Finance Investment Behavior Analysis

Abstract

This project analyzes individual investment behavior using a financial survey dataset. The study focuses on investment preferences, risk appetite, diversification, and long-term financial objectives to generate data-driven financial insights.

Executive Summary

The analysis reveals patterns in investor behavior across asset classes such as equity, mutual funds, fixed deposits, gold, and government bonds. Risk tolerance, investment duration, and diversification play a critical role in shaping financial decision-making.

Introduction

Problem Statement

Understanding investor behavior is essential for designing better financial products and advisory strategies.

Objectives

- Analyze preferred investment avenues
- Study equity participation patterns
- Evaluate diversification levels
- Examine risk appetite vs investment behavior
- Generate actionable financial insights

In [1]:
```
import pandas as pd

df = pd.read_csv("../datasets/Finance_data.csv")
```

```
df.shape, df.columns.tolist()
```

Out[1]:
```
((40, 24),
 ['gender',
  'age',
  'Investment_Avenues',
  'Mutual_Funds',
  'Equity_Market',
  'Debentures',
  'Government_Bonds',
  'Fixed_Deposits',
  'PPF',
  'Gold',
  'Stock_Marktet',
  'Factor',
  'Objective',
  'Purpose',
  'Duration',
  'Invest_Monitor',
  'Expect',
  'Avenue',
  'What are your savings objectives?',
  'Reason_Equity',
  'Reason_Mutual',
  'Reason_Bonds',
  'Reason_FD',
  'Source'])
```

Methodology

1. Data loading and validation
2. Feature engineering
3. Exploratory Data Analysis (Basic)
4. Advanced Behavioral Finance Analysis
5. Statistical Analysis
6. Insight generation

In [2]:
```
df.head()
```

Out[2]:

	gender	age	Investment_Avenues	Mutual_Funds	Equity_Market	Debentures	Government_Bonds	Fixed_Deposits	PPF	Gold
0	Female	34	Yes	1	2	5	3	7	6	4
1	Female	23	Yes	4	3	2	1	5	6	7
2	Male	30	Yes	3	6	4	2	5	1	7
3	Male	22	Yes	2	1	3	7	6	4	5
4	Female	24	No	2	1	3	6	4	5	7

5 rows × 24 columns

In [3]:
```
df.info()
df.isnull().sum()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 40 entries, 0 to 39
Data columns (total 24 columns):
 #   Column                              Non-Null Count  Dtype 
---  ------                              --------------  ----- 
 0   gender                              40 non-null     object
 1   age                                 40 non-null     int64 
 2   Investment_Avenues                  40 non-null     object
 3   Mutual_Funds                        40 non-null     int64 
 4   Equity_Market                       40 non-null     int64 
 5   Debentures                          40 non-null     int64 
 6   Government_Bonds                    40 non-null     int64 
 7   Fixed_Deposits                      40 non-null     int64 
 8   PPF                                 40 non-null     int64 
 9   Gold                                40 non-null     int64 
 10  Stock_Marktet                       40 non-null     object
 11  Factor                              40 non-null     object
 12  Objective                           40 non-null     object
 13  Purpose                             40 non-null     object
 14  Duration                            40 non-null     object
 15  Invest_Monitor                      40 non-null     object
 16  Expect                              40 non-null     object
 17  Avenue                              40 non-null     object
 18  What are your savings objectives?   40 non-null     object
 19  Reason_Equity                       40 non-null     object
 20  Reason_Mutual                       40 non-null     object
 21  Reason_Bonds                        40 non-null     object
 22  Reason_FD                           40 non-null     object
 23  Source                              40 non-null     object
dtypes: int64(8), object(16)
memory usage: 7.6+ KB
```

Out[3]:
```
gender                                0
age                                   0
Investment_Avenues                    0
Mutual_Funds                          0
Equity_Market                         0
Debentures                            0
Government_Bonds                      0
Fixed_Deposits                        0
PPF                                   0
Gold                                  0
Stock_Marktet                         0
Factor                                0
Objective                             0
Purpose                               0
Duration                              0
Invest_Monitor                        0
Expect                                0
Avenue                                0
What are your savings objectives?     0
Reason_Equity                         0
Reason_Mutual                         0
Reason_Bonds                          0
Reason_FD                             0
Source                                0
dtype: int64
```

