

Is Sake More Appealing When Japan Is Cool?
A Comparative Gravity Analysis of Cultural Proximity

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Abstract

This thesis investigates the drivers of Japanese sake exports by identifying the extent to which Japan's cultural fascination influences international demand. The research question is: "To what extent is the international demand for sake driven by Japan's cultural fascination, and does this structural sensitivity differ from that of globalized alcoholic beverages like whisky?" Utilizing a Gravity Model framework estimated with Pseudo-Poisson Maximum Likelihood, the analyses employ a pooled model to statistically compare sake with Japanese whisky. The empirical results identify sake as a cultural experience good with a demand structure fundamentally distinct from whisky. While sake exhibits higher sensitivity to macroeconomic factors and tariffs, its growth is uniquely fueled by experiential and informational cultural flows. A key contribution of this thesis is the identification of an additive effect in sake's cultural sensitivity. In contrast to whisky, where cultural information and physical experience act as substitutes, sake demand is driven by independent channels. The fact that human interaction remains a potent export driver even in information-rich markets theoretically substantiates the effectiveness of export strategies that integrate tourism and creative content.

要旨

本論文は、日本の文化的魅力が国際的需要に及ぼす影響を定量化し、日本酒輸出の推進要因を解明することを目的とし、「日本酒に対する国際的な需要は、どの程度日本の文化的魅力に規定されているのか。また、その需要構造の感応度は、ウイスキーのようなグローバルに標準化されたアルコール飲料とどのように異なるのか」という問いを立てる。分析では、疑似ポアソン最大尤度による重力モデルの枠組みを用いたプール・データ分析を採用し、日本酒を日本産ウイスキーと統計的に比較した。実証結果から、日本酒は文化的体験財としての性質を持ち、ウイスキーとは異なる需要構造を有することが明らかになった。日本酒はマクロ経済要因や関税への感応度が高い一方で、その輸出成長は、体験的・情動的な文化的フローによって独自に促進されている。本研究の主な貢献は、日本酒の文化的感受性における相加的効果を特定した点にある。文化的情報と物理的体験が代替関係にあるウイスキーとは対照的に、日本酒の需要はそれぞれ独立した経路によって駆動される。情報の豊富な市場であっても人的交流が有力な輸出の促進効果を持ち、観光とクリエイティブ・コンテンツを統合した輸出戦略の有効性を理論的に裏付けている。

Preface

The inspiration for this thesis originated from the insightful suggestions of my supervisor, Professor Jota Ishikawa, regarding the unique cultural and economic potential of Japanese sake. Growing up in Japan, sake has always been a familiar presence in my life. It is far more than a mere alcoholic beverage which is an element deeply rooted in our traditions, used in sacred rituals like *Omiki* and *Otosoto*, and as an indispensable part of various celebrations.

This perspective was solidified through my experience at a student conference in South Korea. During the networking event following the academic sessions, I witnessed firsthand how alcoholic beverages served as a vital social lubricant. Despite being from different cultural backgrounds and having various mother tongues, we were able to build a strong rapport and lasting friendships. This experience convinced me that alcohol is more than a luxury good; it is a bridge that connects people globally.

This observation led to my research question: "How does the cultural appeal of Japan influence the export of Japanese sake?" By employing the gravity model, this thesis explores the relationship between cultural appeal and international trade,

analyzing how the essence of Japanese tradition is perceived and consumed in the global market.

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I would like to express my sincere gratitude to everyone who supported me throughout the completion of this thesis.

First and foremost, I would like to extend my deepest appreciation to my supervisor, Professor Jota Ishikawa, for his invaluable guidance and patience. I am particularly grateful for his warm support during our regular seminars and for providing the original inspiration for this thesis. His constant encouragement and insights were essential in shaping the direction of this thesis and bringing it to fruition.

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Supporting each other through the challenges of this writing process made all the difference.

Finally, I would like to express my heartfelt gratitude to my mother, Rieko for her unwavering support during the long hours of work that often lasted late into the night. She remained patient with me, even when I spent dinner talking only about the international trade of sake. Her understanding and encouragement gave me the strength to complete this journey.

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Chapter 1: Introduction

1.1 Research Background

In December 2024, UNESCO officially inscribed traditional Japanese sake-making onto the Representative List of the Intangible Cultural Heritage of Humanity. According to the Agency for Cultural Affairs (2025a), this heritage represents techniques established over 500 years ago, where master brewers known as *Toji* and their staff, the *Kurabito*, manage the intricate brewing process using *Koji* mold. These methods have adapted to diverse climates across the archipelago and are preserved through the production of various traditional spirits such as *Shochu*, *Awamori*, and *Mirin*. These beverages are indispensable to the social and cultural ceremonies of Japan and are recognized globally as quintessential symbols of Japanese heritage.

The international demand for sake has expanded rapidly alongside the growing global popularity of Japanese food. A major turning point was the 2013 UNESCO registration of *Washoku*, or traditional Japanese dietary culture, which validated its unique value on a global scale (Agency for Cultural Affairs, 2023). Beyond culinary trends, the promotion of sake has been bolstered by international tasting events and the establishment of certification and educational programs.

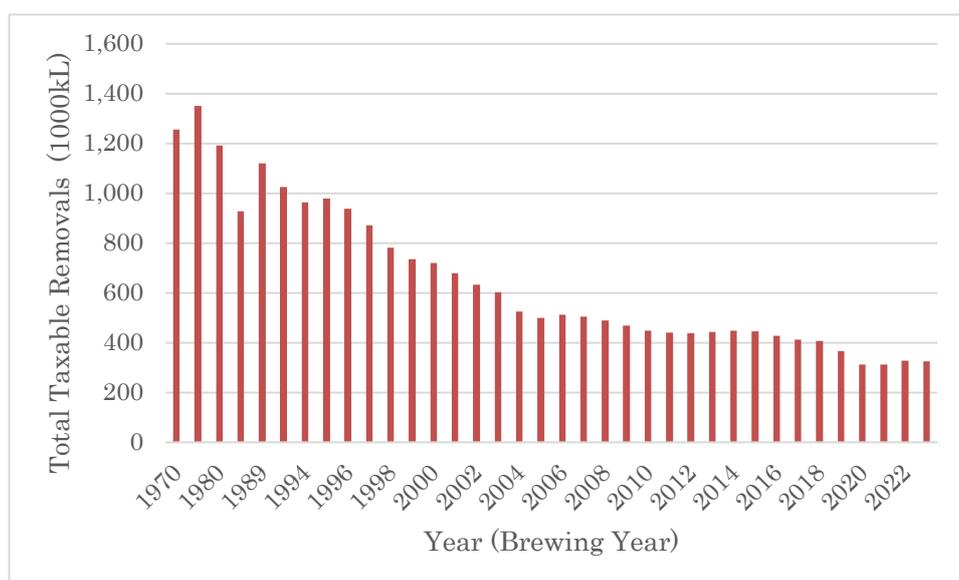
Consequently, sake is now valued not only as a traditional beverage but also as a health-conscious consumer preference and a premium luxury item. As sake establishes itself as a global premium beverage, its role as a bridge between Japanese tradition and modern international markets continues to strengthen.

1.2 The Japanese Sake Industry

1.2.1 Production Trends and the Crisis of Industrial Sustainability

The sake industry in Japan is currently navigating a period of profound contraction, as evidenced by long-term production statistics. According to the National Tax Agency (2025b), the production volume of sake reached its zenith in 1975 at 1,350 thousand kiloliters. However, the subsequent decades have seen a downward trajectory, with production falling to 326 thousand kiloliters by 2023. As illustrated in Figure 1-1, this represents a staggering reduction to approximately 24.1%, less than one-quarter, of its peak volume over the course of nearly half a century.

Figure 1-1 *The Volume of Sake Produced Domestically (1970–2023)*



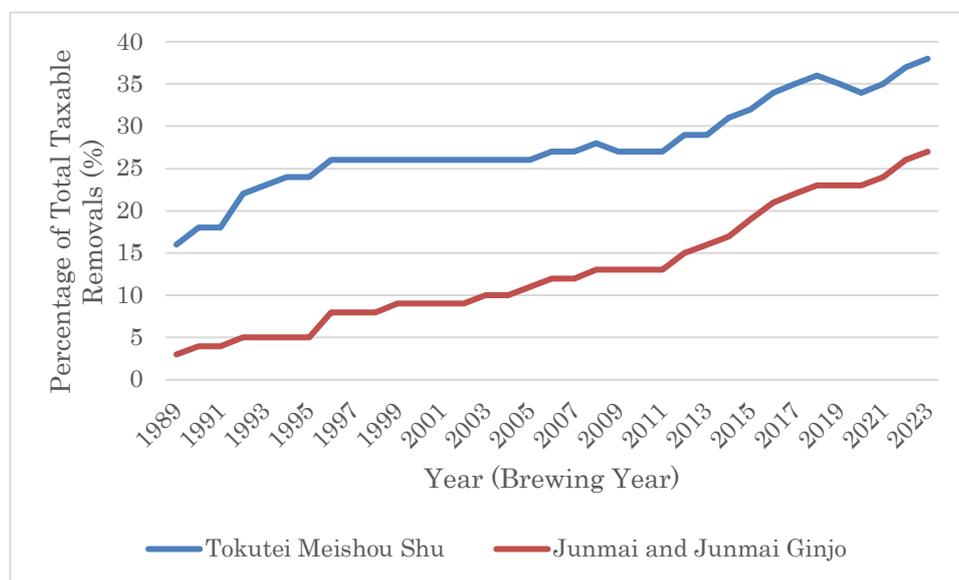
Note. Data adapted from “Sake no Shiori[Alcohol Guidebook],” by National Tax Agency of Japan (2025b)

However, in contrast to the quantitative decrease, a qualitative change is evident. According to the National Tax Agency (2025b), the share of *Tokutei Meishoshu*, premium sake, has been on an upward trend since 1989 (Figure 1-2). The share of premium categories within total taxable removals rose from 16% in 1989 to 38% in 2023, while the share of *Junmai* and *Junmai Ginjo* experienced a dramatic increase from 3% to 27% during the same period. In terms of volume, these premium categories grew from 92 thousand kiloliters in BY2013 to 104 thousand kiloliters in BY2023.

Despite this shift from quantity to quality, the management environment for breweries is becoming increasingly severe due to rising production costs. A critical

factor is that the production of Sake is legally required to use only domestically produced rice. In particular, the soaring price of *Shuzo Kotekimai*, commonly termed as brewing rice, has become a critical challenge. High prices in the table rice market have spilled over into the production and pricing of brewing rice. Given that raw materials account for a high proportion of manufacturing costs, it is difficult for breweries to pass these rapid increases on to domestic retail prices without dampening consumer demand. Furthermore, the industry faces a structural crisis with the aging of *Toji*, master brewers, and a shortage of successors.

Figure 1-2 Trends in the Share of Premium Sake (1989–2023)

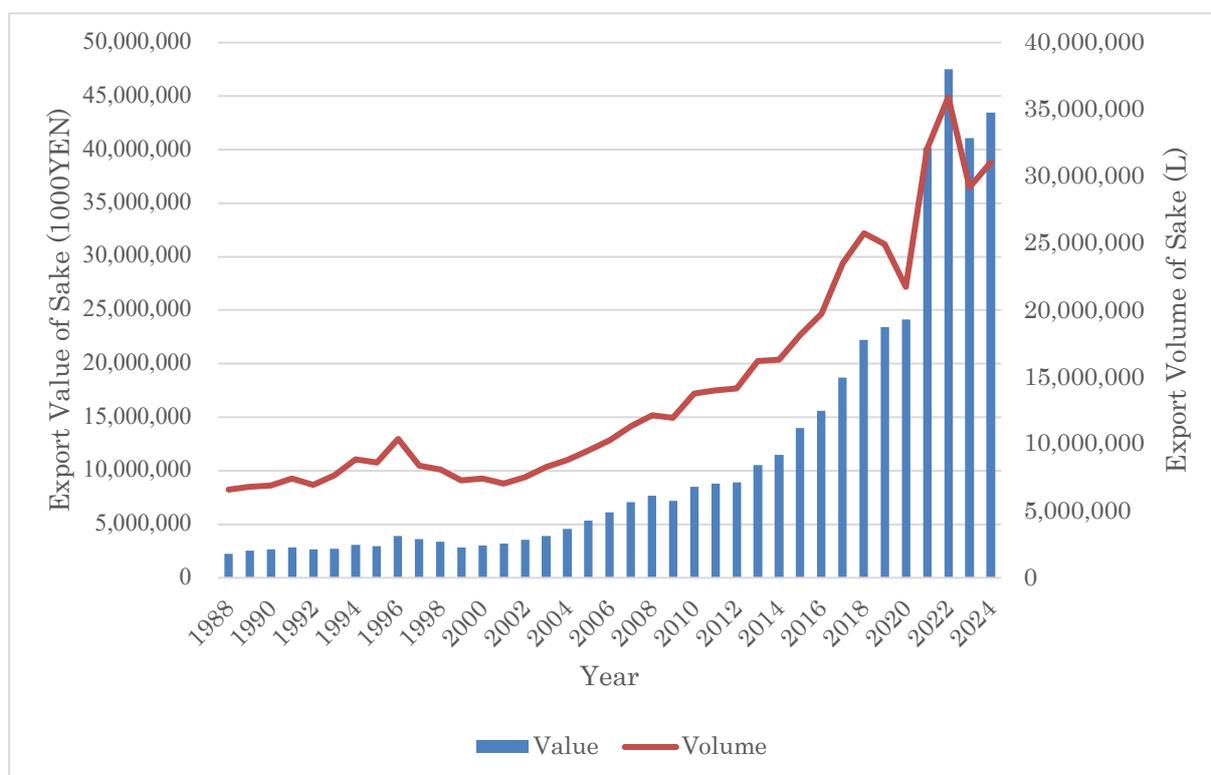


Note. Data adapted from “Seishu no Seizo Jokyō [Current Status of Sake Production]” by the National Tax Agency of Japan (2025)

1.2.2 Global Market Potential and Export Analysis

While the domestic market faces structural challenges, the international market presents a contrasting trajectory of expansion. According to the Ministry of Finance of Japan “Trade Statistics of Japan” (2025), the export performance of sake has grown significantly over the long-term. As illustrated in Figure 1-3, the export value reached 41 billion yen in 2023 and further increased to 43 billion yen in 2024. In terms of quantity, the volume reached 31,054 kiloliters in 2024, maintaining a high level compared to the 6,587 kiloliters recorded in 1988.

