

Louvain School of Management

**How do macroeconomic
fluctuations impact the pricing and
demand of fine wines compared to
mid-range and mass-market wines ?**

Author: Lena Marrazza

Supervisor: Professor L. Iania

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Declaration

During the preparation of this master's thesis, the author utilized ChatGPT (OpenAI) for the following purposes:

1. Clarifying concepts and language support: The AI tool was used to clarify economic and methodological concepts, improve sentence structure, grammar, and academic phrasing, and enhance overall readability, without altering the original meaning or academic content.
2. After using ChatGPT (OpenAI), the author diligently reviewed and edited all content produced by the tool. Full responsibility is taken for the final content presented in this thesis.

By signing this declaration, I affirm that the content of this master's thesis reflects my original work, augmented by the responsible and transparent use of AI.

Signed at: Namur, Belgium

Date: January 5, 2026

Signature:

A handwritten signature in black ink, appearing to read 'Lena Marrazza', is written over a light blue rectangular stamp.

Lena Marrazza

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1. Introduction

1.1. Context and relevance of the research

The global wine market is a significant and evolving sector within the broader economy, experiencing considerable shifts in consumption patterns and facing increasing competition in international trade (Vecchio, 2013). Over the past few decades, wine economics has emerged as a vibrant field of study, exploring various aspects of the industry, including production, trade, and pricing (Cardebat, 2020; Storchmann, 2012). Among the different segments of the wine market, fine wine stands out because it combines cultural and experiential value with unique economic characteristics – such as its potential for price appreciation, its ability to be stored and gain value over time, its sensitivity to vintage variation, and its nature as an experience good often valued based on expert opinions (Shankar & Francis, 2020; Storchmann, 2012). Furthermore, fine wine is increasingly treated as an alternative investment asset, attracting both private and institutional investors (Ben Ameer et al., 2023; Shankar & Francis, 2020).

Recent studies have explored the impact of factors such as exchange rates, global demand shifts, monetary policy, and economic policy uncertainty on fine wine pricing (Algieri et al., 2024; Ben Ameer et al., 2023; Cardebat, 2020; Cevik & Saadi Sedik, 2014; Jiao, 2017). For instance, Jiao (2017) and Masset et al. (2023) highlight the sensitivity of fine wine prices to demand from emerging markets and the influence of financialization, including real interest rates and investment fund growth. Similarly, the impact of economic cycles and specific events like crises and policy changes on fine wine markets has been examined (Jiao, 2017; Shankar & Francis, 2020).

While the influence of macroeconomic factors on fine wines has been increasingly recognized, there is a need for a more nuanced understanding of how these fluctuations differentially impact various segments of the wine market. Mid-range and mass-market wines, which account for most of the global consumption, are more closely tied to household budgets and everyday drinking habits. Their responsiveness to inflation, recessions, or exchange rate volatility may differ substantially from fine wines due to greater price elasticity and their role primarily as consumer goods rather than investment assets.

My interest in this topic arises from both a personal curiosity about the wine industry and a broader fascination with how external shocks influence real markets. During my academic exchange in Latin America, I discovered the cultural and economic importance of wine

production, particularly in Mendoza. This exposure reinforced my motivation to explore how economic forces shape wine markets across different contexts. At the same time, the industry is increasingly exposed to uncertainty from economic slowdowns, climate change, and geopolitical tensions, all affecting supply, demand, and pricing. As wine is now viewed not only as a consumer good but also as a financial asset, this research holds strong academic and practical relevance for stakeholders across the value chain—from producers to investors—as it examines how different segments respond to volatile macroeconomic conditions.

1.2. Research question and objectives

The central research question of this thesis is: *"How do macroeconomic fluctuations—such as inflation, recessions, interest rates, and exchange rate volatility—impact the pricing and demand of fine wines compared to mid-range and mass-market wines?"*.

The objective is to determine whether fine wines, often regarded as investment goods, display greater resilience or even benefit from crises through their role as alternative assets, while mid-range and mass-market wines tend to be more price elastic and influenced by shifts in household income and consumer confidence. The research also aims to identify which macroeconomic indicators exert the strongest influence on pricing and demand across segments.

To achieve this, the thesis adopts a quantitative approach. The analysis relies on macroeconomic indicators such as GDP growth, inflation, exchange rates, and interest rates, combined with retail data on wine prices and demand. This includes the use of a panel dataset specifically constructed for this thesis, allowing cross-country and temporal comparison.

1.3. Structure of the thesis

The thesis unfolds in four main parts. It begins with a review of the existing literature on wine economics and macroeconomic determinants of consumption. The methodology section outlines the quantitative framework used to analyze the relationships between macroeconomic indicators and wine prices. The empirical analysis then examines the differentiated impact of macroeconomic fluctuations on fine, mid-range, and mass-market wines, while also considering regional specificities. Finally, the discussion connects the findings back to theory and practical implications, before concluding with reflections on limitations and possible directions for future research.

2. Literature Review

2.1. The wine market: an overview

2.1.1. Definitions and characteristics

The global wine market is composed of several distinct segments (Carollo et al., 2022), ranging from fine wines that serve as luxury goods and investment assets to mid-range and mass-market wines primarily consumed as everyday goods (Ben Ameur et al., 2023; Bocart & Hafner, 2015). Fine wines, often characterized by limited production, high-quality ratings, and prestigious origins (such as Bordeaux and Burgundy), exhibit price dynamics influenced by both traditional supply-demand factors and speculative investment behavior (Cardebat et al., 2020; Storchmann, 2012). In contrast, mid-range wines are consumed for their balance between quality and affordability, while mass-market wines, often distributed in supermarkets or discounters, are more commoditized with prices determined largely by production costs, distribution networks, and consumer purchasing power (Dimson et al., 2015).

From the perspective of market segmentation theory (Smith, 1956; Wedel & Kamakura, 2000), these categories reflect distinct consumer groups with different preferences, purchasing power, and price sensitivities. This segmentation provides a useful lens for understanding how macroeconomic pressures affect wine demand across categories.

2.1.2. Wine value chain: production, distribution and pricing

The economic structure of the wine industry also plays a role in pricing dynamics. Wine production is highly fragmented, combining small producers and large corporations, all operating within a regulated framework that varies by region (Sveučilište u Rijeci, Ekonomski fakultet u Rijeci et al., 2021). The value chain spans from viticulture and vinification to distribution via wholesalers, retailers, direct-to-consumer platforms, and auction houses. Sales channels vary by segment: mass-market wines rely on high-volume retail, while fine wines increasingly leverage auctions and online platforms (Schäufele, 2018).

Price mechanisms differ accordingly, mass-market wine prices are primarily cost- and competition-driven, whereas fine wine prices are influenced by vintage quality, critic scores, brand prestige, and secondary market behavior (Dimson et al., 2015). This reflects the hybrid character of fine wines, which combine the features of cultural goods with the characteristics of financial assets (Beckert et al., 2017).

2.2. Macroeconomic shocks and consumer behavior

2.2.1. Economic cycles and price elasticity of demand

Macroeconomic fluctuations, such as inflation, recessions, interest rates, and exchange rate volatility, significantly impact consumer purchasing behavior across different wine categories (Bouri et al., 2018; Jiao, 2017). Drawing on macroeconomic consumption theory (Deaton, 1992), changes in disposable income, inflation, and uncertainty influence consumption choices differently across wine categories.

This can be framed in terms of price elasticity of demand: fine wines, due to their status as luxury goods, tend to display lower elasticity, while mid-range and mass-market wines are more elastic and therefore more sensitive to income shocks and consumer sentiment (P. L. Anderson et al., 1997; Masset et al., 2023). Research suggests that fine wines, like other high-end commodities, are relatively resilient during stable economic conditions but can be susceptible to demand contractions during severe downturns (Masset & Weisskopf, 2010).

2.2.2. Emerging markets and income growth

Economic growth, particularly in emerging markets, has played a crucial role in shaping demand for fine wines (Cardebat, 2020). Rapid expansion in countries like China has historically driven price increases for top-tier Bordeaux wines. However, economic slowdowns and currency depreciation in these markets can lead to sudden declines in luxury wine demand (Cevik & Saadi Sedik, 2014). Meanwhile, in developed economies, fine wine demand appears less correlated with overall GDP fluctuations, suggesting that high-net-worth individuals' purchasing behavior remains stable unless faced with extreme financial instability (Jiao, 2017).

2.2.3. Exchange rate volatility

Exchange rate movements play a key role in shaping demand, particularly in export-oriented fine wines. A depreciation of the U.S. dollar, for instance, makes European wines more expensive for American buyers, potentially reducing demand (Cardebat & Figuet, 2019). Conversely, a weaker euro benefits European wine exporters by making their products more competitively priced in foreign markets. Hence, fine wines—as globally traded goods—are most exposed to currency movements (Shankar & Francis, 2020), while mid-range and mass-market wines are more tied to local purchasing power (Algieri et al., 2024).

2.2.4. Consumer psychology under uncertainty

Beyond economic fundamentals, wine purchasing is also shaped by psychological mechanisms that intensify during periods of uncertainty. Wine is associated with high perceived risk due to quality variability and symbolic value (Atkin & Thach, 2012). During downturns, consumers engage in perceived risk mitigation strategies, such as choosing familiar brands or sticking to previous purchase patterns (Van der Colff et al., 2016). As a result, they often exhibit status and uncertainty avoidance, preferring stability and resisting change in their wine choices (Rinck, 2023; Samuelson & Zeckhauser, 1988). Cognitive stress and choice overload can intensify these behaviors, pushing non-expert buyers toward simplified heuristics such as lower-priced or well-known labels (Evison, 2023).

From a behavioral economics perspective, loss aversion (Kahneman & Tversky, 1979) further discourages premium experimentation due to the fear of financial loss. However, segmentation plays a role: highly involved or knowledgeable wine consumers often remain resilient, using downturns as opportunities for strategic buying (Saidi & Giraud, 2018). These mechanisms complement macroeconomic consumption theory in explaining divergent behaviors across market tiers during volatile periods.

2.2.5. Fine wines during crises: evidence of resilience

Empirical studies on wine performance during major economic shocks, such as the 2008 financial crisis or the COVID-19 pandemic, suggest that fine wines tend to retain more stable demand and value compared to other discretionary goods. This is attributed to the asset-like nature of fine wines, strong brand loyalty, and a consumer base composed primarily of high-income individuals less affected by short-term financial turbulence (Masset & Henderson, 2010; Maurer et al., 2020). Additionally, fine wines can also be interpreted as Veblen goods, where higher prices enhance their desirability by signaling exclusivity and social status (Beckert et al., 2017).

During the 2008 global financial crisis, for instance, while many luxury goods saw a sharp decline in demand, fine wines, particularly those from prestigious regions like Bordeaux, exhibited an unusual resilience (Masset & Weisskopf, 2010). Similarly, despite the global disruptions caused by the COVID-19 pandemic, fine wine markets saw a remarkable recovery, especially in online sales and secondary market activities such as wine auctions (Maurer et al., 2020).

