TOP 11 AFRICAN COUNTRIES BASED ON G

- Exploring the primary school completion rate of boys and girls for the various african cou 2019
- Exploring the GDP capital for each country on a spread of 2000 till 2019
- Exploring the life expectancy trend for each country from 2000 till 2019
- Exploring the 15 plus employment rate of the various african countries from 2000 till 201

In [72]:

```
#importing required library
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import warnings

%matplotlib inline
warnings.filterwarnings('ignore')
```

In [73]:

```
#Read in the data
pri_sch_girls_completion = pd.read_csv('primary_school_completion_percent_of_girls.csv')
pri_sch_boys_completion = pd.read_csv('primary_school_completion_percent_of_boys.csv')
gdp_capital = pd.read_csv('gdppercapita_us_inflation_adjusted.csv')
life_expectancy = pd.read_csv('life_expectancy_years.csv') #2021
employment = pd.read_csv('aged_15plus_employment_rate_percent.csv') #2021
```

In [74]:

```
def fill_na_by_row(data):
    """
    This funtion removes all empty entries and replaces it with the mean
    value by country.
    data = pass in adjusted data
    """
    for i in list(data.index):
        data.loc[i,:].fillna(data.loc[i,:].mean(),inplace = True)
    return data
```

In [75]:

```
def adjust_data(data):
    """
    This function is built to adjust the imported data for the project.
    it trims the data to 2000 to 2019.
    It makes the country column the index.
    It trimms down the countries to African countries with the highest Gross Domestic Product (GD
    (in billion U.S. dollars) according to
    https://www.statista.com/statistics/1120999/gdp-of-african-countries-by-country/
    It returns the adjusted data

    data = csv file imported for this project
    """
    x = data.loc[:,'2000':'2019'] #considering only data from 2000 to 2019
    y = data.loc[:,['country']] #picking out the countries column
    data = pd.concat([y,x], axis=1) #combining both dataframes togethe
    data = data[data['country'].isin(['Nigeria', 'Egypt', 'South Africa', 'Algeria', 'Morocco',
                                      'Kenya', 'Ethiopia', 'Ghana', 'Tanzania
                                     ' Angola', 'Cote d\'Ivoire', 'Congo, Rep
    data = data.set_index('country') #converting the country coolumn to the index
    return fill_na_by_row(data) # calling the fill_na_by_row function
```

In [76]:

```
def stats(data):
    """
    This function returns maximum values and minimum values from the inputed data set
    """
    x = pd.DataFrame(data.max(axis=1), columns=['Max'])
    y = pd.DataFrame(data.min(axis=1), columns=['Min'])
    data_stats=pd.merge(x,y, on='country')

    max_country = data_stats.idxmax()['Max']
    max_value = data_stats.max()['Max']

    min_country = data_stats.idxmin()['Min']
    min_value = data_stats.min()['Min']


    max_value_2019 = data.loc[:,['2019']].max()[0] #to give value of max
    max_country_2019 = data.loc[:,['2019']].idxmax()[0] #to give country of max

    min_value_2019 = data.loc[:,['2019']].min()[0] #to give value of max
    min_country_2019 = data.loc[:,['2019']].idxmin()[0] #to give country of max



    print('A TABLE TO SHOW THE GENERAL MAXIMUM AND MINIMUM DISTRIBUTION BY AVERAGE ACROSS THE YEA
    print(data_stats)
    print("\nMAXIMUM\n {} had the the highest overall average of {}".format(max_country,max_value
    print("\nMINIMUM\n {} had the lowest overall average of {}".format(min_country,min_value))
    print('\n---------------------------------------------------------------------')
    print('\n\nTHIS IS THE DISTRIBUTION OF MIN AND MAX AT 2019')
    print('\nMINIMUM\n{} has the lowest average with {}'.format(min_country_2019,round(min_value_
    print('\nMAXIMUM\n{} has the maximum average with {}'.format(max_country_2019,max_value_2019)
```

