

In [18]:

```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from sklearn import preprocessing, svm
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
```

In [19]:

```
df=pd.read_csv(r"C:\Users\chila\Downloads\USA_Housing.csv")
df
```

Out[19]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael 674\nLau
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06	188 John Suite Kath
2	61287.067179	5.865890	8.512727	5.13	36882.159400	1.058988e+06	912 Stravenue\nE \
3	63345.240046	7.188236	5.586729	3.26	34310.242831	1.260617e+06	USS Barnet
4	59982.197226	5.040555	7.839388	4.23	26354.109472	6.309435e+05	USNS Raym
...	
4995	60567.944140	7.830362	6.137356	3.46	22837.361035	1.060194e+06	USNS Willi AP 3
4996	78491.275435	6.999135	6.576763	4.02	25616.115489	1.482618e+06	PSC 8489\nAPO
4997	63390.686886	7.250591	4.805081	2.13	33266.145490	1.030730e+06	4215 Tre Suite 076\nJi
4998	68001.331235	5.534388	7.130144	5.44	42625.620156	1.198657e+06	USS Wallace
4999	65510.581804	5.992305	6.792336	4.07	46501.283803	1.298950e+06	37778 Geo Apt. 509\n

5000 rows × 7 columns



In [20]:

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5000 entries, 0 to 4999
Data columns (total 7 columns):
#   Column                                Non-Null Count  Dtype
---  -
0   Avg. Area Income                      5000 non-null   float64
1   Avg. Area House Age                   5000 non-null   float64
2   Avg. Area Number of Rooms             5000 non-null   float64
3   Avg. Area Number of Bedrooms          5000 non-null   float64
4   Area Population                       5000 non-null   float64
5   Price                                 5000 non-null   float64
6   Address                               5000 non-null   object
dtypes: float64(6), object(1)
memory usage: 273.6+ KB
```

In [21]:

```
df.describe()
```

Out[21]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price
count	5000.000000	5000.000000	5000.000000	5000.000000	5000.000000	5.000000e+03
mean	68583.108984	5.977222	6.987792	3.981330	36163.516039	1.232073e+06
std	10657.991214	0.991456	1.005833	1.234137	9925.650114	3.531176e+05
min	17796.631190	2.644304	3.236194	2.000000	172.610686	1.593866e+04
25%	61480.562388	5.322283	6.299250	3.140000	29403.928702	9.975771e+05
50%	68804.286404	5.970429	7.002902	4.050000	36199.406689	1.232669e+06
75%	75783.338666	6.650808	7.665871	4.490000	42861.290769	1.471210e+06
max	107701.748378	9.519088	10.759588	6.500000	69621.713378	2.469066e+06

In [22]:

```
df.isna().any()
```

Out[22]:

```
Avg. Area Income      False
Avg. Area House Age   False
Avg. Area Number of Rooms  False
Avg. Area Number of Bedrooms False
Area Population        False
Price                  False
Address                False
dtype: bool
```

In [23]:

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

Out[23]:

```
Avg. Area Income      0
Avg. Area House Age   0
Avg. Area Number of Rooms  0
Avg. Area Number of Bedrooms  0
Area Population        0
Price                 0
Address               0
dtype: int64
```

In [24]:

```
df.head()
```

Out[24]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Address
0	79545.458574	5.682861	7.009188	4.09	23086.800503	1.059034e+06	208 Michael Fe 674\nLaurabi
1	79248.642455	6.002900	6.730821	3.09	40173.072174	1.505891e+06	188 Johnsor Suite 079 Kathleer
2	61287.067179	5.865890	8.512727	5.13	36882.159400	1.058988e+06	9127 Eli Stravenue\nDani WI 0
3	63345.240046	7.188236	5.586729	3.26	34310.242831	1.260617e+06	USS Barnett\nF
4	59982.197226	5.040555	7.839388	4.23	26354.109472	6.309435e+05	USNS Raymonc AE

In [25]:

```
df.tail()
```

Out[25]:

	Avg. Area Income	Avg. Area House Age	Avg. Area Number of Rooms	Avg. Area Number of Bedrooms	Area Population	Price	Add
4995	60567.944140	7.830362	6.137356	3.46	22837.361035	1.060194e+06	Williams\nAP 30153-
4996	78491.275435	6.999135	6.576763	4.02	25616.115489	1.482618e+06	PSC 9258,\n8489\nAP(\n42991-
4997	63390.686886	7.250591	4.805081	2.13	33266.145490	1.030730e+06	4215 T\nGarden \n076\nJoshua\nVA
4998	68001.331235	5.534388	7.130144	5.44	42625.620156	1.198657e+06	Wallace\nAE 7
4999	65510.581804	5.992305	6.792336	4.07	46501.283803	1.298950e+06	37778 Ge\nRidges\n509\nEast f\nNV

In [26]:

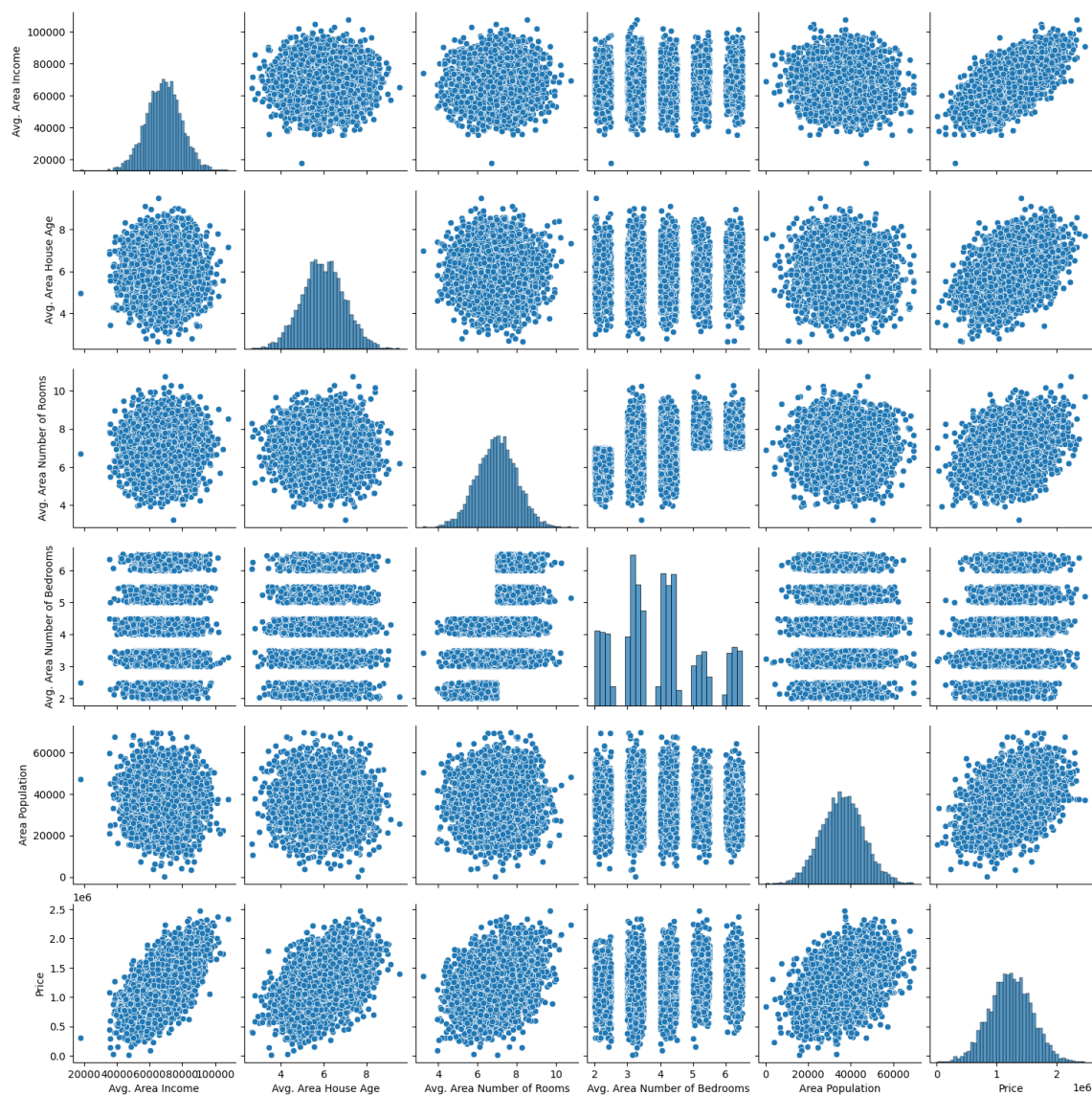
```
df.fillna(method='ffill',inplace=True)
```

In [27]:

