

# Lehman's Lemons: Do Career Disruptions Matter for the Top 5%?\*

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## Abstract

How resilient are high-skilled, white collar workers? We exploit a uniquely comprehensive dataset of individual-level resumes of bank employees and the setting of the Lehman Brothers bankruptcy to estimate the effect of an unanticipated shock on the career paths of mobile and high skilled labor. We find evidence of short-term effects that largely dissipate over the course of the decade and that touch only the senior-most employees. We match each employee of Lehman Brothers in January 2008 to the most similar employees at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS based on job positions, skills, education, and demographics. By 2019, the former Lehman Brothers employees are 2% more likely to have experienced at least a six-months-long break from reported employment and 3% more likely to have left the financial services industry. However, these effects concentrate among the senior individuals such as vice presidents and managing directors and are absent for junior employees such as analysts and associates. Furthermore, in terms of subsequent career growth, junior employees of Lehman Brothers fare no worse than their counterparts at the other banks. Analysts and associates employed at Lehman Brothers in January 2008 have equal or greater likelihoods of achieving senior roles such as managing director in existing enterprises by January 2019 and are more likely to found their own businesses.

**Keywords:** career disruption, bankruptcy, human capital, skilled labor, inequality

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# 1 Introduction

Workplace disruptions such as plant closures and corporate bankruptcies can have dramatic effects on individuals' subsequent career outcomes.<sup>1</sup> Most of the evidence on career disruptions covers menial labor and relatively unskilled, low-wage workers (Kletzer, 1989; Ruhm, 1991). But are there analogous effects for high-skill, white collar workers with fewer liquidity constraints? We address this question using the unique setting of the Lehman Brothers bankruptcy. Our results point to a novel source of income-related inequality: even in the face of a large negative shock, high-skilled white collar workers suffer few of the negative effects from displacement that are typically experienced by the rest of the labor force. Compared to similar employees at other banks, those who were hit by the Lehman Brothers bankruptcy are more likely to experience short-term exit from employment and industry switches. However, these effects concentrate among individuals in senior positions and are absent for younger employees such as analysts and associates. Furthermore, junior ex-Lehman employees did not face any long-term adverse effects in their career growth following the Lehman Brothers collapse, reaching comparable positions as their counterparts at the other banks by January 2019.

The Lehman Brothers bankruptcy offers an attractive empirical setting for two reasons. First, it allows us to study precisely the type of employees who have been understudied by the previous literature on the effects of displacement: high-skilled, mobile, and relatively liquidity unconstrained workers. Second, the Lehman Brothers bankruptcy was an arguably unanticipated event until the last few months. This event affected the operations of one large bank (Lehman Brothers),<sup>2</sup> which disrupted individual individual workers' career trajectories. At the same time, a number of other financial institutions with similar activities and culture did not experience the same type of disruption, offering a natural control group of similar employees drawn from the same pool of skilled labor who experienced the same pre-trends but not the bankruptcy event itself: the employees of other investment banks such as Goldman Sachs and Morgan Stanley.

The effects of the Lehman Brothers bankruptcy on individual employees have drawn continued interest and gathered anecdotal evidence for over a decade, with remarks in the popular press ranging from lamenting the fate of the displaced rank-and-file employees to begrudging the executives' easy recovery and lauding the ex-Lehman employees' successful

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<sup>1</sup>See, for example, Eliason and Storrie (2006) and Huttunen et al. (2011) for the effect of plant closures on career outcomes, and Graham et al. (2013) and Deelen et al. (2018) for the effect of bankruptcies on individual employees.

<sup>2</sup>The Lehman Brothers bankruptcy has previously been used as an exogenous shock to pre-existing investment banking relationships (Fernando et al., 2012) and hedge funds' liquidity (Aragon and Strahan, 2012).

entrepreneurial pursuits.<sup>3</sup> We offer the first systematic investigation of the impact of the Lehman Brothers bankruptcy on all of these aspects – temporary exit from employment, long-term career consequences, and entrepreneurship – using a unique dataset of individual-level resumes. Our data cover 14,536 individuals employed at Lehman Brothers as of January 2008 (50.9% of all Lehman Brothers employees at the time, globally) and allow us to observe detailed characteristics of each employee. Specifically, we see each employee’s education, skills, and demographics such as age and gender, as well as all subsequent employment displayed on their resumes as of January 2019.

We form a control group of non-disrupted employees by selecting, *ex ante*, a group of large investment banks that had similar business models, recruitment practices, and employee bases to Lehman Brothers: Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS. We employ textual analysis of contemporaneous media coverage to confirm that, from the perspective of an employee comparing offers from these firms, Lehman Brothers was indistinguishable from the control banks until early 2008. Specifically, we use the comprehensive database of news articles from the Dow Jones Newswire and compute a sentiment score for each article. We aggregate these article-level scores to monthly sentiment indicators for Lehman Brothers and for the four control banks. Throughout early 2008, there are no noticeable differences in either the volume of news or the average sentiment of news about Lehman, compared to the news about the four other banks. We draw the cutoff for the set of employees at Lehman Brothers and at the other banks conservatively in January 2008, well ahead of any divergence in sentiment.

The composition of the workforce at Lehman Brothers in January 2008 did not meaningfully differ from that of the four control banks, and Lehman Brothers was in the interior of the range spanned by the other banks along all characteristics: employee gender, age, education, hierarchical positions, and skills. For example, Lehman Brothers had a very similar gender ratio to the other firms (57.1% male versus 57.7%), with slightly more male employees than Goldman Sachs or Deutsche Bank but fewer than Morgan Stanley or UBS. Similarly, 31.7% of Lehman Brothers employees in 2008 had a graduate degree, compared to the other banks’ range from 23.2% (Morgan Stanley) to 32.5% (Goldman Sachs). Nonetheless, to account for any concerns about the selection of employees at Lehman Brothers compared to employees at the other banks, we further match each individual employee of Lehman Brothers to the most similar employees at the control banks based on demographics, education, skills, and career stage. Specifically, we employ a two-step matching procedure: (1) exactly matching

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<sup>3</sup>See, for example: [https://www.huffpost.com/entry/lehman-bankers-5-years-later\\_n\\_3891188](https://www.huffpost.com/entry/lehman-bankers-5-years-later_n_3891188), <https://www.ft.com/content/e46e35de-0556-11e6-9b51-0fb5e65703ce>, and <https://www.cnbc.com/2018/09/10/loyalty-doesnt-exist-anymore-what-former-lehman-brothers-employees-learned.html>

each Lehman Brothers employee to the set of employees at other banks in the same broad hierarchical position (analyst, associate, vice president, managing director, senior management, or other), followed by (2) propensity score matching each ex-Lehman employee to the closest one, two, and five employees within the same hierarchical position based on gender, age, educational attainment, and skills.