In [77]:

```
def display_stats(data):
    """
    Function to return the adjusted data statistics
    """
    data = adjust_data(data)
    return stats(data)
```

In [78]:

```
def matrix_maker(data):
    """
    This converts the data to a matrix format
    """
    data1= adjust_data(data)
    return data1.to_numpy()
```

In [79]:

```
ist(range(2000,2020))

= {'2000':0,'2001':1,'2002':2,'2003':3,'2004':4,'2005':5,'2006':6,'2007':7,'2008':8,'2009':9,'2010'
'2012':12,'2013':13,'2014':14,'2015':15,'2016':16,'2017':17,'2018':18,'2019':19,'2020':20} #buildin

['Algeria','Congo, Rep.','Cote d\'Ivoire','Egypt','Ethiopia','Ghana','Kenya','Morocco','Nigeria','
= {'Nigeria':8, 'Egypt':3, 'South Africa':9, 'Algeria':0, 'Morocco':7, 'Kenya':6, 'Ethiopia':4, 'G
  'Cote d\'Ivoire':2, 'Congo, Rep.':1, 'Tunisia':10} # building a dictionary for the countries
```

In [80]:

```
def plot(data, country_list=country):
    """
    Function to build line plots to show the trend over the years by country.
    """

    data = matrix_maker(data)


    col = {'Nigeria':'Black', 'Egypt':'Red', 'South Africa':'Blue', 'Algeria':'Green', 'Morocco':
           'Cote d\'Ivoire':'Magenta', 'Congo, Rep.':'Blue', 'Tunisia':'Green'}
    mark = {'Nigeria':'D', 'Egypt':'o', 'South Africa':'s', 'Algeria':'^', 'Morocco':'o', 'Kenya'
           'Cote d\'Ivoire':'^', 'Congo, Rep.':'D', 'Tunisia':'o'}
    plt.figure(figsize=(10,8))
    for country in country_list:
        plt.plot(data[d_country[country]], c=col[country], ls ='--', marker=mark[country], ms=5,


    plt.legend(loc='upper left', bbox_to_anchor=(1,1))

    plt.xticks(list(range(0,20)),season, rotation='vertical')
    plt.title('TREND')
    plt.show()
```

