Project Title = Foreign Direct Investment Analytics

Technologies = Data Science

Domain = Finance

Project Difficulties level = Intermediate

By Nikhil Reddy

Problem Statement:

Investment is a game of understanding historic data of investment objects under different events but it is still a game of chances to minimize the risk we apply analytics to find the equilibrium investment. To understand the Foreign direct investment in India for the last 17 years from 2000-01 to 2016-17. This dataset contains sector and financial year-wise data of FDI in India Sector-wise investment analysis Year-wise investment analysis.

```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
import warnings
warnings.filterwarnings('ignore')
```

```
from google.colab import files
uploaded = files.upload()
```

```
Choose files FDI data.csv
• FDI data.csv(text/csv) - 7992 bytes, last modified: 08/01/2025 - 100% done
Saving FDI data.csv to FDI data (1).csv
```

```
df = pd.read_csv('FDI data.csv')
df.head()
```

	Sector	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	20
0	METALLURGICAL INDUSTRIES	22.69	14.14	36.61	8.11	200.38	149.13	169.94	1175.75	959.94	419.88	1098.14	1786.14	1466.23	567.63	35
1	MINING	1.32	6.52	10.06	23.48	9.92	7.40	6.62	444.36	34.16	174.40	79.51	142.65	57.89	12.73	68
2	POWER	89.42	757.44	59.11	27.09	43.37	72.69	157.15	988.68	907.66	1271.79	1271.77	1652.38	535.68	1066.08	70
3	NON-CONVENTIONAL ENERGY	0.00	0.00	1.70	4.14	1.27	1.35	2.44	58.82	125.88	622.52	214.40	452.17	1106.52	414.25	61
4	COAL PRODUCTION	0.00	0.00	0.00	0.04	0.00	9.14	1.30	14.08	0.22	0.00	0.00	0.00	0.00	2.96	

Next steps: Generate code with df | View recommended plots | New interactive sheet

```
df.tail()
```

	Sector	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	201
58	PRINTING OF BOOKS (INCLUDING LITHO PRINTING IN...	0.00	0.00	6.30	0.00	0.06	9.90	20.04	35.54	31.61	70.51	36.63	47.39	14.34	113
59	COIR	0.00	0.00	0.00	0.00	0.47	0.59	0.04	0.01	0.00	0.25	0.10	0.55	0.15	0
60	CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES	0.00	0.00	0.00	0.00	0.00	0.93	64.06	182.92	172.70	324.56	675.07	386.28	283.89	485
61	CONSTRUCTION DEVELOPMENT: Townships, housing, ...	24.33	51.75	36.10	47.04	152.06	228.71	1392.95	3887.33	4657.51	5466.13	1663.03	3140.78	1332.49	1226
62	MISCELLANEOUS INDUSTRIES	832.07	221.37	218.76	235.48	121.83	164.76	304.87	528.42	1549.70	1147.56	1475.97	813.38	229.49	468

```
df.shape
```

```
(63, 18)
```

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 63 entries, 0 to 62
Data columns (total 18 columns):
 #   Column   Non-Null Count  Dtype  
---  ------   --------------  -----  
 0   Sector   63 non-null     object 
 1   2000-01  63 non-null     float64
 2   2001-02  63 non-null     float64
 3   2002-03  63 non-null     float64
 4   2003-04  63 non-null     float64
 5   2004-05  63 non-null     float64
 6   2005-06  63 non-null     float64
 7   2006-07  63 non-null     float64
 8   2007-08  63 non-null     float64
 9   2008-09  63 non-null     float64
 10  2009-10  63 non-null     float64
 11  2010-11  63 non-null     float64
 12  2011-12  63 non-null     float64
 13  2012-13  63 non-null     float64
 14  2013-14  63 non-null     float64
 15  2014-15  63 non-null     float64
 16  2015-16  63 non-null     float64
 17  2016-17  63 non-null     float64
dtypes: float64(17), object(1)
memory usage: 9.0+ KB
```

All the datatypes are correct

```
df.describe()
```

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2
count	63.000000	63.000000	63.000000	63.000000	63.000000	63.000000	63.000000	63.000000	63.000000	63.000000	63
mean	37.757302	63.931587	42.925714	34.727778	51.090317	87.932540	198.281905	390.085714	498.348571	410.069524	339
std	112.227860	157.878737	86.606439	67.653735	101.934873	206.436967	686.783115	1026.249935	1134.649040	926.814626	627
min	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0
25%	0.000000	0.000000	0.200000	0.215000	0.715000	1.230000	4.160000	9.950000	11.950000	7.880000	8
50%	4.030000	5.070000	11.010000	6.370000	9.090000	22.620000	25.820000	58.820000	84.880000	69.740000	58
75%	23.510000	44.830000	36.555000	38.660000	43.205000	63.855000	108.325000	279.270000	383.320000	341.595000	304
max	832.070000	873.230000	419.960000	368.320000	527.900000	1359.970000	4713.780000	6986.170000	6183.490000	5466.130000	3296

Here from above we can understand that the data of FDI is largliy skewed specifically right skewed as mean is greater than median(50%)

```
df.isnull().sum()
```

	0
Sector	0
2000-01	0
2001-02	0
2002-03	0
2003-04	0
2004-05	0
2005-06	0
2006-07	0
2007-08	0
2008-09	0
2009-10	0
2010-11	0
2011-12	0
2012-13	0
2013-14	0
2014-15	0
2015-16	0
2016-17	0

dtype: int64

There are no null values

```
df.duplicated().sum()
```

```
0
```

From above we can conclude that there are no duplicates involved here!!!

```
df.columns
```

```
Index(['Sector', '2000-01', '2001-02', '2002-03', '2003-04', '2004-05',
       '2005-06', '2006-07', '2007-08', '2008-09', '2009-10', '2010-11',
       '2011-12', '2012-13', '2013-14', '2014-15', '2015-16', '2016-17'],
      dtype='object')
```

```
df1 = df.set_index('Sector')  ####making Sector as index column
df1.head()
```

Sector	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014
METALLURGICAL INDUSTRIES	22.69	14.14	36.61	8.11	200.38	149.13	169.94	1175.75	959.94	419.88	1098.14	1786.14	1466.23	567.63	359.3
MINING	1.32	6.52	10.06	23.48	9.92	7.40	6.62	444.36	34.16	174.40	79.51	142.65	57.89	12.73	684.3
POWER	89.42	757.44	59.11	27.09	43.37	72.69	157.15	988.68	907.66	1271.79	1271.77	1652.38	535.68	1066.08	707.0
NON-CONVENTIONAL ENERGY	0.00	0.00	1.70	4.14	1.27	1.35	2.44	58.82	125.88	622.52	214.40	452.17	1106.52	414.25	615.9
COAL PRODUCTION	0.00	0.00	0.00	0.04	0.00	9.14	1.30	14.08	0.22	0.00	0.00	0.00	0.00	2.96	0.0

Next steps: Generate code with df1 | View recommended plots | New interactive sheet

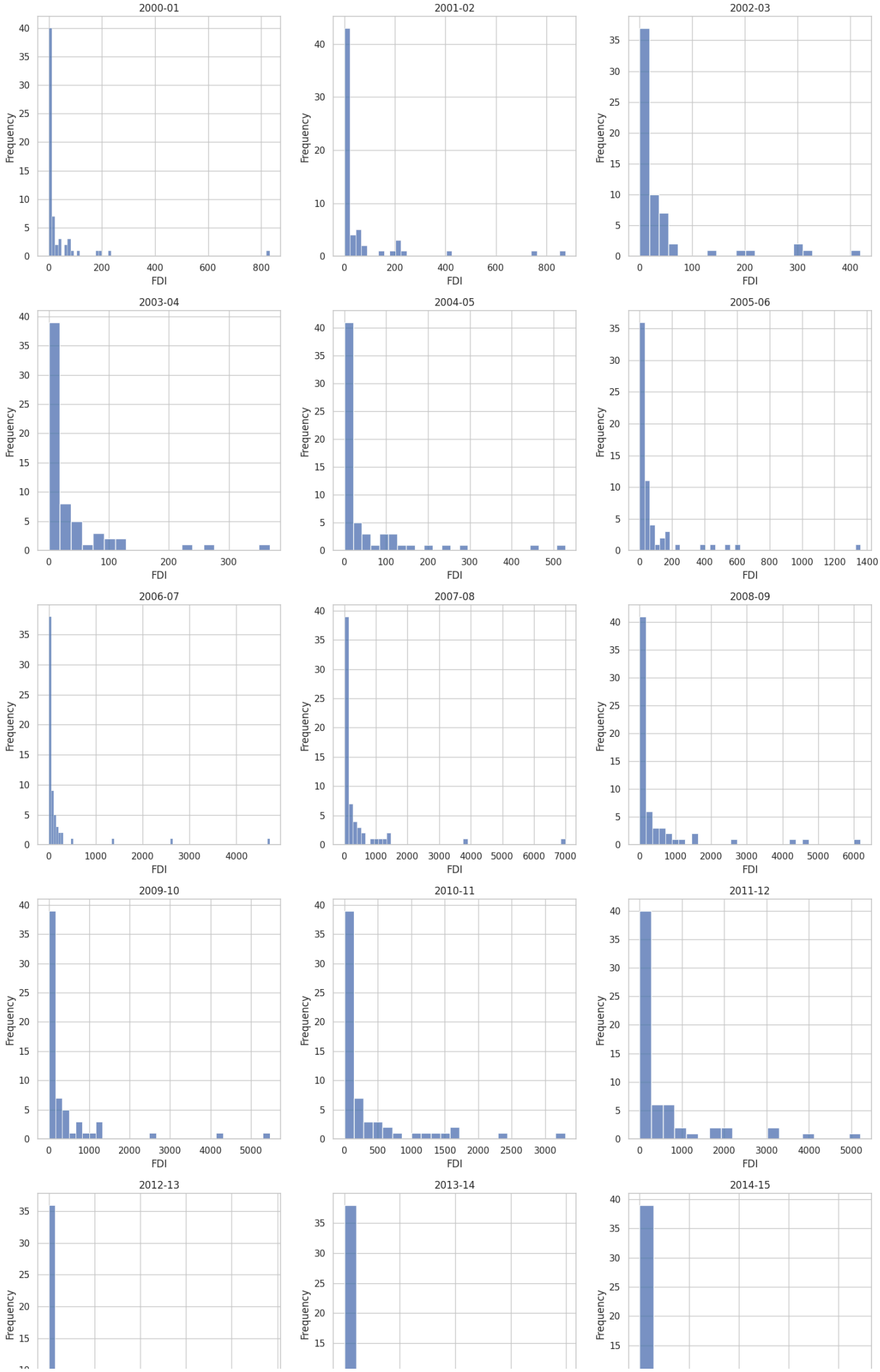
```
df['Sector'].nunique()
```

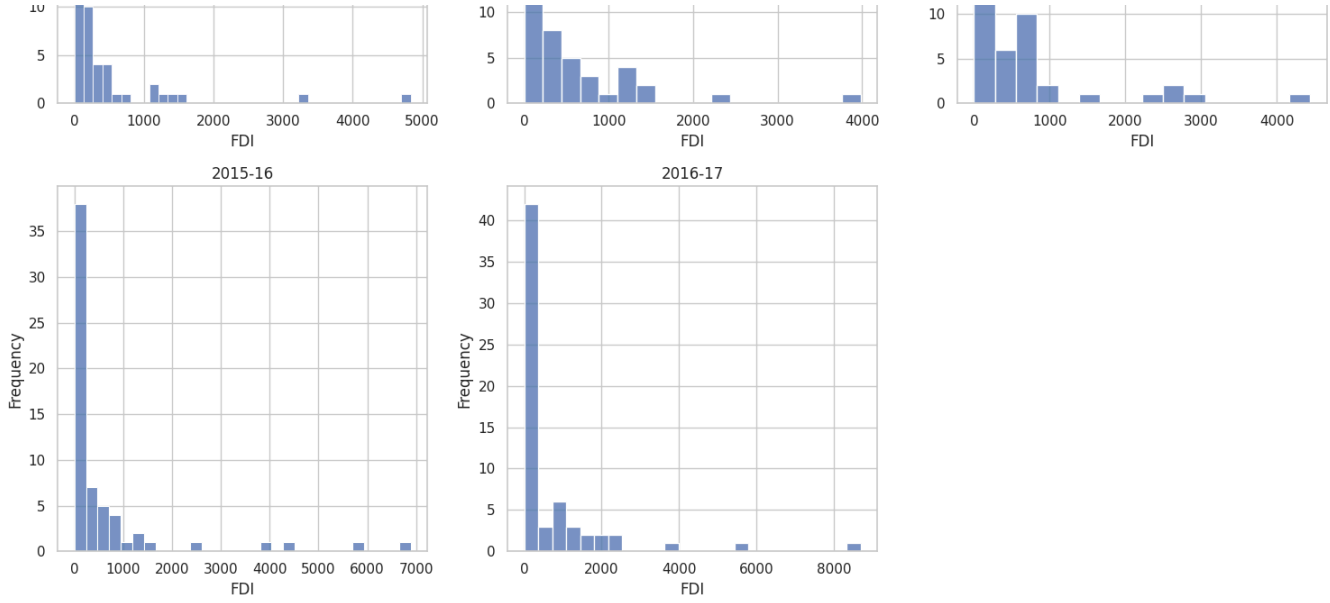
```
63
```

Univariate Plots

Distrubtion of FDI For Each Year

```
def histplots(df1):
    columns = df1.columns
    n_cols = 3
    n_rows = -(-len(columns) // n_cols)

    fig, axes = plt.subplots(n_rows, n_cols, figsize=(15, 5*n_rows))
    axes = axes.flatten()

    for i, col in enumerate(columns):
        sns.histplot(df1[col], ax=axes[i])
        axes[i].set_title(col)
        axes[i].set_xlabel("FDI")
        axes[i].set_ylabel('Frequency')

    # Remove empty subplots
    for j in range(i + 1, n_rows * n_cols):
        fig.delaxes(axes[j])

    plt.tight_layout()
    plt.show()

histplots(df1)
```


2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
Frequency
FDI




```
df2 = df1.T
df2.head()
```

Sector	METALLURGICAL INDUSTRIES	MINING	POWER	NON-CONVENTIONAL ENERGY	COAL PRODUCTION	PETROLEUM & NATURAL GAS	BOILERS AND STEAM GENERATING PLANTS	PRIME MOVER (OTHER THAN ELECTRICAL GENERATORS)	ELECTRICAL EQUIPMENTS	COMPUTER SOFTWARE & HARDWARE	.
2000-01	22.69	1.32	89.42	0.00	0.00	9.35	0.00	0.00	79.76	228.39	
2001-02	14.14	6.52	757.44	0.00	0.00	211.07	0.00	0.00	65.76	419.39	
2002-03	36.61	10.06	59.11	1.70	0.00	56.78	0.00	0.00	34.71	314.24	
2003-04	8.11	23.48	27.09	4.14	0.04	80.64	0.04	0.00	73.20	368.32	
2004-05	200.38	9.92	43.37	1.27	0.00	102.78	0.54	2.66	97.40	527.90	

5 rows × 63 columns

```
df2.columns
```

```
Index(['METALLURGICAL INDUSTRIES', 'MINING', 'POWER',
       'NON-CONVENTIONAL ENERGY', 'COAL PRODUCTION', 'PETROLEUM & NATURAL GAS',
       'BOILERS AND STEAM GENERATING PLANTS',
       'PRIME MOVER (OTHER THAN ELECTRICAL GENERATORS)',
       'ELECTRICAL EQUIPMENTS', 'COMPUTER SOFTWARE & HARDWARE', 'ELECTRONICS',
       'TELECOMMUNICATIONS',
       'INFORMATION & BROADCASTING (INCLUDING PRINT MEDIA)',
       'AUTOMOBILE INDUSTRY', 'AIR TRANSPORT (INCLUDING AIR FREIGHT)',
       'SEA TRANSPORT', 'PORTS', 'RAILWAY RELATED COMPONENTS',
       'INDUSTRIAL MACHINERY', 'MACHINE TOOLS', 'AGRICULTURAL MACHINERY',
       'EARTH-MOVING MACHINERY',
       'MISCELLANEOUS MECHANICAL & ENGINEERING INDUSTRIES',
       'COMMERCIAL, OFFICE & HOUSEHOLD EQUIPMENTS',
       'MEDICAL AND SURGICAL APPLIANCES', 'INDUSTRIAL INSTRUMENTS',
       'SCIENTIFIC INSTRUMENTS',
       'MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS', 'FERTILIZERS',
       'CHEMICALS (OTHER THAN FERTILIZERS)', 'PHOTOGRAPHIC RAW FILM AND PAPER',
       'DYE-STUFFS', 'DRUGS & PHARMACEUTICALS',
       'TEXTILES (INCLUDING DYED,PRINTED)',
       'PAPER AND PULP (INCLUDING PAPER PRODUCTS)', 'SUGAR',
```

```
        'FERMENTATION INDUSTRIES', 'FOOD PROCESSING INDUSTRIES',
        'VEGETABLE OILS AND VANASPATI',
        'SOAPS, COSMETICS & TOILET PREPARATIONS', 'RUBBER GOODS',
        'LEATHER,LEATHER GOODS AND PICKERS', 'GLUE AND GELATIN', 'GLASS',
        'CERAMICS', 'CEMENT AND GYPSUM PRODUCTS', 'TIMBER PRODUCTS',
        'DEFENCE INDUSTRIES', 'CONSULTANCY SERVICES',
        'SERVICES SECTOR (Fin.,Banking,Insurance,Non Fin/Business,Outsourcing,R&D,Courier,Tech. Testing and Analysis,
Other)',
        'HOSPITAL & DIAGNOSTIC CENTRES', 'EDUCATION', 'HOTEL & TOURISM',
        'TRADING', 'RETAIL TRADING', 'AGRICULTURE SERVICES',
        'DIAMOND,GOLD ORNAMENTS',
        'TEA AND COFFEE (PROCESSING & WAREHOUSING COFFEE & RUBBER)',
        'PRINTING OF BOOKS (INCLUDING LITHO PRINTING INDUSTRY)', 'COIR',
        'CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES',
        'CONSTRUCTION DEVELOPMENT: Townships, housing, built-up infrastructure and construction-development projects',
        'MISCELLANEOUS INDUSTRIES'],
      dtype='object', name='Sector')
```

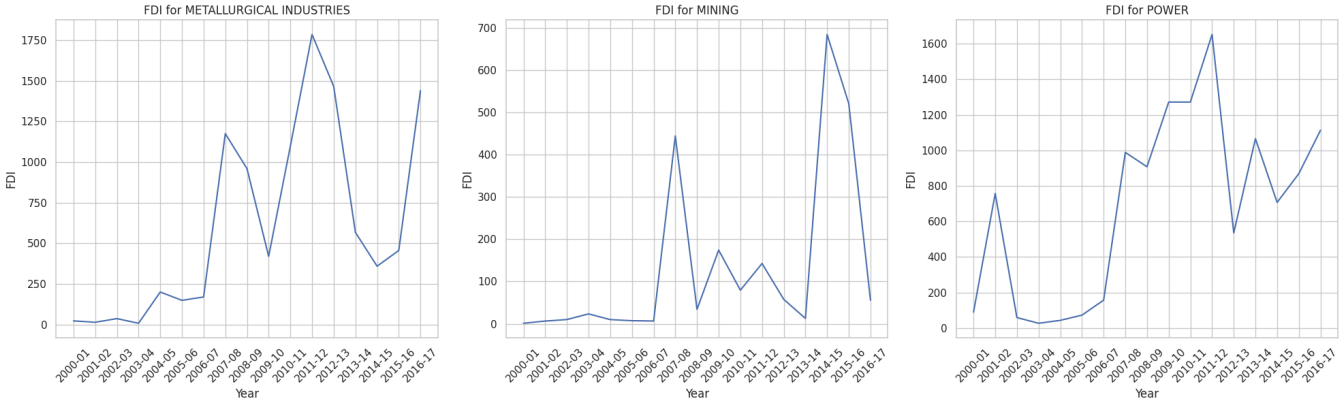
```
df2.rename(columns={'CONSTRUCTION DEVELOPMENT: Townships, housing, built-up infrastructure and construction-development proj
df2.head()
```

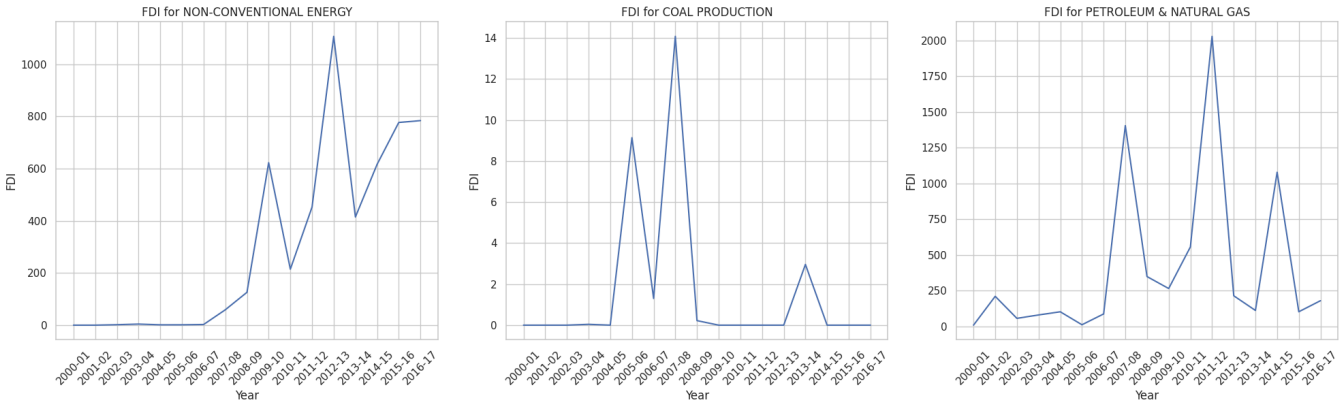
Sector	METALLURGICAL INDUSTRIES	MINING	POWER	NON-CONVENTIONAL ENERGY	COAL PRODUCTION	PETROLEUM & NATURAL GAS	BOILERS AND STEAM GENERATING PLANTS	PRIME MOVER (OTHER THAN ELECTRICAL GENERATORS)	ELECTRICAL EQUIPMENTS	COMPUTER SOFTWARE & HARDWARE	.
2000-01	22.69	1.32	89.42	0.00	0.00	9.35	0.00	0.00	79.76	228.39	
2001-02	14.14	6.52	757.44	0.00	0.00	211.07	0.00	0.00	65.76	419.39	
2002-03	36.61	10.06	59.11	1.70	0.00	56.78	0.00	0.00	34.71	314.24	
2003-04	8.11	23.48	27.09	4.14	0.04	80.64	0.04	0.00	73.20	368.32	
2004-05	200.38	9.92	43.37	1.27	0.00	102.78	0.54	2.66	97.40	527.90	

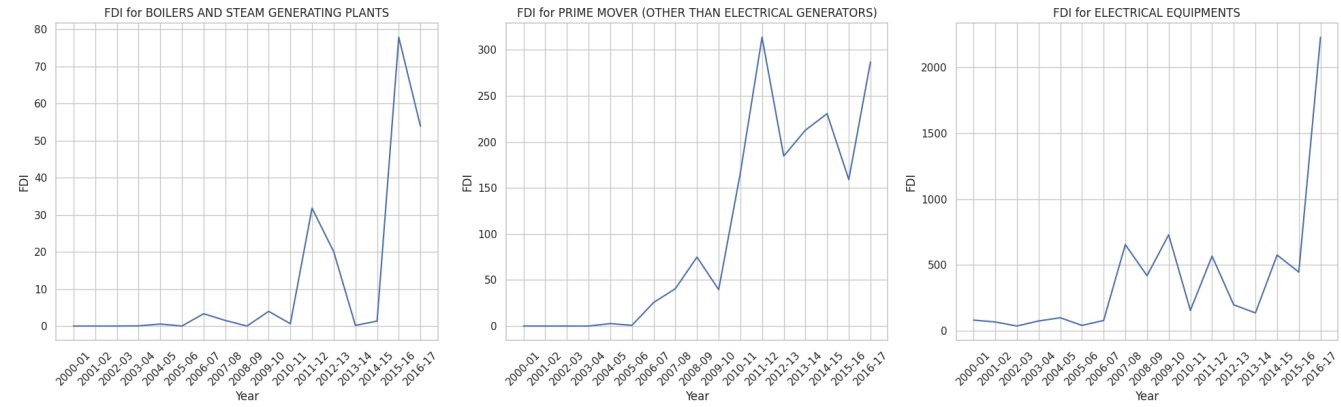
5 rows × 63 columns

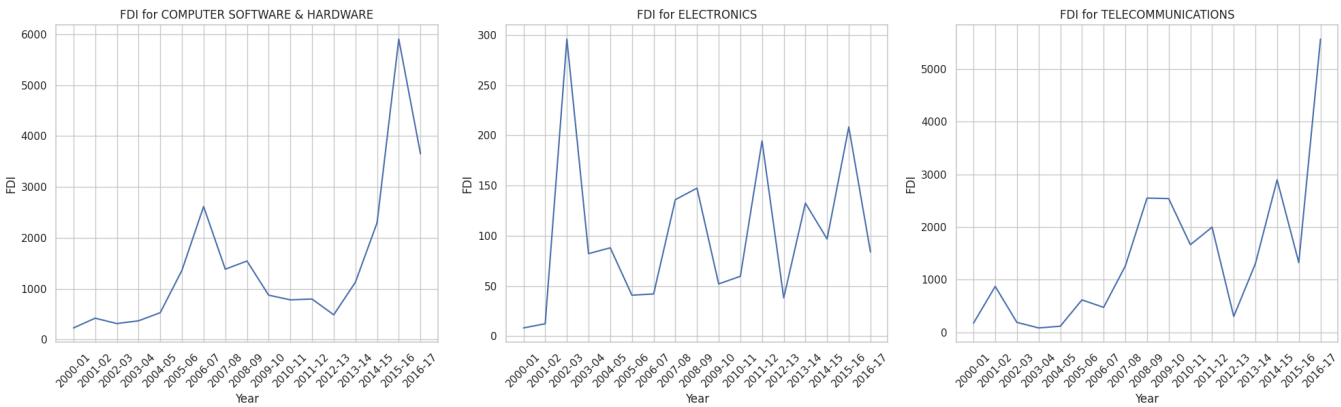
FDI Over The Years For Each Sector

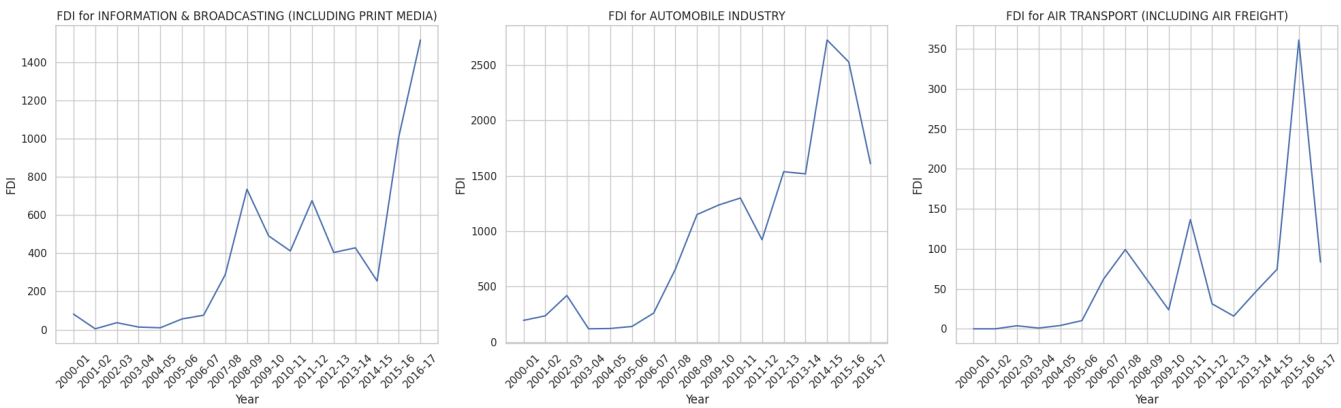
```
def scatterp(df2):
    columns = df2.columns
    n_cols = 3
    n_rows = -(-len(columns) // n_cols)

    fig, axes = plt.subplots(n_rows, n_cols, figsize=(20, 6*n_rows))
    axes = axes.flatten()

    for i, col in enumerate(columns):
        axes[i].plot(df2.index.values, df2[col])
        axes[i].set_title("FDI for " + col)
        axes[i].set_xlabel("Year")
        axes[i].set_xticklabels(df2.index.values, rotation=45)
        axes[i].set_ylabel("FDI")
        axes[i].grid(True)

