Project: Investigate a Dataset - [TMDB-movies dataset]

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Introduction

Dataset Description

> Rounak Banik is a data scientist and machine learning engineer who created the TMDB-movies dataset. The dataset contains information about movies, including their titles, release dates, budgets, revenues, runtimes, genres, popularity, average ratings, and vote counts.

Question(s) for Analysis

> The Qusetion Analysis is baesd on my wonrding
> First Question is what are The Top 10 movie failed to make enough money at the box office to cover their costs. Secon Question How has the average budget for movies changed over the years. third Question What is the oldest movie with the highest popularity.

In [1]:
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
```

Data Wrangling

In [2]:
```
df=pd.read_csv('Database_TMDb_movie_data/tmdb-movies.csv')
df.head()
```

Out[2]:

	id	imdb_id	popularity	budget	revenue	original_title	cast	homepage	director	tagline	...	overview	runtime	genres	production_companies	release_date	vote_count	vote_average	release_year	budget_adj	
0	135397	tt0369610	32.985763	150000000	1513528810	Jurassic World	Chris Pratt|Bryce Dallas Howard|Irrfan Khan|Vi...	http://www.jurassicworld.com/	Colin Trevorrow	The park is open.	...	Twenty-two years after the events of Jurassic ...	124	Action|Adventure|Science Fiction|Thriller	Universal Studios|Amblin Entertainment|Legenda...	6/9/15	5562	6.5	2015	1.379999e+08	1
1	76341	tt1392190	28.419936	150000000	378436354	Mad Max: Fury Road	Tom Hardy|Charlize Theron|Hugh Keays-Byrne|Nic...	http://www.madmaxmovie.com/	George Miller	What a Lovely Day.	...	An apocalyptic story set in the furthest reach...	120	Action|Adventure|Science Fiction|Thriller	Village Roadshow Pictures|Kennedy Miller Produ...	5/13/15	6185	7.1	2015	1.379999e+08	3
2	262500	tt2908446	13.112507	110000000	295238201	Insurgent	Shailene Woodley|Theo James|Kate Winslet|Ansel...	http://www.thedivergentseries.movie/#insurgent	Robert Schwentke	One Choice Can Destroy You	...	Beatrice Prior must confront her inner demons ...	119	Adventure|Science Fiction|Thriller	Summit Entertainment|Mandeville Films|Red Wago...	3/18/15	2480	6.3	2015	1.012000e+08	2
3	140607	tt2488496	11.173104	200000000	2068178225	Star Wars: The Force Awakens	Harrison Ford|Mark Hamill|Carrie Fisher|Adam D...	http://www.starwars.com/films/star-wars-episod...	J.J. Abrams	Every generation has a story.	...	Thirty years after defeating the Galactic Empi...	136	Action|Adventure|Science Fiction|Fantasy	Lucasfilm|Truenorth Productions|Bad Robot	12/15/15	5292	7.5	2015	1.839999e+08	1
4	168259	tt2820852	9.335014	190000000	1506249360	Furious 7	Vin Diesel|Paul Walker|Jason Statham|Michelle ...	http://www.furious7.com/	James Wan	Vengeance Hits Home	...	Deckard Shaw seeks revenge against Dominic Tor...	137	Action|Crime|Thriller	Universal Pictures|Original Film|Media Rights ...	4/1/15	2947	7.3	2015	1.747999e+08	1

5 rows × 21 columns

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 10866 entries, 0 to 10865
Data columns (total 21 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   id                    10866 non-null  int64  
 1   imdb_id               10856 non-null  object 
 2   popularity            10866 non-null  float64
 3   budget                10866 non-null  int64  
 4   revenue               10866 non-null  int64  
 5   original_title        10866 non-null  object 
 6   cast                  10790 non-null  object 
 7   homepage              2936 non-null   object 
 8   director              10822 non-null  object 
 9   tagline               8042 non-null   object 
 10  keywords              9373 non-null   object 
 11  overview              10862 non-null  object 
 12  runtime               10866 non-null  int64  
 13  genres                10843 non-null  object 
 14  production_companies  9836 non-null   object 
 15  release_date          10866 non-null  object 
 16  vote_count            10866 non-null  int64  
 17  vote_average          10866 non-null  float64
 18  release_year          10866 non-null  int64  
 19  budget_adj            10866 non-null  float64
 20  revenue_adj           10866 non-null  float64
dtypes: float64(4), int64(6), object(11)
memory usage: 1.7+ MB
```