Our first finding is that individuals employed at Lehman Brothers right before the bankruptcy are 2.17% more likely to experience at least one stretch of no reported employment lasting at least six months between January 2008 and January 2019. This difference is statistically significant and economically meaningful, representing a 15% increase over the 14.3% unconditional likelihood of employment breaks at the control banks. However, the effect is concentrated among senior employees. In fact, Lehman Brothers employees who were relatively early in their careers at the start of 2008, especially those at the rank of associate, do not experience any higher likelihood of breaks than their counterparts at the other firms. The effect appears starting at the vice president level and monotonically increases with seniority: for example, compared to their counterparts at the control banks (holding the same starting position but with no further matching), employees of Lehman Brothers are 3.25% more likely to experience breaks if they were at the vice president level in 2008, 4.09% if they held titles of managing director, and 6.89% if they held senior-most positions such as C-suite executives and heads of divisions or regional offices. The results are similar when each Lehman Brothers employee is matched to the most similar one, two, or five employees at the control banks. These findings, including the lack of noticeable effects on breaks for junior ex-Lehman employees, are robust to (1) excluding ex-Lehman employees who were immediately hired by Barclays or Nomura, (2) varying the length of time defined as a break, and (3) identifying breaks in a tighter time window after 2008.

Next, we look at whether the employees of Lehman Brothers are more likely to end up outside of the financial services industry over the decade following the bankruptcy. For employees of Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS, the unconditional incidence of remaining in the financial services industry (NAICS code 52) is 55%. Those employed at Lehman Brothers as of January 2008 are 3.00% less likely to remain in the industry. Once again, the effect is strongest for seniormost individuals: employees of Lehman Brothers in senior management positions (C-suite executives and heads of divisions or regional offices) are as much as 7.71% more likely to depart the financial services industry than their counterparts at the control banks, representing a 20% relative increase in industry switching over the baseline of 39% for this group. However, analogously to the results on employment breaks, there are milder or no effects for more junior employees. In fact, the effect reverses in sign for those who held analyst and associate positions in 2008, with junior employees of

Lehman Brothers being slightly less likely to subsequently leave the industry.

Junior employees of Lehman Brothers not only do not experience short-term effects in unemployment or industry switches, but also do not see their subsequent career growth hindered by the bankruptcy event. Since the employment data do not include wages, we proxy for career growth with hierarchical positions at the end of the sample in January 2019. Specifically, we employ two measures of career growth. First, we code each job title in years of experience that it takes an average employee to reach that job title from the entry level (for example, associate positions typically take two years from entry-level, while vice president positions take, on average, eight years). This allows us to compare the distance traversed by different individuals over the decade following the Lehman Brothers bankruptcy. Second, we observe whether or not each individual employee reaches a particular level (vice president or above, and managing director or above). We estimate the differences in these career growth measures between junior employees of Lehman Brothers in January 2008 and junior employees of the control banks. Differences in the first measure (distance traversed in the hierarchy, measured in years) are small (on the order of 0.5 years) and consistently insignificant. Differences in the second measure are likewise insignificant, with Lehman Brothers analysts and associates marginally more likely to reach at least the vice president level by 2019 and marginally less likely to reach at least the managing director level.

Our last result suggests that former employees of Lehman Brothers were prone to use the disruption event as a platform to start new ventures, consistent with the evidence by Babina (2020) and Hacamo and Kleiner (2020). We identify entrepreneurial activity as individuals who are listed as (co-)founders, presidents, or C-level executives of firms that did not exist prior to the bankruptcy event. The unconditional likelihood of entrepreneurship among the employees of the control banks is 2.16%. This likelihood is much higher among former employees of Lehman Brothers, at 3.29%, with the difference significant at the 1% level. Across hierarchical levels, baseline entrepreneurship is higher for more senior employees (e.g., 3.7% for managing directors and 4.1% for senior management), but the Lehman Brothers bankruptcy increases this rate for all positions. In fact, the starkest relative increase is observed for employees who held associate-level titles in January 2008, with ex-Lehman associates showing a 4.5% likelihood of subsequently founding their own ventures, compared to only 1.8% for associates at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS.

Our results contrast with the extensive labor literature on the effects of displacement among less high-skilled workers. For example, Ruhm (1991) finds that workers displaced by plant closures are 16 times more likely to be jobless for more than a year, and Huttunen et al. (2011) and Yagan (2019) document that displaced workers are more likely to permanently exit the workforce. The effects are larger for minority groups (Couch, 1998) and older workers

(Deelen et al., 2018), and displaced workers are also more likely to change industries and geographic regions (Neffke et al., 2018). Furthermore, displaced workers experience large and persistent earnings losses, with point estimates of long-term wage loss in the 10-25% range.<sup>4</sup> The existing literature relies on data predominantly consisting of low-skilled and low-wage workers. In contrast, this paper looks at high-skilled and highly-paid workers and finds mild effects on their career paths following unanticipated displacement, even though the displacement event occurred during relatively difficult labor market conditions, against the backdrop of the financial crisis.

The softer effects of displacement on high-skilled and high-wage workers highlight a new aspect of income-related inequality (Juhn et al., 1993; Piketty and Saez, 2003). A main driver of increasing income inequality has been the adoption of technology, which has led to an increase in demand for high-skilled workers and a decrease in demand for low-skilled workers (Autor et al., 2008; Holzer et al., 2011; Jackson and Kanik, 2020). In addition, during times of financial distress, more low-skilled workers are displaced and their employment levels never recover (Holzer et al., 2011; Jaimovich and Siu, 2020), exacerbated by financial constraints arising from lower risk-taking by financial institutions during distressed times (Busch, 2020). Our work adds to the income inequality literature by showcasing that high-skilled workers are not only less likely to be displaced during times of financial distress but also face less severe labor market consequences even in the worst of circumstances—conditional on being displaced during poor market conditions. Oreopoulos and Heisz (2012) document that recessions have long-term negative effects on the career trajectories of college graduates, but that these effects are milder for more advantaged groups. Our results highlight that for sufficiently advantaged individuals, such as those employed at Lehman Brothers, the effects are negligible despite a combination of exogenous displacement and recession conditions.

The remainder of the paper proceeds as follows. We describe the data in Section 2. Section 3 presents the comparison of Lehman Brothers to the four control banks based on media coverage and details the matching of individual employees of Lehman Brothers to the employees of the control banks. Section 4 presents the results on breaks from employment, industry switches, subsequent career growth, and spillover into entrepreneurship. Section 5 concludes.

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<sup>4</sup>See Hamermesh (1987), Addison and Portugal (1989), Kletzer (1989), Ruhm (1991), Jacobson et al. (1993), Schoeni and Dardia (2003), Couch and Placzek (2010), Hijzen et al. (2010), Graham et al. (2013), and Schmieder and von Wachter (2019).

