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| Assignment Cover Sheet | |
| Candidate Number | 018874 |
| Module Code | BEMM466 |
| Module Name | Business Project |
| Assignment Title | Impacts of US Tariffs and the India–UK FTA on UK Whisky and Gin Export |

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**Impacts of US Tariffs and the India–UK FTA on UK Whisky and Gin Exports (2015–2035): A Forecasting Proposal**

The landscape of UK spirit exports is undergoing rapid transformation due to significant international trade policy changes. In particular, the imposition of 25% retaliatory US tariffs on Scotch whisky (2019–2021) and the landmark 2025 UK-India Free Trade Agreement (FTA), which phases down prohibitive tariffs on spirits, provide a timely opportunity to evaluate how different segments of UK whisky and gin exports respond to both protectionist and liberalised trade environments.

**Aims & Objectives**

The overarching aim of this research is to evaluate the economic impact of international trade policies—specifically US-imposed tariffs and the UK-India FTA—on UK whisky and gin exports. To achieve this aim, the following SMART (Specific, Measurable, Achievable, Relevant, Time-bound) objectives have been defined:

1. To measure the export disruption caused by the 25% US tariffs on Scotch whisky from October 2019 to March 2021 through volume, price, and product segmentation.
2. To simulate and assess the benefits of phased tariff reductions under the India–UK FTA (from 150% to 75%, then to 40%) on export volumes of both whisky and gin.
3. To compare export elasticity between premium (e.g., single malt) and lower-grade spirits (e.g., grain whisky) under both trade events.
4. To test the predictive accuracy of various forecasting models and identify the most robust for long-term export forecasting up to 2035.

**Research Questions:**

* How significantly did the US-imposed tariffs affect UK whisky export volumes across product grades?
* What is the forecasted growth in UK whisky and gin exports under the India–UK FTA’s phased tariff reductions?
* Which product segments (high- vs. low-quality spirits) show the highest sensitivity to trade policy changes?
* Which forecasting model offers the highest accuracy for trade intervention effects?

**Problem Context and Scope of Study**

The global trade environment for alcoholic beverages has experienced unprecedented disruptions and realignments over the past decade. Two major policy events define the contemporary challenge and opportunity for UK spirit exporters: the retaliatory 25% tariffs imposed by the United States on Scotch whisky between October 2019 and March 2021, and the landmark UK-India Free Trade Agreement (FTA) signed in 2025. These events offer a valuable opportunity to study the contrasting effects of protectionist and liberalising trade policies on UK spirit exports across differentiated product categories.

Scotch whisky, recognised internationally through Geographical Indication (GI) status and deeply rooted in British cultural and economic heritage, faced notable market disruptions during the period of US-imposed tariffs. Recent studies (Kim, 2023; Muhammad and Thompson, 2022) suggest that these tariffs had a more severe impact on lower-quality whisky variants due to their heightened price sensitivity, while premium single malts demonstrated relatively greater resilience. Conversely, the UK–India Free Trade Agreement provides a policy-driven gateway into a previously restricted market, where progressive reductions in import duties—from 150 percent to 75 percent, and eventually to 40 percent—are expected to create meaningful growth potential for both whisky and gin exports (Department for International Trade, 2025).

This research focuses on these two pivotal trade events to examine how such divergent policy interventions influence export performance across varying product types and quality levels. The analysis draws on monthly export data between 2015 and 2025 to establish a historical baseline, with forecasts extended to 2035 to explore the longer-term consequences of tariff liberalisation. Whisky and gin are the principal products under investigation, classified using Combined Nomenclature (CN8) codes that allow detailed disaggregation by quality and packaging format. By analysing export trends over time, this study aims to uncover how specific market segments respond to shifts in trade policy, offering insights into patterns of recovery, competitive positioning, and future export elasticity.

The study is geographically scoped to the US and Indian markets, which are strategic not only for their size but also for their contrasting regulatory and demand dynamics. Stakeholders benefiting from this research include producers, exporters, trade associations (e.g., the Scotch Whisky Association), and policymakers aiming to navigate volatility in international trade with data-driven foresight.

**Literature & Data**

### This study draws on a growing body of literature that explores the intersection of international trade policy, product quality differentiation, and the economic performance of spirit exports. Recent research by Muhammad and Thompson (2022) examines the consequences of trade wars on UK whisky exports, highlighting the importance of distinguishing between product categories when assessing tariff impacts. Their work suggests that lower-quality whiskies tend to bear a greater burden from tariff-induced price increases, due to higher demand elasticity among consumers. Kim (2023) offers complementary insights through disaggregated export data, revealing significant variation in pass-through effects, particularly within the US market, where low-cost spirits faced sharper declines during the tariff period.

