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Economic and Preferential Drivers of the Explosion in Chinese Wine Imports from 2001-2015

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ABSTRACT

Chinese wine imports have grown over 6000% since the beginning of the 2000s, far outpacing both nearby countries and typical economic determinants of consumption, neither experiencing over 1000% growth in any category. This paper seeks to determine whether a specific set of preferences among Chinese wine consumers has driven this growth beyond economic factors alone. Previous literature suggests that China tends to have an affinity for French red wine and may also treat wine as a status-bolstering luxury good when given as a gift or served on special occasions. No literature to date, however, has shown which specific preference deviations, if any, from similar nations explain the monstrous growth observed in the market. An ordinary least squares regression analysis is employed to isolate wine demand drivers which appear more significant for Chinese imports compared to South Korea, Thailand, Taiwan, and Japan. The variables that are expected to attain statistical significance are then analyzed directly for China to determine if the deviations expected from the comparative regressions have cultural relevance alongside quantitative explanatory significance. Preliminary results imply non-economic determinants consistent with expectations including a predisposition toward luxury and quality, supported by France as a preferred country-of-origin. These findings imply a clear set of culturally dictated wine preferences in China; similar cultural patterns in other nations or parallel treatment of another market by Chinese consumers could warrant further exploration and potentially support future commercial and political endeavors.

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Chapter 1

Introduction

The Chinese wine market has expanded relentlessly since the beginning of the century, experiencing 6480% growth over the period from 2001 to 2015. Excluding Hong Kong, which mirrors China in many cultural respects according to Anderson (2018), the next closest major wine trading nation (nations that constitute greater than 1% of total wine imports) in terms of import growth was Australia at 864% (Anderson, 2018; OEC). Further, no common economic determinants of consumption have experienced the same magnitude of growth with China's income per capita growing by 782%, wine prices increasing by 222%, and various other metrics which wine imports significantly outperformed (OECD; ITC). The lack of a clear economic explanation implies the contribution of some other factors to the observed trends which likely pertain to luxury and country-of-origin (COO) preferences driven by status seeking.

This paper explores the impacts of various potential preferences on wine imports including tendencies toward luxury, country-of-origin, and alternative alcohol consumption. Numerous variables are employed to capture these effects including designer apparel consumption as a proxy for luxury, beer price for substitutes, and several international trade measures for country-of-origin deviations. Standard economic variables such as income and price are also included in order to determine whether certain preferential impacts deviate more than economic impacts when comparing China with neighboring nations, namely South Korea, Thailand, Taiwan, and Japan. Lastly, standard gravity variables are considered to both validate the model and provide further explanatory power when paired with economic and preferential variables. Wine imports, international relations, and gravity variables will consider China's six largest bottled wine suppliers: France, Chile, Australia, Spain, Italy, and the United States.

A simple regression model with various sets of fixed effects is used to evaluate key wine import drivers as well as potentially significant differences when excluding China. The set of economic, preferential, and gravity regressors attempt to predict the importer-exporter-time variant dependent variable of unilateral wine imports. Potentially significant variables are then directly compared for China relative to the other importing nations considered and the results uncovered are discussed with respect to Chinese culture and market behavior. Separate sets of fixed effects are employed to explore the data at several levels of variation while controlling for variables unconsidered in this analysis. The validity of the model is verified through an analysis of gravity variables alone then with numerous sensitivity checks using non-consecutive years and alternate but parallel data.

Consistent with previous literature implying that luxury and country-of-origin have greater significance for Chinese consumers, designer consumption, price sensitivity, and international ties (see Table 1) are expected to constitute China's largest deviations from the market behavior of other Asian nations.

Table 1 Initial Hypotheses

<i>Category</i>	<i>Variable</i>	<i>Expectation</i>
<i>Luxury + COO</i>	Designer Apparel Demand	Greater marginal impact for China than neighbors
	Percent of wine imports to top 4 consuming nations	China values COO more than neighbors and will prefer wines popular with larger wine consumers
<i>Price Sensitivity</i>	Price	China will value price less than neighbors
	Household Expenditure / GDP per Capita	Chinese imports increase more than other nations with rising income consistent with luxury goods
<i>International Relations</i>	RTA / Tariff	China values international relations less than COO preferences making RTA and tariff less important
	Percent of All Imports from supplying nation	China attributes status to COO making larger consuming nations' preferences more valuable

Chapter 2

Literature Review

Overview

In accordance with the trends observed in the Chinese wine market, this literature review will consider academic research regarding the market dynamics observed in China and neighboring nations alongside potential drivers of wine consumption. The wine industry has undergone significant analysis from numerous perspectives, so this paper will attempt to fill the gap in determining *why* consumers have shifted their behavior more than common indicators imply they would. As such, several of the sections below will concern classical economic determinants of consumption along with trade while this paper will provide insights concerning China-specific preferences and general luxury market trends that could explain the explosion of growth in the industry.

Most of the literature analyzed focuses on the Asian market while some papers touch more broadly on general wine consumption. Both perspectives should shed light on the factors considered throughout the paper and justify their inclusion. The literature will also illuminate the need for further explanation of the observed trends in order to extrapolate to other markets or countries in the future. Only sources contributing a unique perspective on wine consumption or a specific market therein are included here while papers considering broader economic (e.g. trade/demand models) factors are omitted to maintain the paper's focus.

Chinese Wine Market

Li's (2017) data aggregation shows that annual wine consumption in China has grown from 320 million liters and .25 liters per person in 2002 to 1.6 billion liters and 1.16 liters per

person in 2015, implying growth in total consumption is largely separate from changes in population alone. Surprisingly, the import price of wine over the same period grew 486% from \$0.76/liter to \$3.69/liter, according to the author's analysis of data from the Chinese National Bureau of Statistics and United Nations Comtrade (Li, 2017). This implies standard demand effects may contribute less than expected to wine consumption considering the average global wine import price only increased by 54% from \$2.64/liter to \$4.07/liter over the same period (ITC). Anderson (2018) found that domestic production has concurrently increased, but the nation's "wine self-sufficiency" has decreased over the relevant period by 25-30 percentage points. This shows that imports are largely driving the observed consumption changes with domestic wine generally being consumed less and more often mixed with bulk imported wine (Anderson, 2018).

Data from Muhammad et al. (2013) shows that France contributes the most to China's imports, maintaining over 50% market share in recent years and increasing from around a third in 2006. Increasing importation from France coupled with unexpected price effects implies Chinese consumers may have alternate motives in their consumption worth delving into. Further, the author's analysis of the World Trade Atlas's quantity, values, and prices for bottled wine using Thiel's (1980) model shows that Chinese consumers treat French, Chilean, and American wines as effective substitutes. However, they appear notably less price sensitive toward French wines relative to the latter nations, supporting the notion that consumers particularly favor French imports among other potential country-of-origin effects which will be considered further in a later section (Muhammad et al., 2013). Liu & Song (2021) show that income and price seem less important to the Chinese consumer when purchasing French wine, potentially due to the

premium placed on the quality of French wine and preference for red wine due to highly positive cultural associations with the color (Liu & Song, 2021).

Muhammad et al. (2013) also shows that various other characteristics set the Chinese wine market apart from expectations in that production does not align well with consumption alongside stark quality differences for domestically produced wines compared to imports. As mentioned above, self-sufficiency has progressively decreased despite consistently increasing domestic production, potentially due to quality concerns (Muhammad, 2013). Anderson's (2018) data accounts for domestic wines which are often combinations of imported bulk wines with grape juice or wines from lower quality Chinese grapes, immediately suggesting a quality gap between imported and Chinese wines. This trend implies the potential for exaggerated domestic production levels since much of what is labeled as Chinese wine may contain imported grapes (Anderson, 2018). Likely as a result, consumers tend to prefer bottled to bulk wines, also shying away from sparkling wines for potential cultural reasons to be further discussed. Liu's data, gathered from China's Customer Statistics and analyzed using a log-regression on price and income, indicate that these elasticities appear higher in bulk and sparkling wines than in bottled wines. These results show less variation in consumers' purchasing habits across income levels and sensitivity to prices for bottled wines. This result could also follow from French wines contributing significantly more to imports of bottled wine rather than bulk or sparkling (Liu, 2021).

Muhammad (2013) also mentions that the Chinese government has contributed to shifts in behavior toward wine consumption by promoting healthy lifestyles for several decades, a decision whose consequence is a preference toward wine when consuming alcohol over traditional Chinese spirits (Muhammad, 2013). Further, more recent initiatives have bolstered the

wine industry by targeting growth in its 11th and 12th five-year plans. Governmental support paired with social acceptance of red wine, especially for classier occasions, provided the infrastructure for monstrous development.

Using forecasted average annual growth rates, Liu projects considerable growth in the French and Chilean imports of bottled wine, growing from 218 million liters to 316 million liters and 132 million liters to 266 million liters respectively. Australia, Spain, and Italy have lower projections but are still expected to increase by 10-20% by 2023 (Liu, 2021). Li also presents various opportunities in the Chinese market including population, government action, and cultural normalcy which have little opposition from threats that primarily revolve around substitution and expertise, both of which the industry has largely ameliorated (Li, 2017). This market's continued expansion shows little sign of slowing provided its building momentum paired with an optimal growth environment, inciting the need for further explanation for the observed trends.

Economic Drivers of Wine Consumption

French (2016) observed various economic factors that could impact wine consumption including gross national income divided by purchasing power parity (GNIPPP), gross domestic product (GDP), unemployment rate (UR), and household expenditure (HE). Each of these factors had statistically significant impacts on total wine consumption when regressed over 2007-2014 in Thailand with all except UR showing positive log-correlations between 1.6 and 2.2. UR had a slightly negative correlation with total consumption, implying wine is consumed more when people are working and have the money to spend on it rather than as a stress remedy when unemployed. All of these factors point toward higher wealth implying greater consumption,

which is in line with preliminary expectations (French, 2016). Wang's 2011 analysis of sociodemographic impacts on purchasing behavior shows that education correlates with consumption quantity, implying changes in education level could warrant consideration (Wang, 2011). Results from Kapaj et al.'s 2020 survey of 230 Albanian consumers support the notion that higher income and education imply a higher propensity for wine consumption. Interestingly, however, the authors' results show that wine price has a positive and still significant impact on wine consumption¹, with the log-adjusted elasticity approaching 3 (Kapaj et al., 2020). This implies that consumers value more expensive wine meaning demand will increase with higher prices, largely consistent with French (2016) regarding the motivation for wine consumption in Asia (French, 2016). However, this result may be specific to China; Brunner and Siegrist (2011) surveyed 874 Swiss wine consumers and found "bargain" seeking consumers to purchase in greater quantities at lower prices (Brunner & Siegrist, 2011). These considerations do not fully explain the observed behavior implying the need for other economic or preferential drivers which the rest of this paper will explore.

