

PROJECT 3: A SUMMARY OF WHY INVESTMENT BANKS CONTINUE TO FAIL BY CAROLINE GIERYN.

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Financial crisis are extremely costly from a monetary, social and psychological standpoint. Output losses of this magnitude translate into about a \$50,000 to \$120,000 loss for every household. In addition to these monetary losses, unemployment number increased significantly, peaking a 10% in October 2009, and hovered around this level for several years. Many of the repercussions are difficult to quantify, but statistics clearly show that financial meltdowns, like the Great Recession, have severe long-term consequences, which make it far too expensive for society to continue without better preventive policy measures in place. Analyzing past mistakes and historical events is one of the best tools available for determining effective policy and ensuring that financial crises are mitigated in the future.

Both of these consequences are apparent following the collapse of two influential banks, **Caldwell and Company** and **Lehman Brothers**, which failed during the Great Depression and the Great Recession respectively. These failures illustrate the mistakes that investment banks are prone to make. The most striking similarity between the two banks is the culture of greed that they both promoted and which was exemplified by their excessive risk-taking practices that ultimately caused their failures.

A Brief History of Caldwell and Company.

In 1917, Rogers Caldwell, a member of a well-respected Nashville family, started his own municipal bond house Caldwell and Company. His entry into the municipal market coincided with the U.S.'s entry into World War I, which meant that war bonds were flooding bond markets. In addition, southern municipal bonds had long been stigmatized due to a history of default (McFerrin 1). In spite of these problems that had all but suffocated the market for southern municipals, Caldwell, at the age of 27 with minimal experience in matters of finance, started a southern municipal bond house. Over the next 13 years, this seemingly ill-fated venture became the largest investment institution in Southern history (McFerrin 2). The most likely explanation as how Caldwell overcame all odds in a short time is that he undertook an incredible amount of risk, investing in a wide array of speculative markets and leveraging up his company to imprudent levels. As a result, the reason for his successes also explain the bank's rapid descent into insolvency in late 1930.

Shortly after the end of World War I in 1918, Southern municipal bonds became an increasingly popular investment because the South was industrializing, translating into huge economic growth across all business sector. In order to finance expansion into markets outside of the municipal bond market, Caldwell and Company had to build out the liability side of its balance sheet. One of Caldwell's most critical and controversial tactics was the creation of a depository institution called The Bank of Tennessee in order to amass debt, obtain capital, and eventually shield some of its more questionable business practices from the public eye. The

Bank's primary purpose was to provide Caldwell and Company with a place to deposit the money it made from bond sales (McFerrin 6). As early as 1923, the company started to invest in real estate, a market that evolved shortly after World War I. So, the market was new and highly unregulated when Caldwell started to invest company resources in

Despite the inexperience of Caldwell in the industry, by 1925, Caldwell and Company had issued a total of \$1 billion in real estate mortgage bonds on a variety of buildings including hotels, apartments, hospitals, office buildings and collages (McFerrin 18). Next, Caldwell delved into industrial securities, an especially hot market given the ongoing industrialization of the South. In the end, Caldwell and Company had control over industrial assets exceeding \$40 million in spite of his profound lack of experience in managing companies giving it a considerable amount of power and influence over Southern industry (McFerrin 47). By acquiring businesses as opposed to just investing in them, Caldwell and Company could mandate that their subsidiaries deposit all cash reserves with the Bank of Tennessee thereby increasing its access to highly liquid funds with which to invest.

Throughout Caldwell and Company's short history, total assets were primarily comprised of non-liquid securities whereas cash accounted for a mere 5.5% of total assets of best. To make matters worse, Caldwell and Company had almost no permanent capital to support its balance sheet. Instead, it relied completely on outside sources to provide funding. By 1929, the majority of its liabilities were in the form of demand deposits held at Bank of Tennessee, demand loans and liabilities on purchase agreement, all of which could be called by creditors at any time. Thus the company's future was at the whim of creditors. To ensure creditors would not recall their loans and ruin his empire, Caldwell had to convince creditors of his firm financial well-being. To do so, Caldwell engaged in unethical and even illegal activities often using the Bank of Tennessee to shield these practices from public scrutiny.