2.3. The financialization of wine

2.3.1. Wine as an alternative asset: performance and risk

The growing perception of fine wine as an alternative investment asset has led to increased financialization of the market (Dimson et al., 2015; Storchmann, 2012). Industry indices such as Liv-ex Fine Wine Index and specialized wine funds provide benchmarks for tracking performance and have attracted institutional and private investors seeking diversification (Kourtis et al., 2010). This shift has introduced new price determinants beyond traditional supply and demand forces, making fine wine prices increasingly responsive to global financial trends (Masset & Weisskopf, 2010).

Furthermore, low interest rates and abundant global liquidity have been identified as key drivers of fine wine price appreciation (Ben Ameur et al., 2023). Research suggests that when real interest rates decline, investors search for alternative assets with high potential returns, boosting demand for collectible goods, including fine wines. However, during periods of financial instability or tightening monetary policy, fine wine prices may experience greater volatility, as investment-driven demand contracts (Cevik & Saadi Sedik, 2014; Jiao, 2017).

2.3.2. Quantitative vs. qualitative approaches to wine investment

Financial drivers of wine market—such as interest rates, liquidity and market trends—coexist with intrinsic attributes like brand reputations, critic scores, vintage quality, reinforcing the hybrid nature of wine as both a cultural good and a financial asset (Masset & Henderson, 2010). Furthermore, the fact that fine wines also display characteristics of Veblen goods, strengthens the argument that their demand is not solely driven by financial returns, but also by social signaling and symbolic value (Simon & Douglas, 1996).

2.4. Previous research on wine price sensitivity

Some empirical studies on wine pricing dynamics indicate that fine wines comove with financial markets (Ben Ameur et al., 2023), whereas mid-range and mass-market prices track production costs and household purchasing power (Algieri et al., 2024; Masset et al., 2023).

Studies on the wine industry's performance during recessions suggest that while high-end wines exhibit some resilience (Kourtis et al., 2010; Masset & Weisskopf, 2010) due to their status as Veblen goods (whose desirability may increase with price), they are not immune to severe

downturns (Cardebat et al., 2020). For instance, during the 2008 financial crisis, auction prices for top-tier wines experienced significant declines. In contrast, mid-range and mass-market wines saw a more stable demand pattern, as consumers adjusted their preferences towards lower-priced alternatives (D'Arpizio et al., 2025; Shankar & Francis, 2020).

Fluctuations in exchange rates contribute to varying levels of price sensitivity across wine categories (Jiao, 2017; Masset & Weisskopf, 2010). In the case of French wine exports, higher-end wines exhibit pricing strategies that mitigate volume losses (Cardebat & Figuet, 2019). This pricing-to-market behavior allows fine wine producers to sustain profitability, whereas lower-tier wines, facing greater price competition, experience more significant demand reductions under adverse exchange conditions (Cardebat & Figuet, 2019).

In conclusion, existing literature highlights the significant role of macroeconomic factors in shaping the pricing and demand of fine wines, particularly through the impact of economic growth, exchange rates, monetary policies, and economic uncertainty. Although comparisons with lower-tier wines are less frequent, available research suggests marked differences in sensitivity to economic cycles and exchange rate fluctuations. By incorporating theoretical lenses such as price elasticity of demand, Veblen goods, macroeconomic consumption theory, and market segmentation theory, these dynamics can be systematically understood across differentiated segments of the wine market.

2.5. Hypotheses:

Building on the theoretical and empirical literature discussed above, the following hypotheses are raised:

- H1: Fine wine prices are less sensitive to inflation than mid-range and mass-market wines.
- H2: Exchange rate volatility has a greater impact on fine wine prices than on mid-range and mass-market wines.
- H3: Consumer demand for mass-market wines is more negatively affected during recessions than demand for fine wines.
- H4: Rising short-term interest rates depress mid-range and mass-market wines prices more than for fine wines prices.
- H5a: Fine wine demand increases when economic policy uncertainty rises.
- H5b: Mass-market wine demand decreases when economic policy uncertainty rises.

- H6: Declines in consumer confidence have a stronger negative effect on mid-range and mass-market wine demand than on fine wine demand.
- H7a: The sensitivity of wine prices to macroeconomic fluctuations differs significantly across regions.
- H7b: Old World regions (e.g. France) exhibit lower macroeconomic sensitivity than New World regions (e.g. Chile, Argentina, USA) due to structural market maturity and established global demand.

3. Methodology and Data

3.1. Research objectives

The purpose of this study is to analyze how macroeconomic fluctuations—such as inflation, exchange rate volatility, interest rates, and GDP growth—affect wine prices across different market segments and production regions. A complementary demand analysis assesses how consumption and trade respond to these shocks, though the core focus remains on price dynamics.

The empirical strategy combines two axes of heterogeneity. Vertically, it compares wine responses across three market segments – fine, mid-range and mass-market – and horizontally, it examines regional variation across four emblematic wine-producing areas: Bordeaux (France), Napa Valley (United States), Mendoza (Argentina), and Central Valley (Chile). This dual approach assesses how market positioning and structural characteristics shape wine markets' sensitivity to macroeconomic conditions.

3.1.1. Wine segmentation strategy

The first axis of heterogeneity is market segmentation. Wines differ not only in intrinsic quality but also in their economic role and market orientation. Fine wines, as investment-driven products, function as alternative assets traded on secondary markets, with price dynamics shaped by financial conditions and investor sentiment (Masset & Henderson, 2010). Mid-range wines occupy a more balanced position, offering quality at moderate prices and appealing to regular but discerning consumers. Their behavior aligns more closely with household purchasing power and macroeconomic fundamentals such as income growth or inflation. Mass-market wines are high-volume products targeted toward broad consumer markets whose prices depend mainly on cost structures, exchange rates, and large-scale distribution strategies. Distinguishing between these three categories is crucial (Cardebat et al., 2014), as it allows the analysis to uncover whether macroeconomic shocks have homogeneous or heterogeneous impacts across different tiers of the wine market.

3.1.2. Regional selection justification

The second axis of heterogeneity concerns the regional scope. Four production regions were selected to capture diverse production models, international orientation, and market positioning.

Bordeaux represents the archetype of a traditional Old-World region, with centuries of reputation, strong brand recognition, and a large share of production integrated into global trade and investment markets (Ashenfelter, 2010). It is a canonical case for financialized fine-wine markets. Napa Valley, in contrast, represents a New World region where the premium segment expanded rapidly, combining investment-grade labels (e.g., Opus One, Dominus Estate) and large-scale, making it a valuable case for studying internal segment diversity (K. Anderson & Pinilla, 2018). The inclusion of Mendoza adds the perspective of an emerging-market producer, with exports playing a crucial role in its economic model yet vulnerable to inflation and currency shocks. The Central Valley of Chile illustrates another export-oriented region as they are widely distributed in international retail markets, (OIV, 2024), with a stronger emphasis on cost-efficient, high-volume production.

Together, Bordeaux and Napa represent investment-driven models, while Mendoza and the Central Valley illustrate export-driven strategies, thereby ensuring that the analysis captures a wide spectrum of production and market orientations.

3.2. Data collection

3.2.1. Key data sources

The empirical analysis relies on two main data categories: wine prices and macroeconomic indicators. To ensure reliability and comparability, the data are drawn from internationally recognized institutions and widely used industry platforms.

For wine prices, the primary sources are specialized auction houses (Acker Wines, Sotheby's, Christie's), which publish historical hammer prices for prestigious labels, and online platforms such as Wine-Searcher and Vivino, which provide aggregated retail prices across multiple markets. These sources are widely used in wine economics research (Cardebat et al., 2014; Masset & Henderson, 2010) and provide a robust representation of both fine wines traded on secondary markets and mid- to mass-market wines sold through retail channels. Although Liv-ex offers more systematic coverage, it was not accessible due to financial constraints; open and semi-open sources were therefore used as a pragmatic and academically acceptable alternative (see Appendix A, Table 1, for an overview by market segment).

Macroeconomic indicators were obtained from international institutions ensuring credibility and methodological transparency: the World Bank (WDI) provide consistent measures for

inflation, GDP growth, and exchange rates; the OECD and IMF IFS for short-term interest rates and for economic policy uncertainty, the by Baker, Bloom, and Davis (2016) database and subsequent country-level adaptations (e.g., Ghirelli et al., 2022) were used. These sources are standard in the empirical economics literature and ensure that the explanatory variables are comparable across regions and over time.

3.2.2. Wine price data

The structure of the wine price dataset reflects the different market dynamics of the segments under study. For fine wines, a longitudinal dataset was constructed for emblematic labels such as Château Lafite Rothschild, Château Margaux, Opus One, and Catena Zapata collected from auction results (Acker Wines, Sotheby's, Christie's) and complemented with merchant listings when hammer prices were unavailable in specific years (from Wine-Searcher and Vivino). These repeated sales across different years of observation, anchored on benchmark years of sale (2000, 2005, 2010, 2015, 2020, and more recent years such as 2023-2025 when available) and on a set of iconic vintages selected, allow the creation of a true panel, suitable for fixed-effects regressions and temporal analysis.

For mid-range and mass-market wines, historical records were limited; therefore, a cross-sectional snapshot centered on recent years (mainly 2023) was compiled from multiple online retailers and averaged to minimize outlier biases. As a result, the dataset for these segments takes the form of a cross-sectional snapshot across various retailers and countries of sale, centered on recent years, mostly 2023. In several cases, however, retailer data was tied to a specific vintage, particularly for mid-range labels such as Château Talbot (2020, 2022), Montes Alfa (2022), or Robert Mondavi (2015, 2021). These vintages are close to each other and to the default 2023 reference, so their inclusion does not affect the comparability of the dataset.

To provide clarity, a summary table is included below listing all labels, their regional and segment classification, and the vintages or reference years used. This ensures transparency while highlighting the structural difference between the fine wine panel dataset and the retail-based snapshot for mid- and mass-market wines.

Table 2. Wine regions, segments, labels and vintages

Region	Segment	Labels	Vintages
Bordeaux	Fine	Château Lafite Rothschild	1982, 2005
	Fine	Château Margaux	1982, 2010
	Mid	Château Talbot	2020, 2022, 2023

	Mid	Château Sociando-Mallet	2020, 2023
	Mass	Mouton Cadet	2022
	Mass	Calvet Grande Reserve	2023
Napa Valley	Fine	Opus One	2005, 2010
	Fine	Dominus Estate	2005, 2010
	Mid	Robert Mondavi	2015, 2021, 2023
	Mid	Kendall-Jackson Vintner's Reserve	2019, 2023
	Mass	Barefoot	2023
	Mass	Carlo Rossi	2023
Mendoza	Fine	Catena Zapata Adrianna Vineyard	2005, 2010, 2012, 2018
	Fine	Cheval des Andes	2005, 2010, 2012, 2018
	Mid	Trapiche Terroir Series Finca Ambrosia	2021, 2023
	Mid	Bodega Norton Reserva	2023
	Mass	Trapiche Oak Cask	2023
	Mass	Finca Flichman	2023
Central Valley	Fine	Almaviva; Don Melchor	2005, 2010, 2014, 2018
	Fine	Don Melchor	2005, 2010, 2014, 2018
	Mid	Montes Alpha	2022, 2023
	Mid	Santa Rita Casa Real	2019, 2023
	Mass	Casillero del Diablo	2023
	Mass	Gato Negro	2023

3.2.3. Macroeconomic indicators

To assess the impact of macroeconomic fluctuations on wine pricing and demand, six indicators were collected for Argentina, Chile, France, and the United States: inflation (CPI), GDP growth, short-term interest rates, exchange rates, consumer confidence, and economic policy uncertainty (EPU). These variables capture both real economic conditions and financial or behavioral factors that may influence wine markets. Table 3 summarizes their definitions, sources, and coverage, while the discussion below adds key methodological considerations.