French's (2016) study also considers the substitution effect specifically regarding beer, showing that an increase in beer price and marketing correlates with an increase in demand for wine (although only beer price's correlation holds statistical weight at a reasonable confidence level). The author also shows that consumption of local wine has a similarly inverse impact on consumption of imported wine, implying wine drinkers in Thailand do appreciate local wine as a substitute for imported wine to some extent though not statistically significant (French, 2016). Anderson's (2018) findings support the latter notion, showing that consumption of imported

¹ Kapaj et al. control for price with geographic indicators including dummy variables for domestic production.

wine has a clear negative correlation with local wine consumption. This is expressed in a consistently increasing level of consumption in China along with neighboring nations, yet a decreasing level of self-sufficiency, as previously discussed, implying a decrease in local wine when consumption of imported wine increases (Anderson, 2018). Further, Chladkova's aggregation of basic wine and beer consumption data in the Czech Republic suggests that substitutes alongside disposable income and wine price contribute the most, among economic factors alone, to the changes in demand for wine observed from 2007 to 2008. The authors' results suggest that preferences for higher quality or country-specific wines may contribute significantly to these trends since consumption decreases by 15% with approximately static disposable income, 8% aggregate wine price increase, and 5-7% increase in popular beer prices (Chladkova et al., 2009).

Various other nuances can arise when considering general economic determinants, one of which includes diverging income-consumption trends due to ideas associated with higher-status individuals. First considering health: Liu (2007) suggests that above a certain threshold, consumers experience a shift in preferences toward healthier goods; China has recently surpassed that GDP/capita mark and is therefore witnessing greater demand for goods with perceived health benefits, including red wine (Liu, 2007). Lee's (2014) results from a survey of 262 Korean wine drinkers support this notion in that healthy pursuits correlate positively with wine consumption (Lee, 2014). Meanwhile, demand for wine also increases, especially in the higher price bracket, for special occasions and social gatherings; Liu's (2021) data suggests that these events tend to attract consumers at a higher income level. As such, prices paid for wine increase for occasions, and the demand in the market may increase accordingly with price (Liu, 2021). These effects imply that the demand for wine may not behave as expected, supported by income

elasticities of demand greater than one and similar demand at higher price levels, warranting further exploration of wine as a luxury good which will be discussed in a later section.

Trade agreements and international relations can also contribute to a nation's wine consumption, specifically from imports, with free trade agreements and tariffs playing a particularly large role. Harada's findings indicate a statistically significant correlation between wine trade and the presence of a free trade agreement with the applicable tariff rate (Harada, 2021). This finding is consistent with expectations since Anderson (2018) found that Hong Kong experienced a significant increase in consumption following the removal of its 15% tariff (Anderson, 2018). Li (2017) shows that China's entry into the WTO in 2001 also incited a drastic change in Chinese wine imports with a 51-point decrease in the tariff rate for bottled wine. China also affords key suppliers Chile and New Zealand no tariffs on their wines with other nations expected to join this list soon (Li, 2017). The nation's easing policy restrictions have resulted in import growth from less than \$50 million to nearly \$2 billion in 15 years.

Preferential Drivers of Wine Consumption

Lockshin and Rhodus (1993) attempted to delineate price impacts from quality by comparing the public's and wholesalers' opinions, the latter's being considered unbiased. Their results show that, in general, consumers perceive quality, measured by subjective scoring, as an increasing function of price. This implies that price has a greater impact on their perception of a wine than does "true" quality, based upon expert opinion, due to the divergence in opinion between the two groups (Lockshin & Rhodus, 1993). Balestrini (2006) shows that country of origin appears to have similar effects where a superior pedigree naturally increases demand but may arise distinctly from price in that the magnitude of demand change for a specific country of

origin appears to surpass that of price alone (Balestrini, 2006). This is consistent with expectations in that Chinese consumers tend to appropriate significant preference to French wines due to higher perceived quality, which may extend to other supplying nations. Knowledge of wine and perception of quality based upon regulatory standards appear to influence willingness to pay in Italian consumers according to Hetzberg and Malorgio's (2008) assessment of consumers at supermarkets (Hetzberg & Malorgio, 2008). Liu (2021) supports further geographic preference discrepancies due to the observed income elasticities of demand which vary significantly by exporting nation, implying unique degrees of perceived quality by country. The author's results also show that French wines seem less sensitive, but the demands for wines from other old-world countries and Australia appear highly variable by income level (Liu, 2021).

Beyond well-documented deviations between actual and perceived quality, based upon expert and consumer ratings (respectively), from price and geography, Chinese consumers have especially unique preferences due to cultural expectations regarding social perception. Lee (2009) remarks that "face", or *mianzi*, pertains to the respect shown for another which, especially in larger social gatherings or when interacting with superiors or elders, can determine the success of a relationship or event. As a result, the observed elasticity of demand is higher than anticipated among bottled wine with a clear preference toward foreign wines (Lee, 2009). Accordingly, Hannah's (2016) findings show that French red wine has become the expectation when serving guests or giving gifts, cementing the notion that such preferences may contribute in a non-trivial manner to overall Chinese wine consumption (Hannah, 2016). Dahlstrom and Asberg (2009) observe similar results to Lee (2009) regarding increasing elasticity at higher prices in their extensive analysis of Swedish wine consumption using a log-log wine demand function considering price, income, and quality derived from expert grading and price. However,

the authors reject the notion that demand increases at higher prices (Veblen effect) due to social perception since wine consumption typically occurs among those who already know of one's wealth or status (Dahlstrom & Asberg, 2009). *Mianzi* may provide cultural evidence contradicting this claim provided expensive and high-quality wines align with the desired perception among close friends and family.

Occasions present the clearest area for deviation from typical purchasing patterns with Chinese consumers spending nearly four dollars more on average when purchasing wine for an event rather than personal consumption (Balestrini, 2006). Brunner and Siegrist (2011) found that the expectation of drinking wine at events correlates with price of wine purchased indicating a widespread preference for higher quality wines for occasions. Since wine can serve as a status symbol in China, Liu (2021) contends that consumers prefer imported red wine that presents as high-quality such that guests perceive the event or host as possessing a higher social rank (Liu, 2021). This preference is realized in income elasticity having a much greater impact than price elasticity, implying Chinese consumers value social status and purchasing power gains higher than price shifts.

Liu (2021) also notes that gift giving falls into a similar category in that foreign red wines as gifts imply social status for the giver and respect toward the recipient, all while conforming to common positive Chinese associations with red and, to an extent, France (Liu, 2021). Data from Liu and Murphy (2007) shows that Chinese consumers generally weigh wine prices significantly higher for important compared to casual events with perceived benefits of both social perception and special events (Liu, 2007). Yang's (2015) review of Chinese gift-giving behavior suggests the following three goals define gift giving in Chinese culture: manage social status, improve relationships, and adhere to social expectations (Yang, 2015). Red wine conforms to each of

these goals and, as discussed, already experiences higher average purchase price and lower price elasticity when giving gifts, providing further support that this practice could contribute to consumption increases.

Several of the previous sections point to wine behaving as luxury good, most clearly supported by French's (2016) results showing an income elasticity of demand notably greater than 1, implying consumption grows faster than income signaling a *luxury* good (French, 2016). Dahlstrom and Asberg (2009) provide similar evidence of wine's behavior as a luxury good especially at higher price ranges (i.e. price elasticity decreases at higher prices), but suggest that this may signify a luxury segment in the wine market rather than a true luxury good (Dahlstrom & Asberg, 2009). Wolf's qualitative analysis of luxury consumers supports wine as a luxury good, specifically regarding status-seeking motives marked by brand and country of origin quality perceptions (Wolf, 2016). Chang's survey results of 70 Taiwanese students suggest that the majority of consumers would pay for increased status from a luxury good and also pay more attention to luxury branded products (Chang, 2005). These results qualitatively show that Chinese consumers have a higher willingness to pay for wine of high-quality, implied by price and geography, as a status symbol. Consequently, wine is treated as a luxury good begetting the aforementioned benefits from gift-giving and presence at occasions.

Closing Thoughts

Wine's prevalence in China in recent years could have arisen for numerous reasons and while most research to date has pointed toward classical economic drivers, this paper will delve deeper into preferential impacts on consumption. This may result from increased imports and prices due to wine's common presence at special occasions or as gifts, but more generally as an

increasingly luxury good among higher-status individuals in the nation. Research to this point has provided qualitative evidence and this paper will attempt to quantify these impacts. Further, it will attempt to verify previous findings while using economic variables like designer apparel consumption and average beer price to trace any dynamics in the market relative to substitutes or luxury and various preferential drivers to determine their relevance to the wine market.

Chapter 3

Description of Data

Demand

Each importing nation's (China, South Korea, Thailand, Taiwan, Japan) demand for wine is represented by the quantity imported (in tons) each year. Since bottled wine comprises the vast majority of Chinese wine imports, bulk and sparkling wines are omitted. Data for all nations are available through the International Trade Center's (ITC) *Trade Map*, aggregated annually under the Harmonized System Product Code 220421 in consistent units of tons. Quantity imported is used rather than the value of imports to partially remove *quality* considerations from the independent variable, removing overlap with regressors proxying quality. These and all subsequent data are collected from years 2001-2015 unless otherwise noted.

Economic Drivers

Basic economic drivers of consumption are included to determine the extent to which wine demand varies with socioeconomic well-being, the presence of substitutes, and specific international relations. Unemployment rate and household expenditure per capita are shown to influence the demand for wine among most normal and luxury goods (French, 2016). Since each could contribute independently to wine demand, their inclusion is necessary to control for market changes from economic development rather than dynamic preferences. These data are collected from the World Bank's *Open Global Development Database* in units consistent across nations for China, South Korea, Japan, and Thailand. Data for Taiwan is unavailable through this source and is instead taken from MacroTrends Research, the government of Taiwan's statistics website, and the CEIC database sponsored by the ISI Emerging Markets Group. Data for Taiwan had

inconsistent units and is converted into 2015 US Dollars to maintain consistency across nations. Evidence supports education level as another potential consumption determinant, so average years of schooling among the adult population is also included in the model for each importing nation (Wang, 2011). All relevant data is available through Oxford's *World in Data* and appeared consistent in measurement across both nation and period. Average total years of schooling is chosen as the proxy for education level since the literature suggests a small but approximately linear relationship for amount of schooling with minimal consideration for any differentiation between level or quality of education. None of the literature reviewed suggested a stronger correlation when broken down further so only total years are considered in this paper. Tertiary graduation rates are used as a sensitivity check so any notable variation with years of schooling will be discussed.

As expected, the impact of price and substitutes on wine consumption must be considered in addition to typical economic drivers. To stay consistent with exclusively bottled wines, the unit import price for wine under HS 220421 is used to represent the price tag a customer in each nation will see. An obvious potential oversight of this assumption is that domestic wine prices could be trending differently than imported wine, but sufficiently disaggregated data is challenging to acquire due to the presence of domestic, bulk, mixed (domestic combined with bulk), and rice wines in the market. Bulk and rice wines are typically domestically produced, to an extent, and therefore should not impact results significantly since this paper is focused on imports rather than general consumption. Unit price data are pulled from ITC *TradeMap* in units of 2015 USD per ton for all nations. Only beer is considered as a direct substitute for wine due to inconsistent demand for liquor, baijiu, and rice wine across importing nations. As a result, average beer price is considered to determine whether the market behavior of beer has any

noteworthy impact on wine imports as prior studies suggest (French, 2016). Both variables are pulled from Euromonitor's *Passport* database covering years 2006-2015 for all importing countries and normalized to liters and the 2015 USD for analysis. The data include all domestic and imported beer sales for the relevant nations and is not separated by brand, type, or distribution channel, despite the data being available, since no prior literature suggests a correlation between wine consumption and any further disaggregation of beer.