### In contrast, the implications of liberalising trade regimes, particularly in emerging markets, remain relatively underexplored. Ichijo (2019, 2025) addresses this gap by focusing on the symbolic and economic significance of Scotch whisky in global markets, framing it as both a cultural and commercial asset that is shaped by policy regimes and branding strategies. His analysis suggests that reducing trade barriers can unlock significant growth in markets where tariffs have historically restricted access, such as India. Reports from the Scotch Whisky Association (2023) and the Department for International Trade (2025) further emphasise the strategic relevance of the UK–India Free Trade Agreement, particularly its potential to stimulate exports by lowering entry costs for high-value products.

### The study will utilise monthly and quarterly export data from 2015 to 2025, sourced primarily from HM Revenue and Customs (HMRC) and the Office for National Statistics (ONS). Data will be disaggregated at the Combined Nomenclature eight-digit level, allowing for detailed segmentation of whisky and gin exports by type and quality. These quantitative datasets will be supplemented with qualitative insights drawn from trade reports, industry publications, and government policy documents. Together, these sources will support a multimethod approach to forecasting and policy evaluation, ensuring that empirical findings are grounded in both economic theory and market realities. The integration of diverse data types aims to strengthen analytical validity and provide a comprehensive understanding of how trade interventions shape export trajectories across differentiated product lines. Methodology

This study adopts a quantitative research design, grounded in the positivist paradigm, to systematically evaluate the effects of international trade interventions on UK spirit exports. It follows the Cross-Industry Standard Process for Data Mining (CRISP-DM), a widely recognised framework for structuring predictive modelling workflows. The research process begins with business and data understanding, followed by data preparation, modelling, evaluation, and deployment of insights in the form of scenario-based forecasts.

The empirical foundation of the study is time-series export data obtained from HM Revenue and Customs (HMRC), segmented at the Combined Nomenclature eight-digit level. This granularity allows for precise disaggregation of whisky and gin exports by product type and quality, such as single malt, blended grain, or bulk container variants. Monthly data spanning from January 2015 to December 2025 provides sufficient temporal depth to model both pre-intervention baselines and policy-driven shifts. Forecasting extends to 2035 to assess the long-term implications of tariff reduction under the UK–India Free Trade Agreement.

The modelling strategy is based initially on the Seasonal Auto-Regressive Integrated Moving Average with exogenous regressors (SARIMAX) framework, chosen for its robustness in handling seasonality, trend, and external shocks. Trade interventions such as the US-imposed tariffs (October 2019 to March 2021) and the phased implementation of the India–UK FTA (from 2025 onwards) are incorporated as binary exogenous variables. Should alternative models such as ARIMA, Artificial Neural Networks (ANN), or hybrid approaches demonstrate superior performance during model comparison, they will be considered for final deployment. Forecasting will be multimodal in nature, aiming to triangulate predictions across models for greater confidence.

Model evaluation will rely on well-established metrics such as Mean Absolute Error (MAE), Root Mean Squared Error (RMSE), and Mean Absolute Percentage Error (MAPE) to assess predictive accuracy. Diagnostic tests, including the Ljung–Box Q-test and Akaike Information Criterion (AIC), will be used to validate residual behaviour and model fit.

By integrating advanced forecasting techniques with rigorous policy contextualisation, this methodology aims to produce empirically sound and practically relevant insights into the evolving dynamics of UK spirit exports.

**Analytical Approach**

The analytical process unfolds in two primary stages: pre-modelling data transformation and the subsequent application of econometric forecasting techniques. In the first stage, raw export data is cleaned and structured to produce consistent monthly time series for each identified product category. Aggregation is conducted at the CN8 level to differentiate between premium and lower-cost whisky and gin exports. Descriptive statistics, trend decomposition, and seasonal adjustment are employed to identify structural patterns, anomalous periods, and underlying cycles in the data (Hyndman & Athanasopoulos, 2018).

The second stage involves model estimation and comparative evaluation. The SARIMAX framework is used to quantify the impact of trade policy interventions while controlling for seasonality and trend. Binary intervention dummies represent the periods affected by the US tariffs and the phased India–UK FTA implementation. The model will estimate export elasticity, pass-through effects, and recovery trajectories for each product category.

