

PROJECT: EXPLORATORY DATA ANALYSIS ON FOREIGN DIRECT INVESTMENT (FDI)



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PROBLEM STATEMENT

- From the New World Bank country classifications by income level: 2021-2022
- The World Bank assigns the world's economies to four income groups—low, lower-middle, upper-middle, and high-income counties
- I was assigned to find a significance between Foreign Direct Investment and Income Group.

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TARGET

Goal

- IDENTIFY KEY FACTORS OF INFORMATION FOR PRESENTATION AND SUPPORT THE ORGANIZATION'S OPERATIONS. IT MUST ALSO BE INFORMATION THAT CAN BENEFIT THE PUBLIC TOO.



HYPOTHESIS-DRIVEN QUESTION

1. What is the FDI growth rate of each group?
2. What is the FDI trend of each group?
3. What is the FDI ratio of each group?
4. Is there a significance between FDI and each income group?





PROJECT PROCESSING

5-Step Processes

DATA SOURCING



THE WORLD BANK



Data Preparing



Import and know the data

- Import
- DataFrame (df1, df2)
- df.shape()
- df.describe()

	Country Name	Country Code	Indicator Name	Indicator Code	1960	1961	1962	1963	1964	1965	...	2012	2013	2014
0	Aruba	ABW	Foreign direct investment, net inflows (BoP, c...	BX.KLT.DINV.CD.WD	NaN	NaN	NaN	NaN	NaN	NaN	...	-3.146927e+08	2.263714e+08	2.506181e+08
1	Africa Eastern and Southern	AFE	Foreign direct investment, net inflows (BoP, c...	BX.KLT.DINV.CD.WD	NaN	NaN	NaN	NaN	NaN	NaN	...	2.463634e+10	2.153424e+10	2.768142e+10
2	Afghanistan	AFG	Foreign direct investment, net inflows (BoP, c...	BX.KLT.DINV.CD.WD	NaN	NaN	NaN	NaN	NaN	NaN	...	5.682366e+07	4.831135e+07	4.297526e+07
	Country Code	Region	IncomeGroup		SpecialNotes	Table								
0	ABW	Latin America & Caribbean	High income											
1	AFE		Nan											
2	AFG		South Asia	Low income	The reporting period for national accounts dat...	Africa Eastern and So								

Data cleaning

- df.drop()
- pd.merge()
- df.pop()
- df.insert()
- df.dropna()
- df.all()

Country Name	True	Country Name	True
IncomeGroup	True	IncomeGroup	True
1991	False	1991	True
1992	False	1992	True
1993	False	1993	True
1994	False	1994	True
1995	False	1995	True
1996	False	1996	True
1997	False	1997	True
1998	False	1998	True
1999	False	1999	True
2000	True	2000	True

Country Name	IncomeGroup	1991	1992	1993	1994	1995	1996	1997	1998	...
0 Aruba	High income	1.847486e+08	-3.698324e+07	-1.793296e+07	-7.318436e+07	-5.530726e+06	8.502793e+07	1.978212e+08	1.134637e+08	...
2 Afghanistan	Low income	-2.800000e+05	3.600000e+05	-2.000000e+04	2.000000e+04	-9.332660e+04	6.900000e+05	-1.460000e+06	-1.000000e+04	...
4 Angola	Lower middle income	6.645000e+08	2.879560e+08	3.021000e+08	1.703000e+08	4.724270e+08	1.805590e+08	4.116600e+08	1.113970e+09	...

Data Sorting

- df.sort_values()

	Country Name	IncomeGroup	1991	1992	1993	1994	1995
0 Aruba	High income	1.847486e+08	-3.698324e+07	-1.793296e+07	-7.318436e+07	-5.530726e+06	8.502793e+07
55 Germany	High income	4.741535e+09	-2.137728e+09	4.798142e+08	7.517249e+09	1.204151e+10	1.5591...
206 Singapore	High income	4.887094e+09	2.204342e+09	4.686312e+09	8.550165e+09	1.194285e+10	1.1432...
58 Denmark	High income	1.552515e+09	1.017385e+09	1.712766e+09	5.006178e+09	4.139423e+09	7.7344...
203 Saudi Arabia	High income	1.600000e+08	-7.893333e+07	1.367200e+09	3.493333e+08	-1.874667e+09	-1.1274...

