5-2024

Prosperity and Quality of Life: A Comprehensive Analysis of Economically Liberated Nations

Alia Omar Bin Touq AlMarri

Prosperity and Quality of Life:

A Comprehensive Analysis of Economically Liberated Nations

by

Alia Omar Bin Touq Al Marri

A Thesis Submitted in Partial Fulfilment of the Requirements for the Degree of Master of Science in Professional Studies: Data Analytics

Department of Graduate Programs & Research

Rochester Institute of Technology Dubai
May 2024

Graduate Thesis Committee

Dr. Sanjay Modak	Dr. Ioannis Karamitsos
Chair of committee	Member of committee

RIT

Master of Science in Professional Studies:
Data Analytics

Graduate Thesis Approval

Student Name**:** Alia Omar Bin Touq Al Marri
Student ID: 771008755

Graduate Capstone Title**:** Prosperity and Quality of Life: A Comprehensive Analysis of Economically Liberated Nations

Graduate Thesis Committee:

Name: Dr. Sanjay Modak — **Date:** March 4th, 2024
Chair of committee

Name: Dr. Ioannis Karamitsos — **Date:** March 4th, 2024
Member of committee

Acknowledgment

اللهم لك الحمد حتى ترضى ولك الحمد إذا رضيت ولك الحمد بعد الرضا

Abstract

This project aims to employ data exploration, data analysis, visualization tools, and modelling to conduct a comprehensive research study concerning the desirability and impact of residing in economically liberalized nations, strongly focusing on their influence on human development. By leveraging advanced exploratory data analysis techniques such as principal component analysis (PCA) and modelling techniques such as multiple linear regression and random forest, this study aims to offer a nuanced and comprehensive understanding of how economic freedom correlates with and impacts various facets of human development, offering valuable policy suggestions for nations pursuing economic freedom as a development strategy. To ensure a systematic and rigorous approach to data analysis, this project will rigorously adhere to the CRISP-DM (Cross-Industry Standard Process for Data Mining) methodology encompassing several phases, each contributing to the robustness and reliability of the project. Following the CRISP-DM framework will facilitate a systematic journey throughout the research process, enabling a comprehensive understanding of the problem, effective data gathering and preparation, meticulous model selection and evaluation, and, ultimately, the deployment of insights for informed decision-making.

Keywords: Economic Freedom, Human Development Index, Property Rights, Rule of Law, Government Intervention, Property Rights, CRISP-DM, Principal Component Analysis, Multiple Linear Regression, Random Forest

Table of Contents

List of Figures

Chapter 1 Introduction

In an era marked by globalization and interconnectedness, the relationship between economic policies and human development has become a critical area of scholarly inquiry. The exploration of this intricate relationship involves the judicious application of data exploration, analysis, and visualization tools, focusing on understanding the multifaceted dimensions of human development affected by economic policies.

The central objective of this study is to employ advanced data analysis techniques to unravel the intricate connections between economic freedom and various facets of human development. Economic liberalization, characterized by free markets, reduced government intervention, and increased individual liberties, has been a dominant trend in the global landscape. This research seeks to illuminate the desirability of residing in nations embracing economic freedom, shedding light on how such policies influence critical human development indicators. Crucially, the investigation extends beyond conventional economic metrics to encompass broader dimensions of human well-being. Education, healthcare, income, and overall quality of life are among the focal points that will be meticulously examined. By employing robust analytical tools, this study aims to comprehensively understand how economic freedom intertwines with and shapes these critical aspects of human development. Furthermore, the research endeavors beyond mere correlation by employing multiple linear regression and random forest modeling, formulating more precise insights. Through this meticulous approach, the study aspires to contribute valuable knowledge to the ongoing discourse on the desirability and impact of economic liberalization as a development strategy.

The findings of this research are anticipated to offer policy suggestions for nations considering or currently pursuing economic freedom as a developmental pathway. By distilling

insights from the intricate interplay between economic policies and human development indicators, this study aims to empower policymakers with evidence-based recommendations, fostering informed decision-making and facilitating the pursuit of sustainable and inclusive development.

1.1 Problem Statement and Project Goals

The goal of this project is to investigate the desirability and impact of living in economically liberalized nations, primarily emphasizing the influence on human development by:

- Understand if and how economic freedom impacts the human development index.
- Examine whether the established domains of economic freedom indeed have the most significant impact.
- Investigate areas expected to influence economic liberty but have yet to, along with the reasons for this lack of effect.
- Identify whether nations with higher levels of economic freedom provide a more favorable habitat.
- Explore any trade-offs associated with heightened economic freedom.

By answering said questions, this study will help shed light on the complex interplay between economic freedom and quality of life to offer recommendations and policy implications for nations considering economic liberalization as a development strategy.

1.2 Aims and Objectives

This investigation aims to generate comprehensive insights that transcend simplistic correlations, thereby informing robust policy recommendations. By utilizing sophisticated data analysis techniques, the study seeks to uncover the intricate interplay between economic freedom and human development. This deeper understanding is crucial for offering nuanced policy suggestions tailored to the unique challenges and opportunities faced by nations pursuing economic freedom as a central tenet of their development strategy. The anticipated outcome is to elucidate the existing correlations and provide actionable insights that can guide nations in formulating effective policies conducive to economic freedom and enhanced human well-being.

1.3 Research Methodology

To complete the thesis, I intend to adhere to the CRISP-DM methodology to ensure a systematic and rigorous approach to data analysis. Following this structured process, I can thoroughly understand the business problem, gather and prepare data effectively, choose and evaluate appropriate models, and ultimately deploy them for meaningful insights and decision-making. This methodology will serve as a reliable framework to guide my research journey and ensure that the results are significant and actionable.

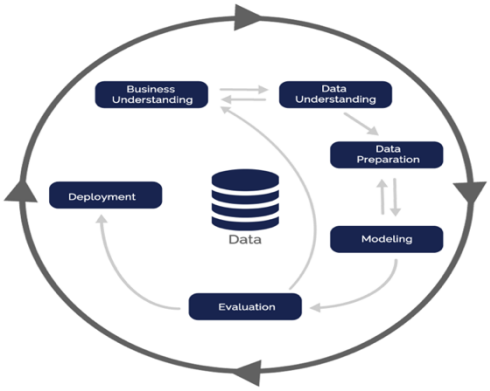

Figure 1: CRISP-DM Methodology

The initial phase, business understanding, centers on delineating my objectives—seeking a holistic understanding of the interplay between economic liberalization and human development. Additionally, I will establish clear success metrics, focusing on measuring the impact of the Human Development Index (HDI) and crafting actionable policy recommendations. The subsequent phase, data understanding, will entail identifying and compiling pertinent data from reputable sources, specifically emphasizing economic freedom, the HDI, and related variables. Exploring the data's structure and content to develop a comprehensive grasp of its nuances and

intricacies will formulate precise research questions that directly address the complex relationship between economic freedom and human development, guiding our subsequent data analysis. As for the data preparation phase, I will carry out the critical task of ensuring data quality to identify initial issues or anomalies. Subsequently, data cleaning procedures will address issues such as null values, standardization, and handling strings, ensuring consistency and reliability. Lastly, feature selection will enable me to pinpoint the most relevant variables for our analysis, streamlining the dataset for meaningful insights. In the modeling phase, I will employ Principal Component Analysis and Multiple Linear regression, which will facilitate the development of models explicitly designed to assess the impact of economic freedom on the Human Development Index (HDI) and uncover intricate relationships between variables. As I progress to the evaluation phase, I will gauge the quality and performance of our developed models through rigorous assessments to ensure alignment with my research objectives. Based on the findings and insights garnered, I will derive and present policy recommendations that can contribute to informed decision-making and further exploration in this field. The final deployment phase will involve the communication of comprehensive insights regarding the relationship between economic liberalization and human development, ensuring accessibility and clarity for a broad audience.

1.4 Limitation of the Study

The study faces several challenges and considerations that may affect its outcomes and implications. Firstly, data limitations could introduce subjective biases or measurement errors, especially regarding economic freedom. Additionally, gathering comprehensive and up-to-date data on various aspects of human development across nations is challenging. Secondly, while employing multiple linear regression helps identify causal relationships, establishing causality between economic freedom and human development indicators remains complex, given potential confounding factors. Thirdly, the generalizability of findings may be limited as the impact of economic liberalization on human development varies based on cultural, political, and historical contexts, potentially overlooking within-country minorities. Fourthly, statistical models like principal component analysis and multiple linear regression rely on certain assumptions, the violation of which could affect results in accuracy and reliability. Moreover, while the study aims to provide policy recommendations, relying solely on data analysis may overlook contextual and practical factors unique to each country. Furthermore, economic policies and their effects on human development are subject to temporal dynamics, potentially overlooking long-term trends or shifts in policy effectiveness. Finally, ethical considerations, including privacy and fairness, are crucial throughout the research process to ensure the validity and integrity of the study's findings.

Chapter 2 Literature Review

Institutional settings are influential in determining the economic performances of economies and individuals' well-being. In recent decades, the consensus on achieving sustainable economic growth and human development favors a free market, the rule of law, fiscal budget balance, and sustainable economic growth (Lee, 2023).

As Zhao et al. (2021) noted, institutional settings determine the interaction of all economic agents and shape the functioning of national economies. Abolishing unnecessary regulations through economic liberalization has been a constant feature of multiple nations in recent decades. Nations are keen on economic growth and investment that such institutional reforms attract (Alexiou et al., 2020). Zhao et al. (2021) added that the reforms impact rules that shape human interactions, structure of actions, interaction principles with other entities, and ways of execution. The institutional settings, therefore, determine the incentive structure and mechanisms that economic agents employ in society and influence the level of investments in capital, technology, and production. Ayal and Karras (1998) add to our knowledge of economic independence and development by focusing on empirical aspects.

On the other hand, Celico and Rode's following study (2023) focuses on the link between populism and economic freedom, advancing the idea that populism in government may lead to losses in economic freedom, demonstrating the role of political ideology and economic policies in constructing the landscape of freedom in democratic countries, with possible distinctions between OECD and non-OECD countries.

