COURSE: FA- 582 - WS Foundation of Financial Data Science

SEMESTER: FALL 2023

PROJECT REPORT

TITLE: Analyzing IFC Investment Services Projects

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SECTION 1: ABSTRACT

Despite the pivotal role of the International Finance Corporation (IFC) and the World Bank in shaping development through investment services, there is a noticeable gap in research on the impact and effectiveness of IFC's investment projects. This study seeks to bridge this gap by conducting a detailed analysis of a dataset encompassing IFC investment services projects. Beyond merely identifying trends and patterns, the research goes further to investigate the key factors contributing to the success of these projects and the challenges they encounter. The project aims to provide a holistic understanding of the dynamics influencing the outcomes of IFC's investment initiatives. This study not only contributes to informed decision-making in international development finance but also addresses the imperative need for comprehensive insights into the impact and effectiveness of IFC's investment services projects.

SECTION 2: INTRODUCTION

The International Finance Corporation (IFC), a vital arm of the World Bank, significantly impacts the development of businesses in developing countries through its financing and investment services. This project focuses on a comprehensive analysis of the IFC's investment services project data, aiming to identify trends and patterns in the types of projects financed. Additionally, the study explores the average duration of each project stage, providing valuable insights into the approval-to-investment timeline.

The significance of this study lies in its potential to unveil shifts in the IFC's investment focus and product lines over time. Understanding these trends can aid in predicting future growth, contributing to informed decision-making in the realm of international development finance.

SECTION 3: RESEARCH QUESTIONS

The following research questions will be addressed in this project:

1. How has the IFC's focus on different industries changed over time?
2. How have the IFC's product lines changed over time?
3. What is the average duration of each project stage?
4. Are there any relationships between the IFC's investment focus, product lines, and project duration?
5. How does the relationship between environmental category and disclosure period vary across different industries?

SECTION 4: DATASET

The IFC Investment Services Projects dataset provides information about the projects that the IFC has invested in through its investment services. The dataset can be used to analyze the IFC's investment portfolio, identify trends in IFC investment, and assess the impact of IFC investment on development outcomes. It contains information about the projects that the International Finance Corporation (IFC) has invested in through its investment services. The IFC is a member of the World Bank Group and provides financing and advisory services to businesses in developing countries. This dataset contains 24 columns and 6024 rows.

Description of column names:

Column Name	Description	Data type
Date Disclosed	Date when the record was first disclosed.	Date & Time
Project Name	Name of an investment project - discrete unit of work associate	Plain text
Document Type	Type of document produced	Plain text
Project Number	Numeric code that uniquely identifies a project.	Plain Text
Project URL	Link to a project page on IFC Projects website.	Website URL
Product Line	Identifies IFC Financial Product. This is the highest level of classification to be applied to Ifc products. Each IFC product must be assigned one and only one product type.	Character
Company Name	Name of the client company	Character
Country	Country where investment and/or advisory services are executed and/or utilized.	Character
IFC Country Code	Country code according to IFC Code list.	Character
Industry	Name that follows the North American Industry Classification System (NAICS) schema identifying a distinct economic segment and is the lowest classification level.	Character
Environmental Category	Code indicating nature and extent of environmental and social assessment needed from investment project as defined in IFC's Policy on Environmental and Social Sustainability.	Character
Department	World Bank Group organizational entity within a Vice Presidency, composed of one or more units and/or divisions.	Character
Status	Identifies the standing of a project.	Character
Projected Board Date	Summary of Project Information is prepared and distributed to the public in advance of the IFC Board of Directors' consideration of the proposed transaction. Board dates are estimates only.	Date
IFC Approval Date	The date on which project was approved by IFC.	Date
IFC Signed Date	The date on which project was signed by IFC.	Date
IFC Invested Date	The date on which the project was invested by IFC.	Date
IFC investment for Risk Management (Million - USD)	Risk Management - product designed to hedge the financial risk of IFC client(s) using derivative products.	Numeric
IFC investment for Guarantee (Million - USD)	Guarantee - promise from one entity to assume responsibility for the payment of a financial obligation of another entity if such other entity fails to perform. A guarantee is a contingent liability of the guarantor.	Numeric
IFC investment for Loan (Million - USD)	Loans - money advances to a client, to be repaid later, usually with interest and/or fees.	Numeric
IFC investment for Equity (Million - USD)	Equity - Ownership interest in a corporation or enterprise that represents a claim on the assets of the entity in proportion to the number and class of shares owned.	Numeric
Total IFC investment as approved by Board (Million - USD)	Sum of project's financial product(s) prior to approval and approved.	Numeric
WB Country Code	Country code according to the WBG Code list. Might be different from ISO codes.	Character
As of Date	Date when this snapshot was taken.	Date

Descriptions for each of the mentioned environmental categories:

1. **FI-1:** Basic level of environmental and social assessment for projects with low impact and minimal risks.
2. **FI-2:** More comprehensive assessment than FI-1, suitable for projects with moderate environmental and social impact.
3. **A:** Rigorous assessment required for projects with high potential for adverse environmental and social impacts.
4. **B:** Assessment for projects with lower environmental and social impact, involving fewer risks than Category A.
5. **FI-3:** Intermediate-level assessment, falling between FI-2 and Category A, for projects with moderate impact.
6. **C:** Minimal assessment for projects with relatively low environmental and social impact.
7. **Other:** Category for projects with unique characteristics not covered by the standard codes.
8. **FI:** Category indicating financial intermediary involvement, often requiring assessments related to financial operations and impact.

Primary Data Source:

1. IFC Investment Services Projects: https://finances.worldbank.org/Projects/IFC-Investment-Services-Projects/efin-cagm
2. Yahoo Finance

SECTION 5: EXPLORATORY DATA ANALYSIS

Summary Statistics and Relationships:

The initial exploration of the dataset involves understanding its structure and handling missing values. The dataset is pre-processed to replace missing values in relevant columns and convert date columns to the appropriate format.