Analysis on **Primary School Girls Completion** Within The Africa

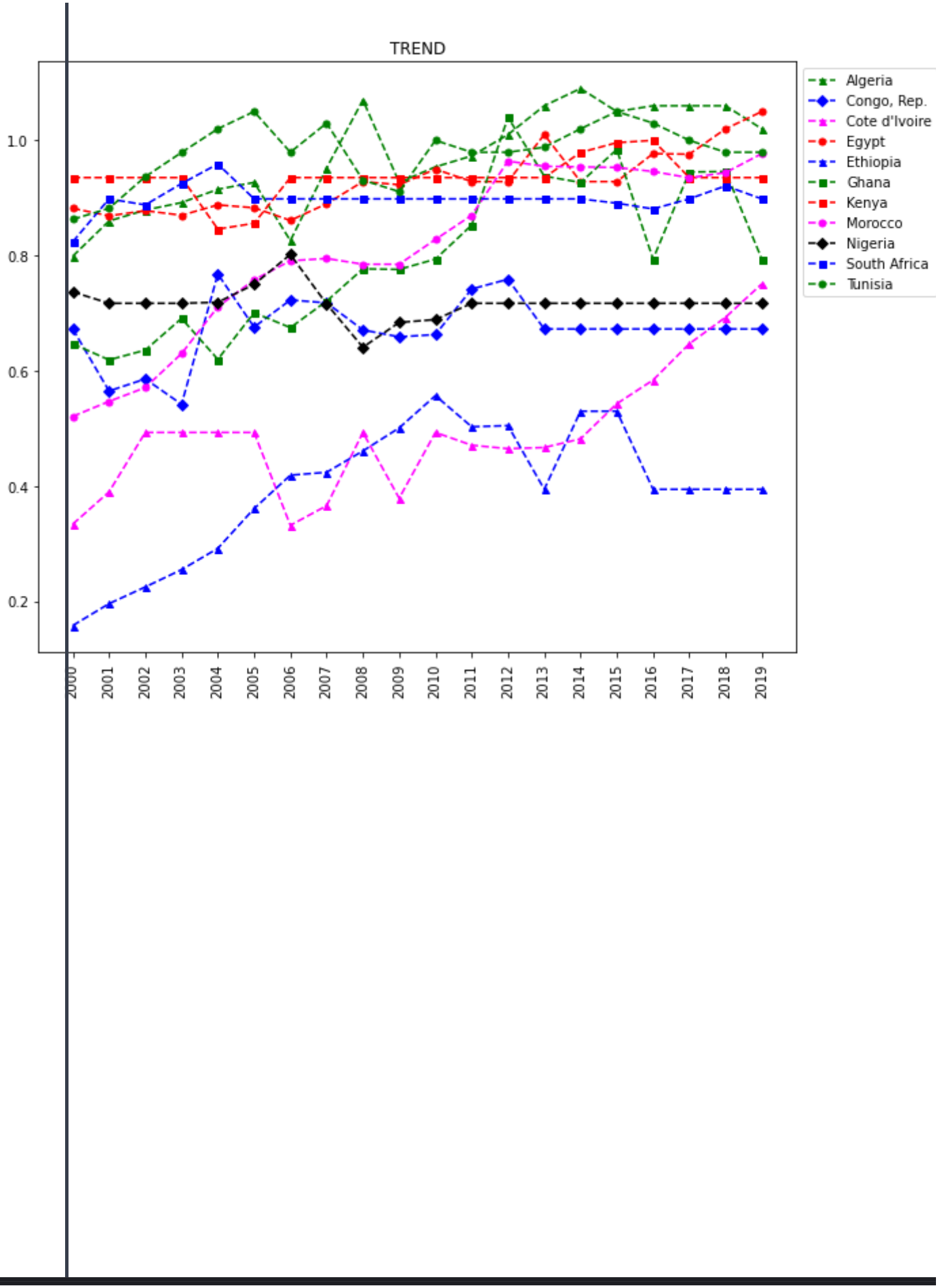
In [81]:

```
display_stats(pri_sch_girls_completion)
```

```
 A TABLE TO SHOW THE GENERAL MAXIMUM AND MINIMUM DISTRIBUTION BY AVERAGE ACROSS THE YEARS
                  Max    Min
 country
 Algeria        1.090  0.799
 Congo, Rep.    0.768  0.542
 Cote d'Ivoire  0.751  0.332
 Egypt          1.050  0.861
 Ethiopia       0.557  0.158
 Ghana          1.040  0.619
 Kenya          1.000  0.846
 Morocco        0.977  0.521
 Nigeria        0.802  0.641
 South Africa   0.959  0.824
 Tunisia        1.050  0.863

 MAXIMUM
  Algeria had the the highest overall average of 1.09

 MINIMUM
  Ethiopia had the lowest overall average of 0.158

 ------------------------------------------------------------------------


 THIS IS THE DISTRIBUTION OF MIN AND MAX AT 2019

 MINIMUM
 Ethiopia has the lowest average with 0.39

 MAXIMUM
 Egypt has the maximum average with 1.05
```