## 2 Data

We outline the unique resume data that we use to identify employees of Lehman Brothers and similar financial institutions and to track their subsequent career moves. We also make use of data on financial news to show that the four other financial institutions that we use for comparisons (Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS) were perceived as indistinguishable from Lehman Brothers in terms of sentiment up to early 2008.

### 2.1 Individual Employment Data

We identify and track individual bank employees by leveraging a novel dataset of approximately 490 million individual resumes provided by Cognism, a platform for sales leads and customer relationship management.<sup>5</sup> For each individual in our sample, we observe education and employment history, as well as self-reported skills, patents, publications, and awards. For each employment record, we observe the name of the employer, job title, and start and end dates. The data also include an approximate age derived from the individual's education history and gender classified based on the individual's first name.

For the current analysis, we concentrate on individuals employed at Lehman Brothers, Deutsche Bank, Goldman Sachs, Morgan Stanley, or UBS as of January 2008. We discuss the selection and comparability of the control set of firms (Deutsche Bank, Goldman Sachs, Morgan Stanley, and UBS) in Section 3. The reasoning for the selection of the cutoff time (January 2008) is as follows. Lehman Brothers filed for Chapter 11 bankruptcy on September 15, 2008. Since Lehman Brothers sustained large losses immediately preceding the bankruptcy filing, it is possible that some of the employees anticipated the displacement and potentially departed from (or did not choose to join) the firm in advance, in response to its poor performance (Brown and Matsa, 2016). To circumvent this concern, we focus on a snapshot of employees well ahead of the bankruptcy filing, in January 2008, at which point the market did not anticipate a worse outcome for Lehman Brothers than for the comparison set of banks, as we show in Section 3. At the same time, the January 2008 cutoff is sufficiently proximal to the bankruptcy to capture the effects on contemporaneous employees. This snapshot gives us a sample of 112,190 unique individuals with employment information spanning from 1990 to 2019. Of these, 14,536 were employed at Lehman Brothers as of January 2008, which represents 50.9% of total Lehman employment at the time.<sup>6</sup> The remainder of our sample covers 37.4% of Deutsche Bank employees, 65.4% of Goldman Sachs employees, 23.4% of Morgan Stanley employees, and 44.4% of UBS employees as of January

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<sup>5</sup>See Fedyk and Hodson (2019) for more detail on the Cognism resume data.

<sup>6</sup>Lehman Brothers had 28,556 employees worldwide according to the 2007 year-end annual 10-K report.

2008.<sup>7</sup>

The detailed employment data allow us not only to identify employees of Lehman Brothers and the four comparison firms but also to track a variety of employment-related outcomes. In particular, we leverage the resumes to identify whether each individual in our sample experiences an extended break from employment, moves to another industry, or starts a new venture, and we observe how each employee moves through the hierarchy of the financial services industry for those who do remain in the industry. To do this, we supplement the resume data with industry classification (at the two-digit NAICS level) from the Compustat database for publicly traded firms, using the methods outlined in Fedyk and Hodson (2019) to match self-reported employer names from resumes to publicly listed firms. However, one challenge in working with resume data of employees of the financial services industry is that a large number of smaller finance firms are private, leading to many former Lehman Brothers (and other banks’) employees moving to firms that do not have readily available industry classifications. To avoid introducing potential bias into our sample, we supplement the data with a manual classification of all company names that are listed by at least two employees at the end of the sample in January 2019.

## 2.2 Dow Jones Newswire

To verify that the perception of Lehman Brothers did not begin to diverge from that of the four comparison banks until after our employee snapshot in January 2008, we directly compare the way in which the firms are discussed in the media. The data on media coverage used for this textual analysis come from the Dow Jones Newswire database, and we examine the period from 2001 to 2011 to allow for generous pre-trends. The database includes several million articles per year. Each article is tagged with ticker symbols for any company mentioned in the article.

We analyze the sentiment of all articles that mention the five banks of interest (Lehman Brothers, Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS) between 2001 and 2011. Most banks have multiple tickers associated with them, so we disambiguate ticker symbol tags by constructing a mapping of all ticker symbols for a given bank to its standardized name. For each bank, we consider the set of all articles in each month that are tagged with at least one corresponding ticker.

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<sup>7</sup>At the end of 2007, Deutsche Bank had 78,291 employees, Goldman Sachs had 30,522 employees, Morgan Stanley had 48,256 employees, and UBS had 83,560 employees. Historical employee counts are taken from 10-K or 20-F annual reports.



### 3 Matching Lehman and non-Lehman Employees

We match Lehman Brothers employees to a control set of comparable individuals using a two-step procedure. First, we discuss the set of comparison banks that we use throughout our analysis (Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS) and confirm that these firms were indeed perceived similarly to Lehman Brothers in early 2008. Second, we propensity score match individual employees based on their job positions, education, skills, and demographics.

#### 3.1 Comparison Firms

In order to construct a benchmark of non-disrupted similar employees against which we can compare the career outcomes of the individuals employed at Lehman Brothers as of January 2008, we focus on four firms that are, like Lehman, multinational investment banks. We specifically exclude investment banks that have a retail banking arm, e.g. Bank of America and JP Morgan Chase, and instead limit the comparison set to Goldman Sachs, Morgan Stanley, UBS, and Deutsche Bank. We argue that, from the perspective of employees choosing where to work in January 2008, Lehman Brothers was not meaningfully different from these firms.

We validate this identifying assumption with an analysis of contemporaneous media coverage of financial firms to compare the public perception of Lehman Brothers against the perception of the comparison firms. The assumption behind this validation strategy is that employees' familiarity with a given firm is correlated with that firm's media coverage and that the average employee's ex-ante perspective of a firm is mirrored by the general media sentiment about that firm. We analyze both the volume of news and the average sentiment of articles from the Dow Jones Newswire that cover Lehman Brothers compared to the news covering Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS.

Specifically, we process each news article from the Dow Jones Newswire using the financial sentiment dictionary introduced by Loughran and McDonald (2011). Each article  $s$  is assigned a sentiment score,  $LMScore_s$ , calculated as:

$$LMScore_s = \frac{1}{n} \sum_{i=1}^n X_i \quad \text{where} \quad X_i = \begin{cases} 1 & \text{if } word_i \in Positive \\ -1 & \text{if } word_i \in Negative \\ 0 & \text{otherwise} \end{cases} \quad (1)$$

where *Positive* is the set of terms identified as carrying positive sentiment in the Loughran and McDonald (2011) dictionary, and *Negative* is the set of negative terms. Examples of

news articles with corresponding sentiment scores are provided in Appendix C. We then compute monthly sentiment scores for Lehman Brothers and the four control banks between 2000 and 2011 by averaging across all articles tagged with a given bank in a given month.