The final economic determinant of wine consumption considered here are the import tariffs placed on supplying nations alongside the relationship between each importing nation and its supplying counterpart. The tariff on bottled wine from each supplying nation is collected from the World Trade Organization's tariff database, thereby accounting for any updates in treatment or policy by any importer. These tariffs should have the most direct implications on consumption as a result of government interplay and international affairs and therefore warrant consideration in this model. Further regard should be given to the relationship between an importing nation and its supplier which will be measured by both the percentage of imports which come from the supplying nation and the GDPs of the importing and supplying nations. Such relationships may not be sufficiently proxied by gravity variables due to historical alliances and unique goods demanded from each supplying nation, motivating these variables' inclusion. The percentage of imports from a supplying nation will indicate the extent to which the countries and governments have an established commercial relationship, thereby showing the approximate quality of this relationship. The GDP of the supplying and importing nations can also influence the extent to which they interact since larger GDPs of either nation generally imply higher trade volume between the pair. These data are pulled from ITC *TradeMap* and the World Bank (respectively) in consistent units of USD across countries.

Preference Drivers

Much of the motivation for this paper comes from the notion that wine demand derives from some combination of a preference for higher quality, typically French wines for which consumers are willing to pay a premium, a trend toward the preferences of the largest wine consuming nations, and a general increase in luxury consumption. As such, several variables worth considering specifically with regard to Chinese preferences are the percent of imports and price of wine from major suppliers including France, Chile, Australia, Spain, Italy, and the United States, the same metrics for the top four wine consuming nations (United States of America, United Kingdom, Germany, and Canada), and market size for designer apparel in each importing nation.

The percentage of imports from each of China's largest suppliers could indicate shifting preferences toward a particular varietal or country-of-origin. Chinese consumers have a well-documented affinity for French, specifically Bordeaux, red wine, so a trend toward a particular nation consistently correlated with overall consumption could warrant further exploration of a causal relationship. The data for this variable come from ITC *TradeMap*, taking the percentage of wine imports from each supplier relative to the sum of the nation's total wine imports. The data will show any relative changes in import behavior allowing for its assessment against any larger trends observed in the data. Average prices from each supplying nation could also indicate some change in preferences if inconsistent with expected movement provided an increase or a decrease in price. For example, an increase in the price of Chilean wine paired with an increase in the percentage of Chilean wine consumed relative to total imports despite a relatively constant average wine price could imply a shifting preference toward Chilean wines since intuition would

suggest substituting toward a presently cheaper relative option. This variable is also calculated from ITC *TradeMap* as the per-unit price of relevant wine imports from each supplying nation; South Korea lacked data for 2001 and 2002. The unit price most directly reflects the price consumers would pay for wine and therefore could significantly affect purchasing behavior provided wine behaves as a normal or luxury good.

Literature also suggests that Chinese consumers' preferences tend toward those of nations that consume more wine, specifically regarding quality and willingness to pay for such quality for occasions and gift-giving. Thus, including purchasing behavior of the world's largest global wine consumers could illuminate another motive for changes in the broader Chinese market. By both imports and nominal wine consumption (excluding sparkling wine), the United States, the United Kingdom, Germany, and Canada emerge as dominant consumers and are therefore considered a benchmark for global preferences. To assess these nations' preference changes toward wines from France, Chile, Australia, Spain, Italy, and the United States (maintaining the benchmarks set before), both percentage of wine consumed and average wine price from each nation are calculated using ITC *TradeMap* data in consistent units of tons and 2015 USD (respectively). These variables can best represent how changing global preferences may impact Chinese consumption in the same manner as above for domestic consumption of wine from these nations.

Previous research also supports the notion that wine behaves as either a luxury good or a normal good with a luxury segment. To determine whether this result holds, general luxury consumption is represented by the designer apparel market size in each importing nation. Euromonitor's *Passport* supplies ready-to-wear designer apparel data from 2007-2015 which includes prototypical designers like Louis Vuitton to niche but upper-class brands like Canada

Goose. The data could show evidence for revised preferences with respect to luxury, whether wine is regarded as a luxury or a normal good, if increases in luxury consumption correspond with increases in general or country-specific wine demand.

Motivation for Various Inclusions

While this paper focuses on growth in Chinese wine imports, other Asian nations are included to compare any noteworthy findings to determine whether certain correlations exist only for China or for the broader Asian market. Relative cultural and geo-political similarities paired with similar, albeit less dramatic, trends in wine import growth makes their inclusion a natural extension and comparative measure for this paper.

China's six largest wine suppliers from 2001-2015 are included in this model since they constitute over 85% of Chinese imports in each year considered. More comprehensive data and the potential for preference-dictated relationships due to perceived differences in wine quality make these suppliers most relevant and representative of each nation's wine imports.

The four largest wine importers are included since their choices largely dictate global trends in wine consumption in terms of both preferences and price. Further, all four are western nations and some evidence suggests Chinese consumers tailor their wine opinions to match the west, especially in terms of business and gift-giving. These nations' behavior can indicate quality perceptions and, consequently, impact the wine market of China and other Asian nations.

Chapter 4

Empirical Model

General Model

Economic theory and previous literature, for example French (2016) and Muhammad (2013), suggest that wine demand may be affected by both economic and preferential determinants such as price, income, international relations, or luxury consumption (French, 2016; Muhammad, 2013). As a result, the following log-linear regression is used to delineate the impacts of each of these variables:

$$\begin{aligned} \ln Q_{itj} = & \beta_0 + \beta_1 * \ln HE_{it} + \beta_2 * \ln UR_{it} + \beta_3 * \ln AWP_{it} + \beta_4 * \ln ABP_{it} + \beta_5 \\ & * \ln School_{i,t} + \beta_6 * \ln Haute_{it} + \beta_7 * \ln P_{itj} + \beta_8 * \ln PAI_{itj} + \beta_9 * \ln T_{i,t,j} \\ & + \beta_{10} * \ln PF_{t,j} + \beta_{11} * \ln PFI_{t,j} + \beta_{12} * \ln GDPS_{tj} + \beta_{13} * \ln Dis_{ij} + \beta_{14} \\ & * \ln Lang_{ij} + \beta_{15} * \ln Rel_{ij} + \beta_{16} * \ln Col_{ij} + \beta_{17} * \ln RTA_{ij} + \varepsilon_{itj} \end{aligned}$$

Description of Variables

In this equation, the dependent variable, Q_{itj} , represents the quantity of wine imported by importing nation i from exporting nation j in year t ; these subscripts have the same meanings across variables.

Household expenditure (HE_{it}) in the importing nation is expected to correlate positively with wine imports, since wine is considered a normal or luxury good according to Wolf (2016) and Dahlstrom (2009)², implying $\beta_1 > 0$ (Wolf, 2016; Dahlstrom & Asberg, 2009). The unemployment rate (UR_{it}) in the importing nation could have either positive or negative

² Wolf (2016) provides survey evidence that wine is treated as a luxury good; Dahlstrom & Asberg (2009) present consumption data implying wine may be treated as a luxury good or it may be a normal good with a luxury segment.

correlation with wine demand since higher unemployment implies less conspicuous consumption but could also incite a stress-related desire for alcohol, leaving β_2 ambiguous but more likely negative according to French³ (French, 2016).

Average wine price in an importing nation (AWP_{it}) could indicate generally high final purchasing prices which would dissuade consumers from purchasing wine regardless of county-of-origin or quality, so a negative β_3 is expected. Economic theory suggests that the presence of substitutes may also contribute to wine demand, and French (2016) supports this notion⁴ using beer price as a proxy for substitutes (French, 2016). Average beer price (ABP_{it}) in an importing nation is expected to have a positive correlation with wine consumption since higher beer prices may encourage alcohol drinkers to substitute wine for beer yielding an expected $\beta_4 > 0$.

Average total years of schooling in an importing nation ($School_{it}$) serves as a proxy for the general education level in a country which is shown by Wang (2011) to have positive and statistically significant correlation with wine consumption (Wang, 2011). Therefore, a positive β_5 is expected. No previous research has shown higher education to have an impact on wine demand but greater enrollment in post-secondary school could expose more of the population to other wine drinking students and cultures while also providing a setting for social alcohol consumption since most students would be of legal drinking age. Thus, Percent enrollment in tertiary school (Ter_{it}) is expected to have positive correlations with consumption as well and is later employed as a sensitivity check.

To account for wine's behavior as a luxury good (see above), nominal spending on designer apparel in an importing nation ($haute_{it}$) is used to represent general changes in the

³ French (2016) shows a statistically significant negative correlation between unemployment and wine consumption

⁴ French (2016) shows a positive but statistically insignificant correlation between wine consumption and beer price

luxury market. If increased spending in the luxury market is correlated with increased wine demand from a specific nation, Chinese consumers may prefer that country's wine as a status symbol, in either consumption or gift-giving. This is supported by Chang's (2005) results showing Taiwanese consumers willingly pay more for luxury branded products (Chang, 2005). Thus, the expected sign of β_6 is positive and relationships with specific importer-exporter pairs could be of special importance.

Price (P_{ijt}) of wine in 2015 USD including tariff but not sales tax is included and expected to have a negative correlation with consumption according to typical economic reasoning of higher prices implying lower quantity demanded making $\beta_7 < 0$. Percent of all imports from a supplying nation (PAI_{ijt}) represents the extent to which a relationship exists beyond wine between an importer-exporter pair. Intuition would suggest a stronger relationship could imply more wine imports from the supplying nation yielding a positive value for β_8 . The *ad valorem* tariff rate between two nations (T_{ijt}) for the specific HS Code 220421 could also impact wine consumption according to Anderson⁵ (2018) and Li⁶ (2017). Both indicate greater consumption of a supplying nation's wine if the tariff on that country is reduced such that β_9 is expected to attain a negative value (Anderson, 2018; Li, 2017).

The affinity for wines of a specific country-of-origin by larger consumers is represented by the percent of wine imported (by value) by the four largest wine importing nations from a given supplier (PFI_{jt}) and the average price of imported wine paid by these four nations from each supplier (PF_{jt}). Higher average prices from a certain country-of-origin to the largest wine importing nations could impart an impression of higher quality among Chinese consumers in

⁵ Anderson's (2018) data shows increased overall wine consumption with a removal of the 15% tariff rate.

⁶ Li's (2017) finds an increase in wine imports to China with the tariff reduction from joining the WTO.

accordance with Lockshin and Rhodus⁷ (1993) (Lockshin, 1993). Paired with the social expectation of higher quality wine at occasions and as gifts according to Liu and Murphy (2007), β_{10} is expected to take a positive value (Liu, 2007). According to Balestrini⁸ (2006) Chinese consumers preferred wines from nations which are popular among countries that import more wine (Balestrini, 2006). This would imply a positive coefficient on β_{11} since more wine imported by these nations from a supplier could inspire greater demand for that country's wine. The GDP of the supplying nation ($GDPS_{jt}$) could also impact the amount it exports to a given nation since larger nations tend to export more according to international trade theory. Therefore, β_{12} is expected to take a positive value.