Figure 1-3 Trends in Export Volume and Value of Sake (1988-2024)



Note. Data adapted from “Trade Statistics of Japan,” by Ministry of Finance (2025)

The geographical distribution of these exports reveals a concentration in East Asia and North America. Table 1-1 presents the export value by country, showing that China and the United States together account for over the half of the total value. China remains the leading market by value, representing 26.86% (11.67 billion yen), while the United States follows closely at 26.33% (11.44 billion yen). In terms of the export volume presented in Table 1-2, the United States is the largest destination by volume, accounting for 25.77% (8,002 kiloliters) of total exports.

Despite the recent growth in exports, the market share of sake in the global alcoholic beverage market remains extremely low, at less than 0.1% (National Tax Agency, 2025). This indicates that while the volume of exports is expanding, the depth of international market penetration has not yet been achieved. This gap suggests a latent potential for further demand stimulation.

Table 1-1 *Top 20 Export Destination of SAKE by Value (2024)*

		1000 Yen	Share
1	China	11,671,373	26.86%
2	United States	11,441,896	26.33%
3	Hong Kong	5,116,764	11.77%
4	South Korea	3,743,474	8.61%
5	Taiwan	2,670,148	6.14%
6	Singapore	1,483,784	3.41%
7	Canada	1,040,604	2.39%
8	Australia	782,389	1.80%
9	United Kingdom	637,000	1.47%
10	France	551,732	1.27%
11	Vietnam	411,045	0.95%
12	Thailand	406,742	0.94%
13	Malaysia	394,542	0.91%
14	Germany	382,336	0.88%
15	Netherlands	365,218	0.84%
16	Italy	268,868	0.62%
17	Spain	224,818	0.52%
18	Brazil	192,196	0.44%
19	Philippines	165,202	0.38%
20	United Arab Emirates	163,637	0.38%
	Others	1,341,908	3.09%
	Total	42,113,768	100.00%

Note. Data adapted from “Trade Statistics of Japan,” by Ministry of Finance (2025)

Table 1-2 *Top 20 Export Destination of SAKE by Volume (2024)*

		L	Share
1	United States	8,002,717	25.77%
2	China	5,322,946	17.14%
3	South Korea	4,894,156	15.76%
4	Taiwan	2,889,651	9.31%
5	Hong Kong	2,015,331	6.49%
6	Canada	925,958	2.98%
7	Singapore	701,826	2.26%
8	Australia	677,962	2.18%
9	Germany	613,730	1.98%
10	Thailand	605,985	1.95%
11	Netherland	461,271	1.49%
12	France	436,147	1.40%
13	United Kingdom	422,448	1.36%
14	Italy	384,050	1.24%
15	Malaysia	361,502	1.16%
16	Vietnam	340,008	1.09%
17	Brazil	278,568	0.90%
18	Spain	267,754	0.86%
19	Israel	157,297	0.51%
20	Switzerland	148,473	0.48%
	Others	1,146,556	3.69%
	Total	31,054,336	100%

Note. Data adapted from “Trade Statistics of Japan,” by Ministry of Finance (2025)

1.3 Theoretical Framework and Research Objectives

The core challenge of this thesis lies in quantifying how cultural fascination and affinity toward Japan translate into international demand for its traditional goods. While traditional economic factors such as GDP and geographical distance remain foundational to trade theory, this thesis posits that "Cultural Proximity" serves as a critical catalyst in the export of Japanese cultural assets. According to Doan (2023), "the concept of cultural proximity (CP) between two nations refers to the degree to which one nation's shared ideas and practices are likely to be similar to that of the other" and it plays a decisive role in promoting the export of differentiated products.

Sake is analyzed as a cultural experience good that represents a unique intersection of economic sensitivity and cultural identity. While its international demand is heavily influenced by market scale and trade barriers as tariffs, it also possesses a cultural premium. The focus is on sake to explore whether its growth is driven by a distinct structural mechanism that differs from mere commodity trade. By identifying sake as a primary representative of Japanese cultural assets, the thesis aims to quantify how non-economic fascination sustains its global market presence.

To empirically test this hypothesis, this thesis adopts a comparative strategy involving two dominant export categories: sake and Japanese whisky. According to the

National Tax Agency (2025b), these two categories account for 65.1% of all Japanese liquor exports, with whisky at 43.6 billion yen and sake at 43.5 billion yen in 2024. Japanese whisky is utilized as a comparative benchmark representing a standardized spirit that adheres to globalized Western norms. While Japanese whisky is a premium product, it adheres to globalized, Western-origin standards, making its demand perception less dependent on specific Japanese cultural fascination. In contrast, sake is deeply rooted in Japan's indigenous identity, and its demand is hypothesized to be more sensitive to a consumer's psychological and cultural interest in Japan. This comparison is critical to identifying the structure unique to sake, where different cultural variables contribute independently to export growth. By contrasting these two products, the study isolates the specific structural sensitivity that allows traditional cultural goods to maintain its demand through multifaceted cultural channels.

The influence of culture on demand is analyzed through two independent pathways: informational flows via cultural property trade and experiential flows via human mobility. The information provided through cultural products serves as an initial gateway, while the experience gained through physical interaction by human mobility reduces psychological barriers and builds deep-rooted trust.

Based on this framework, the objective of this thesis is to conduct an empirical analysis of international trade in Japanese cultural assets, specifically elucidating the impact of cultural fascination on export performance. To achieve this, the thesis first utilizes a gravity model to quantitatively evaluate the extent to which cultural proximity influences the export volume of sake as a primary representative of Japanese cultural goods. Furthermore, through a comparative analysis of sake and Japanese whisky, this thesis investigates how the contribution of cultural variables differs depending on a product's inherent cultural background.

1.4 Research Questions

Based on the problem statement and the framework established above, this thesis addresses the following overarching research question: "To what extent is the international demand for sake driven by Japan's cultural fascination, and does this structural sensitivity differ from that of globalized alcoholic beverages like whisky?"

To investigate this, this thesis explores the following specific sub-questions:

Hypothesis1: Do cultural factors have a statistically significant positive impact on the export of sake when controlling for traditional gravity model variables?

Hypothesis2: Is the export performance of sake more sensitive to fluctuations in Japan's cultural appeal than that of Japanese whisky, which, despite its domestic production, adheres to the standards of a Western-origin beverage?

1.5 Contribution of this thesis

This thesis makes three primary contributions to the field of international trade and cultural economics, addressing the research gaps identified in previous literature: the comparative framework of sake and whisky, the approach to cultural proximity, and the identification of sake uniqueness via pooled model analysis.

First, this thesis is the first to rigorously test the distinction between Sake as Japanese traditional assets and whisky as the standardized market-logic beverages within a unified quantitative framework. By positioning whisky as a benchmark, it clarifies the unique cultural sensitivity of sake, providing empirical evidence that its demand structure is distinct from more globalized and cultural independent spirits.

Secondly, unlike prior studies that rely on limited static indicators, this thesis captures cultural proximity through a multi-layered structure: static variables, dynamic variables, and interaction terms within dynamic cultural variables. The static variables include religion and colonial history, while the dynamic cultural variables contain

UNCTAD-classified cultural trade and human mobility. This approach allows to analyze how informational and experiential flows contribute to trade. Notably, the thesis identifies an additive nature in sake's export structure, where information dissemination does not decay the impact of physical experience which is a discovery enabled by this multi-dimensional modeling.

Finally, the key methodological contribution of this thesis is the adoption of a pooled model incorporating interaction terms between a sake dummy and each independent variable. While individual regressions can suggest differences, they cannot statistically prove a structural shift between products. By integrating all data and utilizing interaction terms, it identifies sake's unique sensitivities as a statistically significant deviation from the whisky baseline. This approach proves why and how sake exports follow a culture-dependent structure that differs from the standardized market logic of general commodities.

1.6 Thesis Structure

The remainder of this thesis is organized as follows. Following this introductory chapter, Chapter 2 provides a comprehensive literature review focusing on the gravity model and the Pseudo-Poisson Maximum Likelihood estimation technique. It explores

the unique characteristics of the sake industry and the theoretical underpinnings of cultural proximity. Chapter 3 details the research methodology, defining the data sources and variables. It also outlines the empirical strategy and provides descriptive statistics to ensure the robustness of the model. Chapter 4 presents the empirical results and their interpretation. This includes an analysis of baseline gravity drivers, the impact of human mobility and cultural property trade, and a comparative study between sake and whisky. It also highlights the synergistic effects of dynamic cultural variables on trade flows. Finally, Chapter 5 concludes the thesis by summarizing the key findings, discussing practical implications for the sake industry, and suggesting avenues for future research.

Chapter 2: Literature Review

This chapter provides the review of the theoretical and empirical foundations that underpin the analysis of international trade, specifically focusing on the export of Japanese sake. It begins by tracing the evolution of the gravity model, emphasizing the methodological shift toward PPML estimation and high-dimensional fixed effects. Subsequently, the chapter reviews the specific application of these models to the alcoholic beverage industry and the sake market. Moreover, it explores the conceptualization of Cultural Proximity as a trade driver. Finally, it identifies the gaps in existing literature and states the originality of this thesis.

2.1 Gravity Model and PPML

The gravity model has served as the workhorse for empirical analysis in international trade for over six decades. Originally developed by Tinbergen (1962), the model was inspired by Newton's Law of Universal Gravitation, proposing that the volume of trade between two nations is proportional to the size of their economies and inversely proportional to the geographical distance between them. Specifically, the export value from country i to country j , denoted as X_{ij} , is expressed by the following functional form:

$$X_{ij} = A \times GDP_i \times GDP_j / Distance_{ij}$$

where A is a constant term, GDP_i and GDP_j represent the economic size of the respective countries, and $Distance_{ij}$ signifies the geographical distance. To estimate this relationship using linear regression, the equation is traditionally transformed into a log-linear form by assigning coefficients (β) and an error term (ε_{ij}):

$$\ln(X_{ij}) = \beta_0 + \beta_1 \ln(GDP_i) + \beta_2 \ln(GDP_j) + \beta_3 \ln(Distance_{ij}) + \varepsilon_{ij}$$

In theoretical terms, under the assumption of frictionless trade and constant elasticities, the coefficients for economic mass, β_1 and β_2 , are expected to be 1, while the coefficient for distance, β_3 , is expected to be -1.

In modern empirical research, the Structural gravity model, formalized by Anderson and van Wincoop (2003), are typically utilized. The core of this model lies in the concept of multilateral resistance where it posits that bilateral trade volumes are determined not only by the direct barriers between two nations but also by their relative barriers in comparison to the rest of the world. The model necessitates the consideration of two distinct resistance terms: Outward multilateral resistance, which represents the ease with which an exporter can ship goods to all potential destinations, and Inward multilateral resistance, which captures the ease with which an importer can source goods from all potential origins. Failing to account for these relative price effects

leads to omitted variable bias, as the intensity of trade between two countries depends on the trade opportunities available in the global market.

Rose (2000) initially utilized a gravity framework to argue that shared currencies significantly boosted trade, reporting an exceptionally large impact. This mystery of exaggerated effects, however, was later re-examined through more rigorous estimation techniques. Larch *et al.* (2019) replicated the linear models of Glick and Rose (2016) and demonstrated that Ordinary Least Squares (OLS), estimates fail to ensure consistency and unbiasedness when data exhibit heteroscedasticity. To resolve these biases, Larch *et al.* (2019) employed the Poisson Pseudo-Maximum Likelihood estimation, commonly referred to as PPML, originally proposed by Santos Silva and Tenreyro (2006). They identified two critical flaws in the traditional OLS estimation of log-linearized gravity models.

First, the presence of heteroscedasticity leads to biased estimates. Under Jensen's Inequality, the expected value of the logarithm of a random variable is not equal to the logarithm of its expected value ($E[\ln y] \neq \ln E[y]$). In the presence of heteroscedasticity where the variance of the error term depends on the regressors the log-linear OLS estimation yields inconsistent estimates of the elasticities. Silva and Tenreyro demonstrated that PPML, by estimating the model in its original multiplicative

form, ensures consistency even when the data exhibit complex error structures. The PPML specification is given by the following equation:

$$X_{ij} = \exp [\beta_0 + \beta_1 \ln(GDP_i) + \beta_2 \ln(GDP_j) + \beta_3 \ln(Distance_{ij})] + \varepsilon_{ij}$$

Second, PPML provides a robust solution to the zero-trade flows problem. Since the logarithm of zero is undefined, OLS necessitates either dropping observations with zero trade or adding an arbitrary constant, both of which introduce significant selection bias. PPML, however, allows for the inclusion of zero-trade observations, which is particularly crucial for analyzing differentiated goods like Japanese sake, where trade pairs often exhibit zero or intermittent volumes.

By incorporating these methodological advancements, Larch *et al.* (2019) replicated earlier studies and demonstrated that previously exaggerated effects, such as the massive trade-creation impact of common currencies, were often statistical artifacts of OLS bias. This transition highlights the necessity of using PPML to account for zero trade flows and complex error structures, ensuring the empirical reliability of trade analysis in modern global markets. By incorporating high-dimensional fixed effect, such as country-pair fixed effects, exporter-year fixed effects, and importer-year fixed effects, and utilizing robust standard errors clustered across exporters, importers, and time, they showed that the previously reported massive effects of common currencies were

statistically insignificant or much smaller. As seen in debates surrounding the trade creation effects of a common currency, gravity models continue to evolve, highlighting the need to utilize PPML, high-dimensional fixed effects, and robust standard errors to ensure the empirical reliability of trade analysis.

2.2 Application of the Gravity Model to Sake Industry

The applicability of the gravity model to the alcoholic beverage sector has been established through various international studies. Early research, such as Dascal and Mattas (2002) on EU wine trade and Gouveia *et al.* (2018) on Port wine, confirmed that while macroeconomic factors like GDP and distance are fundamental. Gouveia *et al.* (2018) further suggested that the presence of Portuguese immigrant communities in importing countries positively influences trade, indicating that shared language and cultural ties have a trade-promoting effect.