In spite of a poor accounting department and tax regulation standards, investors were warned prior to 1929 about Caldwell and Company's suspicious behavior. While the company remained ignorant, Rogers Caldwell finally recognized the dire position of his company. In order to improve the financial health of Caldwell and Company, he negotiated a merge with Banco Kentucky in May of 1930, creating what the Herald-Post deemed "by far the most important financial structure ever built in the middle Western or Southern States and one that will undoubtedly stand out in the future as one of America's greatest financial institution"

In September of 1930, bank examiners were brought in to evaluate the financial health of the Bank of Tennessee and discovered that its cash reserves were far below the legal minimum. This depletion of cash reserves was the result of Caldwell and Company borrowing excessively in order to meet immediate liquidity demands caused by suffering markets. On November 5, the committee appointed by the Atlanta Federal Reserve called the Tennessee superintendent to re-examine the Bank of Tennessee though Caldwell tried to use his political power to influence which candidates were to be elected into this committee. The following day, the superintendent officially declared the Bank of Tennessee insolvent and filed a report with the Chancery Court. Finally, on November 14, Caldwell went into receivership. Caldwell's failure was felt throughout the South as all banks and Companies bearing any association collapsed in

succession. This failure introduced uncertainty and distrust into the entire network causing the whole everything to collapse. This led to severe damage of consumer confidence, raised the cost of financial intermediation and created large financial losses for many Southern firms and states. That is all to say, Caldwell and Company played a significant role in the depressed economic conditions of the South during the early 1930s.

A Brief History of Lehmann Brothers.

Because the collapse of Caldwell and Company had such severe and widespread consequences, it is hard to imagine how investment banks within a matter of decades could forget the lessons of the Great Depression and allow greed to once again dictate decision making. Most importantly, in 1999, the government did away with the remaining elements of the Glass-Steagall Act, implemented after the Great Depression to ensure that history, in particular banking history, did not repeat itself. More specifically, this act was intended to create a firewall between commercial and investment banks, drawing several clear-cut distinctions. Essentially, it contained four provisions, which limited commercial banks to very narrowly-defined investment activities and prohibited investment banks from accepting deposits. However, this piece of legislation was seen as impeding economic development and so congress repealed it in 1999. Without these restrictions in place, banks were once again free to expand without limits and take huge gambles with shareholder money. And once again shareholders and banks paid heavily for their excessive risk-taking behavior.

In 2008, Lehman Brothers went down in infamy for its pivotal role in instigating the Great Recession. Prior to 2008, this investment bank had a history of bouncing back from economic hardship with even larger profit margins and stronger returns on investment. One Lehman Brothers banker describes the company's resilience to hardship, saying: "Our stock price, again and again, hit stratospheric new highs, driven by the only occasionally interrupted momentum of our surging performance". This statement captures the hubris that had become an integral part of Lehman culture. Just as Rogers Caldwell had done 80 years before. Failing to learn from history, at 1:45AM on September 15, 2008, Lehman Brothers filed for Chapter 11 – complete liquidation of the firm. The iconic green letters that had towered over Times Square for years were removed, signifying the first-time in its 160-year history that Lehman could not recover from its losses and prompting a widespread loss of confidence felt throughout the United States. Many times before 2008, Lehman Brothers had found itself on the brink of failure as a result of its yield-seeking strategy. Each of these prior instances should have served as warnings against such imprudent behavior. Unfortunately, much like the lessons of the Great Depression, they were ignored largely because Lehman often escaped these brushes with bankruptcy without facing any real repercussions. Like Caldwell and Company, Lehman began as a Southern institution headquartered in Montgomery, Alabama. Within 15 years of its founding, the Civil War started and presented Lehman with its first potentially ruinous challenge. However, the small firm survived the hardship and rebuilt after the war with its primary change being its relocation to New York.

Well-established as an investment firm, Lehman, like Caldwell, looked for other emerging markets and high-growth industries in which to invest. In 1906, Lehman partnered

with Goldman Sachs to finance the development of the retail sector. However, like all firms, it suffered from the depressed economic activity. In 1930, Lehman Brothers developed private placements, which provided an alternative way for Blue Chip companies to secure funding at a time when struggling financial markets were unreceptive to new issuances.

