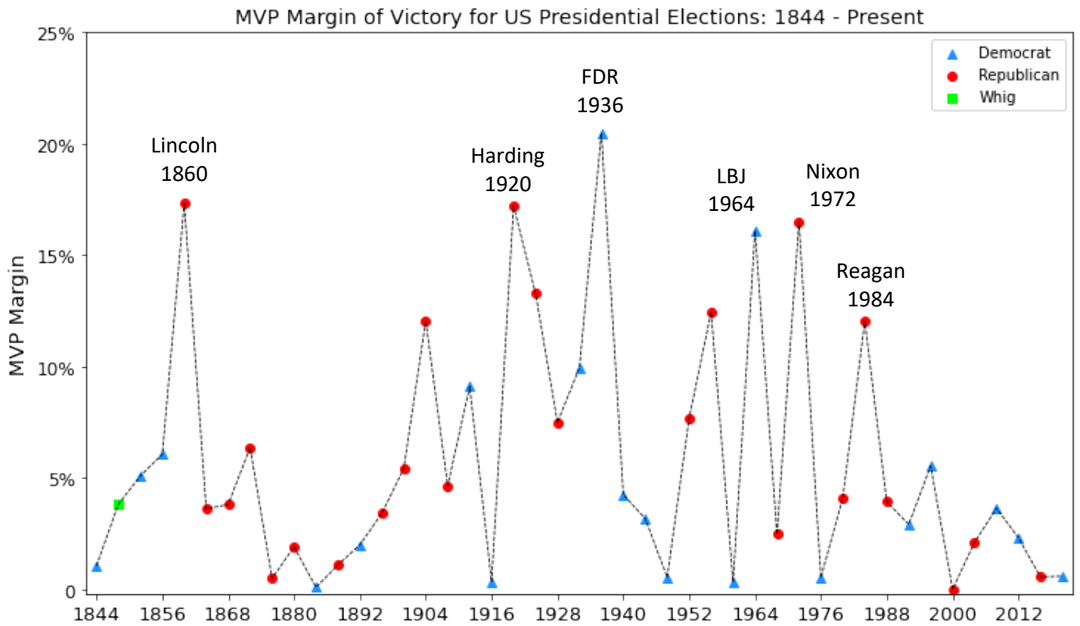
Minimum Vote Path (MVP) is the Winning Metric for Evaluating Presidential Elections



"A Key Performance Indicator (KPI) is a measurable value that demonstrates how effectively a company is achieving key business objectives."[1] If we consider political parties as companies and winning Presidential elections as a business, then the popular vote is not a KPI, because as we observed in both 2000 and 2016 "winning" this metric does not necessarily deliver a party to the White House. Admittedly there is a certain amount of public fascination with the popular vote and rightfully so, because in most voting processes, the popular vote is the KPI, but for US Presidential elections it is not. Therefore, in order to better understand how Presidential elections are won (and lost), and by how much, we offer a new metric, the Minimum Vote Path (MVP). The MVP is the result of an optimization problem (easily solved with MS Excel Linear Solver), which determines the minimum margin of popular votes necessary in a "basket" of states with a sufficient number of aggregate electoral votes to change the election result. Mathematically:

To be Minimized	Objective Function
Total margin of popular votes in basket of states	$= \sum_{states\ (51)}^{popular\ vote\ margin} State(s) \times Vote\ Margin$

Constraint: sum of Electoral Votes for States selected by objective function must be greater than or equal to number of electoral votes needed for election result to be reversed (i.e. losing candidate to achieve 270 Electoral votes)