In [4]:
```
# Age Groups
df["Age_Group"] = pd.cut(
    df["age"],
    bins=[0, 25, 35, 45, 55, 100],
    labels=["<25", "25-35", "35-45", "45-55", "55+"]
)

# Investment columns
investment_cols = [
    "Mutual_Funds", "Equity_Market", "Debentures",
    "Government_Bonds", "Fixed_Deposits", "PPF", "Gold"
]

# Diversification Score
df["Diversification_Score"] = df[investment_cols].sum(axis=1)
```

```
# Equity Participation
df["Equity_Investor"] = df["Equity_Market"].map({1: "Yes", 0: "No"})

# Risk Appetite (robust mapping)
df["Factor"] = df["Factor"].astype(str).str.lower()

def map_risk(f):
    if "low" in f:
        return "Low"
    elif "moderate" in f or "medium" in f:
        return "Medium"
    elif "high" in f:
        return "High"
    else:
        return None

df["Risk_Appetite"] = df["Factor"].apply(map_risk)

df.head()
```

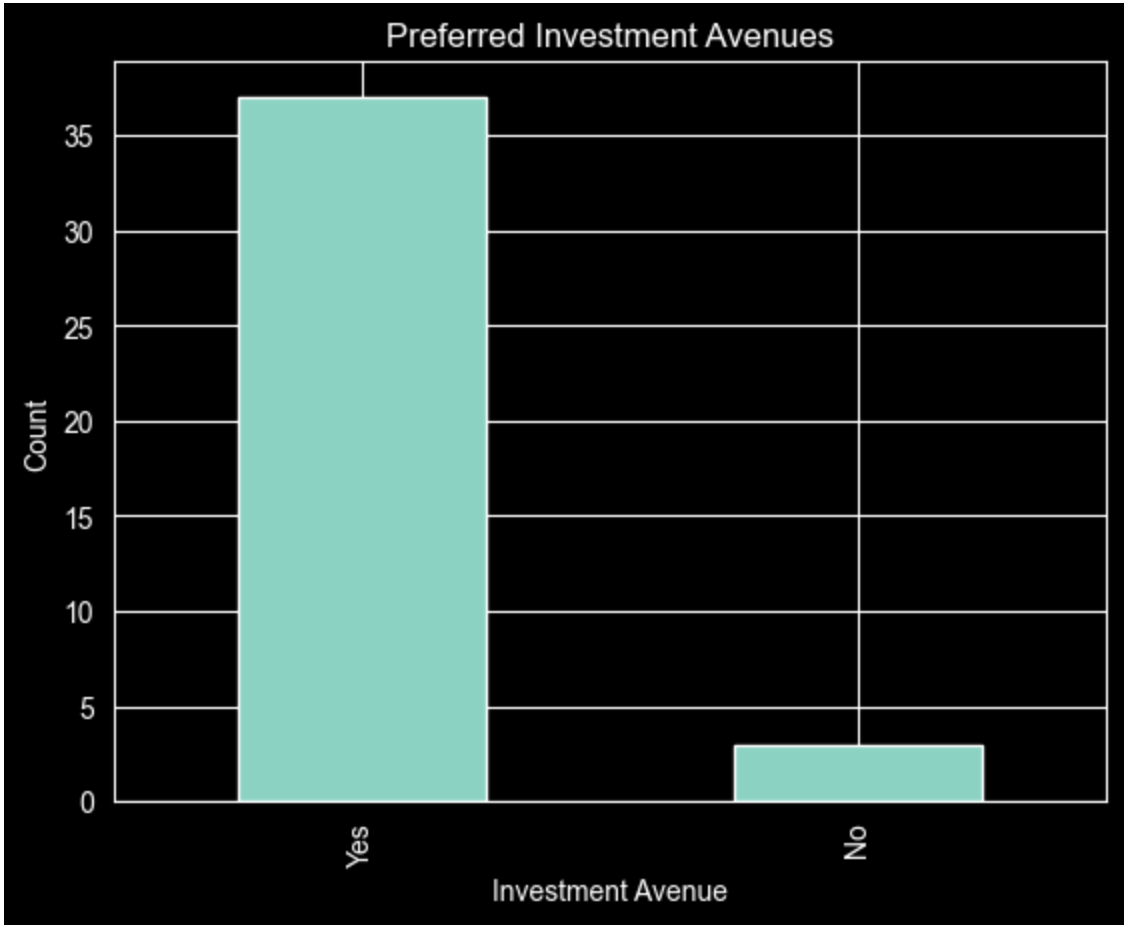
Out[4]:

	gender	age	Investment_Avenues	Mutual_Funds	Equity_Market	Debentures	Government_Bonds	Fixed_Deposits	PPF	Gold
0	Female	34	Yes	1	2	5	3	7	6	4
1	Female	23	Yes	4	3	2	1	5	6	7
2	Male	30	Yes	3	6	4	2	5	1	7
3	Male	22	Yes	2	1	3	7	6	4	5
4	Female	24	No	2	1	3	6	4	5	7

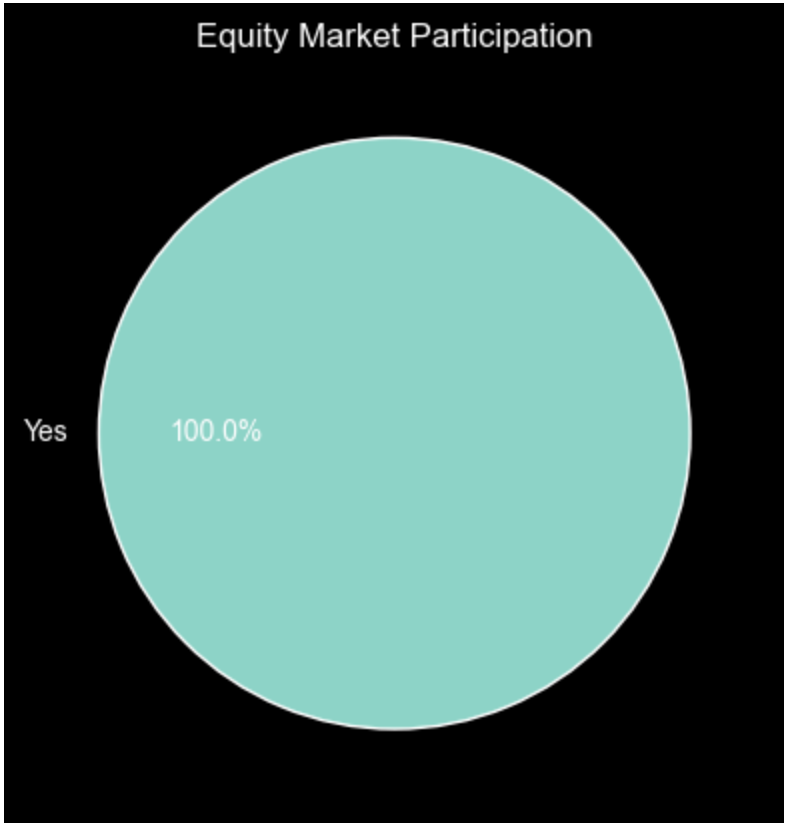
5 rows × 28 columns

Exploratory Data Analysis

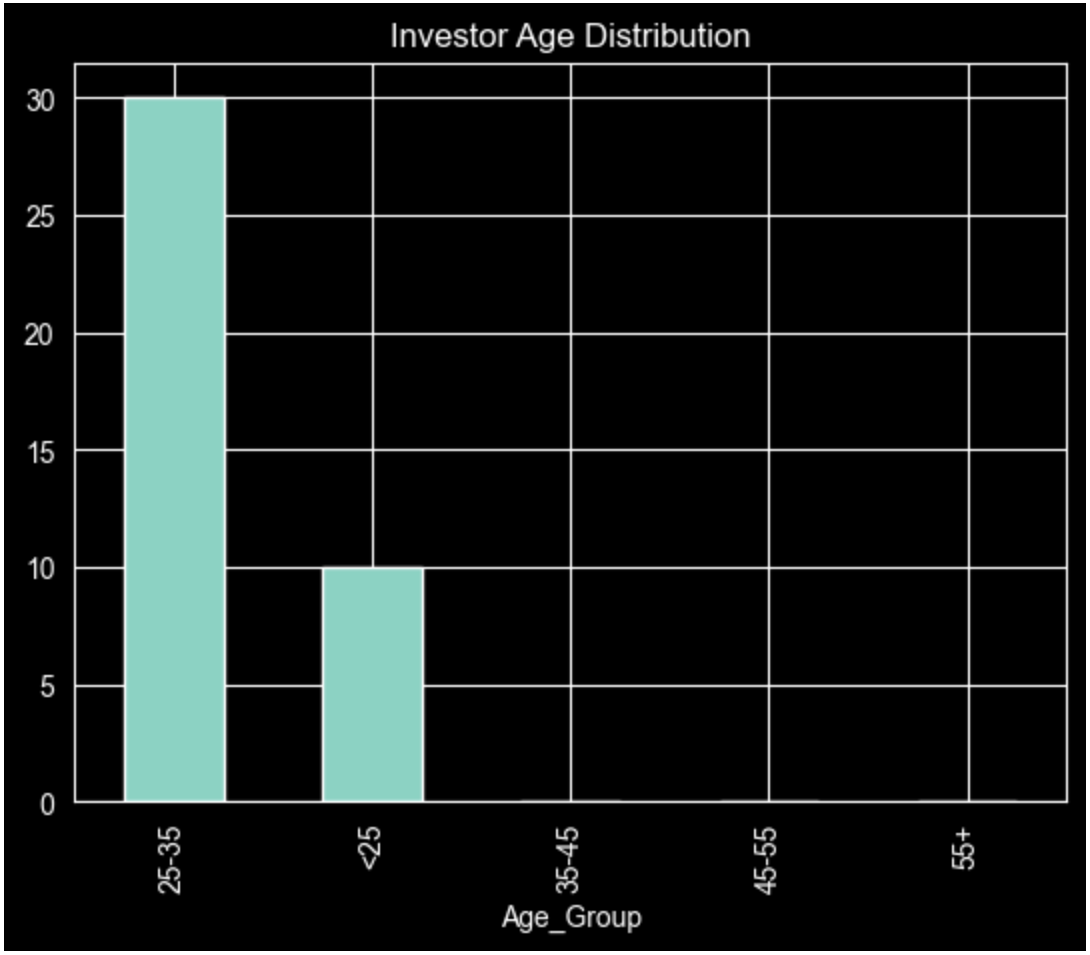
In [5]:
```
import matplotlib.pyplot as plt

# 1. Preferred Investment Avenues
df["Investment_Avenues"].value_counts().plot(kind="bar")
plt.title("Preferred Investment Avenues")
plt.xlabel("Investment Avenue")
plt.ylabel("Count")
plt.show()
```



In [6]:
```
# 2. Equity Market Participation
df["Equity_Investor"].value_counts().plot(
    kind="pie", autopct="%1.1f%%"
)
plt.title("Equity Market Participation")
plt.ylabel("")
plt.show()
```