Again, in 1984, Lehman was almost forced into bankruptcy after sustaining significant trading losses. At this precarious time, one trader Dick Fuld, incidentally the trader that led Lehman into bankruptcy in 2008, placed an enormous bet that interest rates would fall. In 1994 when American Express spun-off Lehman, Dick Fuld, the man who in many ways created the need for the merger in the first place, was named the new CEO. Lehman's history is riddled with many other instances of overly risky investment strategies ending in near-failure, but each time Lehman managed to find a way to extract itself from the situation. That is until 2008 when Lehman gambled and suffered net losses of \$2.8 billion and \$3.9 billion respectively in its final two quarters. These losses were attributable primarily to heavy write downs on investments in very risky, unstable markets, most notably the subprime market.

The causes of Lehman's failure closely mirror those discussed in regards to Caldwell and Company's failure. Though Lehman had a 160-year history (in comparison to Caldwell's 13-year history) from which to learn the importance of risk management, it opted for a similar profit-maximizing investment approach. In 2006, Lehman adopted a very aggressive growth strategy, insisting on 13% growth in revenues year-over-year. By the end of 2007, Lehman had an unprecedented \$32.6 billion in real estate assets on its books comprised mostly of Mortgage-Backed Securities, commercial real estate assets and Credit Default Swaps. When the real estate market started to soften in 2006, Lehman, at the command of senior leadership, actually increased its exposure to both commercial real estate and Alt-A loans, adding to its stockpile of intrinsically risky real estate assets, in October 2007 Lehman entered into a \$22 billion joint venture to purchase Archstone Smith Trust, a real estate investment trust.

To make its leverage situation even more precarious, Lehman used primarily short-term debt to finance its investment activity, introducing a time inconsistency problem in addition to overleveraging (Tully 1). For most of his tenure as CEO of Lehman, the press praised Dick Fuld as one of America's most effective CEOs. He transformed Lehman into one of the preeminent investment banking houses, growing return on equity from a mere 2.2% in 1994 to an astounding 19.4% in 2005 and raising stock price by an average of 29% each year. After the market crashed and wreaked havoc on the Lehman balance sheet, his hubris actually deepened the hole instead of helping him and his firm recover from the mistakes which he had made.

Fuld and Caldwell both relied on their confidence, aggression and greed to turn their respective companies into newsworthy success stories. The extreme hierarchical structure of the two companies meant that as CEOs, Fuld and Caldwell could readily endorse a strategy of greed that centered on entering into poorly understood, high-yield markets while simultaneously unrestrainedly increasing leverage ratios. It also meant that when returns dissipated along with shareholder money, Fuld and Caldwell were saddled with most of the blame.

Quantitative Analysis.

Comparing the history of Caldwell and Company to that of Lehman Brothers reveals several recurring business practices, namely the overexpansion of the balance sheet and the eagerness to be financial innovators, that contributed greatly to the collapse of each institution. The issue then becomes how to prevent other investment institutions from making these same mistakes. Certain mathematical models, for instance, can quantify the risky behavior of banks by quantifying the risk on a bank's balance sheet. If these models are well-formulated and effective, then regulatory agencies can use them to recognize problems and stop such behavior from contributing to a complete financial meltdown. Models, like the Value-at-Risk model, show that Lehman's imprudent, large-scale investments in very risky assets exposed the firm to huge losses when asset prices started to fall. This model measures how much a portfolio stands to lose at a certain confidence level over a set time horizon (NYU Stern School 1). In other words, Value-at-Risk estimates the maximum amount the firm would expect to lose on its portfolio in one period. There are several different methods for actually calculating Value-at-Risk, including the analytical method, the historical simulation and the Monte Carlo simulation, each of which has a unique set of advantages and disadvantages.

In order to apply the Value-at-Risk model, access to balance sheet data is needed and because Lehman was a publically traded company from 1994 onwards, its audited annual reports are readily available. The St. Louis Federal Reserve's database FRED had historical pricing for certain indices that provided a good estimate of market movements in four of the five categories. 10-Year Treasury Bonds were used to represent the Government and Agency Securities market. Despite imperfections in the data, the results should still adequately show that Lehman had allowed for an unjustifiable amount of risk to accumulate on its balance sheet.