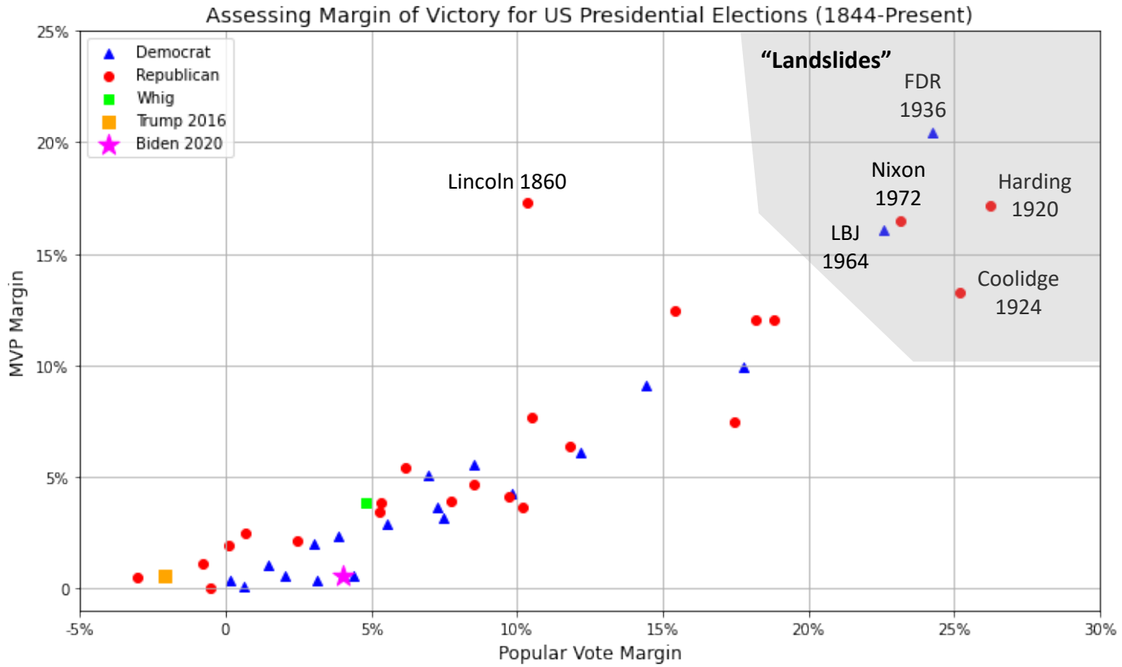
Note: States is a binary variable (1/0) for each state to indicate if it is part of the basket. There are 51 "states" in the problem in recognition of the electoral votes of the district of Columbia (DC). Vote margin is the popular vote margin of victory in each state.

Looking at the above plot of historical MVP margin, it is evident that we are currently in a period of relatively low margins of victory (close elections), something that the US has not persistently seen for over a century. So although, it is often common to hear superlatives such as "unprecedented" to describe recent elections, especially in 2000 and 2016, history disagrees (by repeating itself). Four elections since 1844 have been won by candidates losing the popular vote. Likewise, before the relatively recent run of close victories by Republicans we saw three very close Democratic Presidential victories in 1948, 1960 and 1976 and another in 2020. The point of providing the MVP margin is not to question the legitimacy of any election result, but rather to demonstrate that popular vote margins do not necessary tell an accurate tale of how close the outcome of an election was to being reversed and to demonstrate the close elections are not some unusual exception, but are actually quite common.

Closest Elections Since 1844 Based on MVP Margin

Year	Winner	State(s)	MVP Votes	MVP Margin*
2000	HW Bush	FL	537	0.009%
1884	Cleveland	NY	11,047	0.09%
1960	Kennedy	HI, IL, MO, NV, NM	23,740	0.33%
1916	Wilson	CA	3,420	0.34%
1876	Hayes	SC	889	0.49%
1976	Carter	OH, MS	25,579	0.52%
1948	Truman	OH, CA, IL	58,584	0.54%
2016	Trump	WI, PA, MI	77,744	0.56%
2020	Biden	NV, WI, GA, MI	77,269	0.59%
1844	Polk	NY	5,106	1.05%

*margin is based on MVP votes as a % of all votes in basket of states



1. https://www.klipfolio.com/blog/kpi-metric-measure
2. Visualizations and Analysis conducted in Jupyter (Python) Notebooks available at https://github.com/run2win2k/Data_Science

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