Furthermore, Gropper et al. (2011) investigate the relationship between economic independence and happiness. Their research indicates a favorable relationship between these two

variables, underlining the potential for economic freedom to improve quality of life. This viewpoint is consistent with the concept that economic independence may contribute to general well-being. Gwartney et al. (1999) investigate the link between economic freedom and the economic growth environment. Their results highlight the importance of market institutions and economic freedom as development conditions. This research supports Ayal and Karras's (1998) focus on economic freedom as a predictor of economic growth by emphasizing the varied influence of freedom on development. Gwartney and Lawson (2003) also explored the concept and measurement of economic freedom, concentrating mainly on the importance of individual autonomy, voluntary transactions, competition, and the protection of property rights as fundamental components of economic freedom. Carlsson and Lundström (2002), on the other hand, focused on the delicate interaction between economic freedom and economic progress. The authors' study focused on dissecting the effects of various economic freedom indicators on economic growth while adequately addressing the problem of multicollinearity.

The literature on the relationship between economic liberalization and human development is broad and growing. Most existing literature focuses on the distributional consequences of economic liberalization (Lee, 2023; Hamdi & Hakimi, 2021; Feng et al., 2021; Zhao et al., 2021). Theoretically, Kim et al. (2021) observed that the standard theory typically shows that economic liberalization enables constrained individuals to access capital. The consequent increased opportunities are assumed to lower inequalities. In support, Yang et al. (2023) advanced that an endogenous relationship exists between economic liberalization and market structures. Proponents of liberalization highlight the higher degree of transparency and reduced regulatory uncertainty as critical to creating economic incentives. Nations are incentivized to embrace economic liberalism to exploit economic opportunities and grow their competitiveness. The predominant view

supporting economic liberalization is that a country without economic freedom cannot prosper. Even though countries do not record the benefits immediately, the long-term economic benefits encourage countries to embrace liberalization to be competitive (Feruni et al., 2020). The economic environment following economic liberalization incentivizes people. Such trends are evident in economically free countries such as Hong Kong, Singapore, and New Zealand after providing business and investment freedom and securing property rights. The consequent efficient functioning of their markets raises trust levels and reduces market uncertainties. Such benefits are absent in unfree states like North Korea, Bangladesh, and Pakistan (Zhao et al., 2021). The lack of economic liberalization inhibits economic stability and consistent growth.

Liberalization impacts all facets of society, necessitating focus beyond economic metrics to include human development. A country's development level is a function of economic status, social achievements, and demographic composition. In particular, the human development index (HDI) is the tool that helps assess the development of a country along with economic growth. It shows the main achievements in terms of a long and healthy life, decent standards of living, and knowledge (Hamdi & Hakimi, 2021). Feruni et al. (2020) noted that improving economic freedom should also improve living standards, leading to a rise in demand for goods and services. Health, education, and growth are critical priorities of each society worth considering in the context of economic liberalization. The basis of economic liberalization impacting human development depends on whether financial deepening and increased capital flows benefit people as desired. Increased capital flows encourage entrepreneurship and result in more efficient resource allocation, which is expected to reduce income inequality (Kim et al., 2021).

Moreover, economic liberalization encourages more players to enter the market. The intensified competition and enhanced human capital increase stakeholders' productivity. The

increased access to the market ideally facilitates social welfare gains, raises wages, and reduces poverty (Fu et al., 2023). Using monetary utility-based terms, therefore, Creutzig (2020) confirmed that economic liberalism increases the well-being of economic agents. However, the authors also observed an ambiguous relationship with subjective well-being. The benefits apply when considering material wealth and expansion of individual choice as reflective of human well-being (Creutzig, 2020). Besides, economic liberalization increases the risk and exposure to external shocks and, therefore, increases the fragility and instability of an economy. Apart from increased economic uncertainty, the risks can worsen income inequality (Kim et al., 2021). The trickle-down effects of increased material wealth attributable to economic liberalization do not always materialize. The typical optimism behind economic liberalization comes under challenge in studies showing that the relationship is nonlinear. Success depends on the level of economic development of a country and the existence of elites' rent-capturing behaviors.

Additionally, economic liberalization may disproportionately benefit the already wealthy members of society if the poor cannot access financial services due to fixed costs (Kim et al., 2021). Such adverse outcomes mainly arise in countries in the early phases of economic development and with weak legal institutions. For instance, Haseeb et al. (2020) noted that the Indonesian economy has recorded a decline in human development and widening income gaps ever since its liberalization. In the presence of feeble government authorities, some firms gain sufficient power and create barriers to equal income distribution. The consequent disparities lead to growing occupational and educational discrepancies and threaten to worsen inequalities and poverty in both rural and urban districts.

Pursuing liberal norms fosters income and wealth inequality and indifference to others. Conflicting interests of employers and employees and the tendency to undermine the system of labor relations

based on the humanistic views of equity, power balance, and co-determination characterize liberalized economies (Torp & Reiersen, 2020). The dissection of traditional institutions and norms often contradicts the ideals of human development. For instance, liberalism leads to the dissolution of community and family bonds, which lowers subjective well-being in some societies. The perceived expansion of choices also creates unfulfillable expectations of attaining the optimum, which induces anxiety. The overload of choices induces mental illnesses and depression (Creutzig, 2020). These outcomes from economic liberation correlate with reduced social and health dimensions of well-being.

Sagar and Najam (1998) thoroughly examined the Human Development Index (HDI) as a critical measure of success in their research, with results emphasizing the relevance of the HDI as a compelling alternative to established unidimensional measurements such as GDP. Nonetheless, the evaluation highlighted certain limitations inherent in the Human Development Index (HDI), especially its inability to capture ecological elements. Improvements in human development are possible if economic liberalization discourages vested interests, reduces the rents dictated by the existing economic and institutional arrangements, and increases transparency and information dissemination. If institutions are weak, the increased investment opportunities only benefit those who can influence reforms to reap private benefits (Kim et al., 2021). Besides, countries do not similarly benefit from economic freedom. Conditional quantile regression reveals that the impact is more pronounced among countries with low human development levels. However, the influence of economic freedom settles down in the middle to upper quantiles (Feruni et al., 2020). For liberalization policies to succeed, Haini (2020) recommended that nations mitigate the potential risks of volatile capital flows and credit booms. Countries seeking to implement economic

liberalization should prioritize institutional reforms and policy credibility to cope with its inherent risks.

Countries opening their economies to exploit economic opportunities increase the demand for health care, healthy food, and health management. Feng et al. (2021) use China to show how economic liberalization led to economic growth and health improvements. The income effect of export growth benefited health. However, the authors noted that the stage of development and education levels matter. Longer working hours can impair health. These concerns are common in developed countries. Apart from a nation's level of development, an individual's education level matters. Those with higher education qualifications are better at acquiring health-related knowledge and applying it to their lifestyles (Feng et al., 2021). The underlying mechanism should be examined further to examine how economic liberalization determines the desirability of residing in economically liberalized nations. The patterns of impacts may differ in different country groups. With this, exports affect developed countries positively, but the effect is negative for low-income developing countries. Higher returns to skills in developed countries induce investment in higher education to enrich the human capital level. However, a higher cost of attaining education lowers education attainment in least-developed countries, leading to a lower level of human capital (Dao & Khuc, 2023). In exploring the impact of economic liberalization in the Balkan transition nations, for instance, Dokmanović and Cvetićanin (2020) found no valuable improvement in human ends, such as livelihoods and prosperity of the majority. Poverty levels remained high. The number of poor people rose by one-third, with about half a million Serbians unable to meet their basic subsistence needs. Such findings challenge the free-market perspective of economic liberalization, advancing deregulation, and the shrinking of the government's role in the economy.

In previous implementations of data analytics models to assess the desirability and impact of residing in economically liberalized nations, Saputra et al. (2020) employed segmentation and prediction analysis using descriptive and predictive mining approaches, examining data from Indonesia's Human Development Index (HDI), a country with multiple provinces and districts/cities. Yakunina and Bychkov (2015) contributed to understanding human development by presenting an original perspective informed by UNDP publications. Their research proposed a comprehensive model based on correlation analysis of quantitative data from various nations. The multidimensional model incorporated critical factors such as the human development index, innovation index, ICT index, Gross National Income, and life expectancy indices**.** Heckelman (2000) also investigated the relationship between economic freedom and economic progress by employing Granger-causality tests. The research evaluated whether freedom has a causal influence on development, whether growth has a causal effect on freedom, or whether the two variables are mutually determined.

Tunçsiper (2023) conducted a similar study using panel data analysis that revealed a statistically significant and positive association between the Economic Freedom Index, HDI, and economic progress measured by GDP per capita over a long period in G7 countries. The study aimed to comprehend the combined influence of economic freedom and human development on economic advancement, contributing to a deeper understanding of these dynamics. Staufer and Brockmann (2018) have also adopted a data-driven approach to assess the relationship between the Economic Freedom of the World (EFW) index and the Human Development Index (HDI). Their results indicate a high association between these indicators, emphasizing the significance of economic independence in impacting quality of life. This is consistent with Gropper, Lawson, and Thorne's (2011) results on the positive relationship between economic liberty and happiness.

Yilmaz and Tag (2016) study the relationship between economic freedom and happiness by examining the impact of different economic systems on subjective well-being. Their research emphasizes the importance of the rule of law, regulatory efficiency, and free markets in improving subjective well-being. However, it demonstrates an unanticipated negative link between limited government and subjective well-being, highlighting the complexities of these relationships. This study adds to previous research by elucidating how various features of economic freedom relate to individual happiness.

In conclusion, some studies have indeed attempted to examine the effect of economic liberalization on different aspects of human development, and they offer valuable insights for the current study. However, they do not provide clear conclusions on how economic liberalization impacts different facets of human development based on the perceived desirability and impact of residing in economically liberalized nations. The gap remains because exploring the effect of trade liberalization from an economic perspective does not reveal the overall impact on human development. Besides, the nonlinear relationship between economic liberalism and human development has positive and negative effects (Ou et al., 2023). Since different countries are at different stages of economic development, the effect of economic liberalization shows significant interval differences. By comprehensively examining the desirability and impact of residing in economically liberalized nations, the current study enriches the perspective of economic liberalization in human development by providing empirical evidence of how it influences human development.

