definite trademark infringement, cases of imitations often exist in a grey area, where it can be difficult to say exactly when someone crosses the line of trademark infringement. Trademark protection in China follows the principle of 'first-to-file', i.e. the right to a certain trademark lies with whoever was the first to register it in China (China IPR Helpdesk SME 2016). Products in China are often marketed under a Chinese transliteration of the original name, and while the original name may be trademarked, that is not necessarily the case for the Chinese transliteration.

The highly publicized case of Castel Freres is indicative of the issue. According to an interview with a Castel representative, Castel Freres, through a partnership with Changyu, started selling wines in China under the Chinese transliterated name "Kasite" in 1998. While they were able to register a trademark in China for the name "Castel" in 2005, the name "Kasite" had already been registered by a different wine import company five years prior. The owner of the trademark "Kasite" filed a lawsuit against Castel in 2009 for trademark infringement, a case Castel lost in the Wenzhou Intermediate Court. An appeal was launched to the Zhejiang Provincial High Court, but the original verdict was upheld. As a result, Castel was forced to rebrand their wines in China under the name "Kasidaili". Other alcoholic drinks brands have faced similar issues of closely resembling names, logos or other identifying marks, e.g. Penfolds (Eads 2014) and Hennessy (Xin 2013).

What is of concern for the respondents, many of whom are wine traders, even well versed or highly sophisticated Chinese consumers may not be able to distinguish between a genuine or inauthentic

bottle of wine. This is due to that Bordeaux wine labels are often highly complex, and with a multitude of different producers each with their own separate label, it can be extremely difficult for consumers to notice minor differences, such as changes in the logo or misspellings. Similarly, the discerning palate may not always distinguish fine quality wines. Consumers and researchers alike, often find the nature of wine quality difficult to grasp. Research shows that wine drinkers across all levels of involvement (experts and novices) share widely differing perspectives on what wine quality is (Charters, 2003). This is especially the case in newer markets such as China, where there is a relatively low, albeit growing, level of knowledge among consumers.

(ii) Mislabelling

Mislabelling refers to the practice of stating a claim on the label of the bottle that does not match the actual properties of the content. Examples of false or misleading claims can be claims regarding the grape varieties used, the area in which the wine originates from, how the grapes have been grown and processed. Most chateau bottled wines are for example, grown in an organic manner as a matter of cultural heritage production methods.

Mislabelling of origin was not a big theme when discussing fraud with the respondents in China. Rather, copying and imitation, and to a certain degree smuggling was the focus during the interviews. However, by visiting the wine fair in Chengdu it is obvious that this is also a problem. As French wine, and in particular wine from Bordeaux, has been particularly popular in China, mislabelling of origin is relatively common. Many wine bottles are labelled with "Bordeaux" as its place of origin, without it being produced in the region. This infringement will increasingly incur rule of law consequences for sellers in China, since after the EU-China Summit of April 2019 (EU, 2019), the Chinese authorities have begun to recognize 100 European PDOs (Protected Designation of Origin).

(iii) Smuggling

Several respondents identified smuggling as another phenomenon in the wine trade. The majority of smuggled wine in circulation in China is believed to be imported from either China's special administrative regions, Hong Kong and Macau, or Japan. The challenge in tracing smuggled goods is the complexity of the goods accounting system. Most smuggled wines will likely show legitimate documentation, brought in through appropriate sales channels such as via Hong Kong, before being transported to China.

The respondents representing the Chinese division of French wine companies also noted that it was difficult to convey the issue of counterfeit wine in China to the mother company located in Europe, something the complexity of the supply chain might contribute to. Smuggling is regarded as mainly affecting high-end wines, as it is not seen as worthwhile to smuggle mid- or low-end products.

The main driver for smuggling wine into China is avoiding taxes and other fees, as noted also in other studies, e.g. Anderson and Harada (2018). Wines imported to China from France, and many other countries, are subjected to a total aggregate tax rate of 48.2%, comprised of customs duty (14%), excise tax (10%) and VAT (17%). Further, wines imported to Hong Kong are not subjected to an import duty (USDA 2018). With wines legally imported to China through appropriate sales channels experiencing a near-50% markup, the profits for those avoiding tariffs can thus be considerable when considering the price-level of high-end wines.

The tax rate also highly influences the competitive position of Bordeaux wines compared to wines from other countries. Wine exporters from countries who have entered into bi-lateral free-trade agreements with China, for example Chile, Portugal, and Australia, have had their customs duty reduced to zero. This, combined with a change in consumer preferences, has led to Bordeaux wines losing market shares, as noted by several of the interviewees.

However, smuggled wine is not perceived to be a big problem compared to either copies or imitations. While respondents perceived smuggled wine as being a minor problem, it remains difficult to estimate the scope of the issue due to a lack of a shared or common platform of traded goods knowledge between ports of call, and between countries/regions. Products that are smuggled are not registered in any statistics, neither as being exported from Hong Kong nor imported to China, and thus are treated as a side stream. The lack of consumption estimates in both Hong Kong and China further compounds the problem of getting accurate estimates. The lack of data means it is also difficult to gauge whether the problem has grown or diminished over time, although one respondent sees it as a potentially burgeoning challenge to the wine trade.

