

# Karnataka Elections

March 26, 2023

## 1 2018 Karnataka Assembly Elections Analysis

### 1.1 Import necessary libraries

```
[1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
```

```
[2]: df=pd.read_csv("kar.csv")
```

```
[3]: df
```

```
[3]:
```

	AC No.	AC Name	Winning Party	Winning Candidate \
0	1	Nippani	BJP	SHASHIKALA JOLLE
1	2	Chikkodi-Sadalga	INC	GANESH HUKKERI
2	3	Athani	INC	MAHESH IRANAGOUDA KUMATHALLI
3	4	Kagwad	INC	BALASAHEB PATIL
4	5	Kudachi	BJP	P RAJIV
..	...	...	...	...
219	220	T. Narasipur	JDS	ASHWIN KUMAR
220	221	Hanur	INC	R NARENDRA
221	222	Kollegal	OTHERS	N MAHESH
222	223	Chamarajanagar	INC	PUTTARANGA SHETTY
223	224	Gundlupet	BJP	C S NIRANJANKUMAR

	Winner Votes	Runner Up Party	Runner Up Candidate \
0	87,006	INC	KAKASO PANDURANG PATIL
1	91,467	BJP	ANNASAHEB SHANKAR JOLLE
2	82,094	BJP	LAXMAN SANGAPPA SAVADI
3	83,060	BJP	BHARAMAGOUDA ALAGOUDA KAGE
4	67,781	INC	AMIT SHAMA GHATAGE
..	...	...	...
219	83,929	INC	DR. H.C.MAHADEVAPPA
220	60,444	BJP	DR. PREETHAN NAGAPPA
221	71,792	INC	A.R. KRISHNA MURTHY
222	75,963	BJP	K R MALLIKARJUNAPPA
223	94,151	INC	M C MOHAN KUMARI URUF GEETHA

	Runner Up Votes	Voting Turnout %	Total Voters	Winning Margin \
0	78,500	81.19%	211,827	8,506
1	80,898	84.78%	210,480	10,569
2	79,763	80.67%	213,935	2,331
3	50,118	79.98%	181,486	32,942
4	52,773	75.86%	180,233	15,008
..	...	...	...	...
219	55,451	78.08%	198,434	28,478
220	56,931	81.61%	207,603	3,513
221	52,338	79.15%	211,522	19,454
222	71,050	80.41%	206,146	4,913
223	77,467	87.50%	205,616	16,684

	District Name
0	BELAGAVI
1	BELAGAVI
2	BELAGAVI
3	BELAGAVI
4	BELAGAVI
..	...
219	MYSORE
220	CHAMARAJNAGAR
221	CHAMARAJNAGAR
222	CHAMARAJNAGAR
223	CHAMARAJNAGAR

[224 rows x 12 columns]

## 2 Making the Data Ready for analysis

```
[4]: df.drop("AC No.",axis=1,inplace=True)
```

```
[5]: df
```

	AC Name	Winning Party	Winning Candidate \
0	Nippani	BJP	SHASHIKALA JOLLE
1	Chikkodi-Sadalga	INC	GANESH HUKKERI
2	Athani	INC	MAHESH IRANAGOUDA KUMATHALLI
3	Kagwad	INC	BALASAHEB PATIL
4	Kudachi	BJP	P RAJIV
..	...	...	...
219	T. Narasipur	JDS	ASHWIN KUMAR
220	Hanur	INC	R NARENDRA
221	Kollegal	OTHERS	N MAHESH
222	Chamarajanagar	INC	PUTTARANGA SHETTY

223	Gundlupet	BJP	C S NIRANJANKUMAR
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	Winner	Votes	Runner Up	Party	Runner Up Candidate \
0		87,006		INC	KAKASO PANDURANG PATIL
1		91,467		BJP	ANNASAHEB SHANKAR JOLLE
2		82,094		BJP	LAXMAN SANGAPPA SAVADI
3		83,060		BJP	BHARAMAGOUDA ALAGOUDA KAGE
4		67,781		INC	AMIT SHAMA GHATAGE
..		...		...	...
219		83,929		INC	DR. H.C.MAHADEVAPPA
220		60,444		BJP	DR. PREETHAN NAGAPPA
221		71,792		INC	A.R. KRISHNA MURTHY
222		75,963		BJP	K R MALLIKARJUNAPPA
223		94,151		INC	M C MOHAN KUMARI URUF GEETHA

	Runner Up	Votes	Voting Turnout %	Total Voters	Winning Margin \
0		78,500	81.19%	211,827	8,506
1		80,898	84.78%	210,480	10,569
2		79,763	80.67%	213,935	2,331
3		50,118	79.98%	181,486	32,942
4		52,773	75.86%	180,233	15,008
..		...	...	...	...
219		55,451	78.08%	198,434	28,478
220		56,931	81.61%	207,603	3,513
221		52,338	79.15%	211,522	19,454
222		71,050	80.41%	206,146	4,913
223		77,467	87.50%	205,616	16,684

	District Name
0	BELAGAVI
1	BELAGAVI
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3	BELAGAVI
4	BELAGAVI
..	...
219	MYSORE
220	CHAMARAJNAGAR
221	CHAMARAJNAGAR
222	CHAMARAJNAGAR
223	CHAMARAJNAGAR

[224 rows x 11 columns]

```
[6]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 224 entries, 0 to 223
```

Data columns (total 11 columns):