Standard gravity variables are also included in the model for checks of robustness and to determine if any typical bilateral trade drivers influence the unilateral wine imports to the importing countries under analysis. All gravity variables are time invariant importer-exporter pairs except regional trade agreements which vary on time as well; all except distance are binary according to the method outlined in the *description of data* section. All sign expectations are based upon the CEPII's gravity documentation and Cipollina et al.'s meta-analysis of gravity variables in international trade models (Conte, 2021; Cipollina, 2012). Distance (Dis_{ij}) is expected to have a negative correlation with wine demand, implying $\beta_{13} < 0$, since nations farther apart are less likely to conduct trade. The presence of common language ($Lang_{ij}$), common religion (Rel_{ij}), or colonial ties (Col_{ij}) are all expected to increase trade, yielding expected β_{14} , β_{15} , $\beta_{16} > 0$. The positive correlation of a regional-trade agreement with bilateral trade (RTA_{ij}) is

⁷ Lockshin and Rhodus (1993) show that consumers glean their quality perception of wine from its price relative to otherwise "unbiased" quality ratings from wholesalers and experts.

⁸ Balestrini's (2006) survey results imply that country-of-origin has a significant impact on purchasing behavior for wine consumers and is often based upon the demand for specific countries' wines by nations consuming more wine.

documented by the aforementioned sources, and Harada⁹ (2021) supports these findings for wine trade specifically implying a positive β_{17} for unilateral wine imports as well (Harada, 2021).

Method

The general regression equation above is considered the most comprehensive form of the model used in this paper. The goal of the analyses below is to determine which of these variables has a significant impact on wine imports and if any variable contributes more to China's wine imports from specific suppliers than anticipated. From these results, preferential and cultural nuances that explain China's wine import growth beyond typical economic factors may arise. The model above is therefore applied under various sets of fixed effects to isolate key demand drivers across importing nations relative to their suppliers and domestic economic and preferential factors

The model is run under various sets of fixed effects in order to delineate significant variables while controlling for both observable and unobservable factors at different levels of variation that may affect imports of wine from country j into country i in year t . The sets of fixed effects considered in this paper are the following:

1. Separate importer, exporter, and year
2. Importer-year and exporter-year
3. Importer-year, exporter-year, and exporter-importer¹⁰

⁹ Harada (2021) shows a strong and statistically significant correlation between the presence of a free-trade agreement and wine demand from a specific country-of-origin.

¹⁰ This is the most comprehensive set of fixed effects and should produce a model with the highest explanatory power

Since factors with the same level of variation as a fixed effect would be implicitly absorbed into the effect¹¹, only variables distinct from the set of fixed effects employed are included in their respective models.

The first set of variables considered are the gravity variables distance, colonial ties, common religion, common language, and regional-trade agreement. These gravity variables are considered under separate importer, exporter, and year as well as importer-year and exporter-year fixed effects. This model is primarily included to validate the data collected since the impacts of these variables are well documented and inconsistency could imply a data or methodology issue.

The general model is then employed with the first set of fixed effects allowing all variables to be included. The regression is run for two separate periods, 2001-2015 and 2006-2015 to account for the availability of beer price and designer apparel data. The regressions are then run again excluding China from the analysis to determine if China changes the significance of any variables.

The process described above is repeated for the second set of fixed effects with only gravity variables and price, tariff, and percent of all imports included since all other variables are absorbed by importer-year and exporter-year fixed effects. The process is repeated once more for the third set of fixed effects with only price, tariff, and percent of all imports included since gravity variables are now consumed by importer-exporter fixed effects. Since beer price and designer consumption are absorbed by these sets of fixed effects, only the period 2001-2015 is considered for both regressions.

¹¹ For instance: Average years of schooling ($School_{it}$, β_5) varies on importer and year and would therefore be included in importer-year fixed effects.

Sensitivity Checks

In order to further verify the model's validity, several sensitivity checks are employed using data from non-consecutive years and alternative variables that should have similar correlations as the variables in the main model. The check for non-consecutive years accounts for the possibility of delayed response in imports from an explanatory variable (e.g. regional trade agreement not having an impact for one to two years after its initiation). This analysis is conducted identically to the full model except two- and three-year intervals from 2001-2015 are considered rather than all 15 years. Further, since these sensitivity checks serve to validate the model rather than to offer unique predictive value, all nations are considered for all sets of fixed effects rather than running parallel regressions excluding China as in the main model. For checking the model's strength with similar predictor variables, free trade agreements (FTA_{ijt}) are used in lieu of regional trade agreements, gross national income per capita (GNI_{it}) replaces household expenditure per capita, tertiary school completion rate (Ter_{it}) substitutes for secondary school completion rate, and gross domestic product of a supplier is exchanged for the supplier's gross national income ($GNIS_{jt}$). These variables are chosen as replacements since their correlations should mirror the initial variables and, together, cover each level of variation considered in the model except standard importer-exporter gravity variables. The revised model showing similar results to the initial model would provide evidence for the model's strength.

Chapter 5

Estimation Results and Discussion

Gravity Model

The model using only importer-exporter gravity variables and the presence of a free trade agreement is first considered to fundamentally validate the data and model since these variables have consistent empirical support in the trade literature. This iteration of the model considers all gravity variables for separate importer, exporter, and year fixed effects alongside combined importer-year and exporter-year fixed effects. The model under the comprehensive set of fixed effects only considers regional trade agreements (RTA_{ijt}) since importer-exporter fixed effects would absorb the other gravity variables. Results for both sets of fixed effects with and without China are provided in Table 2.

Results from the gravity model help validate the data since most coefficients have their expected sign and nearly all are significant at the 0.99 confidence level. Distance, as expected, has a large, negative correlation that is significant across all sets of fixed effects and both including and excluding China. This outcome combined with the positive and significant coefficients for all sets of fixed effects on regional trade agreements, another strong predictor of trade, imply that the gravity model and the data collected are largely behaving as expected. Colonial ties and common language take on negative correlations which somewhat contradict expectations. This is reasonable, however, since only four country-pairs share a language which overrepresents those observations in the analysis. Further, colonial ties, especially in the observed instances with Asian nations, could beget a negative current relationship consequently discouraging trade. Common religion takes on a positive and significant coefficient as expected,

and this metric may also have superior predictive power due to varying religious interpretations of alcohol consumption.

Table 2 Gravity Variables and Wine Imports for Years 2001-2015

Table 2: Wine Import Predictors from 2001-2015, China Included						
	(1)	(2)	(3)	(4)	(5)	(6)
	CSEP	NSEP	CCOM	NCOM	CALL	NALL
dis	-2.591*** (0.921)	-2.500*** (0.724)	-2.468*** (0.654)	-2.466*** (0.738)		
col	-0.381*** (0.123)	-0.482*** (0.148)	-0.377*** (0.086)	-0.481*** (0.145)		
rel	1.567*** (0.326)	1.541*** (0.263)	1.501*** (0.238)	1.525*** (0.274)		
lang	-1.174*** (0.239)	-1.198*** (0.178)	-1.163*** (0.167)	-1.195*** (0.175)		
rta	0.292* (0.152)	0.453*** (0.125)	0.372*** (0.138)	0.471*** (0.164)	0.677*** (0.127)	0.792*** (0.145)
Fixed Effects:						
Importer	Yes	Yes	No	No	No	No
Exporter	Yes	Yes	No	No	No	No
Year	Yes	Yes	No	No	No	No
Importer-Year	No	No	Yes	Yes	Yes	Yes
Exporter-Year	No	No	Yes	Yes	Yes	Yes
Importer-Exporter	No	No	No	No	Yes	Yes
China Included?	Yes	No	Yes	No	Yes	No
Observations	450	360	450	360	450	360

Notes: This table reports the relationship between standard gravity variables and wine imports obtained with OLS regression under various sets of fixed effects for the years 2001-2015. Column (1) presents estimates under separate importer, exporter, and year fixed effects with China included whereas Column (2) omits China. Columns (3) and (4) repeat the analysis using importer-year and exporter-year fixed effects then columns (5) and (6) include all sets of fixed effects. Column Headers as follows: SEP indicates separate FE set, COM indicates combined set, ALL indicates comprehensive set; C represents with China while N means without. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

Summary of Findings

With the validity of the model and data sufficiently confirmed by the gravity findings, the general model with all potentially relevant variables can be analyzed. The summary results presented in Table 3 include China and consider all three sets of fixed effects from 2001-2015 as well as separate importer, exporter, year fixed effects for 2006-2015 to account for limited beer price and designer consumption data.

Table 3 Wine Import Predictors from 2001-2015, China Included

Table 3: Wine Import Predictors from 2001-2015, China Included

	(1) SEP1	(2) SEP2	(3) COM	(4) ALL
dis	-1.816*** (0.560)	-2.425*** (0.696)	-1.396** (0.587)	
col	-0.249*** (0.077)	-0.051 (0.090)	-0.216*** (0.081)	
rel	1.753*** (0.197)	2.030*** (0.251)	1.583*** (0.207)	
lang	-1.001*** (0.143)	-0.742*** (0.166)	-1.009*** (0.143)	
rta	0.303*** (0.096)	0.134 (0.136)	0.698*** (0.137)	0.145 (0.117)
ur	-0.018 (0.129)	-0.085 (0.137)		
he	3.898*** (0.232)	3.325*** (0.575)		
school	-0.543 (1.168)	0.867 (1.479)		
awp	-0.078 (0.165)	0.087 (0.241)		
pf	0.301 (0.262)	0.124 (0.327)		
pfi	0.319** (0.159)	-0.353 (0.260)		
gdps	0.319 (0.499)	-0.719 (0.899)		
p	-1.004*** (0.096)	-0.909*** (0.113)	-0.985*** (0.109)	-0.615*** (0.119)
t	-0.362*** (0.135)	0.344 (0.238)	1.193*** (0.280)	0.499** (0.230)
pai	0.481*** (0.117)	0.889*** (0.176)	0.891*** (0.173)	0.181 (0.151)
haute		-0.440 (0.340)		
abp		0.361 (0.371)		
Fixed Effects:				
Importer	Yes	Yes	No	No
Exporter	Yes	Yes	No	No
Year	Yes	Yes	No	No
Importer-Year	No	No	Yes	Yes
Exporter-Year	No	No	Yes	Yes
Importer-Exporter	No	No	No	Yes
Years	2001-15	2006-15	2001-15	2001-15
Observations	444	270	444	444

Notes: This table reports the relationship between all predictor variables considered and wine imports obtained with OLS regression under various sets of fixed effects. Column (1) presents estimates under separate importer, exporter, and year fixed effects from 2001-2015. Column (2) repeats the analysis for years 2006-2015 in order to include abp and haute. Column (3) uses importer-year and exporter-year fixed effects and column (4) includes all fixed effects considered. Column Headers as follows: SEP indicates separate FE set (1 is 2001-2015, 2 from 2006-2015), COM indicates combined set, ALL indicates comprehensive set. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

Gravity variables largely retain their signs and significance across sets of fixed effects with the most notable deviation arising in RTA losing significance under the comprehensive set of fixed effects, seen by comparing RTA coefficients from columns 1 and 3 with column 4. The coefficient stays positive with a p-value of 0.11 implying trade agreements likely still have an impact but are largely absorbed by other relationship proxies like the tariff rate when only considering variation by importer, exporter, and time.