In [82]:

```
plot(pri_sch_girls_completion)
```



Analysis on **Primary School Boys Completion** Within The Africa

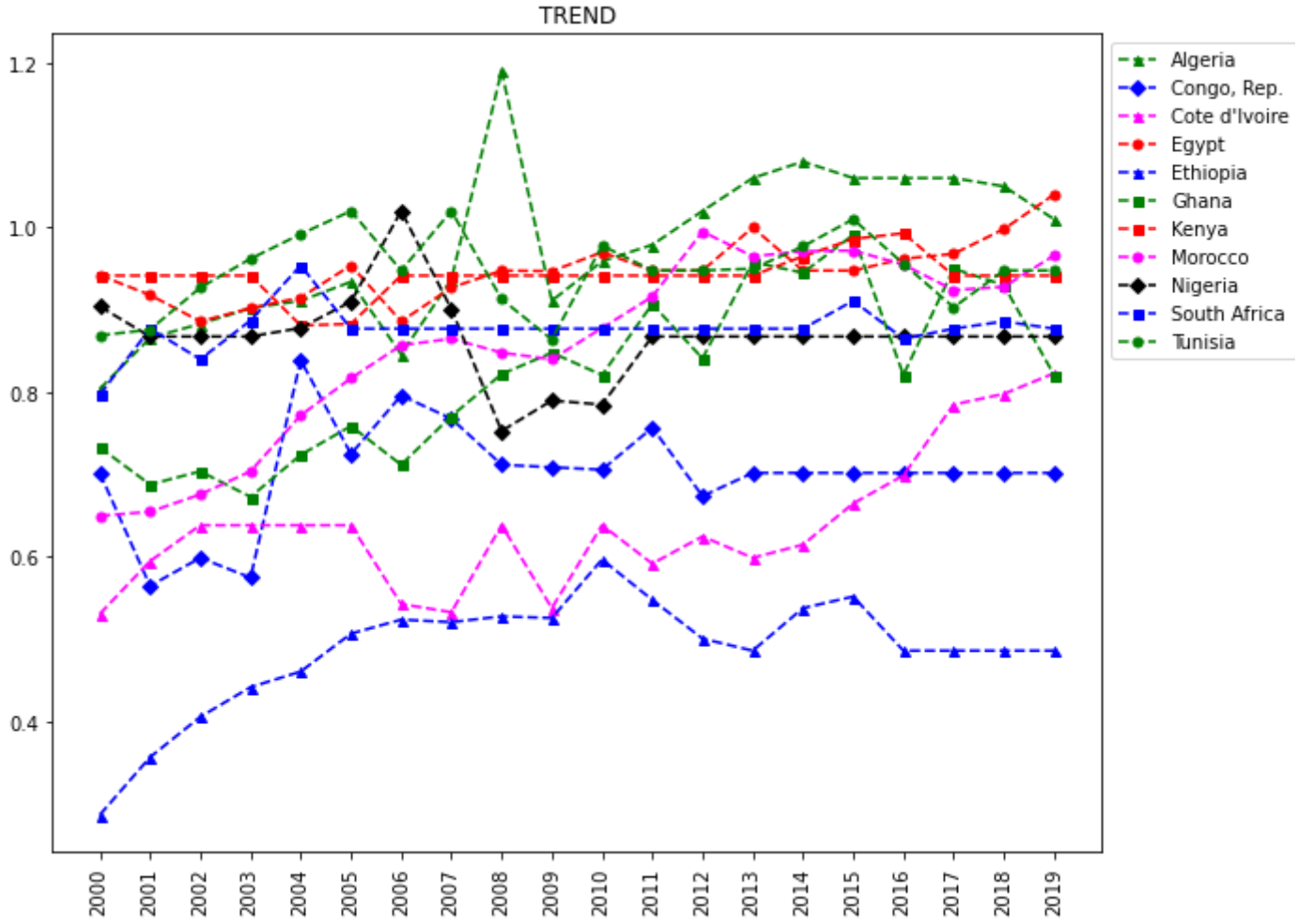
In [83]:

```
display_stats(pri_sch_boys_completion)
```

```
 A TABLE TO SHOW THE GENERAL MAXIMUM AND MINIMUM DISTRIBUTION BY AVERAGE ACROSS THE YEARS
                  Max    Min
 country
 Algeria        1.190  0.804
 Congo, Rep.    0.839  0.565
 Cote d'Ivoire  0.823  0.531
 Egypt          1.040  0.886
 Ethiopia       0.597  0.287
 Ghana          0.991  0.673
 Kenya          0.993  0.881
 Morocco        0.995  0.650
 Nigeria        1.020  0.753
 South Africa   0.954  0.797
 Tunisia        1.020  0.864

 MAXIMUM
  Algeria had the the highest overall average of 1.19

 MINIMUM
  Ethiopia had the lowest overall average of 0.287

 ------------------------------------------------------------------------


 THIS IS THE DISTRIBUTION OF MIN AND MAX AT 2019

 MINIMUM
 Ethiopia has the lowest average with 0.49

 MAXIMUM
 Egypt has the maximum average with 1.04
```