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Exploratory Data Analysis (EDA)



Find Average FDI Growth Rate of each country.

- df.drop()
- df.pct_change()
- df.mean()

IncomeGroup	1991	1992	1993	2018	2019	2020	Average
0 High income	NaN	-1.200181	-0.515106	3374	-1.553457	-3.181247	-1.609357
2 Low income	NaN	-2.285714	-1.055556	7603	-0.804040	-0.445828	-18.909277
4 Lower middle income	NaN	-0.566658	0.049119	7238	-0.365175	-0.544595	2.153042
8 High income	NaN	4.000771	2.093740	3000	0.721152	0.112439	1.812082
9 Upper middle income	NaN	0.816719	-0.369646	7358	-0.431323	-0.396816	0.272958
...

Find Average FDI Growth Rate of each group.

- df.groupby().mean()

IncomeGroup	1991	1992	2019	2020	Average	
High income	NaN	0.228358	-13.4944	-1.434367	-0.602077	-1.412401
Low income	NaN	-0.913347	-0.930000	-0.000404	-0.277034	2.500807
Lower middle income	NaN	30.144035	3.720000	-0.122890	-0.344943	1.658192
Upper middle income	NaN	0.489699	5.229000	-0.084979	-0.280085	0.810173

Find Average FDI of each country.

- df.mean()

Country Name	IncomeGroup	1991	2019	2020	Average	
0 Aruba	High income	1.847486e+08	-3.698320	522654e+07	1.640876e+08	5.599063e+07
2 Afghanistan	Low income	-2.800000e+05	3.600000	340455e+07	1.297015e+07	6.539225e+07
4 Angola	Lower middle income	6.645000e+08	2.879560	098479e+09	-1.866468e+09	-9.605444e+07
8 United Arab Emirates	High income	2.594000e+07	1.297200	787466e+10	1.988447e+10	6.098427e+09
9 Argentina	Upper middle income	2.439000e+09	4.430970	663062e+09	4.019052e+09	7.304720e+09
...

Find Average FDI of each group.

- df.groupby().mean()

IncomeGroup	1991	1992	2019	2020	Average
High income	2.774125e+09	2.748410e+09	10	1.202281e+10	1.916025e+10
Low income	5.241854e+06	5.199993e+06	08	4.424598e+08	3.300328e+08
Lower middle income	1.369430e+08	1.611743e+08	09	3.344711e+09	1.553437e+09
Upper middle income	6.441916e+08	9.809108e+08	10	1.093241e+10	7.376688e+09



KEY AND SIGNIFICANCE INTERPRETING

KEY FINDING

Figure 1: Average YoY growth rate (Bar Chart)

Figure 2: Average FDI proportion (Pie Chart)

Figure 3: FDI trend (Line Graph)

SIGNIFICANCE

A significant relationship between FDI and each Income Group

Average YoY Growth Rate

- import matplotlib
- df.T.plot(kind='bar')

The average growth of each group:

High Income Group = -1.41%

Low Income Group = 2.5%

Lower Middle Income Group = 1.65%

Upper Middle Income Group = 0.81%

Key Finding: The group with the highest average growth rate was the Lower Income group, followed by Lower Middle Income and Upper Middle Income respectively, but the group with the decline in average growth was High Income.