To ensure analytical robustness, alternative models such as ARIMA, Vector Autoregression (VAR), and Artificial Neural Networks (ANN) may be tested. Forecast accuracy will be compared using MAE, RMSE, and MAPE, with residual diagnostics (e.g., Ljung–Box test) validating statistical adequacy.

Scenario-based forecasting will be employed to simulate different policy futures, providing actionable insights for both policymakers and industry actors navigating trade uncertainty.

### Limitations

While the proposed methodology offers a structured and empirically grounded approach, several limitations must be acknowledged. First, the analysis relies exclusively on secondary data from HM Revenue and Customs, which, despite its granularity, may be subject to reporting errors, reclassification issues, or inconsistencies in export declarations. These imperfections could affect the precision of model estimates.

Second, time-series forecasting, particularly over long horizons, inherently carries uncertainty. Although SARIMAX and alternative models can accommodate structural breaks and seasonality, their predictive power diminishes as the forecast period extends, especially in the face of unforeseen shocks or behavioural changes in global markets.

Third, isolating the causal effects of trade interventions is complicated by concurrent events, such as the COVID-19 pandemic and global economic fluctuations. These confounding factors may limit the ability to attribute changes in export performance solely to policy shifts. Finally, the study’s focus on whisky and gin may constrain the generalisability of findings to other export sectors.

### Ethical Considerations

This study involves the analysis of publicly available secondary data and thus presents minimal ethical risk. Nevertheless, ethical integrity is upheld through adherence to best practices in data handling, transparency, and responsible interpretation. All datasets used—primarily sourced from HM Revenue and Customs (HMRC), the Office for National Statistics (ONS), and other government publications—are anonymised and non-personal in nature. No confidential, commercially sensitive, or identifiable information is included.

In line with established ethical research frameworks (Bell, Harley, & Bryman, 2022), the study will ensure informed methodological transparency, reproducibility, and accountability throughout the research process. Forecasts and analytical insights will be presented with appropriate caveats regarding model uncertainty and data limitations, avoiding overstatement of conclusions.

Data will be stored securely using institutional cloud platforms or encrypted devices, complying with GDPR and University of Exeter data policies. Potential biases arising from model design, variable selection, or interpretation will be critically examined and disclosed. Ongoing communication with academic supervisors and full adherence to the University’s ethical review processes will further uphold the credibility and social responsibility of the research.

### Risks

The research timeline has been structured to allow for staged progression across literature review, data processing, model development, and final analysis. However, several risks could affect this timeline. One key risk lies in the data collection and preparation phase (Weeks 3–6), where issues such as inconsistent formatting, gaps in HMRC records, or challenges in mapping CN8 classifications to quality tiers could cause delays. To mitigate this, preliminary data exploration is scheduled early in the project (Weeks 1–2), enabling early detection of such issues.

Another potential risk arises during the modelling and forecasting phases (Weeks 7–10). If the SARIMAX framework fails to provide stable or interpretable results—especially in the context of overlapping economic disruptions—alternative models such as ARIMA, VAR, or ANN may need to be trialled, adding time pressure.

To manage these risks, the Gantt chart incorporates overlapping phases and buffer weeks, ensuring that the final drafting and review period (Weeks 10–12) remains protected for synthesis and refinement.

### Executive Summary Plan

The executive summary will be delivered either as a two-page written briefing or a one-page visual presentation, similar to formats used in academic or industry conferences. It will summarise key insights from the forecasting analysis, supported by export trends, intervention effects, and model accuracy metrics. Visuals such as annotated charts and forecast scenarios will aid accessibility. The goal is to communicate actionable findings clearly and concisely to a diverse audience, including policymakers, industry professionals, and academic reviewers.

**Timeline**

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| --- | --- | --- | --- | --- |
| **Phase** | **Weeks 1-2 (June 17-30)** | **Weeks 3-6 (July 1-28)** | **Weeks 7-9 (July 29-Aug 18)** | **Weeks 10-12 (Aug 19-Sept 3)** |
| Literature Review & Finalizing Proposal | X |  |  |  |
| Data Collection & Preparation | X | X |  |  |
| Model Development & Testing |  | X | X |  |
| Analysis, Forecasting & Scenario Modelling |  |  | X | X |
| Drafting Final Report & Visualizations |  |  | X | X |
| Final Report Submission |  |  |  | X |

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Figure 1: Dissertation Gantt Chart Timeline

A time-based view of research tasks across a 12-week dissertation period. Color-coded by phase, it includes live progress percentages and editable notes for supervisor feedback.

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