#	Column	Non-Null Count	Dtype
0	AC Name	224 non-null	object
1	Winning Party	224 non-null	object
2	Winning Candidate	224 non-null	object
3	Winner Votes	224 non-null	object
4	Runner Up Party	224 non-null	object
5	Runner Up Candidate	224 non-null	object
6	Runner Up Votes	224 non-null	object
7	Voting Turnout %	224 non-null	object
8	Total Voters	223 non-null	object
9	Winning Margin	224 non-null	object
10	District Name	224 non-null	object

dtypes: object(11)

memory usage: 19.4+ KB

```
[7]: df.isna().sum()
```

```
[7]: AC Name          0
     Winning Party    0
     Winning Candidate 0
     Winner Votes     0
     Runner Up Party  0
     Runner Up Candidate 0
     Runner Up Votes  0
     Voting Turnout %  0
     Total Voters     1
     Winning Margin    0
     District Name    0
     dtype: int64
```

```
[8]: lst=["Winner Votes","Runner Up Votes","Voting Turnout %","Total_
     ↪Voters","Winning Margin"]
     for i in lst:
         df[i]=df[i].str.replace(",","")
         df[i]=df[i].str.replace("%","")
```

```
[9]: df
```

```
[9]:      AC Name Winning Party Winning Candidate \
0      Nippani          BJP      SHASHIKALA JOLLE
1  Chikkodi-Sadalga        INC      GANESH HUKKERI
2      Athani          INC  MAHESH IRANAGOUDA KUMATHALLI
3      Kagwad          INC      BALASAHEB PATIL
4      Kudachi          BJP      P RAJIV
..      ...          ...          ...
```

219	T. Narasipur	JDS	ASHWIN KUMAR
220	Hanur	INC	R NARENDRA
221	Kollegal	OTHERS	N MAHESH
222	Chamarajanagar	INC	PUTTARANGA SHETTY
223	Gundlupet	BJP	C S NIRANJANKUMAR

	Winner	Votes	Runner Up	Party	Runner Up Candidate \
0		87006		INC	KAKASO PANDURANG PATIL
1		91467		BJP	ANNASAHEB SHANKAR JOLLE
2		82094		BJP	LAXMAN SANGAPPA SAVADI
3		83060		BJP	BHARAMAGOUDA ALAGOU DA KAGE
4		67781		INC	AMIT SHAMA GHATAGE
..		...		...	...
219		83929		INC	DR. H.C.MAHADEVAPPA
220		60444		BJP	DR. PREETHAN NAGAPPA
221		71792		INC	A.R. KRISHNA MURTHY
222		75963		BJP	K R MALLIKARJUNAPPA
223		94151		INC	M C MOHAN KUMARI URUF GEETHA

	Runner Up	Votes	Voting Turnout %	Total Voters	Winning Margin \
0		78500	81.19	211827	8506
1		80898	84.78	210480	10569
2		79763	80.67	213935	2331
3		50118	79.98	181486	32942
4		52773	75.86	180233	15008
..		...	...	...	...
219		55451	78.08	198434	28478
220		56931	81.61	207603	3513
221		52338	79.15	211522	19454
222		71050	80.41	206146	4913
223		77467	87.50	205616	16684

	District Name
0	BELAGAVI
1	BELAGAVI
2	BELAGAVI
3	BELAGAVI
4	BELAGAVI
..	...
219	MYSORE
220	CHAMARAJNAGAR
221	CHAMARAJNAGAR
222	CHAMARAJNAGAR
223	CHAMARAJNAGAR

[224 rows x 11 columns]

```
[10]: lst1=["Winner Votes","Runner Up Votes","Total Voters","Winning Margin"]
      for i in lst1:
          print(i+": "+str(df[i].str.isnumeric().sum()))
```

```
Winner Votes:222
Runner Up Votes:222
Total Voters:223
Winning Margin:222
```

```
[11]: df[~df["Winner Votes"].str.isnumeric()]
```

```
[11]:
```

	AC Name	Winning Party	Winning Candidate	Winner Votes	\
153	Rajarajeshwarinagar	-	-	-	
172	Jayanagar	-	-	-	

	Runner Up Party	Runner Up Candidate	Runner Up Votes	Voting Turnout %	\
153	-	-	-	-	
172	-	-	-	-	

	Total Voters	Winning Margin	District Name
153	471459	-	B.B.M.P (CENTRAL)
172	203184	-	B.B.M.P(SOUTH)

```
[12]: df=df.drop(index=[153,172],axis=0)
```

```
[13]: df
```

```
[13]:
```

	AC Name	Winning Party	Winning Candidate	\
0	Nippani	BJP	SHASHIKALA JOLLE	
1	Chikkodi-Sadalga	INC	GANESH HUKKERI	
2	Athani	INC	MAHESH IRANAGOUDA KUMATHALLI	
3	Kagwad	INC	BALASAHEB PATIL	
4	Kudachi	BJP	P RAJIV	
..	...	...	...	
219	T. Narasipur	JDS	ASHWIN KUMAR	
220	Hanur	INC	R NARENDRA	
221	Kollegal	OTHERS	N MAHESH	
222	Chamarajanagar	INC	PUTTARANGA SHETTY	
223	Gundlupet	BJP	C S NIRANJANKUMAR	

	Winner Votes	Runner Up Party	Runner Up Candidate	\
0	87006	INC	KAKASO PANDURANG PATIL	
1	91467	BJP	ANNASAHEB SHANKAR JOLLE	
2	82094	BJP	LAXMAN SANGAPPA SAVADI	
3	83060	BJP	BHARAMAGOUDA ALAGOUDA KAGE	
4	67781	INC	AMIT SHAMA GHATAGE	
..	...	...	...	