4.2.3 The importance of Hong Kong in re-exports to China

Re-export is the practice of routing an export shipment through an intermediate location before it reaches its final destination (Andriamananjara *et al.*, 2004, p. 1) which in our case is the Chinese market. Indirect wine trade through an entrepôt is a common phenomenon in world trade. Globally, indirect trade is estimated to be around 17 % (Andriamananjara *et al.*, 2004). Hong Kong is the world’s largest, and as much as 54 % of world re-exports goes through Hong Kong (Feenstra & Hanson, 2004).

A number of countries within the EU can be identified as entrepôts or re-exporters of Bordeaux wine. Netherlands is according to EU statistics the most important one, importing 5 MI in 2017 from France and exporting almost 1 MI of it to the Chinese market. A search in the export statistics of the Dutch will confirm that a relatively large amount, almost 2 MI of Bordeaux wine travels through the Netherlands on its way to United Kingdom. The Netherlands have also re-exported Bordeaux wine to other Asian markets like Hong Kong and Macao.

It is understood, through speaking with respondents for this study, that the most important re-exporter of French wine and Bordeaux wine to the Chinese end market is Hong Kong. However, since Hong Kong is not located within the EU (within the 8-digit HS) this cannot be confirmed by studying the export statistics from Hong Kong to China. The internal EU statistics can, nonetheless, confirm that wine containers are shipped to Hong Kong from a number of other European countries, including United Kingdom and the Netherlands.

Table 6 Total wine import per capita

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
China	0,12	0,13	0,21	0,27	0,29	0,28	0,28	0,40	0,46	0,54
Hong Kong	4,36	5,00	5,69	6,82	6,90	6,98	7,26	8,70	8,58	8,23
Macao	6,84	9,19	11,41	14,03	12,16	10,63	9,10	10,00	9,69	9,69
Japan	1,40	1,47	1,57	1,68	2,08	3,63	2,19	2,27	2,18	2,24
Singapore	4,99	4,12	4,64	5,18	5,31	5,45	6,01	5,57	5,35	5,35

Hong Kong is not producer of wine. As such, a substantial amount of its wine exports could be measured in terms of its initial imports (Table 6). Hong Kong imports about twenty-three times as much wine per capita than its neighbour, Mainland China⁸. In 2017, France reported shipping 15 ML of wine to Hong Kong, and about half was certified as being from the Bordeaux region. Hong Kong reports receiving 14 ML during the same period. According to the same statistics, most of the wine exported from the SAR (over 90%) went to the Chinese mainland.

According to trade statistics, Hong Kong’s importance as a regional wine entrepôt has gradually increased since the beginning of the 2000s. The largest increase in imports happened from 2007 to 2008 with an annual growth of about 30% (United Nations, 2019). As such, Hong Kong stands out as a high-value re-exporter of wine to China. Hong Kong exports a relatively low volume compared to the French, but the shipments were very valuable, about 470 million US dollars in 2017. The high value is a result of exceptionally high wine prices per litres (Figure 6a). While the French report an average export price of about 3.99 US dollars per litres going to Chinese customers, Hong Kong reports an average price of 21.25 US dollars per litre. In the period from 2015-2017, Hong Kong’s wine export prices was about five times higher than wine originating from France or Australia (Figure 6b).

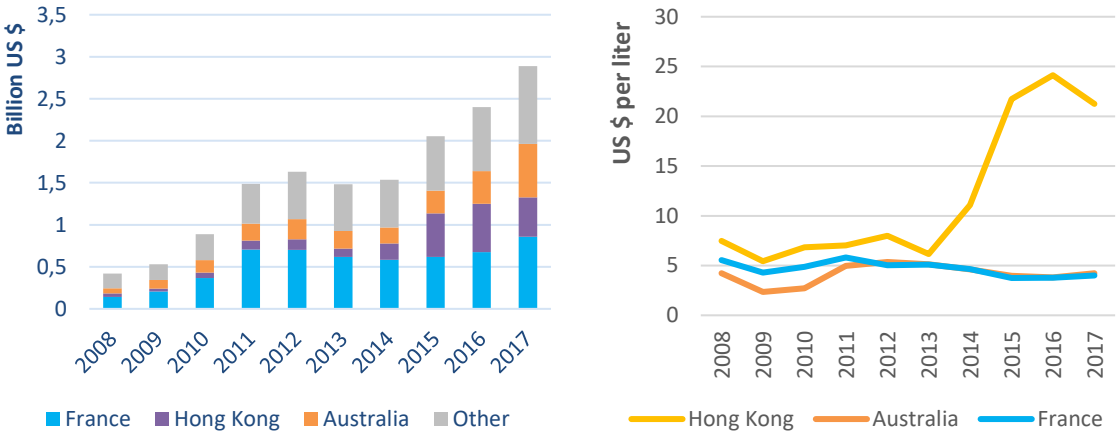


Figure 6 a/b Wine exports (HS 2204) to China in value and US \$ per litre

Explanations of these entrepôts in the literature have mainly focused on the presence of specialized agents that match buyers and sellers across markets (Feenstra & Hanson, 2004) or the economization of transport costs (Andriamananjara *et al.*, 2004). Since Hong Kong became a duty free port in 2008, a number of agents specializing in luxury wine has emerged providing logistics services like freight solutions, customs clearance, climate controlled and high security storage, distribution and delivery services etc. These and other factors like Hong Kong’s proximity to the Chinese Mainland, may provide wine exporters with considerable economies of scale when exporting containers of wine to China through Hong Kong. As it might reduce the costs of both transport and information gathering.