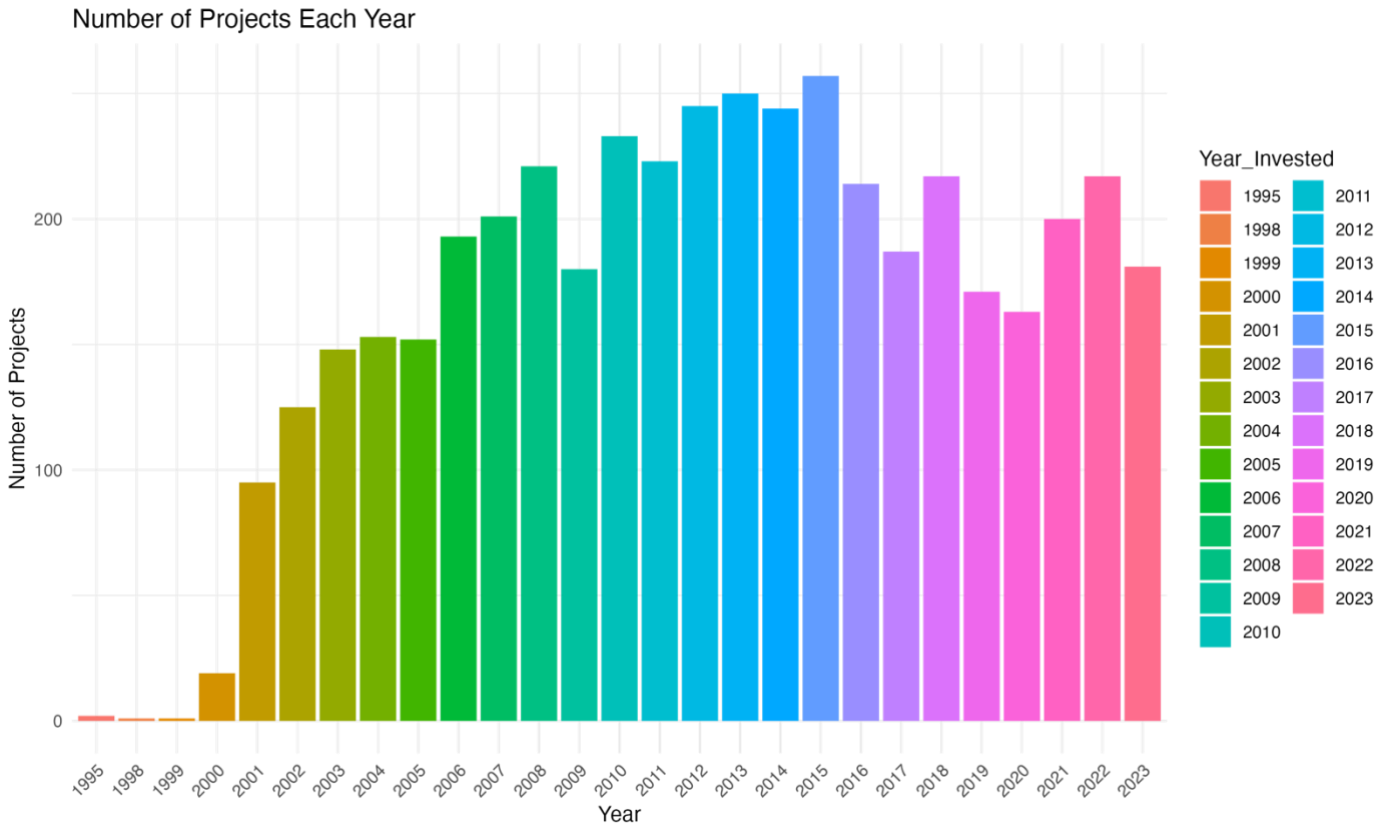
```
> summary(ifc_data)
 Date.Disclosed     Project.Name       Document.Type      Project.Number   Project.Url
 Length:6029        Length:6029        Length:6029        Min.   :  3402   Length:6029
 Class :character   Class :character   Class :character   1st Qu.: 23479   Class :character
 Mode  :character   Mode  :character   Mode  :character   Median : 30585   Mode  :character
                                                          Mean   : 33234
                                                          3rd Qu.: 39369
                                                          Max.   :574447

 Product.Line       Company.Name         Country          IFC.Country.Code     Industry
 Length:6029        Length:6029        Length:6029        Length:6029        Length:6029
 Class :character   Class :character   Class :character   Class :character   Class :character
 Mode  :character   Mode  :character   Mode  :character   Mode  :character   Mode  :character


 Environmental.Category  Department           Status          Projected.Board.Date IFC.Approval.Date
 Length:6029            Length:6029        Length:6029        Length:6029          Length:6029
 Class :character       Class :character   Class :character   Class :character     Class :character
 Mode  :character       Mode  :character   Mode  :character   Mode  :character     Mode  :character


 IFC.Signed.Date    IFC.Invested.Date  IFC.investment.for.Risk.Management.Million...USD.
 Length:6029        Length:6029        Min.   :  0.000
 Class :character   Class :character   1st Qu.:  1.000
 Mode  :character   Mode  :character   Median :  2.500
                                       Mean   :  5.258
                                       3rd Qu.:  5.000
                                       Max.   :100.000
                                       NA's   :5853
```

```
IFC.investment.for.Guarantee.Million...USD. IFC.investment.for.Loan.Million...USD.
Min.   :   0.00                           Min.   :   0.00
1st Qu.:   6.07                           1st Qu.:  10.00
Median :  23.72                           Median :  25.00
Mean   :  89.64                           Mean   :  41.54
3rd Qu.:  74.46                           3rd Qu.:  50.00
Max.   :1500.00                           Max.   :1000.00
NA's   :5723                              NA's   :1736
IFC.investment.for.Equity.Million...USD. Total.IFC.investment.as.approved.by.Board.Million...USD.
Min.   :   0.00                          Min.   :   0.02
1st Qu.:   3.00                          1st Qu.:  10.00
Median :  10.00                          Median :  22.49
Mean   :  21.80                          Mean   :  43.82
3rd Qu.:  23.82                          3rd Qu.:  50.00
Max.   :1003.00                          Max.   :1500.00
NA's   :3890                             NA's   :248
WB.Country.Code     As.of.Date
Length:6029        Length:6029
Class :character   Class :character
Mode  :character   Mode  :character
```

Data Cleaning and pre-processing:

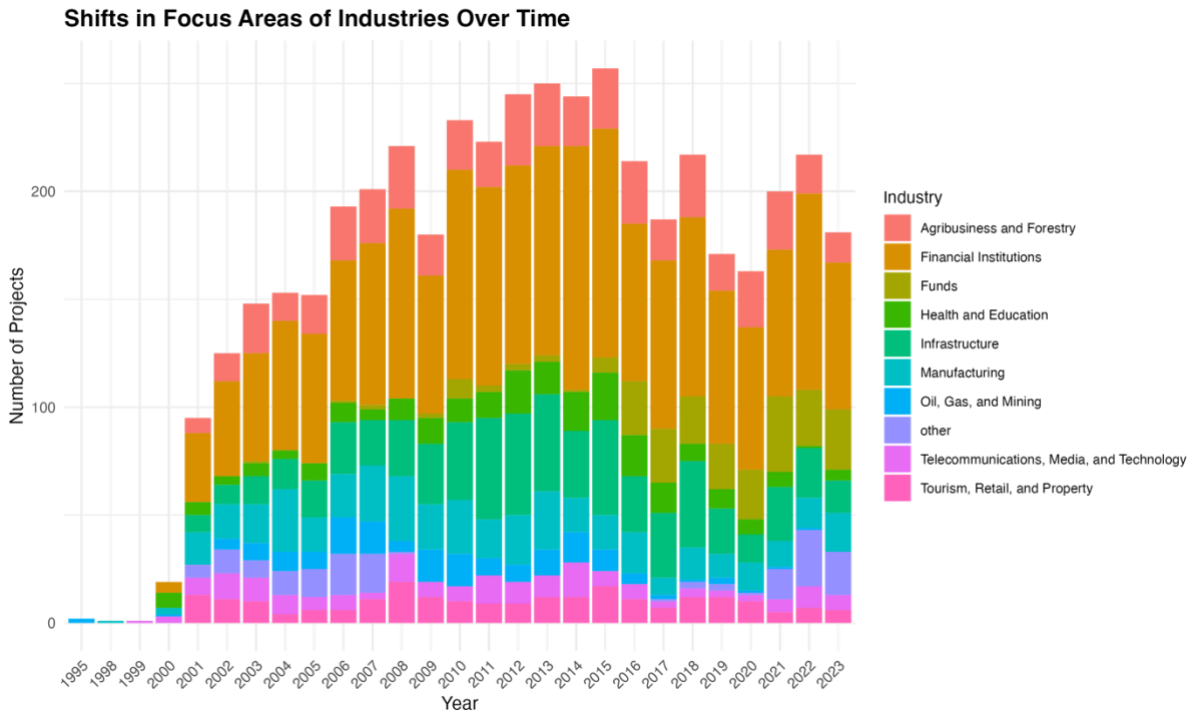
Our project's initial phase focused on cleaning and preparing our dataset for analysis. We began by importing the data from a CSV file and analyzing its structure using str(). This provided a clear picture of the variables and their data types. Missing values, particularly in investment-related columns, were addressed by replacing them with zeros. We standardized the date format using the mdy() function from the lubridate package, ensuring consistency and accuracy. To streamline the data and prioritize our analysis, unnecessary columns like "As.of.Date," "WB.Country.Code," and "Project.Url" were removed. Dates were further refined by converting them to date objects using as.Date(), enabling precise temporal analysis. Additionally, we extracted years from the dates, creating new columns for year-based analysis and visualization. With meticulous attention to detail, we removed rows containing any missing values, culminating in a meticulously cleaned dataset named ifc_data_cleaned. This final dataset, prepared with utmost care, ensured the integrity and completeness necessary for extracting valuable insights in the project's subsequent phases.