219	83929	INC	DR. H.C.MAHADEVAPPA
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222	75963	BJP	K R MALLIKARJUNAPPA
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	Runner Up Votes	Voting Turnout %	Total Voters	Winning Margin \
0	78500	81.19	211827	8506
1	80898	84.78	210480	10569
2	79763	80.67	213935	2331
3	50118	79.98	181486	32942
4	52773	75.86	180233	15008
..	...	...	...	...
219	55451	78.08	198434	28478
220	56931	81.61	207603	3513
221	52338	79.15	211522	19454
222	71050	80.41	206146	4913
223	77467	87.50	205616	16684

	District Name
0	BELAGAVI
1	BELAGAVI
2	BELAGAVI
3	BELAGAVI
4	BELAGAVI
..	...
219	MYSORE
220	CHAMARAJNAGAR
221	CHAMARAJNAGAR
222	CHAMARAJNAGAR
223	CHAMARAJNAGAR

[222 rows x 11 columns]

```
[14]: lst1=["Winner Votes","Runner Up Votes","Total Voters","Winning Margin"]
      for i in lst1:
          print(i+": "+str(df[i].str.isnumeric().sum()))
```

Winner Votes:222  
 Runner Up Votes:222  
 Total Voters:221  
 Winning Margin:222

```
[15]: df['Total Voters'].isna().sum()
```

```
[15]: 1
```

```
[16]: df=df.dropna()
```

```
[17]: df
```

```
[17]:
```

	AC Name	Winning Party	Winning Candidate \
0	Nippani	BJP	SHASHIKALA JOLLE
1	Chikkodi-Sadalga	INC	GANESH HUKKERI
2	Athani	INC	MAHESH IRANAGOUDA KUMATHALLI
3	Kagwad	INC	BALASAHEB PATIL
4	Kudachi	BJP	P RAJIV
..	...	...	...
219	T. Narasipur	JDS	ASHWIN KUMAR
220	Hanur	INC	R NARENDRA
221	Kollegal	OTHERS	N MAHESH
222	Chamarajanagar	INC	PUTTARANGA SHETTY
223	Gundlupet	BJP	C S NIRANJANKUMAR

	Winner Votes	Runner Up Party	Runner Up Candidate \
0	87006	INC	KAKASO PANDURANG PATIL
1	91467	BJP	ANNASAHEB SHANKAR JOLLE
2	82094	BJP	LAXMAN SANGAPPA SAVADI
3	83060	BJP	BHARAMAGOUDA ALAGOUDA KAGE
4	67781	INC	AMIT SHAMA GHATAGE
..	...	...	...
219	83929	INC	DR. H.C.MAHADEVAPPA
220	60444	BJP	DR. PREETHAN NAGAPPA
221	71792	INC	A.R. KRISHNA MURTHY
222	75963	BJP	K R MALLIKARJUNAPPA
223	94151	INC	M C MOHAN KUMARI URUF GEETHA

	Runner Up Votes	Voting Turnout %	Total Voters	Winning Margin \
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1	80898	84.78	210480	10569
2	79763	80.67	213935	2331
3	50118	79.98	181486	32942
4	52773	75.86	180233	15008
..	...	...	...	...
219	55451	78.08	198434	28478
220	56931	81.61	207603	3513
221	52338	79.15	211522	19454
222	71050	80.41	206146	4913
223	77467	87.50	205616	16684

	District Name
0	BELAGAVI
1	BELAGAVI
2	BELAGAVI



```

3          BELAGAVI
4          BELAGAVI
..          ...
219         MYSORE
220  CHAMARAJNAGAR
221  CHAMARAJNAGAR
222  CHAMARAJNAGAR
223  CHAMARAJNAGAR

```

[221 rows x 11 columns]

```

[18]: lst1=["Winner Votes","Runner Up Votes","Total Voters","Winning Margin"]
      for i in lst1:
          df[i]=df[i].astype(int)

```

/tmp/ipykernel\_102/26254697.py:3: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame.  
Try using `.loc[row_indexer,col_indexer] = value` instead

See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user\\_guide/indexing.html#returning-a-view-versus-a-copy](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)  
df[i]=df[i].astype(int)

```

[19]: df.info()

```

```

<class 'pandas.core.frame.DataFrame'>
Int64Index: 221 entries, 0 to 223
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype
---  -
 0   AC Name                221 non-null   object
 1   Winning Party          221 non-null   object
 2   Winning Candidate      221 non-null   object
 3   Winner Votes           221 non-null   int64
 4   Runner Up Party        221 non-null   object
 5   Runner Up Candidate    221 non-null   object
 6   Runner Up Votes        221 non-null   int64
 7   Voting Turnout %       221 non-null   object
 8   Total Voters           221 non-null   int64
 9   Winning Margin         221 non-null   int64
10   District Name          221 non-null   object
dtypes: int64(4), object(7)
memory usage: 20.7+ KB

```

```

[20]: df["Voting Turnout %"]=df["Voting Turnout %"].astype(float)

```

/tmp/ipykernel\_102/2805306349.py:1: SettingWithCopyWarning:  
A value is trying to be set on a copy of a slice from a DataFrame.