Figure 1 presents the monthly volume of articles published about each investment bank. Panel (a) shows the time series separately for each bank, whereas panel (b) aggregates the four control banks together into a single weighted average. The volume of articles written about Lehman Brothers is indistinguishable from the volumes of articles written about the other banks until a small spike in June 2008 and a dramatic increase in September 2008 accompanying the bankruptcy announcement. Figure 2 further shows that the average sentiment of news articles about Lehman Brothers is comparable to the sentiment of news about the other banks through early 2008. Here, too, panel (a) shows the time series separately for each bank, while panel (b) aggregates the four control banks together into a single weighted average. In both cases, the sentiment of Lehman Brothers is in line with the sentiment of the other banks until mid-2008 and diverges sharply only after the Lehman Brothers collapse in September 2008. The lack of pre-trends in either news coverage or news sentiment prior to the bankruptcy announcement helps to confirm that the bankruptcy event was unanticipated by the media. This supports the identifying assumption that, from the perspective of an employee comparing offers from these firms, Lehman Brothers was indistinguishable from Goldman Sachs, Morgan Stanley, Deutsche Bank, or UBS at the cutoff point in January 2008 when we match employees of Lehman Brothers to similar employees of the control banks.

### 3.2 Matching Individual Employees

We present summary statistics on the employees of Lehman Brothers and the four comparison investment banks as of January 2008. In subsequent analysis, we match each Lehman Brothers employee to comparable employees at the other banks based on each employee's role within the firm, as well as gender, age, education, and self-reported skills.

Table 1 presents the professional and demographic characteristics of the individuals employed at Lehman Brothers and the four control banks as of January 1, 2008. Notably, Lehman Brothers does not stand out from the other banks along any dimension. For almost every considered aspect, Lehman Brothers falls in the interior of the distribution, with at least one control bank on either side.

At the top of the table we show the distribution of employees at each bank across the following hierarchical levels: (i) analysts, (ii) associates, (iii) vice presidents and directors, (iv) managing directors, and (v) senior management, including the C-suite and heads of divisions or regional offices. A number of employees (41.3% for Lehman and 46.1%, on average, for

the other four banks) do not fall into any of these categories. These are employees whose job titles do not include hierarchical information (e.g., ‘commodities trader’), employees in support roles that may not follow the prevalent hierarchical demarcations in finance (e.g., ‘system administrator’), and employees who state only the division and no actual role in their self-reported job titles (e.g., ‘efx trading’). The percentage of classified job titles for Lehman is in the middle of the range for the control banks, with more classified job titles than Deutsche Bank or UBS but fewer than Goldman Sachs or Morgan Stanley. Among employees who do fall into the standard hierarchy, Lehman Brothers and the control banks have very similar percentages of associates (7.9% at Lehman versus 9.8% at the other banks) vice presidents and directors (26.3% at Lehman versus 25.4% at the other banks), managing directors (4.1% at both Lehman and the other banks), and senior management (2.6% at Lehman versus 3.7% at the other banks). Lehman Brothers has somewhat more analysts (17.8% at Lehman compared to 10.9%, on average, at the other banks), but is not an outlier – Goldman Sachs has an even higher percentage of analysts at 18.0%.

Lehman Brothers also displays a very similar distribution of employees to those of the control banks based on gender, age, and education. For example, 57.1% of Lehman Brothers employees in 2008 were male, compared to 57.7%, on average, across the four control banks. Lehman Brothers employees in 2008 were, on average, 32.0 years old, compared to 32.9 years old for the four other banks. 31.7% of Lehman employees had a graduate degree (Masters, JD, or PhD), compared to 28.1% at the four other banks. A somewhat higher share of Lehman Brothers employees had degrees from elite institutions (defined as the top 100 educational institutions in the U.S. and World News report) compared to Morgan Stanley, Deutsche Bank, or UBS, but the share of elite degrees at Goldman Sachs was slightly higher than at Lehman Brothers.

In terms of skills, we group the thousands of individual self-reported skills into broad skillsets following the methodology in Fedyk and Hodson (2019). Just under half of all employees at Lehman Brothers and the control banks report skills on their resumes. As shown in Table 1, the distribution of these employees across broad skillsets is very similar at Lehman Brothers versus at the control banks. 19.6% of Lehman employees have financial skills (*Banking and Finance, Accounting, and Insurance*) as either their primary or secondary skillset, compared to 18.6% at the control banks. 9.2% have primary or secondary skillsets in general core operations (*Operations Management, Industrial Management, Logistics, Sales, Sales Management, and Technical Product Management*), compared to 10.2% at the control banks. 5.8% of Lehman employees have technical skills (*Data Analysis, IT, Mobile Network, and Web Development*) as their primary or secondary skillset, compared to 4.3% at the other banks; and 1.9% of Lehman employees have communication skills (*CRM, Social Media, and*

*Digital Marketing*) as their primary or secondary skillset, compared to 1.5% at the control banks.

Overall, Lehman Brothers employees in January 2008 are very similar, based on both professional and demographic observables, to their counterparts at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS, consistent with the lack of any noticeable divergence in media sentiment about Lehman Brothers until much closer to the collapse. Nevertheless, to further confirm that our results are not driven by differential selection of Lehman Brothers employees relative to the four control banks, we match each Lehman Brothers employee to the most similar employees at the other banks based on all observable characteristics. We do so using a two-step matching procedure. First, we perform an exact match on the broad job title category (analysts, associates, vice presidents and directors, managing directors, senior management, and others). Second, we estimate a logistic regression of an indicator variable for whether each employee was employed at Lehman Brothers against gender, age, education, and the employee’s primary skill.<sup>8</sup> We use the predicted values from this regression as a propensity score to match each Lehman Brothers employee to the most similar  $n$  employees at Goldman Sachs, Morgan Stanley, Deutsche Bank, or UBS within the same job title category. Throughout our empirical analysis, we consider  $n \in \{1, 2, 5\}$  closest matches. For concreteness, Appendix A shows a few sample resumes of Lehman Brothers employees holding different ranks at the firm in January 2008, along with the profiles of their single closest matches at the other banks.

In additional analyses, we confirm that our main empirical results are robust to comparing Lehman Brothers employees to only employees of Goldman Sachs and Morgan Stanley, since these two banks were most similar to Lehman Brothers in terms of business models (with heavy broker dealer presence but less substantial commercial banking operations than Deutsche Bank and UBS) and in terms of employee composition reported in Table 1.

## 4 Career Trajectories of Lehman Brothers Employees

We compare the career outcomes of employees of Lehman Brothers from January 2008 against career outcomes of similar employees at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS. The Lehman Brothers bankruptcy significantly increases the employees’ likelihood of experiencing an extended (six months or more) break from employment and

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<sup>8</sup>For computational tractability, we use the information gain criterion (i.e. Kullback–Leibler divergence; see Kullback and Leibler, 1951) to choose the single skillset that is most informative in differentiating Lehman Brothers employees from their counterparts in each sample (e.g., full sample, analysts, associates, etc.). We include only this single most informative skillset in the logistic regression for the propensity score matching step.

subsequently leaving the financial services industry. However, these effects concentrate among the senior employees. Junior employees of Lehman Brothers not only do not experience noticeable disruptions, but also achieve equivalent career progression compared to their counterparts at the control banks over the course of the next decade.