2.1 Key Takeaways

1. Synthesized empirical and theoretical studies on economic growth highlight the positive effects of economic freedom on economic progress and general welfare.
2. Concerns about the lack of development and the repetitive character of Human Development Reports (HDRs) led to requests for improvements in the index's effectiveness, resulting in the necessary research of additional features that are to contribute to accurate indices.
3. Economic liberalization affects all facets of society, not just economic metrics. And while it can lead to increased opportunities, transparency, and efficiency, it also poses risks such as increased income inequality, social disparities, and mental health issues. The success of liberalization policies depends on the level of economic development, existing institutional arrangements, and policy credibility.
4. The Human Development Index is a critical measure of development alongside economic growth. Economic liberalization's impact on human development depends on factors such as financial deepening, access to markets, and the distribution of benefits. However, it may not always translate into improved living standards, particularly in countries with weak legal institutions and high levels of inequality.
5. Research suggests a positive relationship between economic freedom, as measured by indices like the Economic Freedom Index, and subjective well-being. However, the link between limited government and subjective well-being may be more complex, highlighting the nuances of these relationships.
6. Various methodological approaches, including regression analysis, Granger-causality tests, and data-driven assessments, have been employed to understand the relationship between economic liberalization, economic progress, and human development.

Chapter 3 Project Description

3.1 Data Source Description

Both data sets for this study, Economic Freedom of the World and Human Development Index, have been obtained from Kaggle, a platform for data scientists to share datasets for experimentation.

The primary data set, Economic Freedom of the World, was initially published by the Fraser Institute to measure the degree to which countries' policies and institutions support economic freedom. Economic freedom, a fundamental concept, pertains to the degree of government intervention and regulation within an economy, encapsulating principles of free markets, private property rights, and the rule of law. These factors collectively influence a nation's economic prosperity and overall well-being. Policymakers and economists commonly examine five key areas to assess and compare economic freedom. Property rights ensure legal protection for individuals and businesses' rights to own and utilize the property. The second, the rule of law, emphasizes impartial legal systems and government actions governed by established laws. The third aspect involves limited government intervention, streamlined regulations, and a focus on essential government functions. Regulatory efficiency, the fourth area, evaluates the ease of conducting business, while open markets, the fifth dimension, encompass freedom in international trade and commerce. Collectively, these areas provide a framework for assessing a country's economic freedom, with nations scoring higher often experiencing more significant economic growth, higher incomes, and improved living standards. Conversely, countries with lower levels of economic freedom may need help with development, including reduced investment, limited

entrepreneurship, and slower economic growth. Various organizations produce annual reports and indices ranking countries based on their economic freedom scores, offering valuable insights for policymakers and researchers studying the relationship between economic freedom and economic outcomes.

The secondary data set, Human Development Index, has been measured by the United Nations Development Programme to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. The Human Development Index (HDI), introduced by the United Nations Development Programme (UNDP) in 1990, stands as a significant departure from traditional economic indicators like Gross Domestic Product (GDP). It aims to provide a more comprehensive assessment of a country's development and the well-being of its people. The HDI encompasses three vital dimensions of human well-being: health, education, and standard of living. Health is measured through life expectancy at birth, reflecting a population's overall health and longevity. Education is assessed by combining school enrollment and literacy rate indicators, emphasizing access to and quality education. Lastly, the standard of living component considers a nation's per capita income, recognizing that economic prosperity is a fundamental aspect of human development. By amalgamating these dimensions into a single index, the HDI offers a valuable tool for comparing the development progress of countries, identifying disparities, and informing policy decisions aimed at improving the quality of life for people around the world.

3.2 Variables and Data Set Description

3.2.1 Economic Freedom Data Set

The dataset comprises of 3726 observations characterized by 29 variables consisting of 5 integers, 2 characters, and 22 numerical variables. Here's a brief overview of each variable:

YEAR: The year for which the data is recorded.

ISO_CODE: The three-letter country code according to the ISO 3166 standard.

COUNTRY: The name of the country.

SCORE: The overall economic freedom score for a country.

RANK: The rank of a country based on its economic freedom score.

QUARTILE: The quartile to which the country belongs based on its economic freedom score.

GOV_CONSUMPTION: Government consumption as a percentage of total consumption.

TRANSFERS: Transfers and subsidies as a percentage of GDP.

GOV_ENTERPRISES: Government enterprises and investment as a percentage of GDP.

TOP_MARG_TAX_RATE: Top marginal tax rate on personal income.

GOV_SIZE: Total government size as a percentage of GDP.

IMPARTIAL_COURTS: Impartial courts and the rule of law.

PROTEC_PROP_RIGHTS: Protection of property rights.

MILITARY_INTERF: Military interference in rule of law and politics.

INTEGRITY_LEGAL_SYST: Integrity of the legal system.

GENDER_ADJUSTMENT: Gender adjustment for economic freedom.

PROPERTS_RIGHTS: Protection of property rights.

MONEY_GROWTH: Money growth.

STD_INFLATION: Standard deviation of inflation.

INFLATION: Inflation rate.

FOREIGN_CURRENCY: Freedom to own foreign currency bank accounts.

SOUND_MONEY: Sound money (including inflation).

TARIFFS: Tariffs and non-tariff trade barriers.

BLACK_MARKET: Black-market exchange rates.

CONTROL_MOVEMENT: Freedom to trade internationally.

TRADE: Regulation of credit, labor, and business.

CREDIT_MARKET_REG: Regulation of credit, labor, and business.

LABOR_MARKET_REG: Regulation of credit, labor, and business.

REGULATION: Overall level of business regulation.

3.2.2 Human Development Index Data Set

The second dataset, Human Development Index, comprises of 189 observations characterized by 30 variables in which 28 of those are numerical, 1-integer variable, and 1-character variables. The main INDEX variable is described as the overall ranking of the listed countries based on their HDI score, which is a collective accumulation of, but not limited to, life expectancy, education, and income scores.

Chapter 4 Analysis

4.1 Data Preprocessing

4.1.1 Economic Freedom

Data Preprocessing to Retain ISO_CODE

The initial step involves familiarizing with the dataset. This includes examining key aspects such as the data's shape, initial rows, and the presence of any missing values. Thereafter, to streamline the dataset, features with more than 1242 null values are being dropped. The decision is based on retaining variables with at least one-third non-null values, as filling missing data in columns with scarce information using median values might deviate significantly from reality.

Filling Missing Values imputation by the Median

To address missing values, the decision is made to fill them using the median. This approach, calculated by country, is expected to have minimal impact on variance and increases the likelihood of accurate values.

Dealing with Unfilled Values

Some values remain unfilled, likely because the function lacks data from any year of the corresponding country to compute the median. To approximate, the median of the respective quartile is suggested, leveraging the shared similarities among countries within the same quartile.

4.1.2 Human Development Index

Replace Missing Values with Each Country's Median Index

Like my approach with the Economic Freedom dataset, all NaN values have been substituted with the median for each country.

Dealing with Strings

The merging of datasets was based on the Country name. However, it is observed that in some instances, country names may vary between the datasets. Therefore, standardizing the names was done by removing any additional information that follows the country name.

4.2 Exploratory Data Analysis

4.2.1 Economic Freedom

Correlation Matrix Heatmap

The initial correlation matrix heatmap in *Figure 1* depicts the correlation of all numeric variables presented in the Economic Freedom data set, although the focus will be on utilizing only the main features for exploratory data analysis.

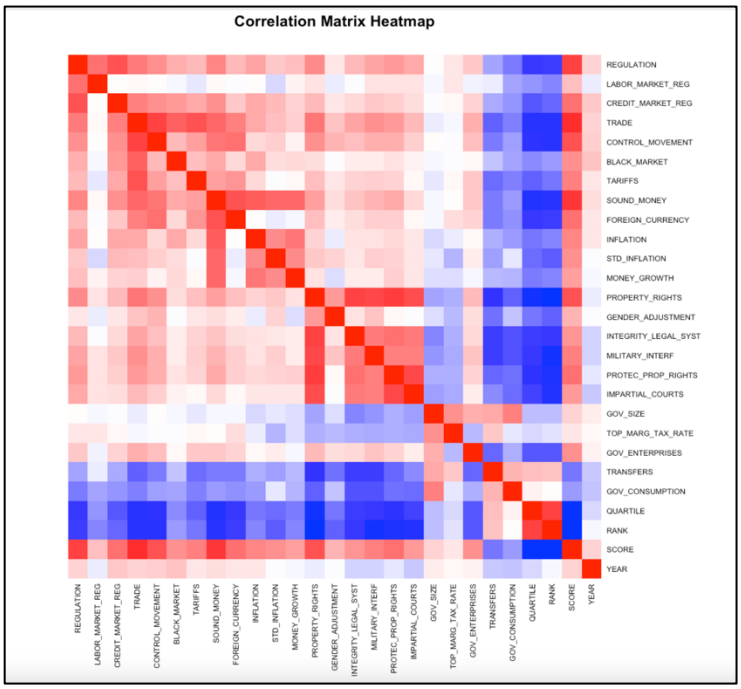

Figure 2 Heatmap of all Numeric Variables

Condensed Correlation Heatmap

As stated in the data set description and literature review, Economic freedom, a fundamental concept, pertains to the degree of government intervention and regulation within an economy, encapsulating principles of free markets, private property rights, and the rule of law. These factors collectively influence a nation's economic prosperity and overall well-being. Policymakers and economists commonly examine five key areas to assess and compare economic freedom. By

focusing solely on the six main features, it becomes apparent that most of them exhibit a strong correlation with the final score, except for Government Size, which appears to lack a robust relationship with the economic index.