In [84]:

```
plot(pri_sch_boys_completion)
```



Analysis on **GDP Capital** Within The African Countries

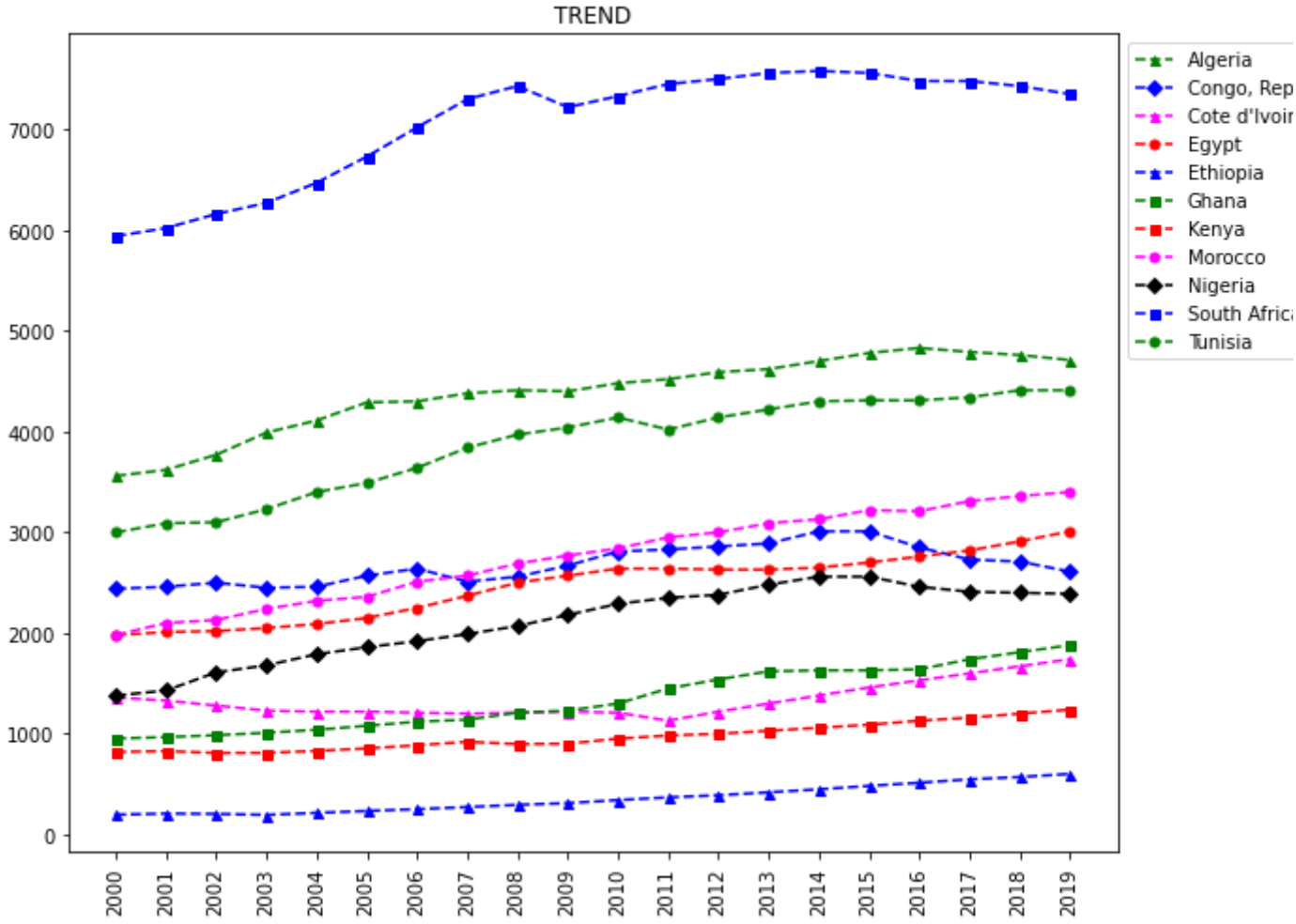
In [85]:

```
display_stats(gdp_capital)
```

```
 A TABLE TO SHOW THE GENERAL MAXIMUM AND MINIMUM DISTRIBUTION BY AVERAGE ACROSS THE YEARS
                    Max     Min
 country
 Algeria         4830.0  3560.0
 Congo, Rep.     3010.0  2440.0
 Cote d'Ivoire   1740.0  1130.0
 Egypt           3010.0  1980.0
 Ethiopia         602.0   195.0
 Ghana           1880.0   953.0
 Kenya           1240.0   810.0
 Morocco         3400.0  1980.0
 Nigeria         2560.0  1380.0
 South Africa    7580.0  5940.0
 Tunisia         4410.0  3000.0

 MAXIMUM
  South Africa had the the highest overall average of 7580.0

 MINIMUM
  Ethiopia had the lowest overall average of 195.0

 ----------------------------------------------------------------------


 THIS IS THE DISTRIBUTION OF MIN AND MAX AT 2019

 MINIMUM
 Ethiopia has the lowest average with 602.0

 MAXIMUM
 South Africa has the maximum average with 7350.0
```