Of the typical economic predictors, only household expenditure appears to have a significant impact on imports with large, positive coefficients under both periods considered. Years in school and average wine purchase price do not appear to have significant effects on imports, implying education level and expectation of domestic sticker price have relatively small impacts according to these variables' coefficients in columns 1 and 2. Only the percent of wine imports to the top four wine consuming nations (PFI_{jt}) for years 2001-2015 shows significance at any reasonable level among preference and substitute indicators. This implies that the importing countries considered may favor exporters preferred by the four nations who consume the most wine. Since this result only holds for 2001-2015, observed in column 1, there may be some evidence suggesting that countries place lower value on this metric in recent years; this result may warrant further exploration but is beyond the scope of this paper.

Price and percent of all imports from a supplying nation have the expected signs and are significant at the 0.01 level for nearly all sets of fixed effects as seen in all columns. These variables appear to have among the most statistical significance in the model by p-value as is expected for imports' typical negative relationship with price and positive correlation with the magnitude of trade relationship with a supplier. Tariff rate behaves contrary to expectations under both sets of combined fixed effects undertaking a positive and significant relationship with

imports observed in columns 1 through 3. This likely occurs due to the gradually diminishing tariff rate for Chile in the 2000s despite smaller increases in wine imports since Chile already possessed a large portion of the market.

Table 4 presents nearly identical information as Table 3 except the analysis excludes China. Only key differences from Table 3 will be mentioned since further comparative analyses to isolate differences due to China's inclusion will be considered later in the paper.

Table 4 Wine Import Predictors from 2001-2015, China Excluded

Table 4: Wine Import Predictors from 2001-2015, China Excluded

	(1) SEP1	(2) SEP2	(3) COM	(4) ALL
dis	-1.977*** (0.594)	-2.645*** (0.749)	-2.119*** (0.632)	
col	-0.334*** (0.121)	-0.215 (0.138)	-0.235* (0.123)	
rel	1.875*** (0.214)	2.185*** (0.277)	1.806*** (0.233)	
lang	-1.011*** (0.143)	-0.782*** (0.166)	-1.026*** (0.144)	
rta	0.378*** (0.106)	0.215 (0.150)	0.653*** (0.151)	0.229* (0.119)
ur	-0.079 (0.135)	-0.086 (0.140)		
he	2.737*** (0.893)	2.471 (1.802)		
school	-1.456 (1.331)	-0.355 (1.786)		
awp	0.047 (0.208)	0.217 (0.295)		
pf	0.285 (0.294)	0.384 (0.358)		
pfi	-0.015 (0.177)	-0.499* (0.279)		
gdps	-0.351 (0.543)	-1.029 (0.980)		
p	-1.154*** (0.103)	-1.002*** (0.122)	-1.110*** (0.119)	-0.862*** (0.125)
t	0.062 (0.246)	0.747** (0.332)	1.452*** (0.393)	-0.459 (0.284)
pai	0.496*** (0.127)	0.863*** (0.195)	1.009*** (0.210)	0.031 (0.182)
haute		-1.035*** (0.390)		
abp		0.862** (0.427)		
Fixed Effects:				
Importer	Yes	Yes	No	No
Exporter	Yes	Yes	No	No
Year	Yes	Yes	No	No
Importer-Year	No	No	Yes	Yes
Exporter-Year	No	No	Yes	Yes
Importer-Exporter	No	No	No	Yes
Years	2001-15	2006-15	2001-15	2001-15
Observations	354	216	354	354

Notes: This table reports the relationship between all predictor variables considered and wine imports obtained with OLS regression under various sets of fixed effects. Column (1) presents estimates under separate importer, exporter, and year fixed effects from 2001-2015. Column (2) repeats the analysis for years 2006-2015 in order to include abp and haute. Column (3) uses importer-year and exporter-year fixed effects and column (4) includes all fixed effects considered. Column Headers as follows: SEP indicates separate FE set (1 is 2001-2015, 2 from 2006-2015), COM indicates combined set, ALL indicates comprehensive set. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

HE_{it} and PFI_{it} , descriptors for household expenditure and percent of wine imports from the top 4 wine consuming nations from a supplier (respectively), lose significance when omitting data from China shown by comparing columns 1 and 2 from Table 4 with the corresponding columns in table 3. This implies that Chinese consumers may value disposable income higher and preferences of major wine consuming nations more than consumers of the other importing nations. Meanwhile, designer consumption and average beer price attain significance at the 0.01 and 0.05 levels (respectively) shown in column 2. Average beer price's (ABP_{it}) greater positive correlation without China implies Chinese consumers may treat beer and wine as substitutes less than other nations. Contrary to expectations, the negative coefficient on $haute_{it}$ suggests that wine imports do not grow with consumption of designer goods. This signifies that wine imports likely do not have similar drivers to classical luxury goods (proxied by $haute_{it}$). However, the coefficient becomes more negative and significant when omitting China implying Chinese consumers may value wine as a luxury good more than neighboring nations.

Sensitivity Checks

To further validate the model, the non-consecutive year and alternate variable sensitivity checks are analyzed to determine whether the model withstands pressure from slightly modified datasets. The model is rerun for all variables under all sets of fixed effects as well as for gravity variables only under both non-comprehensive sets of fixed effects. Tables 5 and 6 show the results the model estimated for every other year and every third year (respectively).

Table 5 Wine Import Predictors, Every Other Year Sensitivity Check, China Included

Table 5: Wine Import Predictors, Every Other Year Sensitivity Check, China Included

	(1)	(2)	(3)	(4)	(5)	(6)
	SGRAV	CGRAV	SEP1	SEP2	COM	ALL
dis	-2.533*	-2.418***	-1.540*	-2.437**	-1.214	
	(1.343)	(0.927)	(0.818)	(0.998)	(0.854)	
col	-0.415**	-0.413***	-0.316***	-0.081	-0.280**	
	(0.179)	(0.121)	(0.110)	(0.127)	(0.114)	
rel	1.705***	1.647***	1.889***	2.214***	1.787***	
	(0.473)	(0.334)	(0.286)	(0.359)	(0.299)	
lang	-1.247***	-1.237***	-1.099***	-0.763***	-1.115***	
	(0.348)	(0.235)	(0.208)	(0.235)	(0.205)	
rta	0.251	0.324	0.266*	0.074	0.602***	0.167
	(0.220)	(0.196)	(0.139)	(0.194)	(0.201)	(0.182)
ur			-0.037	-0.107		
			(0.152)	(0.171)		
he			4.004***	3.011***		
			(0.330)	(0.764)		
school			-1.186	-0.199		
			(1.587)	(2.058)		
awp			-0.167	-0.092		
			(0.215)	(0.297)		
pf			0.223	0.135		
			(0.351)	(0.476)		
pfi			0.338	-0.423		
			(0.213)	(0.357)		
gdps			0.573	-0.853		
			(0.671)	(1.193)		
p			-0.991***	-0.944***	-0.986***	-0.545***
			(0.136)	(0.160)	(0.157)	(0.174)
t			-0.412**	0.279	1.081***	0.557
			(0.180)	(0.326)	(0.385)	(0.351)
pai			0.366**	0.987***	0.902***	0.107
			(0.157)	(0.251)	(0.246)	(0.230)
haute				-0.232		
				(0.465)		
abp				0.417		
				(0.493)		
Fixed Effects:						
Importer	Yes	No	Yes	Yes	No	No
Exporter	Yes	No	Yes	Yes	No	No
Year	Yes	No	Yes	Yes	No	No
Importer-Year	No	Yes	No	No	Yes	Yes
Exporter-Year	No	Yes	No	No	Yes	Yes
Importer-Exporter	No	No	No	No	No	Yes
Years	2001-15	2001-15	2001-15	2006-15	2001-15	2001-15
Observations	240	240	237	150	237	237

This table reports the relationship between all predictor variables considered and wine imports obtained with OLS regression under various sets of fixed effects with China included. Every other year is considered in order to verify model and data validity for non-consecutive years. Column (1) presents basic gravity variable estimates under separate importer, exporter, and year fixed effects from 2001-2015. Column (2) mirrors column (1) and uses importer-year and exporter-year fixed effects. Column (3) shows all variables under separate fixed effects for years 2001-2015. Column (4) repeats the analysis for years 2006-2015 in order to include abp and haute. Column (5) uses importer-year and exporter-year fixed effects and column (6) includes all fixed effects considered. Column Headers as follows: GRAV indicates gravity only (S is separate only, C is combined), SEP indicates separate FE set (1 is 2001-2015, 2 is 2006-2015), COM indicates combined set, ALL indicates comprehensive set. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

Table 6 Wine Import Predictors, Every Third Year Sensitivity Check, China Included

Table 6: Wine Import Predictors, Every Third Year Sensitivity Check, China Included						
	(1)	(2)	(3)	(4)	(5)	(6)
	SGRAV	CGRAV	SEP1	SEP2	COM	ALL
dis	-2.527 (1.596)	-2.435** (1.097)	-1.461 (0.979)	-2.660** (1.086)	-1.145 (1.016)	
col	-0.403* (0.213)	-0.400*** (0.142)	-0.309** (0.132)	-0.077 (0.140)	-0.267** (0.133)	
rel	1.671*** (0.567)	1.623*** (0.402)	1.914*** (0.344)	2.203*** (0.398)	1.793*** (0.362)	
lang	-1.274*** (0.413)	-1.264*** (0.278)	-1.087*** (0.248)	-0.744*** (0.259)	-1.080*** (0.242)	
rta	0.258 (0.260)	0.314 (0.231)	0.272* (0.163)	0.056 (0.218)	0.598** (0.238)	-0.028 (0.250)
ur			0.018 (0.194)	-0.064 (0.182)		
he			3.757*** (0.393)	2.508** (1.162)		
school			-1.043 (2.140)	1.787 (2.827)		
awp			-0.019 (0.283)	-0.072 (0.347)		
pf			0.326 (0.506)	0.132 (0.555)		
pfi			0.391 (0.250)	-0.585 (0.465)		
gdps			0.953 (0.811)	-0.941 (1.447)		
p			-1.099*** (0.173)	-1.010*** (0.187)	-1.119*** (0.191)	-0.681*** (0.237)
t			-0.471** (0.193)	0.272 (0.364)	1.043** (0.444)	0.248 (0.427)
pai			0.270 (0.181)	0.987*** (0.273)	0.801*** (0.277)	0.108 (0.269)
haute				-0.140 (0.581)		
abp				0.617 (0.544)		
Fixed Effects:						
Importer	Yes	No	Yes	Yes	No	No
Exporter	Yes	No	Yes	Yes	No	No
Year	Yes	No	Yes	Yes	No	No
Importer-Year	No	Yes	No	No	Yes	Yes
Exporter-Year	No	Yes	No	No	Yes	Yes
Importer-Exporter	No	No	No	No	No	Yes
Years	2001-15	2001-15	2001-15	2006-15	2001-15	2001-15
Observations	180	180	177	120	177	177

Notes: This table reports the relationship between all predictor variables considered and wine imports obtained with OLS regression under various sets of fixed effects with China included. Every third year is considered in order to verify model and data validity for non-consecutive years. Column (1) presents basic gravity variable estimates under separate importer, exporter, and year fixed effects from 2001-2015. Column (2) mirrors column (1) and uses importer-year and exporter-year fixed effects. Column (3) shows all variables under separate fixed effects for years 2001-2015. Column (4) repeats the analysis for years 2006-2015 in order to include abp and haute. Column (5) uses importer-year and exporter-year fixed effects and column (6) includes all fixed effects considered. Column Headers as follows: GRAV indicates gravity only (S is separate only, C is combined), SEP indicates separate FE set (1 is 2001-2015, 2 is 2006-2015), COM indicates combined set, ALL indicates comprehensive set. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

The results when considering every other year appear nearly identical to the general analysis with several variables losing some significance but retaining the expected sign. Only Dis_{ij} and PFI_{jt} under importer-time and exporter-time fixed effects lose significance in the new analysis. A few additional variables lose significance when considering every third year, but signs are once again retained and the results look approximately consistent. The percent of all imports from a supplier (PAI_{ijt}) losing all significance under separate fixed-effects from 2006-2015 (column 4), PFI_{jt} losing significance under separate fixed-effects from 2001-2015 (column 1), and distance retaining significance but appearing generally less important (all columns) constitute the largest changes. Since very few variables are impacted beyond expected significance decreases (fewer degrees of freedom) and no signs of significant variables are altered, these non-consecutive year sensitivity checks provide further evidence for the reliability of the data and model.