    # Remove empty subplots
    for j in range(i + 1, n_rows * n_cols):
        fig.delaxes(axes[j])

    plt.tight_layout()
    plt.show()

scatterp(df2)
```


FDI for METALLURGICAL INDUSTRIES
FDI for MINING
FDI for POWER
FDI
Year

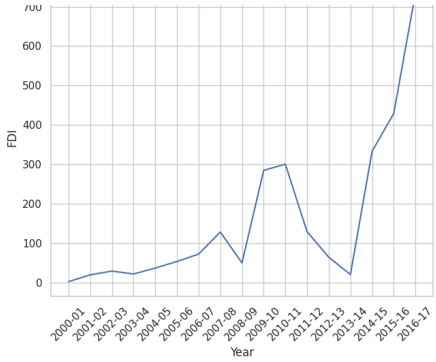

FDI for NON-CONVENTIONAL ENERGY
FDI for COAL PRODUCTION
FDI for PETROLEUM & NATURAL GAS
FDI
Year

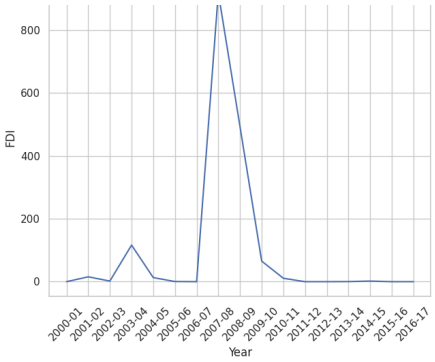

FDI for BOILERS AND STEAM GENERATING PLANTS
FDI for PRIME MOVER (OTHER THAN ELECTRICAL GENERATORS)
FDI for ELECTRICAL EQUIPMENTS
FDI
Year

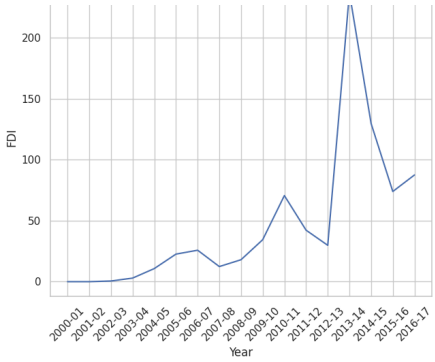

FDI for COMPUTER SOFTWARE & HARDWARE
FDI for ELECTRONICS
FDI for TELECOMMUNICATIONS
FDI
Year

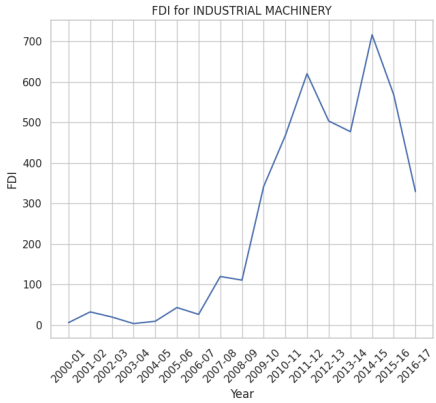

FDI for INFORMATION & BROADCASTING (INCLUDING PRINT MEDIA)
FDI for AUTOMOBILE INDUSTRY
FDI for AIR TRANSPORT (INCLUDING AIR FREIGHT)
FDI
Year

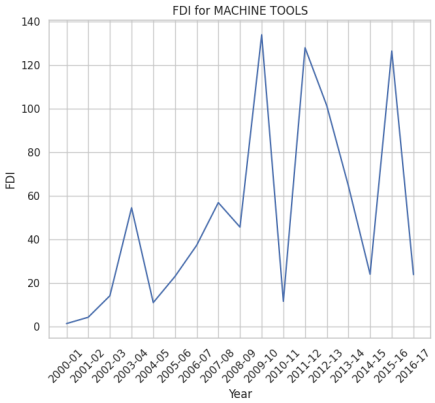

FDI for SEA TRANSPORT
FDI for PORTS
FDI for RAILWAY RELATED COMPONENTS

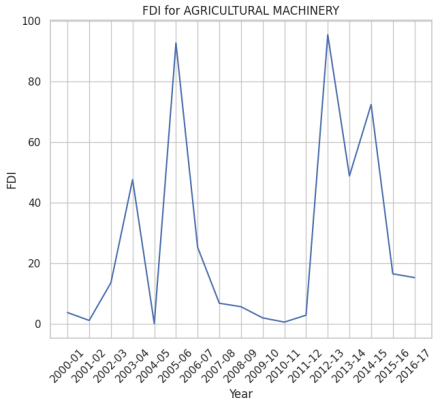

FDI
Year

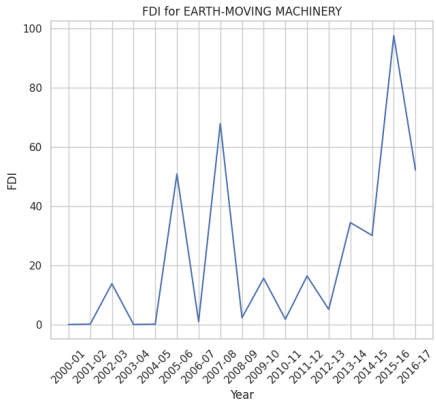

FDI
Year

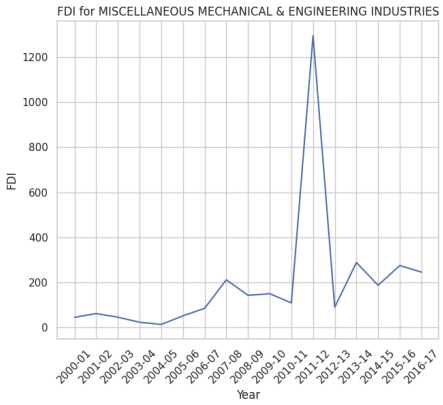

FDI
Year

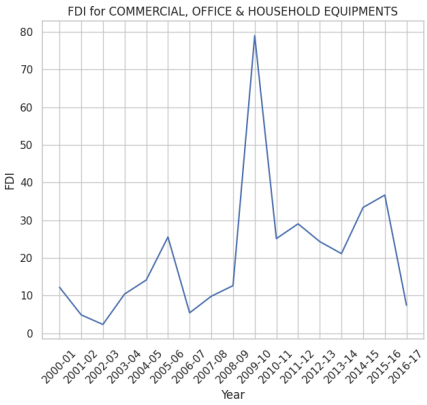

FDI for INDUSTRIAL MACHINERY
FDI
Year

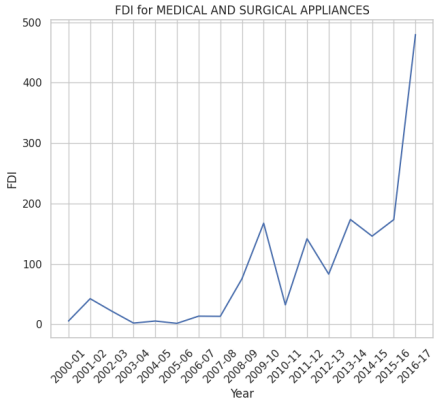

FDI for MACHINE TOOLS
FDI
Year

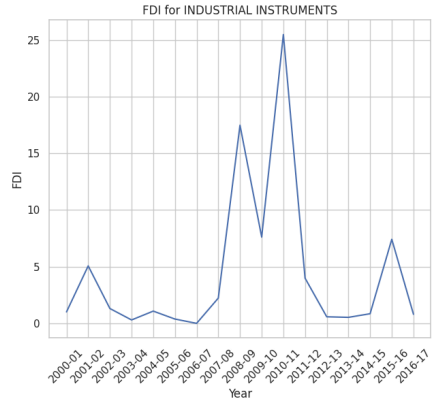

FDI for AGRICULTURAL MACHINERY
FDI
Year

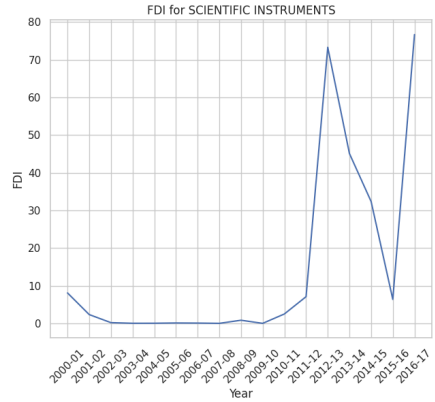

FDI for EARTH-MOVING MACHINERY
FDI
Year

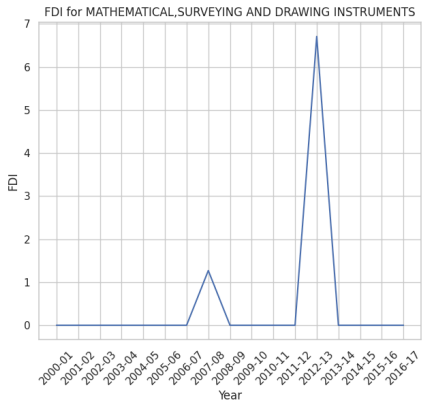

FDI for MISCELLANEOUS MECHANICAL & ENGINEERING INDUSTRIES
FDI
Year

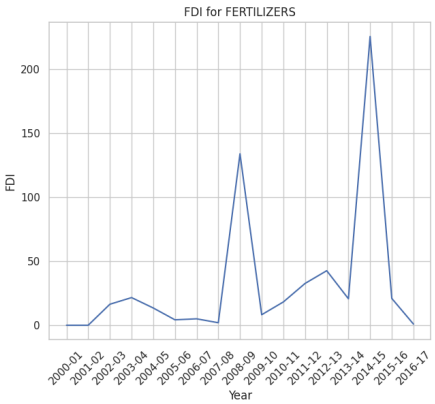

FDI for COMMERCIAL, OFFICE & HOUSEHOLD EQUIPMENTS
FDI
Year

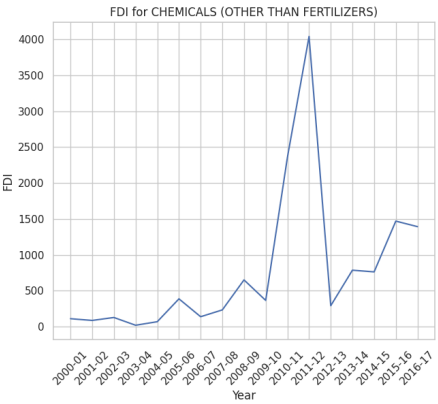

FDI for MEDICAL AND SURGICAL APPLIANCES
FDI
Year

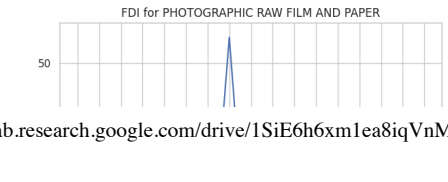

FDI for INDUSTRIAL INSTRUMENTS
FDI
Year

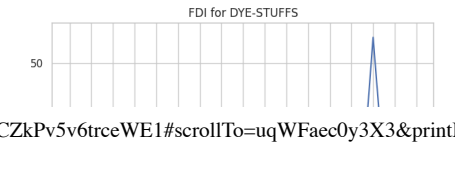

FDI for SCIENTIFIC INSTRUMENTS
FDI
Year

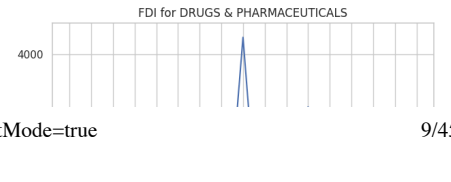

FDI for MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS
FDI
Year

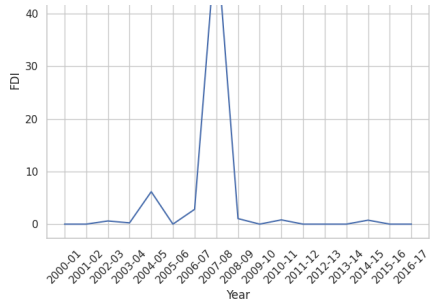

FDI for FERTILIZERS
FDI
Year

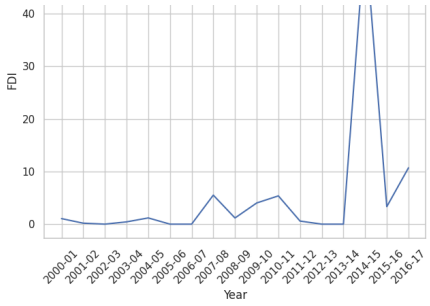

FDI for CHEMICALS (OTHER THAN FERTILIZERS)
FDI
Year

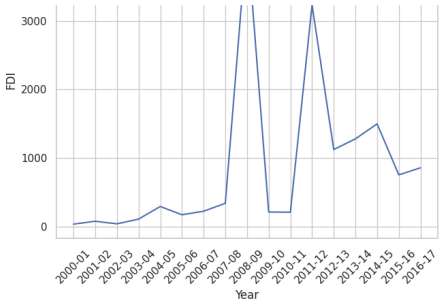

FDI for PHOTOGRAPHIC RAW FILM AND PAPER

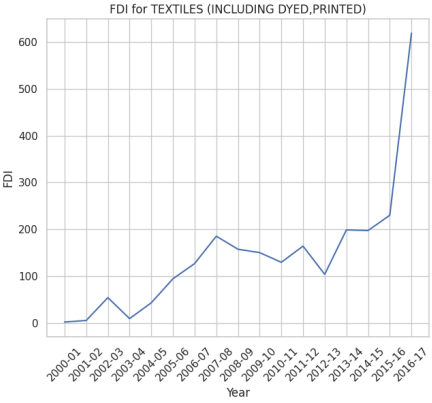

FDI for DYE-STUFFS

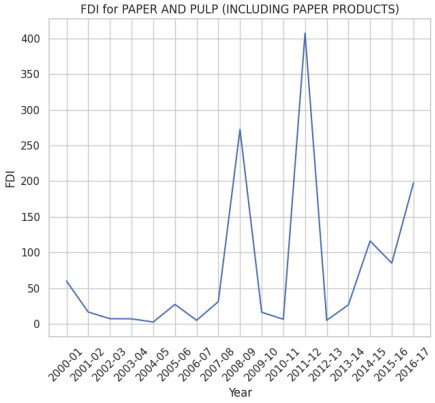

FDI for DRUGS & PHARMACEUTICALS

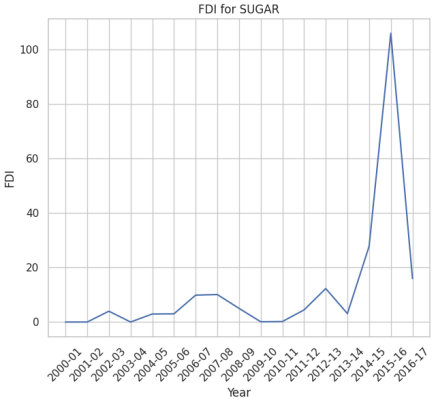

FDI
Year

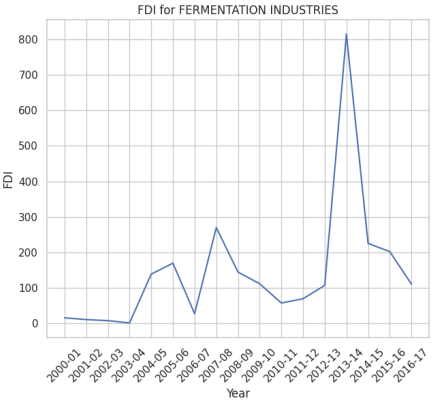

FDI
Year

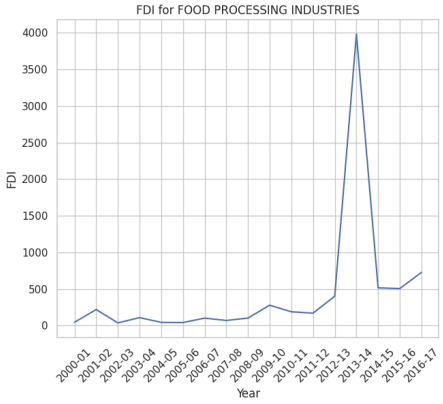

FDI
Year

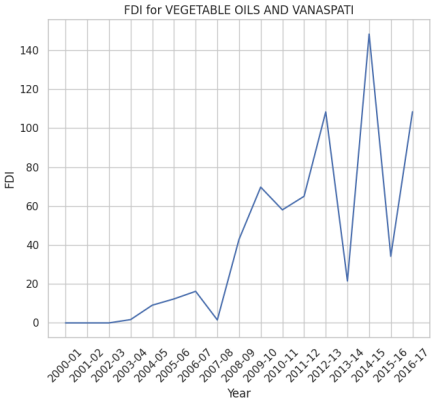

FDI for TEXTILES (INCLUDING DYED,PRINTED)
FDI
Year

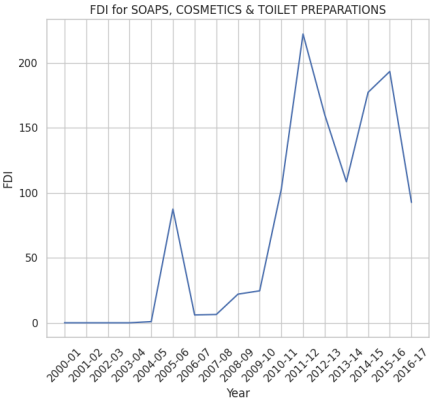

FDI for PAPER AND PULP (INCLUDING PAPER PRODUCTS)
FDI
Year

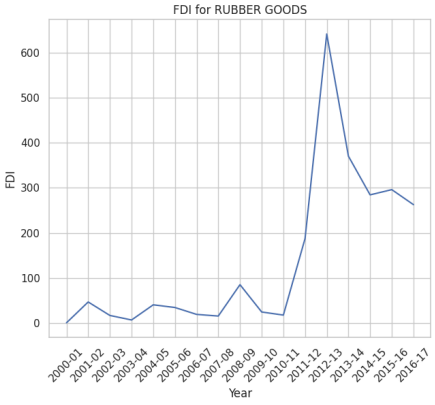

FDI for SUGAR
FDI
Year

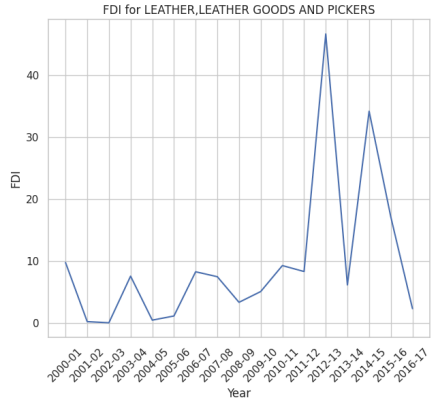

FDI for FERMENTATION INDUSTRIES
FDI
Year

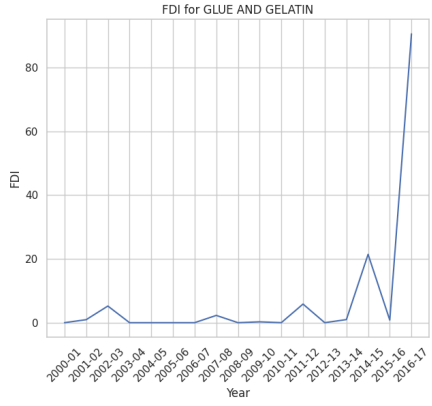

FDI for FOOD PROCESSING INDUSTRIES
FDI
Year

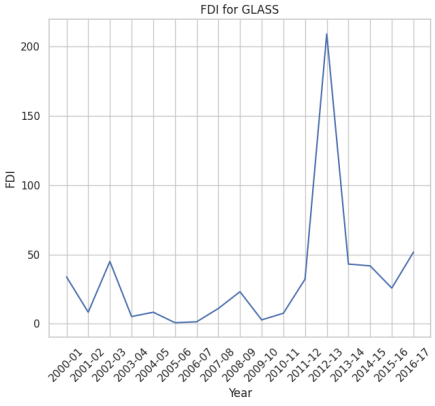

FDI for VEGETABLE OILS AND VANASPATI
FDI
Year

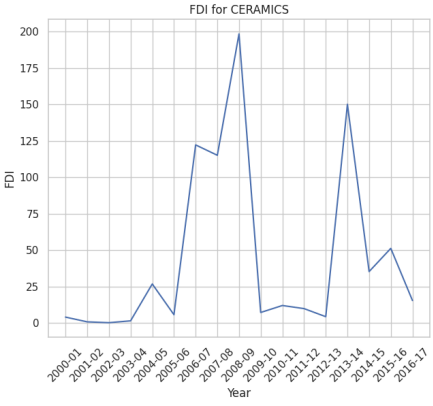

FDI for SOAPS, COSMETICS & TOILET PREPARATIONS
FDI
Year

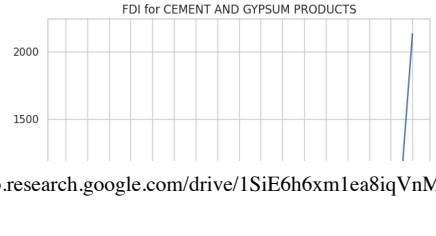

FDI for RUBBER GOODS
FDI
Year


FDI for LEATHER,LEATHER GOODS AND PICKERS
FDI
Year

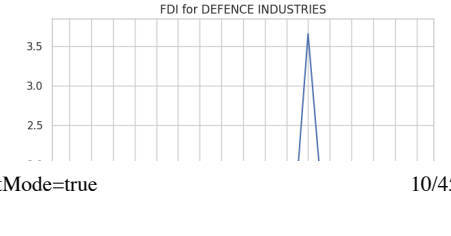

FDI for GLUE AND GELATIN
FDI
Year

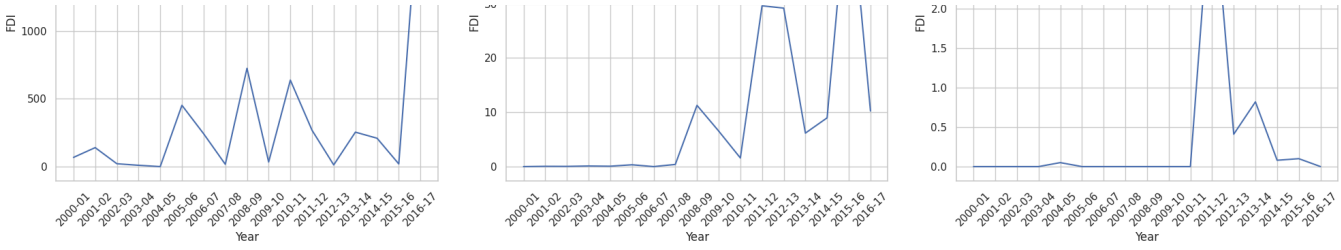

FDI for GLASS
FDI
Year

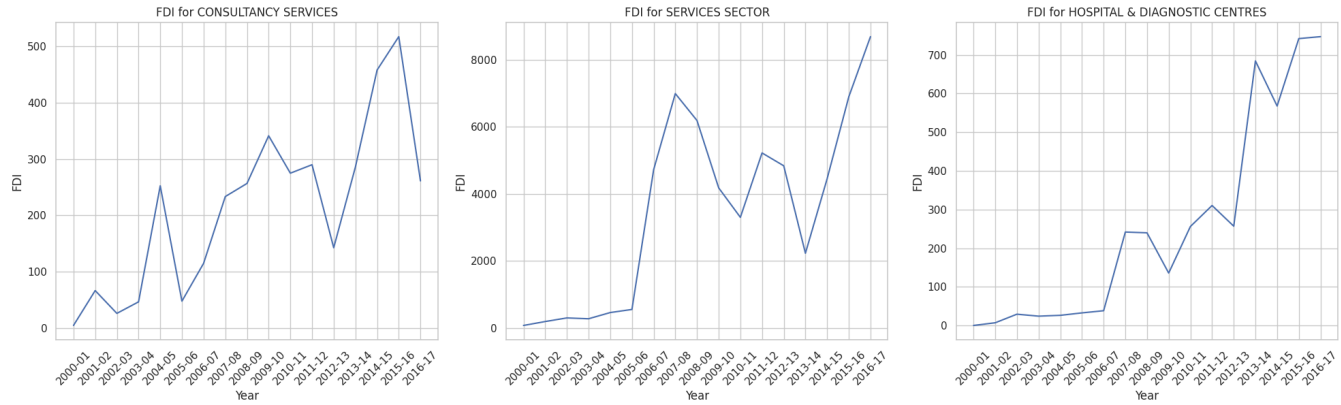

FDI for CERAMICS
FDI
Year

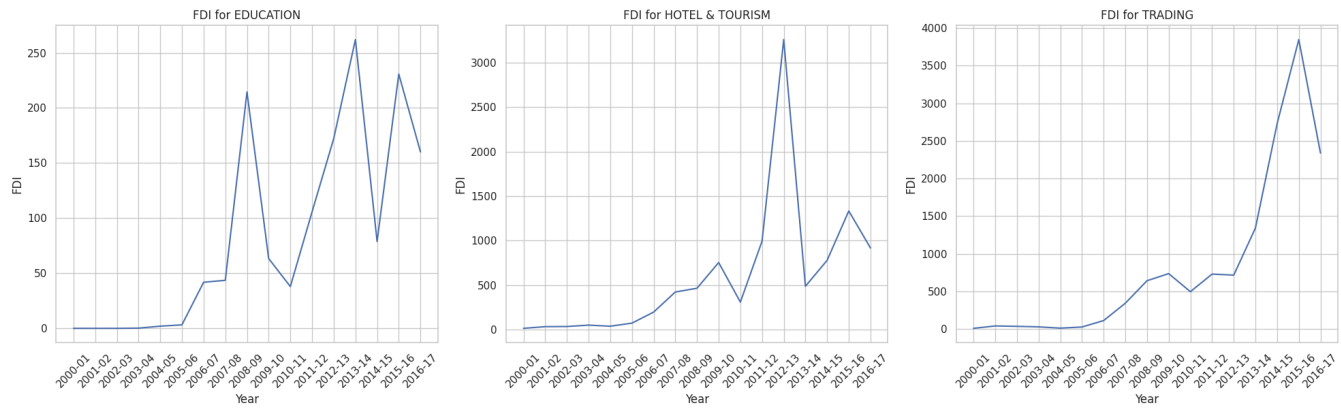

FDI for CEMENT AND GYPSUM PRODUCTS

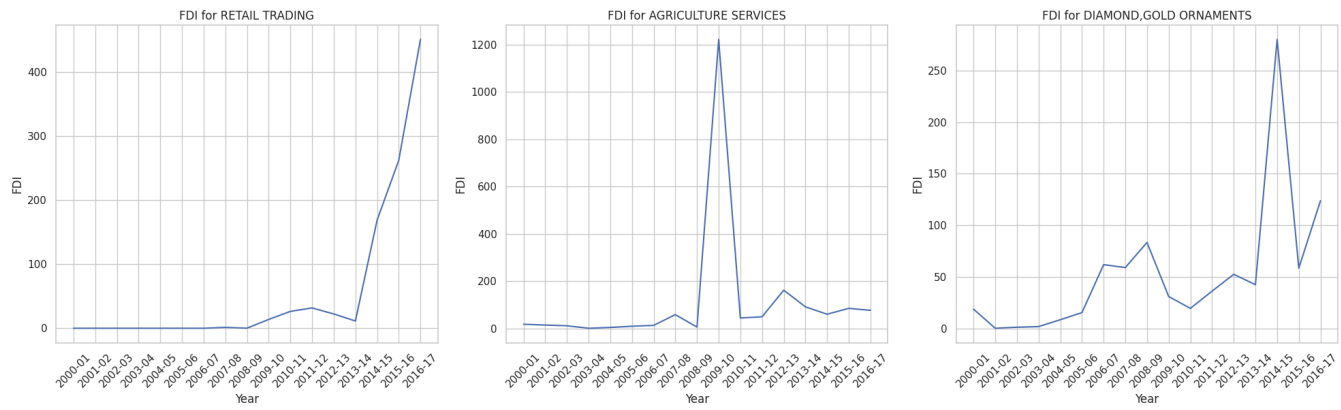

FDI for TIMBER PRODUCTS

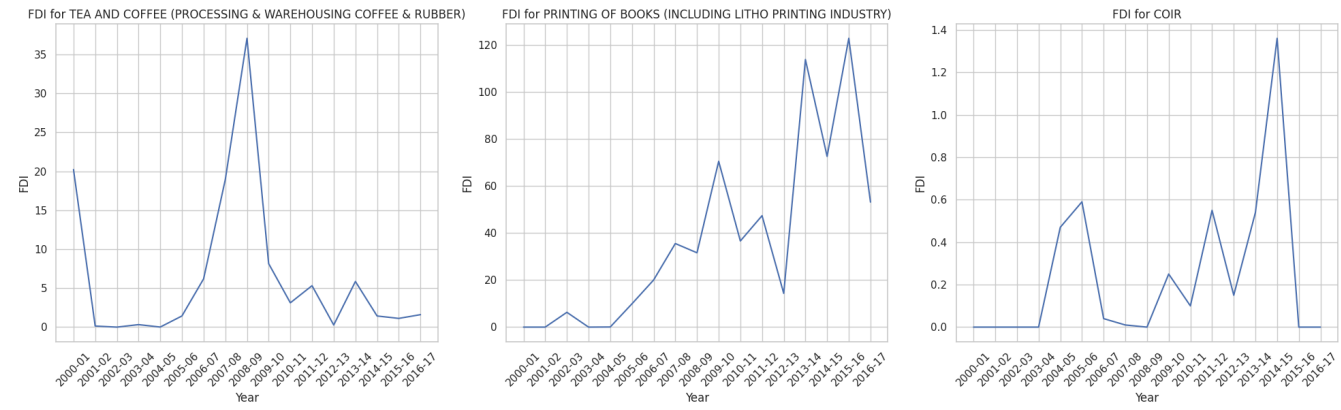

FDI for DEFENCE INDUSTRIES

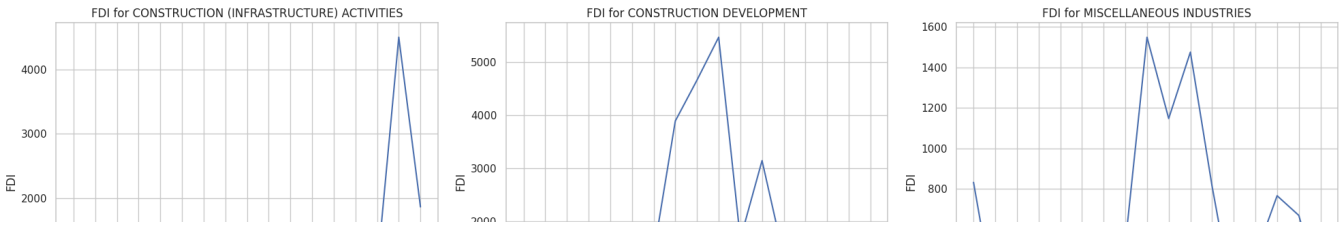

FDI
Year

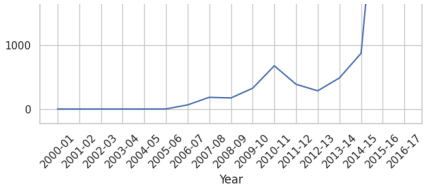

FDI for CONSULTANCY SERVICES
FDI for SERVICES SECTOR
FDI for HOSPITAL & DIAGNOSTIC CENTRES
FDI
Year

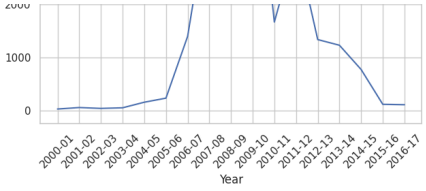

FDI for EDUCATION
FDI for HOTEL & TOURISM
FDI for TRADING
FDI
Year

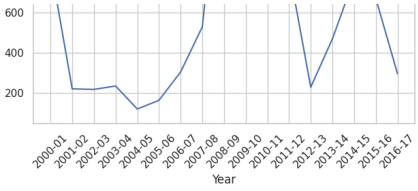

FDI for RETAIL TRADING
FDI for AGRICULTURE SERVICES
FDI for DIAMOND,GOLD ORNAMENTS
FDI
Year


FDI for TEA AND COFFEE (PROCESSING & WAREHOUSING COFFEE & RUBBER)
FDI for PRINTING OF BOOKS (INCLUDING LITHO PRINTING INDUSTRY)
FDI for COIR
FDI
Year


FDI for CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES
FDI for CONSTRUCTION DEVELOPMENT
FDI for MISCELLANEOUS INDUSTRIES
FDI


1000
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year


1000
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year


600
400
200
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

The above plot shows us the how FDI changed over the years for each sector

Year wise total FDI

```
year_total = df2.sum(axis=1)
year_total = pd.DataFrame(year_total, columns=['Total_FDI'])
year_total.sort_values(by='Total_FDI', ascending=False)
```

	Total_FDI
2016-17	43478.26
2015-16	40000.99
2011-12	35120.78
2008-09	31395.96
2014-15	30930.47
2009-10	25834.38
2007-08	24575.40
2013-14	24299.32
2012-13	22423.59
2010-11	21383.07
2006-07	12491.76
2005-06	5539.75
2001-02	4027.69
2004-05	3218.69
2002-03	2704.32
2000-01	2378.71
2003-04	2187.85

Year wise Average FDI

```
year_avg = df2.mean(axis=1)
year_avg = pd.DataFrame(year_avg, columns=['Avg_FDI'])
year_avg.sort_values(by='Avg_FDI', ascending=False)
```

	Avg_FDI
2016-17	690.131111
2015-16	634.936349
2011-12	557.472698
2008-09	498.348571
2014-15	490.959841
2009-10	410.069524
2007-08	390.085714
2013-14	385.703492
2012-13	355.930000
2010-11	339.413810
2006-07	198.281905
2005-06	87.932540
2001-02	63.931587
2004-05	51.090317
2002-03	42.925714
2000-01	37.757302
2003-04	34.727778

Top 10 Sector wise total FDI

```
df3 = df2.T
sec_total = df3.sum(axis=1)
sec_total = pd.DataFrame(sec_total, columns=['Total_FDI'])
sec_total_top = sec_total.sort_values(by='Total_FDI', ascending=False).head(10)
sec_total_top
```

Sector	Total_FDI
SERVICES SECTOR	59476.49
COMPUTER SOFTWARE & HARDWARE	24669.49
CONSTRUCTION DEVELOPMENT	24293.09
TELECOMMUNICATIONS	23946.01
AUTOMOBILE INDUSTRY	16673.92
DRUGS & PHARMACEUTICALS	14706.90
TRADING	14210.88
CHEMICALS (OTHER THAN FERTILIZERS)	13293.09
POWER	11589.13
METALLURGICAL INDUSTRIES	10330.54

Next steps: Generate code with sec_total_top | View recommended plots | New interactive sheet

From above data we can see that the service sector was able to draw more FDI than other sectors

Bottom 10 Sector wise total FDI

```
sec_total_tail = sec_total.sort_values(by='Total_FDI', ascending=False).tail(10)
sec_total_tail
```

Sector	Total_FDI
TIMBER PRODUCTS	157.68
GLUE AND GELATIN	128.39
TEA AND COFFEE (PROCESSING & WAREHOUSING COFFEE & RUBBER)	111.22
DYE-STUFFS	88.40
INDUSTRIAL INSTRUMENTS	76.12
PHOTOGRAPHIC RAW FILM AND PAPER	67.28
COAL PRODUCTION	27.74
MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS	7.98
DEFENCE INDUSTRIES	5.12
COIR	4.06

Next steps: Generate code with sec_total_tail | View recommended plots | New interactive sheet

From above data we can see that the COIR sector was able to draw least FDI than other sectors

Top 10 Sector wise Average FDI