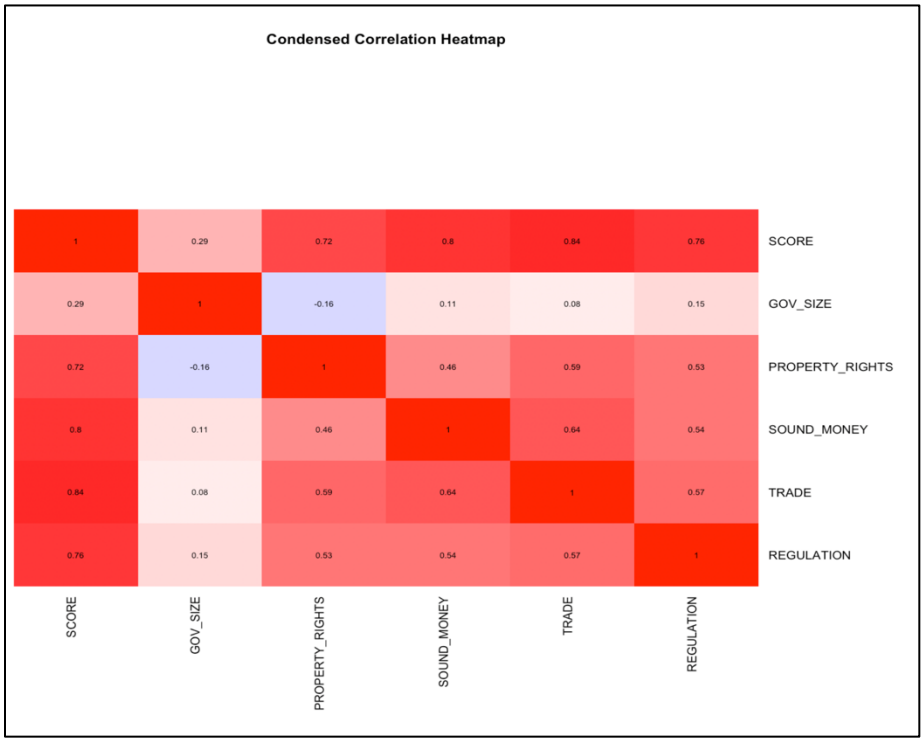

Figure 3 Condensed Correlation Heatmap of Six Main Features

Relation between EF score and Main Economic Freedom Features Scatter Plots

The correlation matrix heatmap analysis reveals a robust positive correlation between TRADE, PROPERTY RIGHTS, SOUND MONEY, and REGULATION with the economic freedom SCORE. This implies that as the levels of said features increase, the economic freedom index also tends to rise. In essence, a higher degree of international trade (TRADE) and well-protected property rights (PROPERTY_RIGHTS), money with stable purchase power (SOUND MONEY), and reduced imposed laws (REGULATION), is associated with an elevated economic freedom index. This observation underscores the significance of these factors in influencing and

contributing to a country's overall economic freedom, highlighting their interconnectedness with a broader economic landscape. As for the GOV_SIZE correlation matrix heatmap, the plot shows disperse plots across the map, with no significant and concise positive or negative correlation.

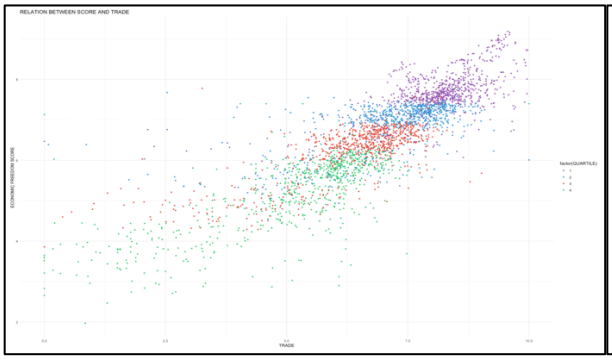

Figure 4 Correlation between EF score & Trade

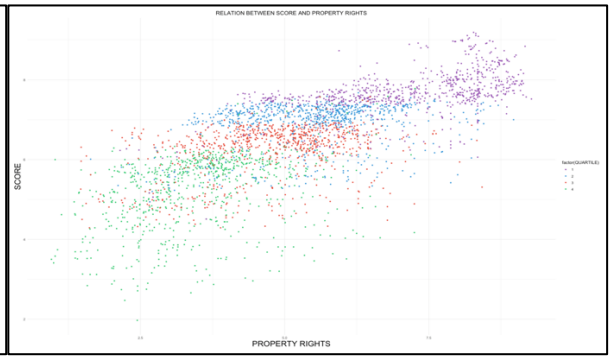

Figure 5 Correlation between EF score & Property Right

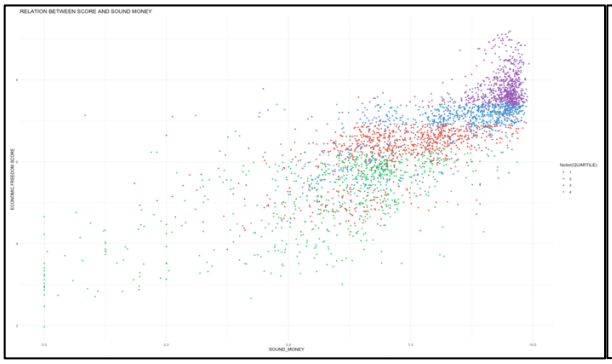

Figure 6 Correlation between EF score & Sound Money

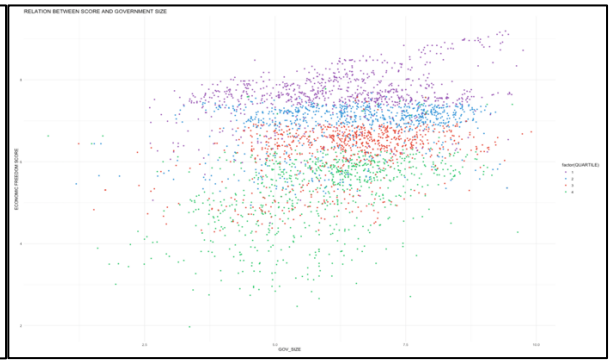

Figure 7 Correlation between EF score & Government Size

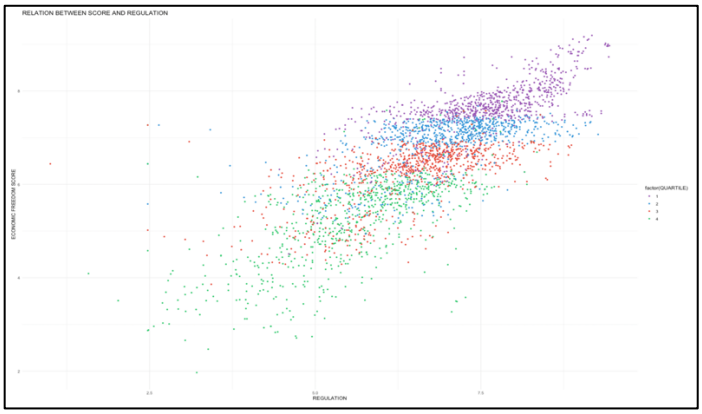

Figure 8 Correlation between EF score and Regulation

Performing Principal Component Analysis

For the PCA plot, I have set the scale parameter to FALSE in the prcomp function and adjusted the arrow lengths by multiplying loadings [, 1] and loadings[, 2] by 1.2 for better visibility. The addition of the grid() function provides a grid background to the plot, aiding in interpretation. The PCA plot illustrates the positions of selected features in a two-dimensional space defined by the first two principal components (PC1 and PC2). The coordinates for each feature provide insights into their influence on these components.

Notably, an increase in GOV_SIZE positively contributes to PC1, while REGULATION and TRADE positively affects PC1 but negatively impacts PC2. SOUND_MONEY positively contributes to PC1 but negatively to PC2, and a decrease in PROPERTY_RIGHTS has a strong negative effect on PC1 and a moderate negative effect on PC2. These interpretations highlight the potential impact of adjustments in GOV_SIZE and SOUND_MONEY, resulting in heightened positive contributions on the economic freedom index, and potential negative effects from TRADE, SCORE, and PROPERTY_RIGHTS.

In Figure 2 Correlation Heatmap - Condensed Correlation Heatmap of Six Main Features it was observed that Government Size (GOV_SIZE) appeared to lack a robust correlation with the economic index. This observation was likely based on the direct correlation coefficients between individual features and the final score, which may not fully capture the nuanced relationships present in the data. However, in the PCA plot analysis, the focus shifts to understanding the principal components that explain the variance in the dataset. The PCA plot reveals that Government Size (GOV_SIZE) contributes positively to PC1, this indicates that while Government Size may not have a strong direct correlation with the economic index on its own, it

still plays a significant role in influencing the overall variation in the data when considered along with other features.

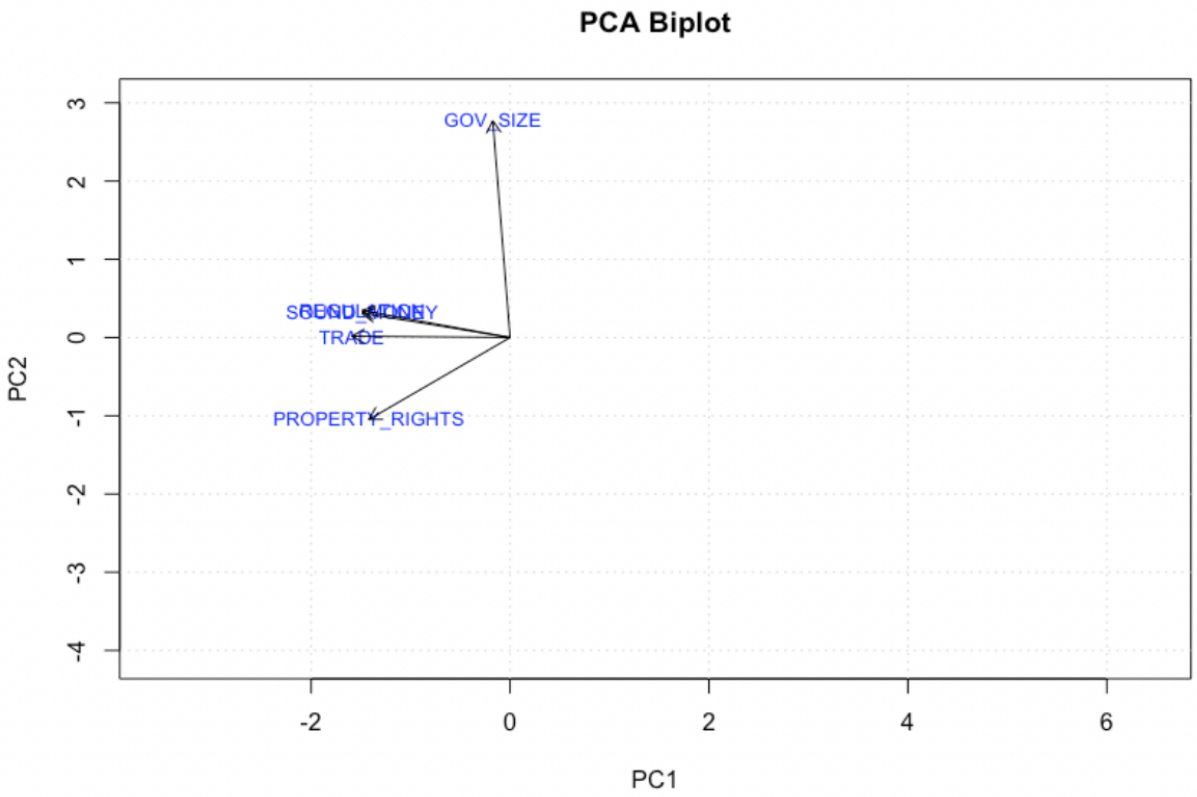

Figure 9 Principal Component Analysis for Main Features of EF

Least 15 Economically Free Countries in 2016 Bar Graph

The dataset includes country indices from 1970 to 2016. It allows us to identify and compare the countries at the bottom and top of the index for the last measured year. The subsequent code provides the Least Economically Free Countries. Most of the bottom 15 countries exhibit similar scores, except for Venezuela, the last-ranked country in 2016, which stands out due to a significant deviation. Venezuela has been undergoing a severe crisis in recent years. Additionally, noteworthy is that most of these countries are from Africa and Asia, with exceptions being Argentina and Venezuela, situated in South America.