However, Fishman, Moustakerski and Wei (2008) argues that there might be a third explanation to the increasing levels of re-export in global trade. The authors introduce a *tax evasion-based* explanation, which also posits a role for specialized agents that are better positioned to transport goods to their final destination. Here the agent’s advantage is in transporting goods without paying the required

⁸ (Imports volume HK2008-2017/population HK2008-2017)/(Imports volume China2008-2017/population China2008-2017)

tariffs. In this study we will refer to this concept as smuggling, which is defined as “the evasion of exercise tax on goods by circumvention of border controls” (Yurekli *et al.*, 2001, p. 3).

Smuggling is conducted for one or both of two reasons: to avoid exercise taxes, and to evade rules prohibiting the sale of the good. The definition encompasses both illegal activities which is typically referred to as tax evasion, and tax avoidance activities which are legal and generally not considered as smuggling. The smuggling term is used rather broadly in this study as both illegal and legal circumvention can affect tax revenues and consumption (Yurekli *et al.*, 2001).

Hong Kong’s importance as a re-exporter is most likely strongly influenced by the stepwise elimination of wine taxes taking place in Hong Kong during 2007 and 2008. Hong Kong went from being one of the highest taxed wine regions in the world with an 80% aggregated tax rate in early 2007 to 0 in February 2008 (Bobik, 2015). The zero-tax rate distinguished Hong Kong from mainland China where wine has an aggregated tax rate of about 50% (Anderson & Harada, 2018).

The high differences in tax rates in China and Hong Kong, might cause disparities in the wine prices in the two regions. Scholars have argued that when similar products are sold at substantially different prices in different locations, there is an incentive to transport the product from the lower priced to the higher-priced market (Yurekli *et al.*, 2001). Thus one might expect that owners or buyers of Bordeaux wine would prefer sending the goods to Hong Kong to later be transported to China, and thereby avoiding paying a tax rate of 50%. However, since Hong Kong is a separate customs area, China applies exactly the same tariff schedule on imports from Hong Kong as those from any other economy in the world. This means that there is no legal tax advantage of sending goods to China via Hong Kong (Fishman *et al.*, 2008).

The high disparities in wine prices may have caused companies to transport wine products from Hong Kong to China, but since the short distance shipping have a high related tax cost, much wine transport seem to happen under the radar of the customs authorities and is not reported in the statistics.

According to respondents to this study, whose responses complement the statistical findings, smuggling is regarded as mainly affecting high-end wines, as it is not seen as worthwhile to smuggle mid- or low-end products. The French export statistics (United Nations, 2019) reveal that the average export prices per year to Hong Kong are significantly higher than the average price of wine going to China (Figure 7). Furthermore, the French Bordeaux wine prices are even higher than the average French wine export prices.

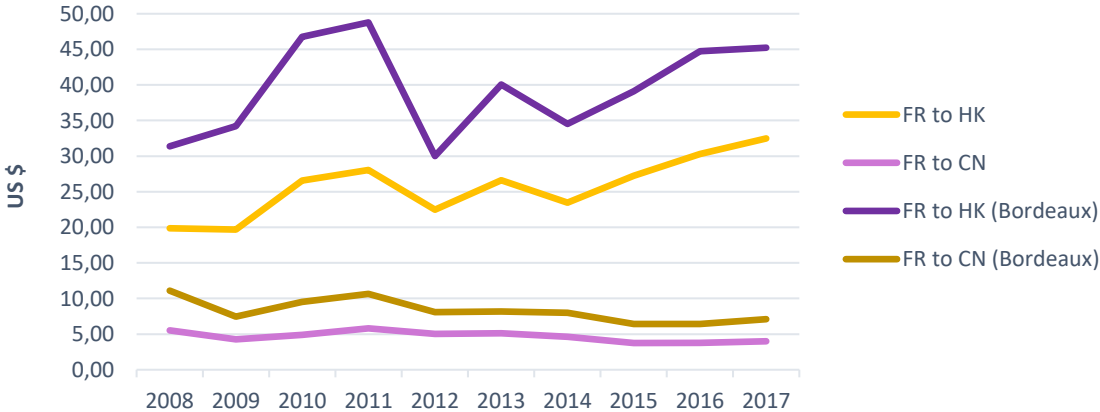


Figure 7 Average price of wine per litre exported from France to China and Hong Kong

This could serve as indication that the wine market of Hong Kong prefers French wine of higher value, than the market consumers in mainland China. However, it can also be interpreted as a sign of smuggling.

In terms of qualitative analysis, and responses gathered by speaking with respondents to this study, smuggling was acknowledged as an issue. The amount of concern placed by the respondents on the subject of smuggling seemed influenced by relativity of positioning i.e. where along the local-to-global supply chain they operated their business. Smuggling is regarded as mainly affecting high-end wines, as it is not seen as worthwhile to smuggle mid- or low-end products.