```
sec_avg = df3.mean(axis=1)
sec_avg = pd.DataFrame(sec_avg, columns=['Avg_FDI'])
sec_avg_top = sec_avg.sort_values(by='Avg_FDI', ascending=False).head(10)
sec_avg_top
```

Sector	Avg_FDI
SERVICES SECTOR	3498.617059
COMPUTER SOFTWARE & HARDWARE	1451.146471
CONSTRUCTION DEVELOPMENT	1429.005294
TELECOMMUNICATIONS	1408.588824
AUTOMOBILE INDUSTRY	980.818824
DRUGS & PHARMACEUTICALS	865.111765
TRADING	835.934118
CHEMICALS (OTHER THAN FERTILIZERS)	781.946471
POWER	681.713529
METALLURGICAL INDUSTRIES	607.678824

Next steps: Generate code with sec_avg_top | View recommended plots | New interactive sheet

Bottom 10 Sector wise Average FDI

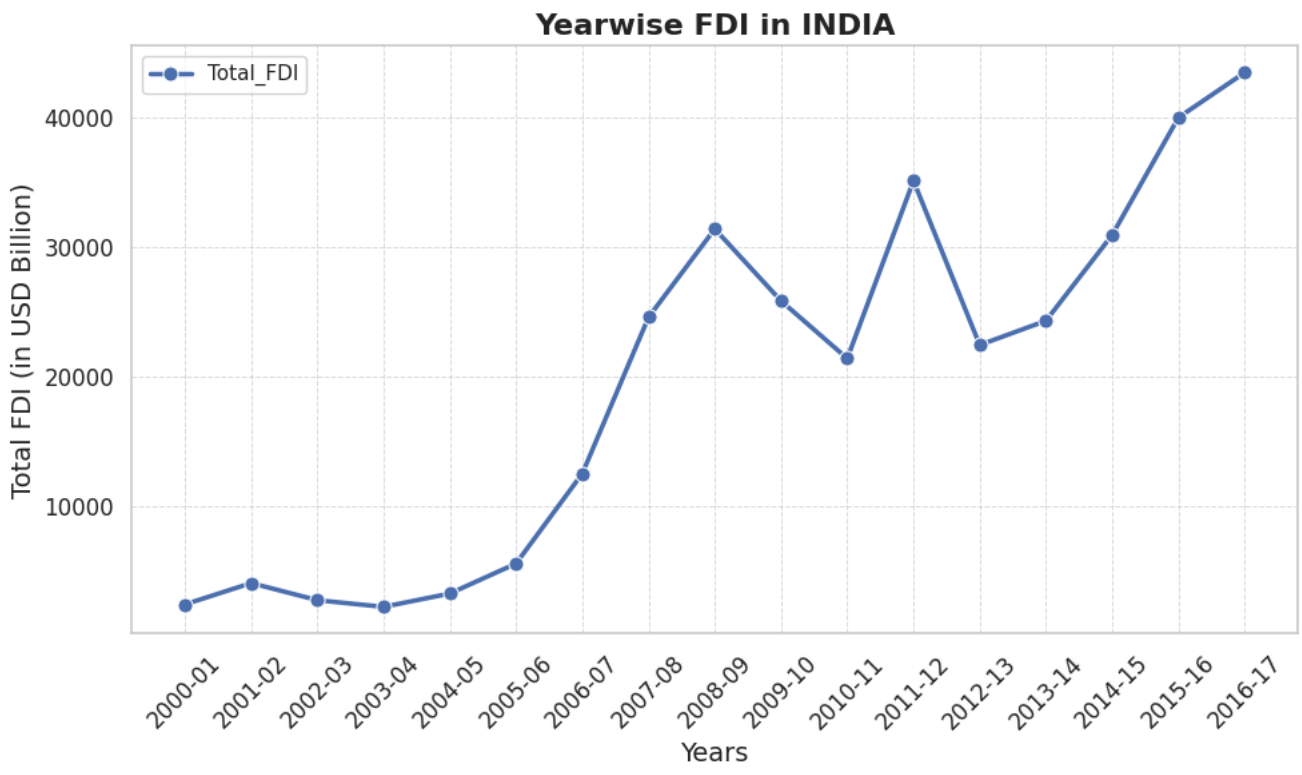
```
sec_avg_bottom = sec_avg.sort_values(by='Avg_FDI', ascending=False).tail(10)
sec_avg_bottom
```

Sector	Avg_FDI
TIMBER PRODUCTS	9.275294
GLUE AND GELATIN	7.552353
TEA AND COFFEE (PROCESSING & WAREHOUSING COFFEE & RUBBER)	6.542353
DYE-STUFFS	5.200000
INDUSTRIAL INSTRUMENTS	4.477647
PHOTOGRAPHIC RAW FILM AND PAPER	3.957647
COAL PRODUCTION	1.631765
MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS	0.469412
DEFENCE INDUSTRIES	0.301176
COIR	0.238824

Next steps: Generate code with sec_avg_bottom | View recommended plots | New interactive sheet

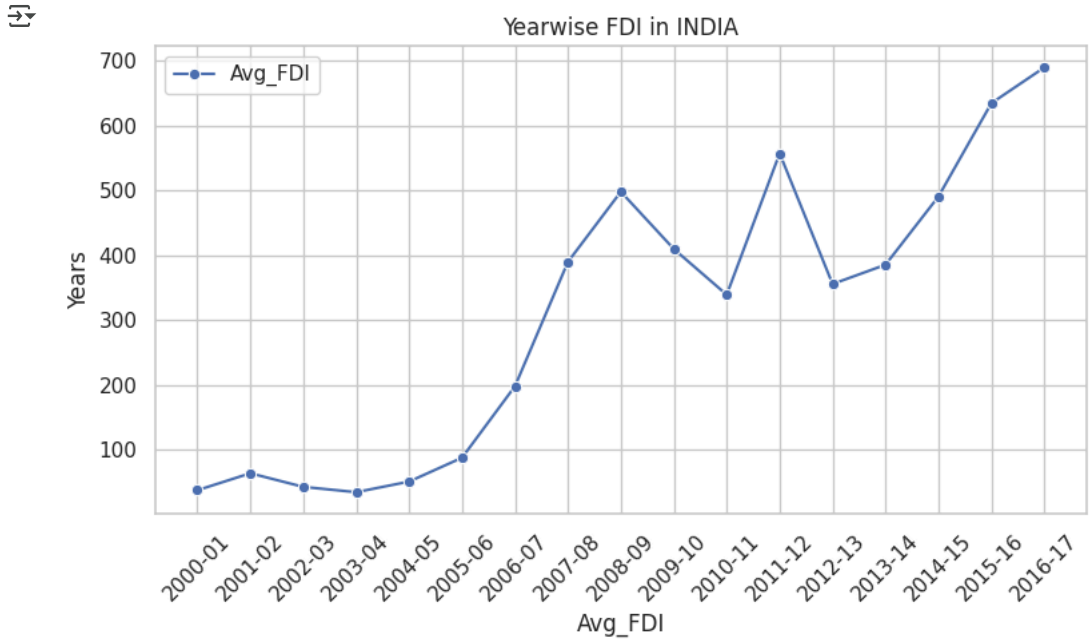
Yearwise Total_FDI in INDIA

```
sns.set(style="whitegrid")

plt.figure(figsize=(10, 6))

sns.lineplot(data=year_total, marker='o', color='#1f77b4', markersize=8, linewidth=2.5)


plt.title('Yearwise FDI in INDIA', fontsize=16, fontweight='bold')
plt.xlabel('Years', fontsize=14)
plt.ylabel('Total FDI (in USD Billion)', fontsize=14)
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)


plt.grid(True, linestyle='--', linewidth=0.7, alpha=0.7)
plt.tight_layout()
plt.show()
```



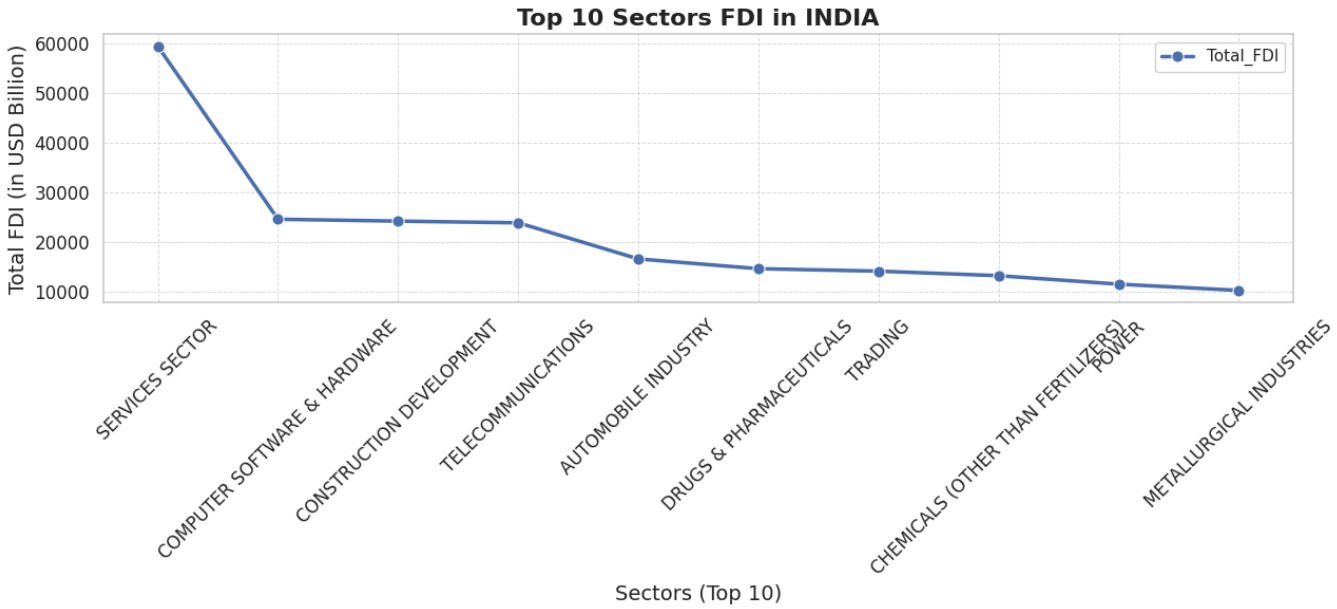
Yearwise Avg_FDI in INDIA

```
plt.figure(figsize=(8, 5))
sns.lineplot(data=year_avg, marker='o', color='b')
plt.title('Yearwise FDI in INDIA')
plt.xlabel('Avg_FDI')
plt.ylabel('Years')
plt.grid(True)
plt.xticks(rotation=45)

plt.tight_layout()
plt.show()
```



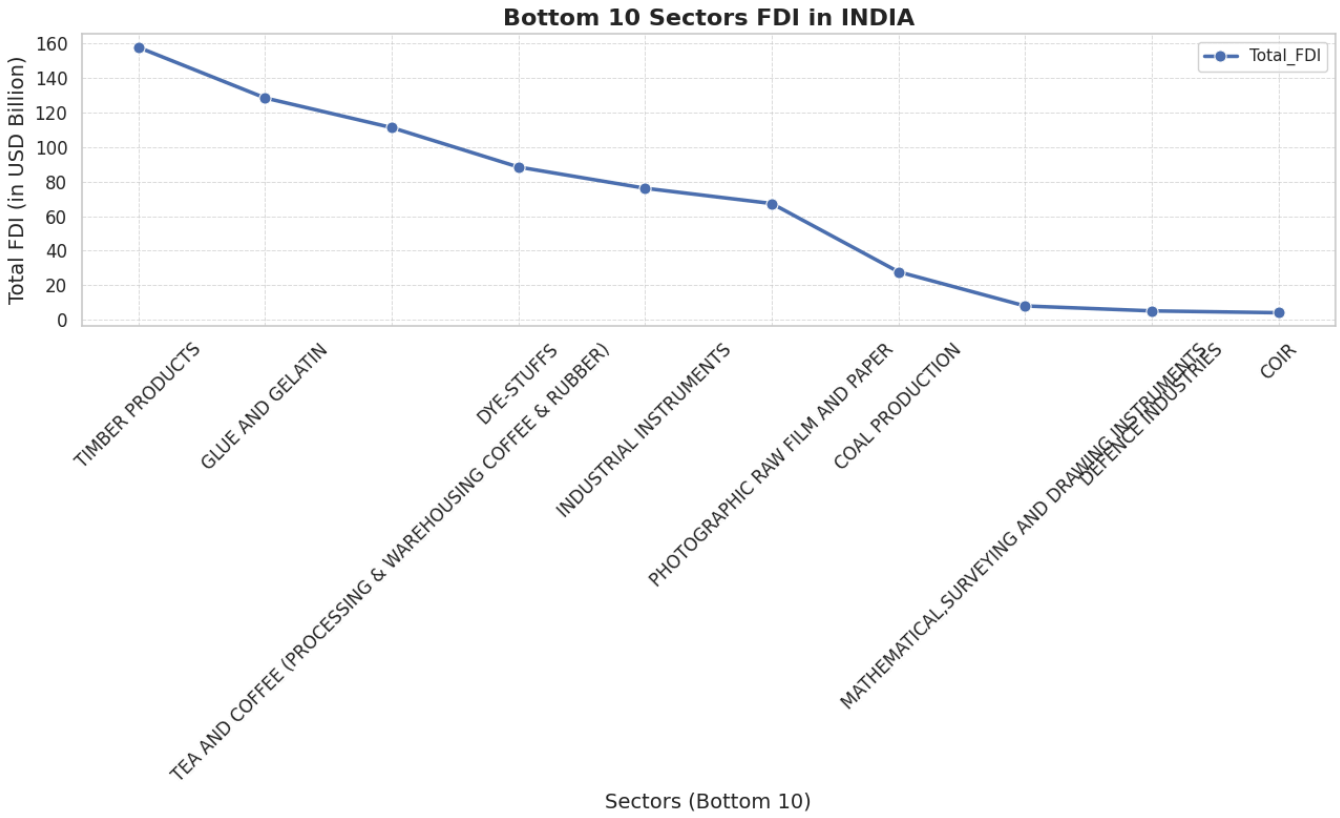
Top10Sectors FDI in INDIA

```
sns.set(style="whitegrid")


plt.figure(figsize=(13, 6))

sns.lineplot(data=sec_total_top, marker='o', color='#ff7f0e', markersize=8, linewidth=2.5)


plt.title('Top 10 Sectors FDI in INDIA', fontsize=16, fontweight='bold')
plt.xlabel('Sectors (Top 10)', fontsize=14)
plt.ylabel('Total FDI (in USD Billion)', fontsize=14)
plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)

plt.grid(True, linestyle='--', linewidth=0.7, alpha=0.7)
plt.tight_layout()
plt.show()
```



Bottom10 Sectors FDI in INDIA

```
sns.set(style="whitegrid")

plt.figure(figsize=(13, 8))

sns.lineplot(data=sec_total_tail, marker='o', color='#2ca02c', markersize=8, linewidth=2.5)

plt.title('Bottom 10 Sectors FDI in INDIA', fontsize=16, fontweight='bold')
plt.xlabel('Sectors (Bottom 10)', fontsize=14)
plt.ylabel('Total FDI (in USD Billion)', fontsize=14)


plt.xticks(rotation=45, fontsize=12)
plt.yticks(fontsize=12)


plt.grid(True, linestyle='--', linewidth=0.7, alpha=0.7)
plt.tight_layout()
plt.show()
```




```
df3.head()
```

Sector	2000–01	2001–02	2002–03	2003–04	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014
METALLURGICAL INDUSTRIES	22.69	14.14	36.61	8.11	200.38	149.13	169.94	1175.75	959.94	419.88	1098.14	1786.14	1466.23	567.63	359.3
MINING	1.32	6.52	10.06	23.48	9.92	7.40	6.62	444.36	34.16	174.40	79.51	142.65	57.89	12.73	684.3
POWER	89.42	757.44	59.11	27.09	43.37	72.69	157.15	988.68	907.66	1271.79	1271.77	1652.38	535.68	1066.08	707.0
NON-CONVENTIONAL ENERGY	0.00	0.00	1.70	4.14	1.27	1.35	2.44	58.82	125.88	622.52	214.40	452.17	1106.52	414.25	615.9
COAL PRODUCTION	0.00	0.00	0.00	0.04	0.00	9.14	1.30	14.08	0.22	0.00	0.00	0.00	0.00	2.96	0.0

Next steps: Generate code with df3 | View recommended plots | New interactive sheet

```
df_long = pd.melt(df, id_vars=['Sector'], var_name='Year', value_name='FDI')
df_long
```

	Sector	Year	FDI
0	METALLURGICAL INDUSTRIES	2000-01	22.69
1	MINING	2000-01	1.32
2	POWER	2000-01	89.42
3	NON-CONVENTIONAL ENERGY	2000-01	0.00
4	COAL PRODUCTION	2000-01	0.00
...	...	...	...
1066	PRINTING OF BOOKS (INCLUDING LITHO PRINTING IN...	2016-17	53.17
1067	COIR	2016-17	0.00
1068	CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES	2016-17	1860.73
1069	CONSTRUCTION DEVELOPMENT: Townships, housing, ...	2016-17	105.14
1070	MISCELLANEOUS INDUSTRIES	2016-17	296.40

1071 rows × 3 columns

Next steps: Generate code with df_long | View recommended plots | New interactive sheet

```
df_long['Growth Rate'] = df_long.groupby('Sector')['FDI'].pct_change()
df_long['Growth Rate']
```

	Growth Rate
0	NaN
1	NaN
2	NaN
3	NaN
4	NaN
...	...
1066	-0.567055
1067	NaN
1068	-0.587486
1069	-0.065837
1070	-0.556798

1071 rows × 1 columns

dtype: float64

```
df_long['Growth Rate'] = df_long['Growth Rate'].fillna(0)
df_long['Growth Rate']
```

	Growth Rate
0	0.000000
1	0.000000
2	0.000000
3	0.000000
4	0.000000
...	...
1066	-0.567055
1067	0.000000
1068	-0.587486
1069	-0.065837
1070	-0.556798

1071 rows × 1 columns

dtype: float64

```
df_long['Moving Average'] = df_long.groupby('Sector')['FDI'].transform(lambda x: x.rolling(window=3, min_periods=1).mean())
df_long['Moving Average']
```

	Moving Average
0	22.690000
1	1.320000
2	89.420000
3	0.000000
4	0.000000
...	...
1066	82.853333
1067	0.453333
1068	2413.896667
1069	328.943333
1070	577.016667

1071 rows × 1 columns

dtype: float64

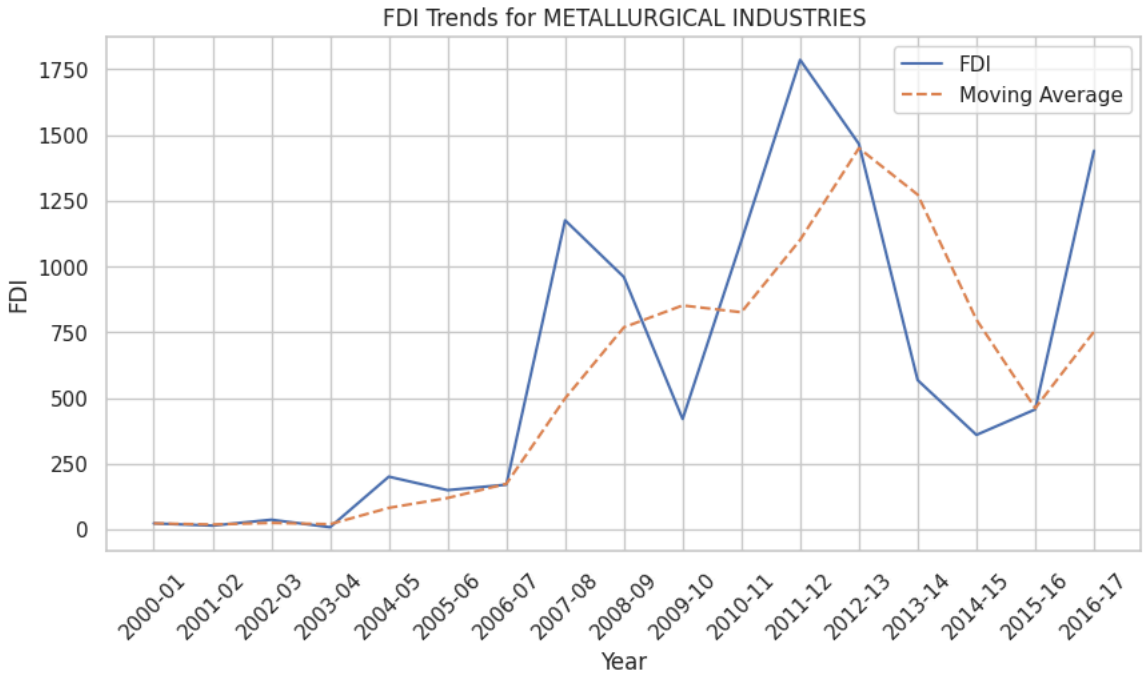
```
def identify_trend(series):
    return 'Uptrend' if series.mean() > 0 else 'Downtrend'

trend_df = df_long.groupby('Sector').apply(lambda x: identify_trend(x['Growth Rate'])).reset_index(name='Trend')
trend_df
```

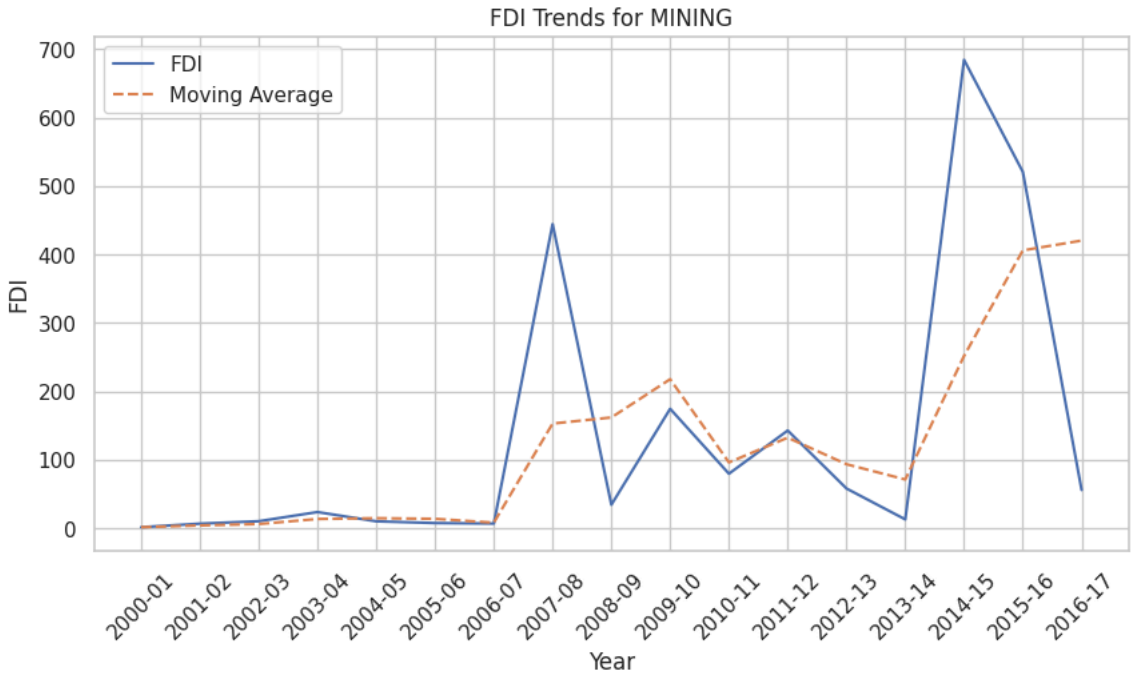
	Sector	Trend
0	AGRICULTURAL MACHINERY	Uptrend
1	AGRICULTURE SERVICES	Uptrend
2	AIR TRANSPORT (INCLUDING AIR FREIGHT)	Uptrend
3	AUTOMOBILE INDUSTRY	Uptrend
4	BOILERS AND STEAM GENERATING PLANTS	Uptrend
...	...	...
58	TELECOMMUNICATIONS	Uptrend
59	TEXTILES (INCLUDING DYED,PRINTED)	Uptrend
60	TIMBER PRODUCTS	Uptrend
61	TRADING	Uptrend
62	VEGETABLE OILS AND VANASPATI	Uptrend

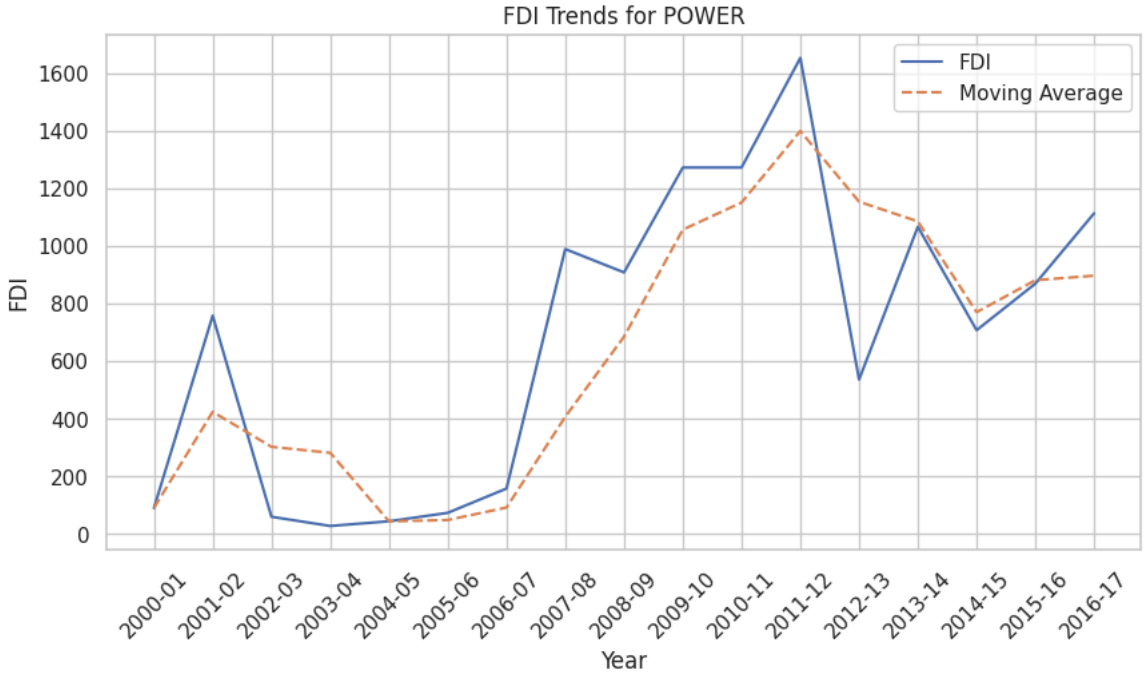
63 rows × 2 columns

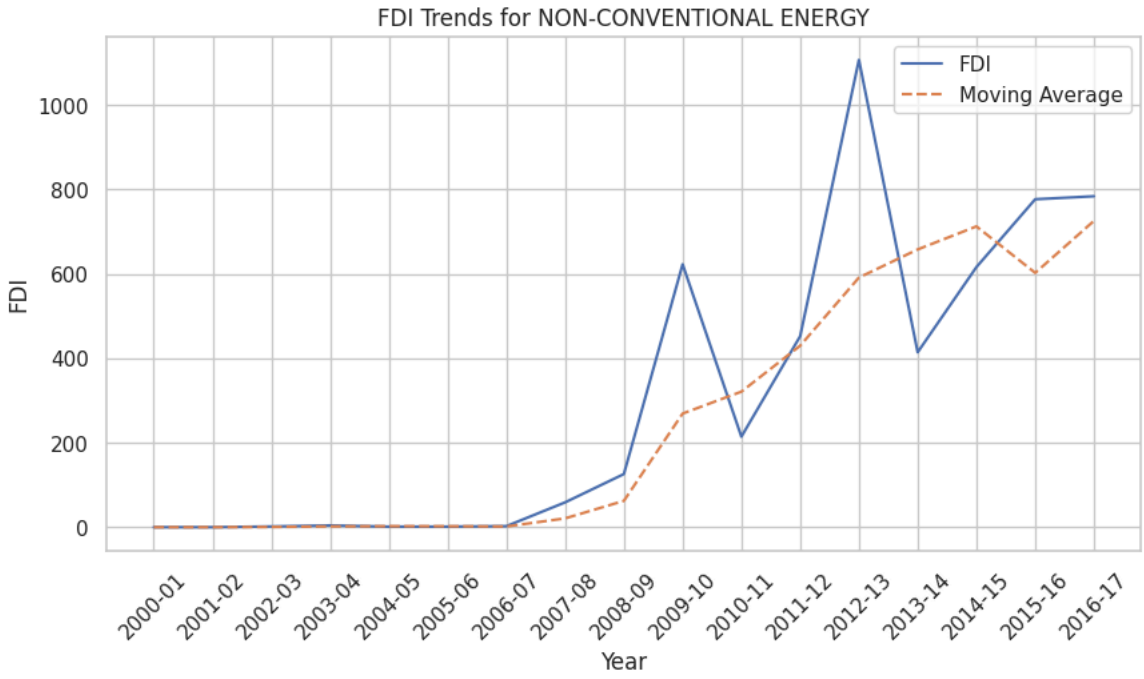
Next steps: Generate code with trend_df | View recommended plots | New interactive sheet

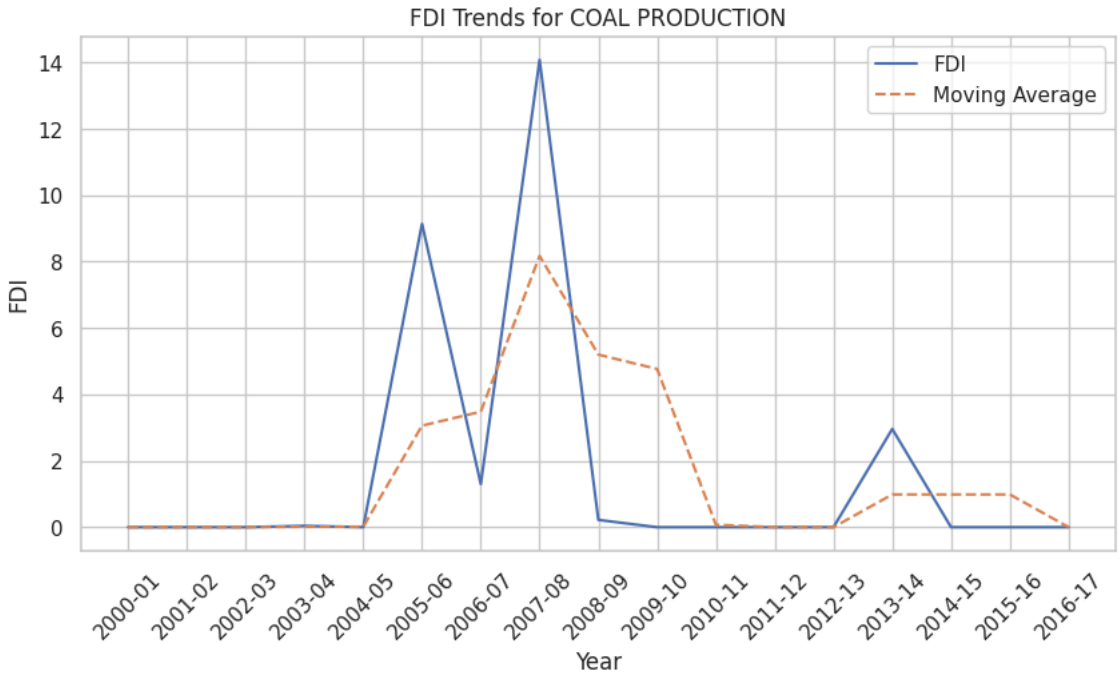
```
import matplotlib.pyplot as plt

sectors = df_long['Sector'].unique()