In [86]:

```
plot(gdp_capital)
```



In [87]:

Analysis on **Life Expectancy** Within The African Countries

In [88]:

```
display_stats(life_expectancy)
```

```
 A TABLE TO SHOW THE GENERAL MAXIMUM AND MINIMUM DISTRIBUTION BY AVERAGE ACROSS THE YEARS
                Max   Min
 country
 Algeria        78.1  74.0
 Congo, Rep.    63.3  52.8
 Cote d'Ivoire  63.3  52.3
 Egypt          71.0  68.4
 Ethiopia       69.1  50.8
 Ghana          66.1  59.4
 Kenya          66.7  55.6
 Morocco        74.4  69.3
 Nigeria        65.2  55.2
 South Africa   66.9  52.0
 Tunisia        78.7  74.3

 MAXIMUM
  Tunisia had the the highest overall average of 78.7

 MINIMUM
  Ethiopia had the lowest overall average of 50.8

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 THIS IS THE DISTRIBUTION OF MIN AND MAX AT 2019

 MINIMUM
 Congo, Rep. has the lowest average with 63.3

 MAXIMUM
 Tunisia has the maximum average with 78.7
```
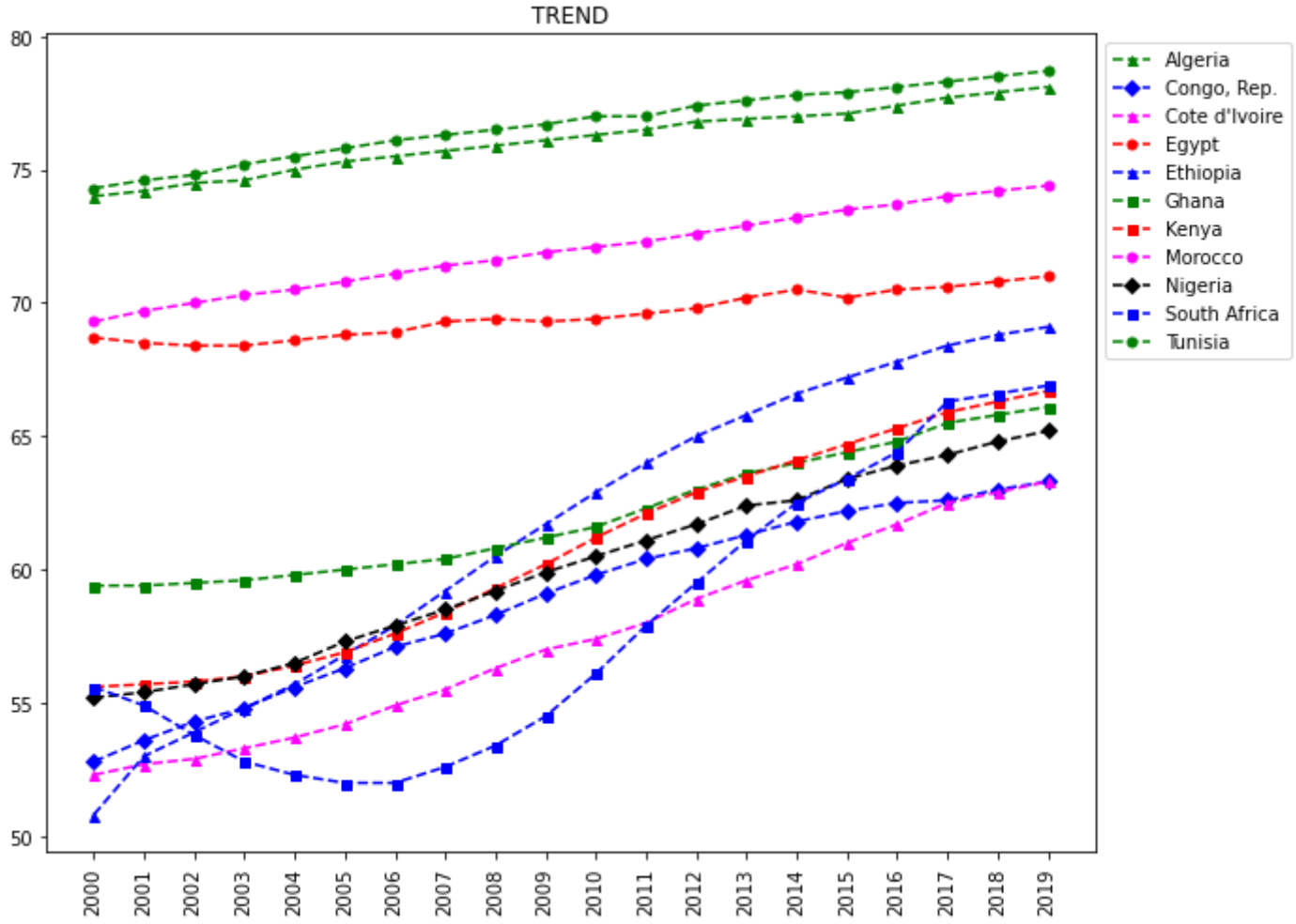