Ida (2022) conducted an empirical analysis of sake exports to top-tier markets, including Top 5, 10, and 20 countries of export value, from 2009 to 2020. Using export value as the dependent variable, it tested traditional explanatory factors including GDP of both exporter and importer, geographical distance between capitals, population of importer, GDP per capita of importer and the presence of EPAs/FTAs. The results

aligned with standard trade theory, indicating that the importer's GDP and trade agreements exerted a significant positive impact, while distance acted as a persistent negative constraint. However, Ida (2022) acknowledged limitations, such as a relatively small sample size, ranging from 60 to 240, and the inability to account for time-varying global shocks, notably COVID-19 pandemic. To address these limitations Ida (2024) expanded the framework to include cultural variables, as the number of inbound tourists to Japan and the number of Japanese-cuisine restaurants. These were introduced as a proxy for cultural exposure and fascination. This subsequent study confirmed that the number of Japanese restaurants significantly boosts sake exports, providing empirical evidence that interest in Japanese culture acts as a catalyst for consumption. Nevertheless, Ida (2022, 2024) pointed out ongoing data challenges, including the absence of official longitudinal surveys on the number of Japanese restaurants abroad and missing values in inbound tourism data.

Despite the valuable insights provided by Ida (2024), several methodological limitations remain, which this thesis seeks to address. First, the use of OLS, which cannot address the heteroscedasticity inherent in trade data, is a significant methodological constraint. Second, the explanatory power of the models in Ida (2024) is relatively low, with R-squared values ranging from 0.36 to 0.70. This suggests that

significant factors influencing sake exports remain unaccounted for. Third, the reliance on a small sample size, 130 to 260, and the focus solely on the top 10 or 20 export destinations may introduce a selection bias. By excluding smaller or emerging markets, the findings may not accurately reflect the global dynamics of cultural fascination. Finally, the simultaneous inclusion of both GDP and population as explanatory variables in the same regression equation raises concerns about multicollinearity, as these two indicators are often highly correlated.

2.3 Unique Features of Sake in International Trade

Ito *et al.* (2018) analyzed the structural characteristics of the globalization of Japanese alcoholic beverages based on statistical data and field interviews in importing countries. They revealed that the international penetration processes of different types of alcoholic beverages vary significantly. Regarding Sake, they clarified that its export expansion is heavily dependent on cultural backgrounds, such as the global Japanese-cuisine boom and the proliferation of Japanese restaurants. They argue that this Japanese cultural context serves as a primary facilitating factor for sake's penetration. In contrast, Japanese whisky has successfully integrated into local beverage markets under the standardized category of distilled spirits, regardless of the presence of Japanese cuisine.

Whiskey demand is autonomous from its cultural foundations and standardized, whereas sake demand demonstrates an extremely high sensitivity to the presence of Japanese cultural hubs. This structural difference between sake and whisky provides a theoretical basis for the hypothesis of the present thesis that sake is uniquely sensitive to Japan's cultural appeal.

2.4 Cultural Proximity

The measurement of cultural proximity in gravity models can be divided into two categories, static indicators and dynamic time-varying proxies. Melitz and Toubal (2014) constructed a new data series on common mother tongues and spoken languages and discussed the combined effects of linguistic factors. Their findings revealed that the impact of language on trade is at least twice as large as that indicated by conventional dummy variables, acting through pathways such as ethnicity, trust, and ease of communication.

On the other hand, Felbermayr and Toubal (2010) and Disdier *et al.* (2010) have shifted to time-varying measurement methods to capture the changing nature of cultural affinity. Felbermayr and Toubal (2010) pioneered this by using Eurovision Song Contest scores as a proxy for cultural proximity, demonstrating that these dynamic scores

significantly affect trade volumes even after controlling for standard bilateral fixed effects. Similarly, Disdier *et al.* (2010) focused on bilateral trade in cultural goods, arguing that such flows represent "proximate cultural tastes." Their findings suggest that cultural flows foster overall trade, implying that cultural regulations and creation have economic impacts reaching far beyond their immediate sector. Doan (2023) utilized trade in cultural goods as a proxy for the asymmetric and time-varying dimensions of cultural proximity within global value chains, GVCs. Doan identified that cultural proximity reduces sourcing costs and facilitates both backward and forward GVC participation.

2.5 Research Gap and Originality

This chapter has synthesized the theoretical evolution of the gravity model and its practical application to the international trade. The literature recommends PPML estimation to address the universal problems of heterogeneous dispersion and zero trade flows in modern trade analysis. Furthermore, incorporating high-dimensional fixed effects to mitigate omitted variable bias. To further ensure the empirical reliability of these estimates, the use of robust standard errors clustered across exporters, importers, and time is now considered essential.

Despite these methodological advancements, several critical gaps remain in the existing research on the Japanese sake industry. While studies such as Ida (2022, 2024) have applied the use of cultural proxies like inbound tourism, they have encountered limitations including the reliance on OLS, potential selection bias, and multicollinearity by focusing primarily on top-tier export markets. Additionally, the qualitative observation by Ito *et al.* (2018), which suggests that sake operates under a culturally dependent logic while whisky follows a standardized market logic, has yet to be rigorously tested within a unified, comparative quantitative framework.

The originality of this thesis lies in its approach to filling these identified gaps. To address the methodological constraints of prior studies, this thesis employs a PPML estimation framework within a structural gravity context, which ensures consistent estimates in the presence of heteroscedasticity and accommodates zero trade observations. To resolve the selection bias found in earlier works, the analysis utilizes an unbalanced panel dataset covering all partner countries from 1988 to 2024. This broad scope allows for a more accurate reflection of global cultural fascination beyond major markets. Regarding the concerns of multicollinearity and data reliability, this thesis implements the analysis of Summary Statistics on Table 3-2 and a Correlation Matrix on Table 3-3 to ensure the independence of explanatory variables in Chapter 3.

Most significantly, this thesis contributes to the field by being the first to empirically compare the cultural sensitivity of sake and whisky using UNCTAD-classified cultural goods as a time-varying proxy. This comparative analysis rigorously quantifies how Japan's cultural factors uniquely drive demand for identity-based traditional assets, in contrast to standardized distilled spirits.

Chapter 3: Data and Methodology

This chapter presents the empirical methodology and data used for the analysis. It specifies the gravity model framework, defines the variables, and details the estimation procedures. Additionally, it provides descriptive statistics and correlation analyses to verify the suitability of the dataset for the intended empirical tests.

3.1 Model Specification

As Japan is the sole exporter in this thesis, the analysis focuses on the variation across importing countries i and time t . To preserve time-invariant cultural variables which would otherwise be absorbed by country-pair fixed effects, this thesis primarily utilizes year fixed effects η_t .¹ The estimated equation is as follows:

$$\begin{aligned}
 X_{jt} &= \exp[\beta_0 + \beta_1 \ln(GDP_{jt}) + \beta_2 \ln(DISTANCE_j) + \beta_3 \ln(TARIFF_{jt}) + \beta_4 FTA_EPA_{jt} \\
 &+ \gamma_1 COL_j + \sum \delta_k Religion_{kj} + \theta_1 \ln(MOVEMENT_{jt}) \\
 &+ \theta_2 \ln(CULTURAL\ TRADE_{jt}) + \theta_3 \ln(MOVEMENT_{jt}) \times \ln(CULTURAL\ TRADE_{jt}) + \eta_t]
 \end{aligned}$$

where X_{jt} represents the export value or volume to country j in year t . The parameters γ and δ capture static cultural factors, while θ represents dynamic cultural factors including human and cultural exchanges. To examine the synergy between these

¹ For the specific formulas used to calculate $TARIFF_{jt}$, refer to Appendix 1.

dynamic factors, the interaction term between movement and cultural trade is incorporated.

To directly compare the determinants of exports between sake and whisky, a pooled dataset is also utilized. In this specification, a product-specific dummy variable, $Sake_{jt}$, is introduced, which takes the value of 1 for sake and 0 for whisky. By incorporating interaction terms between this dummy and all variables, the model statistically tests whether the impact of cultural flows differs significantly between the two types of beverages: sake and whisky.

3.2 Data Source and Variable Definitions

3.2.1 Dependent Variables

The dependent variables in this thesis, export value and export volume, are obtained from the Trade Statistics of Japan (Ministry of Finance 2025). Annual data for Sake (HS Code 2206.00) and Whisky (HS Code 2208.30) were extracted for the period 1988 to 2023.

3.2.2 Basic Gravity Drivers

Economic and geographic foundations are sourced from internationally standardized databases. Market capacity, represented by GDP_{jt} is collected from the

World Bank (2025) and IMF databases (2025); this is expected to have a positive sign, $\beta_1 > 0$. For $DISTANCE_j$, the CEPII GeoDist dataset is utilized to provide the geographical distance between Tokyo and the capital cities of importing countries which is expected to be negative, $\beta_2 < 0$, due to increased shipping costs (Mayer and Zignago 2011). Institutional barriers include $TARIFF_{jt}$, sourced from the World Bank (2025), and the FTA_EPA_{jt} dummy, which is constructed based on official records from the Ministry of Foreign Affairs of Japan (2025). Tariffs are expected to hinder trade $\beta_3 < 0$, while FTA/EPA status is expected to promote it $\beta_4 > 0$ by reducing non-tariff barriers and facilitating trade procedures.

3.2.3 Static Cultural Variables

To control for long-term cultural affinity that remains constant over the sample period, colonial history and religious affiliations are incorporated as static cultural variables. The COL_j variable is a binary dummy sourced from the CEPII dataset, taking a value of 1 if the importing country j shares a colonial legacy with Japan and 0 otherwise, which is expected to have a positive effect, $\gamma_1 > 0$ (Mayer and Zignago 2011).²

² The countries designated as colonial history dummies are South Korea, North Korea, and Palau.

Given the nature of alcoholic beverages, religious beliefs are expected to influence consumption patterns due to doctrinal stances on alcohol. Based on the “Countries and Regions” from the Ministry of Foreign Affairs of Japan (2025), the model includes a series of dummy variables, denoted as $\sum \delta_k Religion_{kj}$, representing the predominant religious affiliation of each partner country. Categories consist of Christianity, Islam, Judaism, Buddhism, Hinduism, other religions, and no religion; in this model, estimates are based on the non-religious category.³ Incorporating these variables allows the estimation to account for both religious prohibitions on alcohol.

3.2.4 Dynamic Cultural Variables and Interaction Term

The primary focus of this thesis lies in the dynamic cultural proxies that capture the evolving fascination with Japanese culture. This dimension is measured through three channels: the presence of Japanese nationals, human mobility, and the flow of cultural goods.⁴

First, the scale of human exchange is captured through a suite of human mobility variables, $MOVEMENT_{jt}$ which account for the physical interaction between Japan and each partner country. This thesis incorporates three distinct measures: (i)

³ The non-religious category includes six countries and areas: Netherlands Antilles, Czech Republic, Estonia, Netherlands, New Zealand, and North Korea.

⁴ For detail discussion of cultural variables, see Appendix 2.

$TOTAL_MOVEMENT_{jt}$ defined as the aggregate sum of both departures and entrants;

(ii) $ENTRANT_{jt}$ the number of individuals entering Japan from the partner country; and

(iii) $DEPART_{jt}$ the number of individuals departing from Japan to the partner country. These variables are constructed using the “Immigration Control Statistics” from the Immigration Services Agency of Japan (2025). This multi-dimensional approach allows for a comprehensive assessment of how the flow of people facilitates trade. Increased flows in any of these categories are expected to promote exports $\theta_1 > 0$ by enhancing mutual understanding, reducing information asymmetries, and stimulating curiosity toward Japanese beverages. While both beverages are expected to benefit from human exchange, the coefficient θ_1 for sake is hypothesized to be larger and more statistically significant than that for whisky. This reflects sake’s high-context nature and its reliance on "cultural ambassadors" to bridge and promote the product.

The material aspect of cultural influence is incorporated through the export value of cultural goods $CULTURAL_TRADE_{jt}$. The data construction for this variable follows a rigorous academic process: cultural goods are identified at the HS 6-digit level using the BACI bilateral trade database (Gaulier and Zignago, 2025). The selection of relevant products is based on the UNESCO (2009) definition of cultural goods, implemented via the classification correspondence table provided by Jinji and Tanaka

(2020). This thesis utilizes both the aggregate flow and its specific sub-sectors. The primary variable is $TOTAL_Trade_{jt}$, representing the log of the total export value of all cultural goods. Furthermore, following the UNESCO categories, this total is decomposed into five distinct sub-categories to examine the heterogeneous effects of different cultural domains: (i) $Audio_AudiovisualMedia_{jt}$, (ii) $CulturalHeritage_{jt}$, (iii) $Music_PerformingArts_{jt}$, (iv) $PrintedMatter_{jt}$, and (v) $VisualArts_{jt}$ ⁵. All cultural trade variables are expected to have a positive influence on the exports of sake and whisky, $\theta_2 > 0$, as they serve as material precursors that stimulate interest in Japanese lifestyle and culinary traditions. Like human mobility, the elasticities for cultural trade are expected to be significantly more pronounced for sake than for whisky, as cultural flows serve as a material gateway that stimulates interest in Japan's identity-based traditional assets. Material cultural flows serve as a more effective gateway for familiarizing foreign consumers with the Japanese culinary tradition.

Finally, an interaction term between human mobility and cultural trade is introduced to examine whether the physical movement of people and the consumption of cultural products exert a synergistic effect on the demand for Japanese sake and whisky. For

⁵ For detail classification, see Appendix 3.

sake, the combined effect is expected to be robust and additive or synergistic, $\theta_3 \geq 0$, as physical experience and informational exposure reinforce one another.

Table 3-1 summarizes the variables utilized in the empirical analysis, including their definitions, expected signs, and data sources.

Table 3-1 *Variable Definition, Expected Sign, and Data Source*

Category	Variable	Definition / Unit	Expected Sign	Data Source
Dependent	Export Value	Annual export value of Sake/Whisky (Yen)		Ministry of Finance
	Export Volume	Annual export volume of Sake/Whisky (L)		Ministry of Finance
Basic Gravity Drivers	GDP	Gross Domestic Product	+	World Bank / IMF
	Distance	Distance between capital cities	-	CEPII
	Tariff	Weighted tariffs on alcoholic beverages	-	World Bank
	FTA/EPA	Dummy (1 if agreement is in force)	+	MOFA of Japan
Static Cultural	Colonial Hist.	Dummy (1 if shared colonial history)	+	CEPII
	Religion	Dummies; Christian, Islam, Buddhism, Hinduism, Judaism, Others and None		MOFA of Japan
Dynamic Cultural	Human Mobility	Inbound and outbound flows	+	ISAJ
	Cultural Trade	Cultural goods exports	+	CEPII
Interaction	Interaction	Interaction between mobility and cultural trade	+	

3.3 Estimation Strategy

This thesis employs the PPML estimator for two technical reasons. First, as established by Silva and Tenreyro (2006), OLS estimates of gravity models in log-linear form are biased in the presence of heteroscedasticity due to Jensen's Inequality. PPML provides consistent estimates by handling the dependent variable in its original level. Second, since exports of specific goods like sake and whisky often result in zero-trade values for certain partners, PPML allows for the inclusion of these observations, which would otherwise be dropped or arbitrarily adjusted in an OLS framework.