The following EDA has been performed in order to answer the research questions->



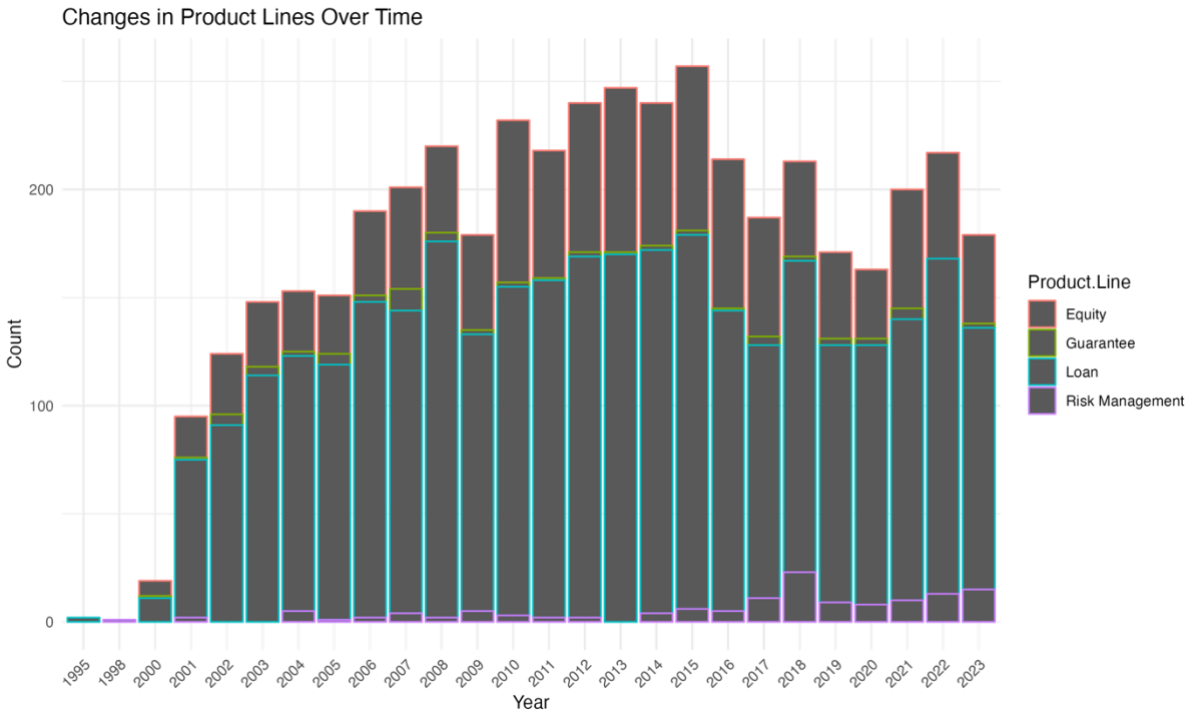
Analysis:

- The number of projects seems to vary across the years, with fluctuations observed in different industries.
- There is a substantial increase in the number invested from year 1999 to 2000.
- The number of projects then declined sharply in 2008 and 2009, this could be due to the global recession during that period.
- Since 2015, the International Finance Corporation (IFC) has reduced project investments due to:
- Global Economic Slowdown: Decline in global economic growth diminished demand for IFC's investments.
- Increased Competition: Heightened competition from private equity and venture capitalists made it challenging for IFC to identify appealing investment opportunities.
- Shift in Focus: IFC's recent emphasis on development-centric projects resulted in fewer investments, aligning with the organization's refined criteria.



Analysis:

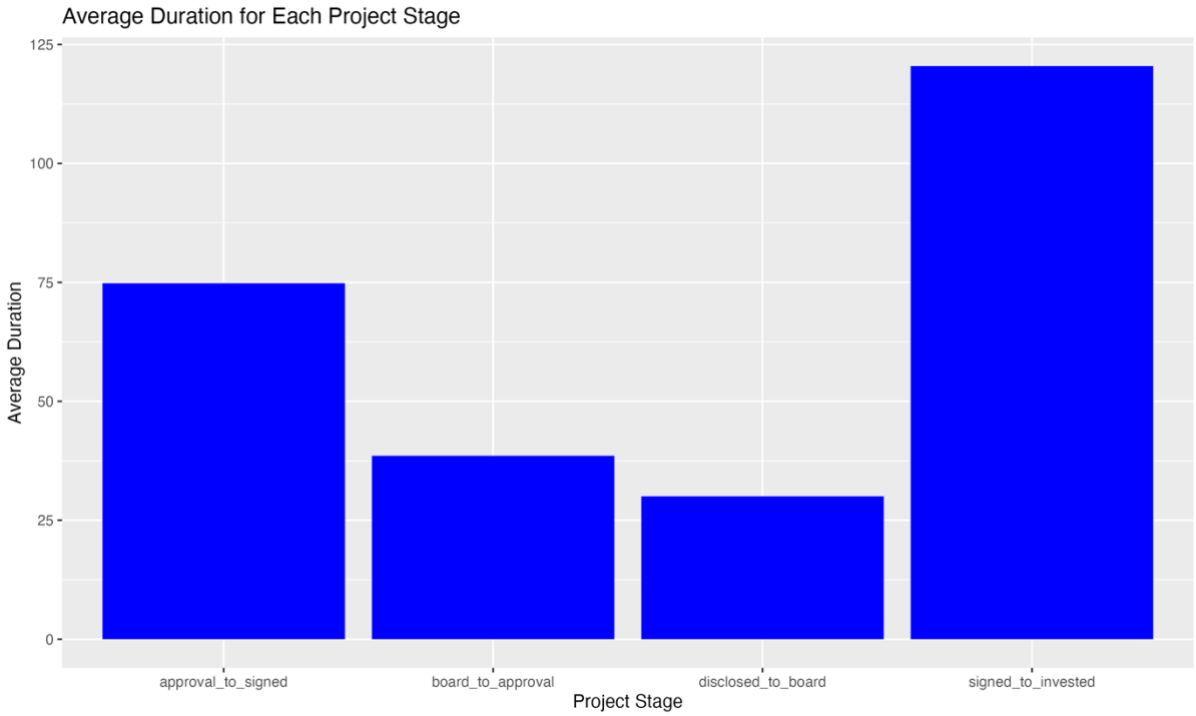
- Sector Distribution: Varied projects across sectors with consistent presence in Financial Institutions, Health and Education, and Manufacturing.
- Industry Fluctuations: Fluctuating project counts in Agribusiness and Forestry, and Oil, Gas, and Mining suggest evolving trends.
- Global Events Impact: Post-2008 sees project distribution changes, reflecting the global economic slowdown's influence.
- Emerging Sectors: Telecommunications, Media, and Technology exhibit a rising project trend from the early 2000s.
- Diverse Portfolio: Financial Institutions maintain a stable project count, highlighting sector reliability.
- Yearly Variability: Annual project count fluctuations showcase IFC's adaptability and strategic investment approach.



Analysis:

The table provides a breakdown of the count of projects invested by the International Finance Corporation (IFC) across different product lines from 1995 to 2023. Here are some key observations:

- Loan Dominance: Throughout the years, loans constitute a significant portion of IFC's investments, with counts consistently exceeding those of other product lines.
- Steady Growth: The count of projects, especially in the Loan and Equity categories, shows a generally increasing trend over the years, indicating a consistent and expanding investment portfolio.
- Diversity in Product Lines: While loans are predominant, IFC also engages in a diverse range of financial instruments, including Equity, Guarantee, and Risk Management.
- Fluctuations in Certain Years: Some years, particularly in the Equity and Risk Management categories, exhibit fluctuations in project counts, suggesting potential variations in investment strategies or market conditions during those periods.
- Risk Management Growth: The count of projects in the Risk Management category shows notable growth in recent years, reflecting a potential emphasis on risk mitigation strategies.



Analysis of Average Duration in Project Phases:

- Disclosed to Board:
  - Mean Duration: 30.03 days
  - Implication: Projects typically move quickly from disclosure to the board, indicating efficient initial assessment and decision-making processes.
- Board to Approval:
  - Mean Duration: 38.55 days
  - Implication: A relatively swift transition from board consideration to approval, suggesting effective internal evaluation and decision-making.
- Approval to Signed:
  - Mean Duration: 74.81 days
  - Implication: The period between approval and signing involves negotiation and agreement finalization, reflecting a moderate timeline for these processes.
- Signed to Invested:
  - Mean Duration: 120.45 days
  - Implication: The longest phase, signifying a substantial duration for project implementation after signing, possibly due to logistical, legal, or operational consideration.