The main driver for smuggling wine into China seemed to be high margin profits through the avoidance of taxes and other fees. This proved a point of frustration for one Chinese trader who traded in more expensive wines. The respondent acknowledges that smuggling was a phenomenon and understood well the intentions behind it by other traders. He explained that wines imported to China from France, and many other countries, are subjected to a total aggregate tax rate of 48.2%, comprised of customs duty (14%), excise tax (10%) and VAT (17%). Further, wines imported to Hong Kong are not subjected to an import duty. With wines legally imported to China through appropriate sales channels experiencing a near-50% mark-up, the profits for those avoiding tariffs can thus be considerable when considering the price-level of high-end wines. In his view, the tax rate also highly influences the competitive position of Bordeaux wines compared to wines from other countries which his firm is now beginning to see increasing imports due to an increase in customer demand. Wine exporters from countries who have entered into bi-lateral free-trade agreements with China, for example Chile, Portugal and Australia, have had their customs duty reduced to zero. This, combined with a change in consumer preferences, has led to Bordeaux wines losing market shares.

For respondents whose firms do not trade in high-end wines, smuggled wine is not perceived to be a big problem compared to either copies or imitations. Products that are smuggled are not registered in any statistics, neither as being exported from Hong Kong nor imported to China, and thus act as a side stream. The lack of consumption estimates in both Hong Kong and China further compounds the problem of getting accurate estimates. The lack of data means it is also difficult to gauge whether the problem has grown or diminished over time, though one respondent sees it as becoming a bigger problem than previously, even if it did not directly affect his own business profits (Wang, 2019).

In terms of higher governance of the local-in-global supply chain, food security and traceability issues are increasingly important in China, with the country prioritising efforts towards addressing trade activities fraudulent in nature (Wu *et al.*, 2018a; 2018b). Measures taken in address of wine smuggling have been reported in the media. In April 2019, a Chinese wine merchant was sentenced for knowingly purchasing smuggled wines (Wang, 2019; 2017), in May 2018 seventeen people were arrested for operating a sophisticated smuggling ring (Wang, 2018), and in January 2012 a Chinese man was given a life sentence for illegally importing millions of dollars of fine wine to China (Decanter, 2012). Wall Street Journal has also reported that Chinese mainlanders have been taking advantage of these price differences, having bottles of wine shipped to Hong Kong and carried on foot over to mainland China (Boric, 2015).

4.2.4 Wine fraud effects

It continues to be a challenge for respondents to estimate or discuss the direct costs or impacts of the counterfeit wines to the overall market. There is general consensus however that market losses are of consequence to not only wine sellers and consumers, but to the industry as a whole much due to consumer loss of faith in quality wines on the Chinese market.

According to the respondents, there is only a negligible difference between the market price for authentic wine and wines that have been counterfeited in some form, as too big of a price difference would be suspicious. Bordeaux wines are also associated with high prices. With adulterated wines having much lower production costs than authentic ones, and with tax avoidance in case of smuggling, the profit margin for those committing fraud can thus be substantially higher than that of those following all rules and regulations. One incident involving 3,496 bottles of Carruades de Lafite smuggled into China from Macau, worth an estimated \$854,680, represented roughly \$245,000 in evaded taxes (Wang 2019). This in turn means that producers of counterfeit wine can spend large amounts of money on marketing, making them highly visible in the market, at the expense of law-abiding actors.

Counterfeit production of wine consists of a network of actors. As such, services needed and provided for within the counterfeiting network continues to support a shadow wine industry where one could argue, such a network could put to more innovative use their resources in producing wines worthy of Chinese narrative and branding rather than copying wines produced outside of China in general.

The financial cost of counterfeit production is but one dimension in terms of socio-economic loss and suboptimal use of resources. Scandals surrounding inauthentic food and drink, particularly those concerning food safety, can lead to a loss of reputation and damaged consumer trust, not only in the wine market, but across the board for food in China.

One respondent noted that counterfeit wine production is mainly a problem for the consumers who are deceived, whilst for the producers and importers of Bordeaux wine, it is more of a question of reputation loss rather than a financial loss. However, the respondent notes further that since they have no way of knowing exactly how big the market for fake wine is, it is impossible to know the potential market share one has lost. Another respondent remarked that as Chinese consumers have a high degree of trust in European products, a possible incident of fraud on the European side of the supply chain would be more damaging than an incident that occurred in China.

It should be noted that wine fraud in France has occurred, involving for example Spanish wine passed off as French (BBC, 2018) and wine mislabeled as Côte du Rhône and Châteauneuf-du-Pape (The Local, 2018). However, none of the fraud incidents that have occurred in France appear to have involved China directly, and it is not clear whether these incidents have made the news in China, or if they have had any form of impact on the market.

5 Conclusion

This report has brought findings and discussion from a combined-methods approach to data sourcing and analysis of data, in food security and traceability of the local-in-global wine supply chain between Europe (Bordeaux, France) and China.

The main purpose was to identify and highlight points of weakness in the wine supply chain as mapped from France to China, and illustrate with a show of concrete empirical examples, the contextual complexities involved in the global wine business environments across region. The complex fabric of supplier to end-customer networks make the task of ensuring greater integrity in the local-to-global wine supply chain challenging where an integrative management effort is encouraged and needed.

Increased alignment of trade and market goals are needed between Europe and China. The limitations of this report are related to the fact that the study has focused solely on the Bordeaux wine trade between France and China. Access to respondents for the study was limited, even if the data collected was complemented with both primary and secondary data sources. Due to the complexities of the wine industry business environments, it is acknowledged that there are many more perspectives along the local-in-global supply chain that have perhaps not been reflected in this report. What is hoped however, is that the findings reported in this study will contribute to the growing body of academic literature and practitioner discourse that continues to inform governance structures as support material in moving forward towards the cultivation of more secure food trade and traceability of food sources in general.