In [89]:

```
plot(life_expectancy)
```



In [90]:

```
### Analysis on **Employment** Within The African Countries
```

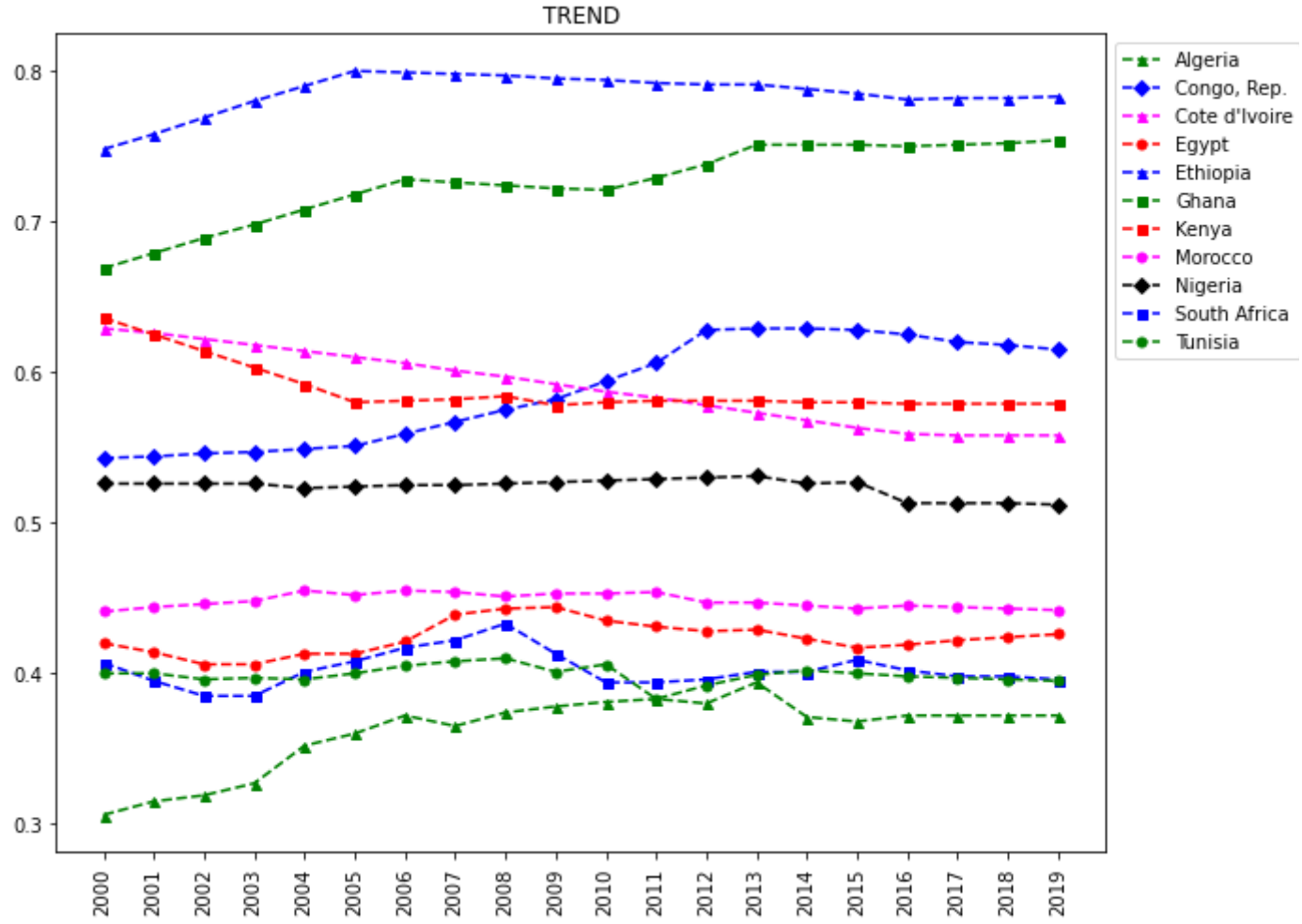
In [91]:

```
display_stats(employment)
```

```
 A TABLE TO SHOW THE GENERAL MAXIMUM AND MINIMUM DISTRIBUTION BY AVERAGE ACROSS THE YEARS
                  Max    Min
 country
 Algeria        0.394  0.306
 Congo, Rep.    0.629  0.543
 Cote d'Ivoire  0.629  0.558
 Egypt          0.444  0.406
 Ethiopia       0.800  0.748
 Ghana          0.754  0.669
 Kenya          0.636  0.578
 Morocco        0.455  0.441
 Nigeria        0.531  0.512
 South Africa   0.433  0.385
 Tunisia        0.410  0.383

 MAXIMUM
  Ethiopia had the the highest overall average of 0.8

 MINIMUM
  Algeria had the lowest overall average of 0.306

 ------------------------------------------------------------------------


 THIS IS THE DISTRIBUTION OF MIN AND MAX AT 2019

 MINIMUM
 Algeria has the lowest average with 0.37

 MAXIMUM
 Ethiopia has the maximum average with 0.7829999999999999
```

In [92]:

```
plot(employment)
```



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