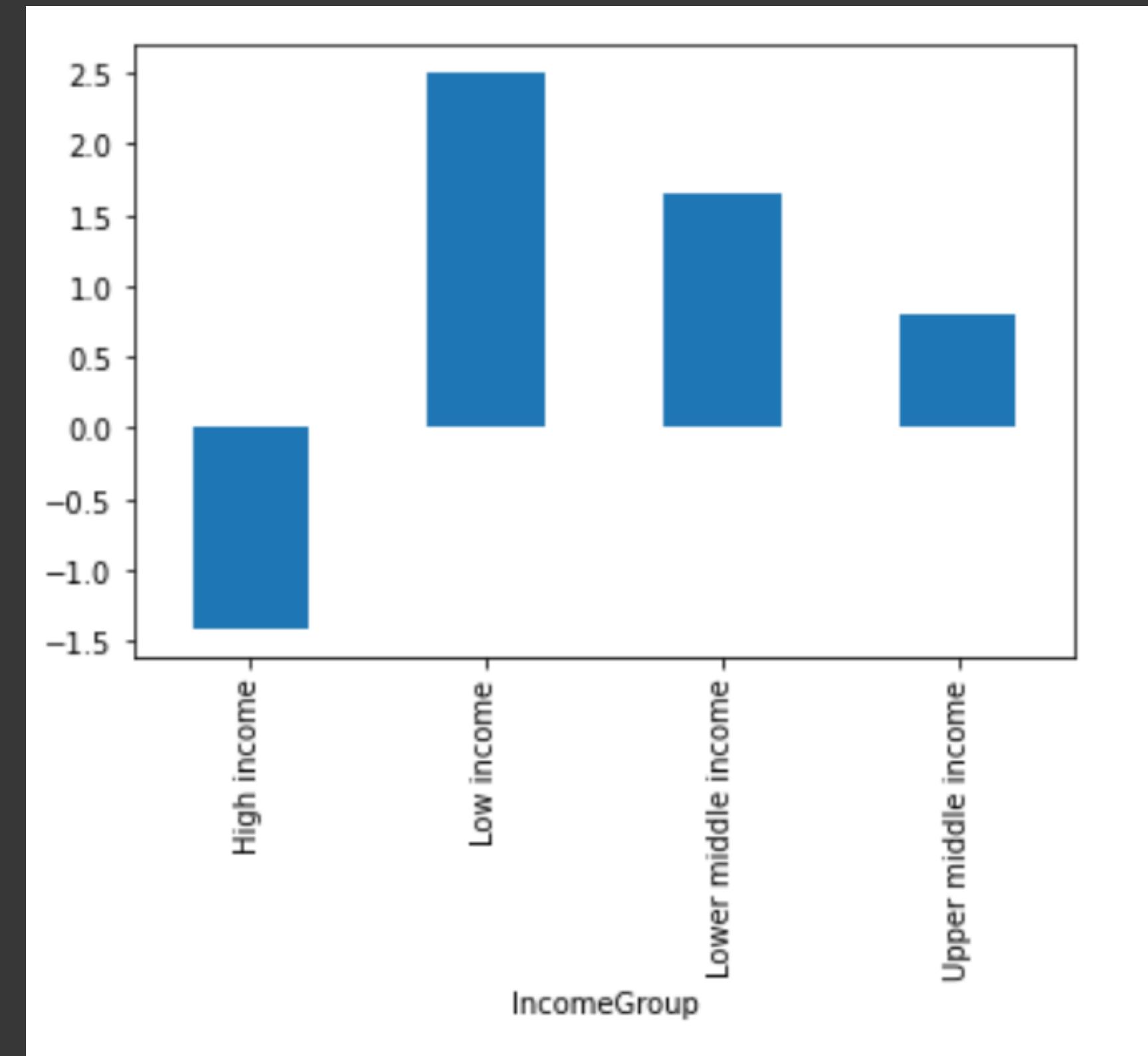


FIGURE 1

Average FDI Proportion

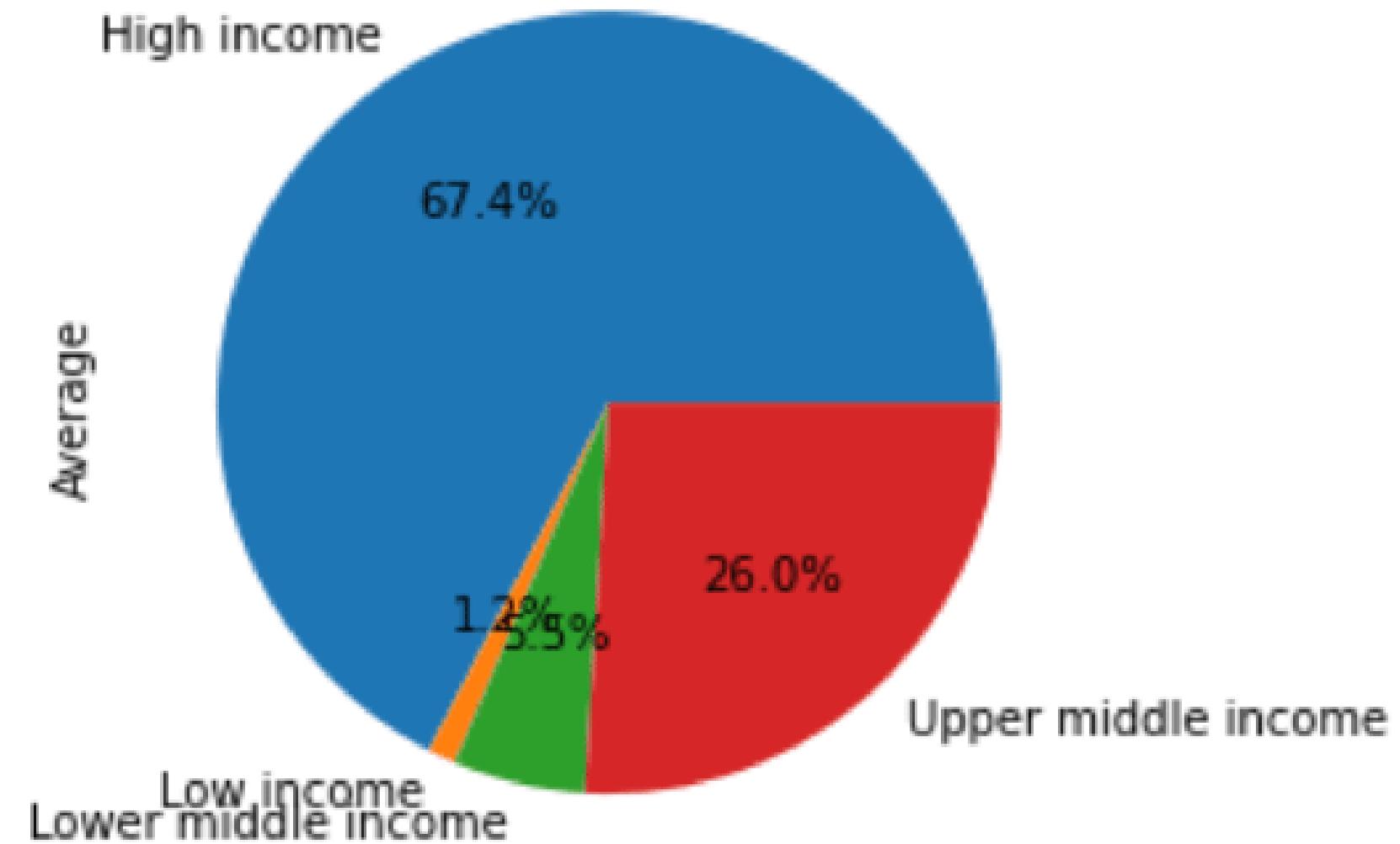


FIGURE 2

- import matplotlib
- df.plot.pie(autopct="%1.1f%%")

High Income Group = 67.4%

Low Income Group = 1.2%

Lower Middle Income Group = 5.5%

Upper Middle Income Group = 26.0%

Key Finding:

The proportion of FDI shows the ratio of investments concentrated in the high income and Upper middle income segments, demonstrating the investment trend of foreign investors and the growth of countries in these two groups.

FDI Trend Line

- import matplotlib
- df.T.plot()

Key Finding: The trend of FDI shows all of the line charts are oriented in the same trend, differing in volatility. It can be noted that **the volatility of High Income is the highest followed by Upper Middle Income, Lower Middle Income, and Low Income.**