The final sensitivity check with several alternate variables shows similarly promising results as presented in Table 7. Once again, similar results to the main model will support the robustness of the model and data. Few differences are expected in the unchanged variables whereas slight significance and magnitude changes may arise for the adjusted variables (FTA_{ijt} , Ter_{it} , GNI_{it} , $GNIS_{jt}$).

As expected, few variables experience notably altered impacts. Free trade agreements (FTA_{ijt}) appears to generally have less predictive value than RTA_{ijt} while gross national income per capita (GNI_{it}) may have a smaller impact than HE_{it} . Tertiary school enrollment appears a better predictor than average years of schooling and the significance, albeit only from 2001-2015, may justify further exploration. No other variables see notable significance changes providing support for the model's ability to withstand altered but similar data sources.

Table 7 Wine Import Predictors, Alternate Variable Sensitivity Check, China Included

	(1)	(2)	(3)	(4)	(5)	(6)
	SGRAV	CGRAV	SEP1	SEP2	COM	ALL
dis	-2.763*** (0.905)	-2.763*** (0.629)	-2.275*** (0.555)	-2.713*** (0.626)	-2.453*** (0.567)	
col	-0.425*** (0.124)	-0.425*** (0.086)	-0.245*** (0.080)	-0.060 (0.094)	-0.235*** (0.087)	
rel	1.786*** (0.302)	1.786*** (0.210)	2.022*** (0.185)	2.166*** (0.208)	2.088*** (0.189)	
lang	-1.275*** (0.241)	-1.275*** (0.167)	-1.051*** (0.147)	-0.781*** (0.168)	-1.113*** (0.152)	
fta	0.308* (0.173)	0.308** (0.120)	0.059 (0.109)	0.050 (0.132)	0.168 (0.117)	-0.335* (0.189)
gni			1.735*** (0.144)	2.227*** (0.494)		
ur			0.550*** (0.115)	0.204 (0.146)		
ter			0.873*** (0.311)	0.385 (0.426)		
awp			0.082 (0.161)	0.366 (0.248)		
pf			0.259 (0.263)	0.042 (0.332)		
pfi			0.226 (0.139)	-0.391* (0.231)		
gnis			0.015 (0.180)	-0.629 (0.409)		
p			-1.024*** (0.097)	-0.883*** (0.113)	-0.905*** (0.113)	-0.613*** (0.119)
t			-0.236 (0.149)	0.269 (0.221)	0.597** (0.264)	0.371* (0.205)
pai			0.633*** (0.118)	0.890*** (0.188)	0.927*** (0.184)	0.166 (0.150)
haute				-0.215 (0.297)		
abp				-0.801* (0.449)		
Fixed Effects:						
Importer	Yes	No	Yes	Yes	No	No
Exporter	Yes	No	Yes	Yes	No	No
Year	Yes	No	Yes	Yes	No	No
Importer-Year	No	Yes	No	No	Yes	Yes
Exporter-Year	No	Yes	No	No	Yes	Yes
Importer-Exporter	No	No	No	No	No	Yes
Years	2001-15	2001-15	2001-15	2006-15	2001-15	2001-15
Observations	450	450	444	270	444	444

Notes: This table reports the relationship between all predictor variables considered and wine imports obtained with OLS regression under various sets of fixed effects with China included. Free trade agreements replace regional trade agreements, GNI per capita replaces GDP per capita, and GNI of supplying nation replaces GDP of supplying nation as a sensitivity check. Column (1) presents basic gravity variable estimates under separate importer, exporter, and year fixed effects from 2001-2015. Column (2) mirrors column (1) and uses importer-year and exporter-year fixed effects. Column (3) shows all variables under separate fixed effects for years 2001-2015. Column (4) repeats the analysis for years 2006-2015 in order to include abp and haute. Column (5) uses importer-year and exporter-year fixed effects and column (6) includes all fixed effects considered. Column Headers as follows: GRAV indicates gravity only (S is separate only, C is combined), SEP indicates separate FE set (1 is 2001-2015, 2 is 2006-2015), COM indicates combined set, ALL indicates comprehensive set. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

Comparisons and Exploration for China

Direct comparison under constant sets of fixed effects with and without China will isolate variables that differentiate the growth in Chinese wine imports from that of other Asian nations. Fundamentally, observing changes in sign and significance when excluding China can show which areas may warrant further exploration. Separate importer, exporter, and year fixed effects are analyzed first, and the results are provided in Table 8. Combined importer-year and exporter-year fixed effects as well as comprehensive fixed effects are shown in Table 9.

The most notable changes realized from excluding China from this analysis are the loss of significance for household expenditure for 2006-2015, lower PFI_{jt} , and greater impacts of tariffs in both periods considered. HE_{it} shows lower significance without China as seen by comparing column 3 with column 4. These results imply that Chinese consumers tend to purchase wine when they have more disposable income. This could indicate that this consumer group tends toward a higher quality wine or only purchases wine when able to afford a wine of high pedigree, potentially due to specific country-of-origin preference or purchase for gifting or occasions. A lower PFI_{jt} coefficient without China further supports the nation's preference for wines that global wine powerhouses prefer, again indicating a preference for wines of a specific COO or wines implying higher status.

Potential complement and substitute behavior have similar implications in that the coefficient on designer consumption is more negative and significant while the beer price coefficient is more positive and significant without China. $Haute_{it}$ taking a more negative value and gaining significance when excluding China indicates that Chinese consumers value wine as a luxury good more than the other Asian nations considered. Further, since the coefficient on ABP_{it} increases and becomes significant when excluding China, Chinese consumers appear to

treat wine and beer less as substitutes than neighboring nations. This evidence suggests that wine tends toward the luxury category and away from the general alcohol market (i.e. beer) in China relative to in other nations.

Table 8 Separate Fixed Effects Wine Import Predictor Comparison

Table 8: Separate Fixed Effects Wine Import Predictor Comparisons

	(1)	(2)	(3)	(4)
	SEP1C	SEP1N	SEP2C	SEP2N
dis	-1.816*** (0.560)	-1.977*** (0.594)	-2.425*** (0.696)	-2.645*** (0.749)
col	-0.249*** (0.077)	-0.334*** (0.121)	-0.051 (0.090)	-0.215 (0.138)
rel	1.753*** (0.197)	1.875*** (0.214)	2.030*** (0.251)	2.185*** (0.277)
lang	-1.001*** (0.143)	-1.011*** (0.143)	-0.742*** (0.166)	-0.782*** (0.166)
rta	0.303*** (0.096)	0.378*** (0.106)	0.134 (0.136)	0.215 (0.150)
ur	-0.018 (0.129)	-0.079 (0.135)	-0.085 (0.137)	-0.086 (0.140)
he	3.898*** (0.232)	2.737*** (0.893)	3.325*** (0.575)	2.471 (1.802)
school	-0.543 (1.168)	-1.456 (1.331)	0.867 (1.479)	-0.355 (1.786)
awp	-0.078 (0.165)	0.047 (0.208)	0.087 (0.241)	0.217 (0.295)
pf	0.301 (0.262)	0.285 (0.294)	0.124 (0.327)	0.384 (0.358)
pfi	0.319** (0.159)	-0.015 (0.177)	-0.353 (0.260)	-0.499* (0.279)
gdps	0.319 (0.499)	-0.351 (0.543)	-0.719 (0.899)	-1.029 (0.980)
p	-1.004*** (0.096)	-1.154*** (0.103)	-0.909*** (0.113)	-1.002*** (0.122)
t	-0.362*** (0.135)	0.062 (0.246)	0.344 (0.238)	0.747** (0.332)
pai	0.481*** (0.117)	0.496*** (0.127)	0.889*** (0.176)	0.863*** (0.195)
haute			-0.440 (0.340)	-1.035*** (0.390)
abp			0.361 (0.371)	0.862** (0.427)
Fixed Effects:				
Importer	Yes	Yes	Yes	Yes
Exporter	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Importer-Year	No	No	No	No
Exporter-Year	No	No	No	No
Importer-Exporter	No	No	No	No
Years	2001-15	2001-15	2006-15	2006-15
China	Yes	No	Yes	No
Observations	444	354	270	216

Notes: This table reports the relationship between all predictor variables considered and wine imports obtained with OLS regression under separate importer, exporter, and year fixed effects including and excluding China. Column (1) presents estimates from 2001-2015. Column (2) repeats the analysis excluding China. Column (3) includes only 2006-2015 in order to include ABP and haute while column (4) excludes China. Column Headers as follows: SEP indicates separate FE set (1 is 2001-2015, 2 is 2006-2015); C represents with China while N means without. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

Table 9 Combined Fixed Effects Wine Import Predictor Comparisons

Table 9: Combined Fixed Effects Wine Import Predictor Comparisons

	(1)	(2)	(3)	(4)
	COMBC	COMBN	ALLC	ALLN
dis	-1.396** (0.587)	-2.119*** (0.632)		
col	-0.216*** (0.081)	-0.235* (0.123)		
rel	1.583*** (0.207)	1.806*** (0.233)		
lang	-1.009*** (0.143)	-1.026*** (0.144)		
rta	0.698*** (0.137)	0.653*** (0.151)	0.145 (0.117)	0.229* (0.119)
p	-0.985*** (0.109)	-1.110*** (0.119)	-0.615*** (0.119)	-0.862*** (0.125)
t	1.193*** (0.280)	1.452*** (0.393)	0.499** (0.230)	-0.459 (0.284)
pai	0.891*** (0.173)	1.009*** (0.210)	0.181 (0.151)	0.031 (0.182)
Fixed Effects:				
Importer	No	No	No	No
Exporter	No	No	No	No
Year	No	No	No	No
Importer-Year	Yes	Yes	Yes	Yes
Exporter-Year	Yes	Yes	Yes	Yes
Importer-Exporter	No	No	Yes	Yes
China	Yes	No	Yes	No
Observations	444	354	444	354

Notes: This table reports the relationship between all predictor variables considered and wine imports obtained with OLS regression under various sets of fixed effects including and excluding China. Column (1) presents estimates under combined importer-year and exporter-year fixed effects from 2001-2015. Column (2) repeats the analysis excluding China. Column (3) uses the comprehensive set of fixed effects and column (4) excludes China. Column Headers as follows: COM indicates combined set, ALL indicates comprehensive set; C represents with China while N means without. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

Few changes arise in the importer-year exporter-year model beyond slight magnitude shifts in gravity variables. All other variables retain their signs and significance including and excluding China. Under the comprehensive set of fixed effects, the most notable differences are seen in international relationships with tariff rate coefficient decreasing and losing significance while RTA_{itj} 's coefficient increases and gains significance when excluding China (column 4). These results suggest international ties have a lesser impact on Chinese imports relative to other nations. This could indicate that Chinese consumers purchase wine from a specific COO primarily because of taste and quality preferences rather than trade relationships.