Complementing the year fixed effects η_t described in Section 3.1, this thesis utilizes Robust Standard Errors clustered at the country level. While the year fixed effects account for global shocks and common time-specific factors, clustering the standard errors ensures that the inference is robust to potential serial correlation and heteroscedasticity within the panel data of each importing country.

3.4 Description Statistics

3.4.1 Summary Statistics

The dataset is an unbalanced panel covering 128 countries from 1988 to 2024. The export data includes 121 partner countries for Sake and 105 countries for Whisky,

with some missing observations across the period. The Table 3-2 presents the summary statistics for the variables used in this thesis. A notable feature of the data is the high degree of dispersion in the dependent variables; for instance, the standard deviation for the export value of sake, 654,044, is nearly seven times its mean, 95,099. This, combined with the presence of zero-trade observations, confirms the necessity of using the PPML estimator. Regarding cultural variables, the sample exhibits diverse religious backgrounds, with Christianity and Islam accounting for 64% and 17% of the partner countries, respectively. Furthermore, the wide range of values in human mobility and cultural trade categories highlights the variation in Japanese cultural presence across different global markets.

Table 3-2 Summary Statistics

		Variable	Obs	Mean	Std. Dev.	Min	Max
Dependent Variables	SAKE	Export Value (1000YEN)	4,473	95,099	654,044	0	14,160,804
		Export Volume (kL)	4,477	117,187	578,211	0	9,083,761
	WHISKY	Export Value (1000YEN)	3,885	87,565	701,530	0	19,616,597
		Export Volume (kL)	3,884	35,900	231,187	0	5,244,360
Basic Gravity Drivers		GDP (thousand USD)	4,303	402,909,913	11,149,201	70,688	27,720,700,000
		DISTANCE (km)	128	9,266	3,809	1,081	18,533
	SAKE	TARIFF (%)	2,500	43	261	0	3,000
	WHISKY	TARIFF (%)	2,164	19.90	39.90	0.00	394.70
		FTA_EPA	4,736	0.0946	0.2927	0	1
Static Cultural Variables		COL	128	0.0313	0.1747	0	1
	Religion	Christian	128	0.6406	0.4817	0	1
		Islam	128	0.1719	0.3788	0	1
		Buddhism	128	0.1016	0.3033	0	1
		Hinduism	128	0.0234	0.1519	0	1
		Judaism	128	0.0078	0.0884	0	1
		Others	128	0.0078	0.0884	0	1
		None	128	0.0469	0.2122	0	1
Dynamic Cultural Variables	Human Mobility	ENTRANT	4,082	81,222	433,457	1	8,481,216
		DEPART	4,129	7,214	361,764	0	7,818,733
	Cultural Trade (thousand USD)	TOTAL_Trade	2,499	26,645	127,307	0	2,899,708
		Audio_AudiovisualMedia	2,152	16,570	111,885	0	2,667,668
		CulturalHeritage	1,122	1,988	6,538	0	75,030
		Music_PerformingArts	2,752	5,201	19,324	0	269,014
		PrintedMatter	3,139	1,967	7,722	0	149,614
		VisualArts	2,499	3,338	19,403	0	314,569

3.4.2 Correlation and Multicollinearity

Table 3-3 reports the correlation matrix for the independent variables. A primary concern in gravity models is multicollinearity, particularly between macroeconomic size and cultural proxies. The matrix confirms that GDP_{jt} maintains a relatively low correlation with human mobility indicators, 0.36 for $ENTRANT_{jt}$ and 0.16 for $DEPART_{jt}$, indicating no significant collinearity between these drivers. Furthermore, the correlation between GDP_{jt} and $TOTAL_Trade_{jt}$ is moderate at 0.47.

Even for the cultural sub-category with the highest correlation to GDP_{jt} , $VisualArts_{jt}$ at 0.65, the value remains below the conventional 0.70 threshold, confirming that macroeconomic size and cultural fascination can be treated as independent drivers in the regression analysis.

However, significant internal correlations exist within the specific groups of cultural and mobility variables. For instance, the correlation between $TOTAL_Trade_{jt}$ and $Audio_AudiovisualMedia_{jt}$ is exceptionally high at 0.96, while the correlation between $ENTRANT_{jt}$ and $DEPART_{jt}$, stands at 0.75. To prevent over-specification and ensures the stability of the estimated coefficients, this thesis adopts a modeling discipline as follow: only one representative variable from the human mobility group and one variable from the cultural trade group are included in any single regression specification. This strategy allows for a clear identification of the individual impact of each cultural channel without the risk of coefficient inflation or instability caused by redundant variables.

Table 3-3 Correlation Matrix

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	
Basic Gravity Drivers	(1)	GDP _{it}	1																		
	(2)	DISTANCE _{it}	-0.02	1																	
	(3)	FTA_EPA _{it}	0.01	-0.12	1																
Static Cultural Variables	(4)	Christian _{it}	0.08	0.36	-0.15	1															
	(5)	Islam _{it}	-0.10	-0.13	0.15	-0.46	1														
	(6)	Buddhism _{it}	0.07	-0.50	0.14	-0.57	-0.11	1													
	(7)	Hinduism _{it}	0.00	-0.09	0.03	-0.13	-0.03	-0.03	1												
	(8)	Judaism _{it}	-0.04	0.19	-0.05	-0.16	-0.03	-0.04	-0.01	1											
	(9)	Other _{it}	-0.02	0.03	-0.02	-0.05	-0.01	-0.01	0.00	0.00	1										
	(10)	None _{it}	-0.10	0.07	-0.06	-0.44	-0.09	-0.11	-0.03	-0.03	-0.01	1									
	(11)	COL _{it}	-0.02	-0.42	-0.10	0.12	-0.06	-0.07	-0.02	-0.02	-0.01	-0.05	1								
	Human Mobility	(12)	ENTRANT _{it}	0.36	-0.43	-0.05	-0.08	-0.06	0.26	-0.02	-0.03	-0.01	-0.09	0.54	1						
		(13)	DEPART _{it}	0.16	-0.40	-0.01	0.04	-0.05	0.08	-0.02	-0.03	-0.01	-0.08	0.72	0.75	1					
Dynamic Cultural Variables	(14)	Total_Trade _{it}	0.47	-0.05	-0.10	0.04	-0.09	0.04	-0.03	-0.03	-0.01	0.00	0.09	0.18	0.22	1					
	(15)	Audio_AudiovisualMedia _{it}	0.30	0.01	-0.08	0.05	-0.07	-0.02	-0.02	-0.02	-0.01	0.03	0.06	0.10	0.13	0.96	1				
	(16)	CulturalHeritage _{it}	0.44	-0.04	-0.07	0.00	-0.10	0.15	-0.02	-0.03	-0.01	-0.07	-0.01	0.14	0.20	0.52	0.38	1			
	(17)	Music_PerformingArts _{it}	0.49	-0.19	-0.16	-0.01	-0.12	0.19	-0.02	-0.05	-0.02	-0.07	0.14	0.25	0.22	0.51	0.32	0.40	1		
	(18)	PrintedMatter _{it}	0.64	-0.19	-0.06	-0.02	-0.09	0.21	-0.03	-0.05	-0.02	-0.09	0.16	0.32	0.34	0.74	0.59	0.64	0.60	1	
	(19)	VisualArts _{it}	0.65	-0.08	0.02	0.02	-0.08	0.11	-0.02	-0.03	-0.01	-0.07	0.07	0.26	0.33	0.35	0.14	0.49	0.27	0.50	1

Chapter 4: Results and Interpretation

This chapter presents the empirical results of the gravity model estimations to identify the drivers of Japanese sake exports in comparison with Japanese whisky. The analysis is structured into four main parts: (i) baseline results for basic gravity and static cultural factors in Section 4.1, (ii) the impact of human mobility in Section 4.2, (iii) the influence of cultural property trade in Section 4.3, and (iv) the synergistic and additive effects of these dynamic cultural proxies in Section 4.4. The primary contribution of these analysis lies in the integration of dynamic cultural proximity into a unified pooled-model framework. Sections 4.2 and 4.3 capture shifts in interest toward Japanese culture using time-varying proxy variables. The triple interaction analysis in Section 4.4 provides the empirical evidence that sake demand is driven by independent, additive channels of information and experience.

4.1 Baseline Results and Static Cultural Effects

Tables 4-1 and 4-2 present the baseline estimation results for sake and whisky, respectively, with Table 4-2 further reporting the results of a pooled analysis incorporating interaction terms with a product-specific dummy variable $Sake_{jt}$ to statistically test the differences between the two beverages. These baseline estimations reveal that sake is significantly more sensitive to macroeconomic fluctuations and trade

barriers than whisky; while market scale and tariffs are critical determinants for both, the pooled analysis demonstrates that sake's vulnerability to price changes and economic contraction is statistically more pronounced, reflecting its status as a high-premium, identity-based asset rather than a standardized commodity. The results for static cultural variables reveal that while colonial history and religion both promote exports, their mechanisms differ significantly by product. Colonial ties exert a much stronger influence on whisky while sake demand is uniquely and more profoundly driven by religious ties.

Table 4-1

		SAKE				WHISKY			
Dependent Var.:		SY_(1)	SY_(2)	SL_(1)	SL_(2)	WY_(1)	WY_(2)	WL_(1)	WL_(2)
		exportYEN		exportL		exportYEN		exportL	
Basic Gravity Driver	$\ln GDP_{jt}$	0.966*** (0.020)	1.21*** (0.025)	0.884*** (0.019)	1.07*** (0.014)	0.836*** (0.036)	0.925*** (0.026)	0.680*** (0.041)	0.868*** (0.033)
	$\ln DISTANCE_{jt}$	-1.26*** (0.027)	-0.947*** (0.196)	-1.30*** (0.032)	-0.372*** (0.099)	-0.941*** (0.051)	0.610*** (0.176)	-1.11*** (0.087)	0.860*** (0.123)
	$\ln TARIFF_{jt}$	-3.52*** (0.294)	-9.64*** (0.600)	-2.00*** (0.329)	-5.95*** (0.406)	-1.99*** (0.525)	-0.369 (0.764)	-0.725 (0.485)	1.17** (0.410)
	FTA_EPA_{jt}	-0.323 (0.221)	-0.123 (0.124)	0.064 (0.143)	0.417*** (0.064)	0.471*** (0.121)	0.865*** (0.167)	0.616*** (0.161)	1.21*** (0.168)
Static Cultural Variables	COL_j		1.29** (0.416)		2.52*** (0.186)		2.37*** (0.452)		3.60*** (0.250)
	Christian		-0.490*** (0.040)		-0.636*** (0.037)		-1.85*** (0.147)		-1.43*** (0.117)
	Islam		0.664*** (0.154)		0.068 (0.169)		-2.72*** (0.324)		-3.50*** (0.290)
	Buddhism		2.32*** (0.151)		1.78*** (0.101)		0.214 (0.168)		0.482** (0.174)
	Hinduism		3.06*** (0.369)		0.297 (0.360)		-2.86*** (0.818)		-3.40*** (0.542)
	Judaism		-0.223 (0.114)		0.356*** (0.070)		-3.68*** (0.322)		-2.60*** (0.380)
Fixed-Effects:		-----	-----	-----	-----	-----	-----	-----	-----
YEAR		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S.E.: Clustered		by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR
Observations		2,486	2,486	2,486	2,486	2,163	2,163	2,163	2,163
Adj. Pseudo R2		0.76710	0.88811	0.74664	0.87535	0.70683	0.79993	0.51649	0.71952
The Number of Years		36	36	36	36	36	36	36	36

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

Table 4-2

		POOLED				
Dependent Var.:		PY_(1)	PY_(2)	PL_(1)	PL_(2)	
		exportYEN		exportL		
	<i>Sake_{jt}</i>	-0.152 (0.996)	7.09*** (1.44)	-2.71. (1.56)	8.97*** (1.41)	
Basic Gravity Driver	<i>lnGDP_{jt}</i>	0.842*** (0.037)	0.950*** (0.033)	0.679*** (0.046)	0.925*** (0.034)	
	<i>lnGDP_{jt}</i> × <i>Sake_{jt}</i>	0.123** (0.043)	0.231*** (0.054)	0.206*** (0.036)	0.125*** (0.033)	
	<i>lnDISTANCE_j</i>	-0.965*** (0.057)	0.630*** (0.188)	-1.14*** (0.087)	0.893*** (0.146)	
	<i>lnDISTANCE_j</i> × <i>Sake_{jt}</i>	-0.282*** (0.081)	-1.55*** (0.185)	-0.161 (0.100)	-1.25*** (0.142)	
	<i>lnTARIFF_{jt}</i>	-1.97*** (0.549)	-0.313 (0.818)	-0.645 (0.532)	1.28* (0.510)	
	<i>lnTARIFF_{jt}</i> × <i>Sake_{jt}</i>	-1.63*** (0.420)	-9.13*** (0.687)	-1.35*** (0.362)	-7.07*** (0.519)	
	<i>FTA_EPA_{jt}</i>	0.592*** (0.147)	1.08*** (0.185)	0.744*** (0.148)	1.56*** (0.158)	
	<i>FTA_EPA_{jt}</i> × <i>Sake_{jt}</i>	-1.01*** (0.124)	-1.37*** (0.144)	-0.733*** (0.155)	-1.24*** (0.159)	
		<i>COL_j</i>		2.50*** (0.472)		3.80*** (0.282)
		<i>COL_j</i> × <i>Sake_{jt}</i>		-1.31*** (0.306)		-1.33*** (0.291)
Static Cultural Variables			-1.91*** (0.156)		-1.58*** (0.125)	
			1.49*** (0.167)		0.984*** (0.113)	
			-2.72*** (0.361)		-3.65*** (0.350)	
			3.46*** (0.391)		3.75*** (0.392)	
		<i>Buddhism</i>		0.221 (0.171)		0.407** (0.150)
		<i>Buddhism</i> × <i>Sake_{jt}</i>		2.03*** (0.264)		1.34*** (0.144)
		<i>Hinduism</i>		-2.97*** (0.875)		-3.67*** (0.618)
		<i>Hinduism</i> × <i>Sake_{jt}</i>		5.87*** (0.654)		3.86*** (0.526)
		<i>Judaism</i>		-3.47*** (0.325)		-2.36*** (0.401)
		<i>Judaism</i> × <i>Sake_{jt}</i>		3.06*** (0.362)		2.64*** (0.396)
		<i>Other</i>		0.290 (0.369)		-0.351 (0.309)
	Fixed-Effects:		-----	-----	-----	-----
		YEAR	Yes	Yes	Yes	Yes
	S.E.: Clustered	by: YEAR	by: YEAR	by: YEAR	by: YEAR	
	Observations	4,649	4,649	4,649	4,649	
	Adj. Pseudo R2	0.73009	0.83655	0.69369	0.83464	
	The Number of Years	36	36	36	36	

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

4.1.1 Basic Gravity Drivers

Across all specifications, the results confirm that while both beverages follow the fundamental laws of gravity, sake exhibits a significantly higher sensitivity to economic and geographic constraints than whisky. Market size $\ln GDP_{jt}$ exhibits a positive and highly significant impact at the 0.1% level for both products; however, the pooled analysis in Table 4-2 shows that the interaction term $\ln GDP_{jt} \times Sake_{jt}$ is positive and significant, suggesting that sake's demand is more closely tied to the destination's economic prosperity. The pooled models, for export volume, also demonstrates that the interaction term $\ln DISTANCE_{jt} \times Sake_{jt}$ is negative, indicating that sake faces higher resistance from geographic distance compared to whisky. This likely due to the rigorous quality control required for premium sake products. Unlike distilled spirits like whisky, high-end sake such as *Junmai Ginjo* is highly sensitive to temperature fluctuations and light exposure, necessitating more complex and costly logistics to maintain quality over long distances.