## 4.1 Breaks from Employment

We begin by examining the effect of the Lehman Brothers bankruptcy on short-term unemployment, motivated by the evidence of substantial unemployment effects on blue collar workers displaced by events such as plant closures (Ruhm, 1991; Yagan, 2019).

Specifically, for each individual in the sample, we identify gaps in reported employment on the resume. We define an indicator variable,  $EmploymentBreak_i$ , to be equal to one if and only if individual  $i$  has at least one break in employment lasting six months or more between the dates of January 2008 and January 2019. We estimate a probit regression of  $EmploymentBreak_i$  on an indicator variable equal to one if and only if individual  $i$  was employed at Lehman Brothers as of January 1, 2008. We do so separately on (i) the full sample of former employees of Lehman Brothers and the control banks and (ii) on the propensity matched samples with the closest 1, 2, and 5 matches for each Lehman Brothers employee.

The results for all employees, pooled across different positions, are reported in the first row of Table 2, quoted as marginal effects. The first column shows the differential likelihood of breaks for Lehman Brothers employees compared to the employees of the four control banks, without controlling for any characteristics of the individual employees. Overall, employees of Lehman Brothers from January 2008 were 2.17% more likely to experience an extended (six months or longer) period of no reported employment between then and January 2019, a difference that is significant at the 1% level. The baseline likelihood of extended breaks from employment for employees of the four control banks is 14.3%, so the 2.17% increase for employees of Lehman Brothers represents a 15% relative increase over the unconditional baseline. The estimate is very robust to controlling for characteristics of individual employees. Columns 2, 3, and 4 of Table 2 report the results from the probit regression performed on the sample of Lehman Brothers employees matched to the most comparable employees at the control banks following the two-step matching procedure (exact matching on broad starting position and propensity score matching based on gender, age, education, and skills), with 1, 2, and 5 closest matches, respectively. Lehman Brothers employees are 1.10% more likely to experience an extended break from employment than the single most similar employee at the control banks, 1.98% more likely to experience an extended break than the

two most similar employees at the control banks, and 1.75% more likely to experience an extended break than the five most similar employees at the control banks, with all of these differences significant at the 1% level.

However, this adverse effect concentrates among senior employees. The remaining rows of Table 2 present the results separately for each level of Lehman and non-Lehman employees: analysts, associates, vice presidents and directors, managing directors, senior management, and the remaining workers who are not classified into any of these standard levels. The results suggest that the negative effect is weaker or even non-existent for younger, more junior employees: the estimate for associates is insignificant and flips sign across specifications, while the estimate for analysts is significant in the matched samples with 2 or 5 closest matches, but becomes insignificant and flips sign in the unmatched sample or the matched sample with 1 closest match. Beyond these junior positions, the effect of the Lehman Brothers bankruptcy on subsequent extended breaks from employment increases in seniority. For example, in the unmatched analysis, vice presidents and directors at Lehman Brothers are 3.25% more likely to experience an extended break from employment than their counterparts at the control banks (an increase of 28% over the baseline 11.8% likelihood for non-Lehman workers), and managing directors at Lehman Brothers are 4.09% more likely to experience a break than non-Lehman managing directors (an increase of 31% over the baseline of 13.1% for this group). Senior management of Lehman Brothers, including C-level executives and division heads, experience the starkest subsequent effects on employment, consistent with these individuals being perceived as potentially responsible for the bankruptcy event. Specifically, senior management of Lehman Brothers is 6.82% more likely to see a break post-bankruptcy than non-Lehman senior management, which corresponds to a dramatic 47% relative increase over the baseline rate of 14.5%. These results are similar in matched samples with 1, 2, and 5 closest matches for each individual Lehman Brothers employee, although the effects for managing directors occasionally lose significance due to lower power (per Table 1, only 4.1% of Lehman Brothers employees in 2008 are managing directors).

In Table 3 we show that the results are robust to the exclusion of Lehman Brothers employees who were subsequently employed by Barclays and Nomura, which each agreed to acquire portions of Lehman Brothers in September 2008. The results remain qualitatively the same and quantitatively stronger. When employees who had immediate jobs at Barclays and Nomura are excluded, the differential incidence of breaks induced by the Lehman Brothers bankruptcy is higher for senior employees but, importantly, there is still no notable effect for junior employees. In Table B1 we demonstrate further robustness of our results to defining a break as at least one year of no reported employment. Using a higher threshold for classifying breaks from employment (one full year rather than six months) shows an even clearer lack

of an effect on analysts and associates. Lastly, in Table B2 we demonstrate that the results are robust to only counting breaks that begin within three years of the bankruptcy event (through the end of 2011).

Overall, the Lehman Brothers bankruptcy does have a noticeable effect on the likelihood that an individual employee experiences a meaningful break from employment. However, this effect concentrates among the senior employees, who have accumulated considerable firm-specific human capital and who may be perceived as directly responsible for the bankruptcy event. For younger high-skilled white collar workers (analysts and associates at Lehman Brothers), even a stark displacement event such as their employer’s bankruptcy does not appear to have an adverse effect on subsequent employment.

## 4.2 Industry Switches

We now turn to exploring the question of whether the Lehman Brothers bankruptcy prompted Lehman employees to exit the financial services industry, as displacement has previously been linked to industry switches (Neffke et al., 2018).

For each individual employed at Lehman Brothers, Goldman Sachs, Morgan Stanley, Deutsche Bank, or UBS as of January 2008, we consider that individual’s employer at the end of the sample in January 2019. If the individual  $i$  is employed at a firm that is classified as part of the broadly defined financial services industry (i.e., 2-digit NAICS code 52), then we set the value of  $IndustrySwitch_i$  to zero; otherwise,  $IndustrySwitch_i$  is equal to one. In addition to standard industry classification data such as Compustat, the industry switch variable also encompasses manual classification of small private firms into broad two-digit NAICS industry sectors.

We estimate a probit regression of the  $IndustrySwitch_i$  indicator on an indicator for whether the individual  $i$  was employed at Lehman Brothers (rather than at one of the control banks) in January 2008. As with the analysis of breaks, we estimate this regression for (i) the full sample, and (ii) matched samples with the closest 1, 2, and 5 employees for each Lehman Brothers employee.

