

BENFORD'S LAW

To paraphrase that country & western song, are you “looking for anomalies in all the wrong places?” If so, a little knowledge of Benford’s Law could give you a new perspective in fraud detection, or at least impress a colleague at the company picnic.

On April 19, your local IIA Chapter co-sponsored a most informative afternoon with the AGA. For the miserly sum of \$8.00 American, a packed house of 40 were treated to a hot Italian Buffet lunch at **Farm Family** Insurance in Glenmont. Then we were treated to a fascinating afternoon of training, featuring KPMG’s Chris Rosetti.

Chris Rosetti is a Senior Manager in the Forensics & Litigation Services practice of KPMG LLP in the Albany, NY office. Chris also serves as the President of the local chapter of Certified Fraud Examiners.

Benford’s Law is named for a General Electric physicist – Dr. Frank Benford, who noticed something odd about numbers in 1938. The logarithm books his colleagues used were more worn on pages with numbers starting with **1**. (This of course occurred in the days before pocket calculators.) The curious physicist delved into other statistical areas – including areas of rivers, street addresses and baseball statistics, finding that the numbers 1 through 9 did not occur in equal measure as the leading digit in such varied statistics. In fact the number 1 showed up 30 percent of the time (versus the logical 11.1%).

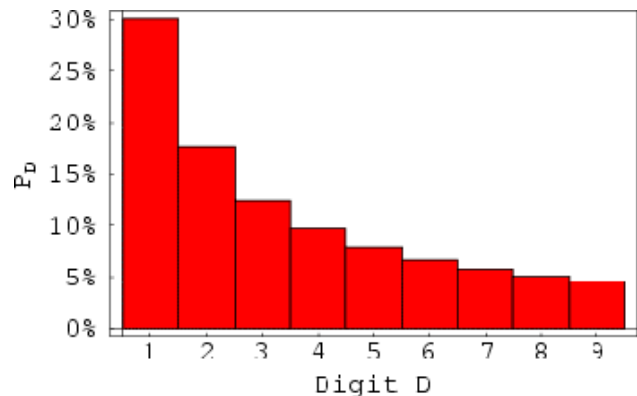
Many years later, a South African – **Dr. Mark Nigrini** (now at Southern Methodist University in Dallas) > pursued this phenomenon in his PhD dissertation titled “*The detection of income tax evasions through an analysis of digital frequencies*”.



This technique does not apply to all sets of numbers, nor can it work with a small sample size, nor should you try to apply this technique next April 15th. For one, there are circumstances where numbers are created with embedded codes – like Social Security Numbers, or special codes like telephone area codes or ZIP codes.

But a judicious application of Benford’s Law when scanning through a pile of purchase orders, vouchers or expense accounts can be a useful technique to detect numerical oddities. Of course, you then need to explain away the numerical anomalies (which may be an artifact of a purchasing process, rather than error or fraud).

Limiting ourselves to the first digit in a string of numbers, we come up with a distribution chart that looks like this:



The two-digit version of this distribution (representing 10 through 99) is a finer curved version of the above.

Chris Rosetti’s presentation also dealt with document fraud (made more attractive these days via desktop publishing), and various ethnic organized crime groups (Nigerian Letters, Russian car theft rings, staged accidents, etc.). A British colleague, **Julie Beesley** (of London and Manhattan KPMG fame) gave us a fascinating peek at **i2** – an intriguing software package which helps auditors and prosecutors coordinate and synthesize disparate data – like phone bills, bank statements, video surveillance tapes, spreadsheets and documents – looking for patterns and retrieving linked information rapidly.

Thanks to **Bob Taft** and Farm Family for hosting such a delightful afternoon. It was also a pleasure to share this day with our colleagues from AGA.

Tim O’Toole

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