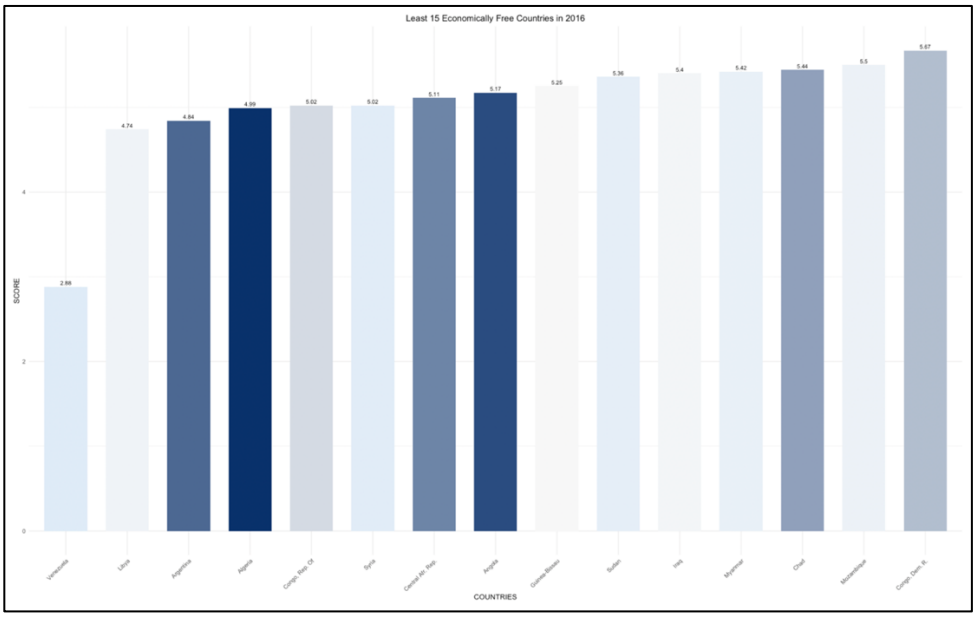

Figure 10 Least 15 Economically Free Countries in 2016

Top 15 Most Economically Free Countries in 2016 Bar Graph

Examining the top 15 countries in 2016 reveals minimal differences among them. Notably, the majority are from Europe or Asia, with only one representative each from Africa (Mauritius) and South America (Chile).

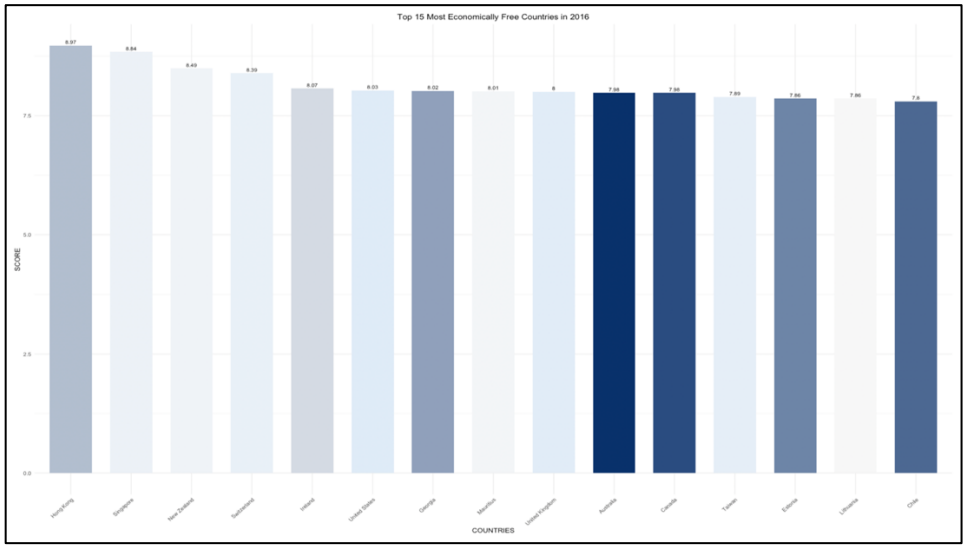

Figure 11 Top 15 Most Economically Free Countries in 2016

Economic Freedom Score between 1970 and 2016

The plot illustrates that most of these countries consistently maintained a high economic freedom score, with occasional significant fluctuations likely influenced by governmental or historical factors. Notably, Chile is the sole South American country in the top 15 in 2016. What makes it particularly intriguing is that Chile, once a 4th quartile country in the mid-70s, has significantly risen in economic freedom rankings.

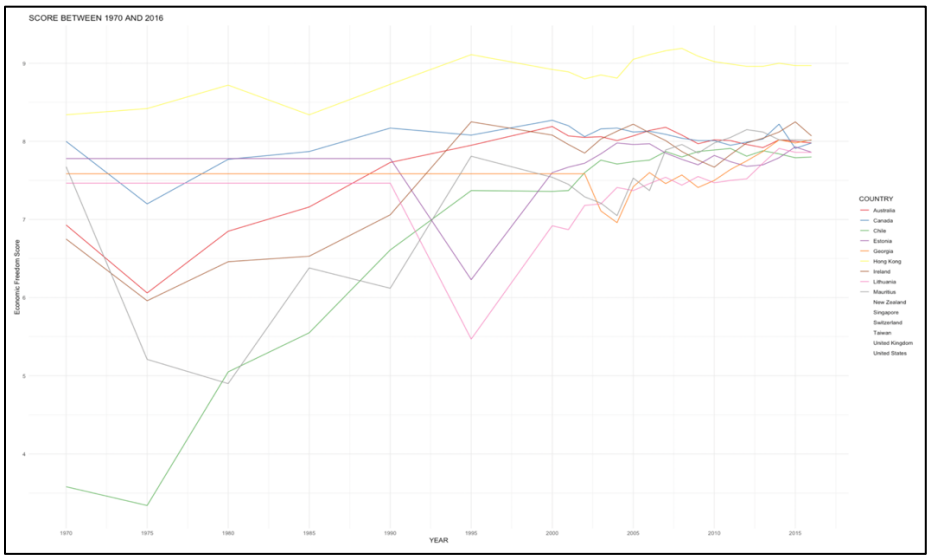

Figure 12 EF Score between 1970 and 2016

Main Economic Freedom Features of EEISU in 1970 and 2016

In the EEISU nations, there's a consistent growth across all features. However, in Chile, notable disparities exist, particularly in TRADE and PROPERTY_RIGHTS. This significant growth might elucidate Chile's transition from the 4th quartile in 1970 to the 1st quartile in 2016. Among the EEISU countries, the economic freedom index remained relatively stable between 5.0 and 8.0 from 2000 to 2015. When comparing the main economic freedom features of EEISU countries and Chile in 1970 and 2016, it's evident that EEISU countries experienced similar growth in all features. However, Chile stands out with substantial differences, particularly in TRADE and PROPERTY_RIGHTS, possibly explaining its transition from the 4th quartile in 1970 to the 1st quartile in 2016. Notably, the UAE exhibited the highest growth across several metrics, including SCORE, GOV_SIZE, PROPERTY_RIGHTS, SOUND_MONEY, TRADE, and REGULATION. The exception is SOUND_MONEY, where Iran outperformed the UAE. This suggests the UAE's significant overall economic improvement over the years, contributing to its enhanced economic freedom.

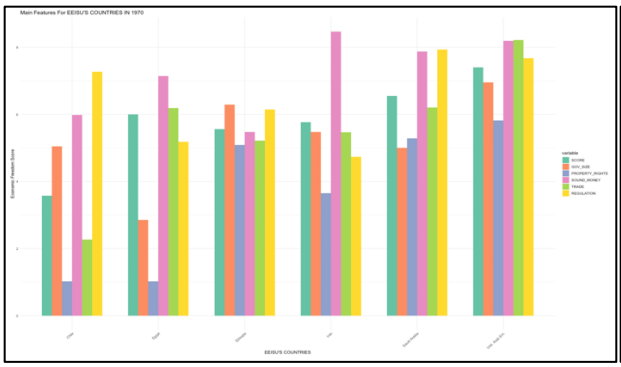

Figure 13 Main Economic Freedom Features in EEISU 1970

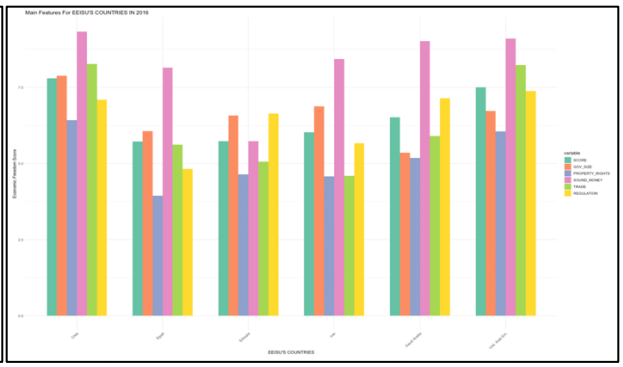

Figure 14 Main Economic Freedom Features in EEISU 2016

4.2.2 Human Development Index

Bar plot of Top 15 Countries in Human Development Index in 2016

Before making comparisons, I will examine the data to identify potential similarities with the initial dataset. Among the top 15, Hong Kong, Australia, Switzerland, and a few more are listed. While not all countries within the top 15 remain consistent, notable ones such as Hong Kong, Australia, and Switzerland persist. Over the period from 1990 to 2016, there is evident growth in the average Human Development Index (HDI) across countries. The graph shows the top 15 countries in the Human Development Index (HDI) as of the year 2016. All the countries had over 0.8 HDI, indicating a uniformly high level of human development among these nations. These countries are recognized for their relatively high standards of living, advanced education systems, and robust healthcare infrastructure. The countries mentioned are, in descending order: Finland, United Kingdom, Canada, United States, Denmark, Netherlands, Hong Kong, Singapore, Sweden, Iceland, Germany, Ireland, Australia, Switzerland, and Norway. Each of these nations has demonstrated exceptional achievements in terms of overall human development, encompassing factors such as life expectancy, education, and per capita income.