for sector in sectors:
    sector_data = df_long[df_long['Sector'] == sector]
    plt.figure(figsize=(10, 5))
    plt.plot(sector_data['Year'], sector_data['FDI'], label='FDI')
    plt.plot(sector_data['Year'], sector_data['Moving Average'], '--', label='Moving Average')
    plt.title(f'FDI Trends for {sector}')
    plt.xlabel('Year')
    plt.xticks(rotation=45)
    plt.ylabel('FDI')
    plt.legend()
    plt.grid(True)
    plt.show()
```

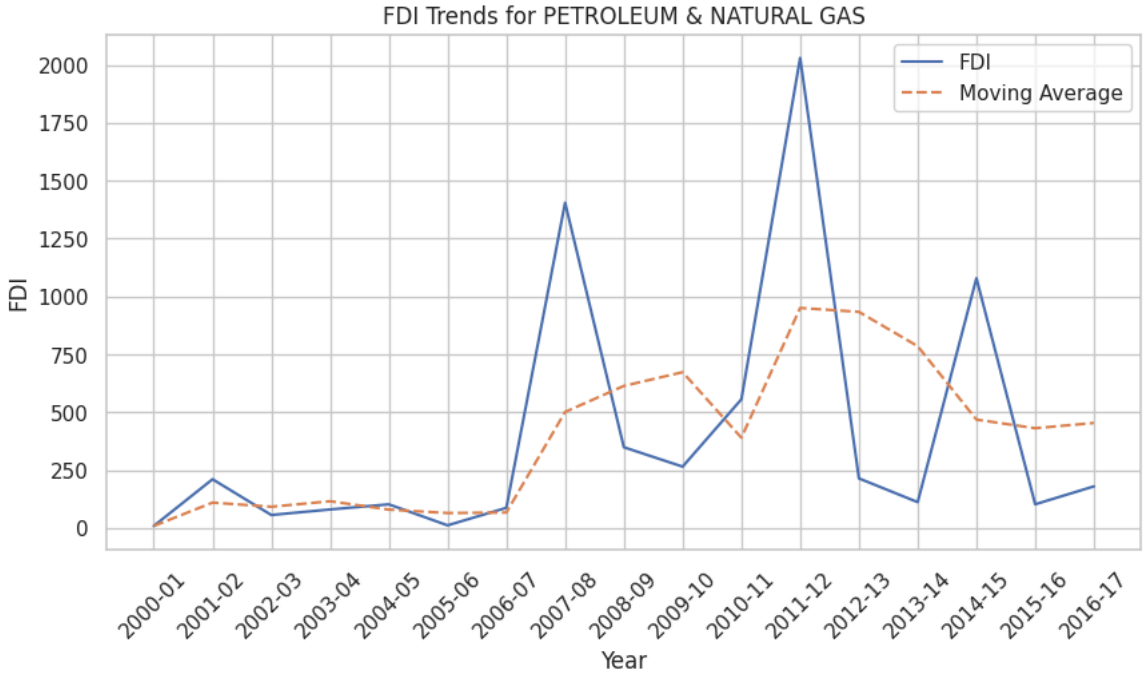

FDI Trends for METALLURGICAL INDUSTRIES
FDI
Moving Average
FDI
Year
0
250
500
750
1000
1250
1500
1750
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17


FDI Trends for MINING
FDI
Moving Average
FDI
Year
0
100
200
300
400
500
600
700
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

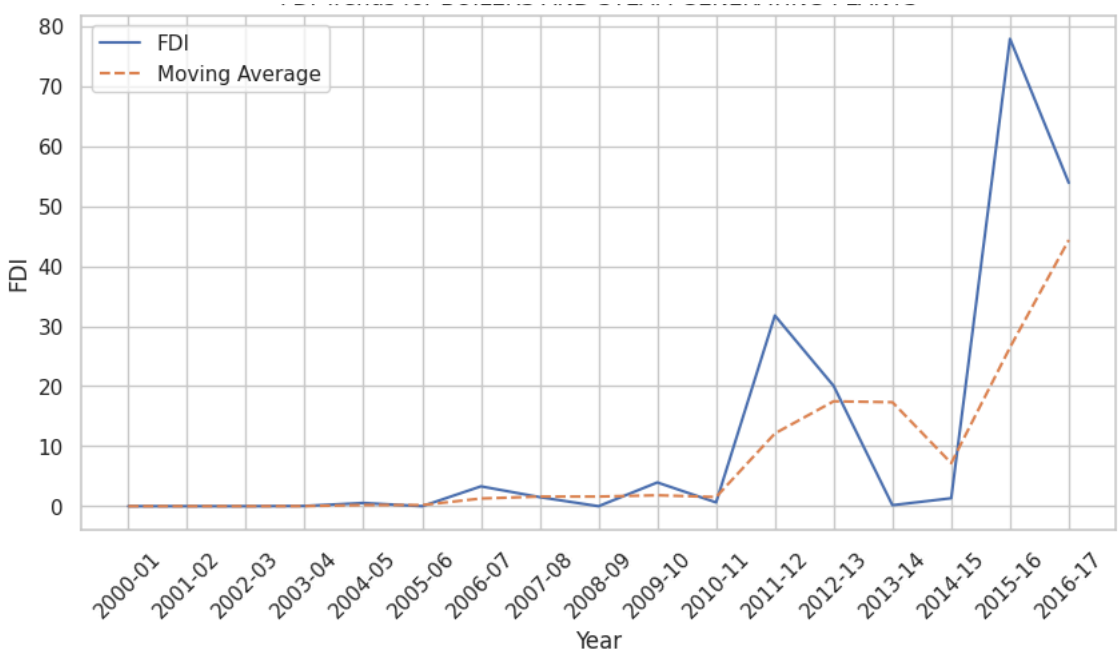

FDI Trends for POWER
FDI
Moving Average
FDI
Year
0
200
400
600
800
1000
1200
1400
1600
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

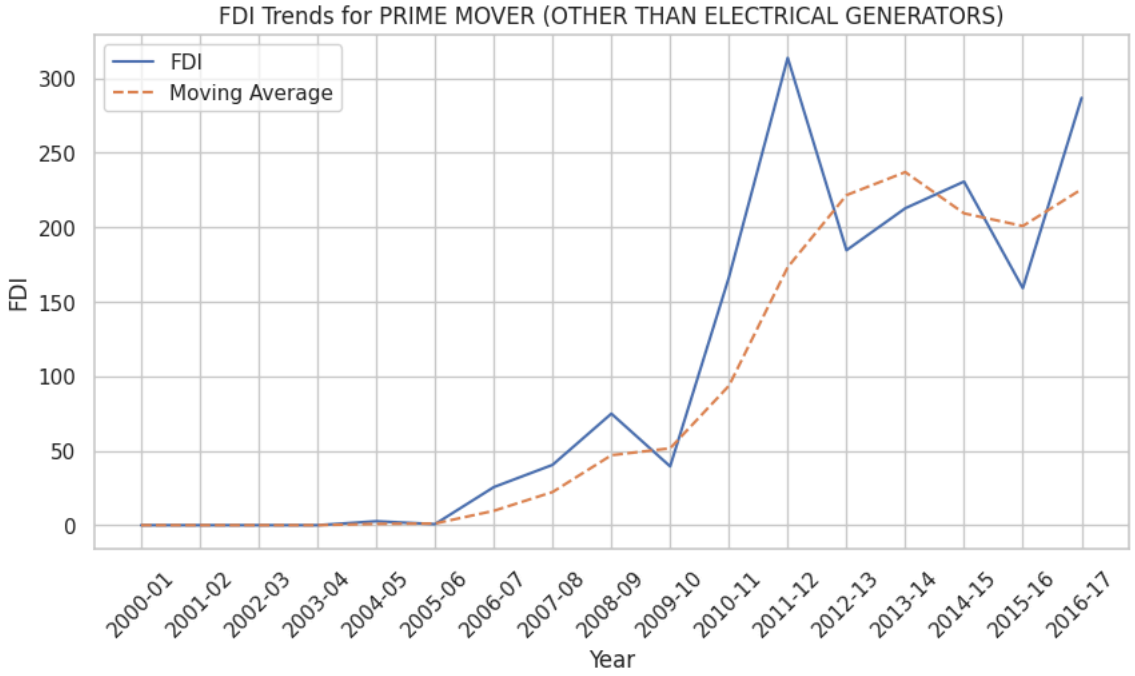


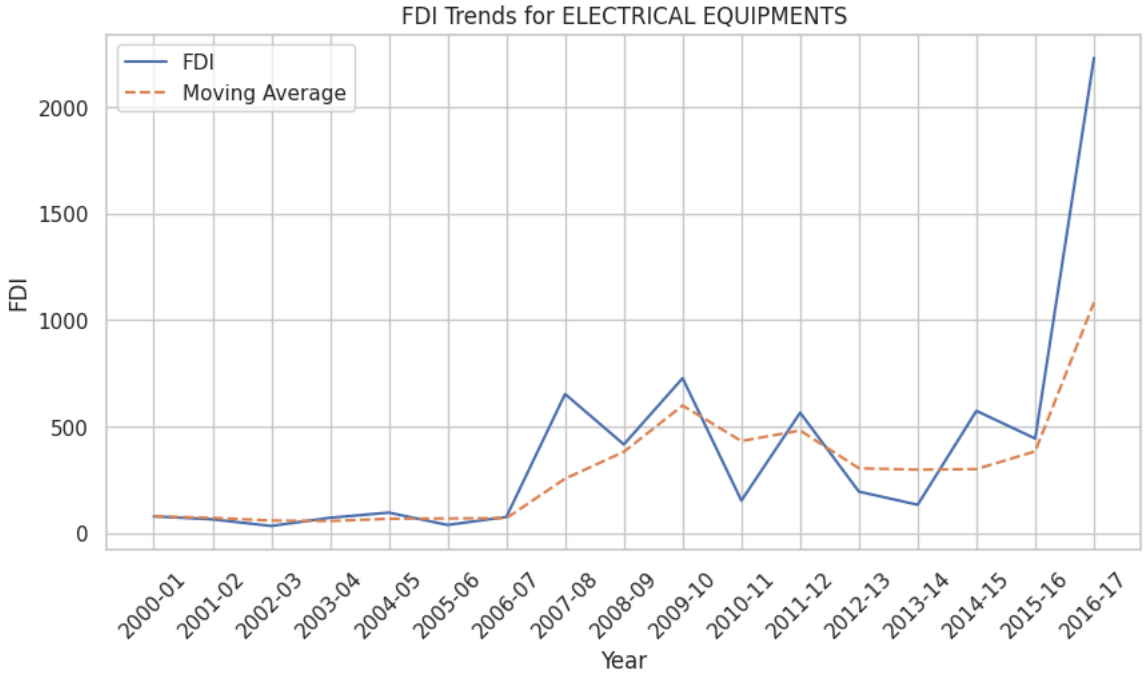




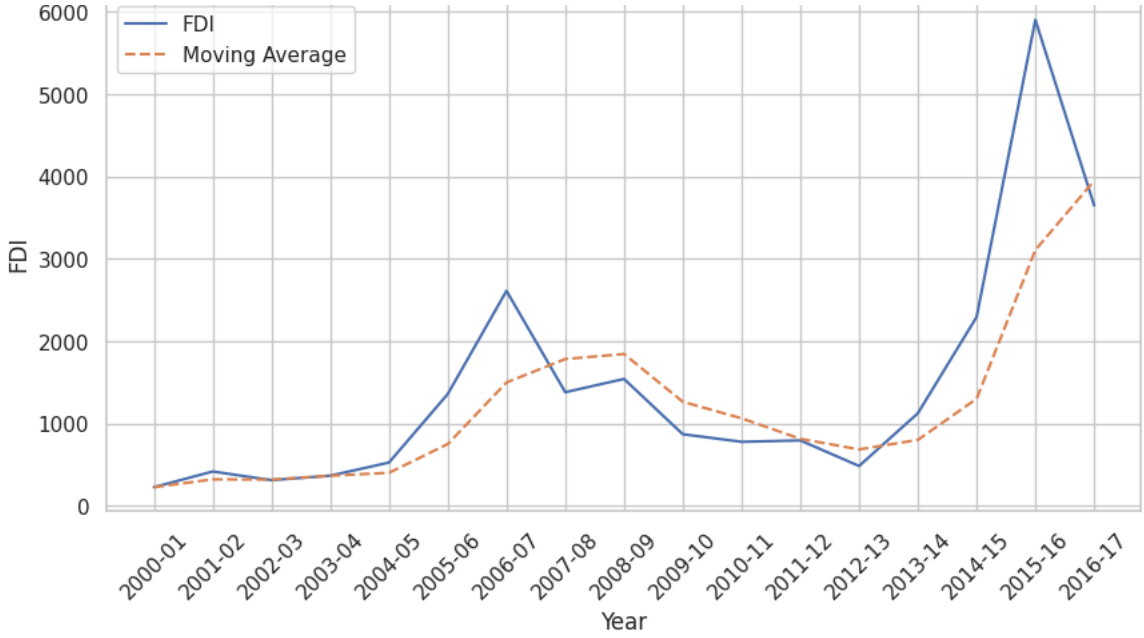
FDI Trends for BOILERS AND STEAM GENERATING PLANTS

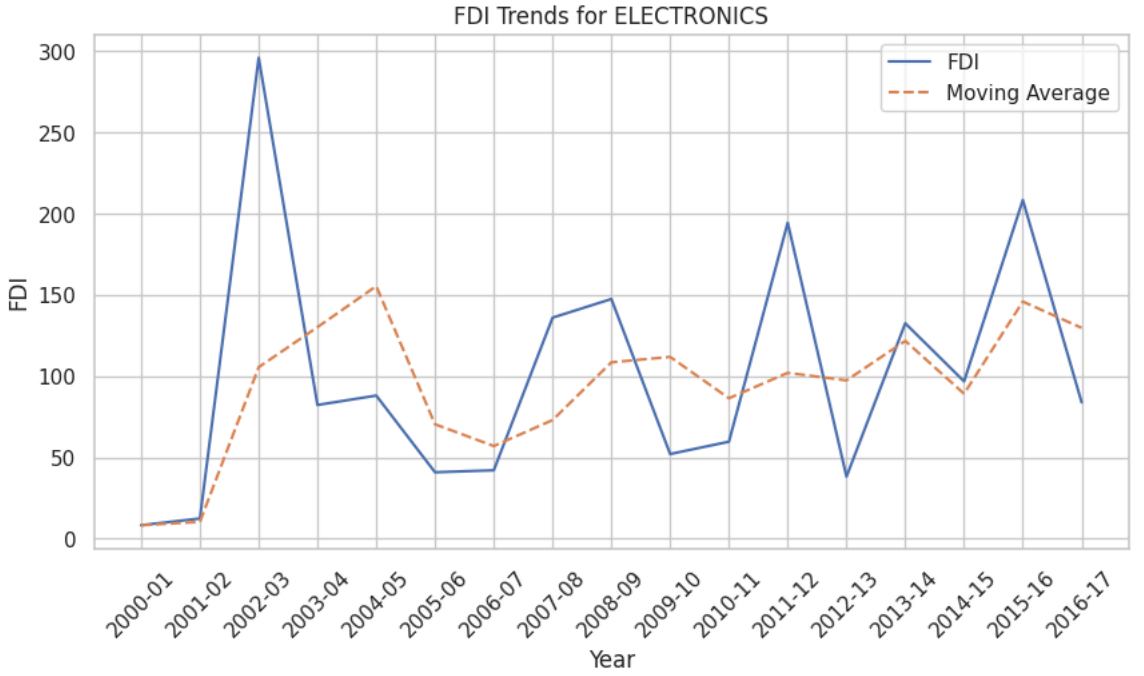

FDI
Moving Average
FDI
Year
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

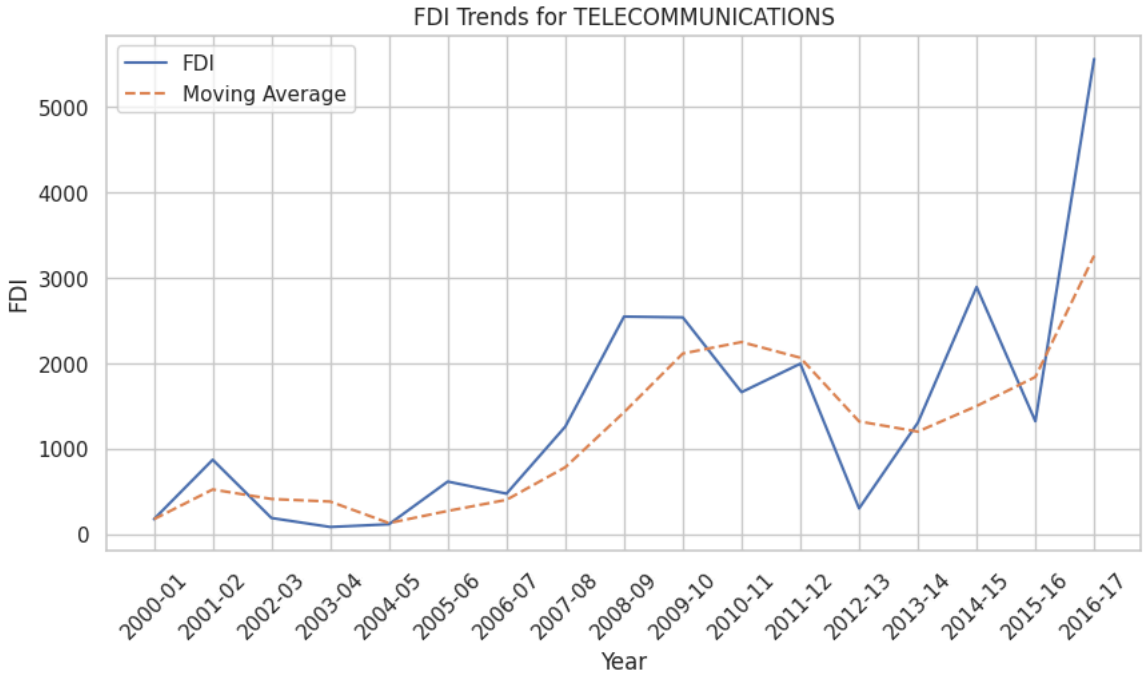

FDI Trends for PRIME MOVER (OTHER THAN ELECTRICAL GENERATORS)
FDI
Moving Average
FDI
Year


FDI Trends for ELECTRICAL EQUIPMENTS
FDI
Moving Average
FDI
Year

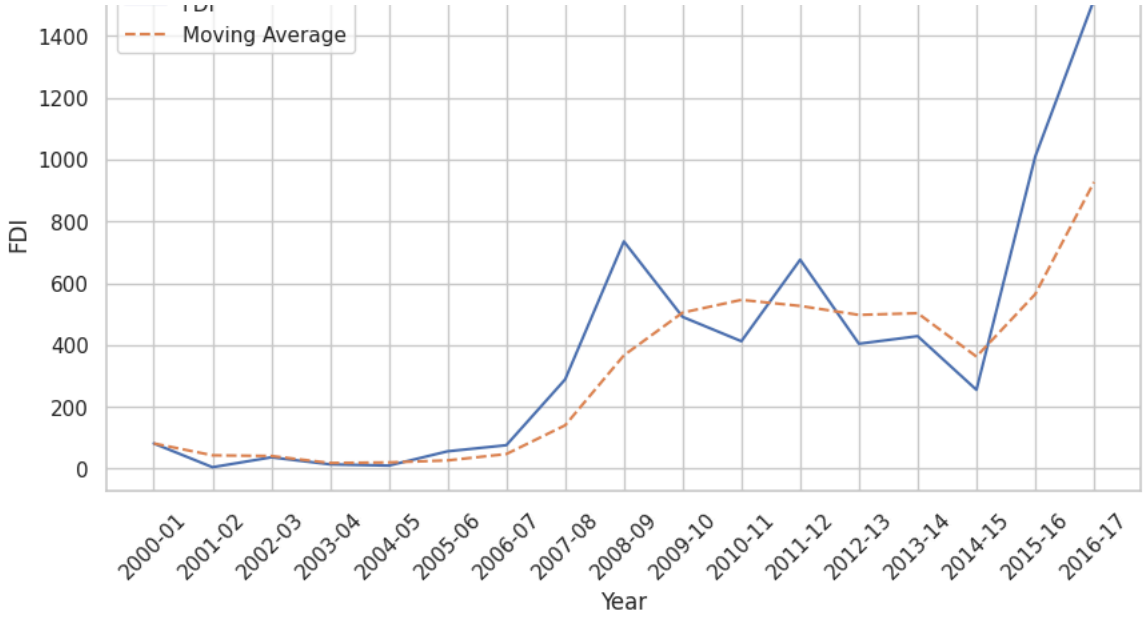

FDI Trends for COMPUTER SOFTWARE & HARDWARE

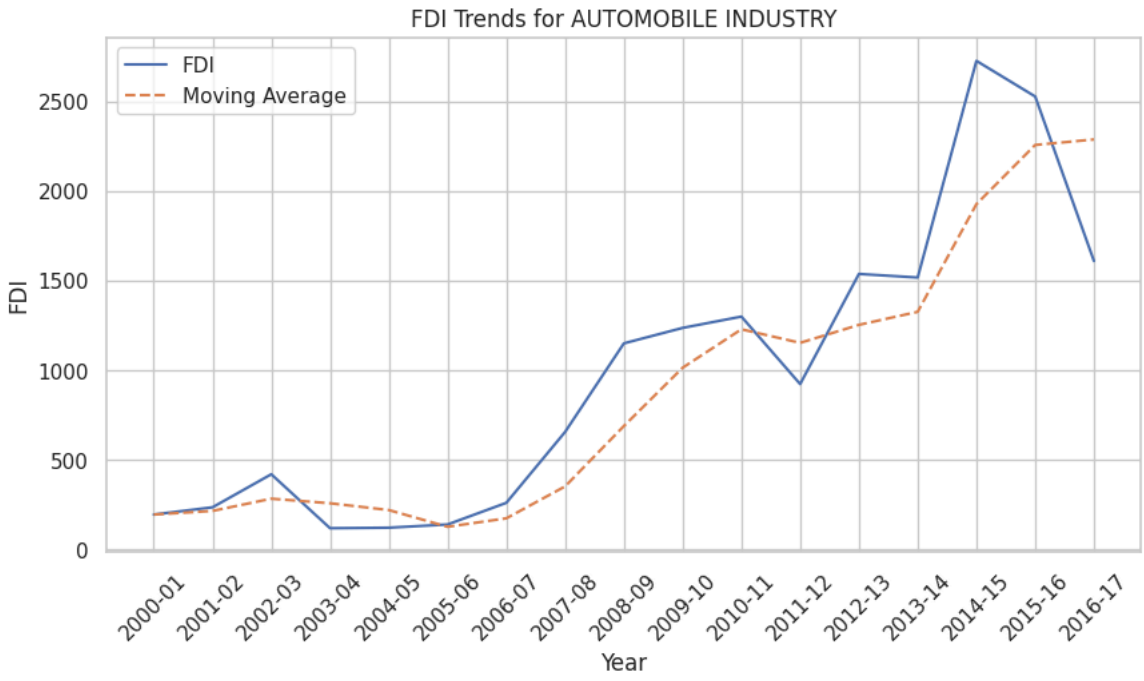

FDI
Moving Average
FDI
Year
0
1000
2000
3000
4000
5000
6000
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

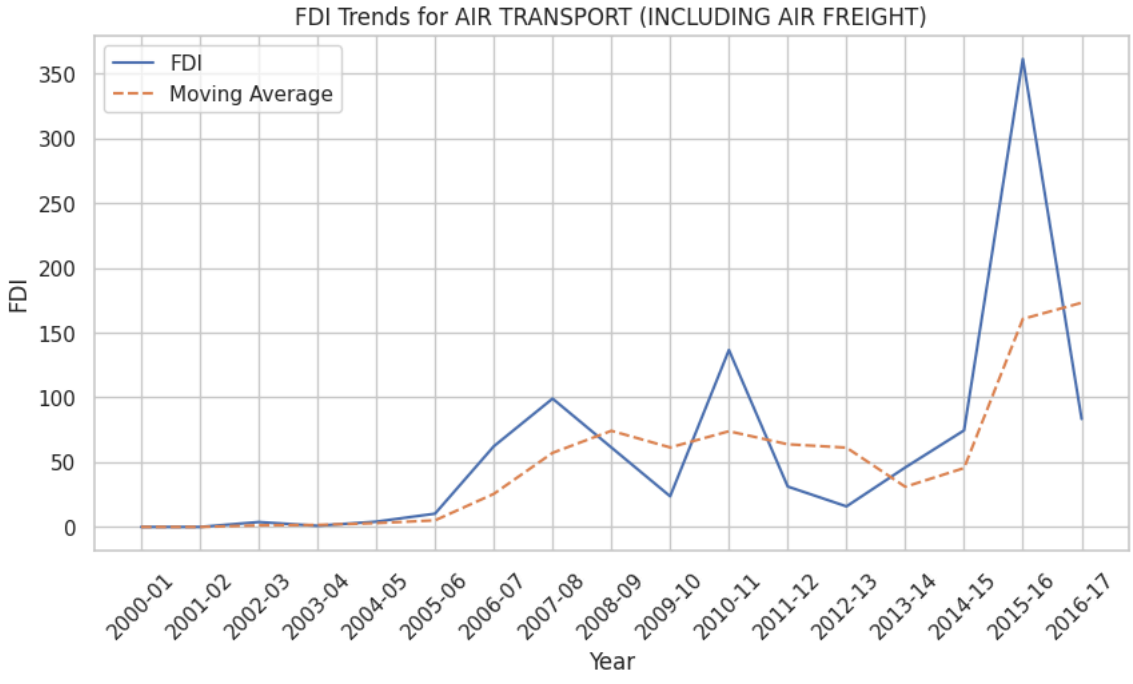

FDI Trends for ELECTRONICS
FDI
Moving Average
FDI
Year
0
50
100
150
200
250
300
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

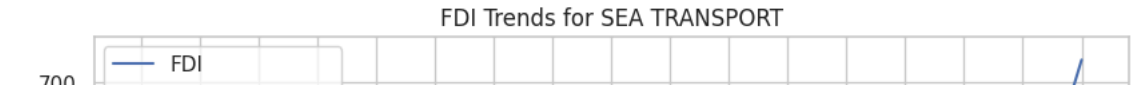

FDI Trends for TELECOMMUNICATIONS
FDI
Moving Average
FDI
Year
0
1000
2000
3000
4000
5000
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

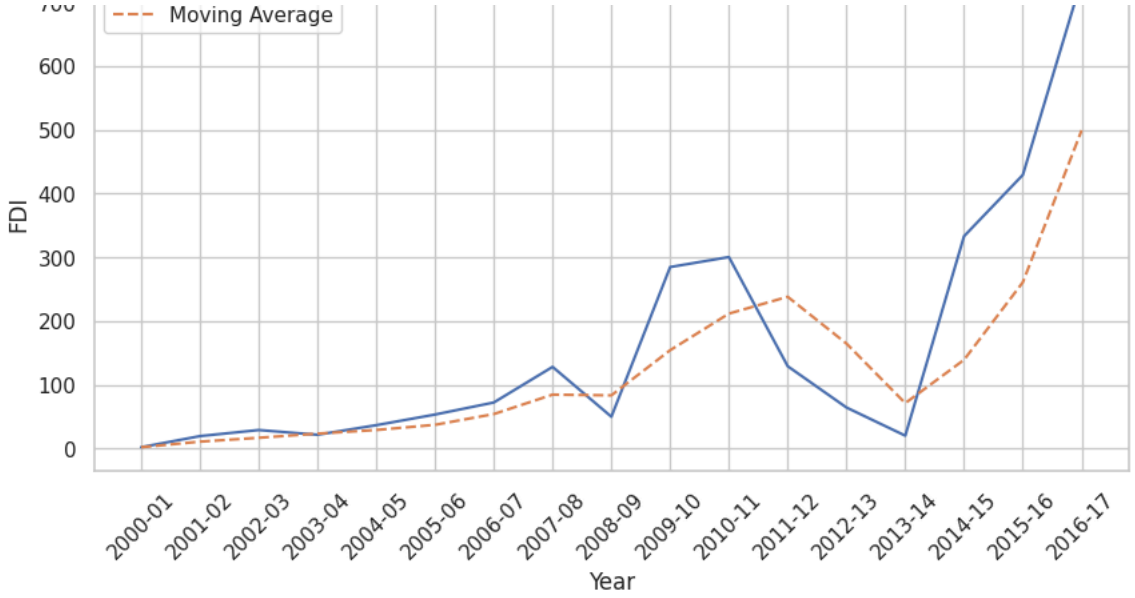

FDI Trends for INFORMATION & BROADCASTING (INCLUDING PRINT MEDIA)

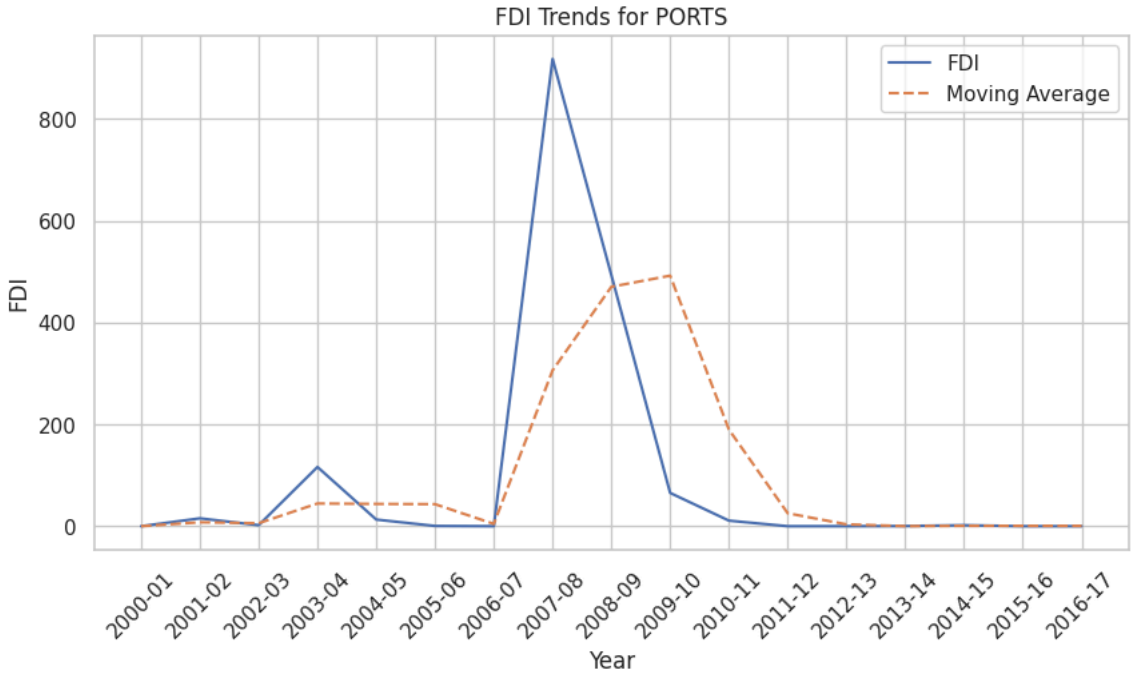

Moving Average
FDI
Year

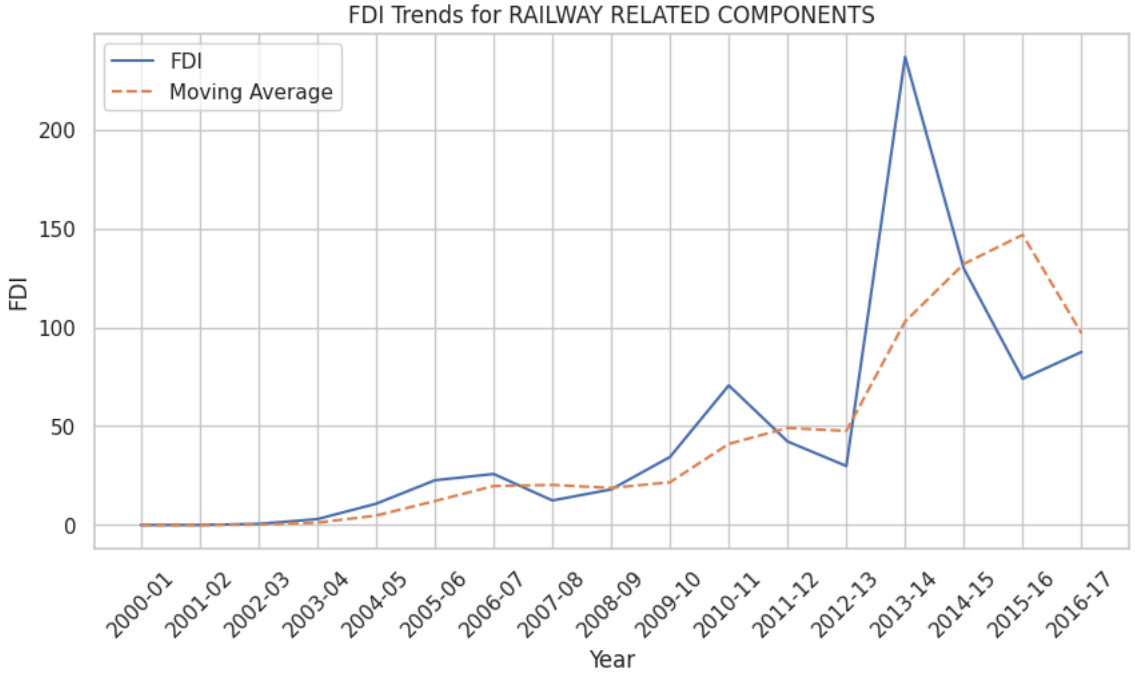

FDI Trends for AUTOMOBILE INDUSTRY
FDI
Moving Average
FDI
Year

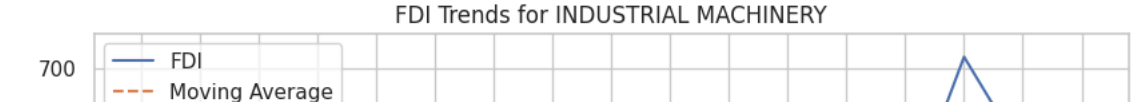

FDI Trends for AIR TRANSPORT (INCLUDING AIR FREIGHT)
FDI
Moving Average
FDI
Year

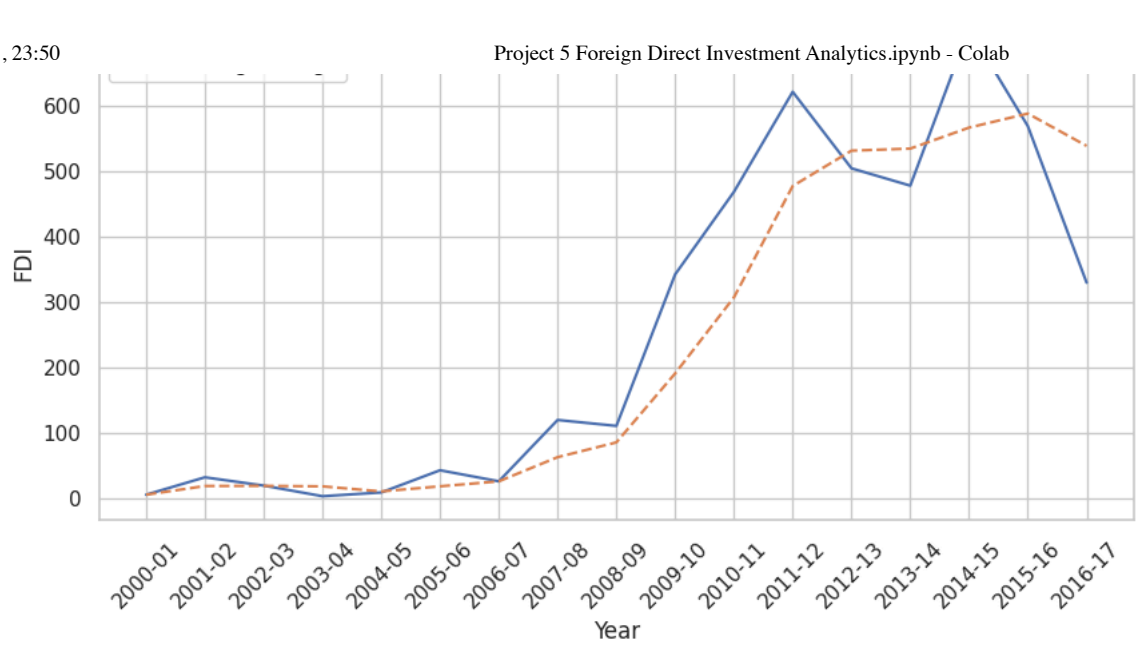

FDI Trends for SEA TRANSPORT
FDI