Try using `.loc[row_indexer,col_indexer] = value` instead

See the caveats in the documentation: [https://pandas.pydata.org/pandas-docs/stable/user\\_guide/indexing.html#returning-a-view-versus-a-copy](https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)

```
df["Voting Turnout %"]=df["Voting Turnout %"].astype(float)
```

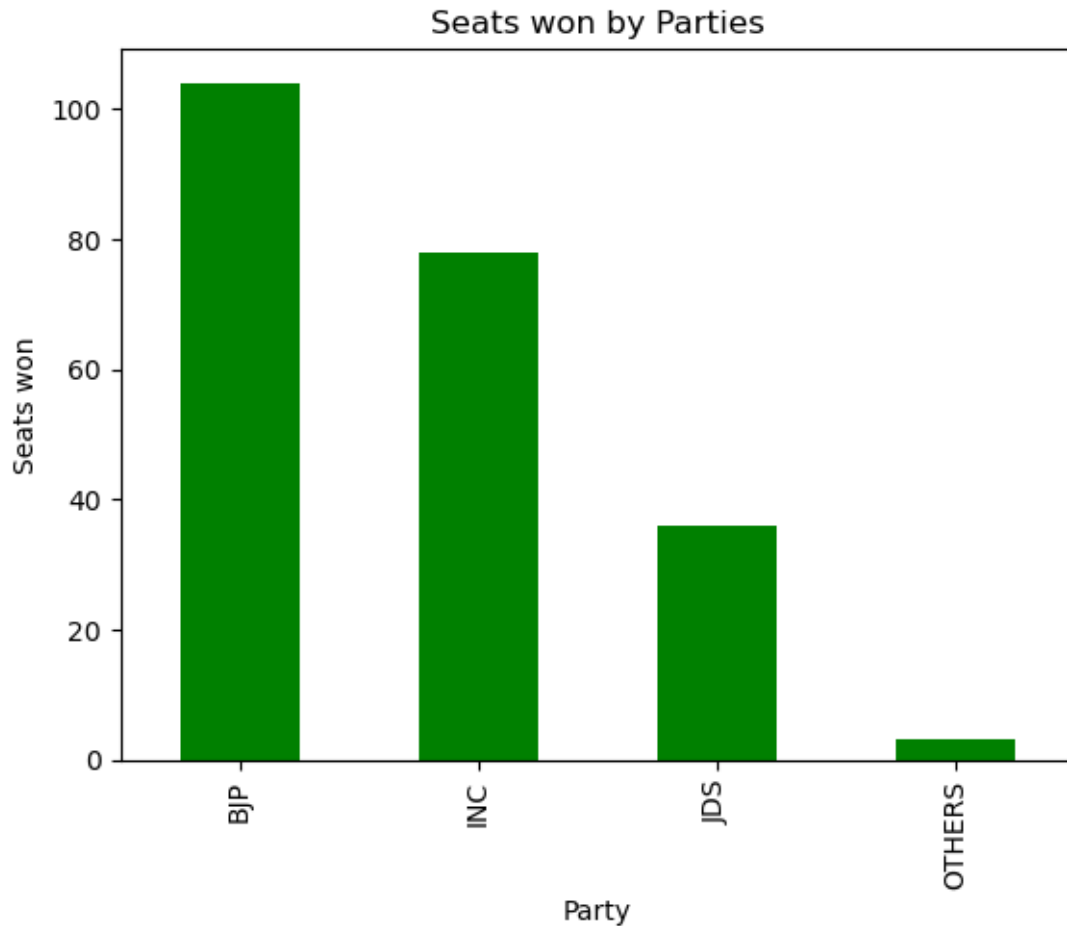
```
[21]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 221 entries, 0 to 223
Data columns (total 11 columns):
 #   Column                Non-Null Count  Dtype
---  -
 0   AC Name                221 non-null   object
 1   Winning Party          221 non-null   object
 2   Winning Candidate      221 non-null   object
 3   Winner Votes           221 non-null   int64
 4   Runner Up Party        221 non-null   object
 5   Runner Up Candidate    221 non-null   object
 6   Runner Up Votes        221 non-null   int64
 7   Voting Turnout %       221 non-null   float64
 8   Total Voters           221 non-null   int64
 9   Winning Margin         221 non-null   int64
10   District Name          221 non-null   object
dtypes: float64(1), int64(4), object(6)
memory usage: 20.7+ KB
```

### 3 Visualization

```
[56]: df["Winning Party"].value_counts().plot(kind="bar",color="g")
plt.xlabel("Party")
plt.ylabel("Seats won")
plt.title("Seats won by Parties")
```

```
[56]: Text(0.5, 1.0, 'Seats won by Parties')
```



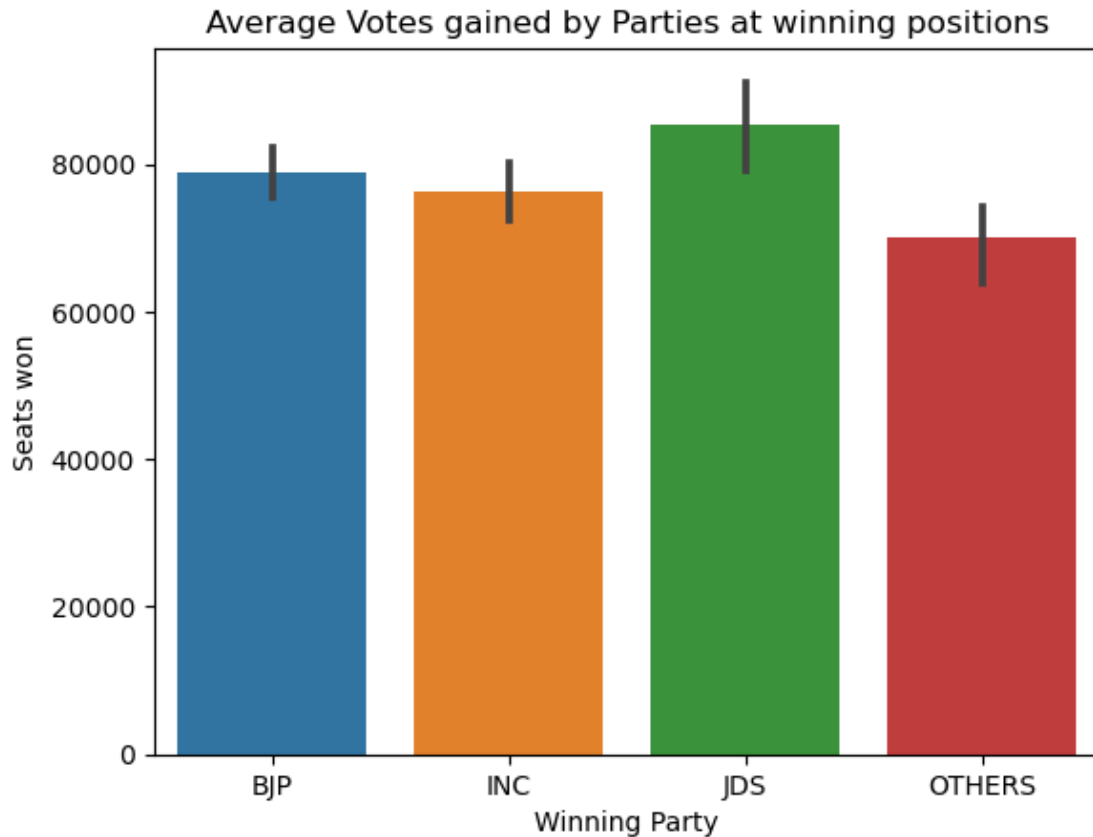
## 4 Observations:

4.1 BJP won most number of seats, but didn't have magic figure.

4.2 Jds plays crucial role to form government.

```
[23]: sns.barplot(x=df["Winning Party"],y=df["Winner Votes"])  
plt.xlabel("Winning Party")  
plt.ylabel("Seats won")  
plt.title("Seats won by Parties")  
plt.title("Average Votes gained by Parties at winning positions")
```

```
[23]: Text(0.5, 1.0, 'Average Votes gained by Parties at winning positions')
```

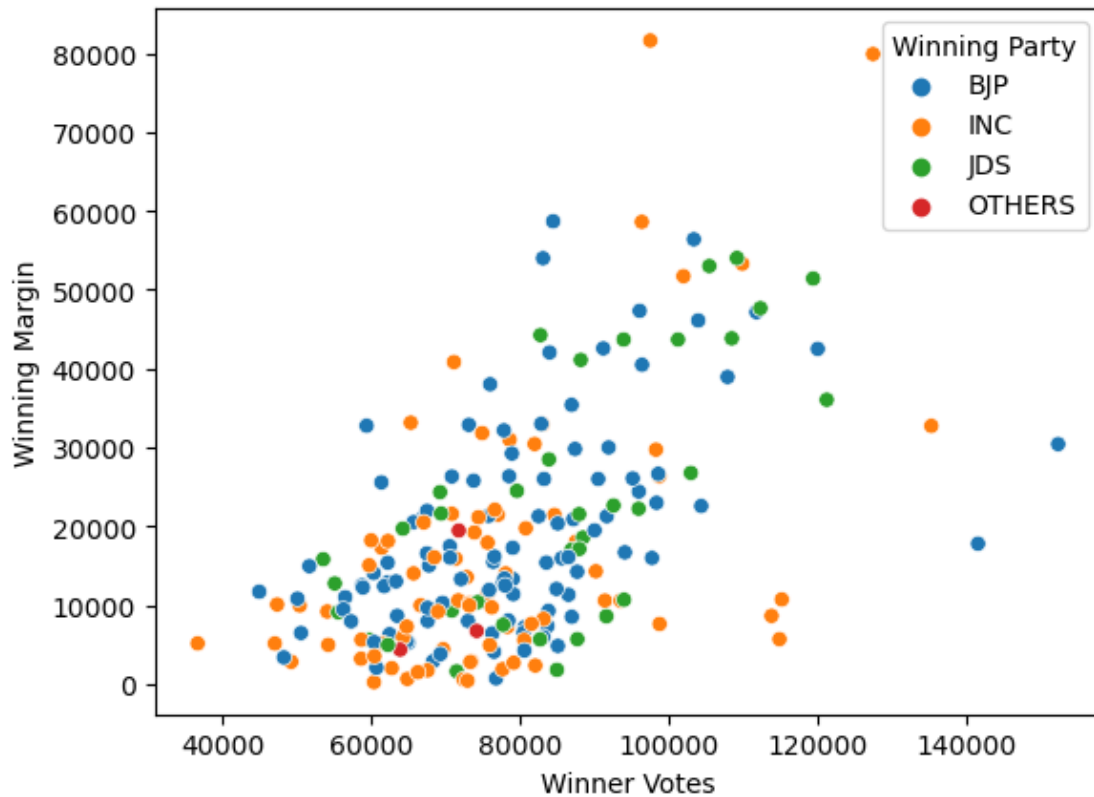


## 5 Observations

- 5.1 JDS got more number of votes in their winning seats. That implies although they won less seats, they have more grip on voters in the places which they had own

```
[24]: sns.scatterplot(x=df["Winner Votes"],y=df["Winning Margin"],hue=df["Winning_Party"])
```

```
[24]: <AxesSubplot: xlabel='Winner Votes', ylabel='Winning Margin'>
```