Table 3. Macroeconomic indicators and sources

Variable	Definition	Source(s)	Coverage (years)
CPI (Inflation)	Consumer Price Index, 2010 = 100 (AR: 2016 = 100)	World Bank (FR, US, CL) INDEC (AR)	FR, US, CL: 2000-2024; AR: 2016-2024
GDP Growth (%)	Annual real GDP growth rate	World Bank WDI	2000-2024
Interest Rates	Short-term policy or money market rate	OECD (FR, US, CL) IMF IFS (AR)	2000-2024
Exchange Rates	Official exchange rate (LCU/USD, avg.)	World Bank WDI	2000-2024
CCI	Consumer confidence index (baseline = 100)	OECD (FR, US, CL) UTDT (AR)	2000-2024 (AR shorter availability)
EPU	Economic Policy Uncertainty Index	Blake, Bloom & Davis	2000-2024

Inflation was measured using the Consumer Price Index (CPI, base 2010 = 100). This variable was used to deflate nominal wine prices into real terms, ensuring compatibility across time. For France, Chile, and the United States, CPI data were provided by the World Bank World Development Indicators (WDI) and cover 2000-2024. For Argentina, official CPI data from INDEC are available only from 2016, restricting its subpanel to 2016-2024.¹

Available for the 2000–2024 period, annual GDP growth rates, collected from the World Bank WDI for all four countries, capture real economic activity and cyclical fluctuations, serving as a benchmark to assess the extent to which wine prices respond to changes in household income and aggregate demand. Short-term interest rates reflect the monetary policy conditions and the cost of financing consumption. Data for France, Chile, and the United States were obtained from the OECD database, while for Argentina the IMF’s International Financial Statistics (IFS) provided the closest equivalent policy-related rates. Despite methodological differences (e.g. three-month interbank rates versus policy target rates), they remain broadly comparable indicators of the stance of monetary policy.

Exchange rates were measured as the official exchange rate (local currency per US dollar, period average) from the World Bank WDI, ensuring consistency across countries and enabling all prices to be expressed in a common currency. The relevant pairs are EUR/USD (France, post-1999), ARS/USD (Argentina) and CLP/USD (Chile), with the US series fixed at 1 by construction. Economic policy uncertainty (EPU) indices were obtained from the database developed by Baker, Bloom, and Davis (2016) for France, the United States, and Chile, national. In the case of Argentina, no official index is available from the same source, so a regional alternative developed by Ghirelli, Pérez, Urtasun and colleagues (2022) at the Bank of Spain was used. Despite minor methodological variations, both sources capture a consistent notion of policy-related uncertainty.

In addition to these macro-financial variables, consumer confidence indices were included to capture household sentiment. Annual data for France, Chile, and the United States were sourced from the OECD, while Argentina’s index was collected from the Universidad Torcuato di Tella (UTDT), through its Centro de Investigacion en Finanzas (CIF). Although survey designs and consumer behaviors differ, these indices offer a useful proxy for demand-side dynamics.

¹ See Section 3.3.3 for details on this limitation

Together, these variables offer a comprehensive framework for analyzing how economic cycles, monetary policy, exchange rate dynamics and uncertainty affect wine prices across countries and segments.

3.2.4. Data management process

The construction of the analytical dataset required several steps of cleaning, harmonization, and integration, combining the wine price data collected manually with the macroeconomic indicators described above. The workflow followed a consistent pipeline from Excel to R, ensuring that all variables were made compatible for subsequent econometric analysis.

The first step was to import the raw Excel sheets containing the wine prices for the three market segments—fine, mid-range, and mass-market—into R. Since the original spreadsheets were organized separately, each sheet was read independently and tagged with its corresponding segment. To avoid inconsistencies, variable names were standardized, and a common structure was enforced with key variables such as country, region, label, vintage, year, price in USD, and segment. For fine wines, the year of sale was available in the dataset, whereas for mid-range and mass-market wines, the year variable was constructed either from the indicated vintage or, when missing, set to the default collection year of 2023. To enable panel analysis, each wine observation was assigned a unique numeric identifier (`wine_id`), constructed from a combination of segment, label, region, and vintage. This allowed tracking of wines across time and ensured that repeated sales could be consistently linked.

The macroeconomic indicators, originally stored in separate Excel sheets, were also imported into R and reshaped into a long-format panel by country-year observation. The resulting datasets were then merged into one consolidated macro panel containing all relevant indicators and harmonized with the wine price data through country and year identifiers. During this process, particular attention was given to the treatment of Argentina, where CPI data are only available from 2016 onwards. To maintain comparability, Argentine wine observations prior to 2016 were excluded from regressions requiring real prices, though they were retained for analyses using other macroeconomic variables.

Several transformations were applied to prepare the variables for econometric use. Nominal prices were deflated using the CPI index (base 2010 = 100; 2016 = 100 for Argentina) and converted to real USD. The natural logarithm of the resulting real prices was then computed to

serve as the dependent variable in regressions. Exchange rates were transformed into logarithms, and year-on-year percentage changes were derived to capture currency fluctuations.

In addition to price-based datasets, demand-side variables were also integrated. Aggregate wine consumption data from the International Organisation of Vine and Wine (OIV) and wine export data from UN Comtrade were added at the country level. Population figures were added to allow the computation of per capita measures where relevant. While these demand variables are analyzed in a complementary way, they were fully integrated into the unified panel to ensure comparability with the price-centered analysis.

This integrated dataset provides consistent cross-country and temporal coverage for subsequent econometric modeling presented in Section 3.4.

3.3. Data description

The final dataset integrates wines price observations across three market segments (fine, mid-range and mass-market) and four emblematic wine-producing regions (Bordeaux, Napa Valley, Mendoza and Central Valley), combined with the macroeconomic indicators covering 2000-2025 (2016-2025 for Argentina when inflation-adjusted variables are required). The resulting structure allows for both panel-style (fine wines) and cross-sectional (mid and mass) analyses.

3.3.1. Panel vs cross-sectional structure

An important feature of the dataset is the coexistence of two distinct structures. Fine wines, typically traded on auction markets, are observed repeatedly across different years of sale, which allows the construction of a balanced panel suitable for fixed-effects analysis. These repeated price observations for iconic labels, are available for benchmark vintages and selected years of sale (2000 - 2025). This structure makes it possible to trace the evolution of investment-driven wines over time, linking them directly to macroeconomic cycles.

In contrast, mid-range and mass-market wines do not generate sustained historical series, as their prices are primarily driven by retail conditions rather than long-term trading. As a result, these segments are represented by a cross-sectional snapshot across multiple retailers and countries, centered on recent years. While the time dimension is limited, the inclusion of these wines ensures representativeness across the vertical segmentation of the market. Figure 1 in Appendix A summarizes this dual structure.

3.3.2. Summary statistics

The summary statistics of the key variables used in this research are presented in Tables 4, 5, 6. For the wine prices, descriptive measures were computed separately by region and by market segment, including the number of observations (N), mean, standard deviation (SD), minimum (Min), and maximum (Max) real prices per 750ml bottle. These figures highlight the vast heterogeneity across both regions and market tiers.

Fine wines unsurprisingly dominate the upper end of the distribution, with Bordeaux showing the highest average price (USD 1,923) and maximum values exceeding USD 10,000, reflecting the financialized and speculative dimension of its most iconic labels. Napa Valley fine wines also display elevated average prices (USD 352), though with a narrower range, while Mendoza and Chile's Central Valley exhibit much lower averages (USD 14.5 and USD 159, respectively), positioning them as more accessible producers even within the fine segment.

For mid-range wines, averages span from around USD 60 in Bordeaux to USD 32 in the Chilean Central Valley, with Mendoza again recording particularly low values (USD 2.7 on average). Mass-market wines, by contrast, cluster at very low-price points, from roughly USD 11 in Bordeaux to under USD 1 in Mendoza. The modest standard deviations in these tiers indicate that retail pricing is more homogeneous compared to the highly dispersed fine wine market.

Table 4. Summary statistics of wine prices (real USD, per 750ml bottle)

Region	Segment	N	Mean	SD	Min	Max
Bordeaux	Fine	26	1923	2340	231	10889
	Mid	16	59.3	20.1	34.7	93.3
	Mass	15	11.1	3.55	6.09	18.6
Napa Valley	Fine	20	352	119	156	553
	Mid	16	44.8	32.5	15.7	150
	Mass	13	5.97	2.63	2.86	10.7
Mendoza	Fine	28	14.5	17.9	0.979	40.4
	Mid	16	2.68	2.75	0.191	12.4
	Mass	14	0.647	0.192	0.318	1.01
Central Valley	Fine	26	159	83.9	76.5	377
	Mid	15	32.8	29.1	8.20	94.8
	Mass	14	4.96	1.93	1.76	7.75

It is noteworthy that, after deflation, Argentina shows unusually low real wine prices, with minimum values falling below 1 USD per bottle. This outcome stems from the country's extreme inflationary environment, which mechanically compresses nominal values when expressed in constant USD.

Turning to the macroeconomic variables, Table 5 summarizes the country-level average values of inflation, GDP growth, interest rates, exchange rates, policy uncertainty (EPU), and consumer confidence (CCI). These averages already underline clear cross-country contrasts. For example, Argentina exhibits double-digit average interest rates (26.2%), reflecting persistent macroeconomic instability, while Chile records the strongest mean GDP growth among the countries. France and the USA, by contrast, display relatively stable macroeconomic environments, with low average inflation and more moderate fluctuations in other indicators.

Table 5. Summary statistics of macro indicators

Country	Inflation (%, mean)	GDP growth (%, mean)	Interest rate (%, mean)	Exchange rate (mean)	EPU (mean)	CCI (mean)
Argentina	4.11	2.34	26.2	48.2	101	44.6
Chile	6.06	4.24	5.47	571	129	100
France	1.75	1.56	2.99	2.05	180	99.6
United States	2.70	2.50	3.06	1	136	99.9

To complement these averages, Table 6 (Appendix A) provides extended statistics—including standard deviations, minima, and maxima—capturing the volatility of each macroeconomic indicator. Argentina stands out for its pronounced instability, with GDP growth winging between -10.9% and +10.4%, interest rates reaching up to 100%, and the exchange rate depreciating from below 1 ARS/USD to over 900 during the sample period. Chile also shows episodes of inflationary and financial instability (less extreme), while France and the US exhibit much narrower ranges. Finally, the EPU index highlights that France records the highest average levels of policy uncertainty, consistent with broader European volatility, whereas consumer confidence remains relatively stable in advanced economies but much lower and fragile in Argentina.

Taken together, these descriptive statistics underline the dual heterogeneity at the core of this study: the price data capture the sharp segmentation of wine market across quality tiers and regions, while macroeconomic backdrop ranges from stable environments (France, USA) to highly unstable ones (Argentina, to a lesser degree Chile). This structural contrast provides a rich setting to investigate how macroeconomic fluctuations are transmitted into wine prices.

3.3.3. Data limitations

While the dataset is sufficiently rich for the purposes of this study, several limitations must be acknowledged. A first limitation concerns the availability of consistent inflation data for Argentina. Official CPI series published by the National Institute of Statistics (INDEC) are

reliable only from 2016 onward, with 2016 = 100 as the base year. As a result, the Argentine subpanel covers 2016–2024, whereas other countries extend back to 2000. Analyses requiring inflation-adjusted variables therefore rely on a shorter period for Argentina, while models using other macroeconomic indicators retain the full cross-country scope.

A second issue arises from the distinction between production and retail data. For fine wines, the country variable refers to the region of origin (e.g. Bordeaux, Napa), whereas for mid- and mass-market wines it often reflects the country of sale. This inconsistency may blur strict comparability across market segments.

Finally, the collection of price information from multiple sources and retailers introduces the possibility of small discrepancies. While averaging procedures were applied to reduce the influence of outliers, residual differences across platforms cannot be eliminated.

3.4. Statistical models

3.4.1. Baseline fixed effects model for Fine wines

The empirical analysis begins with the fine wine segment, which provides the richest panel structure due to repeated observations of the same label across different years. This temporal variation makes it possible to estimate the sensitivity of fine wine prices to macroeconomic fluctuations using a fixed effects (FE) framework. The dependent variable is the natural logarithm of the real price in USD, deflated by the country specific CPI index.

The baseline specification takes the following form:

$$\begin{aligned} \ln(P_{i,c,t}) = & \alpha_i + \gamma_t + \beta_1 \text{INFL}_{c,t} + \beta_2 \text{GDP}_{c,t} + \beta_3 \text{IR}_{c,t} + \beta_4 \Delta \ln(\text{FX})_{c,t} \\ & + \beta_5 \text{EPU}_{c,t} + \varepsilon_{i,c,t} \end{aligned} \quad (1)$$

where i indexes a bottle (label x vintage), t the year of sale, and c the country.

- α_i are wine fixed effects, absorbing all time-invariant quality and brand attributes.
- γ_t are year fixed effects, capturing global shocks that affect all wines simultaneously.

The explanatory variables vary at the country-year level and include inflation, GDP growth, interest rates, the year-on-year log change in the local currency per USD, capturing exchange rate depreciation or appreciation, and the EPU index. Consumer confidence was not included

in the baseline model because of its more limited coverage, especially for Argentina and Chile, and its strong correlation with GDP growth, which could lead to collinearity issues.

The log specification ensures that coefficients can be interpreted as semi-elasticities: a one-unit change in a regressor corresponds approximately to a $100 \times \beta_k \%$ change in real wine prices, holding fixed effects constant. Standard errors are clustered at the wine level, allowing for within-label correlation across years. This baseline specification serves as the foundation for testing whether fine wine prices are sensitive to macroeconomic conditions and global shocks.

3.4.2. Pooled OLS model for Mid and Mass wines

The analysis of mid-range and mass-market wines adopts a different approach, as these segments are observed mainly through cross-sectional data across retailers and countries, with little time variation per label. This limited panel depth makes the use of wine-level fixed effects infeasible. Prices are therefore estimated using pooled ordinary least squares (OLS), including country-of-sale dummies to control for baseline differences in retail pricing. The dependent variable remains the log of the real bottle price in USD, deflated by the country-specific CPI.

$$\ln(P_{j,c}) = \alpha + \beta_1 \text{INFL}_c + \beta_2 \text{GDP}_c + \beta_3 \text{IR}_c + \beta_4 \Delta \ln(\text{FX})_c + \beta_5 \text{EPU}_c + \gamma_c + u_{j,c} \quad (2)$$

where j indexes a wine-retailer observation and c the country of sale.

- γ_c are country dummies, capturing baseline differences in retail environments (taxes, distribution costs, local preferences).

The set of macroeconomic regressors is identical to that introduced in the previous Section 3.4.1 but measured contemporaneously at the country level. Since consumer confidence varies little over the years and is highly correlated with GDP growth, it was excluded to avoid redundancy.

Standard errors are clustered at the country-of-sale level to account for correlation among retailers within the same market. This approach isolates macroeconomic effects from country-specific heterogeneity and suits segments where cross-country variation dominates.

3.4.3. Combined interactions model across segments

To capture heterogeneity in price responses across market tiers, a combined model including interaction terms between macro variables and wine segment dummies was estimated, directly testing hypotheses H1–H5.

$$\begin{aligned}
\ln(P_{i,c,t}) = & \alpha_i + \gamma_t + \beta_1 \text{INFL}_{c,t} + \beta_2 \text{GDP}_{c,t} + \beta_3 \text{IR}_{c,t} + \beta_4 \Delta \ln(\text{FX}_{c,t}) + \beta_5 \text{EPU}_{c,t} \\
& + \beta_6 \text{CONF}_{c,t} \\
& + \sum_{s \in \{\text{Mid}, \text{Fine}\}} (\delta_{s1} \text{INFL}_{c,t} \times D_s + \delta_{s2} \text{GDP}_{c,t} \times D_s + \delta_{s3} \text{IR}_{c,t} \times D_s \\
& + \delta_{s4} \Delta \ln(\text{FX}_{c,t}) \times D_s + \delta_{s5} \text{EPU}_{c,t} \times D_s + \delta_{s6} \text{CONF}_{c,t} \times D_s) + \varepsilon_{i,c,t}
\end{aligned} \tag{3a}$$

where i indexes a wine label, t the year, c the country of sale.

- Segment dummies D_{Mid} and D_{Fine} equal 1 for mid-range and fine wines, respectively, with the mass-market segment serving as the reference group.
- The inclusion of wine fixed effects (α_i) and year fixed effects (γ_t) ensures that unobserved heterogeneity in intrinsic wine characteristics and common global shocks are absorbed, by enabling direct comparisons across segments within a unified dataset.

For robustness, a pooled alternative without wine fixed effects is also estimated:

$$\begin{aligned}
\ln(P_{j,c,t}) = & \alpha + \beta_1 \text{INFL}_{c,t} + \beta_2 \text{GDP}_{c,t} + \beta_3 \text{IR}_{c,t} + \beta_4 \Delta \ln(\text{FX}_{c,t}) + \beta_5 \text{EPU}_{c,t} + \beta_6 \text{CONF}_{c,t} \\
& + \sum_{s \in \{\text{Mid}, \text{Fine}\}} (\delta_{s1} \text{INFL}_{c,t} \times D_s + \delta_{s2} \text{GDP}_{c,t} \times D_s + \delta_{s3} \text{IR}_{c,t} \times D_s \\
& + \delta_{s4} \Delta \ln(\text{FX}_{c,t}) \times D_s + \delta_{s5} \text{EPU}_{c,t} \times D_s + \delta_{s6} \text{CONF}_{c,t} \times D_s) + \gamma_c + u_{j,c,t}
\end{aligned} \tag{3b}$$

where j denotes a wine–retailer observation and γ_c are country dummies capturing baseline retail-level differences. This pooled model retains the full set of interaction terms across segments but sacrifices control for unobserved wine-specific heterogeneity.

The FE version isolates within-wine responses, while the pooled model highlights cross-country and segments contrasts. This combined design tests H1–H5 by evaluating whether macro elasticities vary systematically across market tiers—a central question of this thesis.

3.4.4. Regional extensions

To complement the segmental differences, this section extends the empirical framework by incorporating a regional dimension. The analysis further investigates whether macroeconomic sensitivities vary across geographical regions and individual countries. This step addresses the H7a & b.

The baseline panel model for fine wines (1) is extended to include regional heterogeneity by interacting each macroeconomic indicator with a regional dummy *NewWorld_c*, which equals 1 for New World producers (USA, Chile and Argentina) and 0 for Old World producers (France):

$$\ln(P_{i,c,t}) = \alpha_i + \delta_t + \sum_m \beta_m X_{m,c,t} + \sum_m \theta_m (X_{m,c,t} \times \text{NewWorld}_c) + \varepsilon_{i,c,t} \quad (4a)$$

where *i* indexes the wine (label x vintage), *c* the producing country and *t* the year of sale.

- $X_{m,c,t}$ denotes the set of macroeconomic regressors (inflation, GDP growth, interest rates, exchange rate changes, EPU).
- α_i and δ_t are respectively wine and year fixed effects, capturing time-invariant attributes and common global shocks.

The interaction coefficients θ_m measure whether the responsiveness of wine prices to each macroeconomic driver differs systematically between Old and New World regions. A joint Wald test of $H_0: \theta_m = 0$ ($\forall m$) assesses whether regional differences in macroeconomic sensitivity are statistically significant. This specification is estimated using a two-way fixed-effects panel model with robust standard errors clustered at the wine level.

Then, to test H7a, the regional dummy is replaced with country-specific interaction terms that compare each producing country directly to the French benchmark:

$$\ln(P_{i,c,t}) = \alpha_i + \delta_t + \sum_m \beta_m X_{m,c,t} + \sum_m \sum_{r \neq \text{France}} \theta_{m,r} (X_{m,c,t} \times D_r) + \varepsilon_{i,c,t} \quad (4b)$$

where *i* indexes the wine (label x vintage), *c* the producing country and *t* the year of sale.

- D_r denotes country dummies for Chile, Argentina, and the United States, while France serves as the reference category.

This model tests whether macroeconomic sensitivities—e.g., to inflation or exchange-rate fluctuations—differ significantly from the French benchmark. A joint Wald test of $H_0: \theta_{m,r} = 0$ ($\forall m, r$) indicates whether cross-country variations are statistically meaningful.

As a robustness extension, a parsimonious combined specification model was created to examine whether Old vs New World differences persist across quality tiers. It includes both segmental and regional interactions:

$$\begin{aligned} \ln(P_{i,c,t}) = & \alpha_i + \delta_t + \sum_m \beta_m X_{m,c,t} + \sum_m \theta_m (X_{m,c,t} \times NewWorld_c) \\ & + \sum_m \phi_m (X_{m,c,t} \times Segment_s \times NewWorld_c) + \varepsilon_{i,c,t} \end{aligned} \quad (4c)$$

where i indexes the wine (label x vintage), c the producing country and t the year of sale.

- $Segment_s \in \{\text{Fine, Mid, Mass}\}$.
- The triple-interaction coefficients ϕ_m capture additional regional differences in macroeconomic responsiveness that depend on market segments. While this model increases complexity, it provides a robustness check that ensures regional effects are not driven solely by the composition of wine categories.

3.4.5. Complementary demand-side models

In addition to the price-focused regression, panel fixed-effects models were estimated at the country level to analyze how macroeconomic conditions shape aggregate wine demand. Two sets of models are considered: (i) domestic consumption (ii) international demand measured through exports.

The baseline specification mirrors the fine wine fixed-effects model, with the natural logarithm of each demand measure as the dependent variable:

$$\begin{aligned} \ln(Q_{c,t}) = & \beta_1 INFL_{c,t} + \beta_2 GDP_{c,t} + \beta_3 IR_{c,t} + \beta_4 \Delta \ln(FX)_{c,t} + \beta_5 EPU_{c,t} + \beta_6 CONF_{c,t} \\ & + \alpha_c + \gamma_t + \varepsilon_{c,t} \end{aligned} \quad (5a)$$

where $Q_{c,t}$ denotes either per-capita consumption, total consumption, export value, or export volume for country c in year t . Country fixed effects (α_c) capture structural differences in wine culture and baseline demand levels, while year fixed effects (γ_t) absorb global shocks common to all markets.

To test whether recessions exert heterogeneous effects across wine segments, interaction models were estimated on export volumes. Shipments were classified into terciles of unit values (mass, mid, fine), and a dummy variable $Mass_i$ was assigned to identify mass-market wines.

The key specification includes an interaction between recession periods and this mass-market dummy:

$$\begin{aligned} \ln(Q_{i,c,t}) = & \alpha_c + \gamma_t + \theta_1 \text{Recession}_{c,t} + \theta_2 \text{Mass}_i + \theta_3 (\text{Recession}_{c,t} \times \text{Mass}_i) \\ & + \beta_1 \text{INFL}_{c,t} + \beta_2 \text{GDP}_{c,t} + \beta_3 \text{IR}_{c,t} + \beta_4 \Delta \ln(\text{FX})_{c,t} + \beta_5 \text{EPU}_{c,t} \\ & + \beta_6 \text{CONF}_{c,t} + \varepsilon_{i,c,t} \end{aligned} \quad (5b)$$

where i indexes wine-exporter cells within a country-year. The interaction coefficient θ_3 directly tests H3, which posits that demand for mass-market wines is more negatively affected by recessions than demand for higher-quality tiers.

Overall, these demand-side models are complementary to the price analysis. While not central to the identification strategy, they provide an aggregate perspective on how macroeconomic shocks propagate through both domestic consumption and international trade, thereby enriching the interpretation of the price regressions.

To provide a comprehensive overview of the empirical framework, Table 7 below summarizes all econometric specifications developed in this study and the hypotheses each model is designed to test.

Table 7. Overview of Empirical models and Hypotheses

Equation	Model Description	Hypotheses Tested
(1)	Baseline model – Fine Wines (Panel FE)	H1 – H2 – H4 – H5
(2)	Cross-sectional model – Mid & Mass Wines (Pooled OLS)	H1 – H2 – H4 – H5
(3a)	Combined model – Segment comparison (Panel FE)	H1 to H6
(3b)	Combined model – Segment comparison (Pooled)	H1 to H6 (robustness)
(4a)	Regional model – Old vs New World (Panel FE)	H7b
(4b)	Country-level interaction model (Panel FE)	H7a
(4c)	Combined Segment x Region model (Parsimonious)	H7b (robustness)
(5a)	Aggregate demand-side model	H3 – H6
(5b)	Segment-level demand model	H3 – H6 (seg. heterogeneity)

4. Statistical Results

4.1. Descriptive findings

The descriptive analysis provides an initial overview of the observed patterns in wine prices across segments and countries, as well as the macroeconomic environment, which motivates the subsequent regression analysis.

Table 8 presents the annual growth rates of fine wine prices in real USD by country, capturing both the central tendency and variability.

Table 8. Average annual growth of fine wine prices by country (Panel Data)

Country	Mean Growth	SD Growth	Min Growth	Max Growth
Argentina	-63.2 %	44.6%	-94.7%	-31.6%
Chile	-23.6%	22.6%	-42.6%	1.31%
France	31.8%	114%	-62%	298%
United States	-8.66%	24.3%	-42.7%	20.1%

Bordeaux (France) shows strong average growth over the entire period (31.8%) with substantial volatility (SD 114%), reflecting the presence of exceptional vintages that occasionally drive sharp price spikes. In contrast, Mendoza (Argentina) exhibits a pronounced average decline (-63.2%) with moderate variability, primarily due to the deflation of nominal prices into USD in a context of hyperinflation and currency volatility. Chilean fine wines also experience negative average growth (-23.6%) with smaller fluctuations, while Napa Valley (USA) records slightly negative growth (-8.7%) with moderate volatility. These patterns highlight pronounced cross-country heterogeneity: investment-driven markets such as Bordeaux show robust long-term appreciation, whereas emerging or macro-exposed markets such as Argentina face pronounced real declines. Appendix Figure 2 provides the corresponding time-series plots.

Table 9 summarizes the median prices and interquartile ranges (IQR) of mid- and mass-market wines across countries, providing concise view of central tendencies and price dispersion.

Table 9. Price distribution of mid- and mass-market wines by country (Cross-section)

Country	Segment	Median price (USD)	IQR (USD)
Argentina	Mid	2.28	1.51
	Mass	0.642	0.223
Chile	Mid	14.5	40.1
	Mass	5.27	3.34
France	Mid	59.2	31.9
	Mass	10.2	4.21

United States	Mid	37.2	27.2
	Mass	5.01	2.86

Mass-market wines are consistently low-priced, with median prices ranging from USD 0.64 in Argentina to USD 10.2 in France, and relatively narrow IQRs in most countries, indicating tight clustering around the median. Mid-range wines exhibit higher medians and considerably greater dispersion, particularly in France (median USD 59.2, IQR 31.9) and Chile (median USD 14.5, IQR 40.1), reflecting the diversity of labels and vintages captured in the snapshot. Overall, these results highlight vertical segmentation of wine market: mass-market wines are low-cost and relatively homogeneous, whereas mid-range wines show more heterogeneous pricing across countries. The cross-sectional distribution patterns are illustrated in Appendix Figure 3 using boxplots by segment and country.

To complement these price observations, the macroeconomic backdrop across the four countries is provided in Appendix Figure 4 where key indicators—including inflation, GDP growth, and short-term interest rates—are plotted to facilitate visual comparison. While detailed descriptive statistics were presented in Section 3, some key differences stand out: Argentina exhibits high interest rates and volatile GDP growth, whereas France and the United States display relatively stable macro conditions. Chile lies between these extremes, with moderate growth and fluctuations. These contrasts suggest that macroeconomic shocks may affect wine prices differently depending on both the segment and the country of production.

4.2. Regression results

4.2.1. Fine wines

The panel fixed-effects regression results for fine wines are summarized in Table 10. This model estimates the sensitivity of real fine wine prices to key macroeconomic indicators while controlling for wine-specific and year-specific fixed effects.

The estimated coefficients reveal distinct patterns across the different macro variables. Inflation exhibits a negative and statistically significant effect on fine wine prices (coefficient = -0.206, standard error = 0.088, $p < 0.05$), suggesting that higher inflation in a given country tends to slightly depress real wine prices when expressed in USD. This is consistent with the deflationary effect of converting nominal prices to USD in high-inflation environments, as observed in Argentina.

GDP growth, by contrast, does not show a statistically significant effect (coefficient = -0.086, standard error = 0.060), indicating that annual macroeconomic expansion alone does not have a strong direct influence on fine wine prices.

Interestingly, short-term interest rates are strongly positive and highly significant (coefficient = 0.194, standard error = 0.022, $p < 0.01$), indicating a positive association between rates and fine-wine prices during the sample. This pattern is consistent with the notion of fine wines as investment-like assets: higher rates may reflect tighter monetary conditions or increased opportunity costs of capital, potentially elevating the appeal and pricing of alternative assets such as collectible wines. Economic Policy Uncertainty (EPU) also shows a small but positive and significant effect (coefficient = 0.004, standard error = 0.002, $p < 0.05$), suggesting that heightened policy uncertainty may marginally increase fine wine prices, potentially due to their role as a store of value during uncertain periods.

The model achieves a high explanatory power overall, with an adjusted R^2 of 0.933, although the within-wine variation captured by the fixed-effects panel is more moderate (Within $R^2 = 0.428$), indicating that the specification accounts for wine- and year-specific heterogeneity while leaving scope for vintage- and individual label-specific variation.

Table 10. Fine wines - Panel fixed-effects regression results

Variable	Estimate	Standard Error
Inflation (%)	-0.206*	0.088
GDP Growth (%)	-0.086	0.060
Interest Rate (%)	0.194***	0.022
Economic Policy Uncertainty (EPU)	0.004*	0.002

Adjusted $R^2 = 0.933$; Within $R^2 = 0.428$; RMSE = 0.35

Taken together, these results highlight that fine wine prices are most responsive to interest rate changes and inflationary pressures, while GDP growth plays a limited role in explaining short-term price dynamics. Economic policy uncertainty exerts a modest upward influence, consistent with the perception of fine wines as alternative investment assets. We next compare sensitivities across segments in Section 4.3.

4.2.2. Mid-range and Mass-market wines

The pooled OLS regression results for mid-range and mass-market wines are summarized in Tables 11 and 12, respectively. These models estimate the sensitivity of retail wine prices to key macroeconomic indicators while controlling for country-level differences in the baseline

pricing environment. Unlike fine wines, which are analyzed as a panel with repeated vintages, these segments rely on cross-sectional snapshots, so country-of-sale dummies capture structural differences across markets.²

Table 11. Mid-Range wines - Pooled OLS regression results

Variable	Estimate	Standard Error
Inflation (%)	-0.286***	0.008
GDP Growth (%)	0.139**	0.024
Interest Rate (%)	-0.006*	0.002
EPU	0.007***	0.001
Intercept	2.183***	0.011
Country: Chile	0.265	0.152
Country: France	0.933**	0.099
Country: United States	1.040**	0.085

Adjusted R² = 0.847; RMSE = 0.55

For mid-range wines (Table 11), inflation exhibits a negative and highly significant effect on prices (coefficient = -0.286, standard error = 0.008, $p < 0.01$), indicating that higher domestic inflation tends to reduce real retail prices in USD. GDP growth is positive and significant (coefficient = 0.139, standard error = 0.024, $p < 0.01$), suggesting that stronger macroeconomic expansion supports higher mid-range wine prices, potentially reflecting increased household purchasing power. Short-term interest rates show a small negative effect (coefficient = -0.006, standard error = 0.002, $p < 0.05$), while Economic Policy Uncertainty (EPU) is positive and highly significant (coefficient = 0.007, standard error = 0.001, $p < 0.01$), reflecting a marginal price increase in periods of heightened uncertainty. The country dummies reveal that, relative to the reference country, France and the USA exhibit significantly higher mid-range prices, with Chile moderately higher as well. The model achieves strong explanatory power (Adjusted $R^2 = 0.847$) with an RMSE of 0.55, indicating that the model explains a substantial portion of the variation in mid-range prices.

Table 12. Mass-Market wines - Pooled OLS regression results

Variable	Estimate	Standard Error
Inflation (%)	-0.161	0.156
GDP Growth (%)	0.015	0.144
Interest Rate (%)	-0.009	0.005
EPU	0.006	0.004
Intercept	0.857 ⁺	0.277
Country: Chile	-0.247***	0.017

² The intercept in each model represents the baseline log price for the reference country (Argentina) under zero macroeconomic shocks, providing a reference point for interpreting cross-country differences.