A striking difference is observed in the impact of tariffs $\ln TARIFF_{jt}$. The pooled results confirm this disparity, as the interaction term $\ln TARIFF_{jt} \times Sake_{jt}$ is strongly negative and significant, providing evidence that sake is more price-sensitive and vulnerable to trade barriers than whisky.

In contrast, for FTA_EPA_{jt} , the interaction term $FTA_EPA_{jt} \times Sake_{jt}$ shows that the export elasticity of sake with respect to FTA or EPA is limited or less when compared to whisky.

4.1.2 Static Cultural Influence

The results for static cultural variables highlight the divergent roles of religious and historical backgrounds. The Colonial history COL_j dummy is positive and significant for both products, yet the pooled analysis reveals that the effect is significantly larger for whisky than for sake, as indicated by the negative interaction term $COL_j \times Sake_{jt}$. This disparity is likely driven by the localized sake production in former Japanese colonies. During the colonial period, Japanese-style sake production was deeply institutionalized in regions like the Korean Peninsula. Today, these markets have robust domestic industries producing high-quality sake such as *Gyeongju Beopju* in Korea, which acts as a strong local substitute for imported Japanese sake.

Regarding religion, the two beverages exhibit contrasting patterns. Buddhism and Hinduism show strong positive impacts on sake exports, while Islam, Hinduism, and Judaism show significant negative coefficients for whisky. The pooled analysis demonstrates that for every religious category, the interaction with the $Sake_{jt}$ dummy is positive and significant. This confirms that the positive influence of religion culture,

especially for Islam, Buddhism and Hinduism, is uniquely strong for sake, effectively differentiating its demand structure from that of whisky.

4.2 Impact of Human Mobility

Tables 4-3 and 4-4 present the impact of human mobility on sake and whisky exports. The analysis confirms that mobility is a more powerful catalyst for sake, with an export elasticity nearly 1.5 times higher than that of whisky. This validates the hypothesis that direct human interaction is essential for bridging the information gaps inherent in high-context traditional products.

4.2.1 Effects of Human Flows

The results provide strong evidence that human exchange serves as a significant catalyst for trade. The coefficients for total movement $\ln TOTAL_MOVEMENT_{jt}$ are positive and highly significant for both beverages across all specifications. For export value, the elasticity is 0.483 for sake and 0.313 for whisky. Similar positive effects are observed when decomposing the flow into entrants $\ln ENTRANT_{jt}$ and departures $\ln DPART_{jt}$, highlighting that both the inflow of foreign tourists to Japan and the outflow of Japanese travelers abroad facilitate the cross-border promotion of Japanese alcoholic beverages.

4.2.2 Comparative Analysis via Pooled Model

The pooled analysis in Table 4-3 reveals a critical distinction in how these human flows affect each product. For both export value and volume, the interaction terms between the human mobility variables and the sake dummy are positive. These findings indicate that human mobility has a significantly stronger impact on sake exports compared to whisky. While whisky is a globally recognized category with established international brands, sake is often perceived as a product more deeply embedded in specific Japanese cultural experiences. Therefore, physical travel and direct exposure to Japanese culinary culture appear to be more vital for stimulating sake demand than for the more globally standardized whisky.

Especially for the number of departments, $\ln DEPART_{jt} \times Sake_{jt}$, is statistically significant. This may suggest that travelers and expatriates act as cultural ambassadors, fostering local demand or establishing supply networks in destination countries. The pooled results confirm that this ambassador effect is statistically more pronounced for sake than for whisky, further supporting the hypothesis that sake relies more heavily on human-mediated cultural transmission.

Table 4-3

	SAKE					WHISKY					WHISKY				
	SY_(3)	SY_(4)	SY_(5)	WY_(3)	WY_(4)	WY_(5)	SL_(3)	SL_(4)	SL_(5)	WL_(3)	WL_(4)	WL_(5)	WL_(3)	WL_(4)	WL_(5)
Dependent Var.:	exportYEN														
<i>InGDP_{it}</i>	0.817*** (0.151)	0.837*** (0.174)	1.23*** (0.020)	0.758*** (0.054)	0.740*** (0.062)	1.04*** (0.027)	0.561*** (0.087)	0.524*** (0.101)	1.10*** (0.017)	0.656*** (0.053)	0.649*** (0.061)	0.896*** (0.030)	0.656*** (0.053)	0.649*** (0.061)	0.896*** (0.030)
<i>InDISTANCE_{it}</i>	-0.370 (0.329)	-0.356 (0.390)	-1.21*** (0.130)	0.848*** (0.169)	0.928*** (0.172)	0.196 (0.219)	0.211 (0.135)	0.341* (0.163)	-0.748*** (0.111)	1.08*** (0.138)	1.13*** (0.154)	0.631*** (0.157)	1.08*** (0.138)	1.13*** (0.154)	0.631*** (0.157)
<i>InTARIFF_{it}</i>	-6.69*** (1.39)	-7.53*** (1.34)	-4.95*** (0.509)	-0.152 (0.736)	-0.153 (0.741)	-0.319 (0.689)	-3.44*** (0.547)	-3.94*** (0.594)	-3.23*** (0.219)	1.35*** (0.452)	1.34** (0.445)	1.22** (0.463)	1.35*** (0.452)	1.34** (0.445)	1.22** (0.463)
<i>FTA_EPA_{it}</i>	-0.099 (0.152)	-0.084 (0.134)	-0.132 (0.082)	0.835*** (0.182)	0.885*** (0.178)	0.709*** (0.193)	0.232*** (0.081)	0.284*** (0.081)	0.178* (0.074)	1.07*** (0.179)	1.11*** (0.175)	0.986*** (0.216)	1.07*** (0.179)	1.11*** (0.175)	0.986*** (0.216)
<i>COL_{it}</i>	0.541* (0.241)	0.836*** (0.244)	-0.304 (0.228)	1.89*** (0.433)	2.07*** (0.415)	1.26* (0.547)	1.24*** (0.175)	1.56*** (0.162)	0.892*** (0.226)	3.02*** (0.272)	3.17*** (0.254)	2.75*** (0.381)	3.02*** (0.272)	3.17*** (0.254)	2.75*** (0.381)
<i>Christian</i>	-0.707*** (0.093)	-0.627*** (0.075)	-1.04*** (0.077)	-2.12*** (0.130)	-2.07*** (0.128)	-2.36*** (0.134)	-0.899*** (0.041)	-0.805*** (0.042)	-1.11*** (0.052)	-1.54*** (0.116)	-1.50*** (0.115)	-1.66*** (0.112)	-1.54*** (0.116)	-1.50*** (0.115)	-1.66*** (0.112)
<i>Islam</i>	0.164 (0.282)	0.273 (0.271)	0.059 (0.162)	-2.96*** (0.355)	-2.90*** (0.350)	-3.08*** (0.324)	-0.550** (0.201)	-0.460** (0.208)	-0.465** (0.170)	-3.78*** (0.300)	-3.72*** (0.292)	-3.77*** (0.292)	-3.78*** (0.300)	-3.72*** (0.292)	-3.77*** (0.292)
<i>Buddhism</i>	1.40*** (0.377)	1.55*** (0.376)	1.67*** (0.130)	-0.175 (0.208)	-0.172 (0.208)	0.113 (0.171)	0.599** (0.227)	0.657** (0.239)	1.27*** (0.132)	0.164 (0.191)	0.160 (0.196)	0.483** (0.165)	0.164 (0.191)	0.160 (0.196)	0.483** (0.165)
<i>Hinduism</i>	1.35 (0.943)	2.00* (0.805)	-0.655 (0.431)	-3.10*** (0.743)	-3.02*** (0.766)	-3.48*** (0.668)	-1.43*** (0.348)	-0.897* (0.381)	-2.28*** (0.195)	-3.46*** (0.539)	-3.40*** (0.547)	-3.71*** (0.525)	-3.46*** (0.539)	-3.40*** (0.547)	-3.71*** (0.525)
<i>Judaism</i>	-0.432*** (0.093)	-0.439*** (0.099)	-0.057 (0.112)	-3.70*** (0.349)	-3.70*** (0.353)	-3.52*** (0.338)	0.077 (0.074)	0.046 (0.079)	0.454*** (0.074)	-2.70*** (0.383)	-2.69*** (0.382)	-2.59*** (0.400)	-2.70*** (0.383)	-2.69*** (0.382)	-2.59*** (0.400)
<i>InTOTAL_Movement_{it}</i>	0.483** (0.174)			0.313*** (0.051)			0.648*** (0.089)			0.297*** (0.052)			0.297*** (0.052)		
Dynamic Cultural Variables		0.429* (0.188)		0.306*** (0.063)				0.645*** (0.099)			0.284*** (0.067)			0.284*** (0.067)	
<i>InDEPART_{it}</i>			0.199*** (0.024)			0.131*** (0.019)			0.187*** (0.017)			0.109*** (0.013)			0.109*** (0.013)
Fixed-Effects:	YEAR														
S.E.: Clustered	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,413	2,413	2,445	2,104	2,104	2,122	2,413	2,413	2,445	2,104	2,104	2,122	2,413	2,104	2,122
Adj. Pseudo R2	0.90401	0.89944	0.91853	0.81719	0.81531	0.82724	0.90846	0.90354	0.91149	0.72662	0.72482	0.73172	0.90354	0.72482	0.73172
The Number of Years	36	36	36	36	36	36	36	36	36	36	36	36	36	36	36

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

Table 4-4

		POOLED						
Dependent Var.:		PY_(3)	PY_(4)	PY_(5)	PL_(3)	PL_(4)	PL_(5)	
		exportYEN exportL						
	<i>Sake_{it}</i>	7.95*** (1.55)	8.15*** (1.54)	6.91*** (1.62)	9.36*** (1.49)	9.38*** (1.47)	9.02*** (1.52)	
Basic Gravity Driver	<i>lnGDP_{it}</i>	0.761*** (0.070)	0.750*** (0.084)	1.06*** (0.027)	0.602*** (0.050)	0.576*** (0.056)	0.943*** (0.027)	
	<i>lnGDP_{it}</i> × <i>Sake_{it}</i>	0.070 (0.063)	0.088 (0.065)	0.144** (0.044)	-0.010 (0.055)	-0.012 (0.058)	0.144*** (0.032)	
	<i>lnDISTANCE_{ij}</i>	0.872*** (0.199)	0.958*** (0.218)	0.201 (0.233)	1.23*** (0.156)	1.32*** (0.164)	0.682*** (0.182)	
	<i>lnDISTANCE_{ij}</i> × <i>Sake_{it}</i>	-1.26*** (0.190)	-1.32*** (0.201)	-1.37*** (0.190)	-1.06*** (0.143)	-1.03*** (0.150)	-1.41*** (0.144)	
	<i>lnTARIFF_{it}</i>	-0.104 (0.801)	-0.072 (0.810)	-0.316 (0.774)	1.58** (0.574)	1.59** (0.571)	1.40* (0.563)	
	<i>lnTARIFF_{it}</i> × <i>Sake_{it}</i>	-6.64*** (1.19)	-7.38*** (1.19)	-4.34*** (0.906)	-5.11*** (0.682)	-5.59*** (0.683)	-4.52*** (0.682)	
	<i>FTA_EP_{ijt}</i>	1.03*** (0.178)	1.08*** (0.179)	0.936*** (0.177)	1.25*** (0.198)	1.32*** (0.193)	1.26*** (0.196)	
	<i>FTA_EP_{ijt}</i> × <i>Sake_{it}</i>	-1.29*** (0.133)	-1.32*** (0.133)	-1.22*** (0.158)	-1.08*** (0.179)	-1.10*** (0.178)	-1.17*** (0.165)	
	<i>COL_{ij}</i>	1.93*** (0.382)	2.15*** (0.371)	1.41* (0.554)	2.95*** (0.295)	3.13*** (0.275)	3.00*** (0.405)	
	<i>COL_{ij}</i> × <i>Sake_{it}</i>	-1.38*** (0.320)	-1.35*** (0.312)	-1.80*** (0.374)	-1.64*** (0.290)	-1.52*** (0.281)	-2.14*** (0.277)	
Static Cultural Variables	<i>Christian</i>	-2.22*** (0.158)	-2.14*** (0.153)	-2.42*** (0.139)	-1.73*** (0.118)	-1.68*** (0.118)	-1.77*** (0.105)	
	<i>Christian</i> × <i>Sake_{it}</i>	1.60*** (0.155)	1.59*** (0.156)	1.44*** (0.158)	0.894*** (0.127)	0.925*** (0.126)	0.685*** (0.120)	
	<i>Islam</i>	-3.00*** (0.417)	-2.94*** (0.416)	-3.05*** (0.342)	-4.05*** (0.375)	-3.99*** (0.374)	-3.89*** (0.336)	
	<i>Islam</i> × <i>Sake_{it}</i>	3.28*** (0.404)	3.30*** (0.405)	3.13*** (0.382)	3.59*** (0.420)	3.61*** (0.410)	3.44*** (0.422)	
	<i>Buddhism</i>	-0.207 (0.248)	-0.188 (0.257)	0.123 (0.172)	-0.040 (0.182)	-0.065 (0.187)	0.445** (0.145)	
	<i>Buddhism</i> × <i>Sake_{it}</i>	1.65*** (0.246)	1.73*** (0.250)	1.49*** (0.195)	0.730*** (0.192)	0.814*** (0.190)	0.799*** (0.134)	
	<i>Hinduism</i>	-3.21*** (0.808)	-3.14*** (0.825)	-3.53*** (0.729)	-3.73*** (0.608)	-3.65*** (0.616)	-3.95*** (0.577)	
	<i>Hinduism</i> × <i>Sake_{it}</i>	4.62*** (0.952)	5.08*** (0.910)	2.68*** (0.765)	2.38*** (0.639)	2.79*** (0.649)	1.61** (0.611)	
	<i>Judaism</i>	-3.50*** (0.338)	-3.51*** (0.344)	-3.30*** (0.322)	-2.55*** (0.383)	-2.55*** (0.389)	-2.40*** (0.395)	
	<i>Judaism</i> × <i>Sake_{it}</i>	2.94*** (0.358)	2.94*** (0.362)	3.08*** (0.354)	2.59*** (0.383)	2.56*** (0.385)	2.78*** (0.402)	
	<i>Other</i>	-0.075 (0.338)	0.023 (0.340)	-0.223 (0.329)	-0.479 (0.308)	-0.455 (0.310)	-0.411 (0.286)	
	Dynamic Cultural Variables	<i>lnTOTAL_MOVEMENT_{it}</i>	0.351*** (0.078)			0.448*** (0.045)		
		<i>lnTOTAL_MOVEMENT_{it}</i> × <i>Sake_{it}</i>	0.081* (0.037)			0.136* (0.054)		
		<i>lnENTRANT_{it}</i>		0.330*** (0.092)			0.449*** (0.052)	
<i>lnENTRANT_{it}</i> × <i>Sake_{it}</i>			0.072* (0.034)			0.128* (0.053)		
<i>lnDEPART_{it}</i>				0.127*** (0.016)			0.101*** (0.013)	
<i>lnDEPART_{it}</i> × <i>Sake_{it}</i>				0.076** (0.023)			0.087*** (0.018)	
Fixed-Effects:								
YEAR	Yes	Yes	Yes	Yes	Yes	Yes		
S.E.: Clustered	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR		
Observations	4,517	4,517	4,567	4,517	4,517	4,567		
Adj. Pseudo R2	0.85441	0.85128	0.86683	0.85946	0.85560	0.86362		
The Number of Years	36	36	36	36	36	36		