The formula below was used to calculate gross leverage ratio for both Lehman Brothers and Caldwell and Company:

$$\text{Capital to Asset ratio} = \text{Shareholder's Equity} / \text{Total Assets}$$

Calculating Lehman's Value-at-Risk is a considerably more complex procedure. The first step is to choose the parameters, which in this model are the confidence interval and holding period. Following convention, she specified a 95% confidence level. Assuming distributions of asset prices are standard normal, a 95% confidence level translates into about 1.6455 for a cumulative standard normal distribution. This assumption is important to note because financial asset returns do not necessarily have normal distributions especially in the event of market dislocation.

Because the pricing data for all asset classes was collected on a monthly basis, she used one month for the holding period. The next step was to combine all of the historical pricing data into a single spreadsheet. Then, she took the natural log of the monthly price changes to transform the data into percent change. From there, she constructed a correlation matrix relating the five asset classes. The matrix is reproduced below: (see the paper)

She says that by looking carefully at this chart reveals the unexpectedly high correlation between the different asset classes on Lehman's balance sheet. These high correlations suggest that

Lehman's balance sheet, even when taking into consideration different types of assets, is not well-diversified, which only adds to overall riskiness. The following expression evaluates individual asset (as opposed to portfolio) Value-at-Risk's for each of the five asset types:

$$\text{Asset Value-at-Risk} = \text{standard deviation} \times \text{position} \times 1.6455$$

After calculating individual asset Value-at-Risk for all five asset classes, the asset Value-at-Risk vector must be transposed for the ensuing matrix multiplication. To find portfolio Value-at-Risk at the 95% confidence level over a one month period, the data must undergo the following calculations:

Step 1: multiply the correlation matrix by the transposed asset Value-at-Risk vector. This is an array function, so the result will be another vector with dimensions 1x5.

Step 2: multiply the vector calculated in step 1 by the asset Value-at-Risk vector

Step 3: Take the square root of the number produced in step 2. The final number means that there is a 5% chance that Lehman will sustain a loss of that amount over the course of one month. Because she used yearly balance sheet data, she multiplied the portfolio Value-at-Risk's by 12 to obtain Lehman's annual portfolio Value-at-Risk metric. Transforming the yearly Value-at-Risk into a percentage of total assets makes the information readily comparable to the capital/asset ratio. The findings are reproduced below: A Comparison of Lehman Brothers' Yearly VaR (as a % of total assets) to its Capital: (see paper for the chart.)

To interpret this chart, examine the results for 2007. Lehman's annual Value-at-Risk as a percentage of total assets is around 9.28%, which means that there is a 5% chance that Lehman's total asset value will decline by 9.28% over the course of 2007. However, Lehman has only enough capital to withstand a 3.25% decline, far below the estimated Value-at-Risk. To be adequately capitalized, Lehman should have enough capital on its books to absorb a worse-case scenario loss. In general for a firm to be adequately capitalized:

Value-at-Risk (as a percentage of total assets) < Capital to Asset Ratio

Using the results above, it can be concluded that Lehman was undercapitalized from 2000 until 2007. Thus, evaluating Value-at-Risk as a percentage of total assets alongside capital as a percentage of assets serves as a type of internal stress test.

Recognizing the flaws with self-regulation policies, the Federal Reserve has spent the years after the 2008 financial collapse developing regulation, primarily stress-tests, to evaluate the vulnerability of the largest financial institutions to severe adverse shocks. As a result, supervisory stress tests are now an annual process for the 19 largest banks as well as 11 other institutions deemed critical to the financial system (Bernanke). Due to the complexity of the tests and the value of the results, the Fed has created a model validation group to improve upon the models and a model validation council to provide independent advice on ways that banks can reduce risk. Going forward, regulatory agencies must continue to find ways to effectively monitor balance sheet growth without preventing investment banks from performing their intended function, which if performed correctly is vital to economic efficiency.