In [4]:
```
df.isnull().sum()
# imdb_id , cast ,homepage ,director,tagline,keywords,overview,genres,production_companies,
```

Out[4]:
```
id                         0
imdb_id                   10
popularity                 0
budget                     0
revenue                    0
original_title             0
cast                      76
homepage                7930
director                  44
tagline                 2824
keywords                1493
overview                   4
runtime                    0
genres                    23
production_companies    1030
release_date               0
vote_count                 0
vote_average               0
release_year               0
budget_adj                 0
revenue_adj                0
dtype: int64
```

In [5]:
```
df.describe()
```

Out[5]:

	id	popularity	budget	revenue	runtime	vote_count	vote_average	release_year	budget_adj	revenue_adj
count	10866.000000	10866.000000	1.086600e+04	1.086600e+04	10866.000000	10866.000000	10866.000000	10866.000000	1.086600e+04	1.086600e+04
mean	66064.177434	0.646441	1.462570e+07	3.982332e+07	102.070863	217.389748	5.974922	2001.322658	1.755104e+07	5.136436e+07
std	92130.136561	1.000185	3.091321e+07	1.170035e+08	31.381405	575.619058	0.935142	12.812941	3.430616e+07	1.446325e+08
min	5.000000	0.000065	0.000000e+00	0.000000e+00	0.000000	10.000000	1.500000	1960.000000	0.000000e+00	0.000000e+00
25%	10596.250000	0.207583	0.000000e+00	0.000000e+00	90.000000	17.000000	5.400000	1995.000000	0.000000e+00	0.000000e+00
50%	20669.000000	0.383856	0.000000e+00	0.000000e+00	99.000000	38.000000	6.000000	2006.000000	0.000000e+00	0.000000e+00
75%	75610.000000	0.713817	1.500000e+07	2.400000e+07	111.000000	145.750000	6.600000	2011.000000	2.085325e+07	3.369710e+07
max	417859.000000	32.985763	4.250000e+08	2.781506e+09	900.000000	9767.000000	9.200000	2015.000000	4.250000e+08	2.827124e+09

In [6]:
```
df.duplicated().sum()
```

Out[6]: 1

Data Cleaning

In [7]:
```
# reamove no nedd
df.drop(['imdb_id','homepage','tagline','overview','budget_adj','revenue_adj'],axis =1,inplace = True)
```

In [8]:
```
#change format
df['release_date']=pd.to_datetime(df['release_date'])
```

In [9]:
```
# Changing Release_date from string to datetime format, and change budget and revneue to integer
df['release_date'] = pd.to_datetime(df['release_date'])
df['budget'] = df['budget'].astype(int)
df['revenue'] = df['revenue'].astype(int)
df['popularity'] = df['popularity'].astype(int)
```

In [10]:
```
df.drop_duplicates(inplace=True)
```

In [11]:
```
df.shape
```

Out[11]: (10865, 15)

Exploratory Data Analysis

> **Tip**: Now that you've trimmed and cleaned your data, you're ready to move on to exploration. **Compute statistics** and **create visualizations** with the goal of addressing the research questions that you posed in the Introduction section. You should compute the relevant statistics throughout the analysis when an inference is made about the data. Note that at least two or more kinds of plots should be created as part of the exploration, and you must compare and show trends in the varied visualizations. Remember to utilize the visualizations that the pandas library already has available.

