

NY Election Audits: Is Three Percent Enough?

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New York State Election Law §9-211 and draft State Board of Elections regulations require a 3% initial sample size, based on either voting machines (DREs) or systems (optical scanners). The law requires 3% per county while the draft regulations, more appropriately, require 3% per contest.¹ To evaluate the 3% audits proposed in the draft regulations, we examined all Federal elections from 2002 to 2006 and all State Legislative elections in 2006, excluding primaries. Unfortunately, based on recent election results, we have found that 3% audits are not adequate to confirm the outcomes (winners) of all Federal or State elections independently of software because errors that would trigger additional investigation may never be found in the 3% samples.

The following graphs are based on Election Districts (EDs), also known as precincts, and are thus neutral with respect to the type of voting technology used in each ED. There are about 15,153 EDs statewide and on average, 522 EDs per Congressional District (CD), 244 EDs per State Senate District (SD) and 101 EDs per Assembly District (AD). Because the number of votes per ED varies, we used a precinct size distribution based on the one in "Percentage-based versus SAFE Vote Tabulation Auditing: A Graphic Comparison"² which we believe to be typical. More accurate calculations can only be provided if ED-level vote counts are made available for all contests.

There are 29 CDs, 62 SDs and 150 ADs in the State. The average audit sizes we calculated are based on audits of all races, including those in which candidates ran unopposed.

Statewide Elections

We examined statewide races for President, both US Senate seats and the Governorship from 2002 to 2006. Random audits of 3% would have been more than adequate to confirm the outcomes of these races at the desired level of certainty, which we have set at 99% statistical power. I.e., for these elections, the audit would have triggered additional action at least 99 out of 100 times if the wrong winner had been declared.³

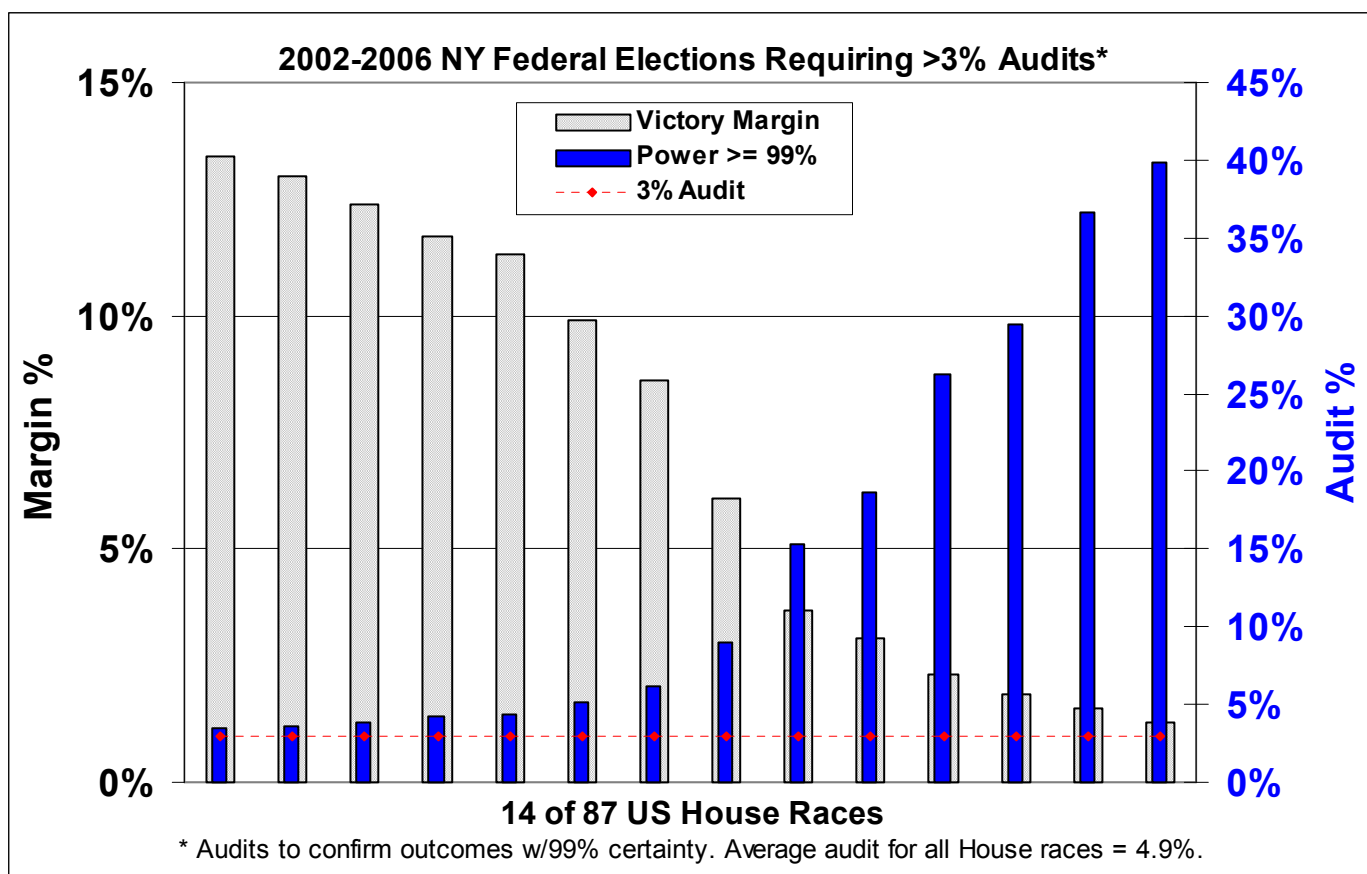
¹ Audits based on electoral contests rather than jurisdictional boundaries were proposed in: Stanislevic, "Random Auditing of E-Voting Systems: How Much is Enough?", <http://vote.nist.gov/ecposstatements/EVEPAuditing.pdf>