The results on industry switches, displayed in Table 4, mirror those for breaks in employment. Overall, employees of Lehman Brothers from January 2008 are more likely to leave the financial services industry by the end of the sample period in 2019 than their counterparts at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS. In the full sample, the difference is an additional 3.00% likelihood of departing the industry over the baseline of 45%. This effect remains very similar when each employee of Lehman Brothers is matched to the most similar employees at the control banks based on starting hierarchical position,

gender, age, education, and skills. Lehman Brothers employees are 3.26% more likely to leave the financial services industry than their single one or two nearest matches at the control banks and 2.13% more likely to leave the financial services industry than the closest five individuals at the control banks. Figure 3 shows the main industries where employees of Lehman Brothers and the control banks work in January 2019, conditional on leaving the financial services industry. The main industry for both the baseline switches by employees of the control banks and for the differential departures of Lehman Brothers employees is Professional, Scientific, and Technical Services (NAICS two-digit code 54), but Lehman Brothers employees are also disproportionately likely (compared to their counterparts at the control banks) to move to the Manufacturing sector (NAICS two-digit codes 31, 32, and 33), Education (NAICS two-digit code 61), and Real Estate (NAICS two-digit code 53)

Breaking down the results by starting position paints a similar picture to the results on employment breaks: that the disruptive effect of the Lehman Brothers bankruptcy concentrate among the most senior employees, and that the displacement shock has a negligible, or even opposite, effect on junior personnel. For example, analysts employed at Lehman Brothers at the time of the collapse are actually 4.07% *more* likely to remain in the financial services industry in 2019, compared to their counterparts at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS, although this estimate is not very robust: the effect is similar in the matched samples with two or five closest matches but flips sign and loses significance in the analysis with the single closest match. Similarly, associates at Lehman Brothers are 3.71% more likely to remain in the financial services industry than their counterparts at the control banks, with an even larger effect in the matched sample with a single closest match but insignificant results for two or five closest matches.

By contrast, the effect on industry switches for senior Lehman Brothers employees is noticeable and significant. Managing directors at Lehman Brothers in January 2008 are 5.36% more like to end up leaving the financial services industry than managing directors employed at the control banks; these estimates remain similar in the matched sample analysis but become insignificant due to the low power of relatively few managing directors in the sample. Employees in senior management positions, including division heads, are most likely to leave the financial services industry after the Lehman collapse: an increase of 7.71% over a baseline of 39% in the unmatched analysis, significant at the 1% level, and the effect size remains similar or stronger in the matched analysis.

For robustness, Table B3 repeats the analyses of both breaks and industry switches with only Goldman Sachs and Morgan Stanley as the comparison banks, reflecting the evidence in Table 1 that these two firms are closest to Lehman Brothers in terms of employee composition. In these tests, too, junior employees of Lehman Brothers are no more likely to



experience adverse effects than their counterparts at Goldman Sachs and Morgan Stanley, and even senior employees do not experience higher industry switches in the matched sample analysis.

### 4.3 Career Progression within the Financial Services Industry

Junior employees of Lehman Brothers do not see any adverse effects from the bankruptcy on future employment breaks compared to similar employees at other investment banks and are not more likely to leave the financial services industry. We now examine their subsequent career trajectories within the financial services industry and find that the bankruptcy does not inhibit these employees' career growth along this dimension either.

We evaluate career trajectories using two measures: (i) the overall length of career path that an individual  $i$  traverses between January 2008 and January 2019; and (ii) the likelihood with which individual  $i$  attains a certain level in the hierarchy by January 2019. For the first measure, we translate the broad position levels—analyst, associate, vice president and director, managing director, and senior management—into an equivalent number of years, based on the average age at which individuals reach that position level. For example, it takes, on average two years to reach the associate level and eight years to reach a vice president or director position. Therefore, an individual  $i$  starting in an associate position in January 2008 and holding a vice president position in January 2019 would be encoded as having traversed six years worth of career growth,  $CareerProgress_i = 6$ . We estimate a cross-sectional regression of each individual's career growth from January 2008 to January 2019 against an indicator for whether that individual was employed at Lehman Brothers in 2008, using raw samples and propensity-score-matched samples. We perform this analysis separately for the individuals who held analyst positions in January 2008, those who held associate positions, and the combined sample of analysts and associates. We do not perform the career progression analysis for individuals who already start in vice president, director, managing director, or senior management positions, given the limited potential to observe further career growth for these individuals.

For the second measure, we consider two levels in January 2019: (i) vice president and above, and (ii) managing director and above. For each individual  $i$ ,  $ManagingDirector_i$  an indicator variable for whether individual  $i$  holds a position of vice president or above in January 2019, and  $SeniorManagement_i$  is an indicator for whether individual  $i$  holds a position of managing director or in January 2019. We estimate probit regressions of these two measures against an indicator for whether individual  $i$  was employed at Lehman Brothers in January 2008. For these tests, too, we focus on individuals who held analyst positions

at Lehman Brothers or one of the control banks in January 2008, those who held associate positions, and the combined sample of analysts and associates.

Table 5 reports the results for first measure. Table 6 estimates the probit regressions for the second measure, looking at the incidence of reaching at least vice president level in Panel 1 and incidence of reaching at least managing director level in Panel 2. In both tables, the top row shows the results for the combined sample, and the next two rows look at subsamples of those who held analyst positions in January 2008 and those who held associate positions. Column 1 reports the results estimated over all employees of corresponding level at Lehman Brothers and at the control banks, while columns 2, 3, and 4 report the results from the matched sample analysis with 1, 2, and 5 closest matches, respectively.

The results show that junior employees of Lehman Brothers tend to perform no worse than junior employees of Goldman Sachs, Morgan Stanley, UBS, and Deutsche Bank in terms of subsequent career growth. Specifically, Table 5 suggests that employees of Lehman Brothers progressed, on average, the equivalent of 0.49 years more in terms of career growth than employees of control banks in unmatched analysis, 0.24 years less in the matched analysis with a single closest match, 0.13 years more in the analysis with two closest matches, and 0.16 years more in the analysis with five closest matches. This result is similar across both analysts and associates. In practically all cases, the estimate is not significantly different from zero.

Table 6 shows analogously insignificant differences between the likelihood of making it to certain hierarchical levels for Lehman Brothers employees compared to the employees of the control banks. Panel 1 displays positive marginal effects of Lehman Brothers on analysts' and associates' subsequent propensity to reach a position of vice president or above, statistically insignificant except for matched analysis of the combined sample of both associates and analysts. Panel 2 shows that the likelihood of achieving a managing director or senior management position is not significantly different for former employees of Lehman Brothers when compared to former employees of Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS. The marginal effect on the Lehman Brothers indicator flips sign, with consistently insignificant negative coefficients in the matched analysis and consistently insignificant positive coefficients in the unmatched analysis.

#### **4.4 Entrepreneurial Activity by ex-Lehman Employees**

High-skilled, white collar workers such as those employed by Lehman Brothers do not appear to suffer lasting damage to their career paths. We now explore whether some of them also use the bankruptcy event as a platform to start new ventures.