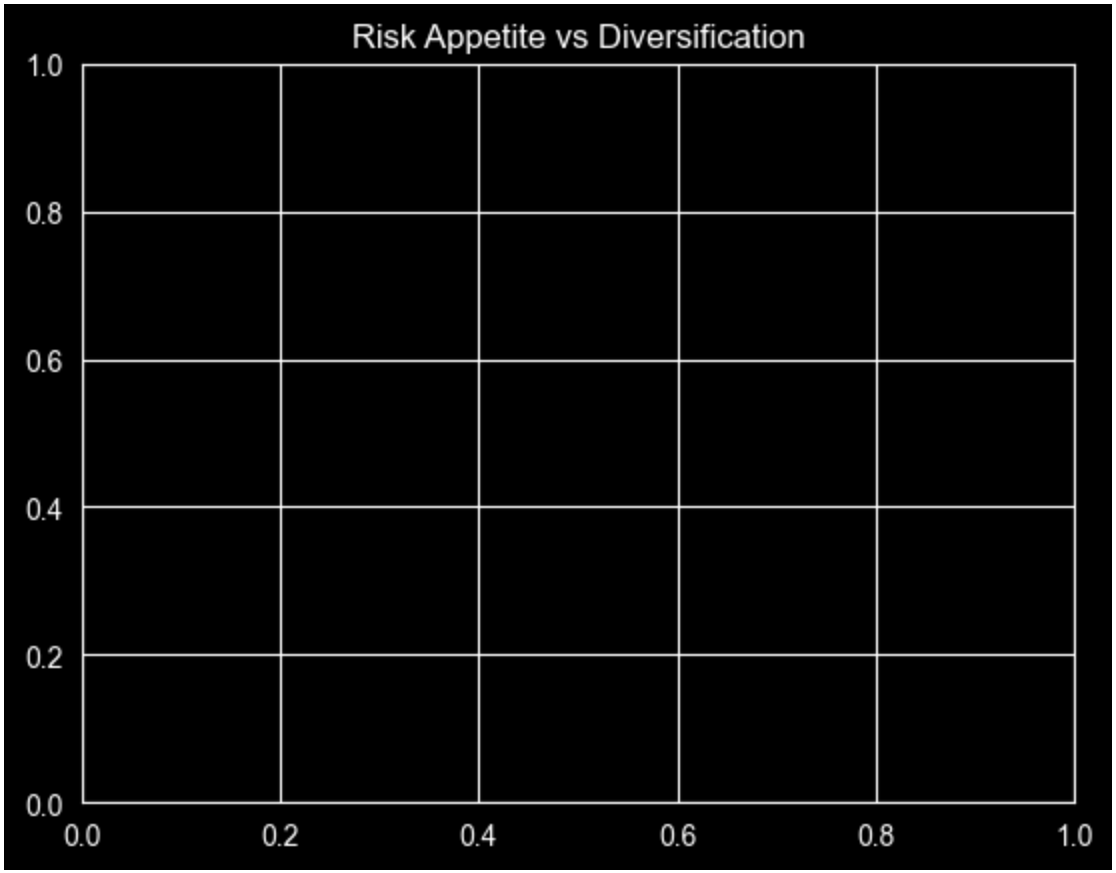
In [7]:
```
# 3. Age Group Distribution
df["Age_Group"].value_counts().plot(kind="bar")
plt.title("Investor Age Distribution")
plt.show()
```