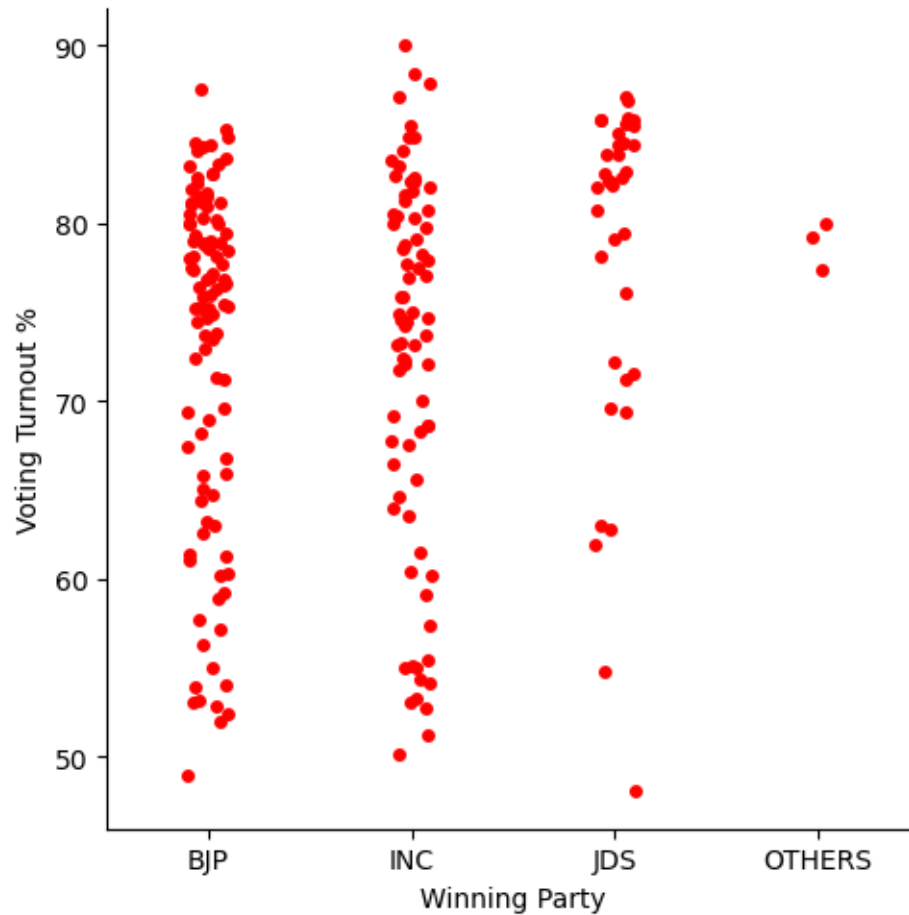
## 6 Observation:

6.1 INC won most seats with below 25k margin

6.2 But JDS and BJP won reasonable seats from 30k to 60k margins.

```
[54]: sns.catplot(x=df["Winning Party"],y=df["Voting Turnout %"],color="r")
```

```
[54]: <seaborn.axisgrid.FacetGrid at 0x7f46bbe1a0e0>
```



## 7 Observations:

7.1 Others own 3 seats, that too only when Voting Turnout is more than 75%

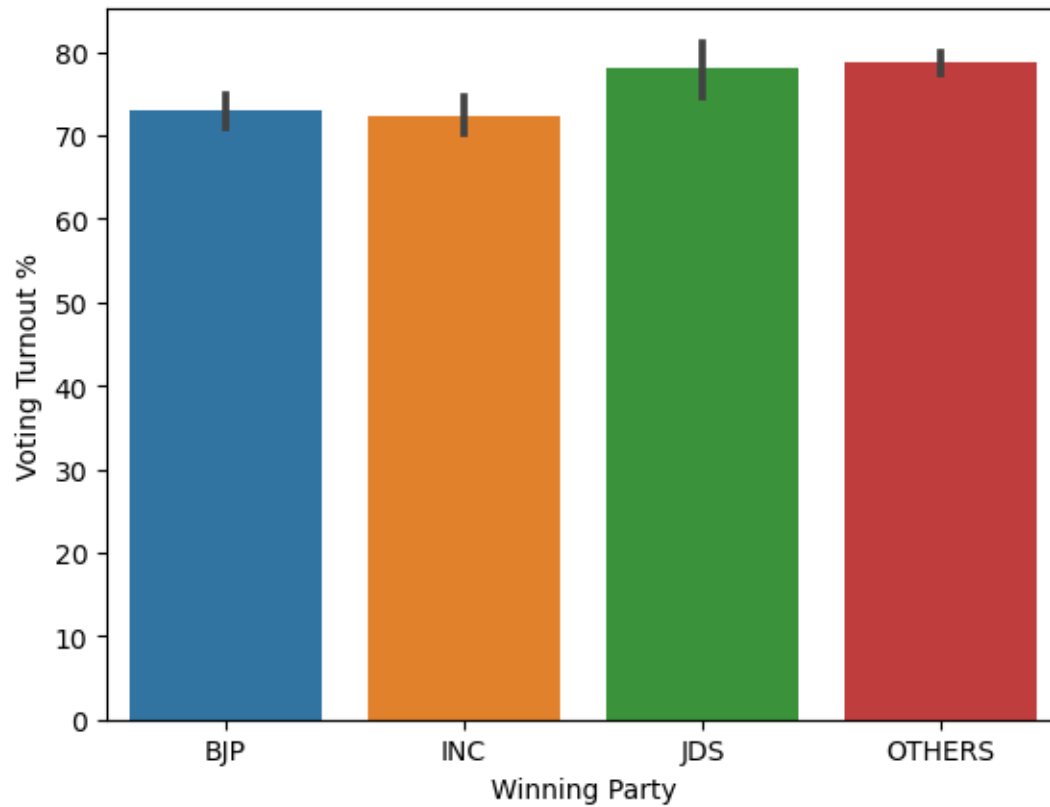
7.2 JDS also own most seats when Turnout is more than 75% only