> **Tip**: Investigate the stated question(s) from multiple angles. It is recommended that you be systematic with your approach. Look at one variable at a time, and then follow it up by looking at relationships between variables. You should explore at least three variables in relation to the primary question. This can be an exploratory relationship between three variables of interest, or looking at how two independent variables relate to a single dependent variable of interest. Lastly, you should perform both single-variable (1d) and multiple-variable (2d) explorations.

Research Question 1 (Top 10 movie failed to make enough money at the box office to cover their costs !)

In [12]:
```
#Use this, and more code cells, to explore your data. Don't forget to add
#in order to find the profet I will Subtract the budget with the rene ans make a column
dfQ1=df
dfQ1['financial gain']=dfQ1['budget']-dfQ1['revenue']
dfQ1=dfQ1[['financial gain','original_title']]
```

In [13]:
```
dfQ1.groupby('original_title')
```

Out[13]: <pandas.core.groupby.generic.DataFrameGroupBy object at 0x7efe7bd328f0>

In [14]:
```
df_indexed = dfQ1.set_index('original_title')
```

In [15]:
```
df_indexed=df_indexed.sort_values(by='financial gain')
```

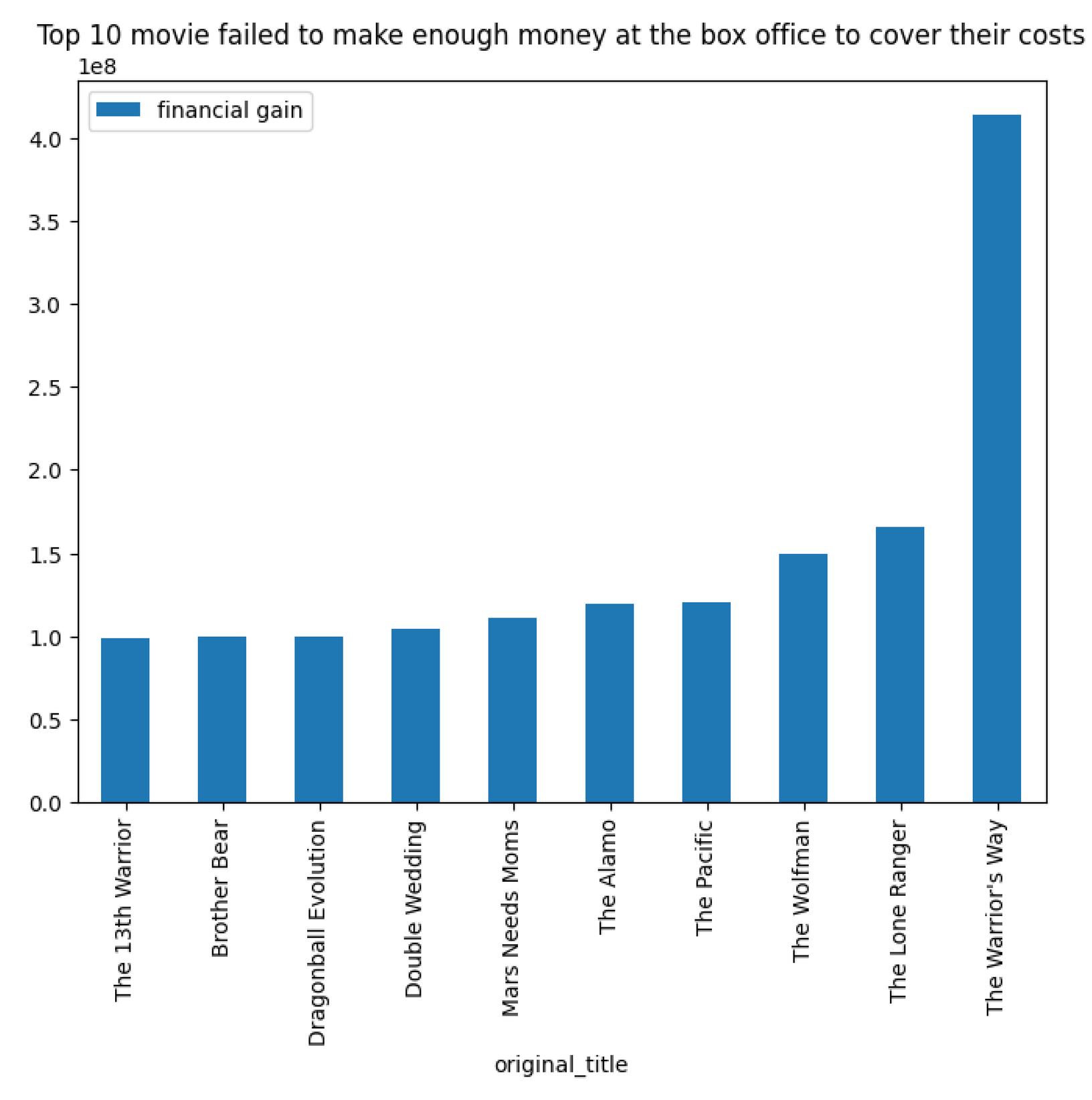
In [16]:
```
df_indexed=df_indexed.tail(10)
```