Analysis:

- Category A:
  - Observation: Longer mean disclosure periods (e.g., Infrastructure - 88.06 days).
  - Potential Explanation: Complexity of diverse, irreversible, or unprecedented risks in Category A projects contributes to extended assessment periods.
- Category B:
  - Observation: Varying mean disclosure periods across industries (e.g., Manufacturing - 41.17 days, Financial Institutions - 65.63 days).
  - Potential Explanation: Industry-specific factors influence disclosure timelines within the limited adverse risk context of Category B.
- Category C:
  - Observation: Variable mean disclosure periods (e.g., Oil, Gas, and Mining - 17 days, Telecommunications, Media, and Technology - 36.96 days).
  - Potential Explanation: Industry characteristics and specific project attributes contribute to variations within the minimal or no adverse risk Category C.
- Category FI (FI-1, FI-2, FI-3):
  - Observation: Diverse mean disclosure periods across FI categories and industries (e.g., FI-1 Funds - 308.1 days, FI-2 Oil, Gas, and Mining - 34 days).
  - Potential Explanation: Financial Institutions involve diverse projects, impacting disclosure periods based on the nature of financial exposure to environmental or social risks.
- Other:
  - Observation: Variable mean disclosure periods within the "other" category across industries (e.g., other in A - 48 days, other in B - 72.34 days).
  - Potential Explanation: The "other" category covers a range of projects, with longer periods potentially associated with those presenting significant risks.

SECTION 6: EMPLOYED METHODS & RESULTS

Method 1: K Means Clustering Analysis

K-Means is an unsupervised machine learning algorithm used to automatically group unlabeled data into meaningful clusters. Unsupervised learning empowers the computer to explore and uncover patterns within uncategorized data without prior training. Like sorting objects based on similarities, K-Means aims to organize data points into groups based on inherent characteristics they share. The goal of clustering is to divide the data into distinct groups, ensuring that data points within each group are more similar to each other than those in different groups. This allows us to analyze and understand the data within the context of these clusters, ultimately revealing the underlying structure and organization within the seemingly chaotic data.

Implementation:

We conducted a k-means clustering analysis to unveil inherent patterns within our meticulously cleaned dataset, `ifc_data_cleaned`. The process involved careful selection of relevant features, focusing on investment-related columns. Missing values in these columns were addressed by replacing them with zeros, and date columns were standardized using the `mdy()` function. Unnecessary columns were removed to streamline our data.

To facilitate the clustering analysis, we introduced a new variable, "Decade," by extracting the decade from the `IFC.Invested.Date` column. This allowed us to segment our data into temporal subsets, enhancing the granularity of our analysis. We addressed missing values, excluding rows with missing investment dates.

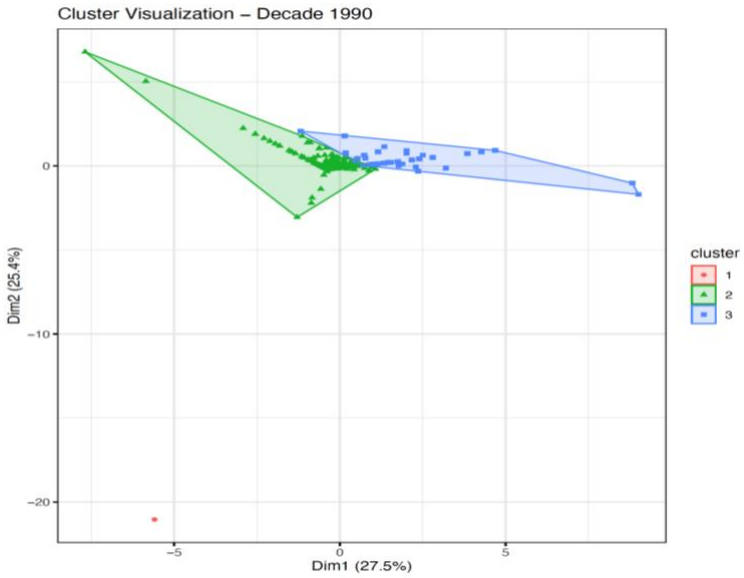
We then selected key investment-related columns for the clustering analysis, such as risk management, guarantee, loan, and equity investments. The k-means algorithm was applied to each decade, seeking to identify inherent structures within the data. To ensure meaningful results, we performed a check for sufficient data points for clustering, skipping decades with insufficient data.

The k-means clustering algorithm was executed with a pre-defined number of clusters ($k = 3$), and the resulting clusters were assigned to the original data. Visualizations, including boxplots and cluster plots, were generated to elucidate the distribution of selected features across clusters. Additionally, cluster centers were displayed for each decade, providing insights into the characteristics of each cluster.

The process was iteratively applied to each decade, resulting in a series of cluster visualizations and insights. This k-means analysis enabled us to identify and explore distinct patterns and groupings within our dataset, laying the groundwork for further exploratory analyses and informed decision-making in subsequent project phases. The visualizations, including cluster plots and boxplots, were saved in PDF format for documentation and reference.

Implementation of K - Means clustering analysis over decades.

Decade 1990:

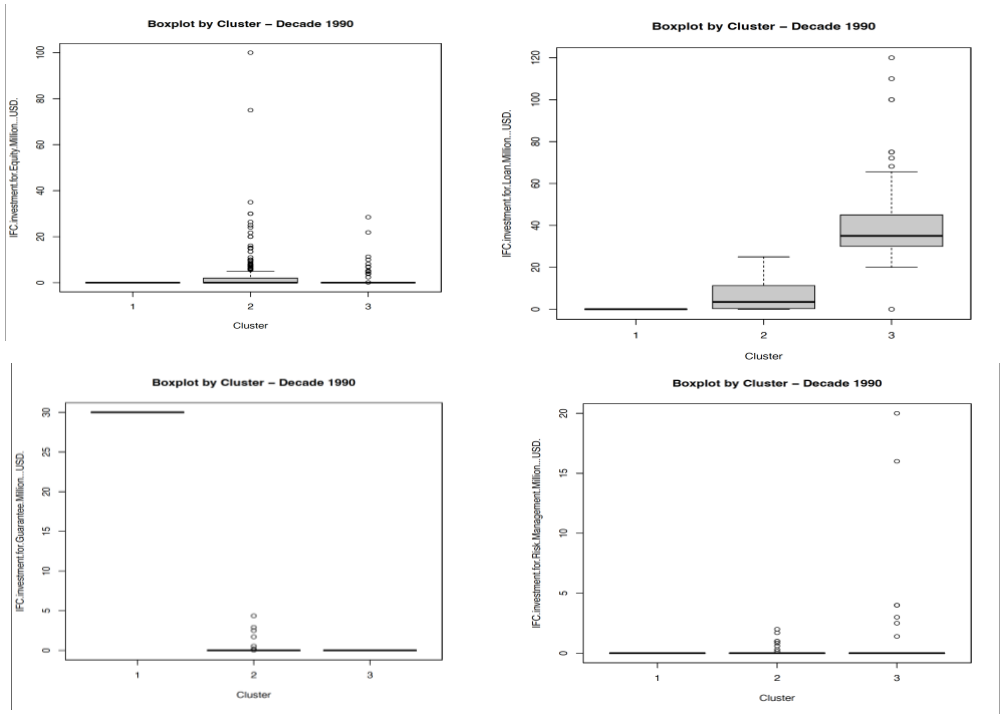


Cluster 1 (green): This cluster is characterized by high values in all four features. This suggests that these investments were large and diverse, involving risk management, guarantees, loans, and equity.