7.3 When Turnout is below 60%, BJP and INC won most seats

7.4 BJP won most seats if Turnout is between 75 and 85

```
[26]: sns.barplot(x=df["Winning Party"],y=df["Voting Turnout %"])
```

```
[26]: <AxesSubplot: xlabel='Winning Party', ylabel='Voting Turnout %'>
```

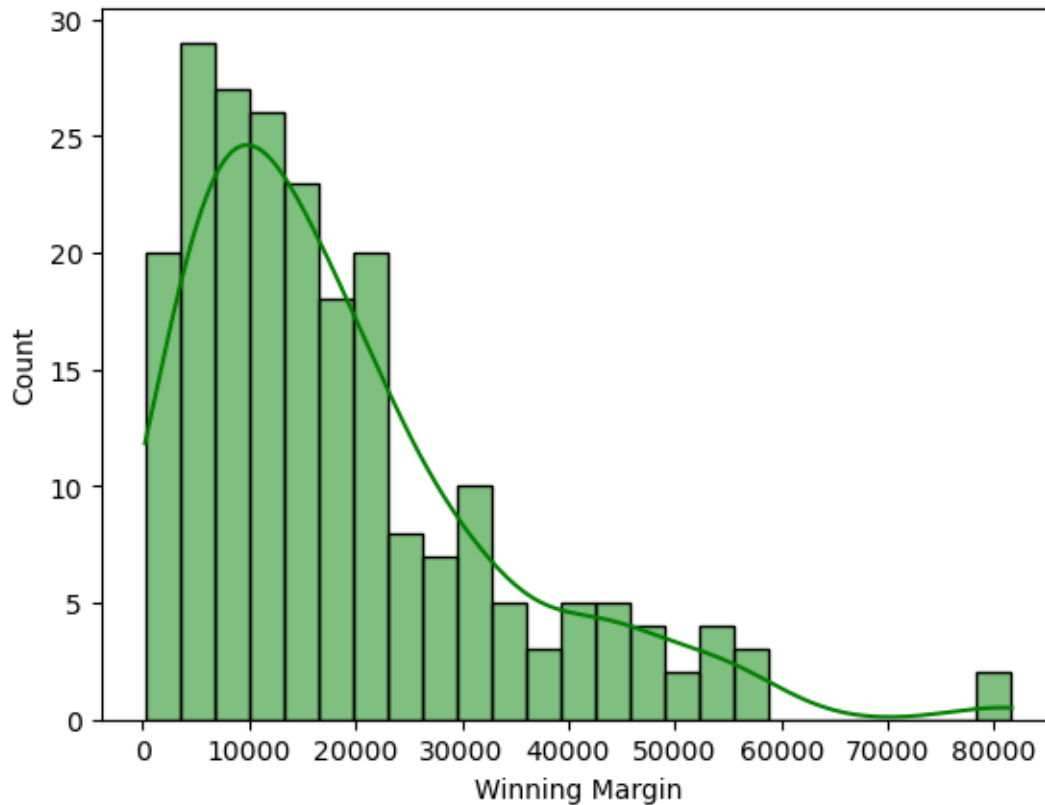


## 8 Observations:

8.1 If more people were voting, JDS and Others have high chances of Winning

```
[53]: sns.histplot(df["Winning Margin"],bins=25,kde=True,color="g")
```

```
[53]: <AxesSubplot: xlabel='Winning Margin', ylabel='Count'>
```



## 9 Observations:

9.1 Generally 1 to 25,000 is the normal range of winning candidates margin

9.2 from 25k to 60k only few candidates got Margins

9.3 above 70k Margin is very very rare

```
[28]: df.groupby("Winning Party")["Winner Votes"].sum()
```

```
[28]: Winning Party
      BJP      8194666
      INC      5944205
      JDS      3074395
      OTHERS    209915
      Name: Winner Votes, dtype: int64
```

```
[29]: df.groupby("Winning Party")["Runner Up Votes"].sum()
```

```
[29]: Winning Party
      BJP      6223038
```



```

INC      4710434
JDS      2241946
OTHERS   179408
Name: Runner Up Votes, dtype: int64

```

```
[30]: df.groupby("Runner Up Party").count()
```

```

[30]:
      AC Name  Winning Party  Winning Candidate  Winner Votes  \
Runner Up Party
BJP          67            67                67            67
INC          111           111               111           111
IND           3            3                3            3
INDEPENDENT  1            1                1            1
JDS          36            36               36           36
OTHERS        1            1                1            1
Others        1            1                1            1
Swaraj India  1            1                1            1

```

```

      Runner Up Candidate  Runner Up Votes  Voting Turnout %  \
Runner Up Party
BJP                    67                67                67
INC                    111               111               111
IND                     3                 3                 3
INDEPENDENT            1                 1                 1
JDS                     36               36               36
OTHERS                  1                 1                 1
Others                  1                 1                 1
Swaraj India           1                 1                 1