In [17]:
```
df_indexed
```

Out[17]:

original_title	financial gain
The 13th Warrior	98301101
Brother Bear	99999750
Dragonball Evolution	100000000
Double Wedding	104002432
Mars Needs Moms	111007242
The Alamo	119180039
The Pacific	120000000
The Wolfman	150000000
The Lone Ranger	165710090
The Warrior's Way	413912431

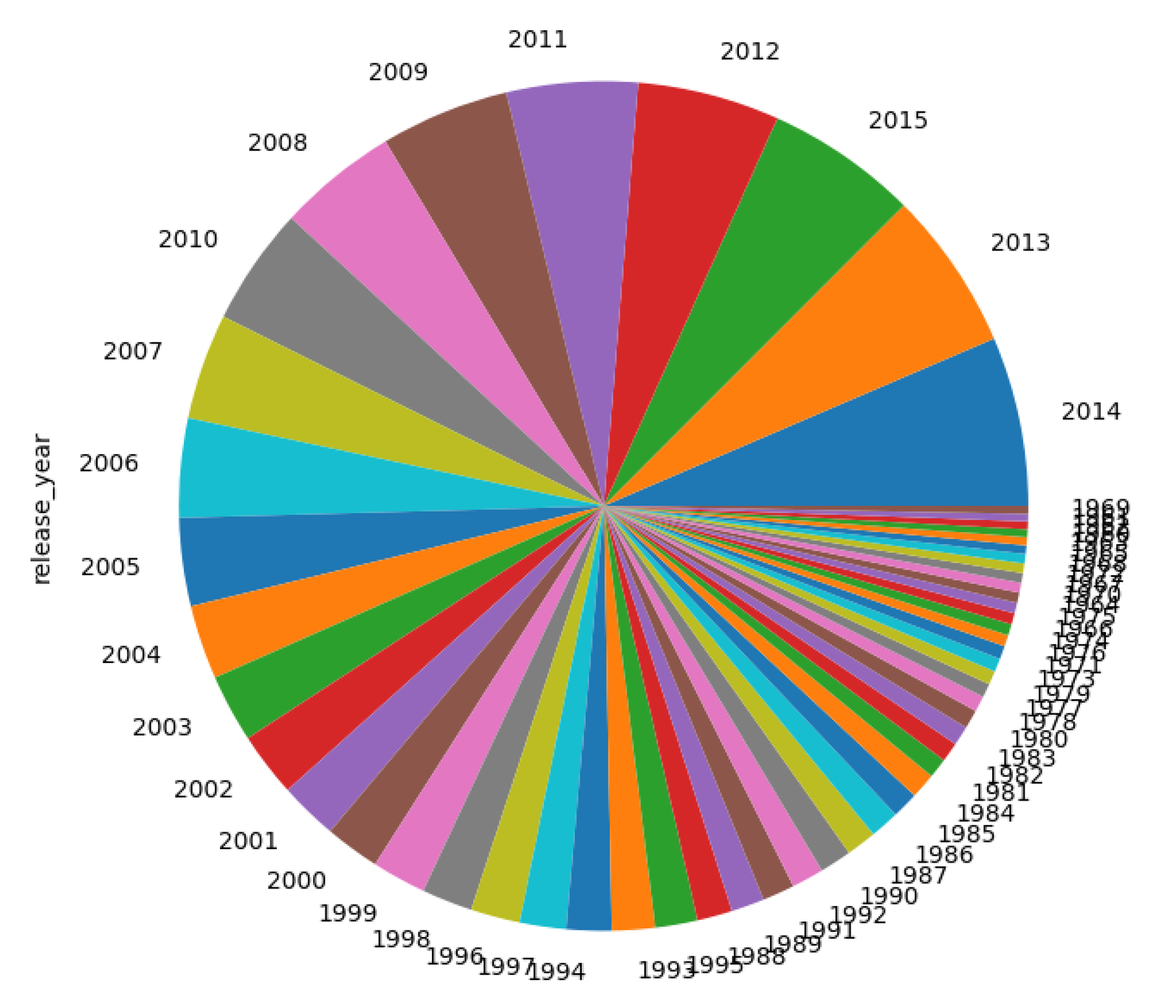
In [18]:
```
df_indexed.plot(kind ='bar',figsize=(8,6))
plt.title('Top 10 movie failed to make enough money at the box office to cover their costs');
```