² McCarthy, Stanislevic, Lindeman, Ash, Addona and Batcher, Verified Voting Foundation, "Percentage-based versus SAFE Vote Tabulation Auditing: A Graphic Comparison", <http://www.verifiedvotingfoundation.org/auditcomparison>

³ Bock, Marker, Gardinier and Ash, American Statistical Association, "Statistics Can Help Ensure Accurate Elections", <http://www.amstat.org/news/2007ASAElectionLettertoDFeinstein.pdf>

NY Federal Elections 2002 – 2006 (87 US House Seats)

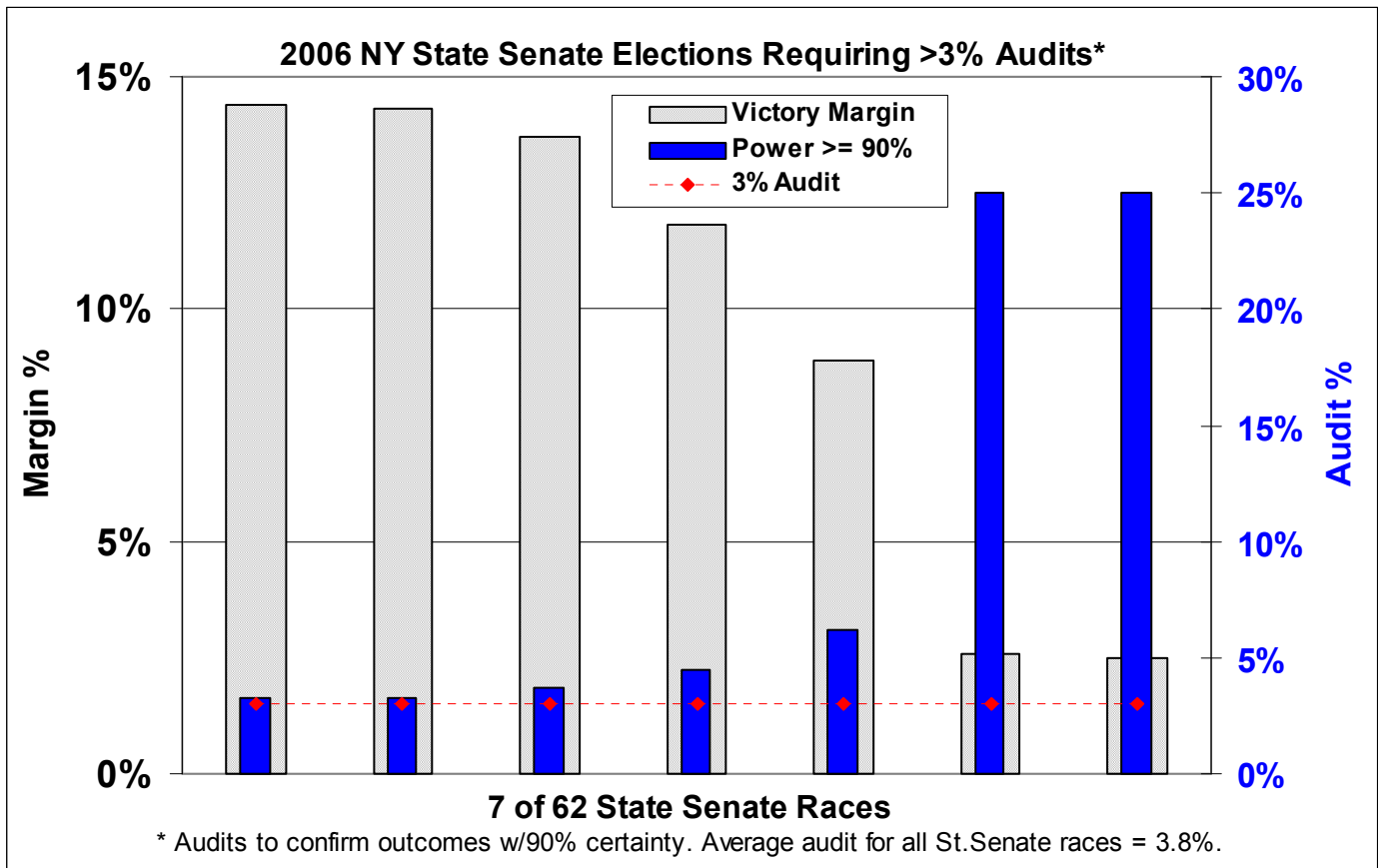
The first graph below shows all Federal elections with outcomes (based on the victory margins) that *cannot* be confirmed with a 3% audit. Of the 87 US House races from 2002 to 2006, which comprise three complete House elections, there were 14 that required more than a 3% audit. Even with the largest audit of almost 40% for the closest race with a margin of only 1.3% (CD-27 in 2004 shown on the far right of the graph), and other close races, the average audit for all Federal contests was only 4.9% to achieve 99% statistical power.



NY State Senate Elections – 2006

The following graph shows all NY State Senate elections in 2006 with outcomes (based on the victory margins) that *cannot* be confirmed with a 3% audit. We used a statistical power of 90% for elections for members of the Legislature. I.e., for these elections, the audit would have triggered additional action at least 9 out of 10 times if the wrong winner had been declared.