```

```

      Total Voters  Winning Margin  District Name
Runner Up Party
BJP              67              67              67
INC             111             111             111
IND              3              3              3
INDEPENDENT      1              1              1
JDS              36             36             36
OTHERS           1              1              1
Others           1              1              1
Swaraj India     1              1              1

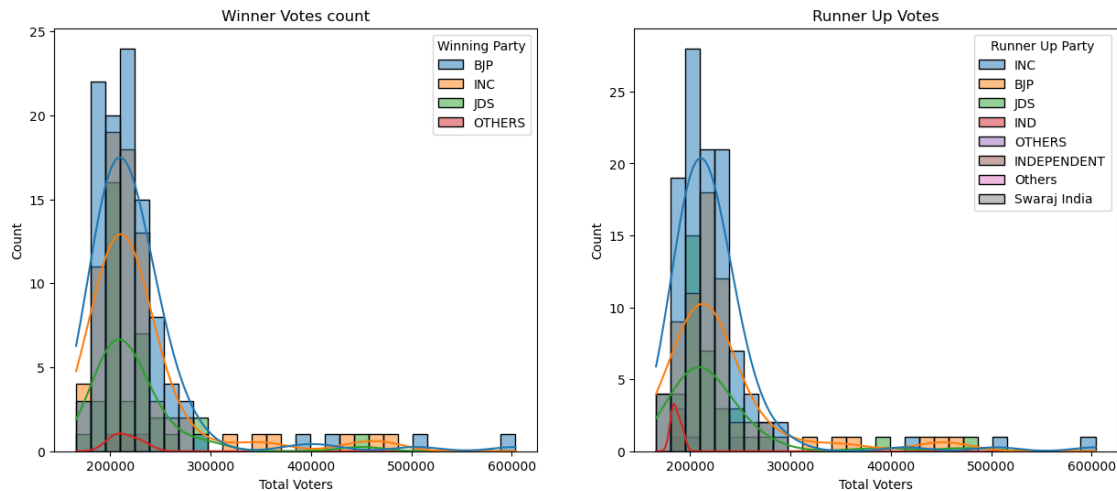
```

## 10 Observations:

10.1 Although INC has more Runner up Seats, BJP won more votes in Runner up Seats. i.e, BJP Managed to get most votes in their Lost seats also.

```
[52]: fig,axis=plt.subplots(1,2,figsize=(15,6))
plt.subplot(121)
sns.histplot(data=df,x="Total Voters",bins=30,color="g",kde=True,hue="Winning_Party")
plt.title("Winner Votes count")
plt.subplot(122)
plt.title("Runner Up Votes")
sns.histplot(data=df,x="Total Voters",bins=30,color="r",kde=True,hue="Runner Up_Party")
```

```
[52]: <AxesSubplot: title={'center': 'Runner Up Votes'}, xlabel='Total Voters',
ylabel='Count'>
```

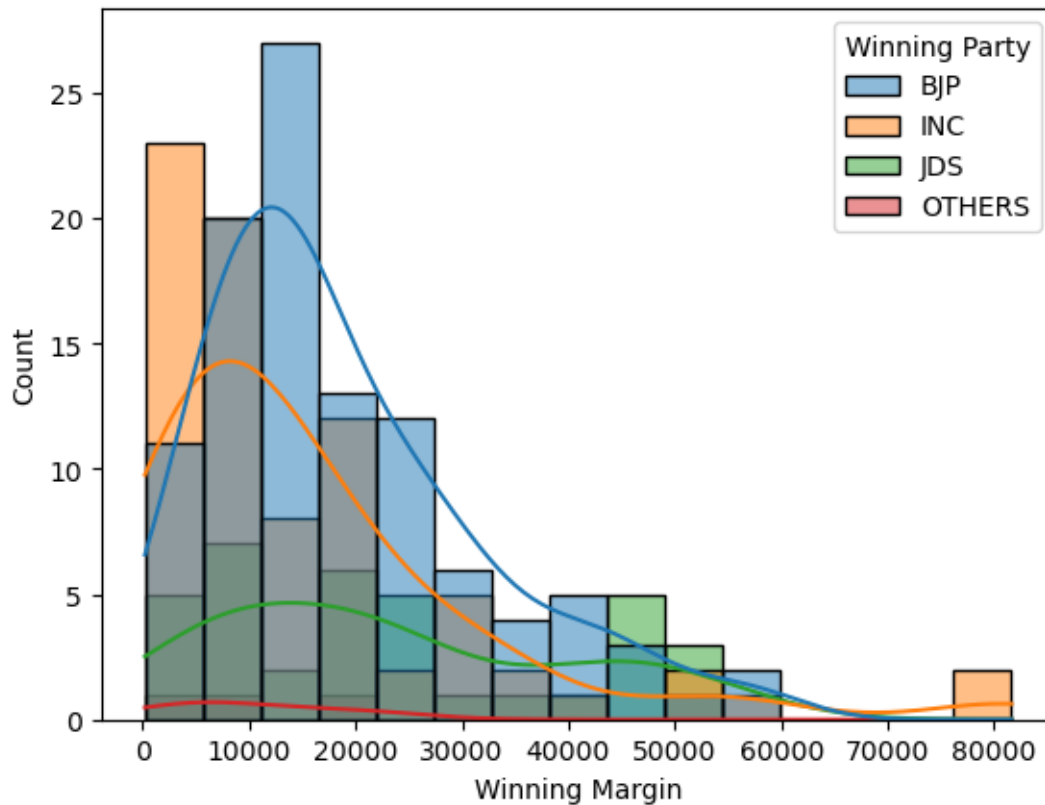


## 11 Observations:

11.1 If Total Voters were less than 300,000 then BJP had a very good dominance

```
[60]: sns.histplot(data=df,x="Winning Margin",kde=True,color="r",hue="Winning Party")
```

```
[60]: <AxesSubplot: xlabel='Winning Margin', ylabel='Count'>
```



## 12 Observations:

- 12.1 Others had a maximum Margin of wins by less than 25k votes only.
- 12.2 INC has most margins below 5000 and also most margin of victories above 65k votes.
- 12.3 JDS Dominated INC at 40k to 60k Margin of Victories.
- 12.4 BJP Dominates from 10k to 50k margin of victories.