```
sns.pairplot(df)
```

Out[27]:

<seaborn.axisgrid.PairGrid at 0x1d4e0e8b130>

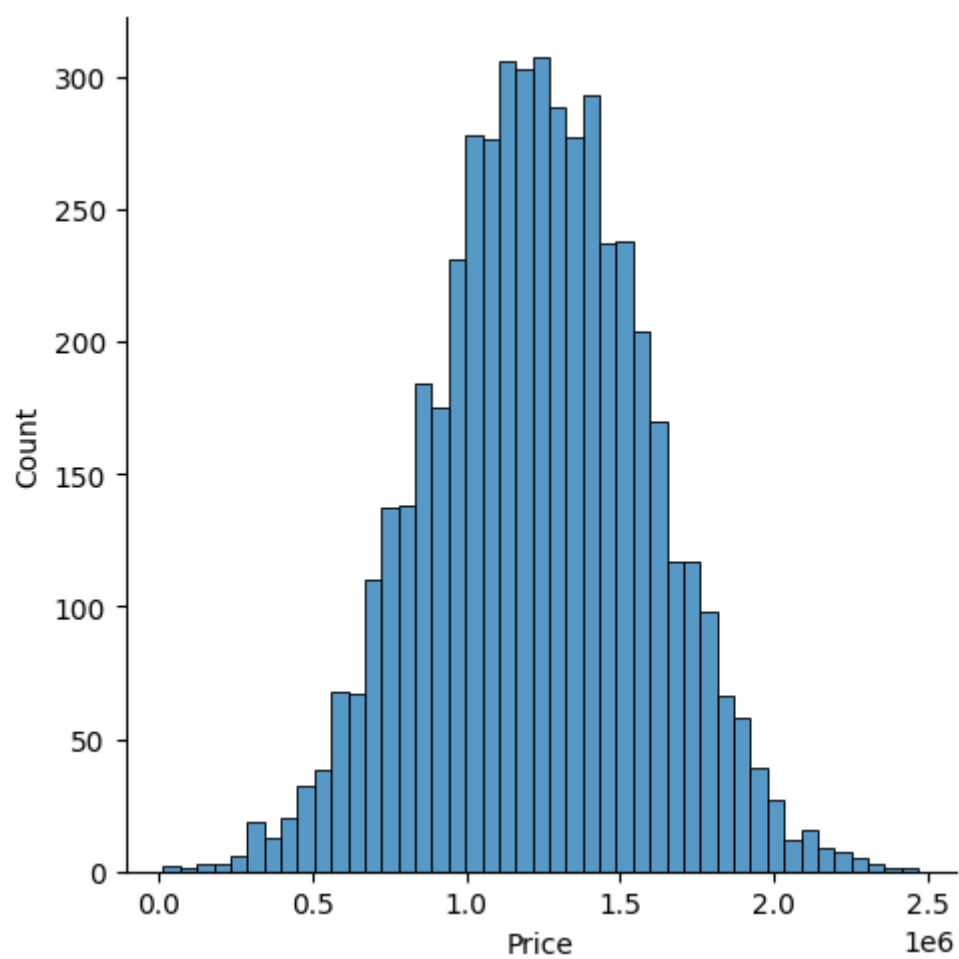


In [28]:

```
sns.displot(df['Price'])
```

Out[28]:

<seaborn.axisgrid.FacetGrid at 0x1d4f15df5e0>

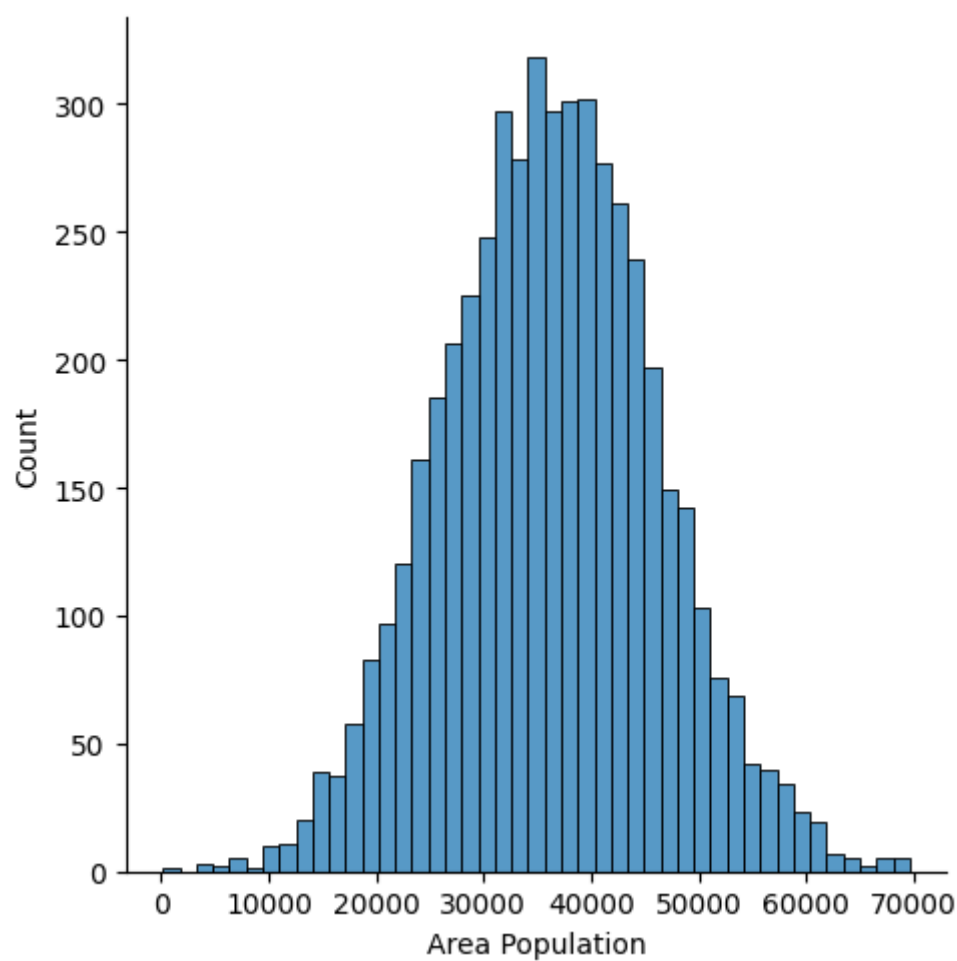


In [29]:

```
sns.displot(df['Area Population'])
```

Out[29]:

<seaborn.axisgrid.FacetGrid at 0x1d4f5e32a70>

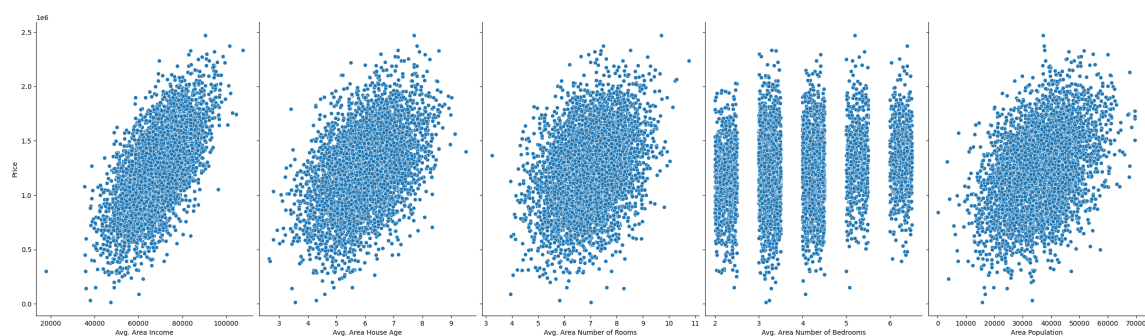


In [30]:

```
sns.pairplot(df, x_vars=['Avg. Area Income', 'Avg. Area House Age', 'Avg. Area Number of R
```

Out[30]:

<seaborn.axisgrid.PairGrid at 0x1d4f5eafc40>



In [31]:

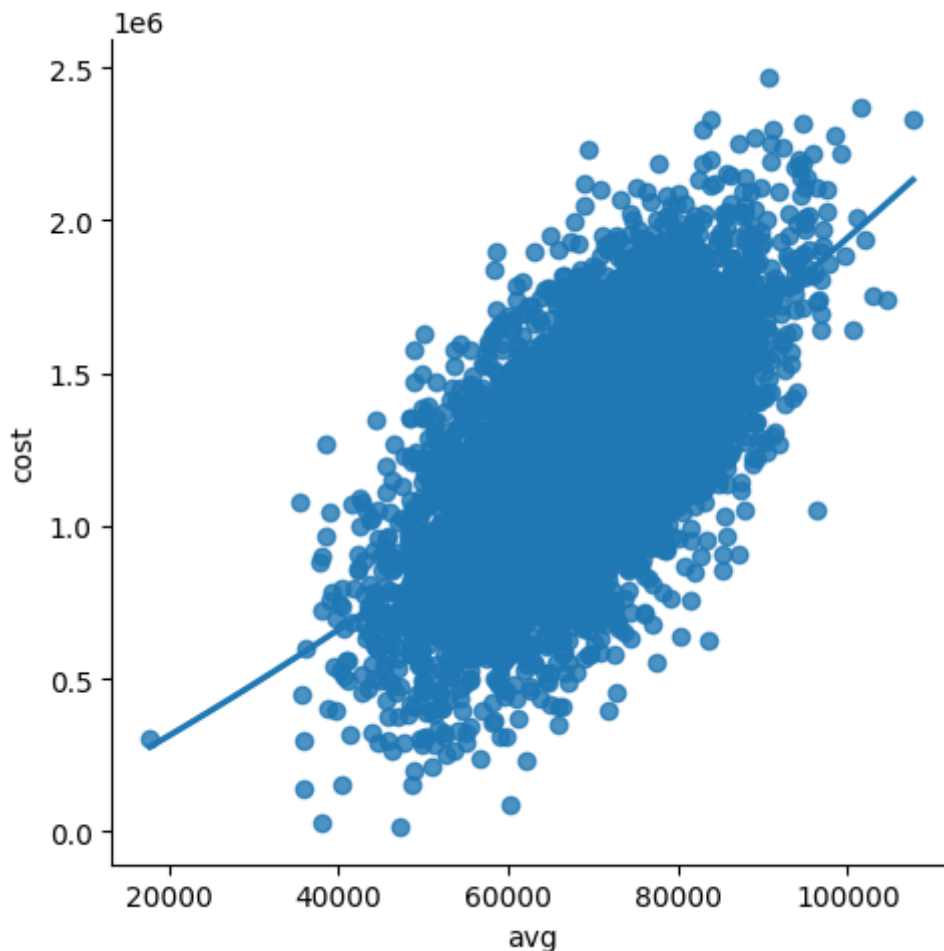
```
df=df[['Avg. Area Income','Price']]
df.columns=['avg','cost']
```

In [32]:

```
sns.lmplot(x='avg',y='cost',data=df,order=2,ci=None)
```

Out[32]:

<seaborn.axisgrid.FacetGrid at 0x1d4f6804550>



In [34]:

```
x=np.array(df['avg']).reshape(-1,1)
y=np.array(df['cost']).reshape(-1,1)
```

In [35]:

```
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.25)
regr=LinearRegression()
regr.fit(x_train,y_train)
print("Regression: ",regr.score(x_test,y_test))
```

Regression: 0.41802780615080537

In [36]:

```
df.dropna()
```

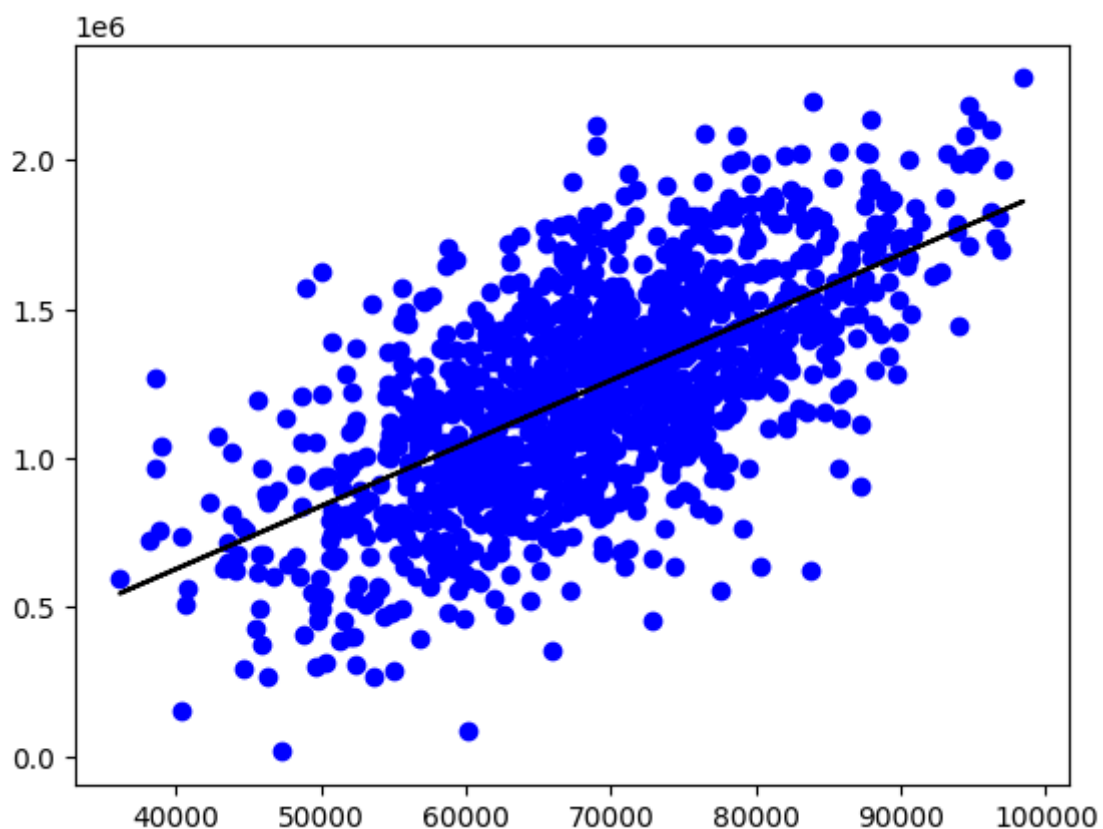
Out[36]:

	avg	cost
0	79545.458574	1.059034e+06
1	79248.642455	1.505891e+06
2	61287.067179	1.058988e+06
3	63345.240046	1.260617e+06
4	59982.197226	6.309435e+05
...
4995	60567.944140	1.060194e+06
4996	78491.275435	1.482618e+06
4997	63390.686886	1.030730e+06
4998	68001.331235	1.198657e+06
4999	65510.581804	1.298950e+06

5000 rows × 2 columns

In [37]:

```
y_pred=regr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_pred,color='k')
plt.show()
```

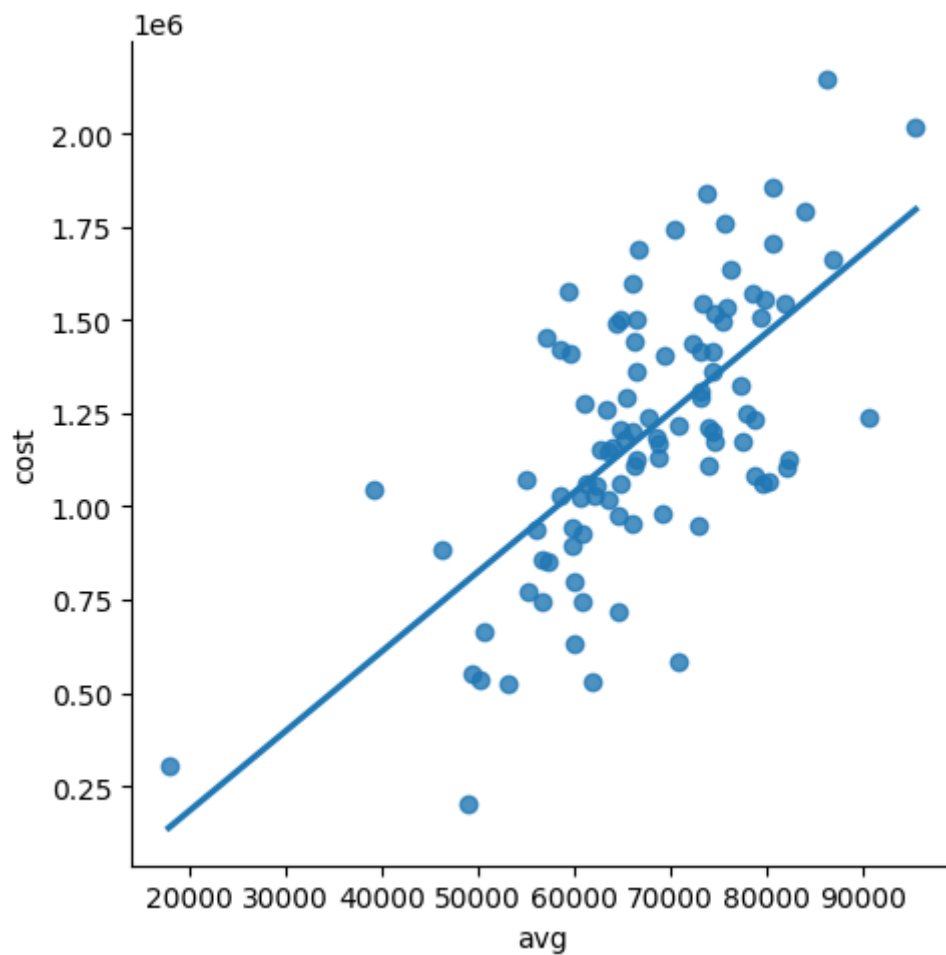


In [38]:

```
df100=df[:][:100]  
sns.lmplot(x='avg',y='cost',data=df100,order=1,ci=None)
```

Out[38]:

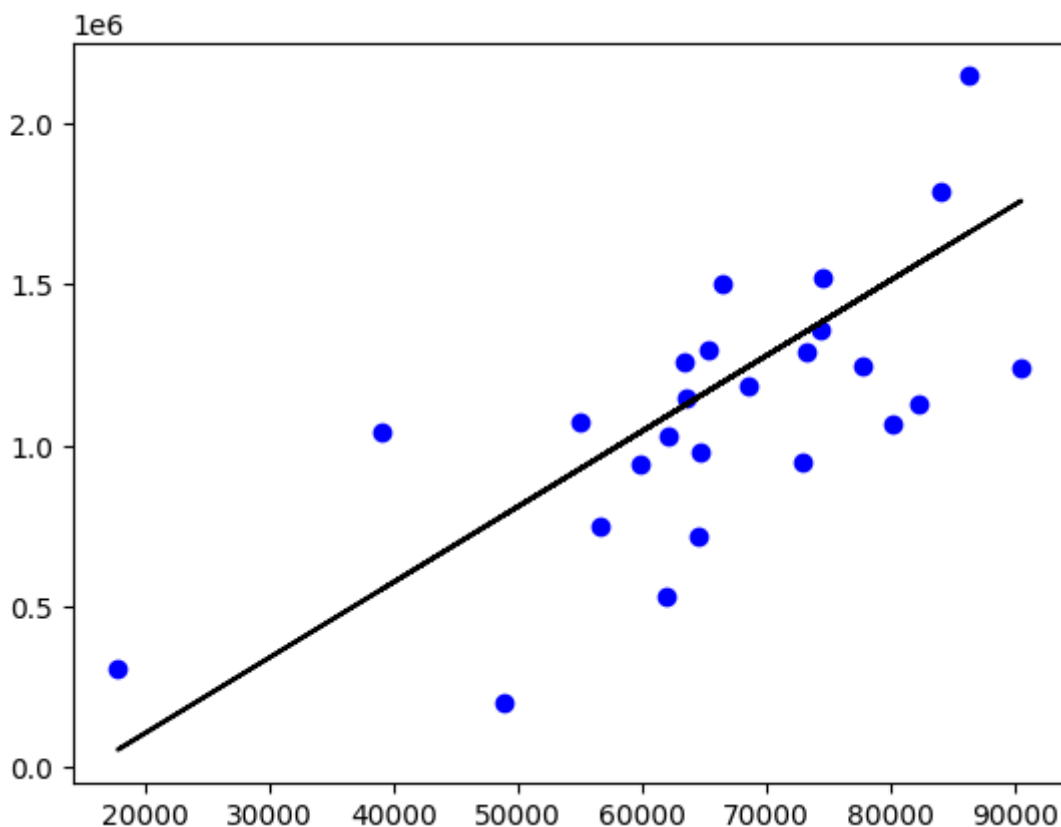
<seaborn.axisgrid.FacetGrid at 0x1d4f67a2f50>



In [39]:

```
df100.fillna(method='ffill',inplace=True)
x = np.array(df100['avg']).reshape(-1,1)
y = np.array(df100['cost']).reshape(-1,1)
df100.dropna(inplace=True)
x_train, x_test, y_train, y_test = train_test_split(x,y,test_size=0.25)
regr = LinearRegression()
regr.fit(x_train,y_train)
print("regression: ",regr.score(x_test,y_test))
y_pred = regr.predict(x_test)
plt.scatter(x_test,y_test,color='b')
plt.plot(x_test,y_pred,color='k')
plt.show()
```

regression: 0.39968917309103424



In [40]:

```
from sklearn.linear_model import LinearRegression
from sklearn.metrics import r2_score
model =LinearRegression()
model.fit(x_train,y_train)
y_pred=model.predict(x_test)
r2=r2_score(y_test,y_pred)
print("R2_Score: ",r2)
```

R2_Score: 0.39968917309103424

Conclusion:

the first 10 years of the 21st century, the number of articles published in the field of management education has increased by 100%.

Despite the growth in the number of articles published in the field of management education, the field has not been able to establish a strong theoretical foundation.

One of the reasons for this is that the field has been dominated by a small number of researchers who have focused on a narrow range of topics.

Another reason is that the field has been characterized by a lack of collaboration between researchers from different disciplines.

As a result, the field has been unable to develop a strong theoretical foundation that can guide research and practice.

In this article, we argue that the field of management education needs to develop a strong theoretical foundation that can guide research and practice.

We propose that this can be achieved by developing a theoretical framework that is grounded in the field's history and current research.

We also propose that this can be achieved by fostering collaboration between researchers from different disciplines.

Finally, we propose that this can be achieved by developing a strong theoretical foundation that can guide research and practice.

We believe that this is the only way to ensure that the field of management education is able to make a significant contribution to the field of management.

We hope that this article will stimulate discussion and debate about the need for a strong theoretical foundation in the field of management education.

We also hope that this article will encourage researchers to collaborate with each other and to develop a strong theoretical foundation that can guide research and practice.

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