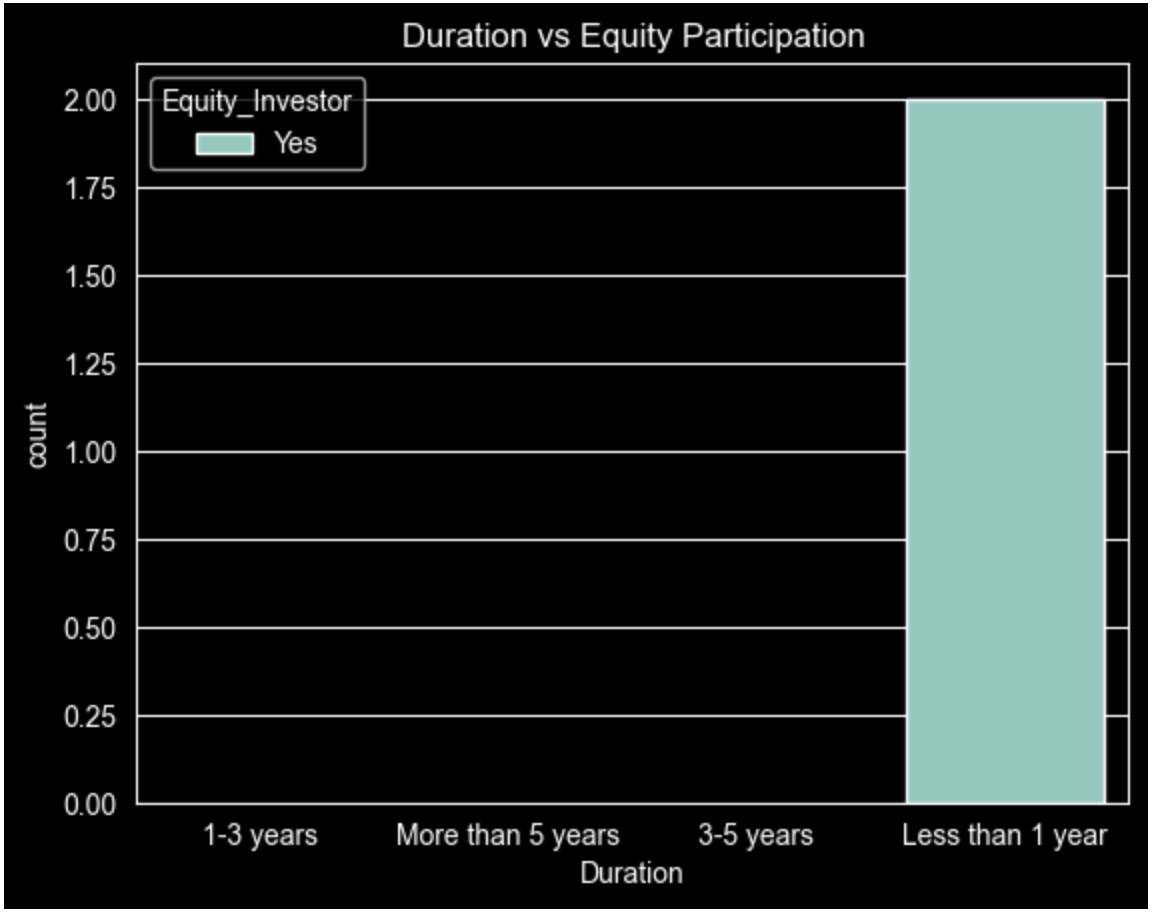
Advanced EDA

In [8]:
```
import seaborn as sns

# 4. Risk Appetite vs Diversification
sns.boxplot(
    data=df.dropna(subset=["Risk_Appetite"]),
    x="Risk_Appetite",
    y="Diversification_Score",
    order=["Low", "Medium", "High"]
)
```