In address of the study limitations would be the anticipated and continued avenues of collaboration in research and development across regions and national borders in multiple disciplines from science to humanities, not in the least that studies such as these should inform and help develop both academic theories and practitioner best practices. The findings and continued open dialogues in various arenas work to contribute too, towards informed policy making.

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Appendix

Appendix 1. EU-China-Safe Interview guide (all questions)

Objective: This European Commission funded project, of which Nofima leads the work package focused on wine, has the overall goal to develop and implement a shared vision of best practice within the EU and China that will enhance food safety, deter food fraud and restore consumer trust. The project aims to deliver a mutually recognized set of data standardization that supports the flow of agri-food trade between the European Union and China.

Group: 1) French producer
 2) French intermediary
 3) Chinese intermediary
 4) Retailer/HoReCa/E-commerce/B2C
 5) researcher/context providers

Name of company:

Respondent:

Topic of interest - get to know/warm-up:

1) *Can you tell us a bit about yourself?*

- *What is your role in the company/organization (title)?*
- *Number of years in the company*
- *What is your experience with wine or food & beverage (F&B) industry?*

(iv)

2) *Can you tell us about your company/organization you represent?*

- *What are your main business areas?*
- *What is the size of your company? (number of people, profitability, number of storage units etc.)*
- *Where are you located? (national/international, all over China/regional, tier I/tier II/tier III/tier IV cities)*
- *Do you have any large competitors? If so, what are your main strengths/weaknesses in comparison?*

(v)

3) *How important are wine products to your company?*

- *How much do wine sales represent out of your overall sales? (%)<- only for companies that trade in wine*
- *How much of your wine is produced in China and how much is imported from other countries? (%)*
- *What are the most prestigious wine brands/labels?*
- *What are the most important supplier countries for imported wines? (E.g. France, Australia...)*
- *After purchasing wine from a foreign supplier – do you do any kind of further processing of the wine?
(for example bottling or re-labeling)*
- *Do you have requirements for your suppliers of wine?*

(vi)*(Quality, labeling, environmental, brand reputation, liability, profitability, traceability etc.)*

- *How do you know the quality of the wine product?*
- *Do you require any kind of certification of origin and/or quality? (Follow up: why/why not?)*
- *Where do you sell your wine? (% On-trade: restaurant/hotel/catering; off-trade: retail; or direct sales)*
- *Do you have any requirements when selling to a customer? (Reputation, knowledge of employees, traceability system, technology etc.)*

*Topic of interest – a **macro view** of the market and the industry structure*

3a) Looking at China and the average Chinese customer - do you have any thoughts about the market for imported wines?

- *How much of the total wine consumption in China would you estimate are imported from outside of China?*
- *(e.g. 70% domestic – 30% import)*
- *How are imported wine perceived (by Chinese consumers) in comparison to domestically produced wine?*
- *Do you think imported wines will become more or less popular in the future? (why/why not)*
- *Which imported wines are most popular? (origin country, red/white, brand)*
- *Can you describe a typical customer of imported wine? (Age, location, purchase situation, income-level, job, etc.)*
- *For a Chinese customer - is being able to show an expensive bottle (i.e. packaging) at a house party more important than the contents of the bottle?*
- *Do you think a typical customer of imported wine would be interested in paying more for a wine bottle that can document its origin and quality? (e.g. Protected designation of origin: EU certification)*
- *Do you think the average Chinese consumer can differentiate between wine of French origin and wine of for example Australian origin? Why/why not?*
- *What are the most popular sales channels for imported wines? (% On-trade: restaurant/hotel/catering; off-trade: retail; or direct sales)*

3b) Looking at China and the average Chinese customer - do you have any thoughts about the market for Bordeaux (alt. French) wines?

- *How much of the annual consumption of imported wines in China - would you estimate is of French origin? (E.g 30%) And how much of this do you think is from the Bordeaux region in France? (E.g. 70%)*
- *Do you think the average Chinese customer can differentiate between Bordeaux wine and wine from other regions/countries?*
- *Do you think there currently is a demand for Bordeaux-wine in China? (High, stable or low demand)*
- *Do you think this position has changed during the last two years? (why/why not)*
- *Do you think this position will change in the future? (why/why not)*

4) Looking at the industry for imported wines in China in general – how would you describe the industry structure?

- *Can you provide/draw a simple example of a general supply chain of wine? (international or only domestic)*
- *Can you estimate how many companies/steps are involved in getting the product to the Chinese customer?*
- *Do the actors provide any processing of imported wines in China? (for example re-labeling)*
- *How many companies (for example importers) are there for imported wines? High competition or a few dominant players?*
- *Large, medium or small companies?*
- *Are the companies differentiated or homogenous? Do they source from one or more countries?*
- *How is each competitor priced against each other?*

Topic of interest – Macro view of wine fraud/authenticity

4) *What are your views on the prevalence of wine fraud?*

- *Has it increased or decreased?*
- *Of wines sold on the Chinese market, what %age would you estimate to be counterfeit?*
- *How aware is the average Chinese wine consumer on inauthentic wine?*
- *Do some wine types have a worse reputation than others do?*
- *Is there a strong economic impact from fraud of wines? Whom does it affect the most?*