Research Question 2 (How has the average budget for movies changed over the years!)

In [18]:
```
# Continue to explore the data to address your additional research
# bused on my investagion for the question "Top 10 movie failed to make enough money at the box office to cover their costs'
# are The Warrior's Way , The Lone Ranger , The Wolfman , The pacific , The Alamo , Mars Nedds Moms , Double Wedding Dragonball Evalution , Brother Bear ,The 13th Warrior
#
#   questions. Add more headers as needed if you have more questions to
#   investigate.
df['release_year'].value_counts().plot(kind = 'pie', figsize = (8,8))
#  60's,70's,80's,90's ,2005's 2010 , 2015 , 2014
```

Out[18]: <AxesSubplot: ylabel='release_year'>

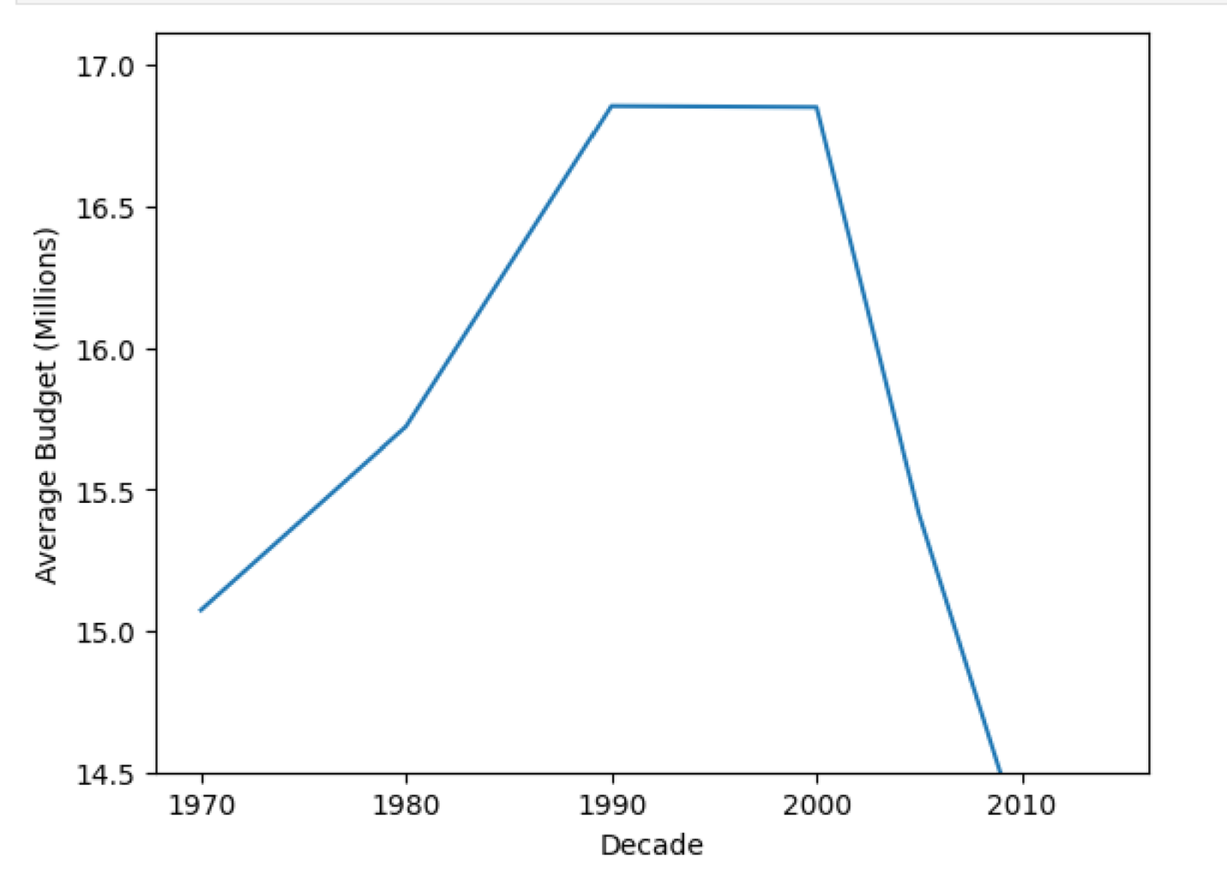


In [19]:
```
decades = [1970, 1980, 1990,2000,2005,2010,2014]
average_budgets_millions = []
for decade in decades:
    movies_in_decade = df[df["release_year"] >= decade]
    average_budgets_million = movies_in_decade["budget"].mean()/ 1000000
    average_budgets_millions.append(average_budgets_million)
```

In [20]:
```
average_budgets_millions
```

Out[20]:
```
[15.073279744073123,
 15.720803717658828,
 16.853934905172416,
 16.8499626402958,
 15.411396316221767,
 14.2590332221914,
 11.678357934537248]
```

In [21]:
```
plt.plot(decades,average_budgets_millions)
plt.xlabel("Decade")
plt.ylabel("Average Budget (Millions)")
plt.ylim(14.5, None)
plt.show()
```



Research Question 3 (What is the oldest movie with the highest popularity !)