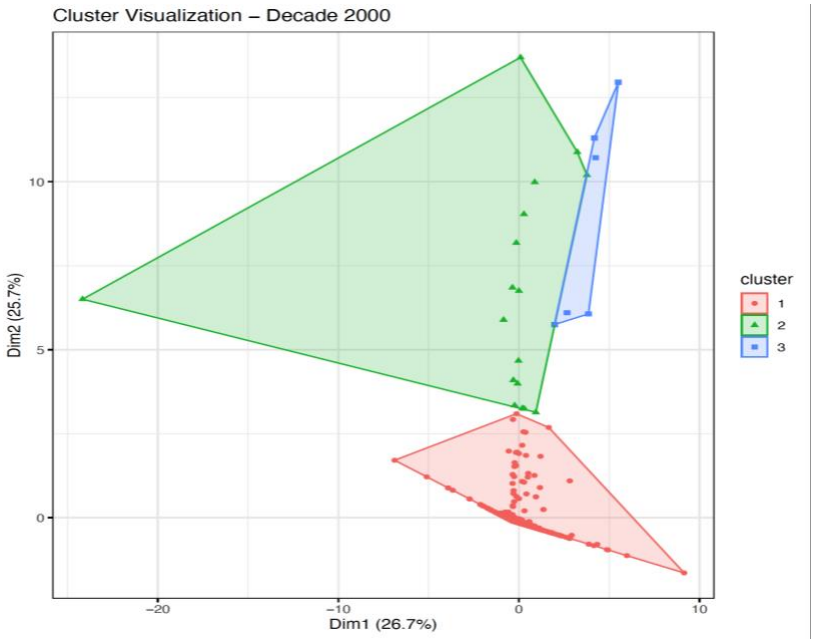
Cluster 2 (blue): This cluster is characterized by lower values in all four features Suggests that these investments were smaller and less diverse, focusing on one or two types of investment.

There are also a few data points that are not assigned to either cluster which may be outliers or may not fit neatly into either of the two main clusters.

Results:



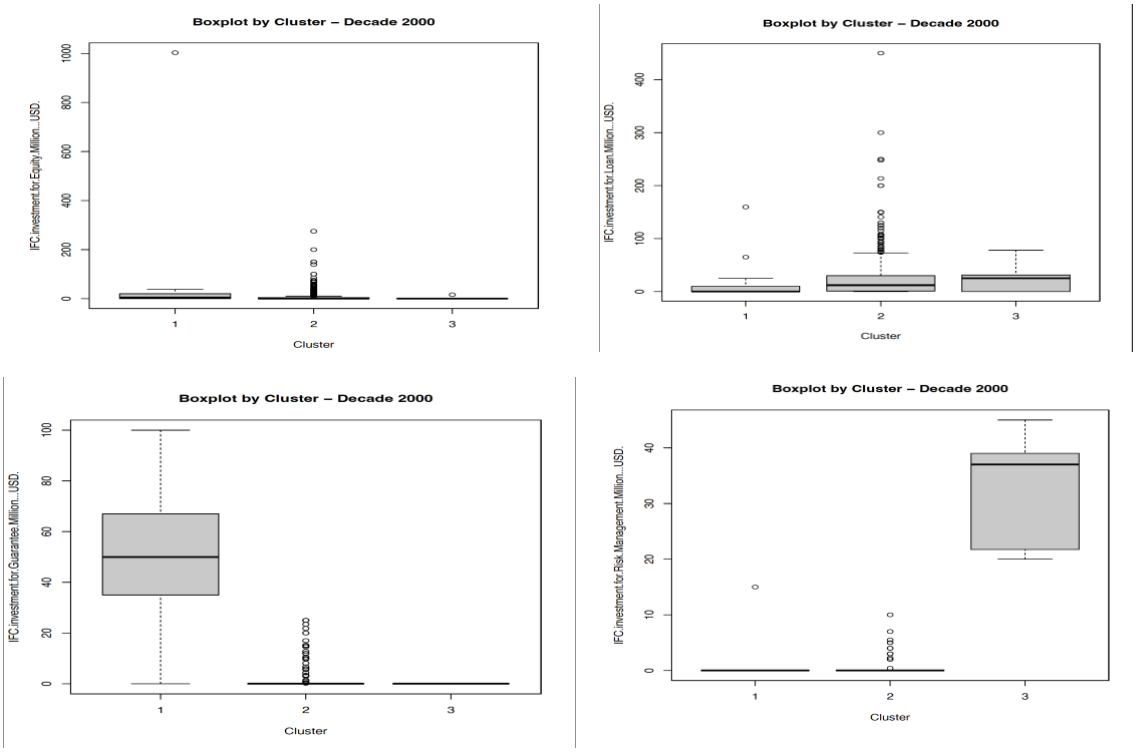
Decade 2000:



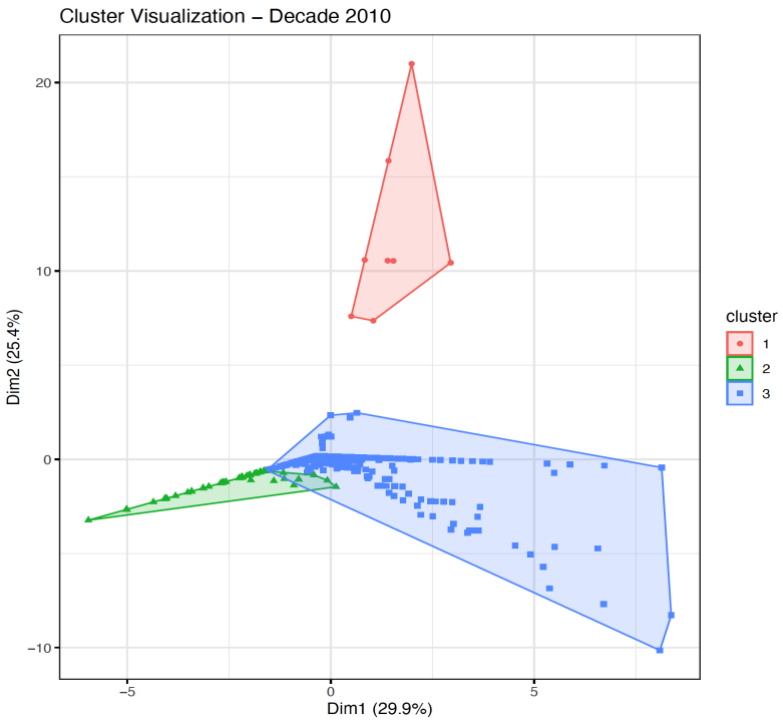
Cluster 1 (blue triangles): This cluster characterized by high values on both Dim1 and Dim2. Associated with investments in risk management, guarantees, and loans, which may have been relatively large and complex, requiring a higher degree of due diligence and oversight.

Cluster 2 (RED circles): This is characterized by high values on Dim1 and low values on Dim2. Associated with investments in equity and loans suggesting that these investments may have been smaller and less complex than those in Cluster 1.

Cluster 3 (GREEN squares): This cluster is in the lower left quadrant of the plot and is characterized by low values on both Dim1 and Dim2. Associated with investments in equity and risk management. these investments may have been relatively small and less complex than those in Cluster 1



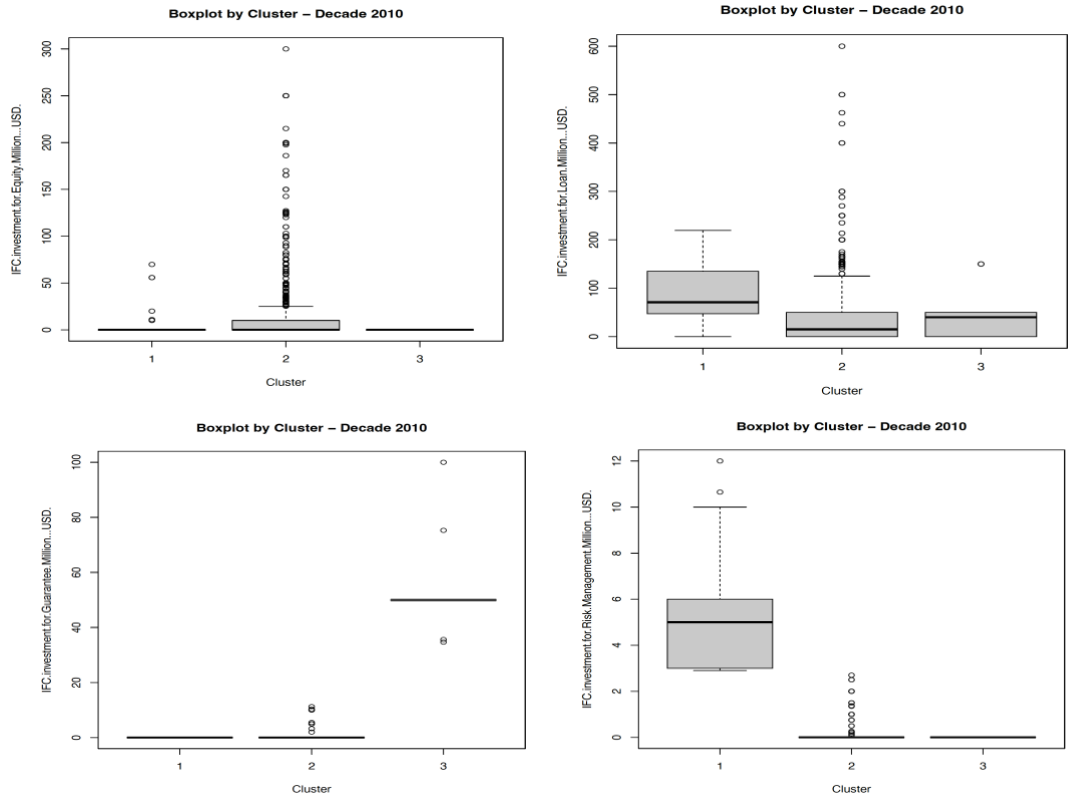
Decade 2010::



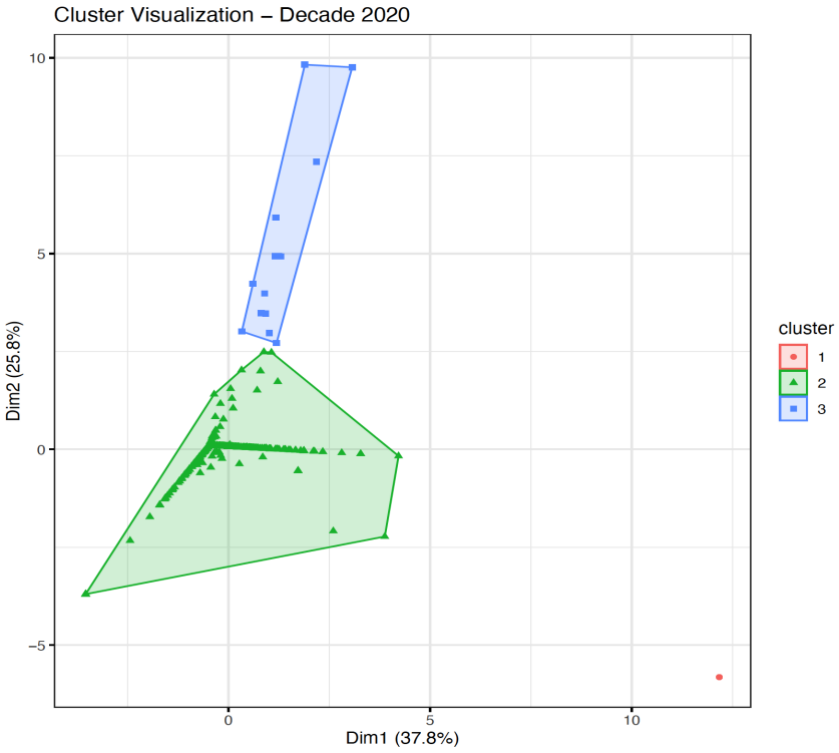
Cluster 1 (blue): Investments tend to be higher in Risk Management and Equity, and lower in Guarantee and Loan. This suggests that these investments may be riskier but have potentially higher returns.

Cluster 2 (green): Investments tend to be higher in Loan and Guarantee, and lower in Risk Management and Equity, which suggests that they are less risky but yield lower returns.

Cluster 3 (red): Investments in are more spread out across all four categories, which suggests that they are more diverse in terms of risk and return profiles.



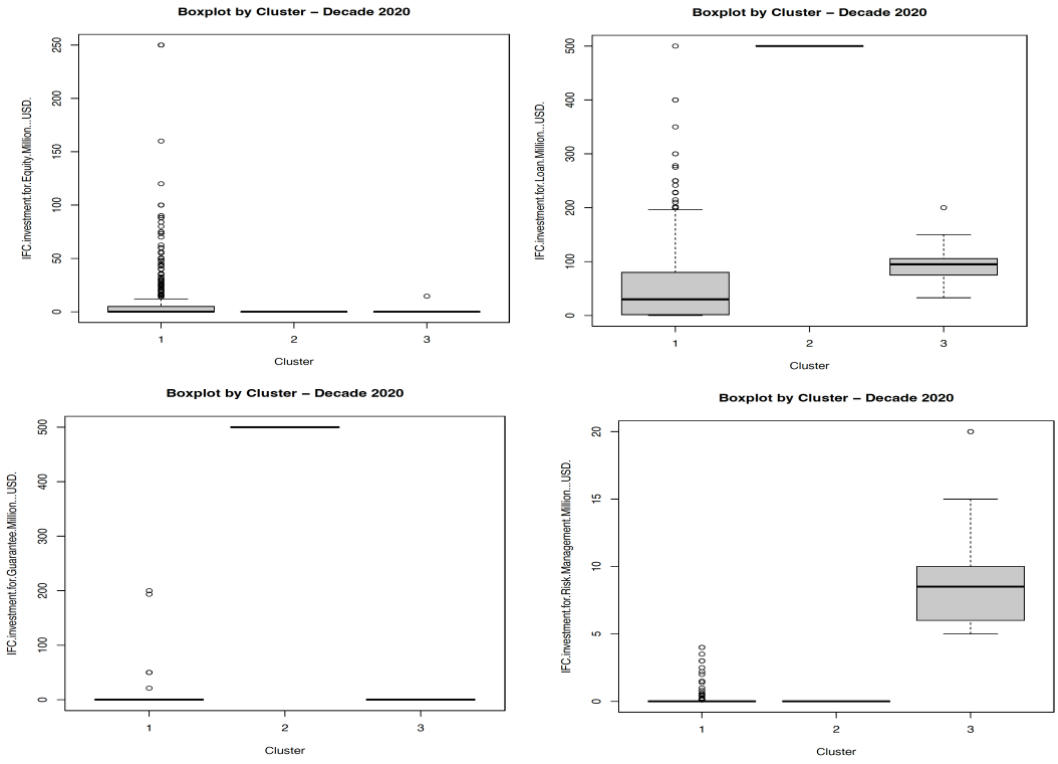
Decade 2020:



Cluster 1 (blue): This cluster likely represents investments with high values in both principal components. suggests a high degree of both Loan and Guarantee investments.

Cluster 2 (red): This cluster likely represents investments with high values in the first principal component (Dim1) and lower values in the second (Dim2). This suggests a focus on Loan investments but potentially lower levels of guaranteed involvement. These might be smaller or less risky loan projects.

Cluster 3 (green): This cluster likely represents investments with low values in both principal components. suggests a focus on Risk Management and Equity investments, possibly smaller projects.



Method 2: Time Series Analysis & Results

Time series data refers to a collection of data points arranged in chronological order, representing a sequence of successive points at equal intervals in time. Conducting a time-series analysis involves employing various techniques to scrutinize such data systematically, with the aim of extracting significant insights and identifying valuable patterns and attributes within the dataset.

Implementation:

For our project's time series analysis, we started by importing and examining our dataset, `ifc_data`, which contains information about IFC investment services projects. Following this, we addressed missing values in key investment-related columns, replacing them with zeros to ensure data integrity.

Our analysis then focused on monthly investment trends. We created a time series by grouping the data based on the monthly investment, utilizing the `floor_date` function from the `lubridate` package to extract the YearMonth information. The total monthly investments were summarized, and missing values in the resulting time series were handled by either removal or imputation.

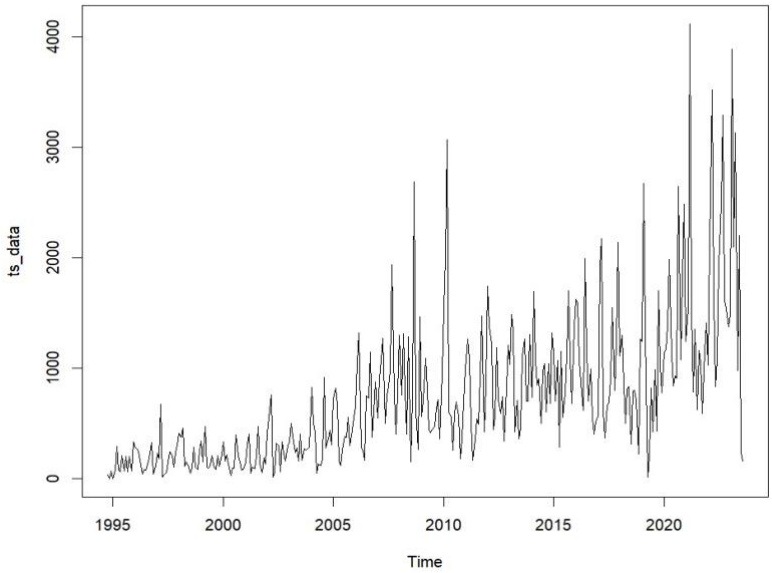
The time series data was transformed into a `ts` object, and a plot of the time series provided a visual representation of the investment trends over time. To model and forecast future investments, we employed an auto-regressive integrated moving average (ARIMA) model. The model was fitted to the time series data, and a forecast for the next N months (e.g., 12 months) was generated and visualized.

For evaluating the forecasting model's performance, we split the time series data into training and testing sets. The ARIMA model was fitted to the training set, and forecasts were generated for the test set. Subsequently, accuracy metrics, including Mean Absolute Error (MAE), Mean Squared Error (MSE), and Root Mean Squared Error (RMSE), were calculated to assess the model's predictive performance. These metrics provide insights into the accuracy of our forecasting model.

Finally, visualizations were created to showcase the forecasted values in comparison to the actual values. Plots of the forecasted values overlaid with the actual values were generated, offering a clear visual representation of the model's predictive capabilities. Additionally, a histogram and autocorrelation function (ACF) plot of the residuals were created to assess the distribution and autocorrelation patterns of the model's errors.

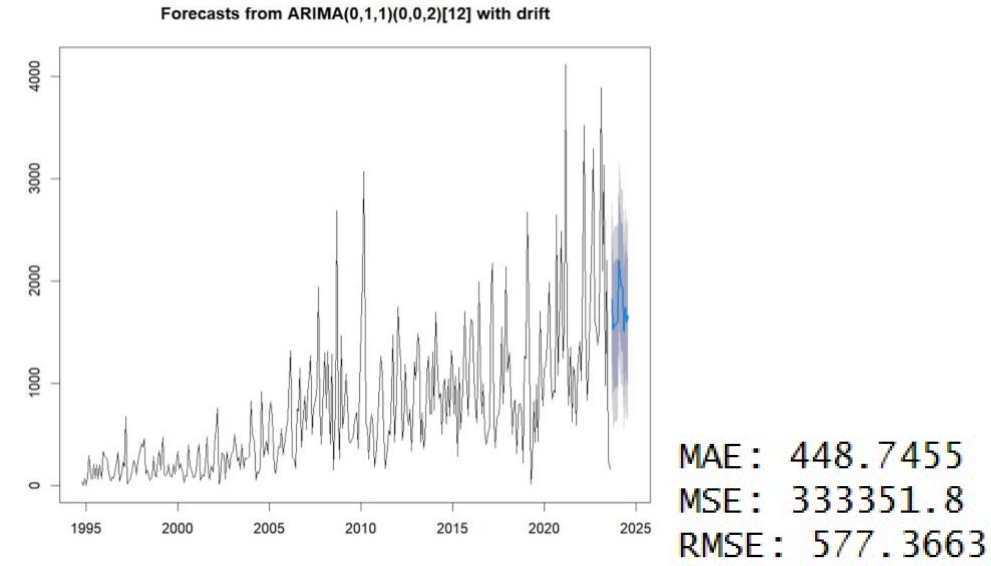
This time series analysis provides a robust foundation for understanding and forecasting monthly investment trends in IFC investment services projects, aiding in informed decision-making and strategic planning for future endeavors.

Exploring Investment Trends Over Time:



The time series graph indicates the fluctuating nature of IFC investments with periods of high activity.
Model Selection: An ARIMA (0,1,1)(0,0,2)[12] model with drift was chosen to analyze and predict investment patterns.
Accuracy Metrics: The model evaluation yielded an MAE of 448.7455, MSE of 333351.8, and RMSE of 577.3663.

Predicted Forecast:



Future Projections: The ARIMA model forecasts suggest potential future investment trends and their associated confidence intervals.
Model Diagnostics: Residual analysis shows that the model has adequately captured the information in the historical data without apparent autocorrelation issues.
Performance Interpretation: The sizeable RMSE emphasizes the need for cautious interpretation of the forecast and consideration of potential variability in actual future investments.

Method 4: IFC Financial Performance Analysis

In the financial performance analysis, various datasets were utilized to gain insights into key aspects such as product metrics, regional contributions, industry-wise performance, and comprehensive financial highlights.

Implementation:

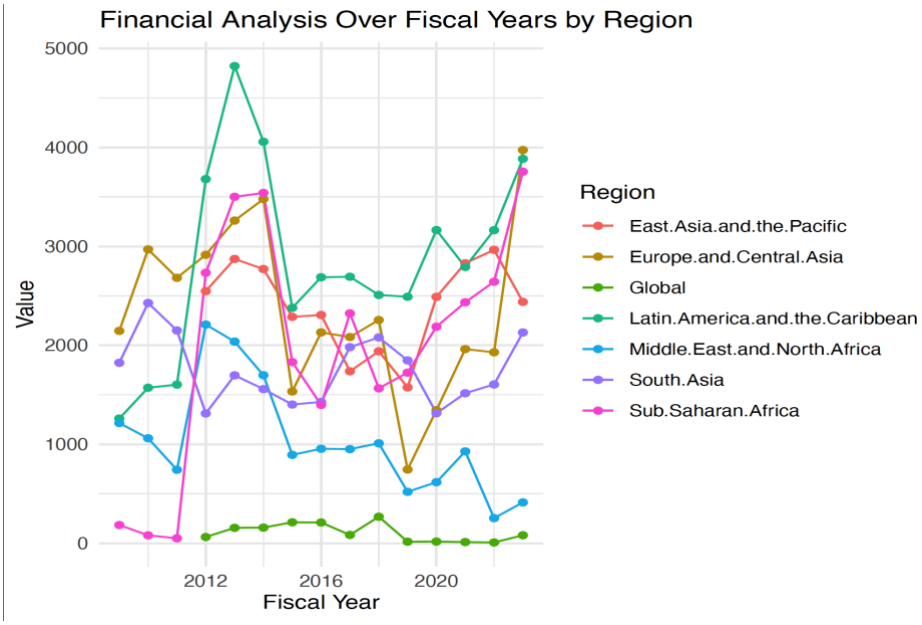
Regional Contribution Analysis: Contributions from different regions were analyzed, showcasing the financial performance across East Asia and the Pacific, Europe and Central Asia, Latin America and the Caribbean, Middle East and North Africa, South Asia, Sub-Saharan Africa, and globally. Line charts with points were used for visualization.

Product Metrics Analysis: Financial metrics related to loans, equity, guarantees, risk management, and loan syndications were explored over fiscal years. Line charts and points illustrated the trends in these financial aspects.

Industry-wise Financial Analysis: The financial performance of various industries such as Agribusiness and Forestry, Telecommunications and Information Technologies, Manufacturing, Infrastructure, Natural Resources, Consumer & Social Services, Financial Markets, Funds, Health & Education, and Tourism, Retail & Property were examined over fiscal years. Line charts with points illustrated the trends.