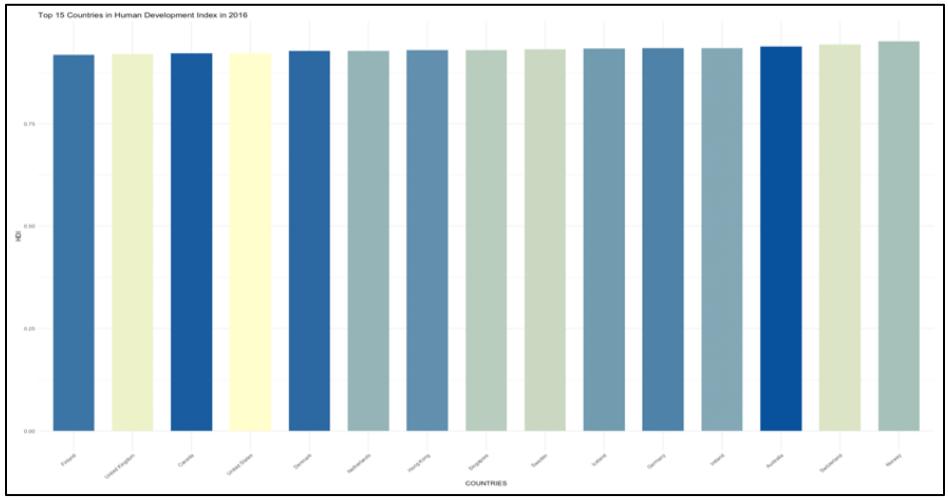

Figure 15 Top 15 Countries in Human Development Index in 2016

HDI Distribution Of 1990 And 2016

The KDE plot illustrates the density distribution of Human Development Index (HDI) in 1990 and 2016. In 1990, the highest density of countries is observed around an HDI of 0.93, gradually decreasing as HDI values exceed 0.93. Conversely, in 2016, the density shifts to a peak around an HDI of 0.95. The drop in density beyond 0.93 in 1990 implies that fewer countries had extremely high HDI values at that time, while the rise in density around 0.95 in 2016 signifies an increase in countries approaching or exceeding this threshold. The shift in density peaks from 1990 to 2016 indicates an overall improvement in global HDI, with more countries achieving higher levels of human development. The concentration of countries around specific HDI values offers insights into the global distribution of human development, with peaks indicating where a significant number of countries fall on the HDI scale. The overall trend of increasing density towards higher HDI values suggests progress in global human development over the years. This KDE plot serves as a valuable tool to visualize changes and trends in the distribution of HDI, providing a nuanced understanding of the global landscape of human development and highlighting the progress made worldwide.

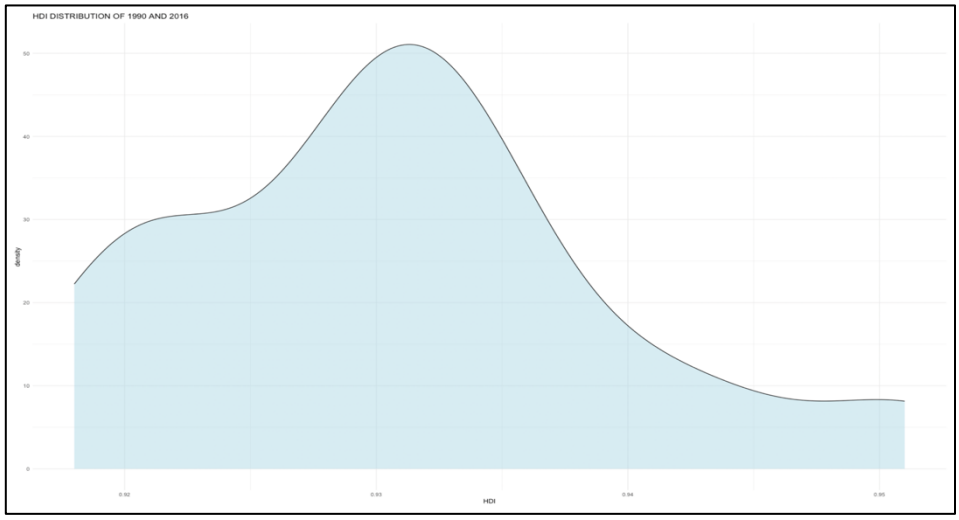

Figure 16 KDE HDI Distribution of 1990 and 2016

4.2.3 Merging of Data Frames

Relation Between HDI and Economic Freedom

The provided code generates a correlation heatmap based on a new data frame 'hdi_econ' after dropping the 'COUNTRY' and 'YEAR' columns. The resulting heatmap visually represents the correlation matrix of numeric variables within this dataset. The color intensity in each cell signifies the strength and direction of the correlation between corresponding variables or metrics were 'YEAR,' 'COUNTRY,' 'SCORE,' 'QUARTILE,' 'GOV_SIZE,' 'PROPERTY_RIGHTS,' 'SOUND_MONEY,' 'TRADE,' and 'REGULATION. Score had a strong correlation with all the variables apart from property-rights and quartile. Positive correlations suggest that as one variable increases, the other tends to increase as well, while negative correlations imply an inverse relationship. A correlation value close to 1 or -1 signifies a strong correlation, while values closer to 0 indicate a weaker relationship. The implication of this plot is twofold. Firstly, it offers a comprehensive view of how different economic indicators within the dataset are correlated with each other. Strong correlations, whether positive or negative, are visually evident through color patterns. Secondly, the absence of strong correlations or the presence of diverse correlation strengths suggests the complexity and multidimensionality of economic factors. The takeaway is that this heatmap provides valuable insights into the interrelationships among economic variables, aiding in the identification of potential patterns and guiding further analysis. Overall, it serves as a powerful tool for understanding the intricate network of economic indicators and their associations within the given dataset.

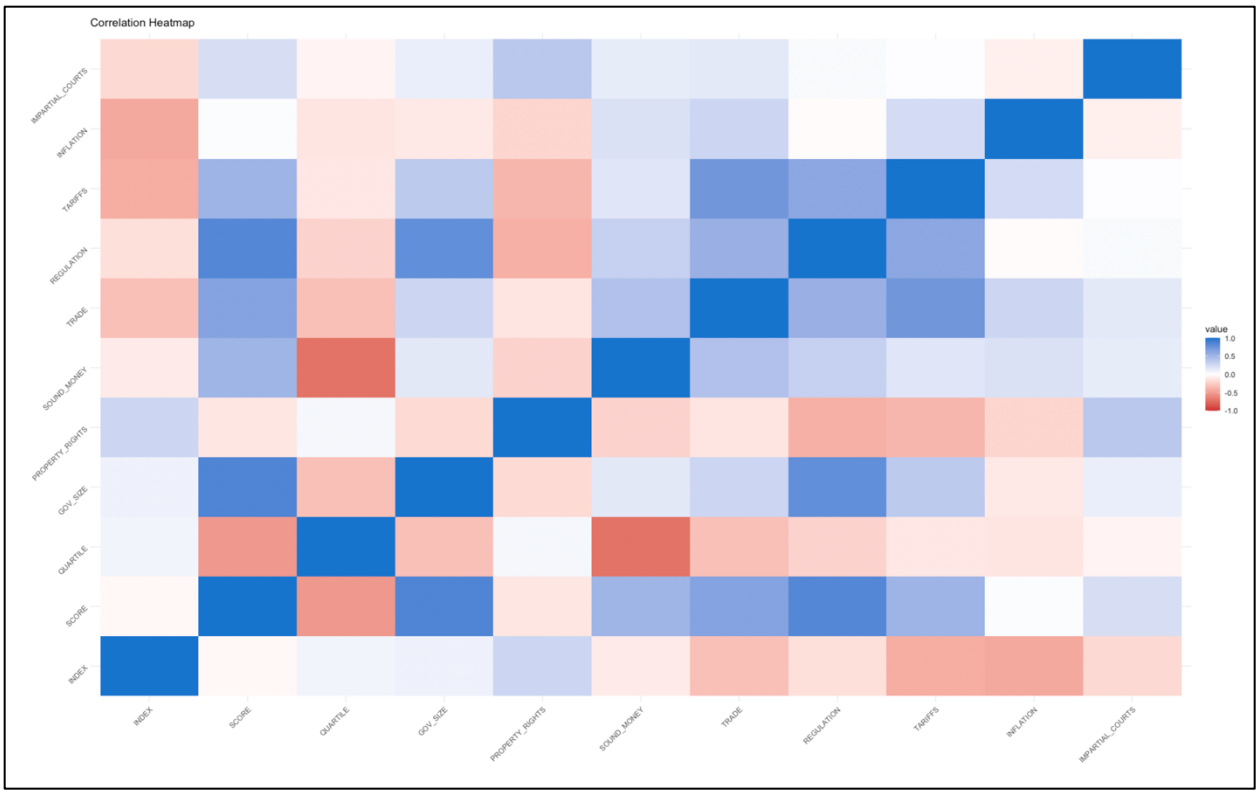

Figure 17 KDE HDI Distribution of 1990 and 2016

Correlation between INDEX and SCORE

The correlation plot between the Human Development Index (INDEX) and the Economic Freedom Score (SCORE) reveals interesting insights. For Quartile 1, the points are scattered across scores ranging from 7.5 to 9.0. Notably, within this quartile, countries with a Human Development Index (HDI) of 0.93 tend to have scores reaching the maximum of 9.0, while those with HDI between 0.93 and 0.95 exhibit even higher scores compared to countries with HDI between 0.90 and 0.93. In contrast, Quartile 2 displays only two points, both with scores below 7.5. The plot suggests a positive correlation between the Human Development Index and Economic Freedom Score, indicating that as the economic freedom score increases, so does the Human Development Index. The observation of higher scores associated with specific HDI ranges within Quartile 1 highlights the nuanced relationship between economic freedom, HDI, and scores. The limited data in Quartile 2, with lower scores, suggests a potential negative correlation but requires further investigation. Overall, the plot provides valuable insights into how the Human Development Index and Economic Freedom Score are distributed across different quartiles and HDI ranges, contributing to a nuanced understanding of their relationship within the dataset.