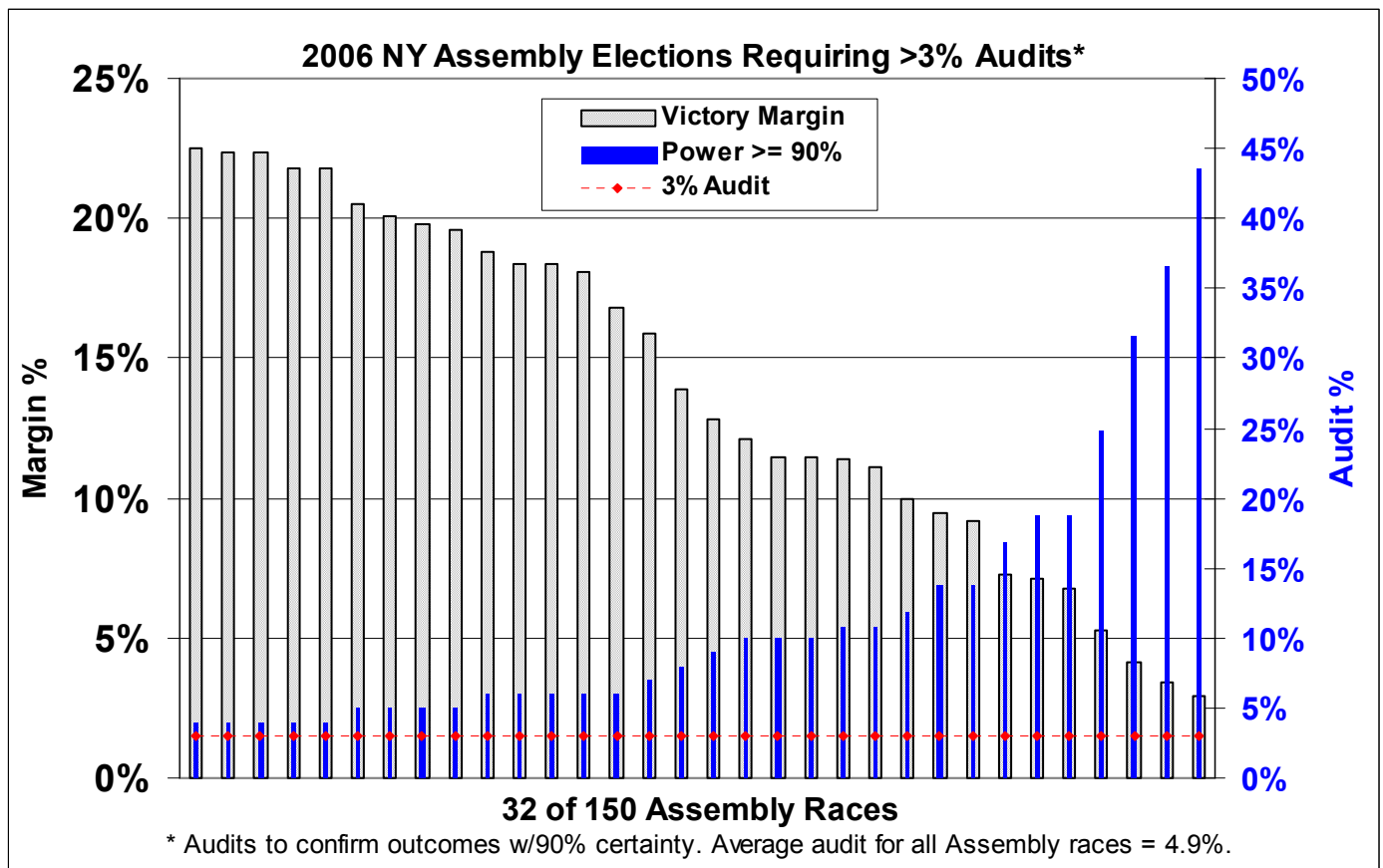
There were 7 out of 62 races that required more than a 3% audit to meet the statistical power requirement. Even with the largest audit of 25% for the closest race with a margin of only 2.5% (SD-35 shown on the far right of the graph), and other close races, the average audit for all State Senate contests was only 3.8% to achieve 90% statistical power.



NY Assembly Elections – 2006

The following graph shows all NY Assembly elections in 2006 with outcomes (based on the victory margins) that *cannot* be confirmed with a 3% audit. As with the State Senate, we used a statistical power of 90% for the Assembly so that for these elections, the audit would have triggered additional action at least 9 out of 10 times if the wrong winner had been declared.

There were 32 out of 150 races that required more than a 3% audit to meet the statistical power requirement. Even with the largest audit of almost 44% for the closest race with a margin of only 2.9% (AD-121 shown on the far right of the graph), and other close races, the average audit for all Assembly contests was only 4.9% to achieve 90% statistical power.



Conclusion

Although the 3% audit will be sufficient to confirm the outcomes of most statewide, Congressional, State Senate and Assembly races, it lacks the statistical power necessary to find discrepancies that would trigger additional action in some Congressional, State Senate and Assembly races that could be incorrectly decided. We believe this makes it impossible to comply with Election Law §16-113, which requires material discrepancies to be found prior to expanded audits or recounts. In addition, the NY State Constitution requires Equal Protection, which would not be the case with audits of varying effectiveness applied to different elections for the *same* office. The use of the methods detailed in the references cited herein can solve these problems and provide statistically accurate, fair and efficient (SAFE) audits that would confirm the outcomes of State and Federal elections with very high confidence, independently of software, while only increasing the average initial audit size for such elections to about 4% or 5% of EDs.