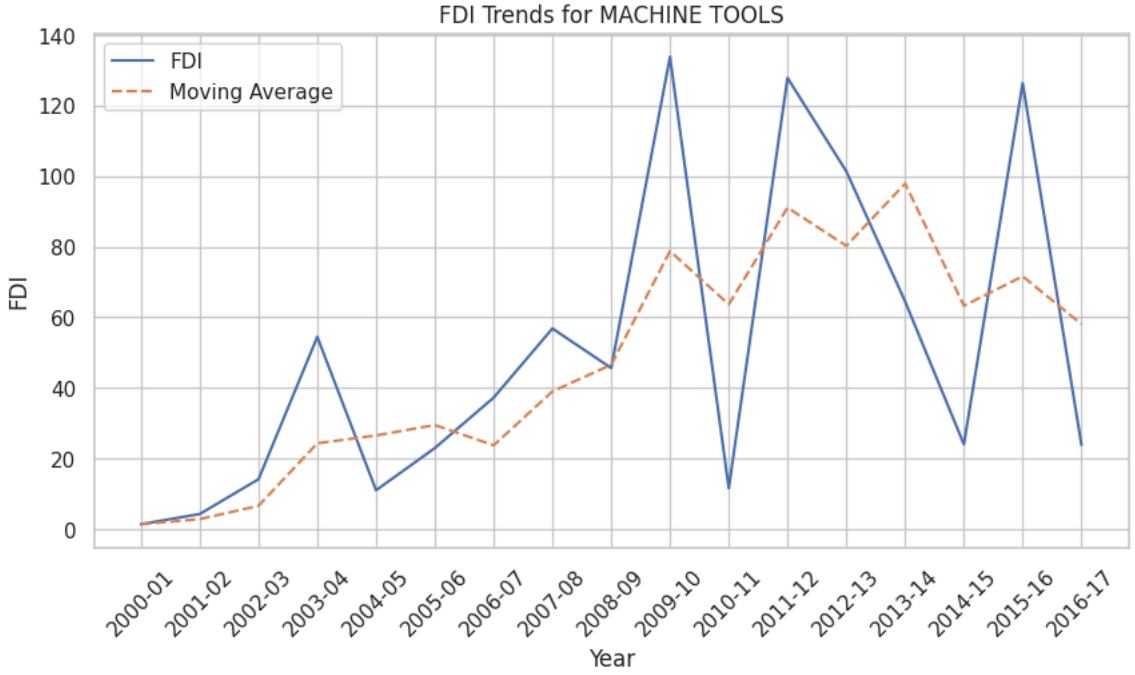

Moving Average
FDI
Year

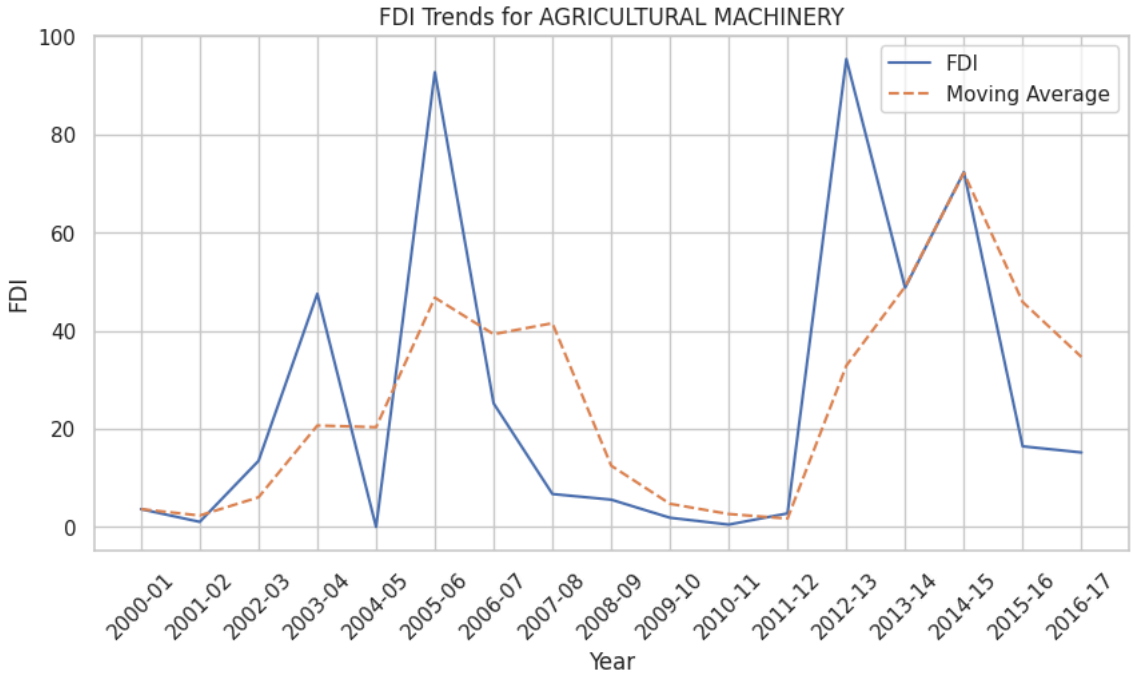

FDI Trends for PORTS
FDI
Moving Average
FDI
Year

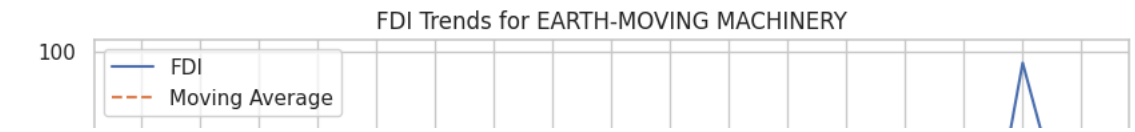

FDI Trends for RAILWAY RELATED COMPONENTS
FDI
Moving Average
FDI
Year

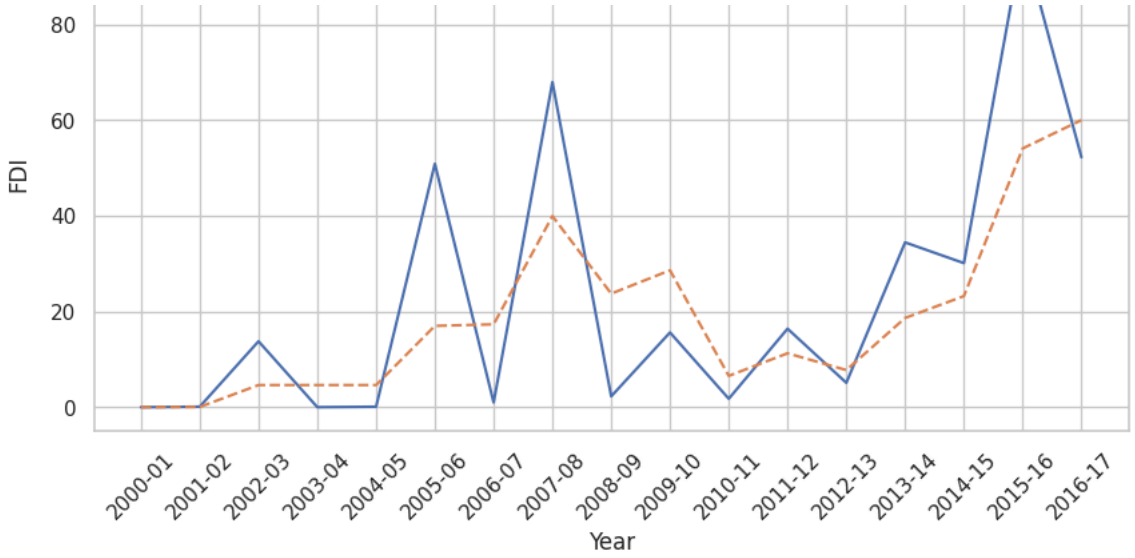

FDI Trends for INDUSTRIAL MACHINERY
FDI
Moving Average

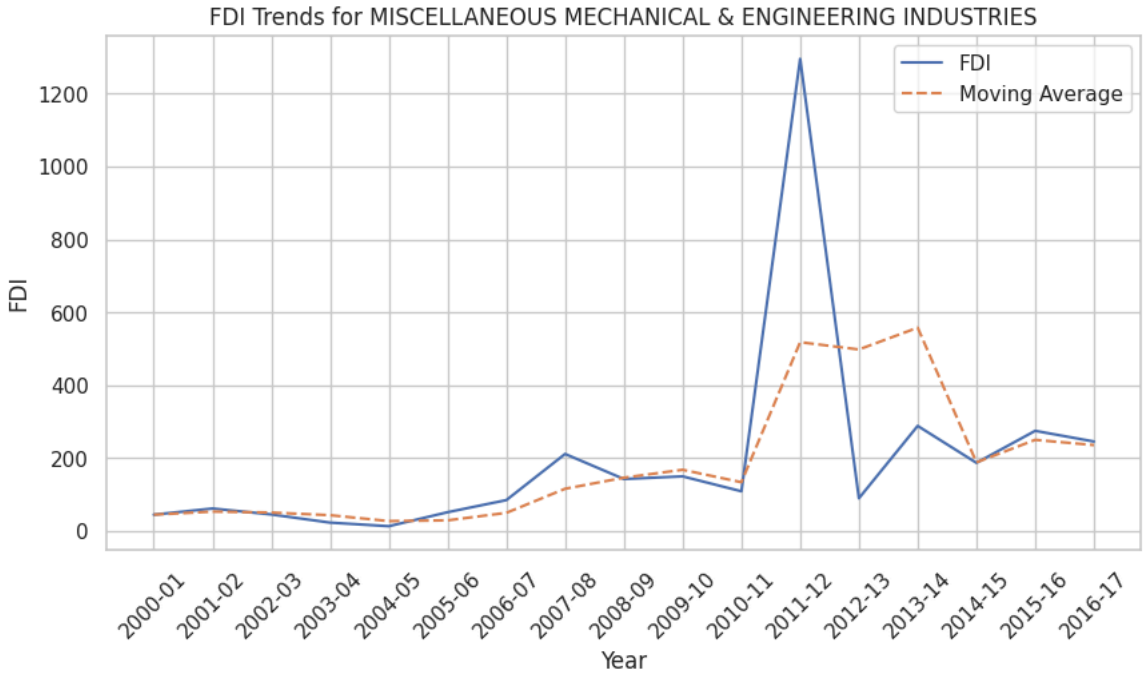

FDI
Year
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

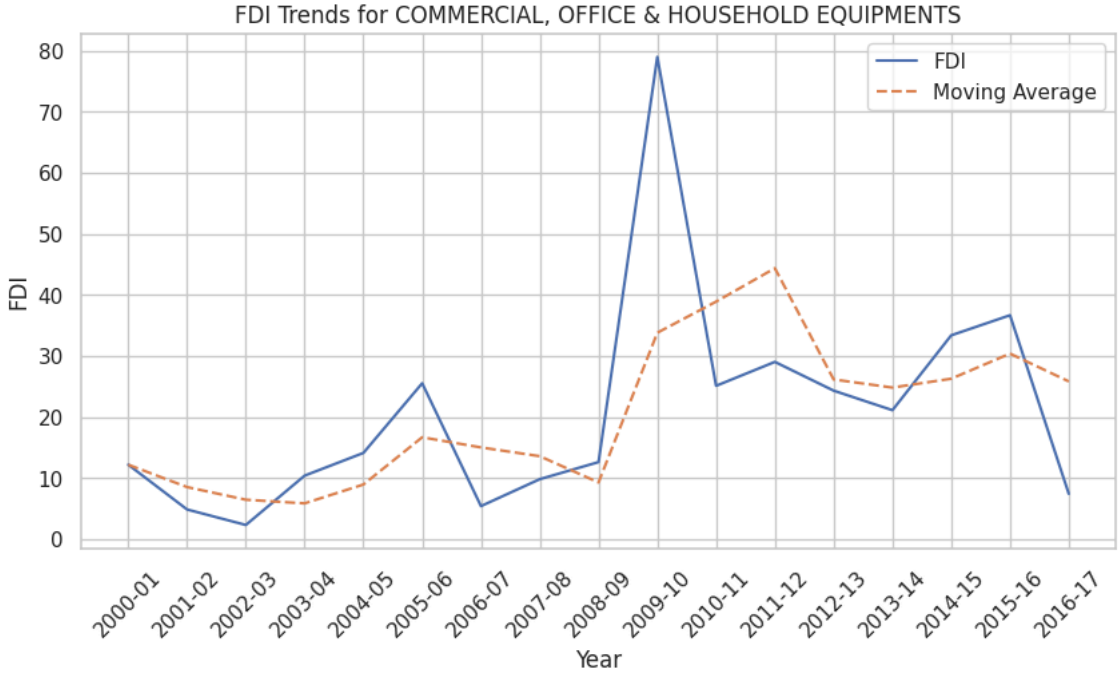

FDI Trends for MACHINE TOOLS
FDI
Moving Average
FDI
Year


FDI Trends for AGRICULTURAL MACHINERY
FDI
Moving Average
FDI
Year

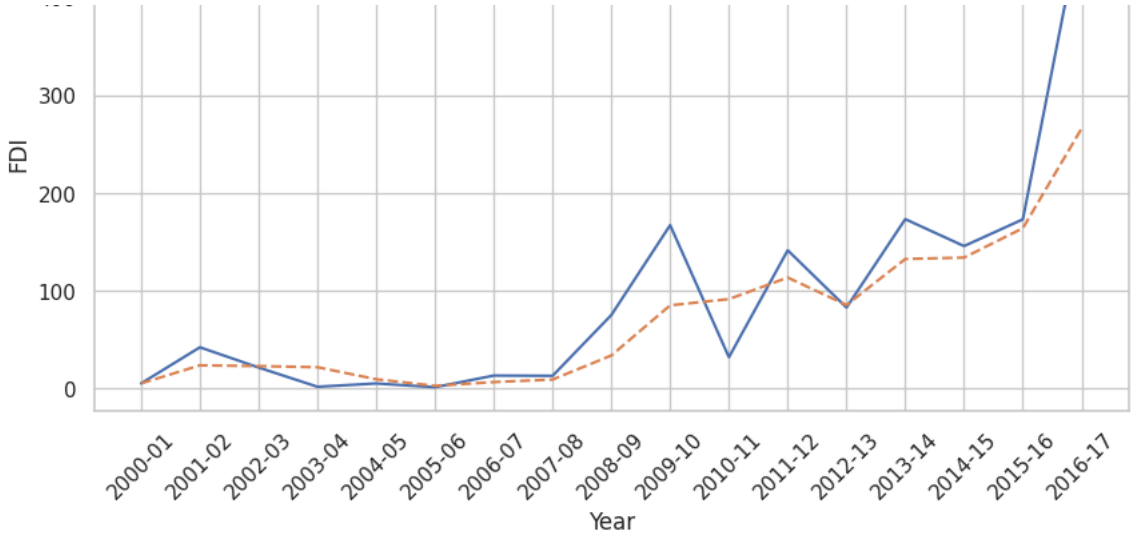

FDI Trends for EARTH-MOVING MACHINERY
FDI
Moving Average

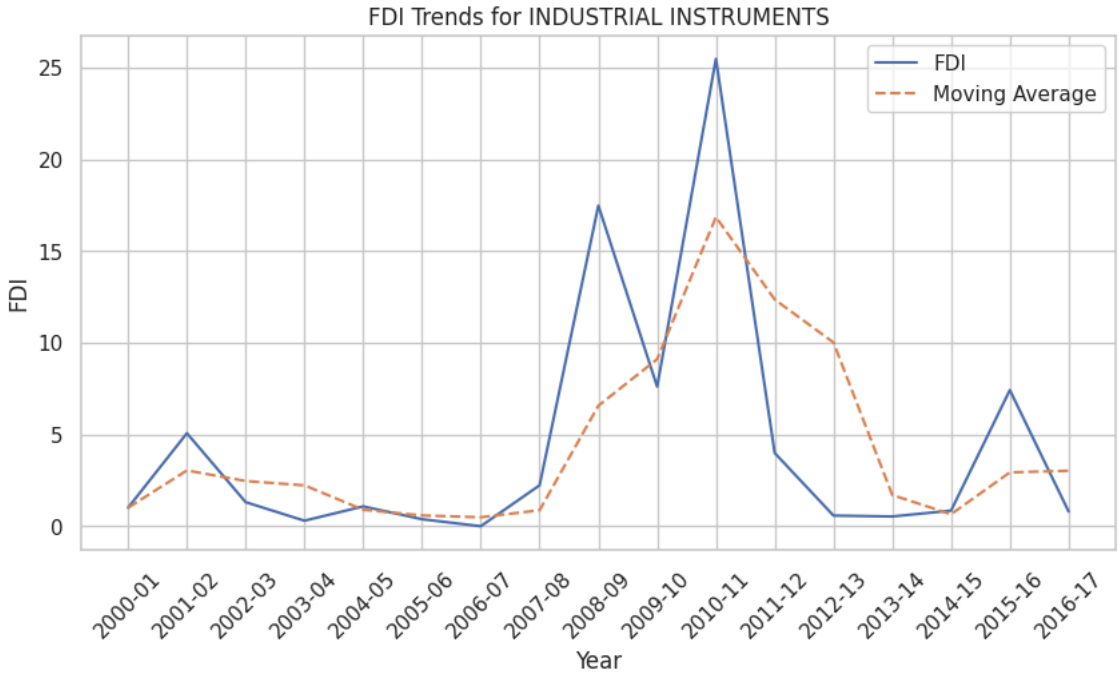

FDI
Year
0
20
40
60
80
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

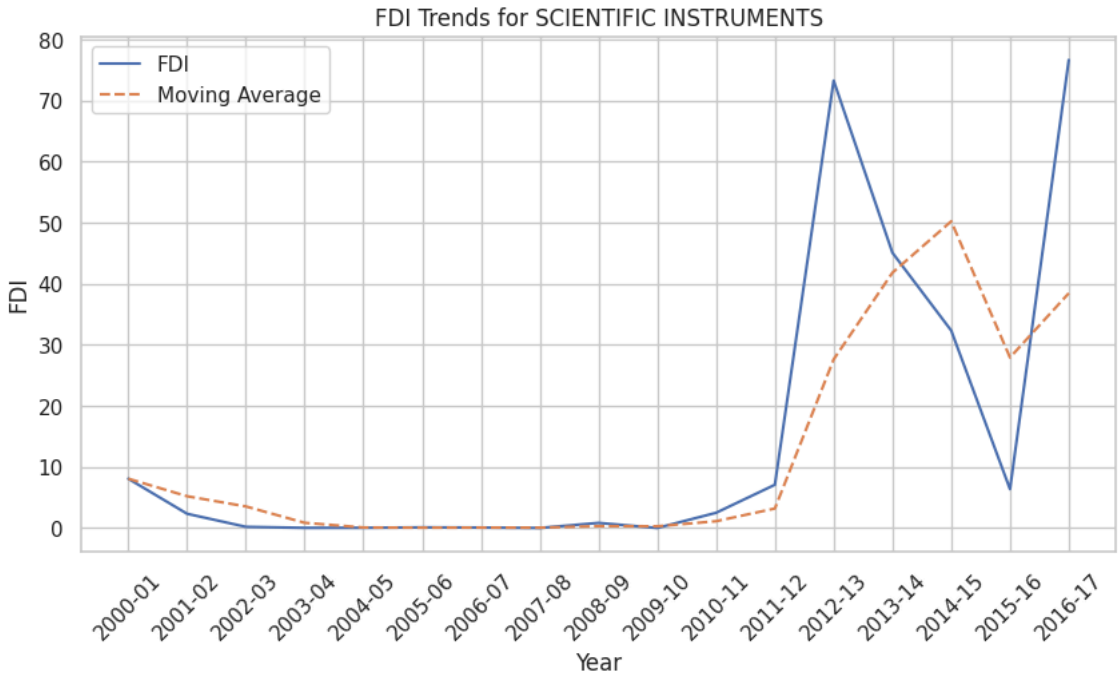

FDI Trends for MISCELLANEOUS MECHANICAL & ENGINEERING INDUSTRIES
FDI
Moving Average
FDI
Year
0
200
400
600
800
1000
1200
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

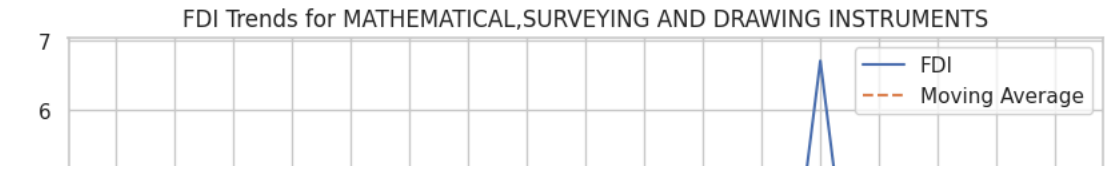

FDI Trends for COMMERCIAL, OFFICE & HOUSEHOLD EQUIPMENTS
FDI
Moving Average
FDI
Year
0
10
20
30
40
50
60
70
80
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

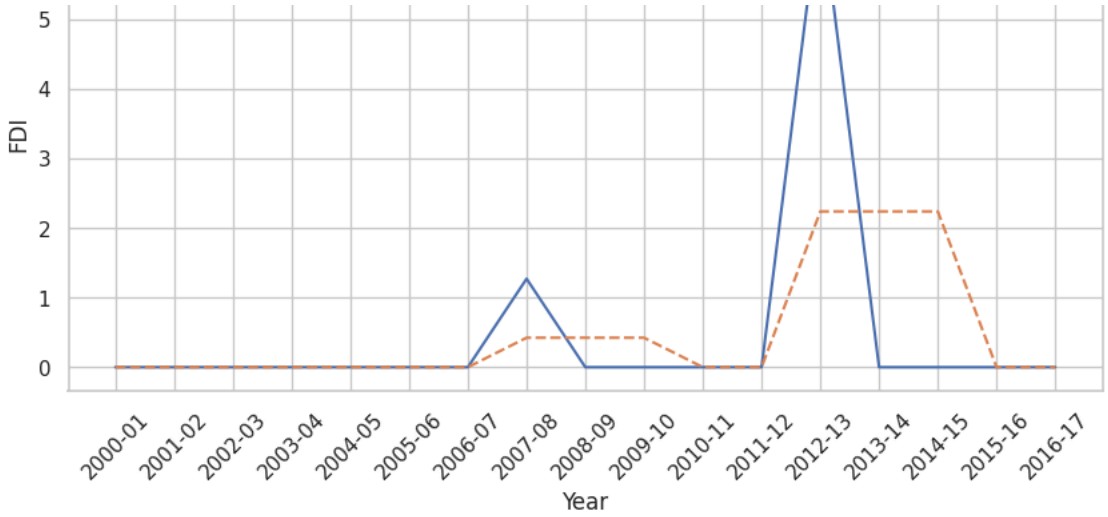

FDI Trends for MEDICAL AND SURGICAL APPLIANCES
FDI
Moving Average
400
500

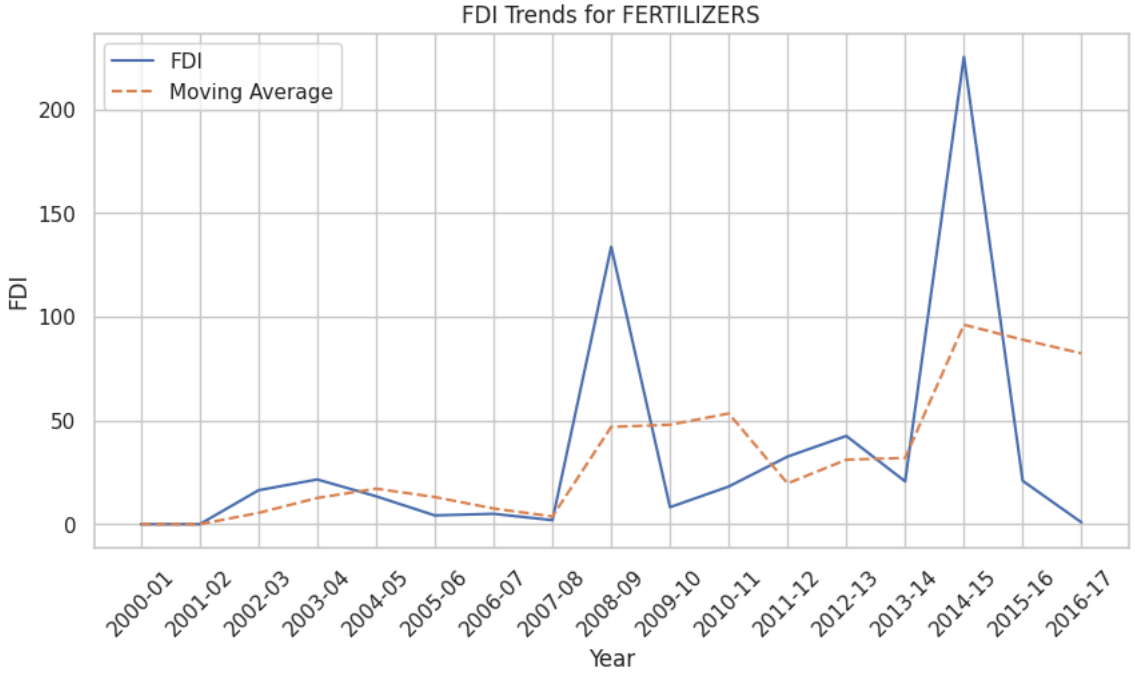

FDI
300
200
100
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

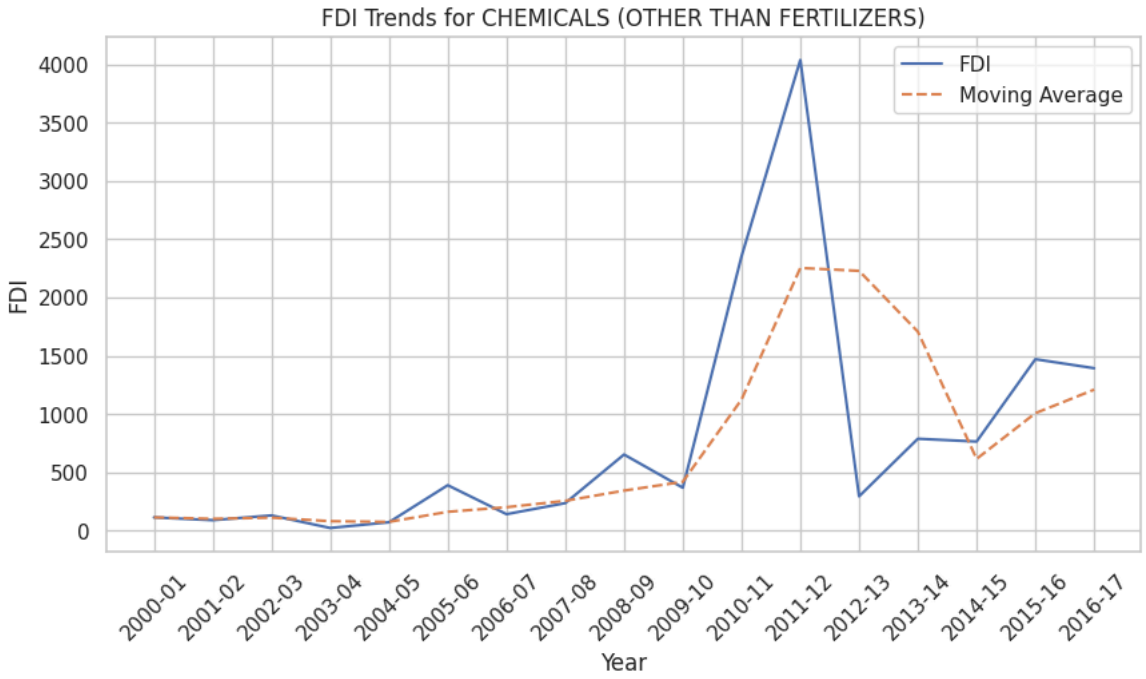

FDI Trends for INDUSTRIAL INSTRUMENTS
FDI
Moving Average
FDI
25
20
15
10
5
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

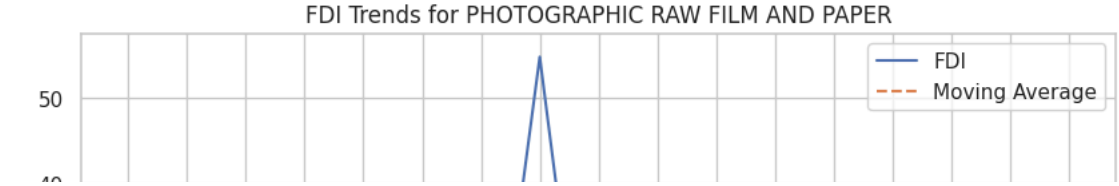

FDI Trends for SCIENTIFIC INSTRUMENTS
FDI
Moving Average
FDI
80
70
60
50
40
30
20
10
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

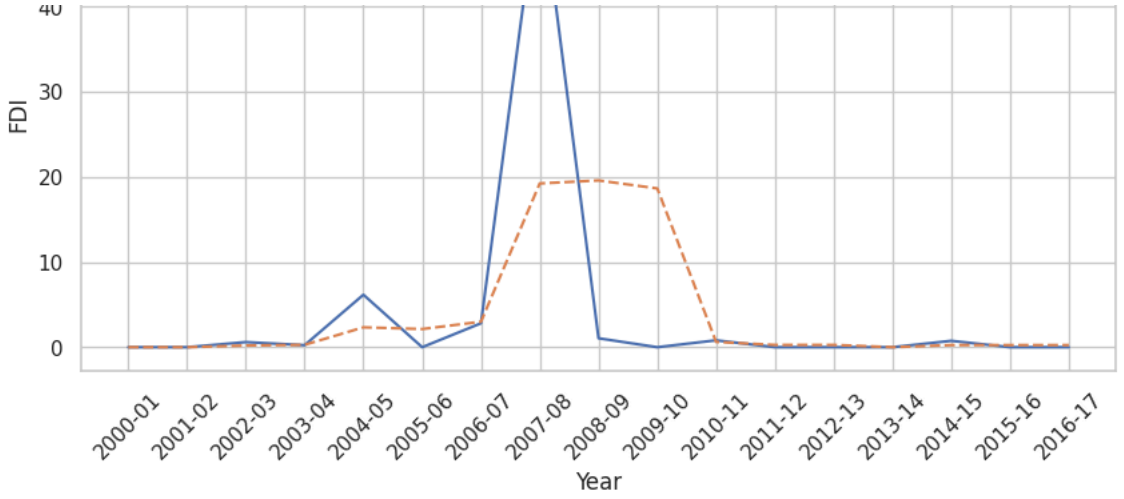

FDI Trends for MATHEMATICAL,SURVEYING AND DRAWING INSTRUMENTS
FDI
Moving Average
7
6

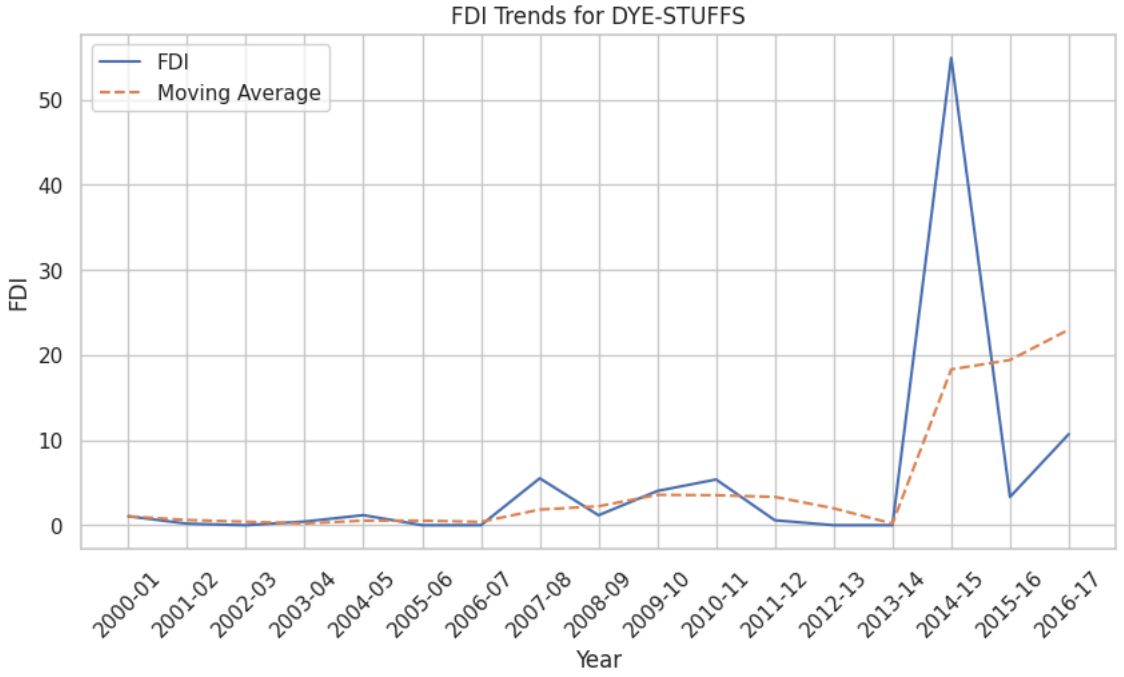

FDI
Year
0
1
2
3
4
5
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

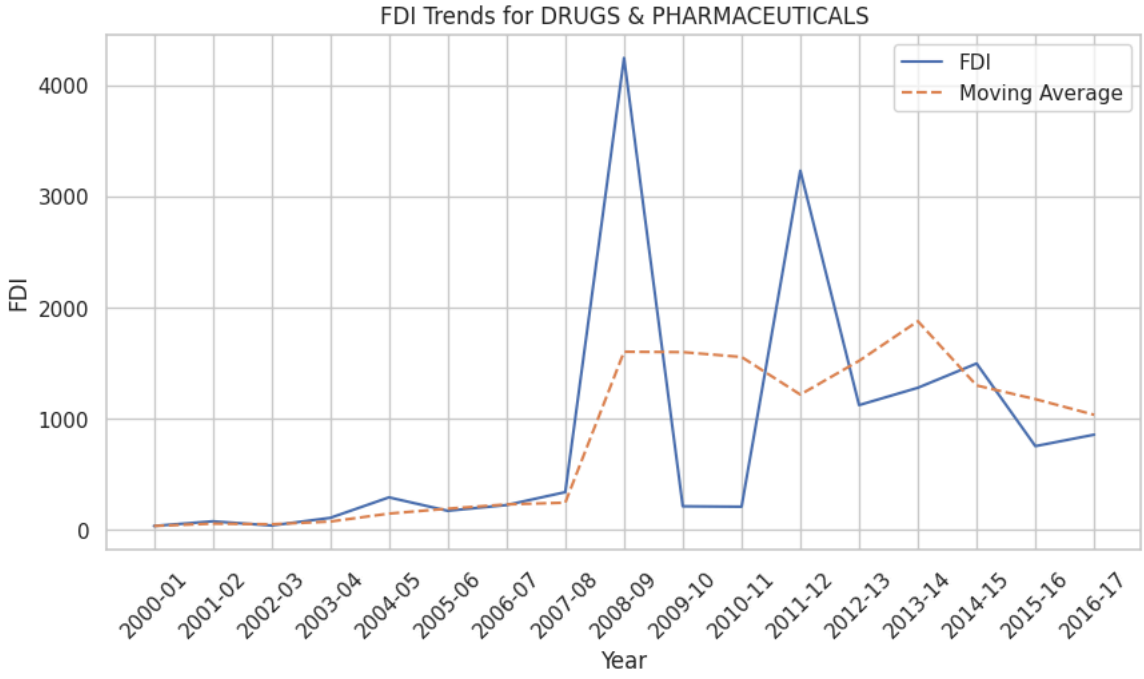

FDI Trends for FERTILIZERS
FDI
Moving Average
FDI
Year
0
50
100
150
200
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17


FDI Trends for CHEMICALS (OTHER THAN FERTILIZERS)
FDI
Moving Average
FDI
Year
0
500
1000
1500
2000
2500
3000
3500
4000
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

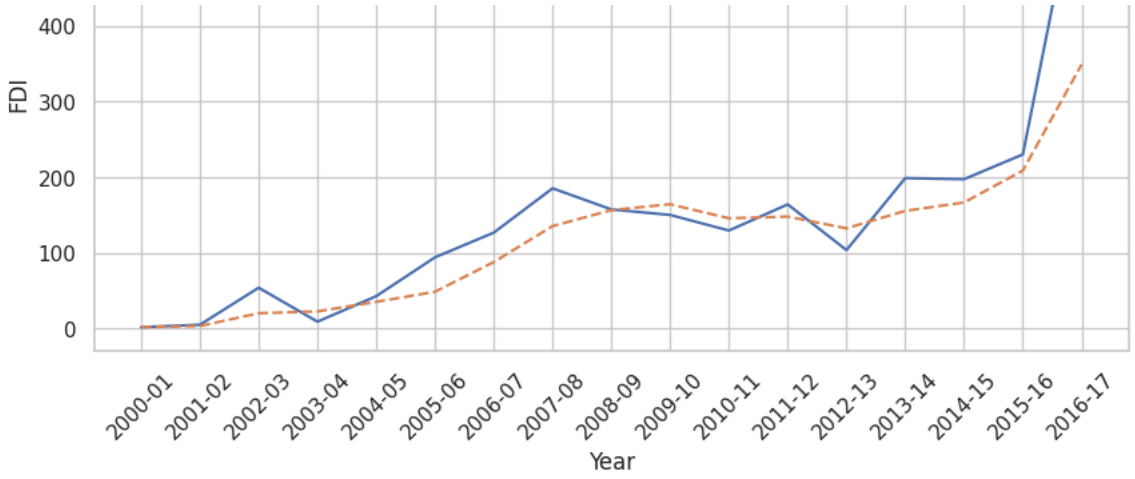

FDI Trends for PHOTOGRAPHIC RAW FILM AND PAPER
FDI