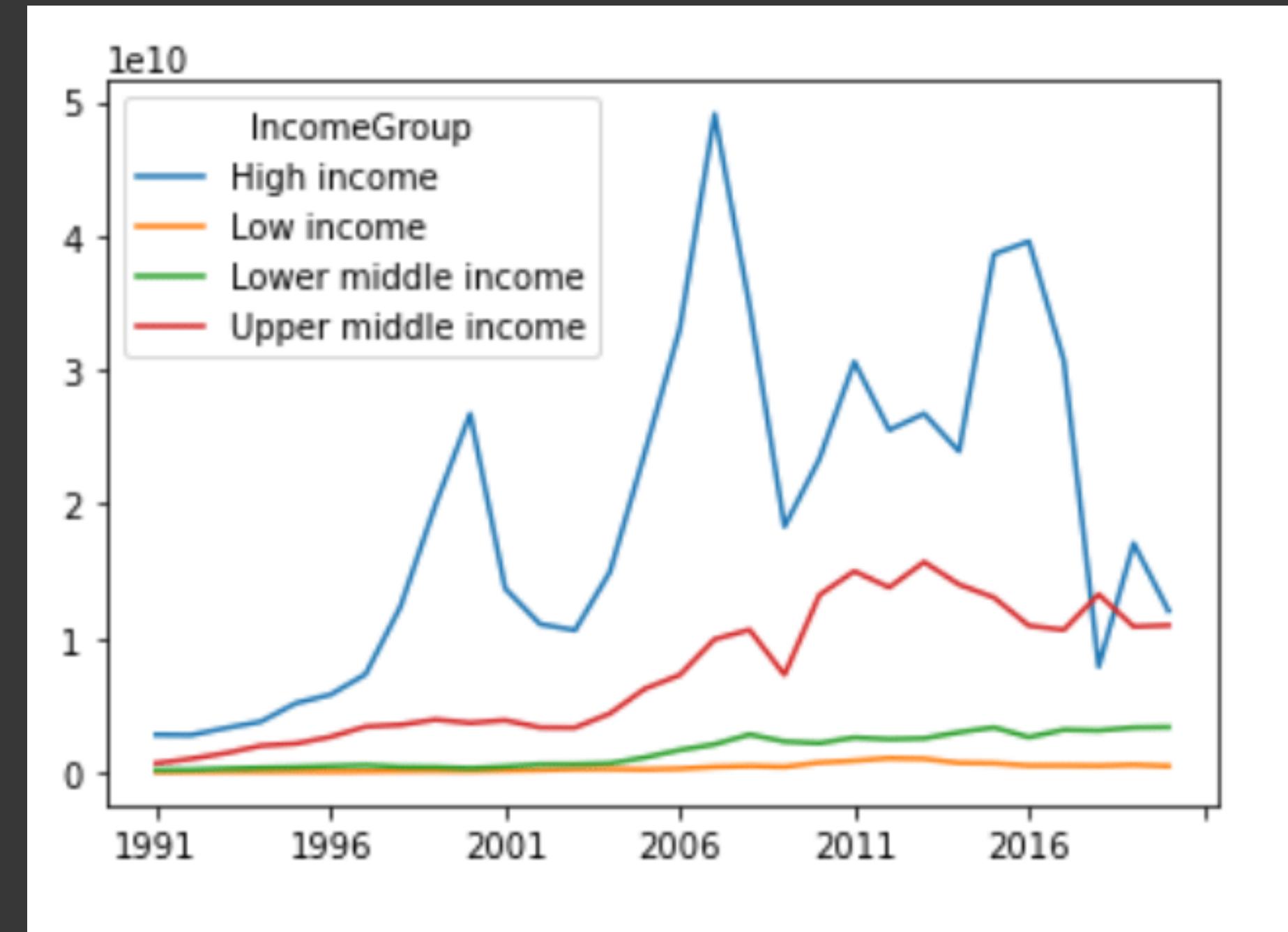


FIGURE 3

	Foreign Direct Investment Proportion (FDI)	FDI Growth rate
High Income Group	67.4%	-1.41%
Low Income Group	1.2%	2.5%
Lower Middle Income Group	5.5%	1.65%
Upper Middle Income Group	26%	0.81%

OPPOSITE RELATIONSHIP

RECOMMENDATION

1. *For investor:* Investors should **invest** in low income group, upper middle income group, lower middle income group countries.
2. *For country:* Although **Thailand** is part of the high middle income group which has a middle high growth rate, Thus, **the government should prepare economic and investment stimulus measures, infrastructure, legislation, etc.** to attract investors into the country.



BENEFITS

Financial Benefits:

- If investor invest in low income group , upper middle income group, and lower middle income group countries, there is a **chance that the business and money will grow more.**
- If the government is well prepared, it will **attract foreign investors to invest more both efficiently and quantity.**

Non-Financial Benefits:

- If the government is well prepared, **people's quality of life will be better.**



**THANK
YOU.**