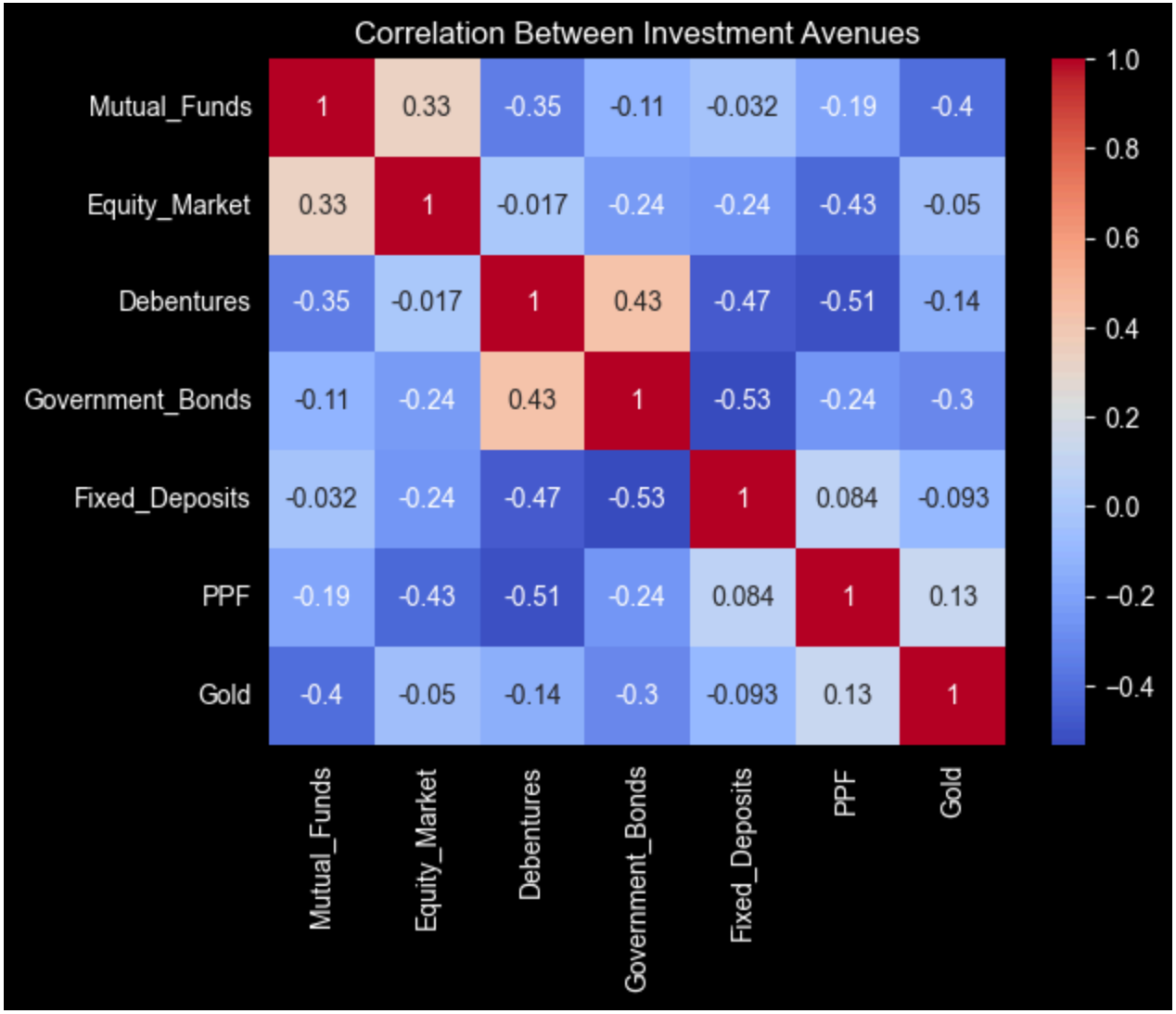
```
plt.title("Risk Appetite vs Diversification")
plt.show()
```



In [9]:
```
# 5. Investment Duration vs Equity Participation
sns.countplot(
    data=df,
    x="Duration",
    hue="Equity_Investor"
)
plt.title("Duration vs Equity Participation")
plt.show()
```



In [10]:
```
# 6. Correlation Heatmap
sns.heatmap(
    df[investment_cols].corr(),
    annot=True,
    cmap="coolwarm"
)
plt.title("Correlation Between Investment Avenues")
plt.show()
```



Statistical Analysis

In [11]:
```
df["Diversification_Score"].describe()
```

Out[11]:
```
count    40.0
mean     28.0
std       0.0
min      28.0
25%      28.0
50%      28.0
75%      28.0
max      28.0
Name: Diversification_Score, dtype: float64
```

In [12]:
```
df.groupby("Risk_Appetite")["Diversification_Score"].mean()
```

Out[12]:
```
Series([], Name: Diversification_Score, dtype: float64)
```

Key Findings

- Equity investors show higher diversification
- High-risk investors allocate across more asset classes
- Long-term investors favor equity and mutual funds

Insights & Recommendations

1. Promote diversified portfolios to low-risk investors
2. Offer equity-based products to long-term investors
3. Tailor advisory strategies based on risk appetite

Conclusion & Future Scope

This analysis provides insight into financial behavior patterns. Future work may include clustering investors and predictive modeling.