Moving Average
50

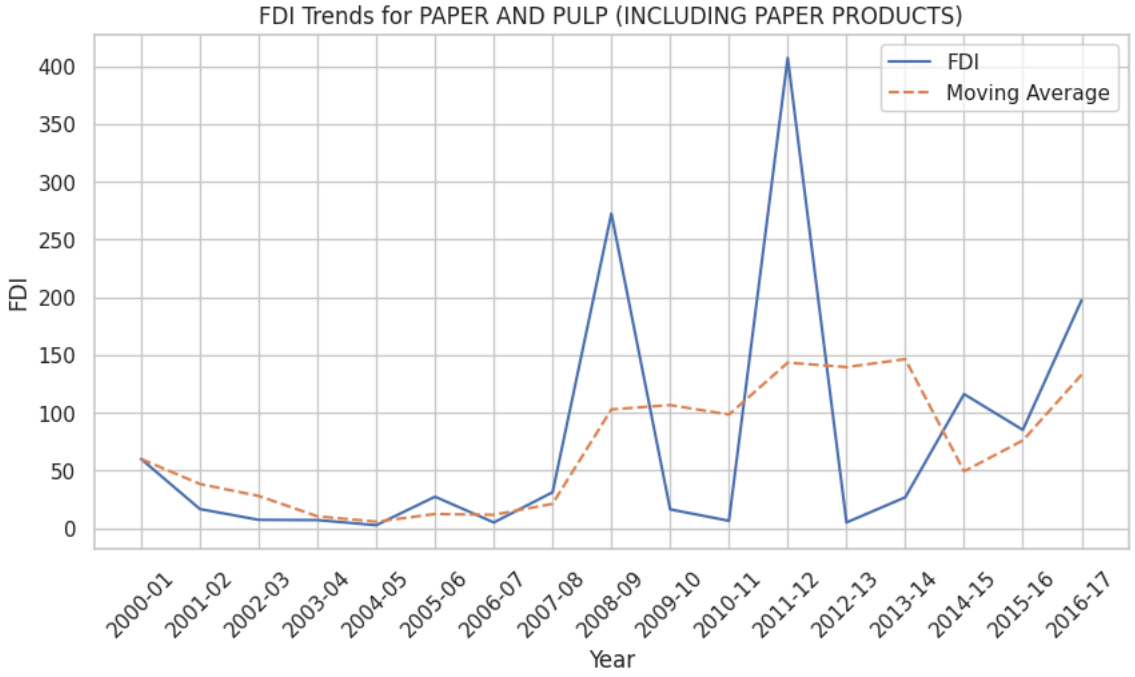

FDI
Year
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

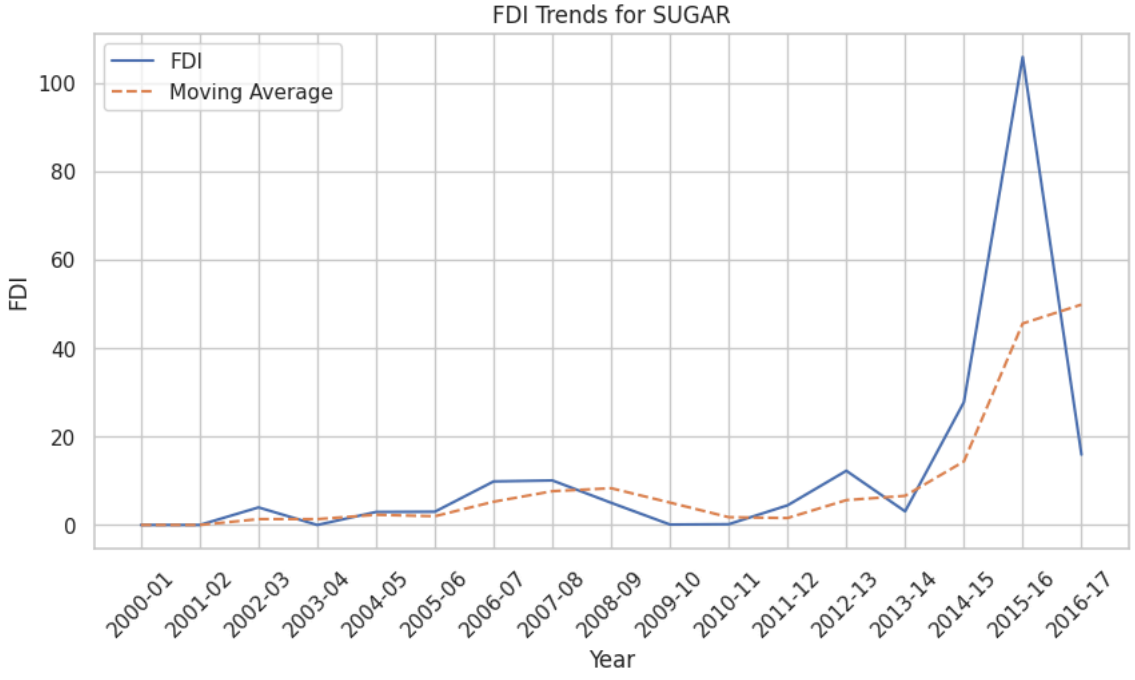

FDI Trends for DYE-STUFFS
FDI
Moving Average
FDI
Year

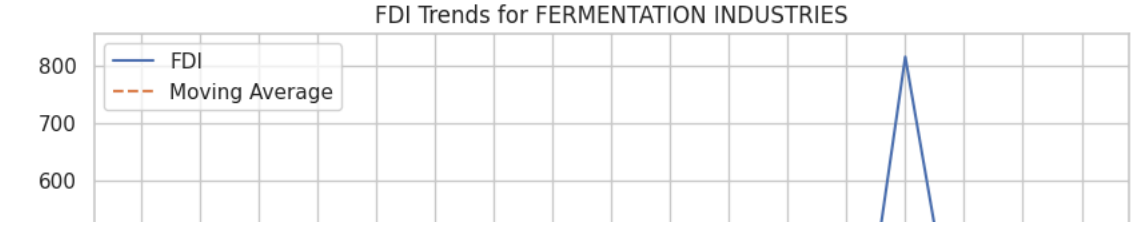

FDI Trends for DRUGS & PHARMACEUTICALS
FDI
Moving Average
FDI
Year

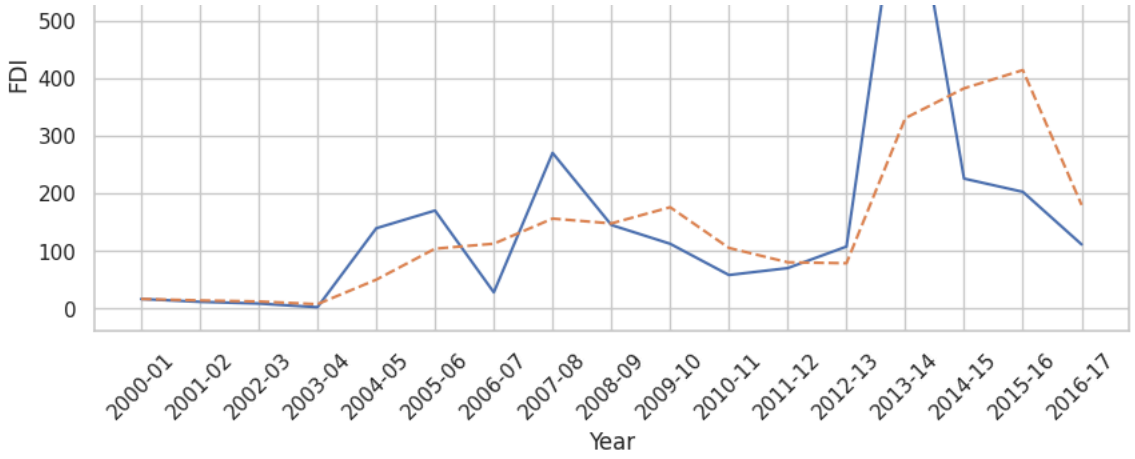

FDI Trends for TEXTILES (INCLUDING DYED,PRINTED)
FDI
Moving Average

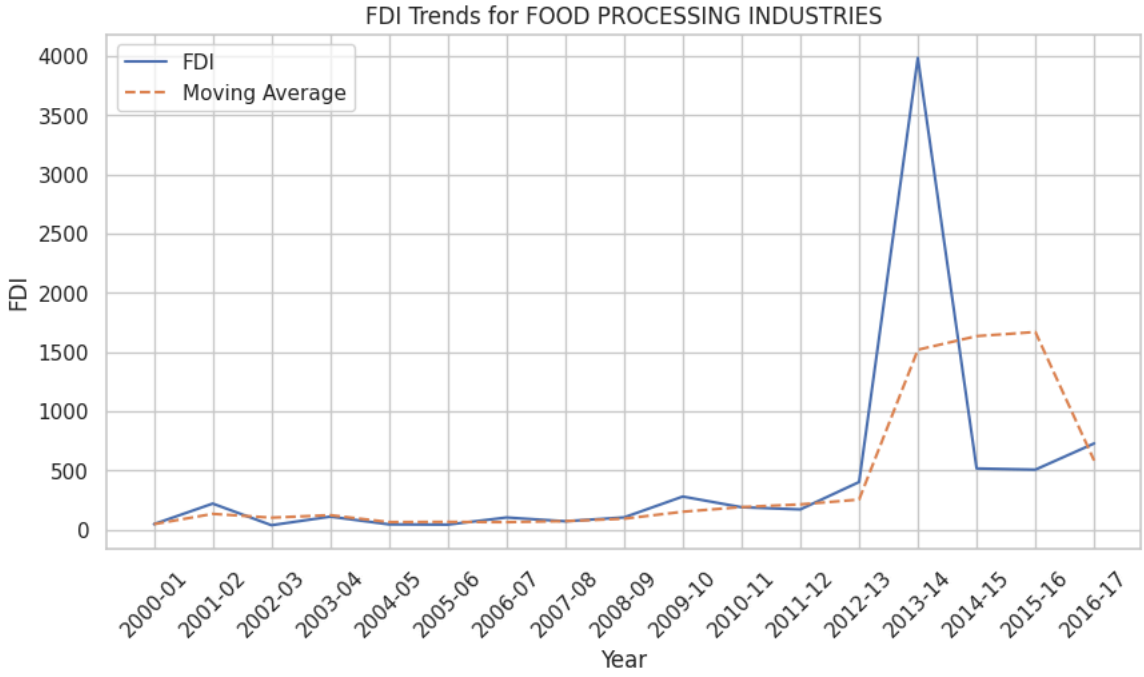

FDI
Year
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

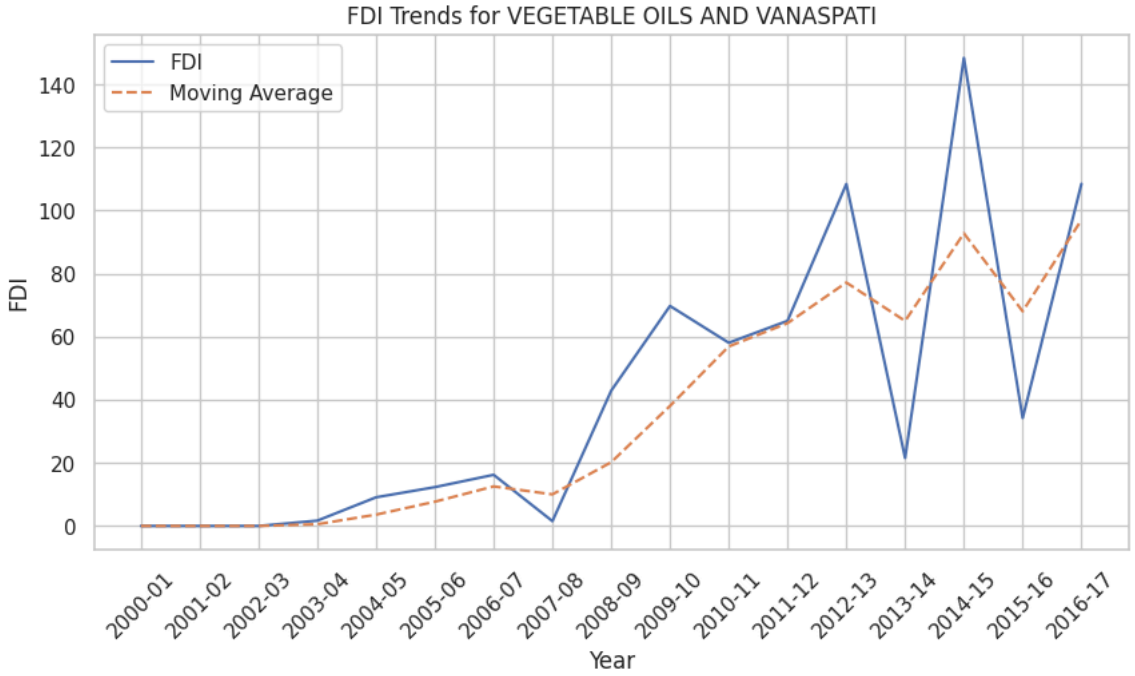

FDI Trends for PAPER AND PULP (INCLUDING PAPER PRODUCTS)
FDI
Moving Average
FDI
Year


FDI Trends for SUGAR
FDI
Moving Average
FDI
Year

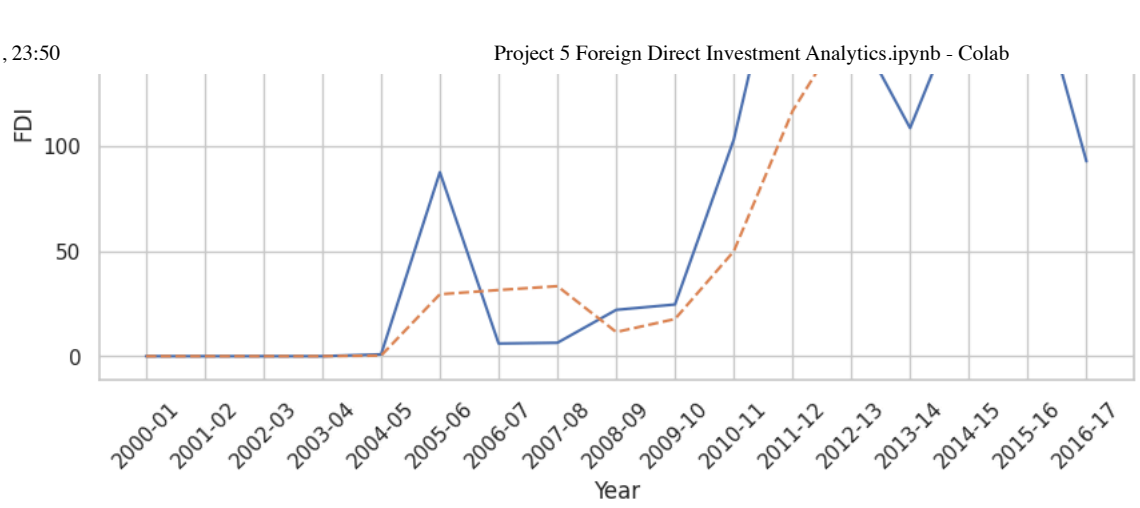

FDI Trends for FERMENTATION INDUSTRIES
FDI
Moving Average

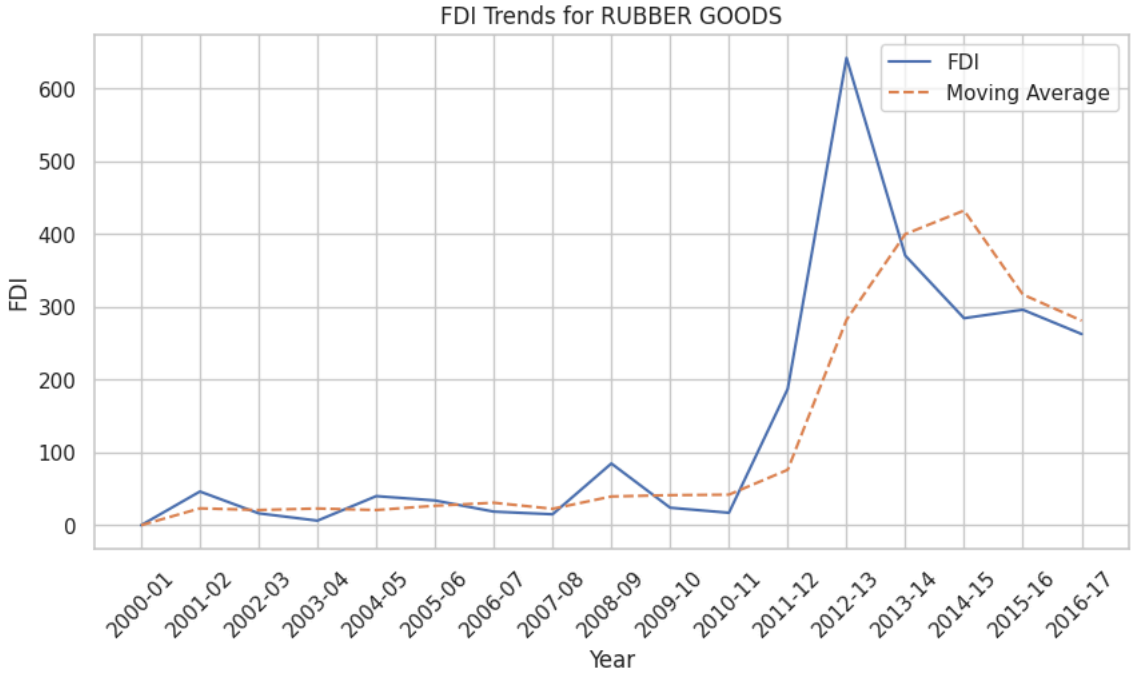

FDI
Year
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

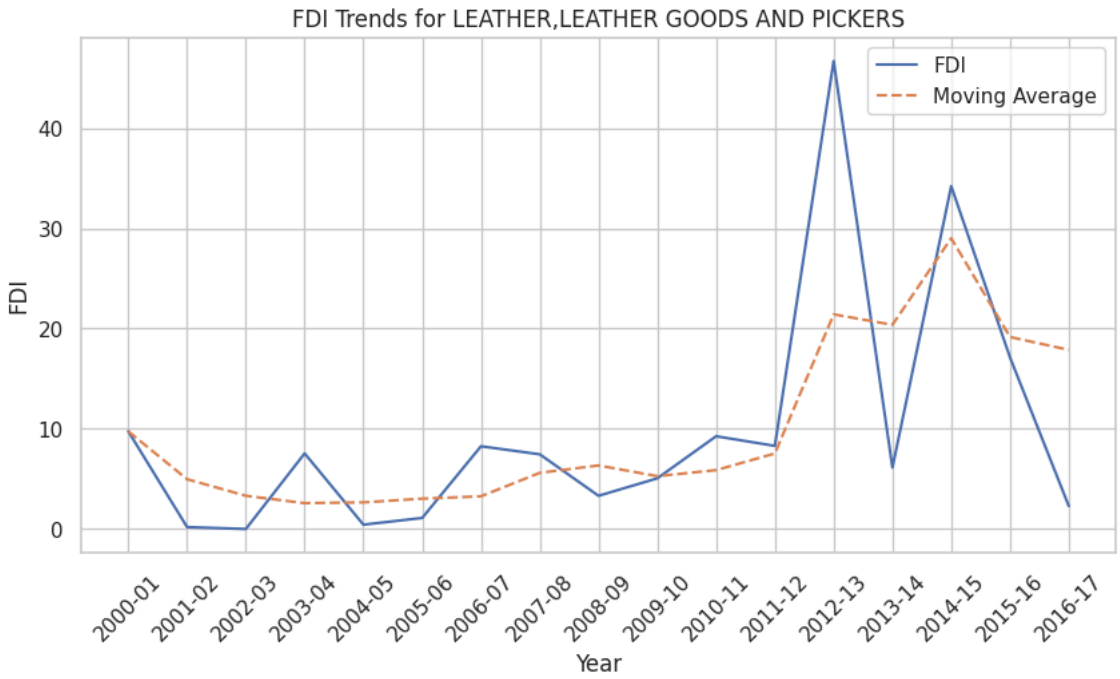

FDI Trends for FOOD PROCESSING INDUSTRIES
FDI
Moving Average
FDI
Year


FDI Trends for VEGETABLE OILS AND VANASPATI
FDI
Moving Average
FDI
Year

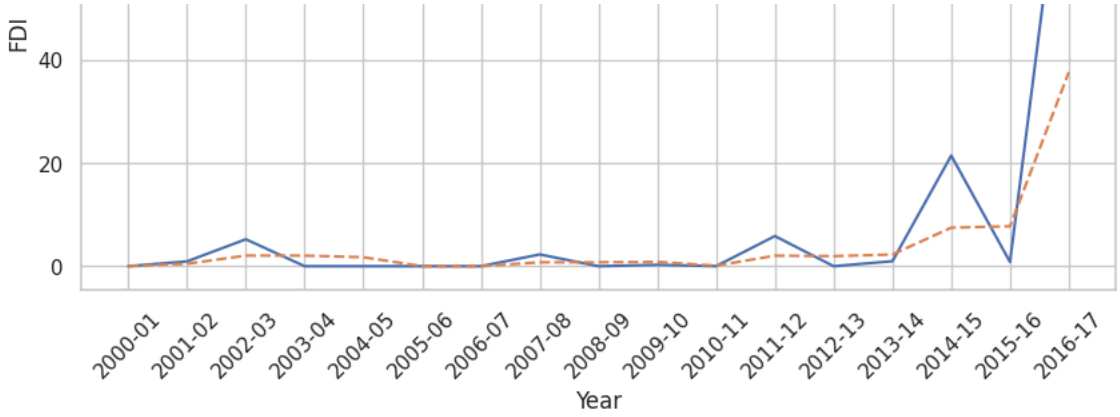

FDI Trends for SOAPS, COSMETICS & TOILET PREPARATIONS
FDI
Moving Average

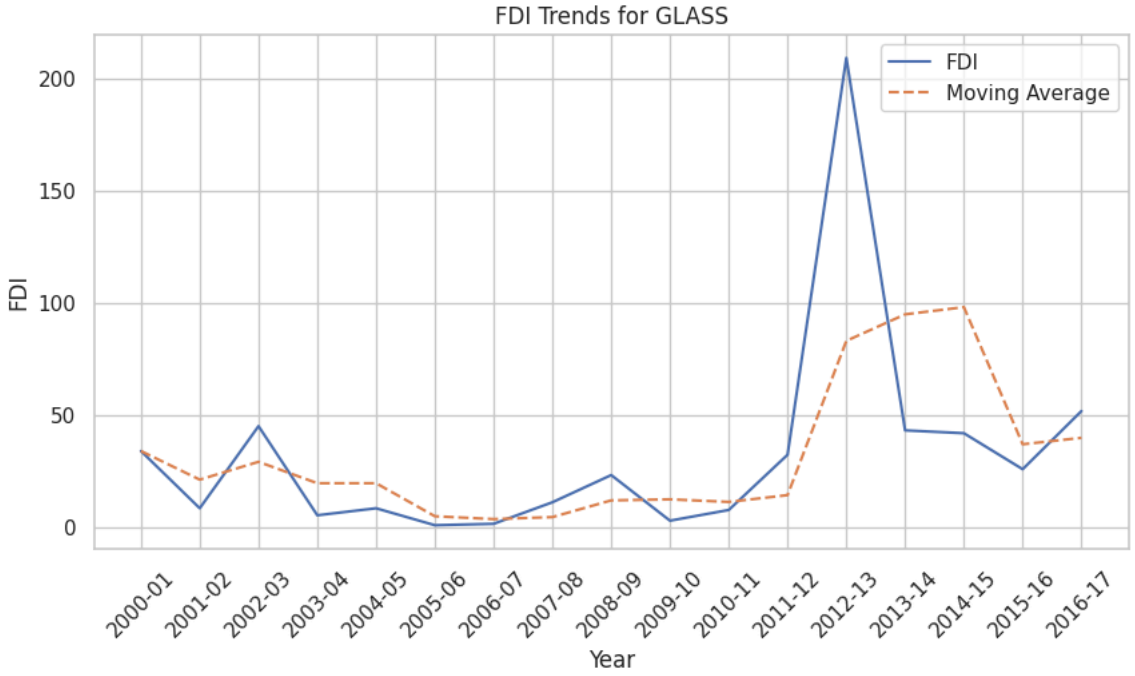

FDI
100
50
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

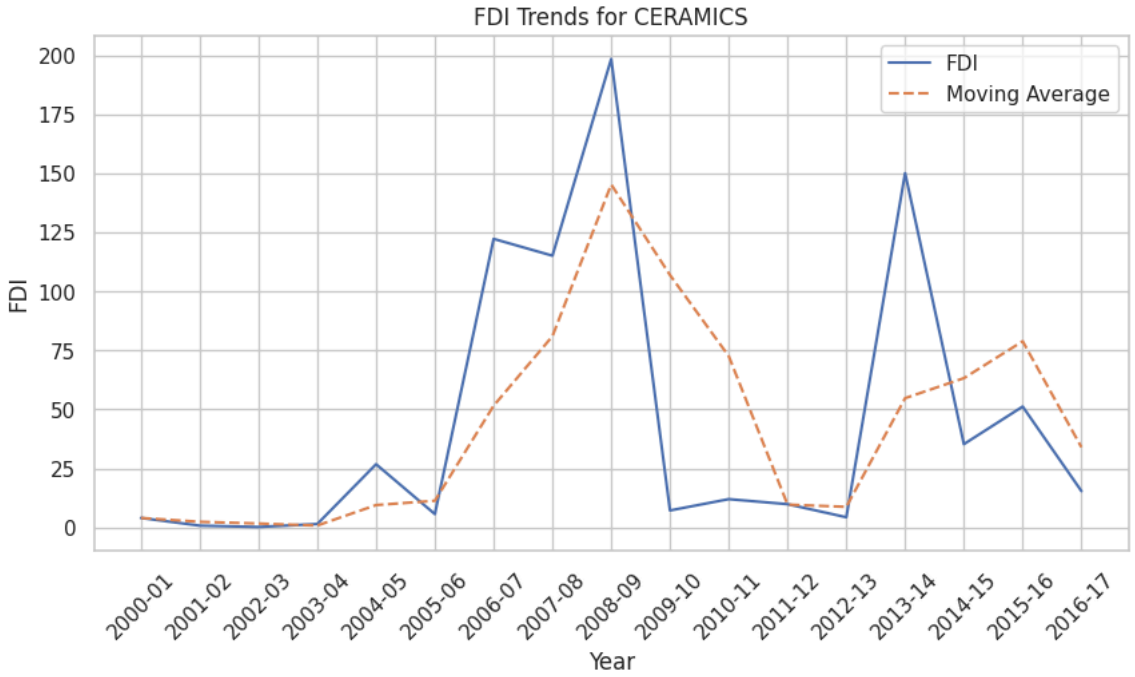

FDI Trends for RUBBER GOODS
FDI
Moving Average
FDI
600
500
400
300
200
100
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

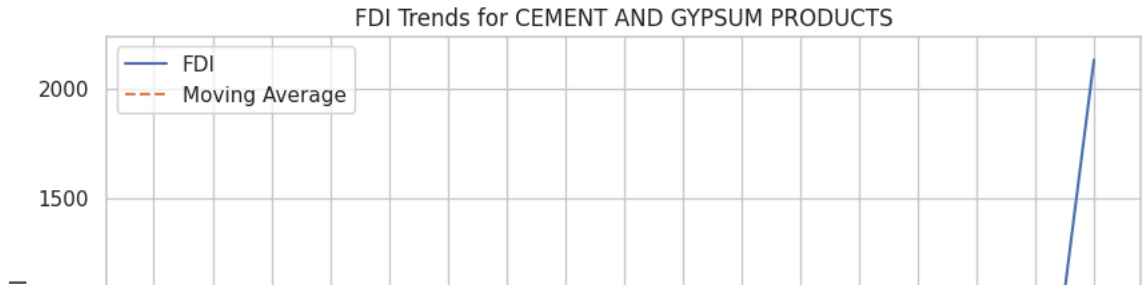

FDI Trends for LEATHER,LEATHER GOODS AND PICKERS
FDI
Moving Average
FDI
40
30
20
10
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

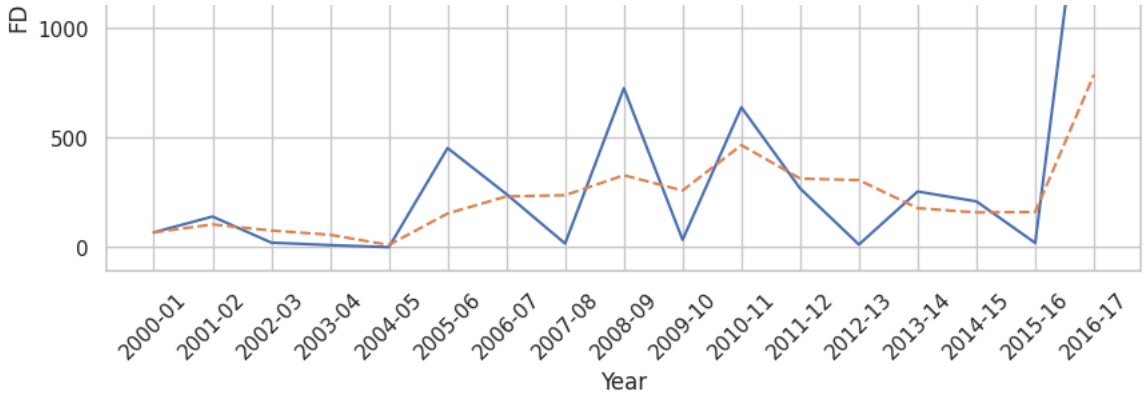

FDI Trends for GLUE AND GELATIN
FDI
Moving Average
80
60

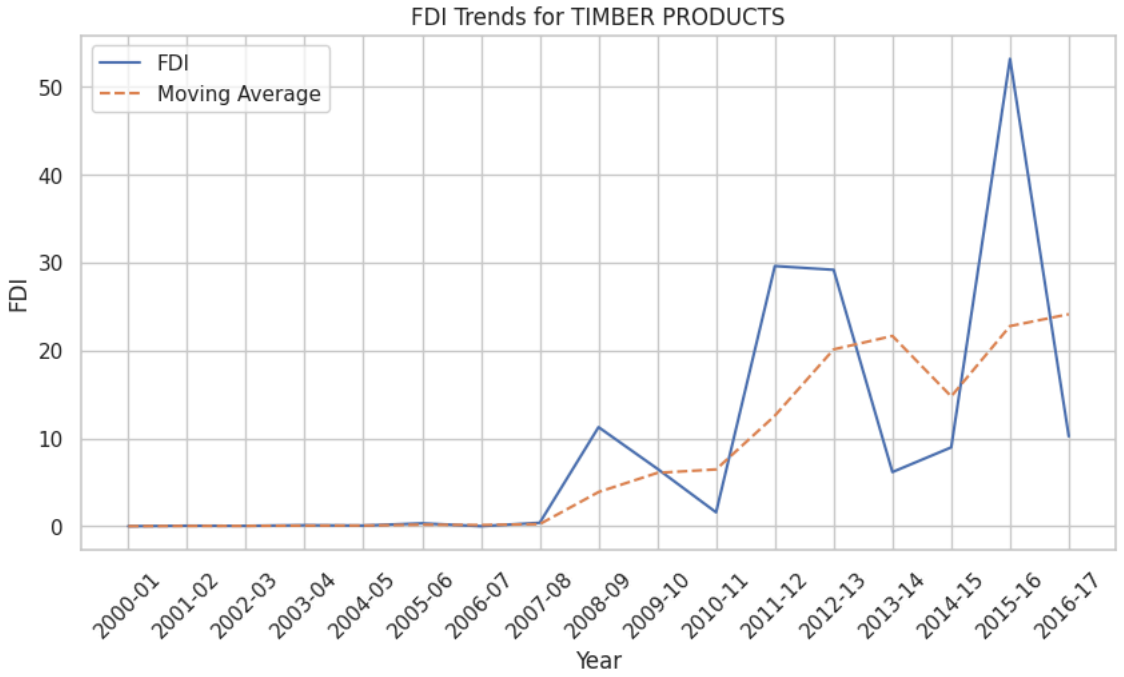

FDI
40
20
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

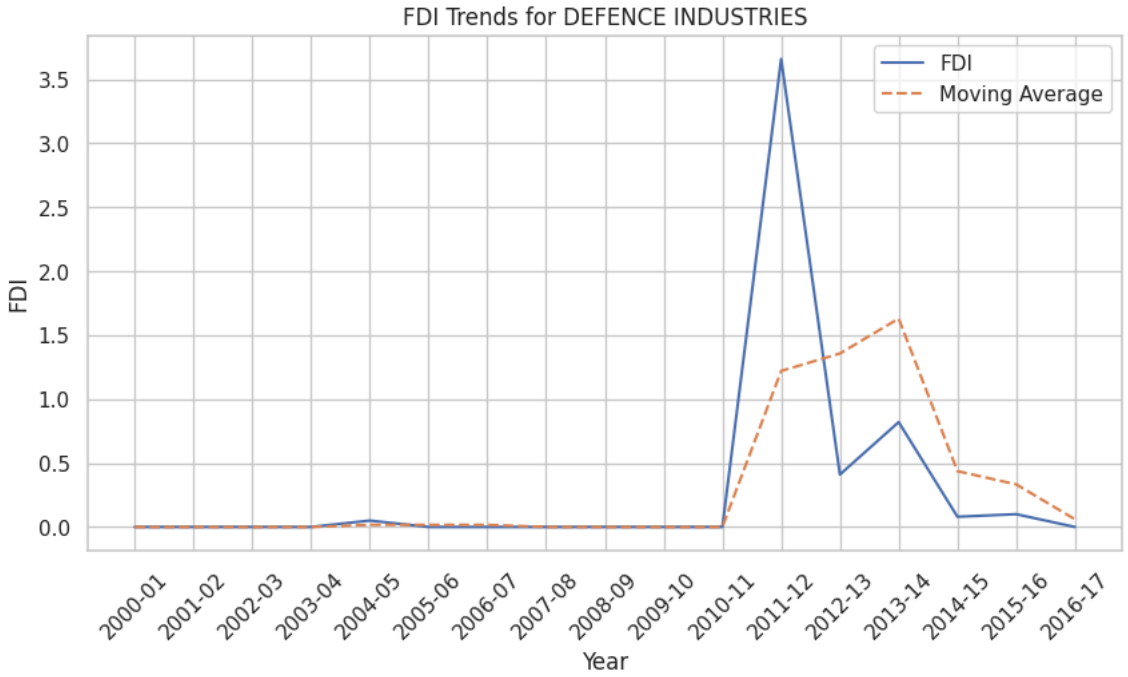

FDI Trends for GLASS
FDI
Moving Average
FDI
200
150
100
50
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

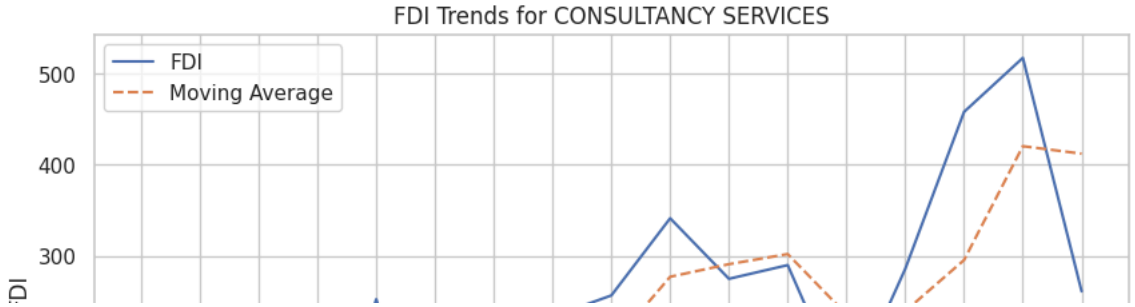

FDI Trends for CERAMICS
FDI
Moving Average
FDI
200
175
150
125
100
75
50
25
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

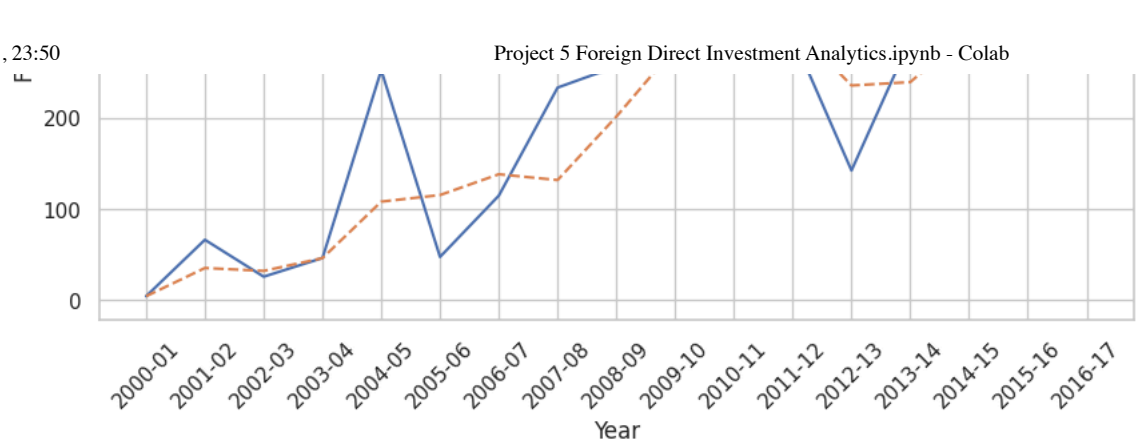

FDI Trends for CEMENT AND GYPSUM PRODUCTS
FDI
Moving Average
2000
1500

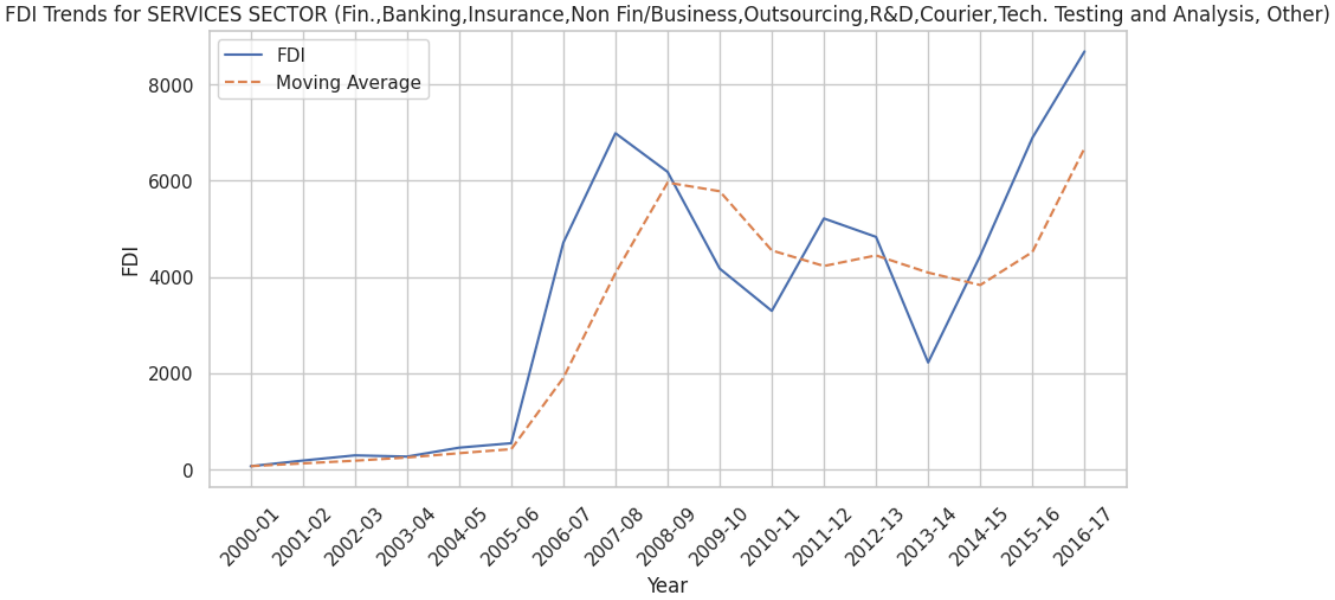

FD
1000
500
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

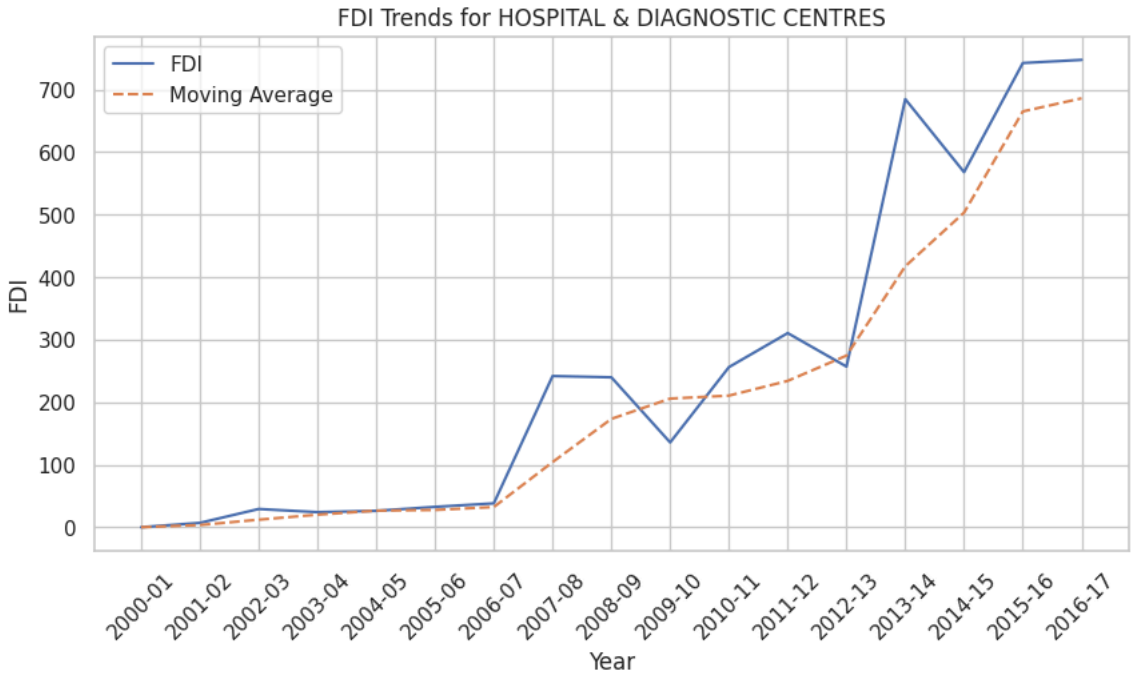

FDI Trends for TIMBER PRODUCTS
FDI
Moving Average
FDI
50
40
30