- *Is there enough being done to combat counterfeit wine? Who should be responsible for this?*
- *Are you aware of methods out there that could potentially help reducing the incidence of counterfeit wine?*
- *How do wine fraud occur in the supply chain?*
- *Do you think wine fraud are more likely to occur in certain parts of the supply chain? And why?*

*Topic of interest – a **company view** of the supply chain*

- 5) Draw your supply chain – or alternatively an example of how you think the supply chain of wine from France to China may look like.
- *What are the core processes in the supply chain of wine? (See wine map – page x).*
 - *How is the chain organized? (Arrows between the core processes – preferably with %)*
 - *What are the key actors involved in the process and what do they do? Are there any actors missing in the chain?*
 - *How do the wine products flow through the chain? (Are there, for example any bottlenecks/disruptions – maybe problems with customs?)*
 - *Where does the wine product originate from and where does it go?*
 - *How do you follow the product flow? How do you exchange information between actors? (IT systems, direct communication, trust based system...)*

(vii)

(viii) *Looking at the map...*

- *What are your areas of responsibility? (draw a yellow line)*
- *Are there parts of the supply chain map where you have limited information on product flow?*
- *Are there parts of the supply chain where you report information/statistics to authorities? If so, which kind of information is this?*
- *In your opinion, are there parts of the supply chain where there is a high risk of any kind of tampering with the wine before it reaches the consumer?*

*Topic of interest – a **company view** of Food Safety and authenticity*

5) *How do your company work to ensure wine quality?*

- *To your knowledge, has your company ever been the victim of wine counterfeiting?*
- *Are you concerned that your wines will be a target for counterfeit within the next 2-5 years?*
- *Is wine fraud impacting your business? How?*
- *Is your company taking measures to prevent counterfeiting of your wine? If so, what methods does your company use? Do you think these technologies are worth the investment? Why/why not?*
- *Who you consider most responsible for combating fraud?*

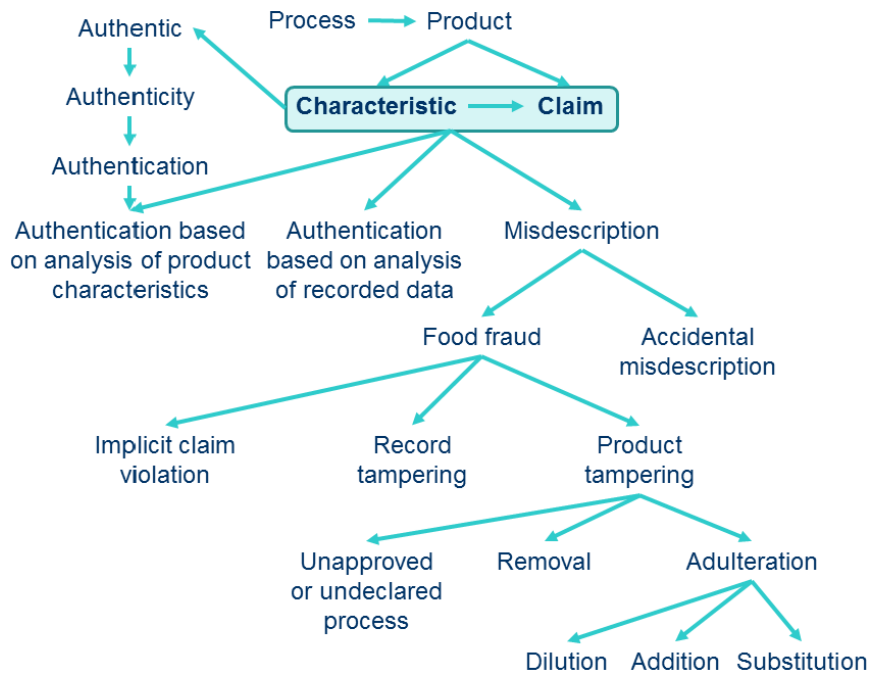
(ix) *(Producer, traders, regional bodies, consumers, police)*

In the case of a French wine: would it matter if the owner of the vineyard in France is Chinese? Does that increase product credibility?

Appendix 2. Supply chain figure used for mapping exercise



Appendix 3. CWA 17369 Food fraud concept hierarchy



Concept hierarchy - CWA 17369:2019 "Authenticity and fraud in the feed and food chain - Concepts, terms, and definitions"

Appendix 4. Relevant organizations

Institut national de l'origine et de la qualité (INAO):

A French organization in charge of regulation French agricultural products with: appellation d'origine contrôlée (AOC), protected designation of origin (PDO), protected geographical indication (PGI), traditional specialty guaranteed (TSG), label rouge (LR) and organic farming (agriculture biologique (AB)). INAO is a public administrative institution under the Ministry of agriculture, food and forestry. Homepage: <https://www.inao.gouv.fr/eng>

Quali-Bordeaux:

Quali-Bordeaux is an association, which brings together all the players in the industry for growers, traders, brokers and wine experts (Mora, 2016). Quali-Bordeaux checks on behalf of the INAO that all inspected operators comply with the conditions laid down in the production specifications of the AOC they want to produce, and control that marketed products meet the qualitative minimum requirement for its AOC. The controls take place at both the vineyard conducting the production process and the end result (Mora 2016):