To directly analyze potentially significant variables, interaction terms for each variable that showed a distinct change including and excluding China are created and regressed alongside the original predictors. Since combined importer-year and exporter-year fixed effects produced no significant deviations, only the other sets of fixed effects are considered. By including China-specific interaction terms alongside the initial regressor, the coefficients returned for each variable's interaction term represent the sign and magnitude of China's deviation from the other nations. The standard errors and significance stars still show the statistical value of each deviation. Table 10 shows the results from this comparative regression with interaction terms defined as *china_var* where *var* is the original variable name. Only the interaction terms are included in this table for clarity and the results of the full regression are provided in Appendix B.

Table 10 China Interaction Term Comparison

Table 10: China Interaction Term Comparison

	(1) SEP1	(2) SEP2	(3) COMP
china_he	1.436* (0.754)	-0.662 (3.215)	
china_pfi	-0.247** (0.120)	-0.183 (0.133)	
china_t	-0.143 (0.280)	-0.196 (0.397)	1.375*** (0.367)
china_p	0.512* (0.276)	0.305 (0.308)	0.575** (0.279)
china_abp		-3.274 (3.398)	
china_haute		2.941*** (0.954)	
china_rta			-0.337 (0.276)
Importer	Yes	Yes	No
Exporter	Yes	Yes	No
Year	Yes	Yes	No
Importer-Year	No	No	Yes
Exporter-Year	No	No	Yes
Importer-Exporter	No	No	Yes
Years	2001-15	2006-15	2001-15
Observations	444	354	444

Notes: This table reports the magnitude and significance of several predictor variables which may be better predictors for China. The results are analyzed using OLS regression under various sets of fixed effects using China-specific interaction terms to isolate the deviations for China for those variables. Column (1) presents estimates under separate importer, exporter, and year fixed effects from 2001-2015. Column (2) repeats the analysis from 2006-2015 in order to include haute and abp. Column (3) uses the comprehensive set of fixed effects. Only the interaction terms (deviations) are presented here; the full regression results can be found in the Appendix. Column Headers as follows: SEP indicates separate FE set (1 is 2001-2015, 2 is 2006-2015) while ALL indicates comprehensive set. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

The significant and negative deviation for the percent of wine imported by the top 4 consuming wine nations from a given supplier, shown in column 1 for $china_pfi$, indicates that China values the preferences of prominent importing nations lower than the other countries considered which contradicts evidence provided from earlier analyses and cultural notions. One possible explanation is the volatility of the PFI_{it} variable whose sign and significance change when considering 2001-2015 compared with 2006-2015 both with and without China. While this is the only interaction variable that undertakes a sign contrary to expectations, the result makes little sense and may warrant further exploration. The positive and significant coefficient on $china_haute_{it}$ in column 2 implies that China values wine as a luxury good more than consumers of other importing nations. This is consistent with expectations since Chinese consumers appear to believe that wine signifies social status and belongs at occasions and as a gift, while many other nations may not have the same affinity (further analysis in appendix C). Economically, household expenditure appears to have the greatest unique impact for China with a positive and significant deviation for 2001-2015 (column 1). Disproportionate increases in wine purchasing paired with higher income could show that Chinese consumers with more discretionary spending choose to purchase wine as a status symbol, supporting the argument for wine as a luxury good.

For the comprehensive set of fixed effects, the tariff rate deviation, shown in column 3 and row $china_t$, appears positive and significant implying Chinese consumers may value the relationship with another nation less than other countries. A lower value on trade relationships could indicate a tendency for greater consideration for country-of-origin and quality. Chinese consumers also appear to consider price less than other nations given the positive and significant deviation term for $china_p$ in column 3 for all sets of fixed effects. This shows that Chinese consumers are less price sensitive and may pay a premium for higher quality wines as predicted.

Chapter 6

Conclusion

The goal of this paper is to clarify the key drivers of wine imports in China considering the market's rapid growth in the past two decades. Since neither common economic metrics nor the import quantity of any other nation has grown at nearly the pace of Chinese wine imports, this study seeks to isolate the impacts of preferential drivers focusing on luxury, usage, and conformity with global preferences. The results of the ordinary least squares regression with three distinct sets of fixed effects run on a set of economic and preferential variables employed in this model suggest that Chinese consumers prefer wine as a luxury good, consistent with its cultural distinction as an item of social status and fit for gifting and special occasions. There is insufficient evidence to show whether China tailors its wine preferences to the tendencies of larger wine consuming nations; this may warrant further exploration since results from this analysis are inconclusive and somewhat contradictory. However, Chinese consumers appear to value established trade relationships less than other nations when importing wine which implies that they place more value on country-of-origin and quality. A lower emphasis on price supports this notion as well as wine's position as a luxury good in the Chinese market.

The validity of the model employed in this paper is supported by several sensitivity checks using both non-consecutive years of data and a set of slightly altered variables. The former accounts for delayed impacts of variables while using alternate variables helps to verify the model's robustness since the regression returns similar results under different but similar variables. Three distinct sets of fixed effects are considered in this paper: separate importer, exporter, and year; combined importer-year and exporter-year; comprehensive importer-year, exporter-year, and importer-exporter. These fixed effects help mitigate any omitted variable bias while also providing additional explanatory power for the model by looking at relationships within each level of variation. The data for each variable are collected from reputable economic

and trade databases and have no notable gaps or inconsistencies¹². To verify the data and structure of the model, the model is first estimated for imports and gravity variables alone and produces results consistent with well-documented trade behavior.

While this analysis considers many major potential determinants of wine imports, other non-economic factors could contribute to China's import growth more than the variables considered. Future research could consider the general consumer's wine knowledge which Hussain (2006) suggests could have a significant impact¹³ on wine consumption (Hussain, 2006). While the results from this paper suggest wine behaves as a luxury good, further exploration into an inverted demand curve under certain circumstances, for example stratifying by income level or specific domains within popular countries of origin, could be justified (Veblen, 1899/2020). This is especially true because of the extensive heterogeneity in the wine market resulting from distinct varietals, vintages, and vineyards for every bottle of wine. This paper focuses on imports holistically but further breakdown by any of these characteristics could provide further explanatory power to a model. This paper also ignores exchange rate volatility¹⁴ which Oczkowski (2014) suggests could have significant implications on wine consumption (Oczkowski, 2014). The analysis conducted in this study provides a starting point for future research whose results would attain more significance with the inclusion of any of these factors.

While retroactive in nature, this paper could provide evidence for preferential drivers that explain consumption and imports beyond economic factors typically considered. Explaining shocking trends like China's explosion in wine imports can provide businesses and governments with knowledge that could help predict the next major industry primed for significant growth or

¹² Data can be provided upon request.

¹³ Hussain's (2006) survey of 122 Californians shows knowledge of wine to most significantly dictate consumption.

¹⁴ Oczkowski's (2014) regression of consumption determinants in Australia cites exchange rates as drivers.

the next country with the growth potential in the wine market. Businesses can use a more holistic view of their consumer base to explore distinct markets or countries with similar tendencies and proactively prepare for market entry. Governments could observe any noteworthy trends arising and enact legislation to either bolster or impede the development of a given market depending on its value to the country's health. Regardless, while only a preliminary analysis of the trend, this paper serves to satisfy the curiosity of any party who questioned such shocking growth in Chinese wine imports.

Appendix A

Variable Names, Descriptions, and Sources

Variable	Name	Unit	Years	Source
Wine Imported	$Q_{i,t,(j)}$	Tons	2001-2015	ITC TradeMap
Unemployment Rate	$UR_{i,t}$	Percent of working population	2001-2015	WorldBank; Taiwan Government Website
Household Expenditure per capita	$HE_{i,t}$	2015 USD	2001-2015	WorldBank CEIC Data
GNI/capita (sensitivity)	$GNI_{i,t}$	2015 USD	2001-2015	WorldBank; Taiwan Government Website
Average Wine Price	$AWP_{i,t}$	2015 USD / Liter	2006-2015	ITC TradeMap
Average Beer Price	$ABP_{i,t}$	2015 USD / Liter	2006-2015	Euromonitor Passport*
Average Schooling	$School_{i,t}$	Years	2001-2015	World in Data (Oxford)
Percentage tertiary school enrollment (sensitivity)	$Ter_{i,t}$	%	2001-2015	WorldBank; No data for Taiwan
Ave Price from supplier j	$P_{i,t,j}$	2015 USD / Ton	2001-2015	ITC TradeMap
Designer Apparel consumption	$Haute_{i,t}$	2015 USD	2007-2015	Euromonitor Passport*
Tariff on supplying nation j	$T_{i,t,j}$	%	2001-2015	WTO Tariff Database
% of all imports from supplying nation j	$PAI_{i,t,j}$	% (\$/\$)	2001-2015	ITC TradeMap
% of wine imports to top 4 from supplying nation j	$PFI_{i,t,j}$	% (Tons / Tons)	2001-2015	ITC TradeMap
Average wine price from supplying nation j	$PF_{i,t,j}$	2015 USD / Ton	2001-2015	ITC TradeMap
Supplying nation j GDP	$GDPS_{tj}$	2015 USD	2001-2015	WorldBank
Supplying nation j GNI (sensitivity)	$GNIS_{tj}$	2015 USD	2001-2015	WorldBank
Distance between nations	$Dis_{i,j}$	Miles	2001-2015	Maps
Colonial Relationship	$Col_{i,j}$	Binary	2001-2015	Various
Same religion(s)	$Rel_{i,j}$	Binary	2001-2015	Wikipedia
Same language(s)	$Lang_{i,t,j}$	Binary	2001-2015	Various
Regional Trade Agreement	RTA_{ijt}	Binary	2001-2015	International Trade Administration
Free Trade Agreement (sensitivity)	FTA_{ij}	Binary	2001-2015	International Trade Administration

*Converted from home currency to 2015 USD via. OECD conversion rates, ofx.com and in2013dollars.com.