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

4.3 Impact of Cultural Property Trade

Tables 4-5 to 4-7 evaluate the impact of cultural trade sub-categories on sake and whisky exports. The pooled analysis reveals that material cultural flows, notably printed matter and visual arts, drive sake exports more effectively than whisky. This indicates that Japanese creative content functions as a critical informational gateway, providing the cultural context necessary for international consumers to engage with traditional sake consumption.

The results confirm that the material flow of Japanese culture, captured by cultural trade, is a robust precursor to the export of Japanese alcoholic beverages. The coefficient for total cultural property trade $\ln TOTAL_Trade_{jt}$ is positive and highly significant for both products. When examining specific categories, all five domains, Audio-visual Media, Cultural Heritage, Music and Performing Arts, Printed Matter, and Visual Arts, exhibit positive effects. This indicates that a broad spectrum of Japanese creative content contributes to building an international brand image that facilitates the acceptance and consumption of sake and whisky in foreign markets. The pooled analysis in Table 4-7 statistically confirms that sake is significantly more responsive to these cultural flows than whisky.

Table 4-5 reveals that the coefficient for $\ln PtintedMatter_{jt}$ is 0.708, the highest among all categories for sake. Additionally, Table 4-7 shows the high significance of the interaction with Printed Matter suggests that the promotion of sake is uniquely tied to the dissemination of Japanese information and stories found in publications. This suggests that Japanese linguistic and informational goods may serve as a primary cultural gateway, stimulating curiosity and providing the necessary cultural context that leads consumers to purchase sake. The linguistic and educational function provided by books, journals, brochures, and mangas offers the cultural literacy needed to understand Japanese unique cultures and traditions. Japanese calendars and postcards often showcase the seasonal landscapes and festivals that are intrinsically linked to the consumption of specific types of sake such as *Hanami* in spring or *Hiyaoroshi* in autumn. The global popularity of manga has added a powerful visual dimension to this cultural dissemination, as its graphic nature allows for an intuitive understanding of Japanese heritage. For example, the international success of a various Japanese manga has exposed global audiences to traditional sake consumption rituals, including the use of *tokkuri* and *ochoko*. By disseminating these specific Japanese aesthetics and lifestyle narratives, printed matter stimulates a sophisticated curiosity that leads directly to export demand. Unlike whisky, which relies on a more standardized global brand logic,

sake demand is constructed through this story-driven interaction between informational content and physical product identity.

Table 4-5

		SAKE						WHISKY					
Dependent Var.:		SY_(6)	SY_(7)	SY_(8)	SY_(9)	SY_(10)	SY_(11)	WY_(6)	WY_(7)	WY_(8)	WY_(9)	WY_(10)	WY_(11)
		exportYEN											
Basic Gravity Driver	$\ln GDP_{jt}$	0.762*** (0.039)	1.37*** (0.063)	1.09*** (0.038)	1.26*** (0.050)	0.563*** (0.037)	0.713*** (0.032)	0.637*** (0.089)	0.842*** (0.046)	0.778*** (0.033)	0.872*** (0.081)	0.611*** (0.067)	0.549*** (0.054)
	$\ln DISTANCE_{jt}$	-0.952*** (0.187)	-1.88*** (0.196)	-1.26*** (0.272)	-1.37*** (0.281)	-0.354** (0.129)	-0.866*** (0.215)	0.685 (0.860)	0.353 (0.254)	0.693* (0.309)	0.813 (0.931)	0.846 (0.718)	0.784 (0.891)
	$\ln TARIFF_{jt}$	-6.06*** (0.539)	-13.0*** (0.688)	-8.22*** (0.600)	-12.0*** (0.728)	-4.23*** (0.232)	-5.07*** (0.444)	-2.60*** (0.668)	-7.42*** (1.95)	-4.28* (1.69)	-4.78*** (1.51)	-3.16*** (0.823)	-0.65372
	FTA_EPA_{jt}	-0.193** (0.069)	-0.352*** (0.102)	0.115 (0.124)	-0.452* (0.187)	-0.063 (0.069)	-0.015 (0.076)	0.204 (0.123)	0.172 (0.165)	0.364* (0.185)	0.207 (0.267)	0.264 (0.136)	0.292* (0.127)
	COL_{jt}	-0.295 (0.546)	-0.271 (0.325)	0.394 (0.507)	0.448 (0.581)	0.601* (0.287)	-0.039 (0.512)	1.94 (2.53)	1.91** (0.666)	2.46** (0.761)	3.27 (2.72)	2.48 (2.04)	1.88 (2.42)
Static Cultural Variables	Christian	-0.312*** (0.080)	-0.740*** (0.084)	-0.548*** (0.070)	-0.552*** (0.075)	-0.310*** (0.060)	-0.605*** (0.053)	-1.89*** (0.169)	-1.89*** (0.181)	-1.72*** (0.167)	-1.70*** (0.257)	-1.84*** (0.166)	-2.08*** (0.163)
	Islam	0.808*** (0.177)	0.487** (0.176)	1.23*** (0.185)	0.754*** (0.207)	0.423*** (0.122)	0.700*** (0.164)	-2.10*** (0.284)	-2.28*** (0.180)	-1.20*** (0.235)	-2.25*** (0.233)	-2.08*** (0.277)	-2.15*** (0.264)
	Buddhism	1.28*** (0.288)	1.75*** (0.161)	2.01*** (0.217)	2.06*** (0.223)	1.08*** (0.140)	1.01*** (0.213)	0.046 (0.946)	-0.036 (0.157)	0.972*** (0.203)	0.579 (0.861)	0.100 (0.764)	-0.091 (0.905)
	Hinduism	1.55** (0.498)	5.19*** (0.528)	2.27*** (0.649)	4.01*** (0.375)	0.894*** (0.220)	0.839* (0.366)	-0.243 (0.567)	2.96* (1.36)	1.51 (1.17)	0.568 (1.17)	0.599 (0.617)	-1.25*** (0.346)
	Judaism	0.503*** (0.133)	0.243 (0.163)	0.829** (0.262)	0.271 (0.220)	0.884*** (0.190)	0.005 (0.170)	-3.84*** (0.541)	-4.36*** (0.406)	-3.13*** (0.413)	-4.01*** (0.707)	-3.45*** (0.528)	-4.05*** (0.531)
	Dynamic Cultural Variables	$\ln TOTAL_Trade_{jt}$	0.448*** (0.031)						0.301*** (0.090)				
$\ln Audio_AudioVisualMedia_{jt}$			0.012 (0.022)						0.071*** (0.019)				
$\ln CulturalHeritage_{jt}$				0.202*** (0.017)						0.205*** (0.016)			
$\ln Music_PerformingArts_{jt}$					0.083*** (0.023)						0.127 (0.107)		
$\ln PrintedMatter_{jt}$						0.708*** (0.036)						0.402*** (0.081)	
$\ln VisualArts_{jt}$							0.391*** (0.019)						0.329*** (0.041)
Fixed-Effects:		-----											
YEAR	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S.E.: Clustered	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR
Observations	1,901	1,642	956	1,974	2,202	1,901	1,774	1,517	932	1,772	1,965	1,774	
Adj. Pseudo R2	0.93735	0.92170	0.93096	0.90818	0.94984	0.94692	0.83679	0.84625	0.83372	0.78731	0.84198	0.85543	
The Number of Years	29	29	29	29	29	29	29	29	29	29	29	29	

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

Table 4-6

		SAKE					WHISKY						
Dependent Var.:		SL_(6)	SL_(7)	SL_(8)	SL_(9)	SL_(10)	SL_(11)	WL_(6)	WL_(7)	WL_(8)	WL_(9)	WL_(10)	WL_(11)
		exportL											
Basic Gravity Driver	<i>lnGDP_{it}</i>	0.735*** (0.062)	1.04*** (0.066)	0.939*** (0.046)	1.03*** (0.058)	0.539*** (0.059)	0.724*** (0.040)	0.673*** (0.085)	0.732*** (0.036)	0.643*** (0.029)	0.803*** (0.091)	0.614*** (0.098)	0.577*** (0.061)
	<i>lnDISTANCE_{it}</i>	-0.260 (0.410)	-1.12*** (0.131)	-0.843*** (0.194)	-0.507 (0.399)	0.068 (0.313)	-0.235 (0.416)	0.909 (0.664)	0.017 (0.372)	-0.032 (0.522)	0.794 (0.687)	0.969 (0.702)	1.10 (0.759)
	<i>lnTARIFF_{it}</i>	-4.54*** (0.449)	-8.22*** (0.684)	-5.66*** (0.634)	-7.30*** (0.542)	-3.04*** (0.300)	-3.97*** (0.426)	0.802 (0.626)	0.920 (0.635)	1.17 (1.59)	0.159 (0.960)	0.651 (0.669)	0.993* (0.422)
	<i>FTA_EPA_{it}</i>	-0.043 (0.073)	-0.091 (0.083)	0.295*** (0.060)	-0.028 (0.087)	0.005 (0.064)	0.086 (0.096)	0.640*** (0.153)	0.538*** (0.130)	0.575*** (0.127)	0.757** (0.237)	0.638*** (0.157)	0.585*** (0.146)
Static Cultural Variables	<i>COL_{it}</i>	1.75 (1.08)	0.786*** (0.193)	1.31*** (0.325)	2.15* (0.888)	1.99* (0.827)	1.90 (0.970)	3.07 (1.74)	0.636 (0.888)	0.495 (1.10)	3.27 (1.95)	3.16 (1.86)	3.29 (1.93)
	<i>Christian</i>	-0.408*** (0.079)	-0.595*** (0.097)	-0.595*** (0.065)	-0.580*** (0.086)	-0.455*** (0.063)	-0.660*** (0.042)	-1.26*** (0.162)	-1.11*** (0.127)	-0.905*** (0.098)	-1.31*** (0.244)	-1.26*** (0.184)	-1.35*** (0.167)
	<i>Islam</i>	0.523* (0.265)	0.096 (0.154)	0.625*** (0.171)	0.343 (0.236)	0.064 (0.260)	0.345 (0.261)	-3.08*** (0.291)	-3.72*** (0.369)	-2.78*** (0.732)	-3.20*** (0.406)	-3.15*** (0.327)	-2.99*** (0.302)
	<i>Buddhism</i>	1.39* (0.544)	1.27*** (0.097)	1.46*** (0.145)	1.80*** (0.385)	0.967* (0.449)	1.18* (0.474)	0.512 (0.730)	-0.467 (0.394)	-0.035 (0.477)	0.633 (0.676)	0.431 (0.793)	0.568 (0.817)
	<i>Hinduism</i>	0.047 (0.534)	1.92*** (0.581)	-0.146 (0.536)	0.941* (0.421)	-0.572 (0.375)	-0.398 (0.486)	-2.60*** (0.608)	-3.70*** (0.948)	-3.34* (1.37)	-3.22*** (0.961)	-2.24*** (0.655)	-2.42*** (0.516)
	<i>Judaism</i>	0.596* (0.292)	0.526*** (0.101)	1.12*** (0.129)	0.563* (0.285)	0.959** (0.316)	0.224 (0.245)	-2.91*** (0.396)	-2.97*** (0.332)	-1.93*** (0.439)	-3.11*** (0.521)	-2.68*** (0.495)	-3.14*** (0.408)
	Dynamic Cultural Variables	<i>lnTOTAL_Trade_{it}</i>	0.322*** (0.063)						0.144 (0.075)				
<i>lnAudio_AudioVisualMedia_{it}</i>			0.068** (0.024)						0.029 (0.023)				
<i>lnCulturalHeritage_{it}</i>				0.176*** (0.015)						0.164*** (0.018)			
<i>lnMusic_PerformingArts_{it}</i>					0.094* (0.044)						0.072 (0.091)		
<i>lnPrintedMatter_{it}</i>						0.575*** (0.067)						0.244* (0.106)	
<i>lnVisualArts_{it}</i>						0.269*** (0.030)						0.196*** (0.043)	
Fixed-Effects:													
YEAR		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S.E.: Clustered		by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR
Observations		1,901	1,642	956	1,974	2,202	1,901	1,774	1,517	932	1,772	1,965	1,774
Adj. Pseudo R2		0.90391	0.89409	0.89933	0.88297	0.92568	0.90844	0.67920	0.68000	0.68977	0.66142	0.68960	0.69159
The Number of Years		29	29	29	29	29	29	29	29	29	29	29	29