20
10
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

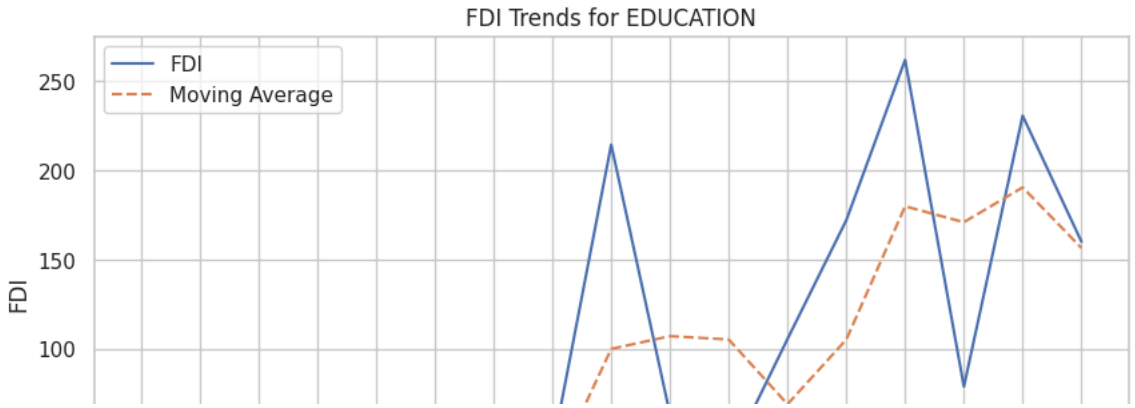

FDI Trends for DEFENCE INDUSTRIES
FDI
Moving Average
FDI
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

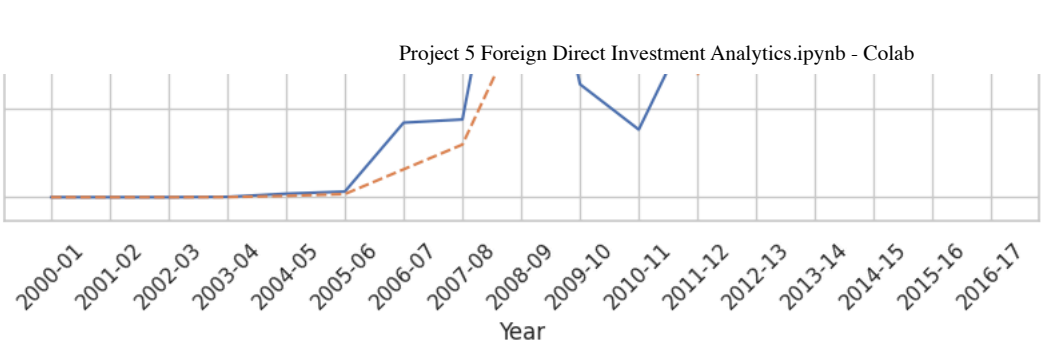

FDI Trends for CONSULTANCY SERVICES
FDI
Moving Average
500
400
300

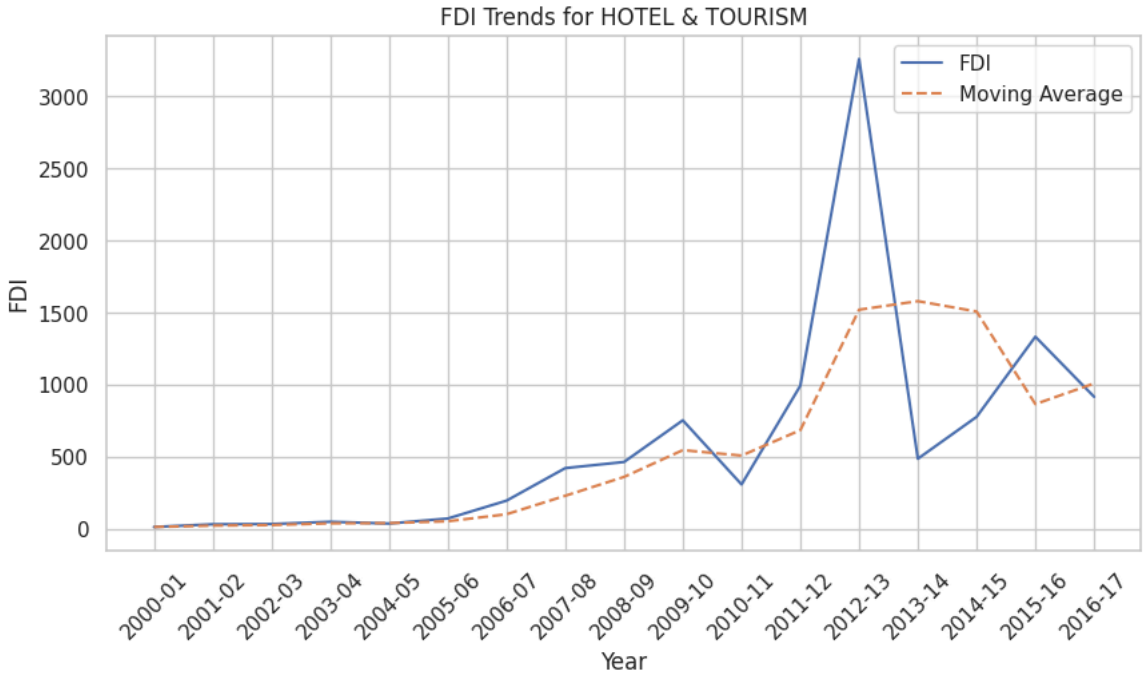

200
100
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

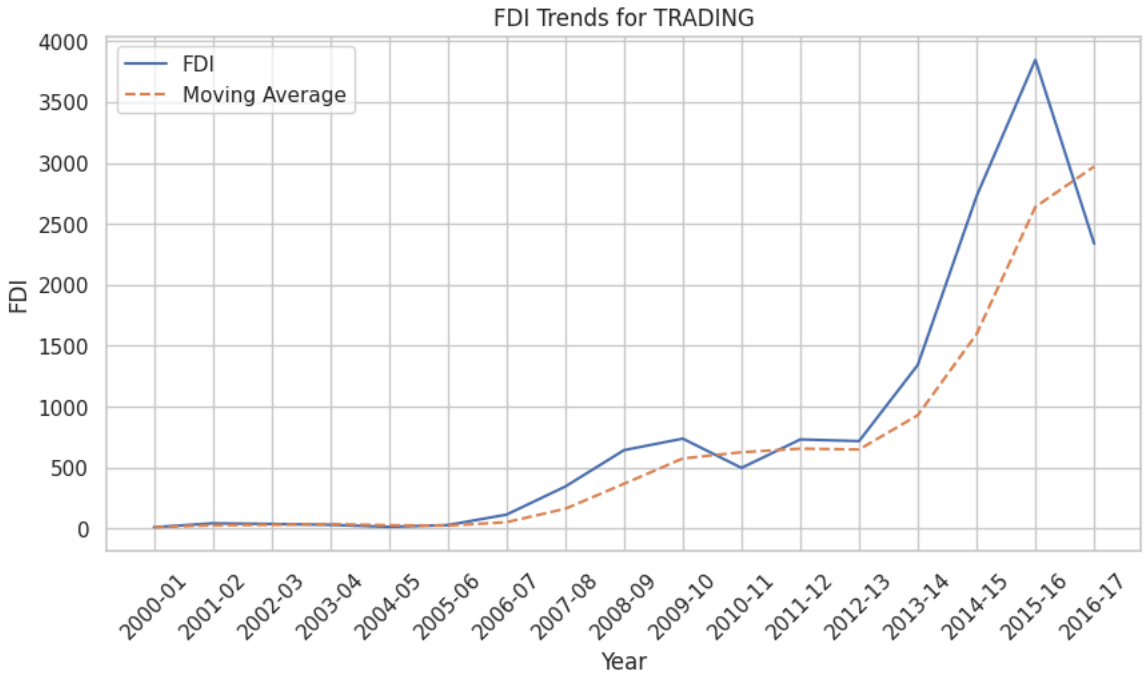

FDI Trends for SERVICES SECTOR (Fin.,Banking,Insurance,Non Fin/Business,Outsourcing,R&D,Courier,Tech. Testing and Analysis, Other)
FDI
Moving Average
8000
6000
4000
2000
0
FDI
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year


FDI Trends for HOSPITAL & DIAGNOSTIC CENTRES
FDI
Moving Average
700
600
500
400
300
200
100
0
FDI
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

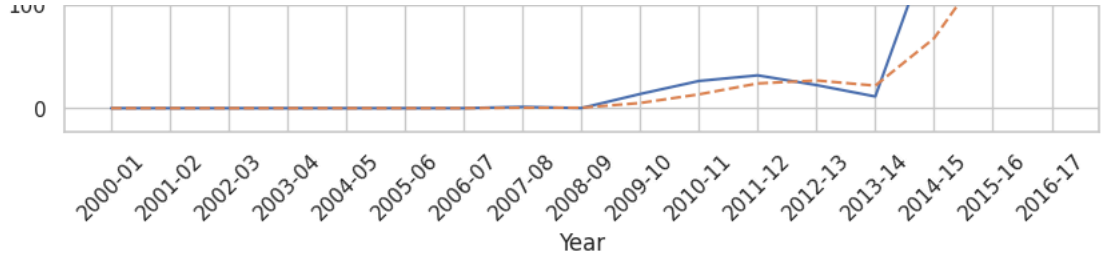

FDI Trends for EDUCATION
FDI
Moving Average
250
200
150
100
FDI

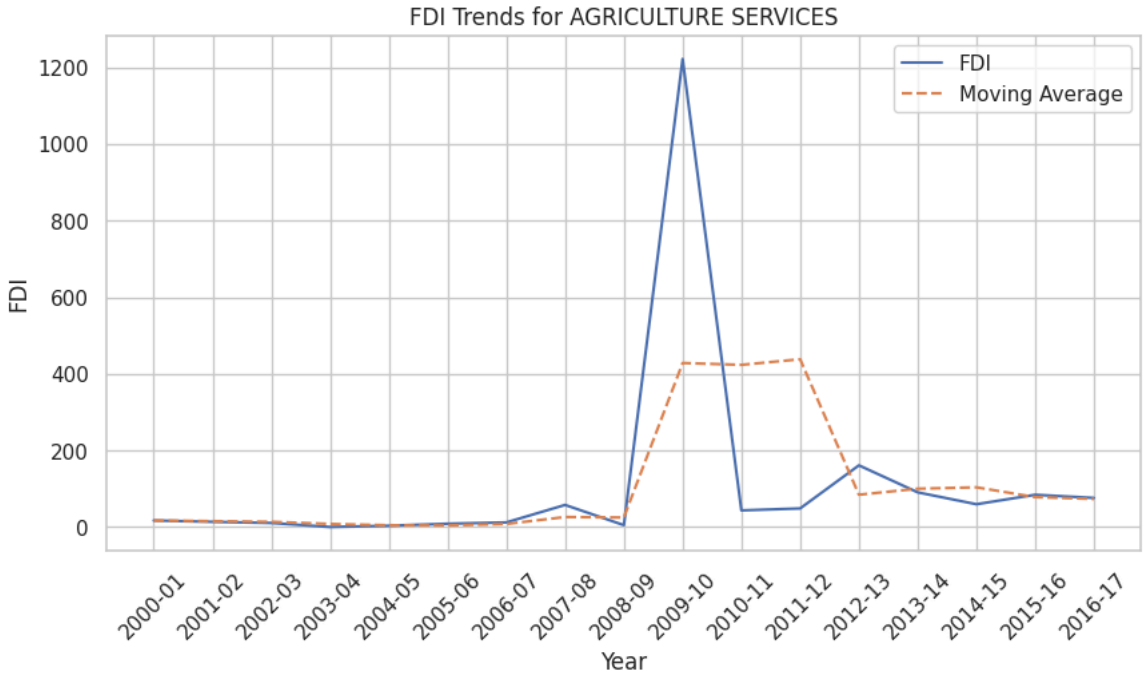

50
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

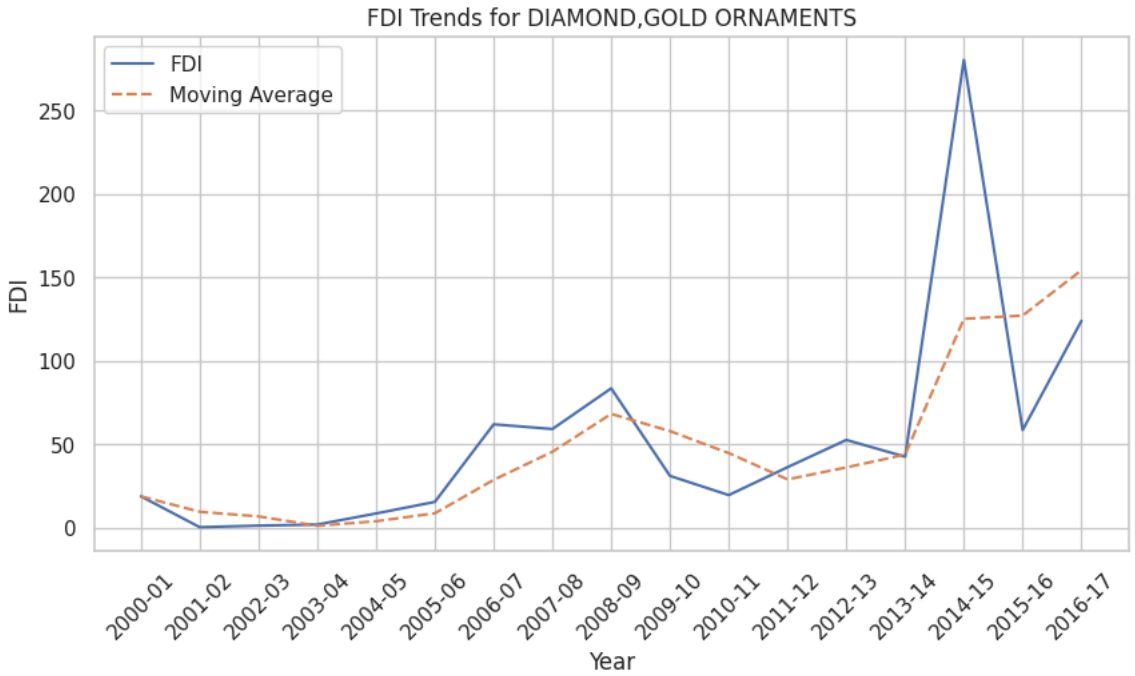

FDI Trends for HOTEL & TOURISM
FDI
Moving Average
FDI
3000
2500
2000
1500
1000
500
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

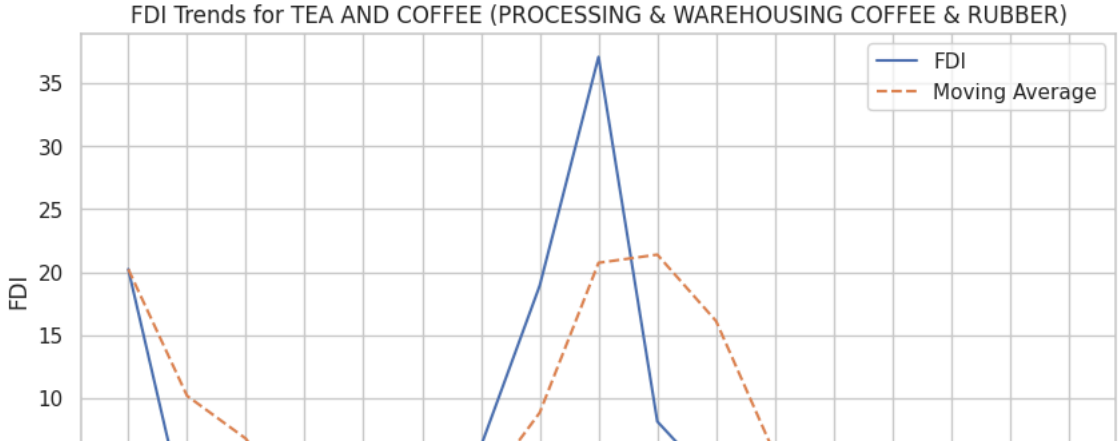

FDI Trends for TRADING
FDI
Moving Average
FDI
4000
3500
3000
2500
2000
1500
1000
500
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

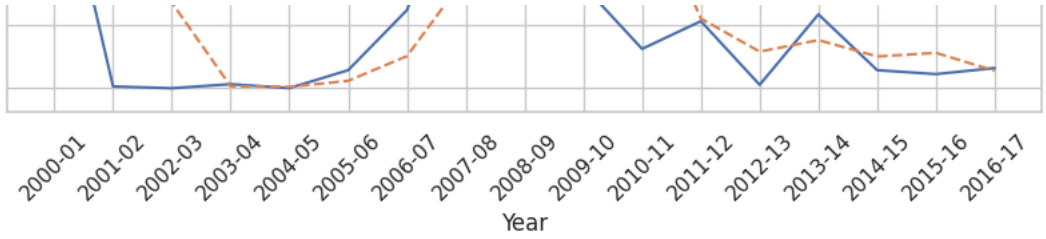

FDI Trends for RETAIL TRADING
FDI
Moving Average
FDI
400
300
200

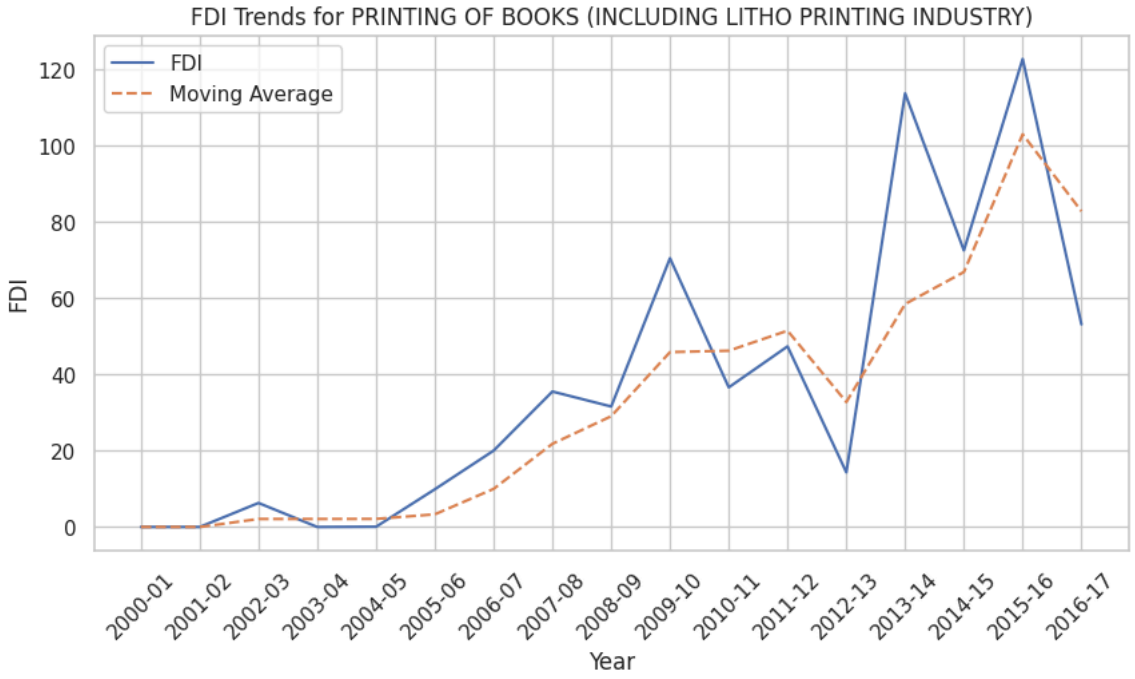

100
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

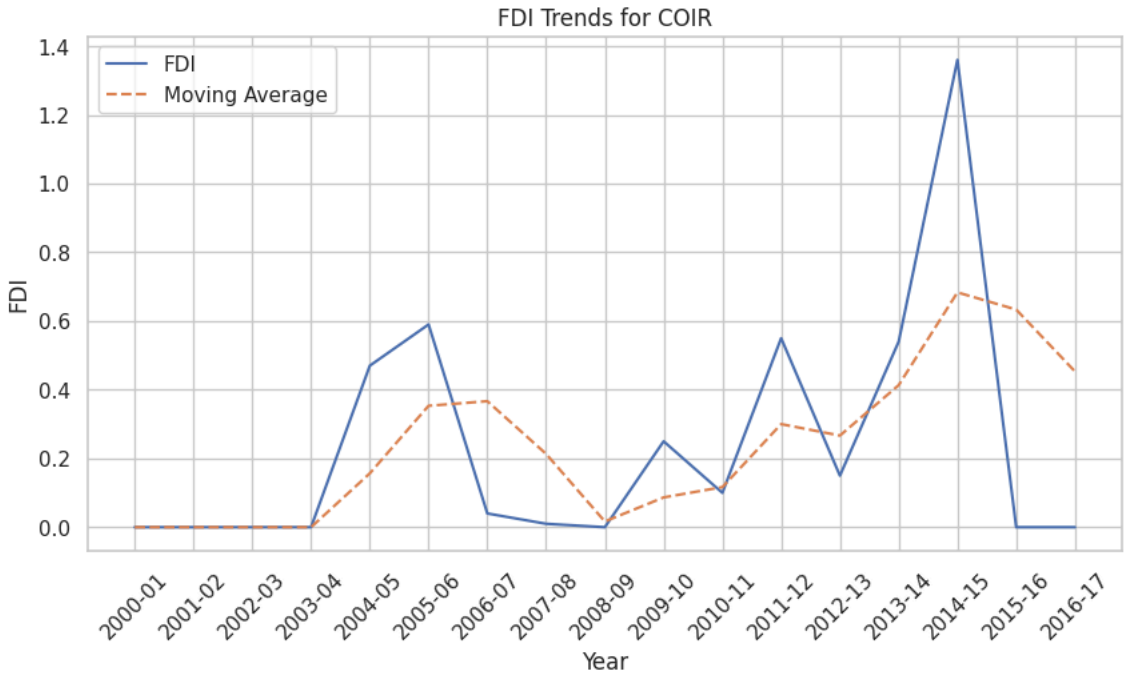

FDI Trends for AGRICULTURE SERVICES
FDI
Moving Average
1200
1000
800
600
400
200
0
FDI
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

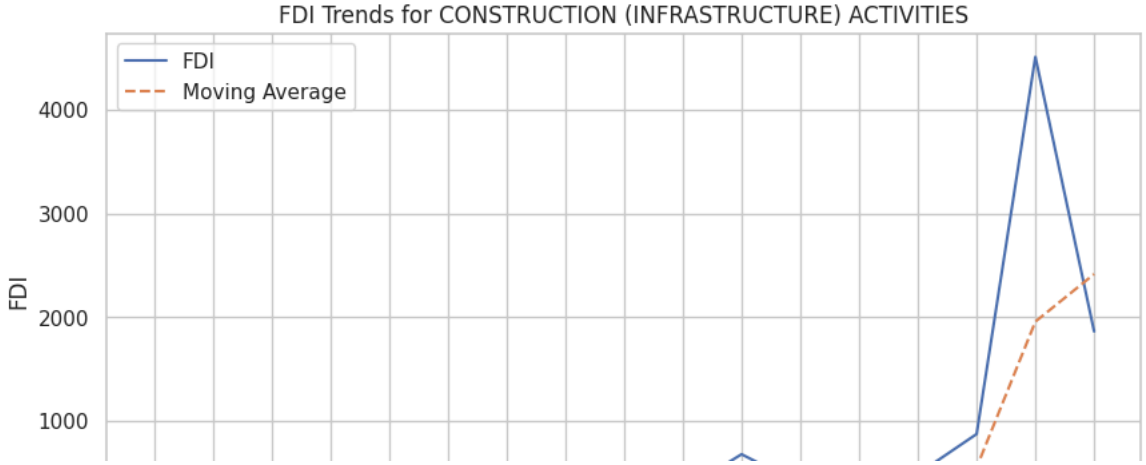

FDI Trends for DIAMOND,GOLD ORNAMENTS
FDI
Moving Average
250
200
150
100
50
0
FDI
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

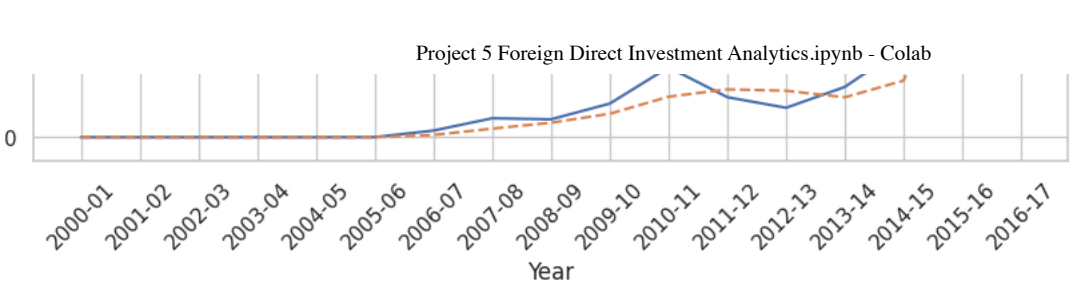

FDI Trends for TEA AND COFFEE (PROCESSING & WAREHOUSING COFFEE & RUBBER)
FDI
Moving Average
35
30
25
20
15
10
FDI

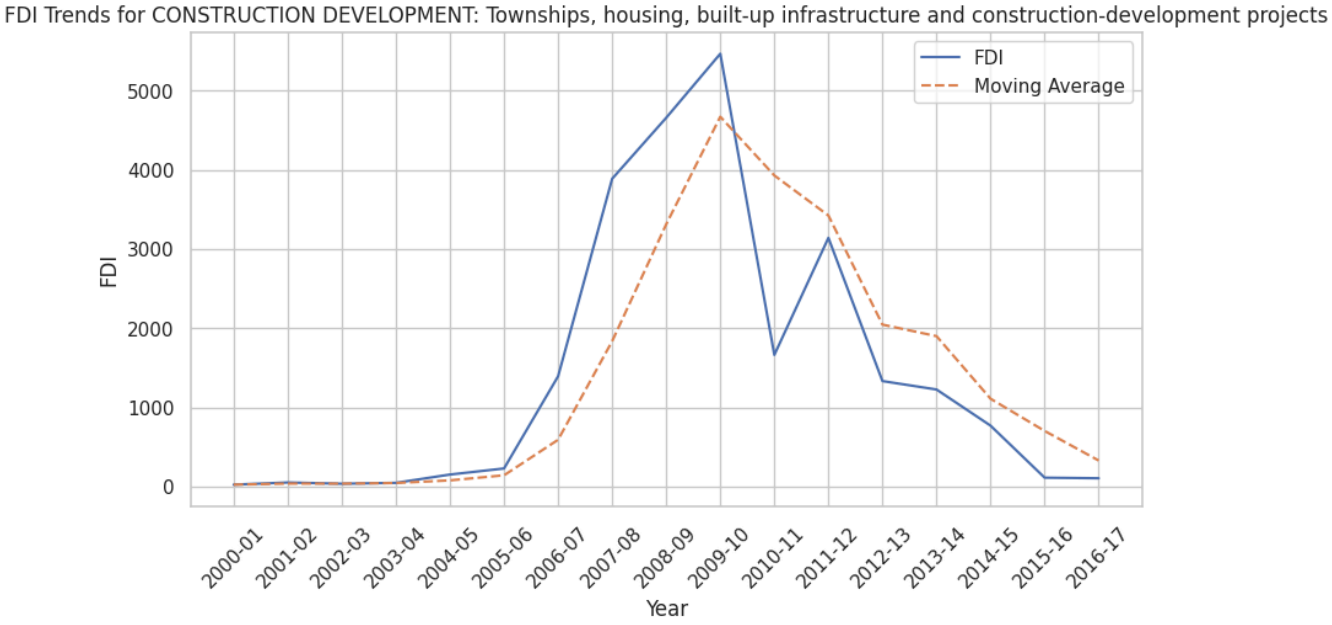

5
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

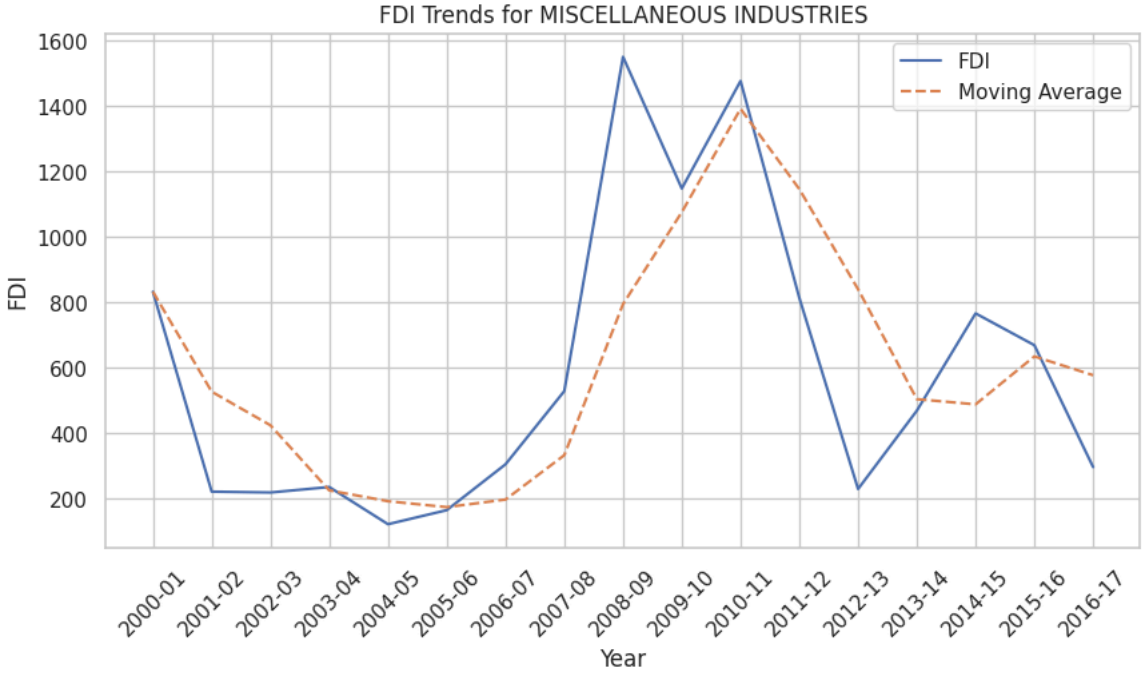

FDI Trends for PRINTING OF BOOKS (INCLUDING LITHO PRINTING INDUSTRY)
FDI
Moving Average
FDI
120
100
80
60
40
20
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year


FDI Trends for COIR
FDI
Moving Average
FDI
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