In [22]:
```
dfQ3=df
# Find the oldest movie with the highest popularity
oldest_movie = dfQ3.loc[dfQ3["popularity"] == dfQ3["popularity"].max(), "release_year"].min()
```

In [23]:
```
# Print the title of the oldest movie
print(dfQ3.loc[dfQ3["release_year"] == oldest_movie, "original_title"].values[0])
```

```
Jurassic World
```

Conclusions

Answer of Research Question 1 :

> After I investigate at the datset I found that The Top 10 movie failed to make enough money at the box office to cover their costs are . Which is mean to find the Subtraction of bdguet and the revenw and Find the finnanaitl cost 1- The Warrior's Way 2- The Lone Ranger 3- The Wolfman 4- The pacific 5- The Alamo 6- Mars Nedds Moms 7- Double Wedding Dragonball Evalution 8- Brother Bear 9- The 13th Warrior

Answer of Research Question 2 :

> Then after I find the top movie who coudnt make a great funding I wondred what are how much the bdguet it decrese in each year or perd of time but Igusee that I have same logic error

Answer of Research Question 3 :

> Lastly what is th eoldet movie with the hisget popurlty? and It was Jurassic World

In [1]:
```
# Running this cell will execute a bash command to convert this notebook to an .html file
!python -m nbconvert --to html Investigate_a_Dataset.ipynb
```

```
[NbConvertApp] Converting notebook Investigate_a_Dataset.ipynb to html
[NbConvertApp] Writing 875662 bytes to Investigate_a_Dataset.html
```

In [ ]: