

A collage of four images illustrating risk management. The top-left image shows a calculator and a pen on a spreadsheet. The top-right image shows the word 'RISK' spelled out in blocks on a spreadsheet. The bottom-left image shows hands typing on a laptop. The bottom-right image shows padlocks over a background of binary code.



Dr. David A. Clark

Manuel Villavicencio
Director of Consulting



Smart People + Small Mistakes = Big Losses

Spreadsheets are like an old friend - we rely and trust them, even if they make us crazy once in a while. But in terms of the private capital industry, too much reliance can turn into an unproductive relationship.

Spreadsheets have played a major role in technological and financial innovation since the advent of VisiCalc. However, a growing number of errors stemming from reliance on them have caused significant financial losses across a wide number of industries. With private capital's increasing influence in the financial markets, the role the spreadsheet plays in making major decisions – across the back office, deal teams and LPs, - is worth examining. This whitepaper looks at the nature of the risks posed by the continued prevalence of spreadsheet-based processes at private equity, private debt, real estate and venture firms.

The spreadsheet error that changed history

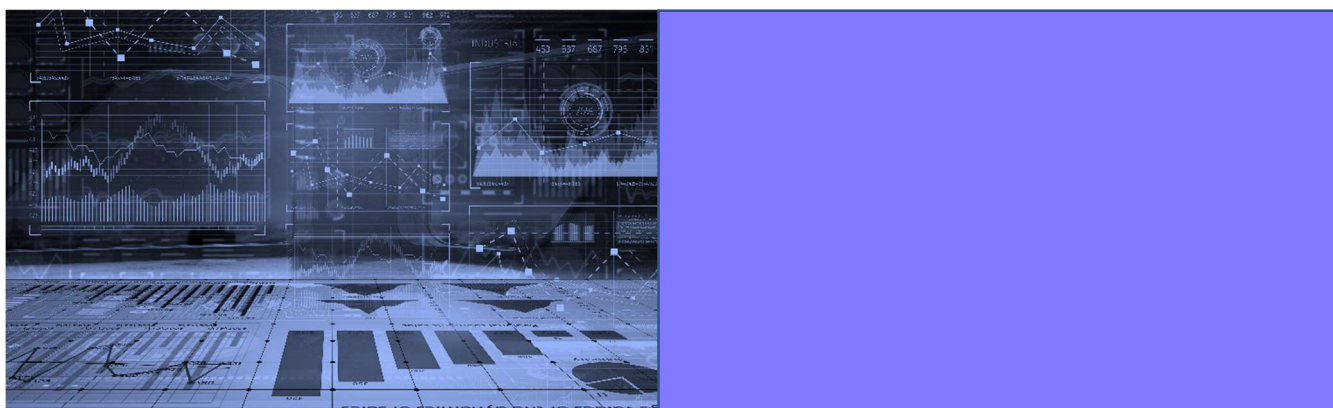
In 2010, Carmen M. Reinhart and Kenneth S. Rogoff, two renowned Harvard economists, circulated a paper, “*Growth in a Time of Debt*,” that analyzed the impact of government debt on economic growth¹. The paper's conclusion - that a ratio of 90% of a country's public debt to GDP leads to declines in economic growth – was highly influential in economic and financial circles. Issued at a time where the global economy was rebounding from the effects of the 2008 financial market crash, and the Greek economy was spiraling into crisis, the Reinhart-Rogoff analysis was one of the most highly cited economic papers in recent history and gained widespread traction amongst officials advocating measures of austerity in lieu of government stimulus.

The analysis and its conclusions, however, had some issues. In addition to disagreements raised by fellow researchers regarding the study's methodology, others, using comparable data sets, simply could not reproduce the results claimed by Reinhart-Rogoff.

Facing pressure, Ms. Reinhart and Mr. Rogoff allowed researchers at the University of Massachusetts to look at their original spreadsheet. In their analysis, these researchers found serious problems in the data used to support Reinhart and Rogoff's conclusions, including an Excel coding error that omitted several rows in a formula – rows which, had they been included, would have significantly reduced the impact on economic growth that was central to the paper's results. As Mike Konczal, a fellow at the Roosevelt Institute, asserted at the time, “If this error turns out to be an actual mistake Reinhart-Rogoff made, well, all I can hope is that future historians note that one of the core empirical points providing the intellectual foundation for the global move to austerity in the early 2010s was based on someone accidentally not updating a row formula in Excel”².

While the Reinhart-Rogoff incident was a highly influential and publicized example of the risk of spreadsheets in the economic world, there have been numerous other high-profile incidents of mistakes, oversights, omissions and plain carelessness that have resulted in losses and misappropriations of financial assets by well-meaning people. Some multi-billion spreadsheet-caused mistakes over the years have ensnared Fidelity, JP Morgan and Barclays amongst others.³

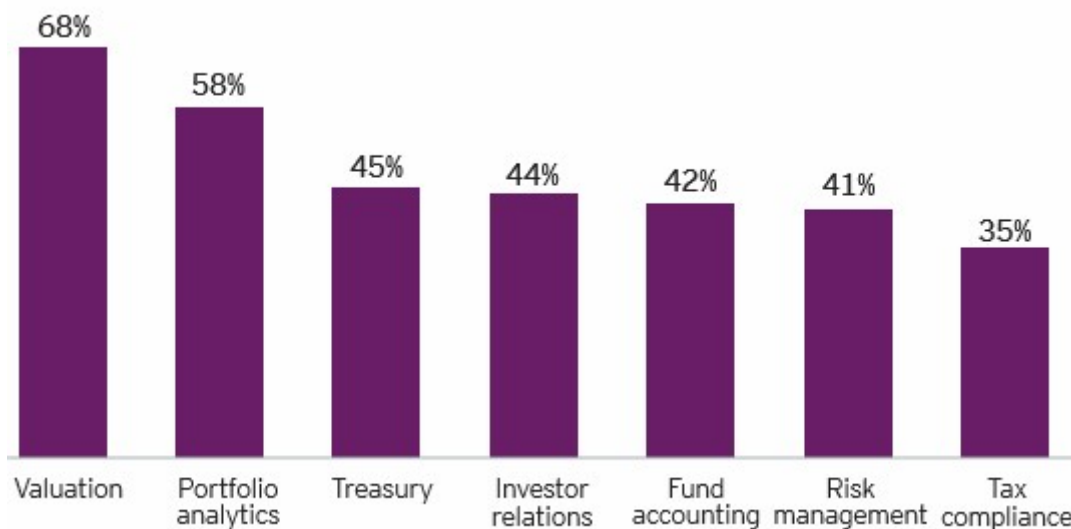
Spreadsheets have had a remarkable impact on productivity in recent decades. The drastic increases in computer processing power and data storage capacity in the past two decades have facilitated improvements in data crunching and analysis that can be efficiently handled by a single end user on a laptop. In the earlier days of computing, such activities would require processing capabilities only available via mainframe and thus was limited to a few individuals at corporate, academic and governmental entities. Today's spreadsheets have replaced paper, pencils and calculators as the tools of financial professionals. The high-profile Reinhart-Rogoff incident is just one among many others that serves as a reminder of how vulnerable many sectors of the finance industry remain to spreadsheet risk. Private capital, in its heavy reliance on data analytics for decision-making, is no exception.



Spreadsheet-based processes in private capital

It is accurate to say that even today, the technology underpinning private capital GPs' reporting, analysis and decision-making is Microsoft Excel. The Excel spreadsheet is a powerful, simple and inexpensive way to capture, analyze, interpret and share financial data. Its applications are broad and sweeping, and the level of expertise required to use it (not to master it) is minimal. It is, therefore, the tool of choice for many of the ways that GPs create value and report results, including valuations, portfolio monitoring, capital account allocations and performance calculations.

What percent of GPs still use spreadsheets at the primary tool for each function:



Source: E&Y

Most GPs collect, aggregate and analyze portfolio company (and properties for real estate GPs) financials and KPIs via the exchange of spreadsheets with the finance department of their respective portfolio companies. These spreadsheets are used by deal teams and operating partners to monitor the progress (or lack thereof) on the road to exit.

It goes without saying the data in these spreadsheets are critical to capital allocation decisions for GPs, and portfolio allocation decisions for LPs. But the risks in these processes are sizeable and numerous. Firstly, transmitting spreadsheets via e-mail is not a secure practice, especially in light of the highly sensitive information being shared. High profile data breaches involving Equifax, SWIFT, RBC, TRW, Blackrock and LPL Financial, as examples, have put a spotlight on the ability of determined hackers to access confidential corporate data. In fact, financial services firms fall victim to cybersecurity attacks 300 times more frequently than businesses in other industries. ⁴

In addition, data integrity is compromised by the lack of scalability and controls around information in spreadsheets. These spreadsheets, typically updated on a monthly basis, grow exponentially over time as columns, rows, tabs, links, formulas and such are added over time. Without controls and checks, “spreadsheet creep” undermines the consistency and continuity of the data. As spreadsheets frequently change hands, a lack of safeguards or internal controls means just one small mis-key or input error can have dramatic ripple effects.

Another major area of spreadsheet risk at private capital is in their allocation of capital accounts and investment income, typically performed by the use of a waterfall spreadsheet model, prepared according to the methodology set forth in the fund’s LPAs. Partnership agreements, especially those crafted by creative lawyers, can be difficult to interpret and even more difficult to operationalize. As a result, the waterfall spreadsheet models developed by fund managers are often tremendously complex, requiring multiple layers of computations each time a transaction triggers any of the various hurdles and tiers that comprise the calculation.

A number of other highly sensitive processes at PE firms are typically spreadsheet-based. Performance calculations prepared for current and prospective investors, interest calculations on mezzanine debt investments, even the creation of audited financial statements are still very commonly prepared using spreadsheets. Such practices have led to many errors, many of which have been identified by diligent investors that have taken the time and effort to recalculate results. But is the impact of such errors confined to the fund manager and their limited partners, or should it signal a broader concern regarding the reliability of results reported by private capital managers?

Risk Management

Although the nature of private capital investing provides some insulation from many of the risks that concern other asset classes, with private equity, debt, venture or real estate, individual transaction amount are large and small mistakes can get magnified in dollar terms. In a highly-publicized story, a spreadsheet error overstating the number of fully diluted shares resulted in a private equity firm overpaying for the acquisition of a software firm to the tune of \$100 million⁵. This story came to light due to its high-profile stakeholders and the fact that it was the biggest technology buyout deal of 2014. Many lesser-known incidents of spreadsheet errors occur with relative frequency but do not garner such publicity and so remain strictly within the purview of the firms or service providers who uncover similar errors. Many spreadsheet errors exist which may never be identified, and as such cannot be quantified.

It is doubtful that spreadsheet errors give rise to a broader systemic risk. But at the micro level, where values are being calculated that affect investment decisions, fees are being calculated based on investment earnings, and investors are weighting their investment portfolio based on reported capital account allocations. The thought that the existence of a spreadsheet error in one of these calculations is more likely than not is at the very least unnerving.



“A spreadsheet error overstating the number of fully diluted shares resulted in a private equity firm overpaying for the acquisition of a software firm to the tune of \$100 million”

LPs are looking under the hood

Institutional investors are taking a much deeper dive into a GP's operations these days, particularly across valuation procedures, internal controls, reporting and cyber-security. If the economic cycle starts to trend down and performance begins to suffer over the next few years, you can expect LPs to dig even deeper into the levers available to GPs in managing their investments.

Fund managers, always cognizant of having to differentiate themselves during fundraising, would do well to leverage technological tools above and beyond spreadsheets to re-enforce to LPs that they employ a well-thought out hands-on approach to operational improvements in their management firm. Some of the operational areas institutional investors are known to take a close look at include:

- Has the fund manager ever been audited and what were the results of said audit? Were there any deficiencies?

- What types of data is typically included in reporting to LPs, how long does it take and in what format? (LPs are moving away from static PDFs looking for more of the actual underlying data). How do you ensure the information being provided to LPs is accurate?
- How is the information from a fund's underlying holdings verified, compiled, distributed and ultimately used to make investment decisions?
- How is the risk from fraud, both internally and externally, being addressed and managed?



It's hard to see how a GP still reliant on spreadsheets for these functions can stand up well in comparison to a firm that has employed more modern technologies to manage the information and processes across the firm. Risk management in the private capital world is not being looked at as a 'nice to have' any longer. Any kind of stress in the markets will only reaffirm the need for sound protocols.

What can be done?

Although the risks and inefficiencies of spreadsheets are generally agreed upon, database technology vendors have a mixed record of reducing GPs' dependence. Many firms have implemented technology solutions only to find their overall reliance on spreadsheets has remained unchanged, or that one risk has been replaced with another risk of equal magnitude. The challenge facing technology vendors continues to be developing functionality that is responsive to the growing complexity of private capital investing while retaining the flexibility and ease of use that drives the attractiveness of spreadsheets.

But fund managers ultimately bear the responsibility of mitigating their risk, as they hold the fiduciary responsibility for safeguarding their investors' assets. In addition, since private capital GPs generally engage in less frequent but large transactions, it can only require one error to trigger a severe blow to a firm's reputation. The reality is LPs talk, and word spreads quickly.

So why has it proven difficult thus far to reduce firms' reliance on spreadsheets? For one, although firms embark upon technology implementations with constructive intentions, many find that the impediments to fully embracing the technology outweigh the immediate benefits of maintaining the status quo. The cost and effort of documenting requirements, migrating data, process change, integration, training and documentation can be substantial, and without overwhelming pressure from investors or regulators, organizational will is unlikely to shift. However, firms that choose to hold back on such improvements run the risk of committing a major error that eventually forces their hand

An intermediate solution that has become increasingly common is undergoing periodic spreadsheet audits. A small but growing contingent of software and service providers are developing tools and services to analyze spreadsheets and identify errors and deficiencies in their construction. It is equally if not more important to ensure that any such efforts also incorporate a review of controls around the spreadsheets, including version controls, file security, validations, data integrity, and other such practices designed to reduce errors.

Finally, a look at managers in other asset classes provides a glimpse at approaches that GPs may veer towards as the industry continues to adopt operational standards and best practices. Mutual funds and hedge funds, although their respective risk profiles are quite different from the private markets, almost universally adopt a risk management function, which,



among other things, manages data-related practices and standards across the firm, ensuring that calculations are reasonable and using trend-based analyses to test assumptions and detect risks and errors. Mutual funds and hedge funds make more fulsome use of third-party administrators, including maintaining “shadow accounting” books and records in order to have an external check on calculations. In part, these approaches were adopted in response to fraud and errors committed by a few well publicized offenders, and it may take a similar event for such practices to take hold with private capital managers.

In summary

The inherent advantage of private capital strategies includes the ability for firms and investors to tailor transactions in creative ways that enhance value for all parties, ways that investors in the public, regulated markets cannot avail themselves of. The drawback of such highly customized agreements is the difficulty in interpreting and operationalizing them. Spreadsheets are a powerful and immediate solution to model data, analyze results, and make decisions. But given the exponential growth of the private capital markets' activity, size and influence globally over the past two decades, there is an accompanying consensus that reducing reliance on spreadsheet-based processes should be a high priority of firms seeking to reduce their operating risk profile.

- 1) <http://www.nber.org/papers/w15639>
- 2) <http://rooseveltinstitute.org/researchers-finally-replicated-reinhart-roff-and-there-are-serious-problems/>
- 3) <https://blogs.oracle.com/smb/10-of-the-costliest-spreadsheet-boo-boos-in-history>
- 4) <https://www.itspmagine.com/from-the-newsroom/the-cost-of-a-cybersecurity-breach-for-financial-institutions>
- 5) <http://www.cfo.com/spreadsheets/2014/10/spreadsheet-error-costs-tibco-shareholders-100m/>

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