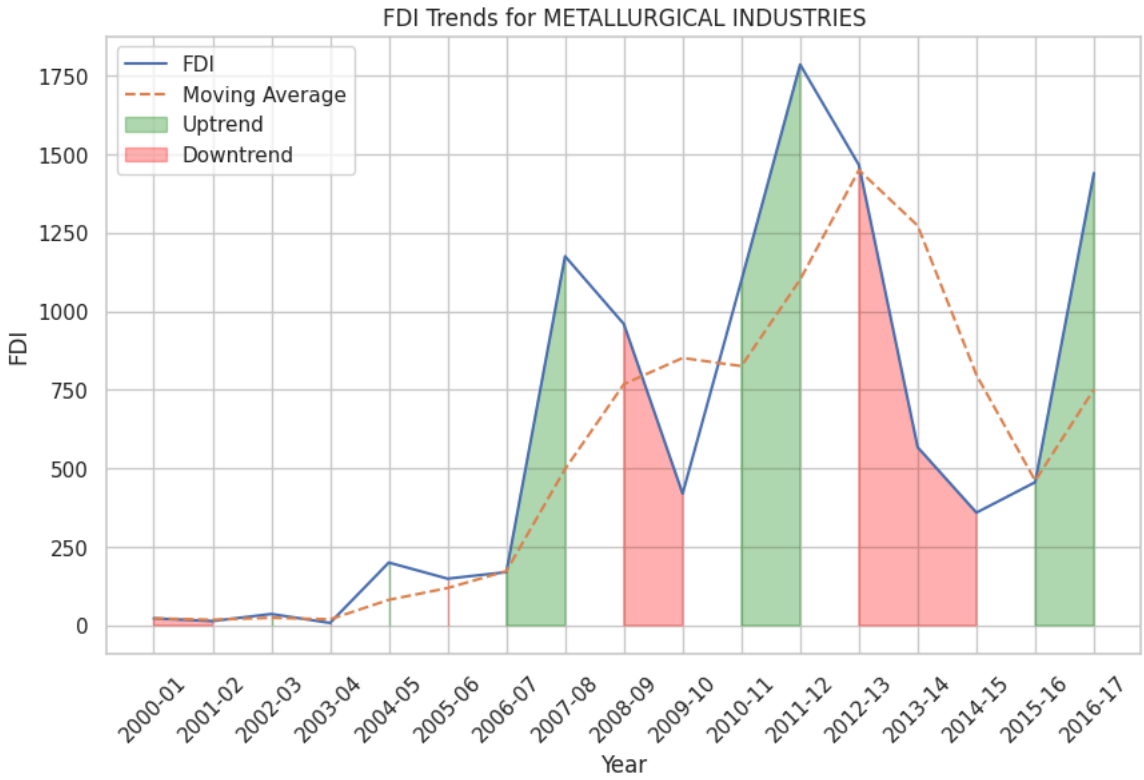

FDI Trends for CONSTRUCTION (INFRASTRUCTURE) ACTIVITIES
FDI
Moving Average
FDI
4000
3000
2000
1000

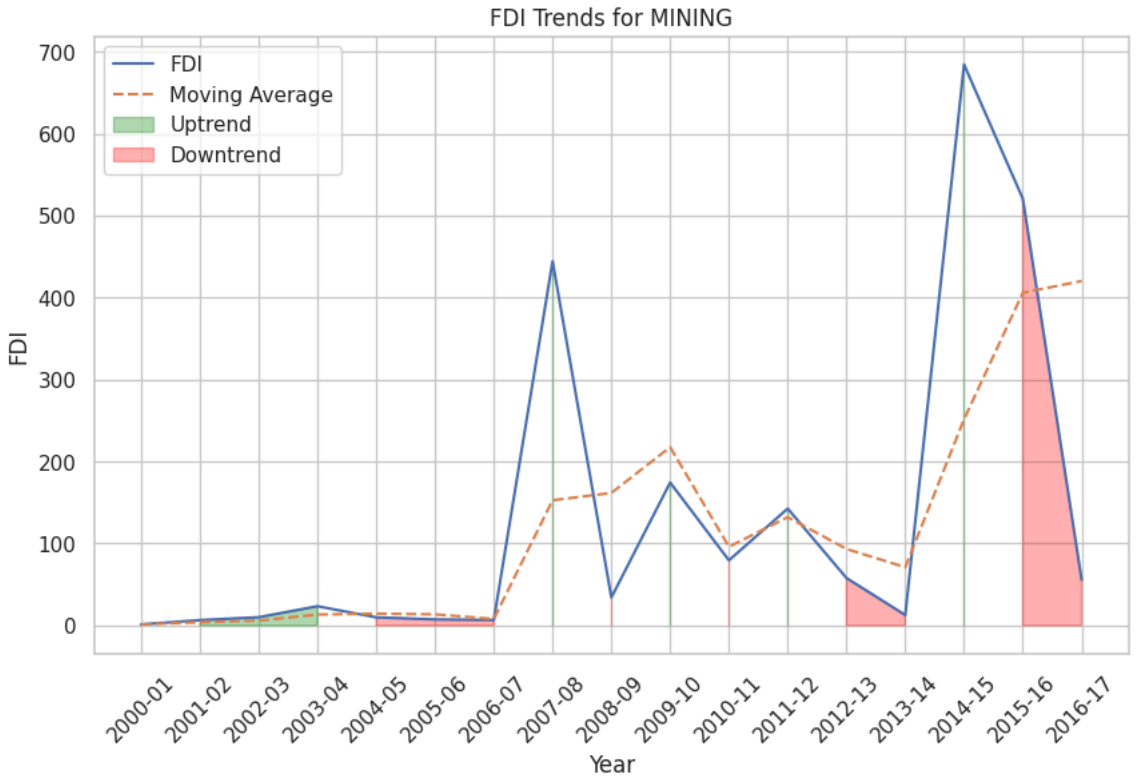

0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

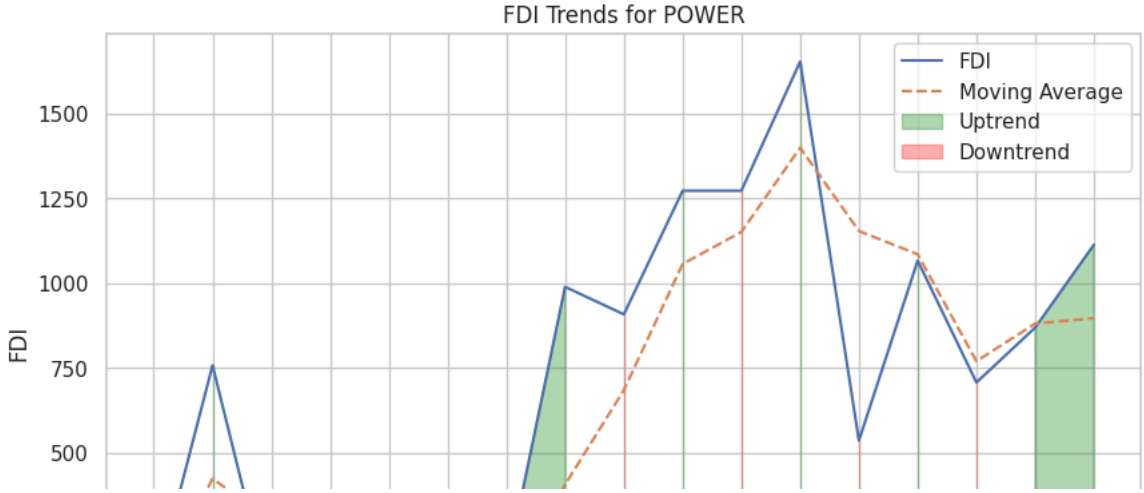

FDI Trends for CONSTRUCTION DEVELOPMENT: Townships, housing, built-up infrastructure and construction-development projects
FDI
Moving Average
FDI
5000
4000
3000
2000
1000
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

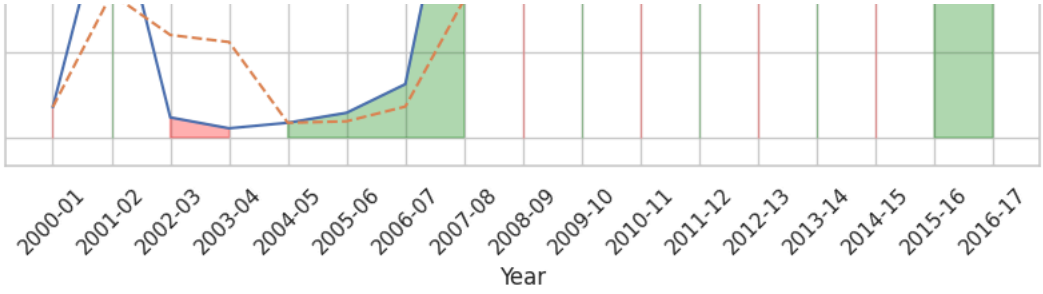

FDI Trends for MISCELLANEOUS INDUSTRIES
FDI
Moving Average
FDI
1600
1400
1200
1000
800
600
400
200
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year

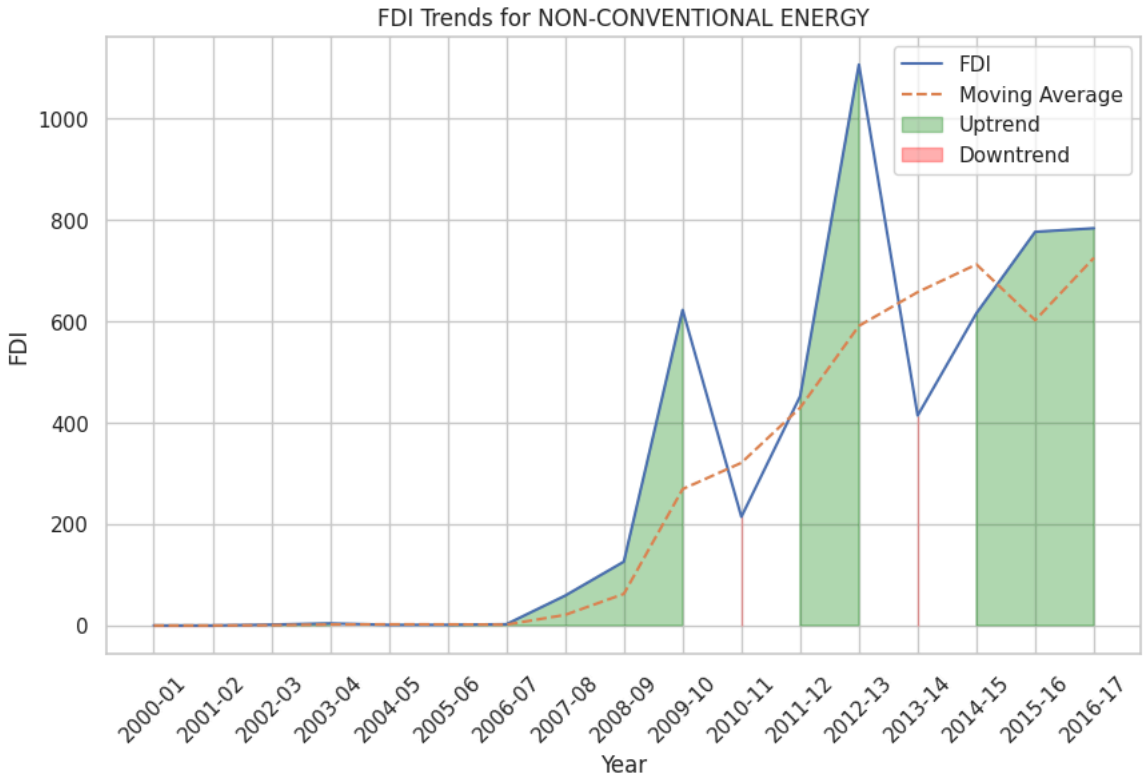
```
    for sector in sectors:
        sector_data = df_long[df_long['Sector'] == sector]
        plt.figure(figsize=(10, 6))
        plt.plot(sector_data['Year'], sector_data['FDI'], label='FDI')
        plt.plot(sector_data['Year'], sector_data['Moving Average'], '--', label='Moving Average')
        plt.fill_between(sector_data['Year'], sector_data['FDI'], where=sector_data['Growth Rate'] > 0, color='green', alpha=0.3
        plt.fill_between(sector_data['Year'], sector_data['FDI'], where=sector_data['Growth Rate'] <= 0, color='red', alpha=0.3,
        plt.title(f'FDI Trends for {sector}')
        plt.xlabel('Year')
        plt.xticks(rotation=45)
        plt.ylabel('FDI')
        plt.legend()
        plt.grid(True)
        plt.show()
```

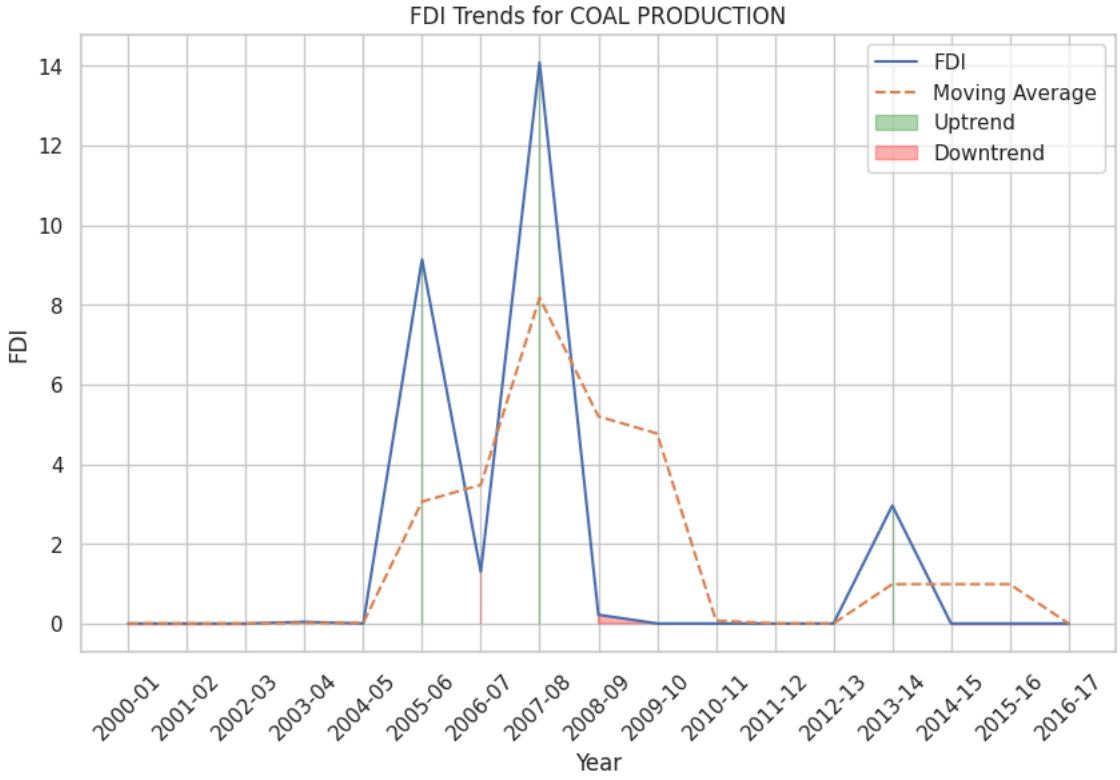

FDI Trends for METALLURGICAL INDUSTRIES
FDI
Moving Average
Uptrend
Downtrend
FDI
Year
0
250
500
750
1000
1250
1500
1750
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17

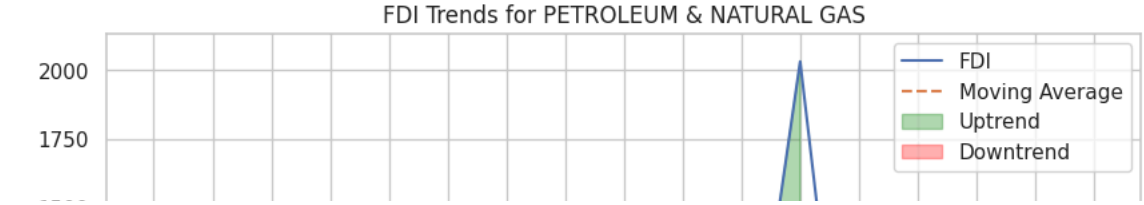

FDI Trends for MINING
FDI
Moving Average
Uptrend
Downtrend
FDI
Year
0
100
200
300
400
500
600
700
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17


FDI Trends for POWER
FDI
Moving Average
Uptrend
Downtrend
FDI
500
750
1000
1250
1500


250
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year


FDI Trends for NON-CONVENTIONAL ENERGY
FDI
Moving Average
Uptrend
Downtrend
FDI
1000
800
600
400
200
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year


FDI Trends for COAL PRODUCTION
FDI
Moving Average
Uptrend
Downtrend
FDI
14
12
10
8
6
4
2
0
2000-01
2001-02
2002-03
2003-04
2004-05
2005-06
2006-07
2007-08
2008-09
2009-10
2010-11
2011-12
2012-13
2013-14
2014-15
2015-16
2016-17
Year


FDI Trends for PETROLEUM & NATURAL GAS
FDI
Moving Average
Uptrend
Downtrend
2000
1750