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

Table 4-7

		POOLED											
Dependent Var.:		PY_(6)	PY_(7)	PY_(8)	PY_(9)	PY_(10)	PY_(11)	PL_(6)	PL_(7)	PL_(8)	PL_(9)	PL_(10)	PL_(11)
		exportYEN						exportL					
	<i>Sake_{it}</i>	10.0 (8.48)	11.2*** (3.14)	2.60 (3.58)	10.7 (8.14)	8.13 (7.63)	-2.82 (2.58)	11.0* (4.36)	5.77 (3.49)	-3.82 (3.96)	8.53 (4.47)	11.5 (6.91)	-4.16 (3.08)
Basic Gravity Driver	<i>lnGDP_{it}</i>	0.731*** (0.084)	1.00*** (0.062)	0.814*** (0.035)	0.957*** (0.056)	0.685*** (0.068)	0.550*** (0.022)	0.776*** (0.082)	0.867*** (0.052)	0.700*** (0.039)	0.889*** (0.074)	0.707*** (0.100)	0.565*** (0.033)
	<i>lnGDPP_{it}</i>	-0.079 (0.064)	0.229*** (0.053)	0.225*** (0.047)	0.223*** (0.051)	-0.199** (0.077)	0.318*** (0.033)	-0.056 (0.071)	0.130* (0.063)	0.214*** (0.061)	0.123* (0.059)	-0.182* (0.087)	0.247*** (0.048)
	<i>lnDISTANCE_{it}</i>	0.625 (0.950)	0.358 (0.276)	0.219 (0.297)	0.795 (0.979)	0.724 (0.812)	-0.197 (0.224)	1.01 (0.783)	-0.065 (0.356)	-0.541 (0.480)	0.818 (0.672)	1.09 (0.939)	-0.302 (0.373)
	<i>lnDISTANCE_{it}</i> × <i>Sake_{it}</i>	-1.30 (0.877)	-2.07*** (0.367)	-1.06* (0.463)	-2.01* (0.834)	-0.788 (0.778)	-0.645* (0.320)	-1.23* (0.479)	-1.01* (0.440)	-0.131 (0.556)	-1.30** (0.398)	-0.978 (0.683)	-0.172 (0.413)
	<i>lnTARIFF_{it}</i>	-3.74** (1.21)	-9.07*** (2.00)	-5.42** (1.65)	-5.54** (1.72)	-3.77** (1.17)	-2.05** (0.732)	0.759 (0.917)	0.626 (1.15)	0.017 (1.72)	-0.029 (1.07)	0.650 (0.895)	1.23* (0.591)
	<i>lnTARIFF_{it}</i> × <i>Sake_{it}</i>	-1.13 (1.65)	-3.15 (1.74)	-2.25 (1.46)	-5.79*** (1.68)	0.303 (1.40)	-5.19*** (0.926)	-5.18*** (1.13)	-8.63*** (0.947)	-5.48*** (1.60)	-7.12*** (0.223)	-3.59** (0.231)	-6.47*** (0.125)
	<i>FTA_EPA_{it}</i>	0.534*** (0.136)	0.589*** (0.153)	0.853*** (0.205)	0.579*** (0.160)	0.591*** (0.144)	0.730*** (0.146)	0.937*** (0.115)	1.01*** (0.108)	1.33*** (0.158)	1.06*** (0.221)	0.916*** (0.113)	1.11*** (0.137)
	<i>FTA_EPA_{it}</i> × <i>Sake_{it}</i>	-0.898*** (0.160)	-1.22*** (0.142)	-1.03*** (0.184)	-1.21*** (0.245)	-0.831*** (0.127)	-1.14*** (0.171)	-1.03*** (0.137)	-1.20*** (0.132)	-1.18*** (0.195)	-1.14*** (0.270)	-0.967*** (0.114)	-1.22*** (0.173)
	<i>COL_{it}</i>	2.34 (2.55)	2.81*** (0.734)	1.85* (0.727)	3.77 (2.55)	2.57 (2.17)	-0.512 (0.608)	3.63 (1.98)	0.984 (0.876)	-0.132 (1.00)	3.68* (1.86)	3.74 (2.42)	-0.314 (0.866)
	<i>COL_{it}</i> × <i>Sake_{it}</i>	-2.47 (2.14)	-3.30*** (0.908)	-0.824 (1.00)	-3.33 (2.07)	-1.64 (1.96)	0.776 (0.748)	-1.86 (1.11)	-0.243 (1.03)	1.71 (1.18)	-1.55 (1.15)	-1.70 (1.67)	1.80 (0.955)
Static Cultural Variables	<i>Christian</i>	-1.90*** (0.169)	-1.95*** (0.175)	-1.83*** (0.154)	-1.85*** (0.208)	-1.87*** (0.163)	-2.08*** (0.129)	-1.35*** (0.188)	-1.20*** (0.122)	-1.07*** (0.106)	-1.47*** (0.223)	-1.35*** (0.231)	-1.24*** (0.125)
	<i>Christian</i> × <i>Sake_{it}</i>	1.70*** (0.164)	1.35*** (0.188)	1.42*** (0.153)	1.43*** (0.187)	1.62*** (0.157)	1.63*** (0.145)	0.963*** (0.163)	0.656*** (0.128)	0.531*** (0.123)	0.921*** (0.182)	0.884*** (0.207)	0.711*** (0.131)
	<i>Islam</i>	-2.05*** (0.296)	-2.22*** (0.236)	-1.29*** (0.273)	-2.29*** (0.257)	-2.07*** (0.331)	-2.27*** (0.210)	-3.14*** (0.399)	-3.67*** (0.614)	-2.82*** (0.639)	-3.24*** (0.425)	-3.13*** (0.396)	-3.93*** (0.433)
	<i>Islam</i> × <i>Sake_{it}</i>	3.01*** (0.292)	2.82*** (0.307)	2.88*** (0.389)	3.26*** (0.259)	2.62*** (0.265)	3.29*** (0.275)	3.70*** (0.459)	3.83*** (0.633)	3.62*** (0.662)	3.64*** (0.410)	3.21*** (0.355)	4.40*** (0.411)
	<i>Buddhism</i>	0.216 (0.926)	0.245 (0.190)	0.661** (0.215)	0.676 (0.829)	0.177 (0.798)	-1.02*** (0.185)	0.642 (0.791)	-0.448 (0.347)	-0.398 (0.449)	0.669 (0.644)	0.622 (0.968)	-0.883* (0.391)
	<i>Buddhism</i> × <i>Sake_{it}</i>	1.02 (0.679)	1.43*** (0.296)	1.63*** (0.391)	1.38* (0.652)	0.899 (0.660)	2.45*** (0.321)	0.750* (0.345)	1.71*** (0.407)	1.98*** (0.528)	1.12*** (0.331)	0.320 (0.533)	2.07*** (0.410)
	<i>Hinduism</i>	0.572 (0.807)	3.59*** (1.20)	2.08 (1.40)	1.13 (1.12)	0.854 (0.843)	-1.01 (0.804)	-2.73*** (0.811)	-4.05** (1.28)	-3.02 (1.63)	-3.11** (1.06)	-2.42** (0.784)	-3.49*** (0.687)
	<i>Hinduism</i> × <i>Sake_{it}</i>	0.366 (1.11)	1.45 (0.899)	0.226 (1.46)	2.67** (0.944)	-0.262 (0.938)	3.72*** (0.885)	2.75** (0.837)	5.95*** (0.915)	2.92 (1.61)	3.99*** (0.860)	1.82* (0.737)	4.05*** (0.445)
	<i>Judaism</i>	-3.60*** (0.625)	-3.79*** (0.390)	-2.40*** (0.440)	-4.00*** (0.640)	-3.26*** (0.609)	-2.99*** (0.343)	-2.79*** (0.498)	-2.39*** (0.361)	-0.985* (0.502)	-3.09*** (0.477)	-2.64*** (0.648)	-2.04*** (0.363)
	<i>Judaism</i> × <i>Sake_{it}</i>	3.92*** (0.610)	3.62*** (0.459)	2.74*** (0.510)	4.23*** (0.475)	3.97*** (0.563)	2.81*** (0.404)	3.35*** (0.388)	2.80*** (0.386)	1.90*** (0.540)	3.64*** (0.300)	3.55*** (0.458)	2.33*** (0.403)
<i>Other</i>	-0.263 (0.425)	0.919 (0.623)	0.454 (1.25)	0.425 (0.322)	-1.17*** (0.332)	2.50** (0.916)	-0.339 (0.303)	-0.426 (0.635)	-0.421 (1.14)	-0.458 (0.304)	-1.25*** (0.331)	1.46 (0.860)	
Dynamic Cultural Variables	<i>lnTOTAL_Trade_{it}</i>	0.223** (0.082)						0.072 (0.067)					
	<i>lnTOTAL_Trade_{it}</i> × <i>Sake_{it}</i>	0.288*** (0.052)						0.257*** (0.068)					
	<i>lnAudio_VisualMedia_{it}</i>		-0.003 (0.024)							-0.029 (0.019)			
	<i>lnAudio_VisualMedia_{it}</i> × <i>Sake_{it}</i>		0.072** (0.025)							0.114*** (0.032)			
	<i>lnCulturalHeritage_{it}</i>			0.210*** (0.015)						0.163*** (0.018)			
	<i>lnCulturalHeritage_{it}</i> × <i>Sake_{it}</i>			-0.006 (0.019)						0.015 (0.029)			
	<i>lnMusic_PerformingArts_{it}</i>				0.039 (0.064)							-0.005 (0.056)	
	<i>lnMusic_PerformingArts_{it}</i> × <i>Sake_{it}</i>				0.102** (0.039)							0.116** (0.043)	
	<i>lnPrintedMater_{it}</i>					0.328*** (0.081)							0.165 (0.096)
	<i>lnPrintedMater_{it}</i> × <i>Sake_{it}</i>					0.436*** (0.073)							0.422*** (0.084)
<i>lnVisualArts_{it}</i>						6.35*** (0.380)						3.50*** (0.494)	
<i>lnVisualArts_{it}</i> × <i>Sake_{it}</i>						-1.63*** (0.434)						-0.296 (0.509)	
Fixed-Effects:													
YEAR		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
S.E.: Clustered		by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR	by: YEAR
Observations		3,675	3,159	1,888	3,746	4,167	2,983	3,675	3,159	1,888	3,746	4,167	2,983
Adj. Pseudo R2		0.87858	0.87508	0.86916	0.84487	0.88934	0.88827	0.85168	0.84817	0.85073	0.84184	0.87024	0.84992
The Number of Years		29	29	29	29	29	29	29	29	29	29	29	29

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

4.4 Synergistic Effects of Dynamic Cultural Proxies

Table 4-8 examines the synergy between human mobility and cultural trade using interaction terms. The results reveal a structural divergence in demand: while whisky exhibits diminishing marginal returns where information and experience act as substitutes, sake follows an additive demand logic. The positive triple interaction term for sake confirms that informational and experiential flows function as independent, non-interfering drivers of export demand.

4.4.1 Interaction Effects in Individual and Pooled Models

The results for the interaction term $\lnTOTAL_Trade_{jt} \times \lnTOTAL_MOVEMENT_{jt}$ show diverging patterns between the two products. For whisky, the interaction is negative and statistically significant, suggesting that for a globally established commodity like whisky, mobility and cultural trade may act as substitutes or reach a saturation point. However, the core finding of this section lies in the pooled analysis, Table 4-8 PY_(12) and PL_(12). While the baseline interaction is negative, the triple interaction term $\lnTOTAL_Trade_{jt} \times \lnTOTAL_MOVEMENT_{jt} \times Sake_{jt}$ is positive and highly significant. For PY_(13), $\lnTOTAL_Trade_{jt} \times \lnTOTAL_MOVEMENT_{jt} + \lnTOTAL_Trade_{jt} \times \lnTOTAL_MOVEMENT_{jt} \times Sake_{jt} = 0$, which offsets the negative base interaction term. This implies that the net interaction

effect for sake is near zero. Statistically, this indicates that unlike whisky, the export elasticity of sake with respect to human mobility remains stable, regardless of the level of cultural trade.

4.4.2 Interpretation of the Synergy for Sake

The fact that the negative interaction is canceled out for sake suggests a unique demand structure. While whisky, a globally standardized product, faces a saturation point where different cultural flows begin to substitute for one another, sake's demand is driven by a more persistent cultural linkage. For sake, the experiential value provided by human mobility does not lose its potency even in markets where material cultural goods are already highly prevalent. This suggests that sake exports are consistently reinforced by human interaction, making it a product that can maintain growth momentum through multiple cultural channels simultaneously without the effects canceling each other out.

