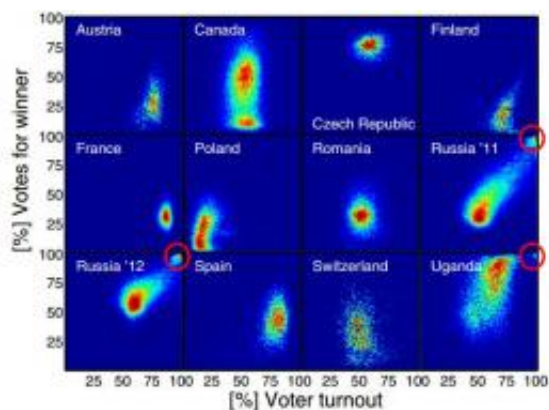# Researchers use new statistical method to show fraudulent voting in Russian election

September 25 2012, by Bob Yirka

Election fingerprints. Two-dimensional histograms of the number of units for a given voter turnout (x axis) and the percentage of votes (y axis) for the winning party (or candidate) in recent elections from different countries (Austria, Canada, Czech Republic, Finland, France, Poland, Romania, Russia 2011, Russia 2012, Spain, Switzerland, and Uganda) are shown. Color represents the number of units with corresponding vote and turnout numbers. The units usually cluster around a given turnout and vote percentage level. In Uganda and Russia, these clusters are smeared out to the upper right region of the plots, reaching a second peak at a 100% turnout and 100% of votes (red circles). In Canada, there are clusters around two different vote values, corresponding to the Québécois and English Canada (SI Text). In Finland, the main cluster is smeared out into two directions (indicative of voter mobilization because of controversies surrounding the True Finns) Credit: (c) PNAS, doi: 10.1073/pnas.1210722109

(Phys.org)—A team of Austrian researchers has applied a new statistical

method in looking at elections in various countries and the ways that some of them might be influenced by fraud, and have found, as they describe in their paper published in the *Proceedings of the National Academy of Sciences*, that two recent elections stood out as likely suspect, one in Uganda and one in Russia.

Traditionally, to detect voter fraud, statisticians have looked at voting patterns that appear to adhere to a certain constant (ten, hundred, etc) indicating that whole blocks of votes were cast for a certain candidate. The downside to such a method is that the best it can offer is an indication that there might have been some irregularities in an election, but nothing definitive, which is far too little to go on to spout claims of fraud. To get around that problem the new team instead focused on areas of regional voting.

The idea is that if a certain small region has a very high voter turnout and virtually all of the votes from that area are for just one candidate, it's probably due to some serious ballet stuffing (and likely destruction of votes for the other party) which of course tends to skew the results. If a sufficient number of regions are able to show such numbers, it becomes possible to alter the outcome of the election, and that is what the researchers found when looking at the elections held in Uganda last year and in Russia earlier this year.

To ensure that their method was valid, the team applied the same measurements to elections in a whole host of countries that held elections in recent years, and in virtually all cases, the results showed a consistency in voter turnout and range of votes for the different candidates in different regions, save for those in Russia and Uganda, which were both held under clouds of suspicion.

The new method isn't foolproof either of course, but it does generate data that can be used as a means of investigating instances where voter

fraud is suspected, if a means is in place for such an effort of course. In plotting out areas that diverge sharply from the norm, the new method shows in striking detail areas that stand out to anyone who choose to look, making the point rather obvious.

In the case of the Russian election, the team was able to note and plot areas where voter turnout approached a hundred percent, with virtually every single vote being cast for the eventual winning party. As clear a sign of ballot stuffing as statistics is ever likely to show.

More information: Statistical detection of systematic election irregularities, *PNAS*, Published online before print September 24, 2012, doi: 10.1073/pnas.1210722109

Abstract
Democratic societies are built around the principle of free and fair elections, and that each citizen's vote should count equally. National elections can be regarded as large-scale social experiments, where people are grouped into usually large numbers of electoral districts and vote according to their preferences. The large number of samples implies statistical consequences for the polling results, which can be used to identify election irregularities. Using a suitable data representation, we find that vote distributions of elections with alleged fraud show a kurtosis substantially exceeding the kurtosis of normal elections, depending on the level of data aggregation. As an example, we show that reported irregularities in recent Russian elections are, indeed, well-explained by systematic ballot stuffing. We develop a parametric model quantifying the extent to which fraudulent mechanisms are present. We formulate a parametric test detecting these statistical properties in election results. Remarkably, this technique produces robust outcomes with respect to the resolution of the data and therefore, allows for cross-country comparisons.

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