Homepage: <https://www.qualibordeaux.org/> (only in French)

The Conseil Interprofessionnel du Vin de Bordeaux (CIVB or Bordeaux Wine Council):

CIVB represent the winegrowers, wine merchants and brokers, and has three missions:

- (i) *Marketing: develop the notoriety of Bordeaux wines in France and abroad through advertising campaigns, digital communications, public and press relations, and training.*
- (ii) *Economic: acquiring data and improving knowledge relating to the production, the markets and the sale of Bordeaux wines throughout the world.*
- (iii) *Technical: improve the industry's understanding of various technical issues relating to the production and quality of Bordeaux wines and anticipate new environment – and health-related requirements.*

Homepage: <https://www.bordeaux.com/us/Contact>

Union des Grands Crus de Bordeaux (UGCB):

International promotion on behalf of the Grands Crus. Hosted by estate owners or their operational staff, some 80 events take place each year in over a dozen countries. The Union has often played a pioneering role in opening up these markets, especially in Asia. The Union was also the originator of another highlight of the Bordeaux wine calendar, *Primeur (futures) Week*. An opportunity to reserve fine wines at preferential prices while they are still in the barrel, the annual event draws 5 – 6,000 wine professionals from all over the world.

Homepage: www.ugcb.net/en

Union de Maisons de Bordeaux (UMB, Association of Bordeaux Wine Merchants):

The UMB groups together one hundred of Bordeaux's most influential Wine Trade firms. Its role is to be a:

- *preferential source of information and guidance for its members*
- *place for consultation and decision-making,*
- *proactive, representational body for this profession.*

Homepage: <https://www.vins-bordeaux-negoce.com/?lang=en>

A list of companies selling Grand Crus wine to professional customers can be found on the UMB website ([link here](#)).

International Organisation of Vine and Wine (OIV):

The OIV is an intergovernmental organization that deals with technical and scientific aspects of viticulture and winemaking. The field of OIV includes grape production for all purposes, i.e. not just wine, but also table grapes and raisin production. One of the activities of OIV is the compilation of global statistics within its field. OIV is based in Paris, and had 45 member states as of 2013.

Homepage: <http://www.oiv.int/>

Comité européen des entreprises vins (CEEV):

CEEV the representative professional body of the EU industry and trade in Wines. CEEV is member of the European Liaison Committee for Agricultural and Agri-Food Trade (CELCAA www.celcaa.eu) and the International Federation of Wine and Spirits (FIVS fivs.org). Their objectives are to:

- *Assert and defend the interests of the EU wine industry and trade among the decision-makers of European institutions, international organisations, other key partners, consumer organisations and the media.*
- *Promote scientific research, technical progress and improvement of the quality of products in the professional wine sector, at the level of the European institutions.*
- *To be the mouthpiece for the European wine industry and trade.*

Homepage: <http://www.ceeve.eu>

Fédération des Exportateurs de Vins & Spiritueux de France (FEVS):

Created by and for French wine and spirits exporters, FEVS mission is to provide a better understanding of regulatory requirements in the different markets and to remove barriers affecting wines and spirits' exports. The federation has 550 members and represent 85 % of the French wine and spirits exports.

Homepage: <http://www.fevs.com/en/>

International Federation of Wines and Spirits (FIVS):

FIVS is a non-profit French association which has been based in Paris, France since its founding in 1951. FIVS is a global association of associations, national federations, companies, entities and individuals for the alcohol beverage industry and trade. Among FIVS' objectives are the following:

- *United advocacy with all appropriate organisations, and in particular to serve as a liaison between the membership and relevant international organisations (e.g., the International Organisation of the Vine and Wine (OIV), the World Health Organisation (WHO), the World Trade Organisation (WTO), the World Customs Organisation, the World Intellectual Property Organisation (WIPO)*
- *To create and pursue agreed-upon initiatives in response to global pressures and opportunities, and to encourage members and other interested parties to work collaboratively on such endeavours.*
- *To provide statistics and other relevant findings demonstrating the economic significance of the sector in terms of employment, trade flows between countries, consumption patterns, industry trends, etc.*

Homepage: <https://www.fivs.org/>

Établissement National des Produits de l'Agriculture et de la Mer (FranceAgriMer): Government Agency.

Homepage: <https://www.franceagrimer.fr/>

Appendix 5. Questionnaire

Merci pour bien vouloir accepter de participer à ce questionnaire.

Votre opinion est très importante pour nous. Les résultats seront utilisés pour identifier le défi principal quand à l'authenticité du vin. Ce questionnaire se compose de 17 questions et il faudra seulement 10 minutes pour le remplir. Restez assuré que toutes les réponses que vous fournirez, seront traitées dans la plus stricte confidentialité.

EU-China-Safe est financé par le EU Framework Programme for Research and Innovation (Horizon 2020) qui implique 15 organisations de recherche, des représentants du gouvernement et de l'industrie de l'UE et 18 de la Chine. Pour plus d'information visitez:

www.euchinasafe.eu/



European
Commission

Horizon 2020
European Union funding
for Research & Innovation

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1.