Table 4-8

		SAKE		WHISKY		POOLED	
Dependent Var.:		SY_(12)	SL_(12)	WY_(12)	WL_(12)	PY_(12)	PL_(12)
		exportYEN	exportL	exportYEN	exportL	exportYEN	exportL
<i>Sake_{jt}</i>						23.6** (7.53)	12.9*** (3.37)
<i>lnGDP_{jt}</i>		0.609*** (0.093)	0.399*** (0.089)	0.642*** (0.062)	0.477*** (0.046)	0.716*** (0.059)	0.529*** (0.054)
<i>lnGDP_{jt}</i> × <i>Sake_{jt}</i>						-0.183*** (0.053)	-0.122 (0.080)
<i>lnDISTANCE_j</i>		-0.643 (0.381)	0.459 (0.376)	0.977 (0.608)	0.804* (0.339)	0.954 (0.685)	0.859** (0.277)
<i>lnDISTANCE_j</i> × <i>Sake_{jt}</i>						-1.36* (0.571)	-0.413 (0.352)
Basic Gravity Driver							
<i>lnTARIFF_{jt}</i>		-4.78*** (0.789)	-2.66*** (0.373)	-2.37*** (0.597)	0.983 (0.808)	-3.05*** (0.845)	0.674 (1.04)
<i>lnTARIFF_{jt}</i> × <i>Sake_{jt}</i>						-0.919 (1.16)	-3.30** (1.15)
<i>FTA_EPA_{jt}</i>		-0.140 (0.095)	-0.091 (0.083)	0.237* (0.117)	0.414** (0.131)	0.560*** (0.153)	0.774*** (0.169)
<i>FTA_EPA_{jt}</i> × <i>Sake_{jt}</i>						-0.863*** (0.148)	-0.936*** (0.169)
<i>COL_j</i>		-0.427 (0.508)	1.39* (0.675)	2.30 (1.69)	1.66* (0.674)	2.63 (1.76)	1.86** (0.577)
<i>COL_j</i> × <i>Sake_{jt}</i>						-2.86* (1.40)	-0.416 (0.740)
Static Cultural Variables							
Religion							
<i>Christian</i>		-0.449*** (0.120)	-0.733*** (0.077)	-2.08*** (0.170)	-1.27*** (0.149)	-2.12*** (0.168)	-1.43*** (0.118)
<i>Christian</i> × <i>Sake_{jt}</i>						1.75*** (0.150)	0.758*** (0.122)
<i>Islam</i>		0.528** (0.205)	-0.192 (0.211)	-2.22*** (0.267)	-3.83*** (0.362)	-2.19*** (0.304)	-3.87*** (0.537)
<i>Islam</i> × <i>Sake_{jt}</i>						2.83*** (0.278)	3.78*** (0.654)
<i>Buddhism</i>		0.946*** (0.265)	0.605 (0.325)	-0.156 (0.577)	-0.299 (0.319)	-0.044 (0.586)	-0.343 (0.233)
<i>Buddhism</i> × <i>Sake_{jt}</i>						0.992* (0.409)	1.01*** (0.236)
<i>Hinduism</i>		0.583 (0.700)	-1.42*** (0.368)	-0.711 (0.506)	-3.10*** (0.637)	-0.290 (0.635)	-3.12*** (0.885)
<i>Hinduism</i> × <i>Sake_{jt}</i>						0.477 (0.869)	1.76 (0.994)
<i>Judaism</i>		0.317 (0.261)	0.215 (0.203)	-3.55*** (0.398)	-2.63*** (0.360)	-3.35*** (0.456)	-2.46*** (0.399)
<i>Judaism</i> × <i>Sake_{jt}</i>						3.54*** (0.450)	2.68*** (0.403)
<i>Other</i>						-0.376 (0.383)	-0.320 (0.415)
MOVEMENT							
<i>lnTOTAL_MOVEMENT_{jt}</i>		0.149 (0.140)	0.775*** (0.209)	1.09*** (0.248)	1.26*** (0.159)	1.11*** (0.269)	1.38*** (0.182)
<i>lnTOTAL_MOVEMENT_{jt}</i> × <i>Sake_{jt}</i>						-0.895*** (0.212)	-0.640*** (0.121)
Dynamic Cultural Variables							
INTERACT							
<i>lnTOTAL_MOVEMENT_{jt}</i> × <i>lnTOTAL_Trade_{jt}</i>		0.005 (0.013)	-0.018 (0.015)	-0.088*** (0.020)	-0.089*** (0.016)	-0.087*** (0.021)	-0.088*** (0.015)
<i>lnTOTAL_MOVEMENT_{jt}</i> × <i>lnTOTAL_Trade_{jt}</i> × <i>Sake_{jt}</i>						0.087*** (0.020)	0.069*** (0.014)
Cultural Trade							
<i>lnTOTAL_Trade_{jt}</i>		0.371 (0.193)	0.435* (0.177)	1.28*** (0.161)	1.16*** (0.184)	1.19*** (0.175)	1.03*** (0.172)
<i>lnTOTAL_Trade_{jt}</i> × <i>Sake_{jt}</i>						-0.711** (0.226)	-0.561*** (0.154)
Fixed-Effects:		-----					
YEAR		Yes	Yes	Yes	Yes	Yes	Yes
S.E.: Clustered		by: YEAR					
Observations		1,831	1,831	1,718	1,718	3,549	3,549
Adj. Pseudo R2		0.94057	0.92487	0.85723	0.71343	0.89160	0.87454
The Number of Years		29	29	29	29	29	29

Note. Signif. codes: '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1

() Robust Standard Errors clustered by YEAR

4.5 Summary of Empirical Findings and the Uniqueness of Sake

The results of the gravity models reveal a nuanced export structure for sake that is distinct from that of whisky. Overall, sake demonstrates a significantly higher sensitivity to economic and trade-related barriers, exhibiting a higher elasticity for market scale and a more pronounced vulnerability to tariffs. This suggests that despite its cultural premium, sake remains a product whose international growth is heavily dictated by the economic health and trade openness of partner nations.

Beyond these economic fundamentals, the analysis shows the unique cultural drivers of sake demand. The material cultural flows, such as printed matter, serve as more effective gateways for sake than for whisky. Similarly, experiential flows through human mobility, particularly the presence of travelers as cultural ambassadors, exert a statistically stronger influence on sake exports.

The most important finding of these analyses is the additive effect of sake's cultural sensitivity. While whisky shows diminishing marginal returns, where cultural trade and human mobility act as substitutes, the negative interaction in the pooled model is offset by the positive triple interaction term. This implies that for sake, the promotion through human interaction remains constant, regardless of how much cultural merchandise has already penetrated the market. For far more, the effects of information

through cultural trade, and experience through human mobility are additive and independent. In other words, the export-promoting effect of physical human interaction does not diminish even as cultural information saturates the market. This coexistence between information and experience suggests that sake demand is formed through independent channels that do not interfere with one another.

Chapter 5: Conclusion

5.1 The Contribution of the thesis

This thesis has investigated the extent to which Japan's cultural fascination drives the international demand for sake, relative to Japanese whisky. The unique contribution lies in three areas: (i) the comparative positioning of sake against whisky as a benchmark for Westernized spirits, (ii) a multi-layered definition of cultural proximity that integrates static historical and religious variables with dynamic flows of people and goods, and (iii) the rigorous verification of structural differences using a pooled-model framework. By synthesizing these elements, the thesis moves beyond traditional descriptive accounts of sake promotion, providing the statistical proof that sake's export logic is fundamentally independent and additive compared to globally standardized beverages.

5.2 Hypothesis Testing

This thesis has investigated the extent to which Japan's cultural fascination drives the international demand for sake, comparing its structural sensitivity with that of Japanese whisky. The empirical results have provided evidence to address the research questions and hypotheses established in Section 1.5. Both human mobility and

cultural trade are strong predictors of export performance. More importantly, the pooled analysis has confirmed that sake is significantly more sensitive to Japan's cultural appeal than whisky.

Regarding Hypothesis 1; Do cultural factors have a statistically significant positive impact on the export of sake when controlling for traditional gravity model variables, the analysis confirms that cultural factors have a statistically significant positive impact on sake exports. Both human mobility, Tables 4-3, and cultural trade, Tables 4-5 and 4-6, are found to be strong predictors of export performance, even when controlling for traditional gravity model variables such as GDP and distance. The findings suggest that the international demand for sake is not merely a function of economic scale but is deeply intertwined with the global dissemination of Japanese culture.

Regarding Hypothesis 2; Is the export performance of sake more sensitive to fluctuations in Japan's cultural appeal than that of Japanese whisky, which, despite its domestic production, adheres to the standards of a Western-origin beverage, the pooled analysis, Tables 4-2, 4-4, 4-7 and 4-8, consistently demonstrates that sake is significantly more sensitive to Japan's cultural appeal than whisky. While whisky exports benefit from cultural flows, the magnitude of the impact is smaller. The triple

interaction analysis in Table 4-8 reveals that while whisky exhibits diminishing returns as cultural exposure increases, sake's export elasticity with respect to human mobility remains stable due to the offsetting effect identified in the triple interaction analysis. This confirms that sake's demand structure is uniquely resilient in its cultural sensitivity.

5.3 Policy Implication

The findings of this thesis provide insights in defining the unique position of sake. Unlike globally standardized spirits such as whisky, sake acts as a cultural experience good whose demand is formed through two distinct and independent pathways: cultural information and experience by human interaction.

In the international trade of most globalized goods, information dissemination and physical experience often act as substitutes, where an increase in one may diminish the marginal effectiveness of the other, as shown in whisky model. However, for sake, these two forces coexist without interference. This coexistence means that the export-promoting effect of human interaction remains potent even in markets where Japanese cultural information is already highly prevalent. Consequently, policymakers should pursue a strategy that simultaneously accelerates both inbound tourism promotion and strategic information dissemination through creative contents. As there is no cultural

saturation point for sake, investment in tourism does not cannibalize the effectiveness of PR campaigns; instead, they serve as parallel engines that maximize total export growth with high efficiency. Furthermore, given that sake remains statistically more sensitive to trade barriers such as tariffs than whisky, achieving trade liberalization is a fundamental prerequisite. Removing these economic brakes is essential to allow sake's dual cultural engines to drive international demand to its full potential.

5.4 Limitations and Future Research

Despite the findings, this thesis is subject to several limitations. The first concern involves the interpretation of the static cultural variables, particularly the religious dummies. While these variables were intended to capture religious proximity, their inclusion occasionally caused traditional gravity variables to yield unexpected results. In addition to these statistical issues, the interpretation of these variables is inherently difficult. This suggests that religious dummies may not only reflect belief systems but may also function as proxies for broader, unobserved cultural characteristics or lifestyle patterns inherent to a specific nation. Distinguishing these multifaceted cultural traits remains a challenge for future modeling.

The second limitation is the potential endogeneity arising from simultaneity and reverse causality between cultural flows and trade. While cultural fascination drives sake exports, the international popularity of sake could conversely stimulate interest in Japanese media and tourism. To address this, preliminary tests were conducted using lagged versions, $t - 1$, of the dynamic cultural variables. However, these tests did not fundamentally alter the results or resolve the structural endogeneity, suggesting that simple temporal lags are insufficient.

Future research should prioritize more rigorous identification strategies to isolate the pure unidirectional causal impact of cultural fascination on export performance. A promising candidate could be the construction of a Bartik-type shift-share instrumental variable. This approach involves interacting a time-invariant share, representing a destination country's initial exposure to Japanese culture at a fixed baseline, with a time-varying shift, consisting of exogenous global shocks in Japan's creative or tourism sectors. Multiplying these two components isolates the variation in cultural fascination that is independent of local beverage demand shocks, thereby enabling a more rigorous causal inference of the impact of culture on export performance.

Appendix

Appendix 1: The Calculation Formulas for Tariff

Appendix 1 provides the detail calculation formulas for tariff. The tariff variable $Tariff_{jt}$ is constructed using two different methods depending on the nature of the duty applied by the destination country.

For nations that utilize ad valorem duties, the variable is calculated by adding the tariff rate to a base of one as shown below.

$$Tariff_{jt} = 1 + \tau_{jt}$$

In this equation, τ_{jt} represents the applicable tariff rate. For instance, a tariff rate of 20 percent is expressed as 1.2.

For countries that apply specific duties based on weight or volume, the ad valorem equivalent is calculated using the following formula.

$$Tariff_{jt} = 1 + \frac{D_{jt} \times E_{jt}}{V_{jt}/Q_{jt}}$$

In this formula, D_{jt} denotes the specific duty per unit, E_{jt} represents the exchange rate sourced from the International Monetary Fund, V_{jt} is the total export value, and Q_{jt} is the total export quantity. This process ensures that all trade barriers are converted into a comparable percentage format relative to the export price.

Appendix 2: Examination of Other Explanatory Variables

Appendix 2 discusses the rationale for excluding certain explanatory variables that are evaluated during the preliminary stages of the model construction. The number of Japanese residents in the destination country was initially considered as one of proxy for human interaction. However, preliminary testing revealed that this variable exhibited a high correlation with GDP. To maintain the structural integrity of the gravity model and prevent issues related to multicollinearity, the number of Japanese residents was excluded from the final research specifications.

Appendix 3: The Classification of Cultural Property Trade

Appendix 3 outlines the classification criteria and data sources used to identify the various categories of cultural property trade. Cultural goods are identified at the HS six-digit level using the BACI database. This selection adheres to the UNESCO (2009) definition as implemented by Jinji and Tanaka (2020) classification correspondence table. The table below presents the detailed categories.

FCS category	HS6	Description
Audio and Audiovisual media	370590	Photographic plates or film, exposed or developed nes
Audio and Audiovisual media	370610	Cinematograph film, exposed and developed, width >35 mm
Audio and Audiovisual media	370690	Cinematograph film, exposed & developed, width <=35 mm
Audio and Audiovisual media	950410	Video games used with a television receiver
Cultural heritage	970500	Collections and collectors pieces
Cultural heritage	970600	Antiques older than 100 years
Music and the performing arts	852410	Recorded gramophone records
Music and the performing arts	852421	Recorded magnetic tapes, width < 4 mm
Music and the performing arts	852422	Recorded magnetic tapes, width 4-6.5 mm
Music and the performing arts	852423	Recorded magnetic tapes, width > 6.5 mm
Music and the performing arts	852490	Sound recordings other than photographic products nes
Printed Matter	490110	Brochures, leaflets, and similar, in single sheets
Printed Matter	490191	Dictionaries and encyclopedias
Printed Matter	490199	Printed reading books, except dictionaries and others
Printed Matter	490210	Newspapers, journals, and periodicals, > 3 issues/week
Printed Matter	490290	Newspapers, journals, and periodicals, < 4 issues/week
Printed Matter	490300	Children's picture, drawing, or coloring books
Printed Matter	490400	Music, printed or in manuscript
Printed Matter	490510	Globes, geographical, printed
Printed Matter	490591	Maps and charts, printed, in book form
Printed Matter	490599	Maps and charts, printed, other than book form
Printed Matter	490900	Postcards, printed or illustrated, greeting cards
Printed Matter	491000	Calendars, printed
Printed Matter	491191	Pictures, designs, and photographs
Printed Matter	970400	Used postage and revenue stamps, first day covers, and others
Visual arts	442010	Statuettes and other ornaments of wood
Visual arts	691310	Statuettes & ornamental articles of porcelain or china
Visual arts	691390	Ceramic statuettes, ornamental articles, not porcelain
Visual arts	830621	Statuettes, other ornaments plated with precious metal
Visual arts	830629	Statuettes and other ornaments, base metal, unplated
Visual arts	960110	Worked ivory, articles of ivory
Visual arts	960190	Animal carving material, articles, nes
Visual arts	970110	Paintings/drawings/pastels executed by hand
Visual arts	970190	Collages, similar decorative plaques
Visual arts	970200	Original engravings, prints, and lithographs
Visual arts	970300	Original sculptures and statuary, in any material

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