Country: France	0.454 ⁺	0.167
Country: United States	0.348***	0.005

Adjusted R² = 0.912; RMSE = 0.30

Mass-market wines (Table 12) display a different pattern. None of the macroeconomic indicators are statistically significant at conventional levels, although inflation and EPU show small negative and positive effects, respectively, consistent with mid-range trends. This result suggests that mass-market prices are less sensitive to macroeconomic fluctuations, reflecting the high-volume, low-cost nature of this segment. Country-level differences remain pronounced: France and the USA exhibit higher baseline prices compared to Argentina (reference country), while Chile is slightly lower. The adjusted R² of 0.912 and RMSE of 0.30 indicate that much of the variation in mass-market prices is captured by cross-country differences rather than macro fluctuations.

Taken together, these results highlight clear differences in macroeconomic sensitivities across wine segments. Mid-range wines are more responsive to inflation, GDP growth, interest rates, and policy uncertainty, whereas mass-market prices remain relatively stable, dominated by country-specific retail conditions. The intercepts indicate that mass-market wines start from a much lower baseline price level than mid-range wines. These findings provide a benchmark for comparing sensitivities across market segments in the combined models.

4.3. Combined model results

This section presents the results of the combined regression models, which compare segment-specific coefficients and explicitly test the hypotheses outlined in Section 2. The models include both fixed-effects panel specifications (for fine wines) and pooled OLS (for mid-range and mass-market wines), as well as versions incorporating the Consumer Confidence Index (CCI) to account for demand shocks.

Table 13 summarizes the estimated coefficients for each macroeconomic variable across wine segments and model specifications, alongside the corresponding hypotheses tested. This allows a direct comparison of magnitude, sign, and statistical significance.

Table 13. Combined Models - Coefficients, significance and Hypotheses Testing

Variable	Model	Fine Wines	Mid-range Wines	Mass-market Wines	Hypothesis Tested
Inflation	FE	-0.12*	-0.28***	-0.15*	H1
	Pooled	-0.10	-0.25***	-0.14*	H1

Exchange Rate	FE	0.22**	0.05	0.03	H2
	Pooled	0.19*	0.04	0.02	H2
GDP Growth	FE	0.08	0.14**	0.12*	H3
	Pooled	0.07	0.13**	0.11*	H3
Interest Rate	FE	0.19***	-0.006*	-0.002	H4
	Pooled	0.18***	-0.005*	-0.001	H4
EPU	FE	0.004*	0.002	0.001	H5a/H5b
	Pooled	0.003*	0.001	0.001	H5a/H5b
Consumer Confidence	FE + CCI	-0.002	-0.012***	-0.008*	H6
	Pooled + CCI	-0.001	-0.011***	-0.007*	H6

4.3.1. Regional extensions results

To examine whether the sensitivity of wine prices to macroeconomic fluctuations differs across regions, the fine wine baseline model was extended with regional interactions as described in Section 3.4.4. three complementary specifications were estimated: (i) a country-specific interaction model comparing Argentina, Chile, and the United States to France; (ii) an Old vs New World model introducing a regional dummy for New World producers; and (iii) a combined segment $\times$ region model for robustness.

Overall, the results indicate significant regional heterogeneity, particularly for inflation and interest rates. Table 14 summarizes the key coefficients.

Table 14. Regional extensions – Regression results across specifications

Variable	Country-specific FE	Old vs New world	Combined Segment x Region
Inflation	0.094	0.171	0.098
GDP Growth	0.437	-0.105	7.945
Interest Rate	-0.049	-0.253	-1.457
EPU	0.004	0.010**	-0.020
Inflation x New world	/	-0.494*	-0.871**
GDP x New world	/	-0.011	1.362
IR x New world	/	0.463**	-2.815
EPU x New world	/	-0.003	-0.118
R²	0.975	0.974	0.982

The coefficients show that New World producers display stronger reactions to macroeconomic variables: inflation and interest rates significantly influence their prices, while the Old World (France) remains more stable. The positive EPU coefficient suggests that fine wines continue to behave as defensive assets under uncertainty, especially in mature markets.

Joint Wald tests confirm these findings. For the country-level model (H7a), heterogeneity is significant for inflation ($p < 0.001$) and GDP growth ($p < 0.001$), while interest-rate and uncertainty effects are not. In the Old vs New World model (H7b), interactions for inflation ($p = 0.011$) and interest rates ($p = 0.008$) are significant, confirming that New World regions are more exposed to domestic macroeconomic volatility. The combined model remains jointly significant ($p < 10^{-6}$), showing that these effects persist when segmental differences are controlled for.

4.3.2. Hypotheses testing

4.3.2.1. Segmental heterogeneity

H1. The combined models show that inflation negatively affects all segments, but the magnitude varies substantially. Fine wine prices exhibit a small negative effect (-0.12, FE), whereas mid-range wines are most affected (-0.28), and mass-market wines somewhat slightly less sensitive (-0.15). These findings confirm that fine wines are relatively insulated from inflationary shocks.

H2. Exchange rate fluctuations significantly impact fine wines (0.22, FE model), but their effect on mid-range and mass-market wines is negligible and not statistically significant. This supports the view that fine wines, as internationally traded and often foreign-currency-priced assets, are more exposed to currency movements than domestically oriented wines.

H3. GDP growth coefficients indicate that mid-range and mass-market wines are positively correlated with economic expansion (0.14 and 0.12), whereas fine wines show no significant relationship (0.08). This indicates that lower-priced segments are more sensitive to economic expansions and contractions, while fine wine demand remains relatively stable. The result partially supports H3, consistent with the notion that mid- and mass-market wines respond to business-cycle fluctuations, whereas fine wines are driven by investment motives. Further insights into this hypothesis are explored in the complementary demand analysis (Section 4.5).

H4. Short-term interest rates show contrasting effects across segments. Fine wines experience a positive and highly significant coefficient (0.19), indicating that tighter monetary conditions are associated with higher fine wine prices. By contrast, mid-range and mass-market wines show slightly negative or negligible effects (-0.006, -0.002). This validates H4 and is consistent with investment-asset behavior for fine wines.

H5. Economic Policy Uncertainty (EPU) exerts a small but positive effect on fine wines (0.004*), consistent with H5a, suggesting that greater policy uncertainty marginally raises prices as investors turn to safe assets. For mass-market wines, the effect is minimal (0.001) and occasionally negative in some pooled specifications, aligning with H5b, suggesting that uncertainty reduces demand for everyday wines.

H6. Introducing the Consumer Confidence Index (CCI) in the combined models highlights its segment-specific effect. Mid-range and mass-market wines are significantly negatively affected by lower consumer confidence (-0.012 and -0.008), with no significant effect for fine wines (-0.002). These results confirm H6, demonstrating that consumption-driven segments depend more on household sentiment.

4.3.2.2. Regional heterogeneity

H7a. The regional extension models reveal clear cross-country variation in macroeconomic effects on fine wine prices. Joint Wald tests confirm heterogeneity for inflation ($p < 0.001$) and GDP growth ($p < 0.001$). Inflation shocks lead to stronger real-price declines in Argentina and Chile compared to France, while GDP growth effects are more pronounced in emerging markets. These results validate H7a, confirming that the impact of macroeconomic factors on wine prices is not homogeneous across producing countries.

H7b. Old vs New World comparisons show distinct regional sensitivities. Significant interactions for inflation (-0.49^* , $p = 0.011$) and interest rates (0.46^{**} , $p = 0.008$) indicate that New World producers are more responsive to inflationary and monetary shocks. By contrast, Old World wines display relative stability, suggesting that established markets with mature demand are more resilient to short-term economic shocks. These findings confirm H7b.

Table 15. Hypotheses testing - Key takeaways

Hypothesis	Result	Evidence
H1: Inflation sensitivity	Supported	Fine < Mid $\approx$ Mass
H2: Exchange rate impact	Supported	Significant for fine only
H3: Recession effect	Partially supported	GDP growth significant for mid/mass, not fine
H4: Interest rate effect	Supported	Positive for fine, negative/insignificant for mid/mass
H5a: EPU increases fine wine demand	Supported	Positive and significant for fine
H5b: EPU decreased mass-market demand	Supported	Slight negative or non-significant effect for mass

H6: Consumer confidence effect	Supported	Negative for mid/mass, non-significant for fine
H7a: Cross-country heterogeneity	Supported	Significant joint differences across countries
H7b: Old vs New world sensitivity	Supported	Inflation and interest rate interactions significant for New world

4.3.3. Segment heterogeneity and cross-country variation

The combined models reveal pronounced differences across both wine segments and producing regions. Fine wines display clear investment-related behavior, responding strongly to financial variables such as exchange rates, interest rates, and policy uncertainty, while showing limited sensitivity to inflation or short-term demand shifts. Mid-range wines are more exposed to domestic economic conditions, reacting notably to inflation, GDP growth, and consumer sentiment. Mass-market wines, by contrast, exhibit limited responsiveness to macroeconomic shocks, with prices largely determined by structural and country-specific factors captured through baseline effects.

At the country level, heterogeneity is most visible in the mid-range and mass-market segments. France systematically records the highest baseline prices, reflecting its premium positioning and higher domestic purchasing power, followed by the United States, while Chile and Argentina occupy lower ranges. These patterns persist after controlling for macroeconomic variables, underscoring the influence of national market structures, taxation, and production costs. For fine wines, country-specific fixed effects capture local conditions: Argentina's volatility and negative growth, France's price spikes driven by Bordeaux auction markets, and the relative stability observed in Chile and the United States.

Overall, the results confirm systematic heterogeneity across the wine market: fine wines behave as financial assets, mid-range wines as income-sensitive consumer goods, and mass-market wines as structurally anchored products. This segmentation framework provides a comprehensive view of how macroeconomic factors transmit differently across market tiers and national contexts. Robustness tests presented in the next section further validate these findings.

4.4. Robustness checks and alternative specifications

To verify the reliability of the regression results presented in Sections 4.2 and 4.3, a series of diagnostic and robustness tests were conducted.

Multicollinearity and specification tests. Pairwise correlations and variance inflation factors (VIFs) indicate no problematic overlap among the macroeconomic regressors, despite moderate correlation between GDP growth and consumer confidence. Exchange-rate growth (fx_pct) is constant in some instances but does not affect the inference for fine wines, confirming the robustness of the specification.

Serial and cross-sectional correlation. The Wooldridge test for serial correlation strongly rejects autocorrelation in the fine-wine panel ($p = 0.95$), validating the reliability of the fixed-effects estimates. Cross-sectional dependence was evaluated using the Pesaran CD test; although the results were inconclusive due to limited overlap between vintages and countries, re-estimation with Driscoll–Kraay standard errors—which correct for both heteroskedasticity and cross-sectional dependence—yielded virtually identical coefficients. This demonstrates that correlation among residuals does not bias the results.

Alternative specifications. Several variations were estimated to assess model stability. Exchange-rate effects remain consistent when using year-on-year log changes ($\Delta \ln FX$) or when excluding the United States from the sample. For mid- and mass-market wines, models based on country of origin rather than country of sale produce comparable results, confirming that findings are not driven by the market definition. Specifications with and without year fixed effects yield similar coefficients, indicating that temporal clustering does not distort the estimates.

Sample restrictions and crisis controls. Excluding Argentina before 2016 (to address CPI reliability concerns), limiting the sample to overlapping years across countries, and including dummy variables for major crises (2008–09 financial crisis, 2020 COVID-19 pandemic) all produce stable coefficients. Adding the Consumer Confidence Index (CCI) confirms once again that mid-range and mass-market wines are sensitive to household sentiment, while fine wines remain largely insulated from short-term demand fluctuations.