1. Où habitez-vous (personnellement)?

- La région de Bordeaux
- France (excepté Bordeaux)
- Grande Bretagne
- Chine (excepté Hong Kong)
- Hong Kong
- Autre (spécifiez s'il vous plaît) _____

2. Quel est votre intitulé de poste? (facultatif)

3. Depuis combien de temps travaillez-vous dans l'industrie du vin?

- Moins d'une année
- 1 à 5 ans
- 5 à 15 ans
- Plus de 15 ans

4. Quelle est l'activité principale de votre entreprise?

Vous pouvez cocher plusieurs réponses si vous voulez

- Producteur de vin
- Marchand de vin
- Importateur (in-market)
- Distributeur (supermarché, caviste, vente spécialisée)
- Lieu de consommation (bars, restaurants, hôtels)
- Les ventes en ligne
- Agent de commerce
- Autre (spécifiez s'il vous plaît) _____

5. Dans quelle région/pays est localisé votre bureau principal?

- La région de Bordeaux
- France (excepté Bordeaux)
- Grande Bretagne
- Chine (excepté Hong Kong)
- Hong Kong
- Autre (spécifiez s'il vous plaît) _____

6. Quel est le nombre de salariés de votre entreprise?

- 0 – 1 personne
- 2 – 9 personnes
- 10 – 49 personnes
- 50 - 249 personnes
- 250 - 499 personnes
- 500 - 999 personnes
- 1 000 - 9 999 personnes
- 10 000 + personnes

7. Quelle est l'importance des marchés suivants pour votre entreprise en ce qui concerne les ventes?

	1 (pas important / pas pertinent)	2 (légèrement important)	3 (moyennement important)	4 (important)	5 (très important)
Chine (excepté Hong Kong)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hong Kong	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
France	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Grande Bretagne	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8. Quelle est l'importance des classifications suivantes de vin en ce qui concerne les ventes?

	1 (pas important / pas pertinent)	2 (légèrement important)	3 (moyennement important)	4 (important)	5 (très important)
Vins de France	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indication géographique protégée (IGP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Appellation d'origine protégée (AOP)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Vin d'origine bordelaise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

9. Votre entreprise a-t-elle confiance dans les informations fournies sur le produit par votre fournisseur local (origine, certifications, ingrédients, marque etc.)?

- 1 - Pas confiante du tout
- 2 - Pas très confiante
- 3 - Ni l'un ni l'autre
- 4 - Assez confiante
- 5 - Très confiante
- Pas pertinent (Je n'ai pas de fournisseur/je ne reçois pas d'information)

10. Jusqu'à où dans la chaîne de production êtes-vous capable de tracer votre vin?

Vous pouvez cocher plusieurs choix si vous voulez

- Jusqu'au lien suivant dans la chaîne de production
- Jusqu'au pays de la consommation
- Jusqu'à la région de la consommation
- Jusqu'au lieu d'achat (supermarché, restaurant, hôtel, restauration etc.)
- Jusqu'au consommateur final
- Autre (spécifiez s'il vous plaît) _____

11. Votre entreprise a-t-elle confiance dans les informations données par vos distributeurs (conditions d'espaces de rangement, clients principaux, certifications etc.)?

- 1 - Pas confiante du tout
- 2 - Pas très confiante
- 3 - Ni l'un ni l'autre
- 4 - Assez confiante
- 5 - Très confiante
- Pas pertinent (Je n'ai pas de fournisseur/je ne reçois pas d'information)

12. Que pensez-vous de la facilité d'obtention d'informations industrielles et de technologiques pour confirmer l'authenticité du vin?

- 1 - Cela n'existe pas
- 2 - Très mauvaise
- 3 - Satisfaisante
- 4 - Complète

13. À votre connaissance, votre entreprise a-t-elle été la victime de fraude au vin?

- Non
- Oui (spécifiez s'il vous plaît) _____

14. Si vous avez répondu "oui" à la dernière question, quelle perte de revenus estimez-vous que votre entreprise a subi à cause de la fraude?(facultatif)

- Elevée
- Basse
- Aucune

15. Quelle perte de revenus estimez-vous que votre entreprise a subi a cause du manque de contrôle dans la chaîne de distribution?

- Elevée
- Basse
- Aucune

16. Êtes-vous inquiet que vos vins puissent être le cible de fraude dans une période de 10 ans?

- 1 - Pas inquiet du tout
- 2 - Légèrement inquiet
- 3 - Quelque peu inquiet
- 4 - Moyennement inquiet
- 5 - Très inquiet

17. Cela vous intéresse-t-il , vous et votre entreprise d'en savoir plus sur le circuit d'approvisionnement et de ses risques?

Nos chercheurs seront à Bordeaux du 13 au 15 juin 2018.

Nous sommes particulièrement intéressés de rencontrer des entreprises qui vendent du vin aux consommateurs chinois.

Le rendez-vous sera informel et n'exige pas que vous continuiez à participer au projet. Toute l'information fournie restera confidentielle.

- Oui, cela nous intéresse de vous rencontrer à Bordeaux
- Oui, nous aimerons bien en savoir plus sur le projet
- Non merci

2.

Email

Nom de l'entreprise

Votre nom complet

Merci d'avoir pris le temps de compléter ce questionnaire.

Nous sommes très reconnaissants pour l'information que vous nous avez donné. Vos réponses contribueront à notre analyse des chaînes de distribution et suggéreront de nouvelles approches quand à la traçabilité et à l'authenticité du vin.

Vous pouvez trouver les derniers mis à jour sur le projet à la cite www.euchinasafe.eu/



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