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The value killers revisited
A risk management study

Foreword

The last two decades have seen a number of events driving major value losses in individual companies and collectively in the global economy. From the global financial downturn to other events of the last decade, such as the tsunami and Fukushima disaster, the disruptive floods in Thailand, and the ongoing political upheavals in the Middle East, businesses should learn to expect – and manage through – the unexpected.

Since our first value killers study[1] in 2005, risk management has grown in importance to corporations worldwide. We find boards, management, and regulators paying increasing attention to risk management and governance. New disclosure requirements seek to help shareholders become more aware of company-specific risks. Yet, many companies continue to experience significant value losses in a short period of time.

"The value killers revisited" reexamines the 2005 study, in which we assessed the drivers of 20 percent or greater value losses in a company within a one-month period relative to a broad market index. Following up on our prior research, this study examines the drivers of major value losses from 2003 through 2012. This new analysis benefits from a rich new pool of data that reinforces previous findings and gives rise to new ones. In the period studied, the financial crisis was a key driver of major value losses, but not the only one.

Scrutinizing value killers and pathways to losses can help frame better questions on how to sidestep or manage future risk events. While new surprises are always lurking around the corner, and the past is not necessarily a prelude to the future, by understanding the past we can more likely avoid repeating its mistakes.

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Executive summary

The findings in this study come from a comprehensive analysis of the 1,000 largest global public companies as of December 31, 2012. Since 2003, almost 38 percent of these companies suffered share-price declines of more than 20 percent in a one-month period relative to the MSCI Global 1000 index in the same period. We call these dramatic losses in a short period "value-killer losses." By the end of 2012, roughly 18 percent of these companies had not yet recovered their value-killer losses, and 18 percent waited over a year for their share prices to recover.

Utilizing more than 2 million financial data points over 10 years, we began by calculating the magnitude of each company's largest one-month loss ("loss event"). We then analyzed hundreds of articles and reports on these loss events to understand the reasons for the 142 most severe drops in company value (to identify 100 company names). We identified the value killers behind these major losses and drew inferences across our analysis to infer insights about key value killers. For the purposes of this report, "prior decade" refers to the years 1994 to 2003, the period covered in our original study, and "current decade" refers to 2003 to 2012.

The losses, while distinct, were often driven by similar underlying risks. To identify strategies for protecting shareholder equity, Deloitte LLP's CFO Program, in conjunction with Deloitte Touche Tohmatsu's Risk & Capital Management practice, analyzed the factors contributing to severe losses in value. In all, we observed five major themes.[2]

High-impact, low-frequency risks trigger most value killers. The most notable trigger of value-killer risks was a high-impact, low-frequency event, a finding consistent with Nassim Nicholas Taleb's work on black swans. Large industry- or economy-wide events such as the credit crisis or eurozone crisis drove the most value losses. These events often expose a company's biggest strategic, operational, or financial weakness, often triggering a further cascade of negative events for the company.

Correlated and interdependent risks. The study revealed nearly three-fourths of major loss events occurred due to correlated and interdependent risks. While a black-swan event may trigger a value loss, its magnitude is often amplified by interdependencies among a variety of risks in an organization. Interdependent risks were the key driver of value losses in our first report; our latest research reaffirms the importance of thinking about risk events not just in isolation but in terms of how a risk event may trigger other events within a company and escalate into a massive value loss.

In this decade, the term "systemic risk" entered the lexicon as many companies in the financial-services sector stood on the brink of collapse during the financial crisis. Interdependencies between the financial-services industry, and other industries and companies dependent on financial services, made it critical to consider how the events and risks outside a company's core industry – but still within its ecosystem of critical resources – can drive value.

Liquidity risk became more salient. The financial and initial credit crisis made real or perceived weaknesses in a company's balance sheet, and the potential inability to access capital, a much more salient driver of value losses. Since the financial downturn, highly leveraged companies without sufficient liquidity reserves were at greater risk of value loss than comparable firms with less leverage. In the face of rising costs and slowing demand, lack of liquidity was often a critical constraint on the company and a driver of value losses.

Unsuccessful Mergers & Acquisitions (M&A) remained a critical value killer for select companies. As we found in our prior work, unsuccessful M&A deals can be value killers for many different reasons. Deals can go bad due to incorrect valuations before the deal, failure to complete an announced deal, changed economic circumstances after the deal, or failure to capture anticipated synergies or effectively execute postmerger integration.

Culture, compensation, and fraud risks as drivers of value losses. These risks arise when a company's culture and compensation plans create incentives to commit fraud or encourage employee behaviors that increase the risks that are assumed by a company.

In addition to the above findings, the study revealed a few other categories of salient risks that drove value killer-like losses. These include cost overruns and political and sovereign policy risks.

In the pages that follow, you will learn about the magnitude and depth of various value killers and how companies fared during a crisis. The report examines some of the pathways to loss among the largest percentage losses in shareholder value and suggests some steps to mitigate against future value losses.

One noteworthy finding: the instances of accounting fraud as a driver of value-killer losses – at the 100 companies that experienced the largest value-killer losses – was substantially lower this decade than in the previous decade.

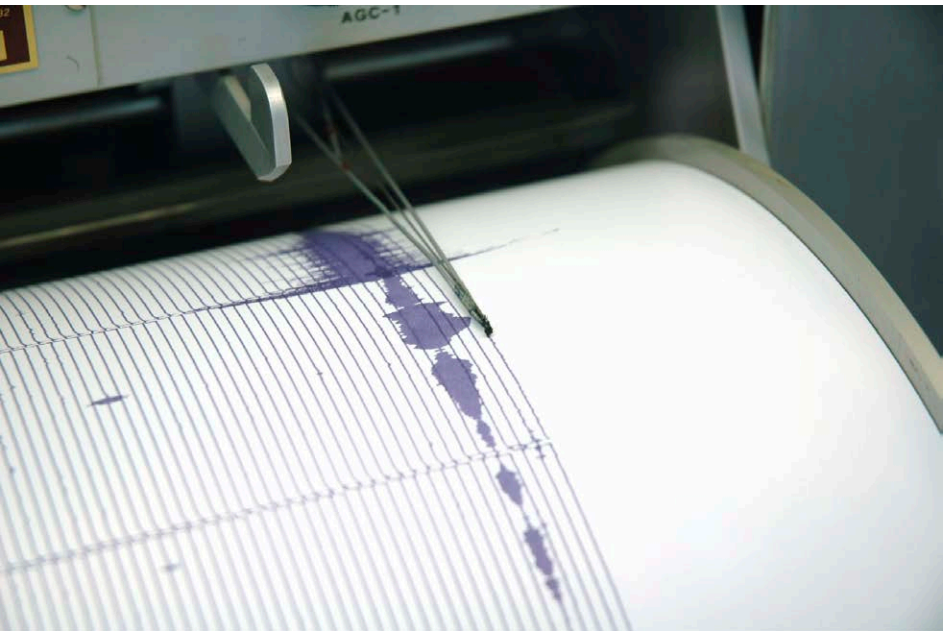
The five major drivers and plausible approaches to disarming value killers are summarized in Table 1. The past is not a prelude to the future, but we will seek to learn from the biggest value killers of the last decade. While we have not placed it on our list for the last decade, we anticipate that cyber-attacks will emerge as potential value killers in the coming years as our dependence on a networked communications infrastructure grows.

Table 1. Summary of key findings

High-impact, low-frequency risks	**Challenge:** Unexpected black swan events often caught companies by surprise, leading to value-killer losses. **Consider** deploying broader scenario planning and stress tests to envision and plan for the consequences of a broad range of risks and rare events.
Correlated or interdependent risks	**Challenge:** Almost 90 percent of the companies suffering the greatest losses in value were exposed to more than one type of risk. In most cases, an event exposed one major weakness that cascaded through the organization. **Consider** not looking at risks in isolation, and construct scenarios to assess what could go wrong in confronting the event and subsequent events across an enterprise and the ecosystem. Identify and evaluate buffers that help mitigate against cascading risks.
Liquidity risks	**Challenge:** The global financial crisis made liquidity risk more salient and increased the cost of capital to those with high leverage and low ratings. **Consider** current liquidity and cash reserves, and stress test the ability to navigate a future credit crisis. Work to ensure sufficient lines of credit from traditional and alternate sources of capital.
M&A risks	**Challenge:** M&A can sometimes fail to deliver the anticipated value. **Consider** the viability of the M&A deal to deliver anticipated returns under different and stressed economic scenarios.
Culture and compensation risks	**Challenge:** Incentive programs that reward short-term performance may create unsustainable models of profit and companywide risks. **Consider** how compensation and culture can impact risk taking by the company. Does it encourage risk taking within or outside the bounds of the company's risk appetite?

The value killers

In this research, we define value-killer losses as those losses of company value that are 20 percent or greater relative to changes in the MSCI All Country World Index within the same one-month period. So these are significant losses. If the MSCI index fell 10 percent in a month, the corresponding value-killer loss would be 30 percent or more within a month. We focused on losses of this magnitude relative to the market index, as we expect such losses to increase the scrutiny of management choices and drive increased pressure on management by shareholders, boards, and other stakeholders to deliver improved performance relative to a broad market index. We focused our value-killer research on the companies that survived through the period, so there is a survivor bias to this study. As a result, it allows us to make inferences on the frequencies, magnitudes, and types of risks encountered by the largest companies that do survive.



The frequency and magnitude of value killers

Across the 10 year time span of our study, we observed that 38 percent of the largest 1,000 public companies that still existed at the end of 2012 had suffered value-killer losses. One company lost as much as 81 percent of its total value. Only 6 percent of the companies analyzed had a value loss relative to the MSCI index of less than 10 percent over the decade. Although many of the value-killer losses were concentrated in the finance, insurance, construction, and raw-materials industries, we found value-killer losses were prevalent across a wide range of industries.

In contrast, in our first value killers study, we found 48 percent of companies had encountered a value-killer risk. At face value, this might suggest that 10 more companies in our sample avoided value-killer risks during the last decade. We can hypothesize that this is due to the improved and expanded use of risk management, but we cannot be certain. The global financial crisis in the last decade could have generated such unprecedented stock-market and index drops over an extended period of time that it obscured or distorted what in other circumstances would be recognized as a value-killer loss.

Exhibit 1. Partitions the largest 1,000 public companies into groups defined by their largest one-month decrease in value relative to the change in value of the MSCI All Country World Index

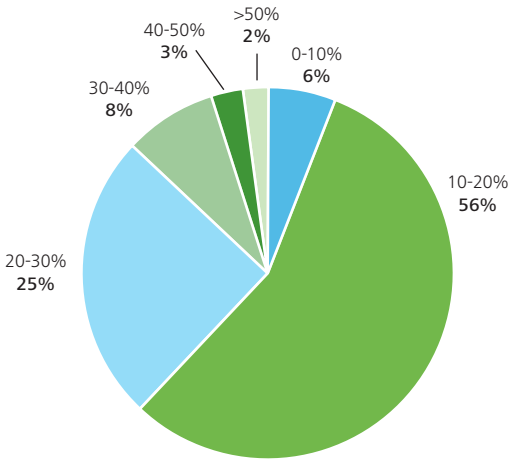
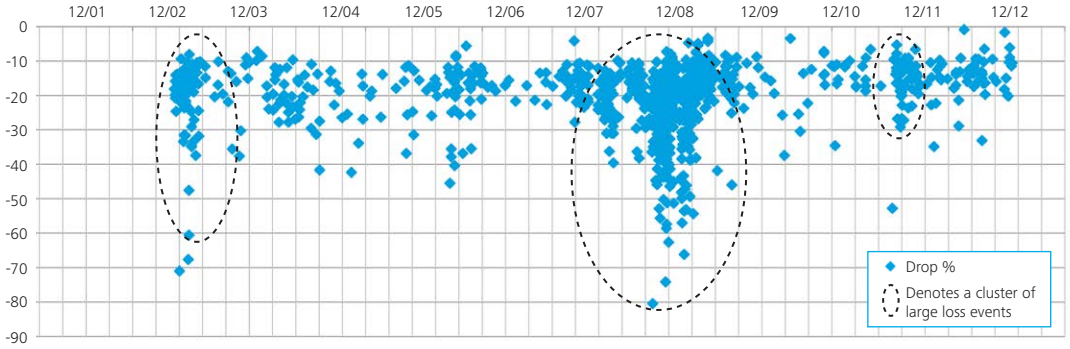


Exhibit 2. The distribution of loss events in the largest 1,000 public companies over the current decade

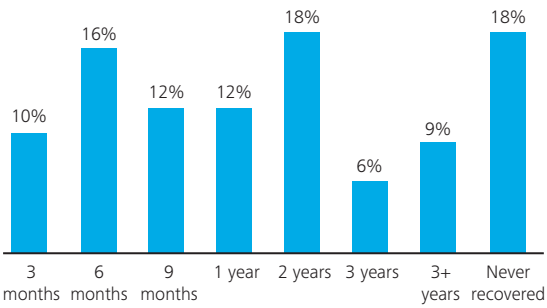


Duration of loss

In addition to the depth of a company's loss in value, we also examined the duration of loss. How long did it take for companies to recover from the damage?

Twenty-six percent of the companies saw their equity recover in six months or less. Another 24 percent took up to a full year before they saw their stocks return to their original levels. Beyond one year however, the picture is less encouraging. One-third of the companies recovered slowly over three plus years' time, but 18 percent failed to recover to previous values during the duration of our study. This recovery pattern is remarkably consistent with the duration of losses from our first value-killers study. It suggests that for about half the companies, management is able to act to remedy a value-killer loss within the first year. If not, the duration of the loss to recovery can drag out considerably.

Exhibit 3. Time required for share price to recover[4]



Drivers of loss

What might be the causes of the value killers that drive so much corporate value loss in a very short time?

To identify the drivers of major loss, we focused on the 100 companies with the steepest declines in value. By utilizing public disclosures, analyst reports, and news articles, we captured a broad set of secondary data. These 100 companies saw, on average, 42 percent of their value wiped out in one month. At best, 33 percent of value disappeared; at worst, 81 percent.[3] 18 percent of the companies had not recovered their lost value by the end of 2012.[4]

As with the 2005 value killers study, we grouped the 142 loss events (comprising 100 unique companies, as a few companies had more than one event of loss) into four broad categories of risk (see Exhibit 4). Exhibit 5 illustrates the triggering risk across the 142 loss events by the four broad categories we used for risk classification in our previous study.

Exhibit 4. Four broad categories of risk

Strategic risks
- Demand shortfalls
- Customer losses/problems
- M&A problems
- Pricing pressures
- Product/services competition
- Product problems
- Regulation
- R&D
- Management change
- Corporate governance
- Miscommunication/false guidance

Operational risks
- Earnings shortfall
- Cost overruns
- Poor operating controls
- Accounting problems
- Capacity problems
- Supply-chain issues
- Employee issues and fraud
- Noncompliance
- High input costs
- IT security
- Supplier losses

Financial risks
- Poor financial strategies
- Asset losses
- Goodwill and amortization
- Liquidity crises
- High debt and interest rates

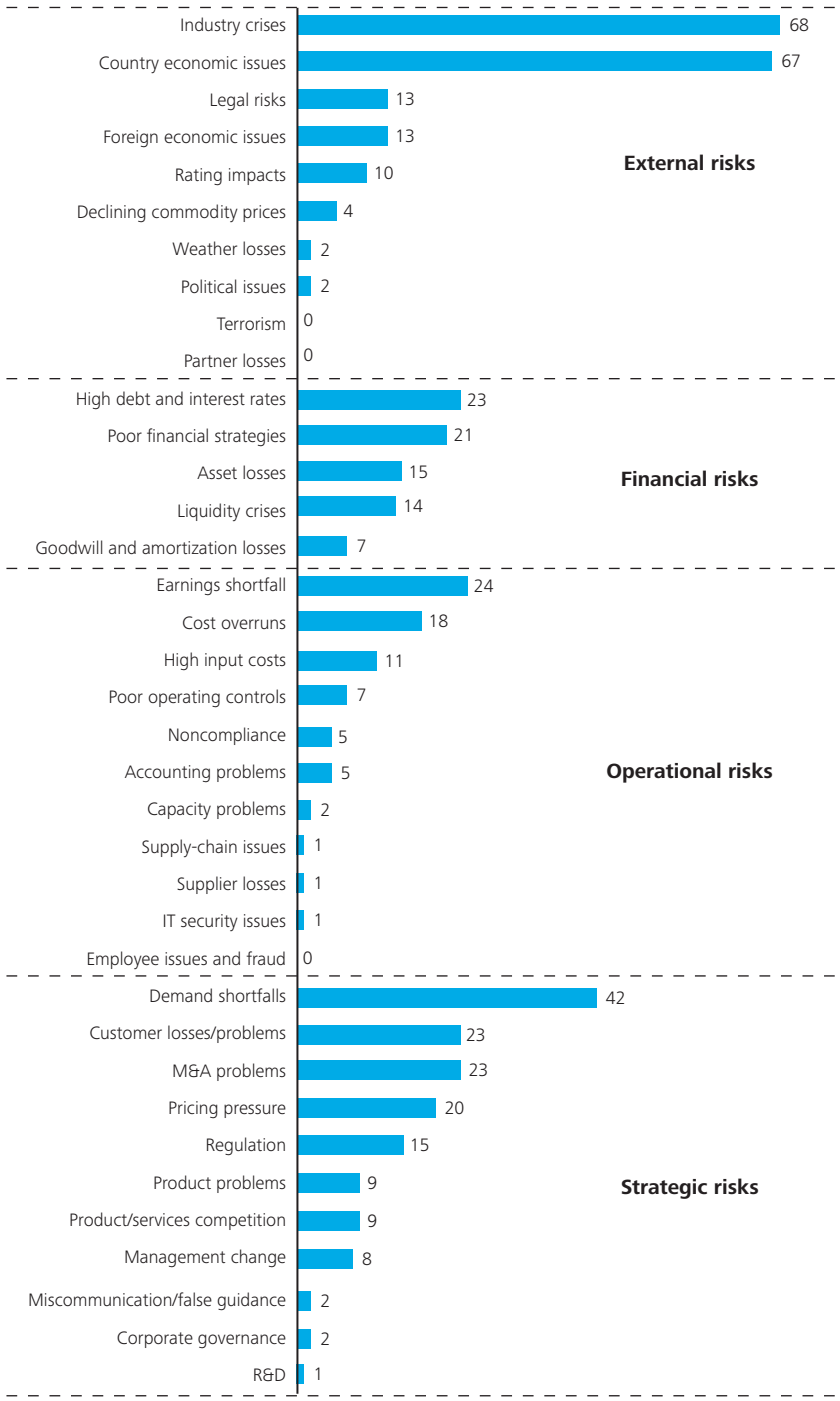
External risks
- Declining commodity prices
- Rating impacts
- Industry crises
- Legal risks
- Country economic issues
- Weather losses
- Partner losses
- Political issues
- Terrorism
- Foreign economic issues

Exhibit 5. Frequency of risk events across 100 public companies with largest value drops[5]

When we analyzed the largest losses, the story of loss was rarely simple. Almost 90 percent of companies were hurt by several risks working in concert even if triggered by a specific event. Most often, a low-frequency risk acted in conjunction with another risk the company did not anticipate, with loss-creating events spreading from one part of a company to another. Thus, when we further analyzed the stories of the 142 largest value losses, we found that a more complex array of risks was manifested in many of these losses.

Below we discuss five key types of risk issues that were particularly salient during the period of the study, along with some illustrative examples. They are:
- High-impact, low-frequency risks
- Correlated or interdependent risks
- Liquidity risks
- Mergers & Acquisitions risks
- Culture and compensation risks

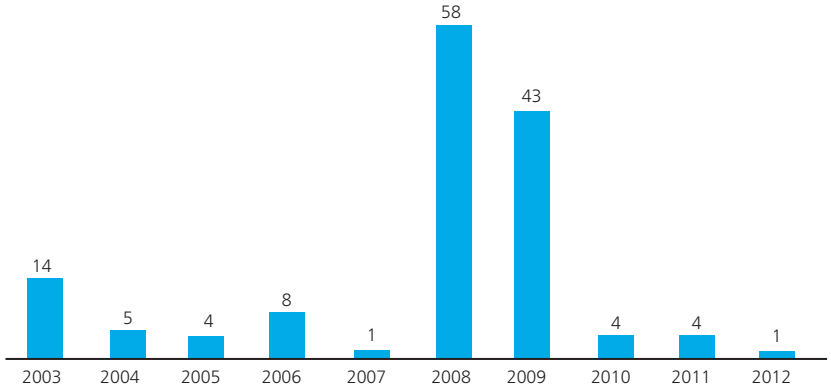
Exhibit 6. Frequency of drivers across 100 companies with largest value drops



High-impact, low-frequency risks

In our 2005 report, we observed that the largest global loss events occurred in conjunction with rare major events. These included the Asian financial crisis, the tech bubble, 9/11 and the economic downturn, and a series of accounting frauds. The same was true between 2004 and 2012, except that most events occurred in closer proximity to one another. In this period of study, the dominant event could be broadly classified as the global financial crisis. A large number of value-killer events across the 100 companies with the largest losses occurred in 2008 and 2009. Indeed, 30 of the 100 companies were financial-services firms, with 26 of the companies encountering a value-killer loss in 2008 or beyond.

Exhibit 7. Distribution of loss events across 100 companies with largest value drops



Case studies

The multiple value killers

During the financial downturn, some companies experienced multiple value-killer events. Indeed, nine of the 26 financial-services firms experienced more than one such event. In fact, these nine companies together accounted for 24 of the 142 value-killer events experienced by the 100 companies with the greatest value drops during the decade. This suggests that it was hard for investors to value these companies in relationship to the overall market during the course of the crisis, leading to multiple significant value-killer reassessments as information unfolded during the downturn.

In the hole

Various mining, minerals, and oil-and-gas extraction and processing companies experienced value drops during the global financial crisis. Seventeen of the 100 companies confronting the largest drops were in these industries, and 14 of these companies confronted value killers in the last quarter of 2008. After many years in which average commodity prices increased substantially – in what some called a "super-boom" cycle – prices of key commodities began to fall rapidly in 2008 on concerns of falling global demand and recession. In the fourth quarter of 2008, this led to significant loss in market value for various mining, minerals, and other extraction companies.

Correlated or interdependent risks

In 2005 we wrote, "While many firms have invested in enterprise risk management, few adequately manage risk interdependencies. Most firms manage risk in 'silos,' often leaving them blind to relationships between risks. At the time, we noted a 2003 Global Association of Risk Professionals survey of financial services executives, in which more than half said their firm used disparate systems for operational risk and credit risk, while only 10 percent said that they had integrated technology that covers both sets of risks.[6]"

In this study, 90 percent of the companies observed were affected by more than one risk factor. An isolated risk may be manageable, but the biggest losses were the result of contagion, when weakness in one part of a company almost always triggered problems elsewhere in the company. Sometimes the weakness came from an external source, such as a customer, a supplier, or the economy. At other times, the source of the weakness was internal. A common element was a segregated view of risk, or one that didn't weigh the possible effect across business units sufficiently, which often led to a cascade of losses.

Caught between a rock and a hard place

A large company in the computer industry confronted declining demand and prices for its products and could not meet prior business-plan forecasts for fourth-quarter 2008. The company reduced its go-forward revenue expectations, and had to initiate a restructuring of its operations and reductions in its workforce to focus on strengthening the balance sheet. On top of this, the company also announced that it would record material impairment charges because of "the current macroeconomic business environment." These factors, in turn, motivated a credit-rating agency to downgrade the company's rating, citing the above factors. All of this led to a drop in share value of more than 40 percent within 20 days.

At the mercy of policies

Travel and hospitality companies were also adversely effected by the financial crisis. An Asian investment holding company that owns and operates hotels and casinos in Macau saw significant declines in share price during the last quarter of 2008. While the economic uncertainty caused by the financial crisis played a key role, this was amplified by the Chinese government's tightening of visa restrictions and monetary policy for Chinese citizens. This reduced the number of tourists visiting Macau and their ability to spend, driving a 52 percent share-price drop.

As illustrated above, value-killer losses often result from the interaction of a number of unpredictable factors and are rarely the outcome of just one issue. In other words, when bad things happen, they can occur as an unexpected bundle of correlated or uncorrelated events that add up to a significant value-killer loss.

Liquidity risks

The downturn highlighted the critical importance of liquidity. On the one hand were companies that were well capitalized and able to finance their operating losses during the crisis. On the other were companies that were highly leveraged—they had debt coming due and sometimes were unable to raise capital during the downturn. This led to "A Tale of Two Capital Markets,"[7] where the cost of capital was highly differentiated across similar-size companies in an industry, creating a competitive advantage for liquid companies with low leverage and adequate cash flows to meet operating needs.

Case studies

Cementing a future

Another group of companies confronting value-killer losses during the global economic crisis were those in the real estate, construction, and construction-materials industries. A large global cement company had leveraged up to make a key acquisition to expand its U.S. and European footprint prior to the downturn. At the end of 2008 and the beginning of 2009, the company faced two value-killer losses amounting to over a 40 percent drop in the company's stock value as demand for its cement products fell dramatically in key markets and investors became concerned about the liquidity of the company. The major credit-rating agencies downgraded the credit rating of the company, which had large debt repayments from its acquisition coming due in 2009 and 2010. First-quarter operating income in 2009 was significantly reduced to less than a tenth of the income from the same period in the prior year; the company also reported a significant loss in the first quarter of 2009. In response, management took a number of steps to shore up liquidity, successfully renegotiating loans and extending repayment terms with banks and issuing shares and new bonds. Combined with a program of cost cutting, the company was able to return to profitability by the end of 2009, reducing more than 80 percent of its bank loans.

Liquidity injections

During the global financial crisis, many companies confronted both market liquidity and funding liquidity risks. As investors lost confidence in various collateralized debt obligations, especially mortgage-backed securities, the market liquidity in these assets was significantly reduced. Various financial institutions and other companies also faced funding-liquidity risks as in the previous example. As financial firms reduced lending to shore up capital positions, credit markets worldwide began to freeze up. In many countries, this was followed by government intervention to help recapitalize financial institutions and ensure funding liquidity lending remained available broadly to companies. Under the U.S. Troubled Asset Relief Program (TARP), the U.S. Treasury Department purchased key assets and provided funding to key banks in return for preferred shares and warrants. Ten of the 31 financial-services firms that were among the 100 companies with the largest value losses received government funding from their respective countries to help them manage their funding liquidity risks.

Mergers & Acquisitions (M&A) – related risks

Successful mergers and acquisitions typically benefit both the acquirer and the acquired by unlocking value from synergies across the merged entities, upholding the theory that the whole is greater than the sum of its parts. Potentially realizing this value requires careful due diligence and valuation before the merger and an effective postmerger integration strategy.

After industry crises, country economic issues, and customer-demand shortfalls, M&A issues were the next major driver of the largest value-killer losses. Compared with the prior decade, there was a 64 percent increase in the number of value-killer losses driven by M&A. What does this convey? Like the cement company discussed in the last section, M&A activity may be a factor in creating exposure to other risks, such as liquidity risks in changing economic circumstances.

Case study

The hunter is hunted

In 2007, a global automotive-parts company acquired the parts division of another company to expand its product and market offerings and capture synergies and talent. To make the purchase, the acquirer assumed considerable debt. Over the next year, as the acquired company was being integrated, the stock price of the acquirer declined to nearly half its original value. This motivated a third company to launch a hostile takeover bid and take control of the company in 2008. A short-term drop in performance, partly due to the global financial crisis, made it difficult for the hunter not to become the hunted.

Culture, compensation, and fraud risks

In our previous study for the period 1994 to 2003, there were a number of instances of value-killer losses in major companies due to accounting scandals and fraud. These scandals were widely reported. In the period of our recent study, the reported instances of such losses from outright accounting fraud were substantially diminished in our sample of 100 companies with the largest value drops. The aftermath of prior scandals and the enhanced focus on internal controls to comply with Sarbanes-Oxley and similar regulations worldwide may have reduced the instances of value-killer losses from accounting fraud.

Although large accounting frauds as value killers diminished, a significant loss of market value occurred during the downturn. In hindsight, it appears many financial services firms may have taken excessive risks and made poor decisions about the risks in the securities they originated, purchased and sold. Did compensation models and corporate culture contribute to this risk taking? There are different points of view as to the causes of the financial crisis, but compensation models and culture in the industry is viewed by some researchers as a contributing factor.[8] As noted in our last study, sustaining an ethical tone at the top of the organization and promoting an ethical and risk-aware culture can act as deterrents to some of these risks. Aligning compensation and control models to avoid excessive risks can also be helpful. However, as the researchers referenced above note, industry-wide adoption of similar compensation models is required to ensure that firms can manage compensation incentives without losing talent to competitors with more permissive compensation models.

Conclusion

The dominant driver of major value drops in this revisit of our 2005 value-killers study was the global financial crisis. As illustrated in this report, the consequence of the crisis triggered varied value-killer losses—from decreased customer demand across a wide range of industries to increased funding-liquidity risk to the inability to realize benefits from M&A activity in a timely fashion. The crisis and the massive government interventions in financial markets may have obscured the prevalence of other value killers. Yet, despite the overwhelming impact of the financial crisis as a major driver of risks underlying value-killer losses, many findings remain similar across both decades.

First, low-probability, high-impact, low frequency events drive many value-killer losses. This suggests the need for CFOs, risk officers, and boards to consider scenarios of low-frequency events or what would create "tail risks."

Second, the interdependence between risk events matters. Value killers often come as a consequence of a messy, unpredictable bundle of correlated or uncorrelated events. The financial crisis highlighted the importance of systemic risks and interdependence between institutions. The world today is more interconnected globally through technology, transportation, and trade than ever before. Interdependence and vulnerability to worldwide events and systems has increased. A flood in Thailand or a nuclear power plant disaster in Japan can throw manufacturers' supply chains into disarray. All of this shows our increased dependence on global resource networks for critical inputs. Risk management should go beyond enterprise resource planning to more critically evaluate the extended enterprise resource network and its resilience to risk events. While it is hard to predict the future, building scenarios from risks identified in this and our previous study might help companies frame critical risk events and establish a dialogue on how risk events may further snowball into value killers. While we did not see cyber value killers as significant events in the current study, the Stuxnet computer worm has already demonstrated how a cyber-attack can impact a nuclear program. As our collective use of electronic networks and systems proliferate, we can perhaps anticipate cyber-attacks, software errors, or network failures to drive significant future value losses for some companies.

Third, liquidity- and M&A-related risks were more salient this decade. Again, the scale and scope of the financial crisis impacted market and funding liquidity and may have adversely affected the financing assumptions underlying varied merger deals. One encouraging development over the last decade was the lower frequency of fraud risks driving the largest value killers.

While risks cannot be eliminated, companies can better prepare for them. Scenarios and models can be built to explore how companies will fare when confronted with a value-killer event (see Exhibit 6), especially, high-impact, low-frequency events. Companies can stress-test their capacity to respond to different scenarios where a bundle of events—correlated or uncorrelated—occur concurrently. While the past is not a prelude to the future, a risk-intelligent enterprise can build on the knowledge of prior value-killer risks to help identify, model, and practice ways to manage and respond to existing and future value-killer risks.

Appendices

Appendix 1: Study methodology

Company selection

- Downloaded daily closing stock price ("stock price") and shares outstanding for every company listed in the New York Stock Exchange ("NYSE"), NASDAQ, and the NYSE AMEX (collectively, "major indices") on 12/31/2012
- Calculated market capitalization by multiplying closing stock price by shares outstanding
- Reduced the list to the 1,000 largest companies by market capitalization ("1,000 largest companies")

Stock price analysis

- Downloaded the stock price and cumulative factor to adjust prices over a date range ("cumulative factor")[9] between 1/1/2003 and 12/31/2012 ("the observation period") for each of the 1,000 largest companies
- Adjusted for distributions and stock splits by dividing stock price by cumulative factor ("adjusted price")
- Obtained the daily index level ("daily level") of the MSCI All Country World Index ("MSCI")
- Calculated 20-day moving average of adjusted price and daily level over the observation period for each company's stock
- Arithmetically normalized 20-day moving average of adjusted price by dividing it by 20-day moving average of daily level ("normalized price") for each company's stock
- Computed 21-day change in normalized price[10] ("normalized return") for each company's stock

Value killers analysis

- Identified the most negative normalized return and corresponding date (jointly "loss event") for each of the 1,000 largest companies
- Counted the number of days it took for each company to return to its normalized price 20 days before its loss event
- Sorted the loss events of the 1,000 largest companies to determine the 100 company names with the largest loss events (This included 142 events as some companies had multiple loss events.)
- Analyzed all news and corporate press releases written in English generated by Factiva between a month and three months preceding each loss event
- Followed up by reading equity-analyst reports when the root cause of a loss event could not be discerned from news and press releases
- Summarized each of the 142 loss events by applying the risk classification framework from the prior study and writing short descriptions; due to inadequate publicly available information, we excluded 11 companies from the qualitative loss event classification analysis

Appendix 2: Maximum one-month loss in normalized share price

Range	Count	Frequency
0-10%	64	6%
10-20%	561	56%
20-30%	245	25%
30-40%	81	8%
40-50%	27	3%
>50%	19	2%
Grand total	**997**	**100%**

Note: The total number of companies in the above distribution is 997. Three companies were omitted given insufficient stock price data available (no moving average).

Appendix 3: Time required for share price to recover

Recovery	Count	Frequency
3 months	93	10%
6 months	158	16%
9 months	115	12%
1 year	111	12%
2 years	172	18%
3 years	54	6%
3+ years	87	9%
Never recovered	168	18%
Grand total	**958**	**100%**

Note: The total number of companies in this distribution is 958.

Appendix 4: Loss magnitude statistics

Maximum loss statistics	
Mean	-67.20%
Median	-66.30%
Standard deviation	5.00%
Standard error	0.5.%
Sample variance	25.30%
Kurtosis	-0.90%
Skewness	-70.80%
Minimum	-59.80%
Maximum	-59.80%
First-Quartile loss (25%)	13.79%
Third-Quartile loss (75%)	23.68%
Range	23.00%
Count	100%
Confidence level (95%)	1.40%

Appendix 5: Loss duration statistics

Loss duration statistics	
Mean	297.9063
Median	193.5
Mode	1
Standard deviation	315.3466
Standard error	11.21953
Sample variance	99443.5
Kurtosis	10.28398
Skewness	2.452103
First-quartile duration (25%)	95
Third-quartile duration (75%)	362
Minimum	1
Maximum	3098
Range	3097
Count	790
Confidence interval (95%)	40.84309

Note: This calculation is based on 790 companies that recovered.

Endnotes

1 "Disarming the Value killers: A Risk Management Study," Deloitte Research, 2005. http://www.deloitte.com/assets/Dcom-Australia/Local%20Assets/Documents/ValueKillersfinal.pdf

2 Appendix 1: Study methodology

3 Appendix 4: Loss magnitude statistics

4 Appendix 5: Loss duration statistics

5 Assignments do not sum to 142 because loss events can be described by more than one category

6 "Operational Risk Survey – 2003," Global Association of Risk Professionals, 2003.

7 "A Tale of Two Capital Markets," Deloitte, 2011. http://www.deloitte.com/assets/Dcom-UnitedStates/Local%20Assets/Documents/CFO_Center_FT/us_cfo_ATaleofTwoCapitalMarkets_030711.pdf

8 See: Chapter 8: Rethinking Compensation in Financial Firms by Gina Luca Clementi, Thomas F. Cooley, Matthew Richardson and Ingo Walter in Restoring Financial Stability: How to Restore a Failed System edited by Vichal Acharya and Matthew Richardson (Wiley 2009).

9 Defined by the Center for Research in Security Prices (CRSP) as the cumulative factor from a base date used to adjust prices after distributions so that equivalent comparisons can be made between prices before and after the distribution. http://www.crsp.com/products/documentation/data-definitions-c#cumulative-factor-to-adjust-prices-over-a-date-range

10 21-day gap used to avoid overlap in 20-day moving averages

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