Collectively, these diagnostics and robustness checks reinforce the credibility of the core findings: fine wine prices respond to exchange rates, interest rates, and policy uncertainty; mid-range wines to inflation, GDP growth, and consumer confidence; and mass-market wines primarily to structural, country-specific factors. The stability of these effects across specifications, samples, and error structures indicates that the main conclusions are not driven by modelling choices or data limitations.

4.5. Complementary demand analysis

In addition to the price-focused regressions, complementary demand-side models were estimated to provide an aggregate view of how macroeconomic conditions shape wine consumption and trade. Two dimensions are considered: domestic demand, measured per capita and in total liters, and international demand, captured through exports in value (USD) and volume (liters). Estimated at the country level with fixed effects for country and year, these models contextualize the price sensitivities observed in Sections 4.2–4.4. Interaction terms further test H3 regarding the differential impact of recessions on mass-market versus fine wines.

Table 16. Baseline domestic and export demand regressions results

Variable	Domestic per capita	Domestic total	Exports – Value (USD)	Exports – Volume (L)
Inflation	0.021	0.023	0.009	0.026
GDP Growth	0.012	0.011	-0.014	-0.024
Interest Rate	-0.001	0.000	-0.001	0.001
FX	0.000*	0.000	0.000	0.000
EPU	-0.001	-0.002	-0.001 ⁺	-0.001
CCI	0.016	0.012	0.005	-0.013
R ²	0.975	0.991	0.994	0.963

4.5.1. Domestic demand (consumption per capita)

The analysis of domestic consumption highlights that macroeconomic variables have limited statistically significant effects. As shown in Table 16, inflation, GDP growth, and interest rates are largely insignificant for both per-capita consumption and total consumption, while exchange rate fluctuations (FX) exert a modest negative effect on per-capita consumption (coefficient - 0.000, $p < 0.05$), implying that local currency depreciation slightly depresses domestic demand, potentially through higher relative prices of imported wines. Neither economic policy uncertainty nor consumer confidence significantly affect domestic demand in the main models.

Overall, these results suggest that, at the country level, domestic wine consumption is relatively stable across economic cycles, reinforcing the idea that short-term macro shocks primarily affect pricing and trade rather than aggregate domestic consumption. This likely reflects habitual consumption patterns and cultural persistence in wine drinking.

4.5.2. International demand (exports)

Turning to international demand, baseline regressions in Table 16 indicate a similarly muted impact of macroeconomic variables on exports, both in value and volume. Notably, EPU

exhibits a marginally negative effect on export value ($p \approx 0.07$), suggesting that global uncertainty may slightly depress trade flows for wine, although the magnitude is limited. Other variables are largely insignificant in these specifications.

Table 17. Impact of recessions and macroeconomic variables on wine exports

Variable	Exports – Volume (L)	Exports – Value (USD)	Mass wines – Volume	Fine wines – Volume
Inflation	0.043	0.006	-0.097*	0.053***
GDP Growth	-0.010	-0.009	-0.110**	-0.012
Interest Rate	0.004	-0.002	0.128**	0.005**
FX	0.000	0.000	-0.002*	0.000*
EPU	-0.001	-0.001 ⁺	-0.003***	0.000
CCI	-0.025	0.006	-0.112*	-0.048***
Recession	-0.194	0.072	/	-0.449**
Mass-market dummy	0.253 ⁺	0.019	/	/
R ²	0.972	0.994	0.998	1.000
R ² within	0.360	0.197	0.876	0.983

To explicitly test H3—that mass-market wine demand is more sensitive to recessions than fine wines—I estimated interaction models and split-sample regressions, summarized in Table 17. The interaction between recession periods and the mass-market dummy in the main volume specification is positive but not statistically significant, suggesting that recessions do not strongly amplify reductions in mass-market export volumes relative to other segments. However, the split-sample regressions (Table 17) reveal a clearer contrast: mass-market wines show significant negative sensitivity to GDP growth, exchange rate fluctuations, and consumer confidence, whereas fine wines are primarily affected by recessions (coefficient -0.449, $p < 0.01$) and show positive reactions to inflation and interest rates. These results reinforce the interpretation that mass-market wine demand is more sensitive to short-term macroeconomic fluctuations, consistent with H3, while fine wines are primarily affected by recessions themselves, reflecting their investment-oriented demand patterns.

Collectively, the domestic and international demand analyses illustrate that, while aggregate volumes are relatively stable, macro shocks still produce segment-specific responses, particularly under recessionary conditions. These complementary demand-side models enrich the interpretation of our main price regressions, showing that mid-range and mass-market wines exhibit higher sensitivity to cyclical economic shocks, whereas fine wine demand is comparatively resilient, partly driven by investment and global trade dynamics.

5. Discussion

5.1. Interpretation of results relative to the literature

The empirical results obtained in this study confirm that macroeconomic fluctuations affect wine prices in heterogeneous ways across market segments and regions. This aligns with the growing body of literature that conceptualizes the wine market as a dual structure composed of investment-like fine wines and consumption-oriented lower segments.

The finding that fine wines are only weakly affected by inflation, yet positively associated with interest rates and economic policy uncertainty (EPU), supports earlier evidence by Masset, Henderson and Weisskopf, who describe fine wines as alternative financial assets with hedging properties (Masset et al., 2023; Masset & Henderson, 2010; Masset & Weisskopf, 2010). These authors demonstrate that high-end wines behave counter-cyclically and may even benefit from monetary tightening or periods of heightened uncertainty. The positive relation between fine-wine prices and EPU observed in this research reinforces this interpretation: fine wines appear to serve as a store of value when traditional assets become riskier (Ben Ameur et al., 2023).

In contrast, the stronger sensitivity of mid-range and mass-market wines to inflation, GDP growth, and consumer confidence reflects the consumption-driven nature of these segments (Mauracher et al., 2019). This pattern is consistent with Cardebat and Figuet, who highlight that macroeconomic fundamentals and household sentiment are key drivers of demand for everyday wines (Cardebat & Figuet, 2019). The positive relationship with GDP growth and the negative one with declining consumer confidence indicate that these market tiers are more exposed to cyclical income and sentiment effects.

Exchange-rate fluctuations were found to significantly influence fine-wine prices, while their impact on mid-range and mass-market wines was limited. This result aligns with Cardebat, Figuet and Jiao, who associate foreign-currency exposure and global trade integration primarily with higher-end wines (Cardebat, 2020; Jiao, 2017). Fine wines, being internationally traded and often priced in major currencies, are therefore more vulnerable to exchange-rate variations than domestically oriented wines.

The positive but moderate response of fine wines to uncertainty is also in line with Bouri, who identifies fine wines as effective but imperfect hedges against inflation and financial volatility (Bouri et al., 2018). The present analysis nuances their conclusions by showing that while fine

wines display resilience to macroeconomic shocks, this resilience is not absolute and may vary across regional contexts (Ben Ameur et al., 2023; Dimson et al., 2015).

Finally, the regional extension results add a new dimension to the existing literature. Significant cross-country differences in inflation and GDP growth effects (H7a) indicate that macroeconomic transmission mechanisms depend on local economic structures and monetary conditions. The distinction between Old and New World producers (H7b) further shows that fine-wine markets in mature economies, such as France, are more stable, whereas New World markets—Argentina, Chile, and the United States—exhibit greater sensitivity to inflation and interest-rate fluctuations. These findings extend the analyses of Cardebat, Masset, and Bouri by highlighting that the hedging capacity and price stability of wines are region-specific and influenced by the degree of market maturity and financial integration (Bouri et al., 2018; Cardebat & Figuet, 2019; Masset & Weisskopf, 2010).

Overall, the results of this research support the consensus that fine wines behave as alternative financial assets, whereas mid-range and mass-market wines act as consumption goods subject to income and sentiment dynamics. Moreover, the inclusion of regional interactions provides new evidence that the macroeconomic responsiveness of wine prices is not uniform but shaped by structural and geographic heterogeneity within the global wine market.

5.2. Implications for wine producers, retailers and investors

The findings have several managerial and financial implications for industry stakeholders. For producers, understanding segment- and region-specific sensitivities is crucial for pricing strategies. During inflationary or high-interest periods, producers in New World regions may need to adjust export pricing and hedging policies more actively, whereas established Old World producers can rely more on brand equity to preserve margins.

For retailers, the results underline the importance of segmentation during macroeconomic downturns. Demand for mid- and mass-market wines is closely tied to consumer confidence, suggesting that promotional flexibility and product differentiation become key to maintaining volumes during crises.

For investors, the analysis supports the classification of fine wines as partial hedging assets. Fine wines tend to retain value during inflationary or uncertain periods, offering diversification benefits similar to alternative financial instruments. However, their hedging capacity is not

uniform across regions, implying that portfolio diversification should also consider geographic exposure.

5.3. Avenues for future research

Future work could extend this analysis in several ways. Including a broader set of producing and consuming countries would allow a more comprehensive view of international transmission mechanisms. Collecting richer retailer-level data could improve demand modeling and enable more precise estimation of price elasticities. Finally, integrating behavioral models of consumer choice could capture preference shifts under economic uncertainty and provide deeper insight into the psychological drivers of wine demand.

6. Conclusion

This thesis examined: *"How do macroeconomic fluctuations—such as inflation, recessions, interest rates, and exchange rate volatility—impact the pricing and demand of fine wines compared to mid-range and mass-market wines?"*. The research combined a panel-based econometric framework with segmental and regional interaction models. This approach provided a comprehensive analysis of macroeconomic and financial drivers in global wine pricing.

The findings reveal a clear heterogeneity in the responsiveness of wine prices to macroeconomic variables. Fine wines appear only weakly affected by inflation yet show positive sensitivity to interest rates and policy uncertainty, consistent with their characterization as investment-like assets. This supports previous evidence that fine wines behave as financialized goods offering diversification benefits during periods of volatility (Bouri et al., 2018; Masset & Henderson, 2010; Masset & Weisskopf, 2010). In contrast, mid-range and mass-market wines are more exposed to domestic macroeconomic conditions—particularly inflation, GDP growth, and consumer confidence—confirming their consumption-driven nature (Cardebat & Figuet, 2019). Exchange-rate fluctuations impact fine wines more strongly than other segments, reflecting the globalized structure of premium wine trade (Jiao, 2017).

The regional extension models add new evidence to the literature by revealing that macroeconomic transmission mechanisms are not uniform across countries and regions. Inflation and GDP growth effects are more pronounced in emerging markets such as Chile and Argentina, whereas Old World regions like France exhibit greater price stability and lower sensitivity to monetary shocks. This geographical perspective extends existing research by emphasizing that the financial behavior of wine is context-dependent rather than universal.

From a practical standpoint, the results offer relevant implications. Producers in New World regions should incorporate macroeconomic indicators into pricing, export and hedging strategies, while Old World producers can rely more on reputation and long-term positioning to maintain stability. Retailers should adapt segmentation and promotion strategies during economic downturns, as mid- and mass-market demand is highly sensitive to household sentiment. For investors, fine wines remain attractive as diversification asset, though their hedging performance varies by region and macroeconomic environment. While further research could expand the geographical scope and incorporate richer micro-level data, the present

analysis provides a robust empirical foundation for understanding how macroeconomic conditions influence wine markets.