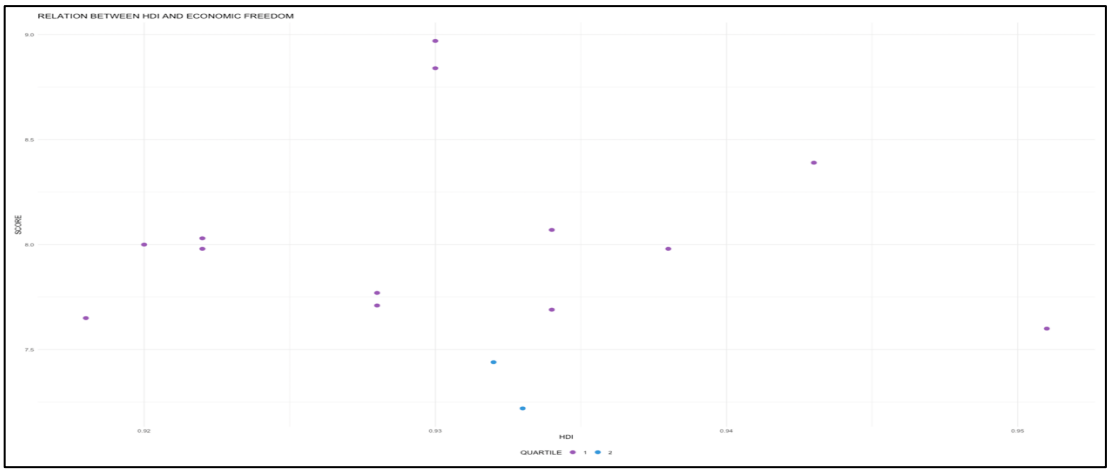

Figure 18 EF Index and the Economic Freedom Score Correlation

EEISU Analysis

The line plot comparing the Economic Freedom Index of EEISU countries, Chile, and Ethiopia, offers valuable insights. Notably, it shows the dynamic changes in economic freedom over the years for these countries. Chile stands out as a remarkable case, transitioning from one of the least economically free countries in 1970 to being among the top 15 in 2016. This aligns with the earlier observations. However, the focus shifts to the correlation between economic freedom and HDI for Chile. The line plot indicates that while the Economic Freedom Index for these countries varied from 4 to 8, all of them remained below Chile's level. This suggests that Chile's economic growth, as measured by the Economic Freedom Index, has not been accompanied by a proportional increase in the Human Development Index (HDI). Ethiopia's lack of oscillation until 2005, likely due to median filling for null values, underscores the impact of data imputation on the analysis. UAE's performance, closely mirroring Chile's, indicates a positive trend in economic freedom, potentially contributing to overall economic development. In summary, the plot implies that while Chile has made substantial strides in economic freedom, its HDI growth might not be as pronounced, emphasizing the importance of considering multiple indicators for a comprehensive assessment of a country's development.

Figure 19 Figure 18 Economic Freedom Index of EEISU countries

4.3 DATA MODELING

4.3.1 Multiple Linear Regression Model of Initial Attributes

I created a multiple linear regression model with the Economic Freedom Index (INDEX) as the dependent variable. The independent variables, which are factors considered to influence the Economic Freedom Index, include SCORE, GOV_SIZE, PROPERTY_RIGHTS, SOUND_MONEY, TRADE, and REGULATION. This model aims to analyze how variations in these independent variables collectively contribute to changes in the Economic Freedom Index, providing insights into the relationships and impacts of these factors on economic freedom. The multiple linear regression results indicate that the model has an intercept of 0.9316 with a significant t-value, suggesting a strong association between the independent variables and the Economic Freedom Index. However, the coefficients for the individual predictors (SCORE, GOV_SIZE, PROPERTY_RIGHTS, SOUND_MONEY, TRADE, and REGULATION) are not statistically significant, as indicated by their respective p-values being greater than the conventional significance level of 0.05. This implies that, in this model, the individual predictors may not have a significant impact on the Economic Freedom Index. The residual analysis shows a relatively low residual standard error of 0.008842, suggesting a good fit. However, the overall model fit, as indicated by the Multiple R-squared and Adjusted R-squared, is limited, with an Adjusted R-squared close to zero. The F-statistic and its associated p-value suggest that the overall model may not be statistically significant. In summary, the model exhibits a weak overall fit, and individual predictors may not be significant contributors to the variation in the Economic Freedom Index in this context.

```
Call:
lm(formula = INDEX ~ SCORE + GOV_SIZE + PROPERTY_RIGHTS + SOUND_MONEY +
    TRADE + REGULATION, data = hdi_econ)

Residuals:
      Min        1Q    Median        3Q       Max
-0.012068 -0.003526 -0.001339  0.003578  0.010260

Coefficients:
               Estimate Std. Error t value Pr(>|t|)
(Intercept)       0.9316     0.1076   8.657 2.46e-05 ***
SCORE             1.5341     0.9369   1.637    0.140
GOV_SIZE         -0.3048     0.1876  -1.625    0.143
PROPERTY_RIGHTS  -0.3022     0.1878  -1.609    0.146
SOUND_MONEY      -0.3015     0.1849  -1.630    0.142
TRADE            -0.3142     0.1892  -1.660    0.135
REGULATION       -0.3116     0.1879  -1.658    0.136
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.008842 on 8 degrees of freedom
Multiple R-squared:  0.425,     Adjusted R-squared:  -0.006222
F-statistic: 0.9856 on 6 and 8 DF,  p-value: 0.4926
```

Figure 20 Multiple Linear Regression Model Initial Attribute

4.3.2 Multiple Linear Regression Model of New Attributes Affecting EF

I created a multiple linear regression model with the Economic Freedom Index (INDEX) as the dependent variable. The independent variables, which are factors considered to influence the Economic Freedom Index, include inflation, tariffs, and impartial courts. This model aims to analyze how variations in these independent variables collectively contribute to changes in the Economic Freedom Index, providing insights into the relationships and impacts of these factors on economic freedom. The coefficients indicate that none of the independent variables show a statistically significant linear relationship with 'INDEX' at conventional significance levels. Furthermore, the model's overall fit is inadequate, as demonstrated by the low adjusted R-squared value of 0.1849 and the non-significant p-value of 0.164 associated with an F-statistic of 2.059. These values suggests that the overall regression model is not statistically significant at the conventional significance level of 0.05. Therefore, despite attempting to predict 'INDEX' using these variables, the model fails to capture a substantial portion of the variability in the data. This suggests that the chosen independent variables may not be appropriate predictors for the 'INDEX', highlighting the need for further investigation or potentially different variables to improve model performance.

P-values	0.164
R-squared value	0.1849
F-statistic	2.059

Figure 21 Performance Evaluation Metrics

```
Call:
lm(formula = INDEX ~ TARIFFS + INFLATION + IMPARTIAL_COURTS,
    data = hdi_econ)

Residuals:
      Min        1Q    Median        3Q       Max
-0.014363 -0.004866  0.001109  0.005313  0.011548

Coefficients:
                 Estimate Std. Error t value Pr(>|t|)
(Intercept)      1.147338   0.113718  10.089 6.76e-07 ***
TARIFFS         -0.002663   0.002000  -1.332    0.210
INFLATION       -0.018076   0.011564  -1.563    0.146
IMPARTIAL_COURTS -0.002596   0.002801  -0.927    0.374
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.007958 on 11 degrees of freedom
Multiple R-squared:  0.3596,    Adjusted R-squared:  0.1849
F-statistic: 2.059 on 3 and 11 DF,  p-value: 0.164
```

Figure 22 Multiple Linear Regression Model New Attribute

4.3.3 Assessing using Random Forest Approach

The Random Forest model yields promising results for predicting the 'INDEX' variable. The low Mean Absolute Error (MAE) of 0.0072 and Root Mean Squared Error (RMSE) of 0.0084 indicate close alignment between predicted and actual values. Moreover, the R-squared (R^2) value of 0.7452 highlights the model's ability to explain approximately 74.52% of the variability in the 'INDEX' variable using the selected independent variables. This outcome suggests significant explanatory power and underscores the model's effectiveness in analyzing the relationship between the independent variables and 'INDEX'. While these findings are encouraging, further assessment and comparison with alternative methods are prudent to ensure robustness and reliability. The analysis sought to understand how variables such as inflation, tariffs, sound money, and impartial courts influence human development, as measured by the HDI, rather than economic freedom directly. However, the findings indicate a lack of statistically significant linear relationships between these variables and HDI, with non-significant coefficients and a poor overall model fit. This suggests that the selected independent variables may not fully explain variations in human development.

Mean Absolute Error (MAE)	0.0072
Root Mean Squared Error (RMSE)	0.0084
R-squared (R^2)	0.7452

Figure 23 Performance Evaluation Metrics II

Chapter 5 Conclusion

Exploring Unexplored Factors Influencing Economic Liberty

Despite constructing a multiple linear regression model to examine the factors influencing economic liberty using the Economic Freedom Index as the dependent variable and inflation, tariffs, sound money, and impartial courts as independent variables, the analysis yielded inconclusive results. The coefficients of the independent variables failed to exhibit statistically significant linear relationships with the INDEX at conventional significance levels, as evidenced by their p-values exceeding 0.05. Moreover, the model's overall fit was inadequate, indicated by a low adjusted R-squared value of 0.1095 and a non-significant F-statistic ($p = 0.2935$). Consequently, the model failed to explain a significant portion of the variability in the data, suggesting that the selected independent variables may not be suitable predictors for the INDEX. This underscores the necessity for further exploration into alternative variables or additional factors that could better capture the complexities of economic freedom and its determinants. Future research should focus on investigating areas expected to influence economic liberty but have yet to exhibit significant effects, analyzing the reasons for this lack of impact, and exploring potential avenues for enhancing model performance.