Appendix B

Full Regression Results for Interaction Term Analysis

Table 11: China Interaction Term Comparison

	(1)	(2)	(3)
	SEP1	SEP2	ALL
dis	-1.846*** (0.566)	-2.245*** (0.713)	
col	-0.354*** (0.089)	-0.154 (0.117)	
rel	1.848*** (0.201)	2.017*** (0.257)	
lang	-1.022*** (0.142)	-0.759*** (0.163)	
rta	0.323*** (0.098)	0.257* (0.140)	0.181 (0.116)
ur	-0.071 (0.130)	-0.107 (0.135)	
he	2.144** (0.849)	3.089* (1.645)	
school	-1.922 (1.304)	0.046 (1.732)	
awp	0.114 (0.193)	0.147 (0.268)	
pf	0.230 (0.261)	0.028 (0.320)	
pfi	0.316** (0.160)	-0.436* (0.255)	
gdps	0.221 (0.499)	-0.965 (0.882)	
p	-1.046*** (0.096)	-0.941*** (0.111)	-0.656*** (0.116)
t	-0.063 (0.244)	0.749** (0.325)	-0.429 (0.280)
pai	0.442*** (0.117)	0.793*** (0.175)	0.148 (0.151)
haute		-1.085*** (0.379)	
abp		0.922** (0.418)	
china_he	1.436* (0.754)	-0.662 (3.215)	
china_pfi	-0.247** (0.120)	-0.183 (0.133)	
china_t	-0.143 (0.280)	-0.196 (0.397)	1.375*** (0.367)
china_p	0.512* (0.276)	0.305 (0.308)	0.575** (0.279)
china_abp		-3.274 (3.398)	
china_haute		2.941*** (0.954)	
china_rta			-0.337 (0.276)
Importer	Yes	Yes	No
Exporter	Yes	Yes	No
Year	Yes	Yes	No
Importer-Year	No	No	Yes
Exporter-Year	No	No	Yes
Importer-Exporter	No	No	Yes
Years	2001-15	2006-15	2001-15
Observations	444	354	444

Notes: This table reports the magnitude and significance of several predictor variables which may be better predictors for China. The results are analyzed using OLS regression under various sets of fixed effects using China-specific interaction terms to isolate the deviations for China for those variables. Column (1) presents estimates under separate importer, exporter, and year fixed effects from 2001-2015. Column (2) repeats the analysis from 2006-2015 in order to include haute and abp. Column (3) uses the comprehensive set of fixed effects. Column Headers as follows: SEP indicates separate FE set (1 is 2001-2015, 2 is 2006-2015) while ALL indicates comprehensive set. Standard errors in parentheses. Significant at the * 0.10, ** 0.05, or *** 0.01 level.

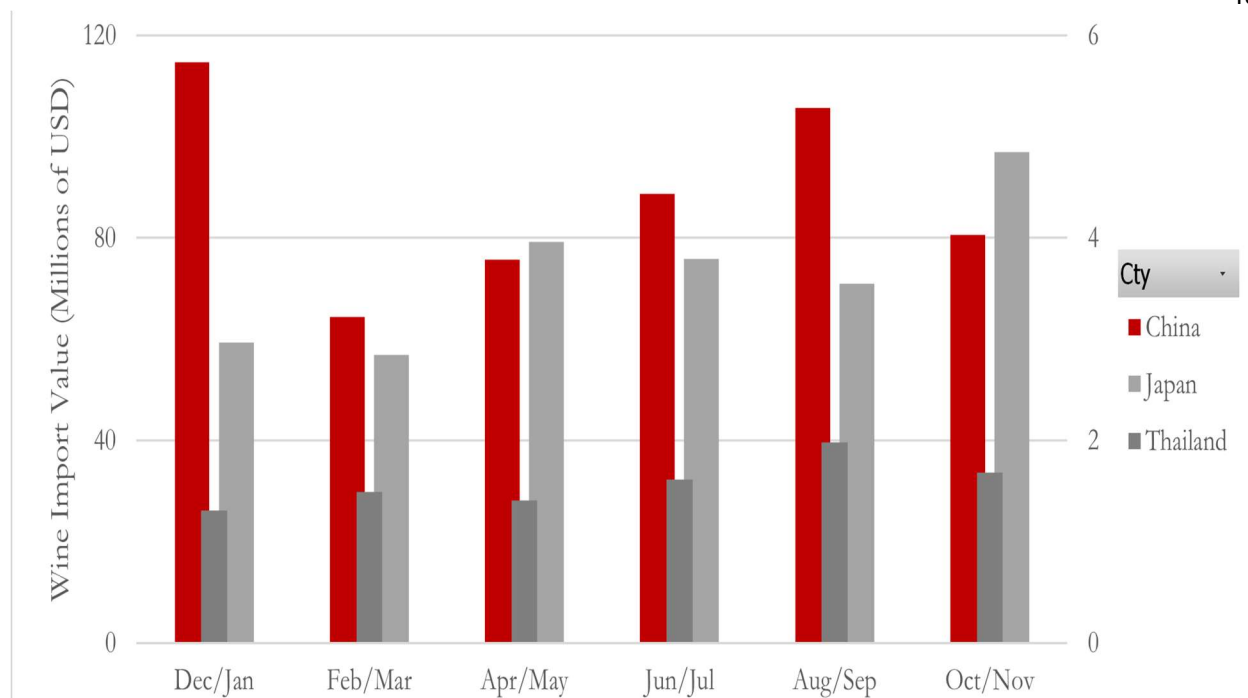
Appendix C

Extension of Gift Giving and Occasions Analysis

Gift giving and occasions present an interesting potential factor driving wine growth as mentioned numerous times in the paper. The following brief analysis serves to contextualize the ideas suggested while providing some evidence for the validity of gifts and occasions driving some growth for China specifically.

In terms of scale, it is unlikely that gift giving and occasions play a massive role in overall import growth as considered in this paper. Nevertheless, the impacts are likely non-negligible provided increased quality for these events as well, driving up quantity demanded with less concern over price. Regardless, imported wine becoming commonplace as gifts and at occasions signifies the extent to which it can serve as a social status stimulant. This supports several of the notions presented for Chinese consumers including wine as a luxury, lower focus on price than quality, and higher value on country-of-origin (for both status and quality) than trade relationships

The seasonal breakdown of wine imports could indicate whether these factors play any significant role in import growth. Spikes in imports one to two months before Chinese New Year and the Fall Festival, two Chinese holidays saturated with gatherings and gift giving, would provide evidence for a direct, quantitative link rather than more tenuous cultural expectations. The former takes place in late January to early February so imports are considered for December and January while the latter occurs in late September to early October so imports from August and September may be relevant. The following monthly breakdown of wine imports considers two-month periods from 2010-2012 for China compared with Japan and Thailand (Thailand is the minor y-axis, China and Japan are both on the major y-axis).



Data from UN Comtrade | Monthly Wine Imports from 2010-2012 for China, Japan, and Thailand (minor axis)

Clear spikes for China arise during the months consistent with purchasing for Chinese New Year (December/January) and the Mid-Autumn Festival (August/September) and are not mirrored for Japan and Thailand. This observation shows that wine imports increase prior to festivities with frequent gatherings and gift giving, supporting the notion that these factors may have quantitatively significant impacts on overall import growth since the wine only became a status symbol in China in the past two decades.

The other nations considered do not experience similar spikes except, potentially, Japan in October and November. Japan celebrates the Gregorian New Year on January 1st and many¹⁵ partake in the Shinto tradition Gantan-Sai which takes place over the week following January 1st. As such, the increase in wine imports for Japan prior to the new year could have similar implications and may warrant further exploration despite smaller magnitude spikes than China.

¹⁵ Shinto is one of Japan's oldest religions and is practiced by 69% of religious Japanese (Religion).

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ACADEMIC VITA

Tyler M. Dolan

EDUCATION

Pennsylvania State University | Schreyer Honors College
College of Liberal Arts | Bachelor of Science in Economics, Business and Law Module
Eberly College of Science | Minors in Mathematics and Statistics

University Park, PA
Class of 2022

PROFESSIONAL EXPERIENCE

Boston Consulting Group

Summer Associate

- Refined shop-floor production tracking and planning by developing and implementing a tool to track process-health from multiple angles while preempting bottlenecks in key historically limiting areas
- Mitigated delays across administrative, procedural, and mechanical functions by using insights from historical shop-floor trends to interview experts and staff, pinpointing shortcomings in supply and management

Philadelphia, PA
Jun 2021 – Aug 2021

CVS Health – Aetna

Actuarial Leadership Development Intern | Commercial Mountain Market

- Strengthened Utah's long-term financial health and risk profile up to 15% by developing and using a national sloping model to adjust pricing relativities 5-10% with respect to plan richness and historical loss
- Improved Aetna's competitive positioning in weathering COVID-19 related healthcare and consumer sentiment changes by pitching a \$200,000 large-claim reserve increase and a 4% telehealth focused benefit improvement

San Francisco, CA
Jun 2020 – Aug 2020

State Auto Insurance

Actuarial Intern | Commercial Auto Pricing

- Optimized Commercial Auto rates in Tennessee and Indiana by adjusting prices over 10% with respect to company goals and industry trends, using a self-developed model to compare rates to market leaders
- Drove 4 concurrent projects in internal strategy, product management, and actuarial rating by collaborating with 20 colleagues to produce a competitive analysis model and recently executed marketing suggestions

Columbus, OH
May 2019 – Aug 2019

University of Pennsylvania – Perelman Center for Advanced Medicine

Research Intern | Medical Physics

- Appraised efficacy of proton therapy for treating brain tumors by simulating proton beam behavior in brain tissue and bone, using Topas, Matlab, and Excel to examine and synthesize findings for the research team
- Decreased required receptor precision by 5% and enhanced amplification of incident acoustic signals to improve protoacoustic quality assurance through proton behavior simulations with over 15 materials and contrast agents

Philadelphia, PA
Jun 2017 – Jun 2018

LEADERSHIP EXPERIENCE

Nittany Lion Consulting Group (formerly Nittany Consulting Group)

Founding Member | Vice President of Consulting Services

- Pioneered NLCG with a team of 6 by merging 3 established organizations into a faculty-supported consulting entity providing client, education, and recruiting services to revolutionize and simplify consulting at Penn State
- Acquired and oversaw 8 clients and 36 associates while defining best practices for future success of my role
- Delivered gamification and early-stage funding strategy for 2 start-ups by directing 2 teams of 3-4 consultants in the creation of 2 market analyses and a pitch video that balanced strategic valuation with company mission

University Park, PA
Aug 2019 – Dec 2020

Schreyer Consulting Group

Vice President of Professional Development | Chair of Corporate Outreach

- Maximized member exposure to consulting by communicating with 15 recruiters and consultants at firms of varying size and specialty to organize 6 information sessions and itinerate 2 treks to 4 company offices
- Developed consulting and industry-specific knowledge in weekly discussions with consulting professionals and industry experts, while learning to think critically about business challenges and organizational leadership

University Park, PA
Jan 2019 – Present

Alpha Kappa Psi Co-ed Professional Business Fraternity

Brother | Case Competition Advisor

- Mentored 8 future brothers on case competition technique and etiquette, empowering an inexperienced team to win the competition through empathic and persistent coaching on analysis, structure, and presentation
- Collaborated with an inductee class of 14 to orchestrate professional, philanthropic, and social events for a brotherhood of 120, while focusing on biweekly events to encourage brother and pledge class unity

University Park, PA
Oct 2019 – Present

SKILLS, PROJECTS, HONORS, AND INTERESTS

Skills: Working knowledge in Microsoft Office (Excel, PowerPoint, Word); Experience in SAS, Python, SQL, MatLab, and Mathematica

Projects: Heavener International Case Competition (1st US, 5th Overall), Deloitte Undergraduate Competition (top 5), PwC Challenge (2nd)

Honors: Schreyer Academic Excellence Award, Braddock Scholar, Provost Scholar, President's Freshman Award, Deans List (4/4)

Interests: Cancer research, Eagles Football, Healthy cooking, Hockey, Logic puzzles, Nimzowitsch, Weightlifting (380 Wilks; Class I)