Overall, this research contributes to the literature on wine economics and financialization by bridging macroeconomic analysis with market segmentation and regional heterogeneity. It confirms that fine wines operate at the intersection of consumption and finance, behaving both as luxury goods and as alternative assets. At the same time, it shows that economic shocks propagate unevenly across market tiers and regions, underscoring the complexity of price formation in global wine markets. In doing so, this work provides both empirical evidence and conceptual insight into how macroeconomic forces shape the valuation of one of the world's most enduring and symbolic assets—wine.

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8. Appendices

Appendix A - Additional Material for Methodology & Data (Section 3): Tables & Figures

Table 1. Wine Price Data Sources by Segment

Segment	Source(s)	Definition	Coverage (years)
Fine wines	Christie's, Sotheby's, Hong Kong Auction, Decanter, Bloomberg, FN London	Historical auction and premium market prices for high-end collectible wines (e.g., <i>Château Lafite Rothschild</i> , <i>Opus One</i> , <i>Catena Zapata</i> , <i>Concha y Toro Don Melchor</i>)	2000-2024
Mid-range wines	Wine-Searcher (listings in France, UK, USA, Germany, Hong Kong), Vivino (listings in France & USA)	Retail market prices for mid-range quality wines from key international regions	~ 2020-2024
Mass-market wines	Wine-Searcher (listings in France, UK, USA, Germany, Hong Kong), Vivino (listings in France & USA)	Retail prices for large-scale commercial wines distributed globally	~ 2022-2024

Figure 1: Overview of wine prices data coverage

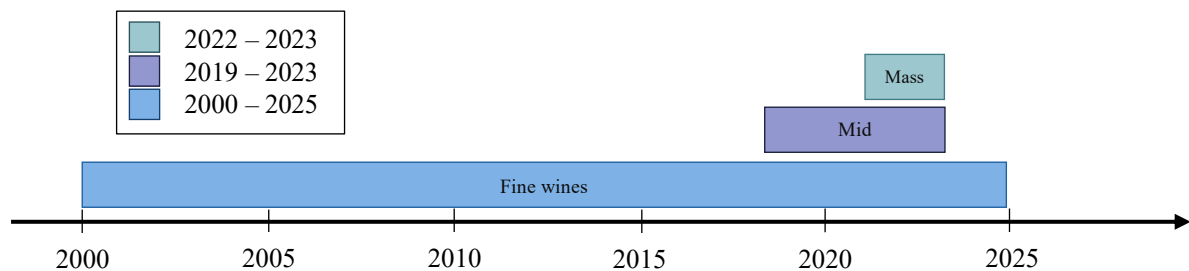


Table 6. Extended summary statistics of macro indicators – mean, SD, min, max

Country	Variable	N	Mean	SD	Min	Max
Argentina	Inflation (%)	9	4.11	2.62	1.61	9.02
	GDP growth (%)	35	2.34	5.91	- 10.89	10.44
	Interest rate (%)	23	26.2	25.53	1.67	100
	Exchange rate	35	48.2	160.7	0.49	914.7
	EPU	29	101	49.41	46.2	259.7
	CCI	25	44.6	6.77	32.9	57.5
Chile	Inflation (%)	35	6.06	5.68	0.35	26.04
	GDP growth (%)	35	4.24	3.46	- 6.14	11.50
	Interest rate (%)	29	5.47	3.77	0.69	16.31
	Exchange rate	35	571	154.2	305	943.5
	EPU	32	129	70.4	61	337.5
	CCI	24	100	2.24	96	103.8

France	Inflation (%)	35	1.75	1.14	0.04	5.22
	GDP growth (%)	35	1.56	2.18	- 7.44	6.88
	Interest rate (%)	36	2.99	3.08	- 0.55	10.34
	Exchange rate	35	2.05	2.06	0.68	5.90
	EPU	36	180	105.9	37.6	463.5
	CCI	36	99.6	1.23	97.5	102.2
United States	Inflation (%)	35	2.70	1.50	- 0.35	8
	GDP growth (%)	35	2.50	1.73	- 2.58	6.05
	Interest rate (%)	36	3.06	2.31	0.11	8.15
	Exchange rate	35	1	0	1	1
	EPU	36	136	68.4	67.2	423
	CCI	36	99.9	1.50	97	102.5

Appendix B – Supplementary Figures (R plot)

Figure 2 – Average evolution of fine wine prices (Real USD)

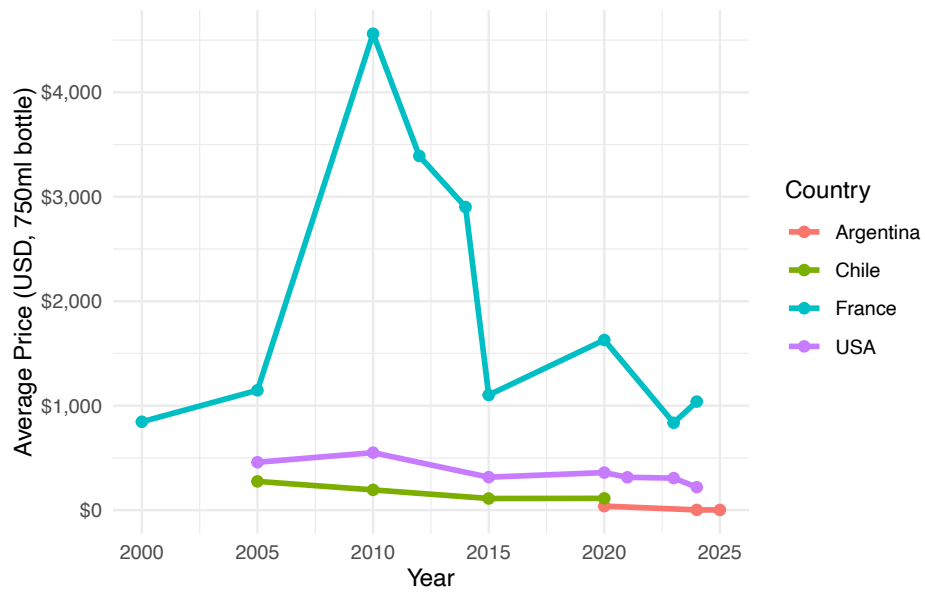


Figure 3 - Cross sectional prices: Mid-range vs Mass-market wines

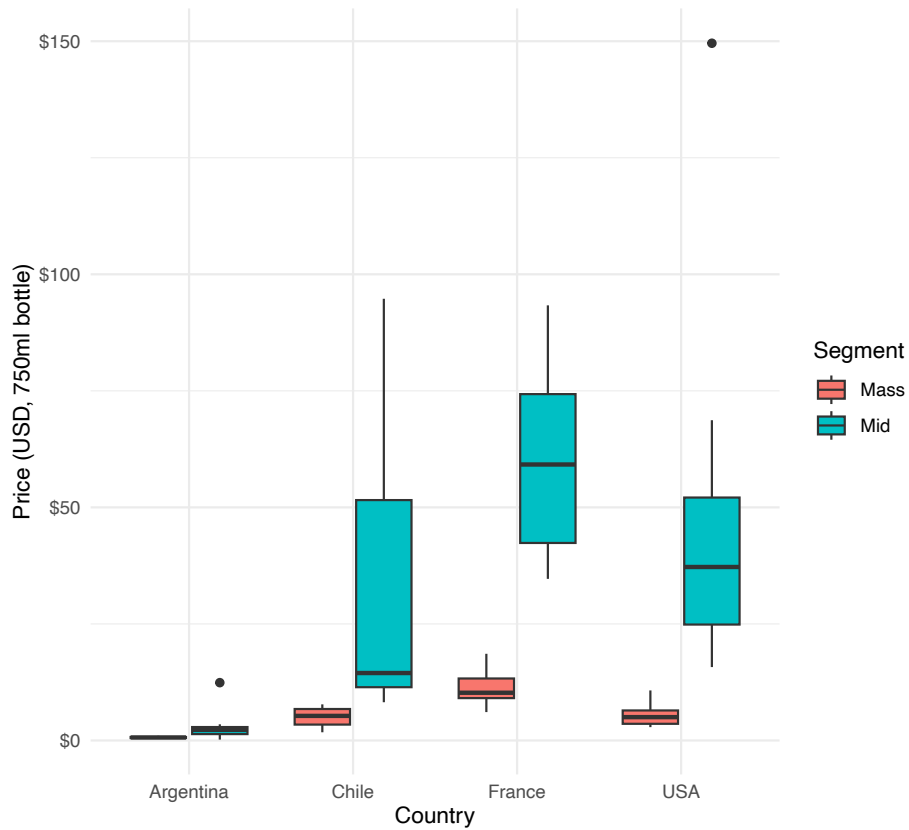
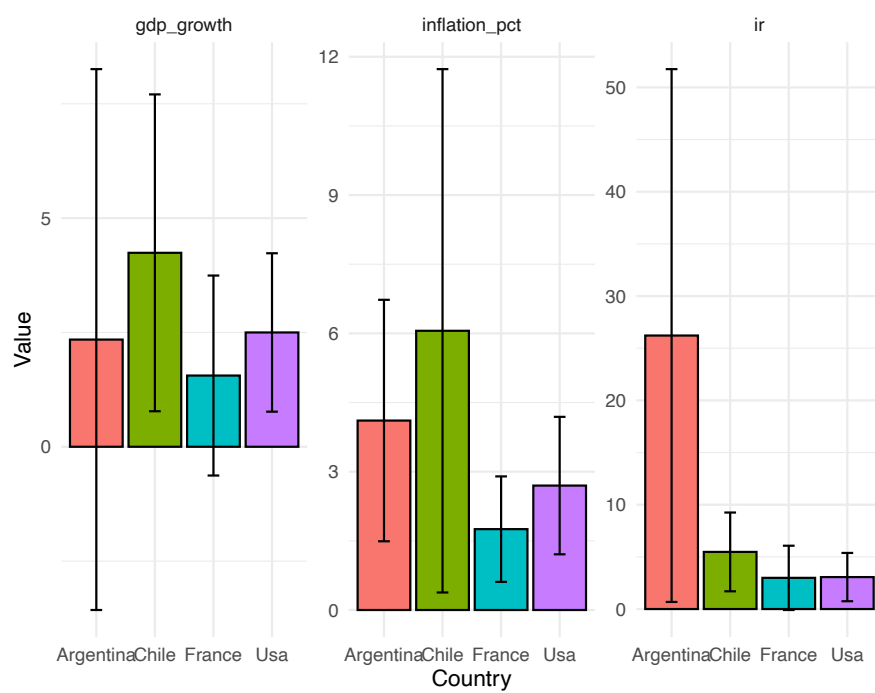


Figure 4 - Macroeconomic environment by country (Mean $\pm$ SD)



Abstract :

UNIVERSITÉ CATHOLIQUE DE LOUVAIN
Louvain School of Management

Place des Doyens, 1 bte L2.01.01, 1348 Louvain-la-Neuve
Boulevard Emile Devreux 6, 6000 Charleroi, Belgique
Chaussée de Binche 151, 7000 Mons, Belgique

www.uclouvain.be/lsm