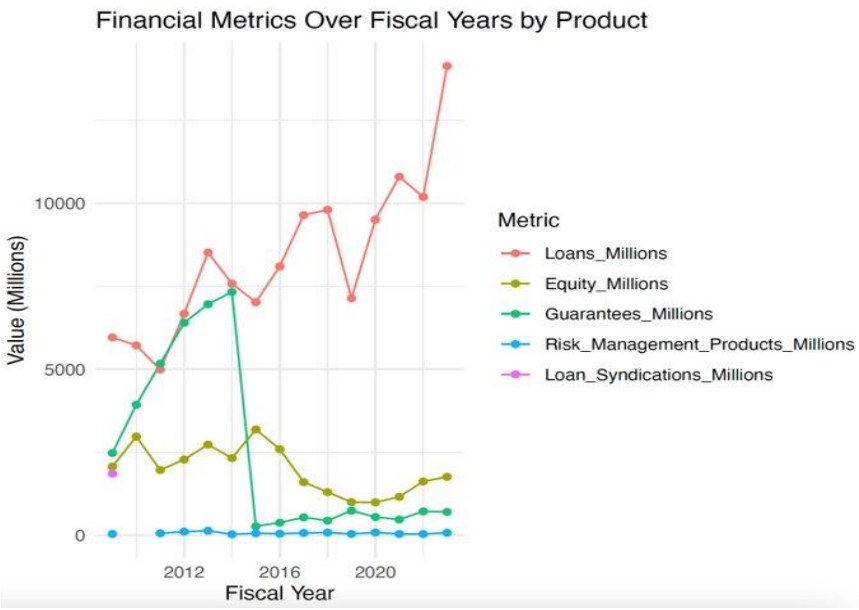
Financial Highlights Analysis: A diverse set of financial indicators, including net income, liquidity ratio, debt-to-equity ratio, fair value of equity investments, grants to IDA, return on assets, return on capital, total assets, total reserves, capital available, and capital required, were scrutinized over a span of years. Summary statistics and line plots were employed for a comprehensive analysis.
These analyses collectively provide a thorough understanding of the financial landscape, offering valuable insights for decision-making and strategic planning.

Regional Analysis:



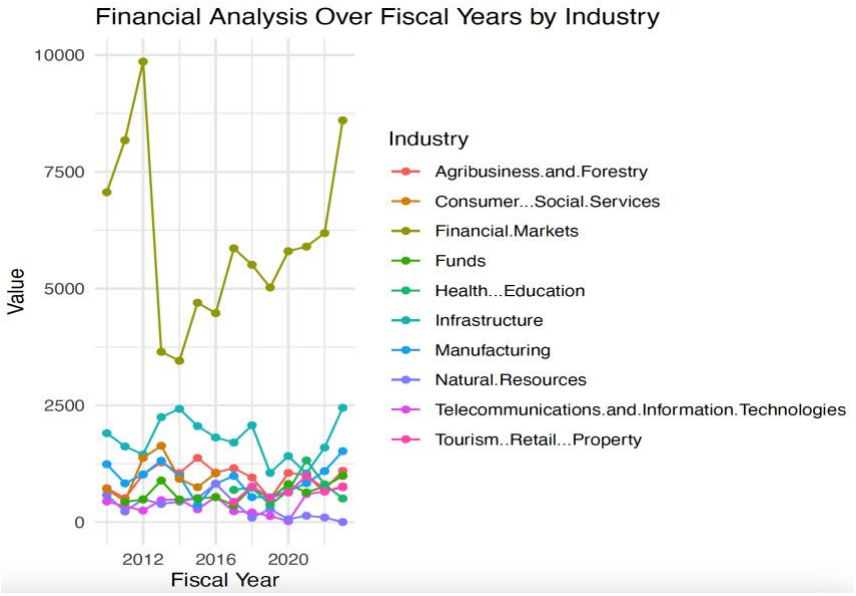
Most investments by region using the most recent measurement indicates that Latin America and the Caribbean region were the prominent interest for IFC averaging at $3040.33(millions) over the years. Lowest investments over the 4-year intervals is the Middle East and North Africa averaging at $1067.06(millions).

Product Analysis:



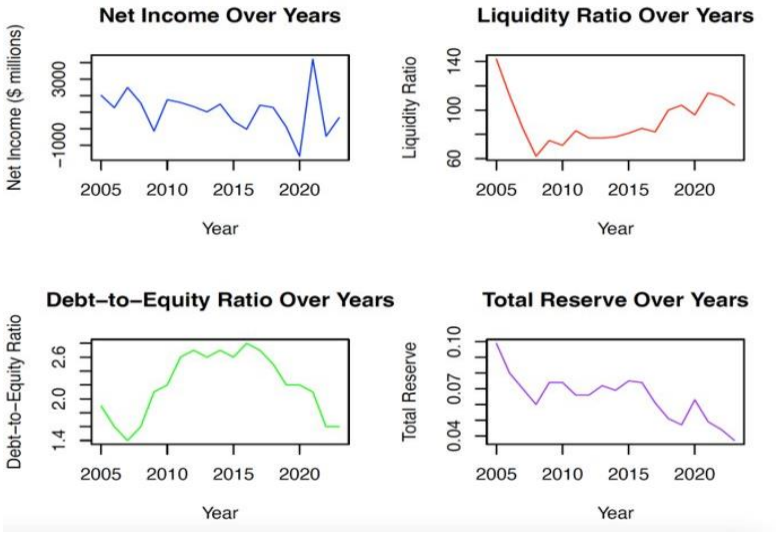
IFC's Financial products enable companies to manage risk and broaden their access to foreign and domestic capital markets. Investment services product lines include loans, equity investments, trade and commodity finance, derivatives and structured finance and blended finance.
In the fiscal year 2022, IFC pledged an unprecedented $32.8 billion across 296 projects, supporting private companies and financial institutions in developing nations and leveraging the influence of the private sector.

INDUSTRIAL ANALYSIS



IFC (International Finance Corporation) has made investments across various diverse sectors. The most common correlation in between sectors were Financial markets and Infrastructure. The least correlated was natural resources based on the market value and revenue the company generated over the years.

Financial Highlights:



The metrics presented here span from 2005 to 2023. The most notable downturns in the overall performance indicators occurred in 2008, attributed to a significant housing market crash, and in 2020, resulting from the global COVID-19 pandemic.

SECTION 7: CONCLUSION

In conclusion, a detailed analysis of the IFC's project data reveals insights into its evolving strategies. The exploration of trends in industry focus, product lines, project duration, and disclosure periods has provided a nuanced understanding of the IFC's operations. Clustering and Time series analysis highlights fluctuating investment patterns, offering cautious yet valuable predictions. Financially, the IFC's record commitment of $32.8 billion in 296 projects in FY22 underscores its dedication to global development, with a strategic focus on Latin America and the Caribbean. This analysis equips stakeholders with valuable insights into the IFC's past, present, and potential future trajectories, fostering a foundation for informed decision-making in the dynamic landscape of international development finance.

SECTION 8: REFERENCES

1. https://www.ifc.org/en/what-we-do/products-and-services/ifc-project-cycle
2. IFC Financial Highlights: https://datacatalog.worldbank.org/search/dataset/0037863/IFC-Financial-Highlights
3. Investment by Product: https://datacatalog.worldbank.org/search/dataset/0037861/IFC-Investment-By-Product---Annual-Summary
4. 4. Investment by Region: https://finances.worldbank.org/Financial-Reporting/IFC-Investment-By-Region-Annual-Summary/wdx8-uxce
5. Investment by Industry: https://datacatalog.worldbank.org/search/dataset/0037583/IFC-Investment-By-Industry---Annual-Summary
6. Natural Resources Forum: naturalresourcesforum.com/companies/ifc/

SECTION 9: TEAM MEMBER CONTRIBUTION

The project reached its completion through the combined efforts of all team members. Throughout the semester, we worked together, dividing tasks based on our understanding and availability. In the initial project phase, Riddhi Mahesh Dange took charge of finding ideation and the dataset and the research questions, while the project's significance was collaboratively developed through group brainstorming. Kirtana Sridharan led handling data cleaning & preprocessing and conducting exploratory data analysis and contributed to researching model analysis techniques and determining the subsequent steps. Riddhi Mahesh Dange conducted K-Means clustering analysis, Shrey Shah focused on Time series analysis, and Urvashi Brahmbhatt led the IFC Financial Performance Analysis. The collective efforts of the team members ensured the successful completion of the project.