Evaluating Economic Freedom's Impact on Habitat Favorability

Nations with higher levels of economic freedom often provide a more favorable habitat due to various factors such as pro-business policies, low taxation, minimal government intervention, substantial property rights, efficient regulatory systems, transparent regulations, low levels of corruption, and streamlined procedures that contribute to an environment conducive to

entrepreneurship, innovation, and investment. Countries with competitive tax regimes, skilled workforces, and access to global markets attract businesses and investors seeking stability and growth opportunities. Furthermore, a commitment to economic liberalization, political stability, and good governance enhances a nation's attractiveness for economic activities. Diverse economies, supportive regulatory environments, and a focus on innovation create favorable business development and prosperity conditions. Overall, combining these factors fosters economic growth, job creation, and higher living standards in nations with heightened levels of economic freedom. About Figure 10, Top 15 Most Economically Free Countries in 2016, Europe and Asia are known to have scored the highest in economic freedom levels. Many countries in Europe and Asia have a long history of market-oriented economies and policies that promote economic freedom. This includes respect for property rights, contract enforcement, and limited government intervention in markets. Additionally, several European and Asian countries have undergone significant economic development over the past century, transitioning from rural to industrialized economies. This development often coincides with adopting policies promoting economic freedom, such as trade liberalization and deregulation. Cultural and institutional characteristics are also prevalent in Europe and Asia, such as a strong work ethic, respect for the rule of law, and a tradition of entrepreneurship, which fosters an environment conducive to economic freedom. Furthermore, political stability is essential for economic freedom, providing a conducive investment and business growth environment. Many countries in Europe and Asia have relatively stable political systems compared to other regions, which can contribute to their higher economic freedom scores.

Trade-Offs Associated with Heightened Economic Freedom

As assessed in the exploratory data analysis, heightened economic freedom is highly associated with heightened human development indices such as increased prosperity and innovation. However, increasing economic freedom comes with trade-offs and potential drawbacks, indicating that absolute economic freedom should not be a solemn target. A significant fundamental trade-off associated with heightened economic freedom is income inequality, as while economic freedom can lead to wealth creation and upward mobility for some, it may also widen the gap between the rich and the poor, leading to social and economic disparities as examined by Ugoh, S. (2021). Heightened economic freedom may also result in market failures due to improper resource allocation. Factors such as externalities, monopolies, asymmetric information, and public goods may not be adequately addressed without government intervention, leading to suboptimal outcomes, inefficiencies, and societal welfare losses. Furthermore, there may be a reduced emphasis on social safety nets such as unemployment benefits, healthcare, and education subsidies, as excessive economic freedom can erode social cohesion and trust within society. Rising inequality, perceived injustices, and lack of opportunities for certain groups may lead to social unrest, polarization, and decreased confidence in institutions, undermining social stability and economic prosperity in the long run. Also, free-market economies are prone to fluctuations and economic downturns due to financial crises and market speculation. Heightened economic freedom can exacerbate volatility and increase the frequency and severity of economic recessions, leading to widespread unemployment and financial insecurity, exploiting workers, offering low wages, unsafe working conditions, and lack of bargaining power, perpetuating cycles of poverty and hindering socioeconomic mobility. Additionally, focusing on short-term profits and prioritizing immediate gains over long-term investments in research, development, and

infrastructure impedes sustainable growth and innovation, hindering the economy's ability to adapt to changing circumstances and technological advancements.

5.1 Recommendations and Future Work

Achieving economic freedom is a commendable goal yet recognizing and mitigating its inherent trade-offs is essential. While economic freedom can stimulate innovation, entrepreneurship, and prosperity, it also has the potential to amplify volatility and worsen economic downturns without adequate regulation. Thus, striking a balance between the advantages of economic freedom and its associated risks necessitates thoughtful policy implementation. Future research and work should include regulatory frameworks that safeguard stability and foster sustained growth and can harness the benefits of economic freedom while mitigating its adverse effects, ensuring a more equitable and resilient economic landscape.

References

1. Ayal, E. B., & Karras, G. (1998). Components of economic freedom and growth: An empirical study. *The Journal of Developing Areas*, *32*(3), 327-338. https://www.jstor.org/stable/4192775
2. Carlsson, F., & Lundström, S. (2002). Economic freedom and growth: Decomposing the effects. *Public choice*, *112*(3-4), 335-344. https://link.springer.com/article/10.1023/A:1019968525415
3. Celico, A., & Rode, M. (2023). Populism, Majority Rule, and Economic Freedom. *To appear*. https://www.fraserinstitute.org/studies/populism-majority-rule-and-economic-freedom
4. Heckelman, J. C. (2000). Economic freedom and economic growth: A short-run causal investigation. *Journal of Applied Economics*, *3*(1), 71-91. https://www.tandfonline.com/doi/abs/10.1080/15140326.2000.12040546
5. Gropper, D. M., Lawson, R. A., & Thorne Jr, J. T. (2011). Economic freedom and happiness. *Cato J.*, *31*, 237.
6. Gwartney, J., & Lawson, R. (2003). The concept and measurement of economic freedom. *European Journal of Political Economy*, *19*(3), 405-430. https://www.sciencedirect.com/science/article/abs/pii/S0176268003000077
7. Gwartney, J. D., Lawson, R. A., & Holcombe, R. G. (1999). Economic freedom and the environment for economic growth. *Journal of Institutional and Theoretical Economics (JITE)/Zeitschrift für die gesamte Staatswissenschaft*, 643-663. https://www.jstor.org/stable/40752161
8. Sagar, A. D., & Najam, A. (1998). The human development index: a critical review. *Ecological economics*, *25*(3), 249-264. https://doi.org/10.1016/S0921-8009(97)00168-7
9. Saputra, F. A., Barakbah, A., & Rokhmawati, P. R. (2020, September). Data analytics of human development index (HDI) with features descriptive and predictive mining. In *2020 International Electronics Symposium (IES)* (pp. 316-323). IEEE. https://ieeexplore.ieee.org/abstract/document/9231661
10. Staufer, J., & Brockmann, P. (2018). Forecasting macroeconomical indices with machine learning: impartial analysis of the relation between economic freedom and quality of life. *International Journal on*

Soft Computing, Artificial Intelligence and Applications, *7*(4), 21-35. https://www.academia.edu/download/87632596/IJSCAI_001.pdf

11. Tunçsiper, Ç. (2023). The Effect of Economic Freedom and Human Development on Economic Growth: Panel Data Analysis for G7 Countries. *Journal of Recycling Economy & Sustainability Policy*, *2*(1), 28-33. https://respjournal.com/index.php/pub/article/view/16
12. Yakunina, R. P., & Bychkov, G. A. (2015). Correlation analysis of the components of the human development index across countries. *Procedia Economics and Finance*, *24*, 766-771. https://www.sciencedirect.com/science/article/pii/S2212567115006929
13. Yilmaz, I., & Tag, M. N. (2016). Happiness and economic freedom: Are they related? In *SHS Web of Conferences* (Vol. 28, p. 01109). EDP Sciences. https://www.shs-conferences.org/articles/shsconf/abs/2016/06/shsconf_rptss2016_01109/shsconf_rptss2016_01109.html
14. Alexiou, C., Vogiazas, S., & Solovev, N. (2020). Economic growth and quality of institutions in 27 postsocialist economies. *Journal of Economic Studies, 47*(4), 769-787. https://doi.org/10.1108/JES-02-2019-0069
15. Creutzig, F. (2020). Limits to liberalism: Considerations for the Anthropocene. *Ecological Economics, 177*, 1-10. https://doi.org/10.1016/j.ecolecon.2020.106763
16. Dao, T. B., & Khuc, V. Q. (2023). The impact of openness on human capital: A study of countries by the level of development. *Economies, 11*(7), 1-13. https://doi.org/10.3390/economies11070175
17. Dokmanović, M., & Cvetićanin, N. (2020). Economic freedom in the Balkan transition countries from a valuable human ends perspective. *Journal of Balkan and Near Eastern Studies, 22*(5), 629-648. https://doi.org/10.1080/19448953.2020.1799597
18. Feng, J., Xie, Q., & Zhang, X. (2021). Trade liberalization and the health of working-age adults: Evidence from China. *World Development, 139*(1), 1-13. http://dx.doi.org/10.1016/j.worlddev.2020.105344
19. Feruni, N., Hysa, E., Panait, M., Rădulescu, I. G., & Brezoi, A. (2020). The impact of corruption, economic freedom and urbanization on economic development: Western Balkans versus EU-27. *Sustainability, 12*(22), 1-22. https://doi.org/10.3390/su12229743

20. Fu, X., Wang, T., & Yang, H. (2023). Does service trade liberalization promote service productivity? Evidence from China. *Sustainability, 15*(8), 1-22. https://doi.org/10.3390/su15086440
21. Haini, H. (2020). Examining the relationship between finance, institutions and economic growth: Evidence from the ASEAN economies. *Economic Change and Restructuring, 53*, 519–542. https://doi.org/10.1007/s10644-019-09257-5
22. Hamdi, H., & Hakimi, A. (2021). Trade openness, foreign direct investment, and human development: A panel cointegration analysis for MENA countries. *The International Trade Journal, 36*(3), 219-238. https://doi.org/10.1080/08853908.2021.1905115
23. Haseeb, M., Suryanto, T., Hartani, N. H., & Jermsittiparsert, K. (2020). Nexus between globalization, income inequality and human development in Indonesian economy: Evidence from application of partial and multiple wavelet coherence. *Social Indicators Research, 147*, 723-745. https://doi.org/10.1007/s11205-019-02178-w
24. Kim, D.-H., Hsieh, J., & Lin, S.-C. (2021). Financial liberalization, political institutions, and income inequality. *Empirical Economics, 60*, 1245–1281. https://doi.org/10.1007/s00181-019-01808-z
25. Lee, W. (2023). Trade liberalization, distributional coalitions and economic growth: A case of Vietnam. *Sustainability, 15*(14), 1-19. https://doi.org/10.3390/su151410883
26. Ou, J., Zheng, Z., & Zhang, N. (2023). A study of the effect of trade openness on population health: Empirical evidence from China. *Sustainability, 15*(16), 1-19. https://doi.org/10.3390/su151612571
27. Torp, S., & Reiersen, J. (2020). Globalization, work, and health: A Nordic perspective. *International Journal of Environmental Research and Public Health, 17*(20), 1-20. https://doi.org/10.3390/ijerph17207661
28. Ugoh, S. (2021). Leadership and Governance issues in Nigeria as a constraint to Sustainable Development: A reflection of the 'End SARS' Protest. https://core.ac.uk/download/482738156.pdf
29. Yang, Z., Vitenu-Sackey, P. A., Hao, L., & Tao, Y. (2023). Economic freedom, inclusive growth, and financial development: A heterogeneous panel analysis of developing countries. *PLoS ONE, 18*(7), 1-20. https://doi.org/10.1371/journal.pone.0288346

30. Zhao, J., Madni, G. R., Anwar, M. A., & Zahra, S. M. (2021). Institutional reforms and their impact on economic growth and investment in developing countries. *Sustainability, 13*(9), 1-14. https://doi.org/10.3390/su13094941