Prior work finds that bankruptcies and financial distress can be associated with increased entrepreneurship by the firm’s employees (Babina, 2020; Hacamo and Kleiner, 2020). Former employees of Lehman Brothers may constitute a demographic group especially well suited to this type of creative destruction, as their relatively high prior earnings imply weaker liquidity constraints. The Lehman Brothers collapse as a fertile ground for entrepreneurship has been highlighted by the popular press, but so far the notion is supported only by anecdotal evidence.<sup>9</sup>

We systematically identify instances of exit to entrepreneurship in our resume data through a two-step procedure. First, we identify all employees of Lehman Brothers and the control set of banks who hold founder level positions between January 2008 and January 2019. Specifically, we search for the terms ‘*founder*’, ‘*co-founder*’, ‘*president*’, and various C-level executive titles (e.g., ‘*chief executive officer*’, ‘*chief operating officer*’, etc.) in the individual employees’ subsequent job titles. Second, for each identified potential entrepreneur  $i$ , we manually confirm that the associated firm did not exist prior to September 2008 and prior to  $i$  joining the firm. The end sample of individuals constitutes our sample of entrepreneurs from Lehman Brothers and from the control set of banks.

In the full sample, 3.29% of those employed at Lehman Brothers in January 2008 become entrepreneurs, compared to 2.16% of those employed at the control set of banks. The difference is statistically significant at the 1% level. Figure 4 breaks these proportions down across broad position ranks of the employees in 2008. Lehman Brothers employees are more likely to enter entrepreneurship across all levels. Higher ranked individuals are more likely to start their own firms in the baseline, with an entrepreneurship rate of 3.7% for managing directors and 4.1% for senior management. The Lehman Brothers bankruptcy drives this even further up, to 5.9% for managing directors and 5.3% for senior management. Interestingly, the Lehman Brothers bankruptcy spurs the largest relative increase in entrepreneurship rates for associates. For these employees, who are early on in their careers but somewhat more established than entry-level analysts, the bankruptcy shock increases their propensity to start new ventures by more than twice, from 1.8% to 4.5%.

## 5 Conclusion

The Lehman Brothers bankruptcy offers a unique setting to study the effects of career disruptions on the types of employees who have been understudied by the prior labor economics literature on the effects of disruption. By comparing subsequent outcomes of individuals employed at Lehman Brothers in 2008 against those of individuals who were

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<sup>9</sup>See, for example, [https://www.huffpost.com/entry/lehman-bankers-5-years-later\\_n\\_3891188](https://www.huffpost.com/entry/lehman-bankers-5-years-later_n_3891188).

employed at comparable banks but did not experience a bankruptcy event (Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS), we document the surprising finding that, apart from the seniormost employees, high-skilled white collar workers are remarkably resilient to career disruptions. While Lehman Brothers employees have been, overall, more likely to experience lengthy breaks from employment and to leave the financial services industry than their counterparts at the comparable firms, these effects concentrate entirely among vice presidents, managing directors, and senior management. Analysts and associates employed at Lehman Brothers are not significantly more likely to experience either unemployment or industry switches, and in fact progress as well as their non-Lehman counterparts within the financial services industry between 2008 and 2019.

These findings contrast sharply with the existing evidence on the effects of displacement (e.g., plant closures) on blue collar workers in the United States, which documents substantially higher rates of unemployment and long-term decreases in career growth for displaced workers compared to non-displaced workers. As such, our paper highlights a novel aspect of income inequality. Not only are high-skill, high-wage workers less likely to experience displacement during times of financial distress (Holzer et al., 2011; Jaimovich and Siu, 2020), but they suffer no negative effects even conditional on experiencing a large displacement shock during a recession, which is typically associated with especially adverse consequences (Oreopoulos and Heisz, 2012).

Several features of Lehman Brothers employees differentiate them from the types of workers who have been studied in the past and potentially contribute to the contrast in the results. Employees in sectors such as large financial institutions tend to be highly educated (with a large share of employees in our sample holding graduate degrees and degrees from the world's top institutions), yet with skills that are relatively transferable (most hold degrees in social sciences and humanities, rather than technical or specialized disciplines). These employees earn high wages and likely face weaker liquidity constraints than blue-collar workers exposed to plant closures, potentially allowing for a more optimized choice of subsequent career steps upon displacement. We believe that understanding how these individual factors contribute to the resilience of high-skill, high-wage workers, in contrast to the vulnerability of the rest of the labor force, will constitute a fruitful avenue for future work, especially in light of the rising concerns on further increases in labor market inequality from the disruptions caused by the COVID-19 pandemic (Angelucci et al., 2020; Montenegro et al., 2020; Lee et al., 2021).

Table 1: Summary statistics of employees of Lehman Brothers as of January 2008, as well as employees of the control set of investment banks Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS) at the same point in time. The statistics for the control (non-Lehman) banks are provided separately for each bank and pulled together across all four banks.

	LEH	non-LEH	GS	MS	DB	UBS
Role (as of 2008)						
Analyst	17.8%	10.9%	18.0%	5.9%	9.6%	9.7%
Associate	7.9%	9.8%	9.8%	14.3%	5.9%	11.4%
Vice President & Director	26.3%	25.4%	32.3%	36.0%	22.1%	21.2%
Managing Director	4.1%	4.1%	6.9%	3.4%	3.7%	3.0%
Head	2.6%	3.7%	6.9%	3.4%	3.7%	3.0%
Other roles or unclassified	41.3%	46.1%	30.9%	38.7%	53.2%	51.0%
Gender						
Male	57.1%	57.7%	53.2%	59.3%	55.8%	61.1%
Female	25.6%	28.1%	29.0%	31.1%	27.2%	27.3%
Unclassified	17.3%	14.3%	17.8%	9.6%	17.1%	11.6%
Average Age (as of 2008)	32.0	32.9	31.4	35.5	32.1	33.5
Education						
Graduate Degree	31.7%	28.1%	32.5%	23.2%	27.3%	26.3%
Elite Institution	19.6%	13.7%	21.4%	12.9%	9.7%	10.6%
Skills						
Financial skills	19.6%	18.6%	19.4%	20.2%	19.1%	17.2%
Operational skills	9.2%	10.2%	8.0%	5.9%	11.0%	12.0%
Technical skills	5.8%	4.3%	5.8%	2.6%	3.5%	4.7%
Communication skills	1.9%	1.5%	1.8%	1.0%	1.7%	1.3%

Table 2: Differences in the likelihood of experiencing a career break between those who were employed at Lehman Brothers as of January 1, 2008 and those who were employed at Goldman Sachs, Deutsche Bank, Morgan Stanley, and UBS. Career breaks are identified as six or more months of contiguous lack of reported employment in an employee’s profile between January 1, 2008 and December 31, 2019. Column 1 reports the results from a probit regression of career breaks on initial employer (Lehman Brothers versus other banks). Columns 2-4 match each Lehman Brothers employee to the most similar  $n$  employees of the other banks first based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. We vary the number of matches  $n \in \{1, 2, 5\}$ . All coefficients are reported as marginal effects.

Seniority	No matching	n = 1	n = 2	n = 5
Full Sample	2.17%***	1.10%***	1.98%***	1.75%***
Standard Error	(0.003)	(0.004)	(0.004)	(0.003)
Analyst	-0.40%	-0.77%	2.45%***	2.92%***
Standard Error	(0.008)	(0.011)	(0.009)	(0.007)
Associate	-1.46%	0.52%	1.12%	-0.21%
Standard Error	(0.012)	(0.015)	(0.012)	(0.011)
Vice President	3.25%***	2.74%***	2.68%***	2.84%***
Standard Error	(0.005)	(0.008)	(0.007)	(0.006)
Managing Director	4.09%***	2.83%	4.66%***	2.69%*
Standard Error	(0.021)	(0.021)	(0.017)	(0.016)
Senior Management	6.82%***	14.26%***	10.74%***	6.68%***
Standard Error	(0.018)	(0.025)	(0.020)	(0.019)
Other	2.42%***	9.32%***	2.81%***	3.03%***
Standard Error	(0.005)	(0.006)	(0.006)	(0.005)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

Table 3: Differences in the likelihood of experiencing a career break between those who were employed at Lehman Brothers as of January 1, 2008 and did not immediately transition to Barclays or Nomura versus those who were employed at Goldman Sachs, Deutsche Bank, Morgan Stanley, and UBS. Career breaks are identified as six or more months of contiguous lack of reported employment in an employee’s profile between January 1, 2008 and December 31, 2019. Column 1 reports the results from a probit regression of career breaks on initial employer (Lehman Brothers versus other banks). Columns 2-4 match each Lehman Brothers employee to the most similar  $n$  employees of the other banks first based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. We vary the number of matches  $n \in \{1, 2, 5\}$ . All coefficients are reported as marginal effects.

Seniority	No matching	n = 1	n = 2	n = 5
Full Sample	4.23%***	5.20%***	4.88%***	4.08%***
Standard Error	(0.004)	(0.006)	(0.004)	(0.003)
Analyst	1.60%	1.93%	3.84%***	4.10%***
Standard Error	(0.010)	(0.014)	(0.011)	(0.010)
Associate	-0.07%	0.60%	1.26%	0.65%
Standard Error	(0.015)	(0.020)	(0.017)	(0.015)
Vice President	4.95%***	4.91%***	4.92%***	4.71%***
Standard Error	(0.007)	(0.011)	(0.009)	(0.008)
Managing Director	6.51%***	2.84%	4.96%***	5.67%***
Standard Error	(0.018)	(0.030)	(0.024)	(0.020)
Senior Management	8.63%***	13.82%***	12.05%**	9.52%***
Standard Error	(0.022)	(0.035)	(0.027)	(0.024)
Other	4.65%***	7.08%***	4.67%***	5.08%***
Standard Error	(0.006)	(0.008)	(0.007)	(0.006)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

Table 4: Differences in likelihoods of leaving the financial services industry between those who were employed at Lehman Brothers as of January 1, 2008 and those who were employed at Goldman Sachs, Deutsche Bank, Morgan Stanley, and UBS. Industry switches are identified as holding a position outside of the broad 2-digit NAICS code (52) corresponding to the financial services industry as of the end of the sample period, January 2019. Column 1 reports the results from a probit regression of industry switches on initial employer (Lehman Brothers versus other banks). Columns 2-4 match each Lehman Brothers employee to the most similar  $n$  employees of the other banks first based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. We vary the number of matches  $n \in \{1, 2, 5\}$ . All coefficients are reported as marginal effects.

Seniority	No matching	$n = 1$	$n = 2$	$n = 5$
Full Sample	3.00%***	3.26%***	3.26%***	2.13%***
Standard Error	(0.005)	(0.007)	(0.006)	(0.003)
Analyst	-4.07%***	0.72%	-4.48%***	-3.36%**
Standard Error	(0.017)	(0.021)	(0.018)	(0.013)
Associate	-3.71%*	-8.70%***	-2.94%	-1.34%
Standard Error	(0.022)	(0.028)	(0.024)	(0.022)
Vice President	0.59%	2.93%**	4.97%***	2.43%***
Standard Error	(0.010)	(0.012)	(0.010)	(0.009)
Managing Director	5.36%**	2.50%	4.60%	3.47%
Standard Error	(0.026)	(0.035)	(0.030)	(0.027)
Senior Management	7.71%**	15.11%***	8.65%**	7.23%*
Standard Error	(0.037)	(0.049)	(0.044)	(0.039)
Other	3.39%***	-1.91%*	-1.04%	-1.13%
Standard Error	(0.008)	(0.011)	(0.010)	(0.009)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.



Table 5: Differences in subsequent career growth for analysts and associates employed at Lehman Brothers in January 2008, compared to individuals employed in similar positions at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS at the same time. For each individual  $i$  going from hierarchical position  $x$  in 2008 to hierarchical position  $y$  in 2019, career growth is measured as the average number of years that it takes to move from  $x$  to  $y$  across the full sample. Column 1 reports the results from a regression of career growth on initial employer (Lehman Brothers versus other banks). Columns 2-4 match each Lehman Brothers employee to the most similar  $n$  employees of the other banks first based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. We vary the number of matches  $n \in \{1, 2, 5\}$ . The coefficients are reported in the units of years of career growth.

Seniority	No matching	n = 1	n = 2	n = 5
Analyst & Associate	0.487	-0.239	0.128	0.160
Standard Error	(0.199)	(0.453)	(0.371)	(0.304)
Analyst	0.423	0.727	0.075	0.052
Standard Error	(0.396)	(0.512)	(0.450)	(0.419)
Associate	1.10**	-0.653	0.194	0.290
Standard Error	(0.488)	(0.674)	(0.517)	(0.435)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

Table 6: Differences in likelihoods of progressing to senior positions for analysts, associates, and vice presidents employed at Lehman Brothers in January 2008, compared to individuals employed in similar positions at Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS at the same time. Panel 1 reports the differential likelihood of making the level of vice president or above. Panel 2 reports the differential likelihood of reaching the level of either managing director or senior management positions (i.e., C-suite executives or heads of divisions or regional offices). Column 1 reports the results from probit regressions of progressing to these final positions against initial employer (Lehman Brothers versus other banks). Columns 2-4 match each Lehman Brothers employee to the most similar  $n$  employees of the other banks first based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. We vary the number of matches  $n \in \{1, 2, 5\}$ . All coefficients are reported as marginal effects.

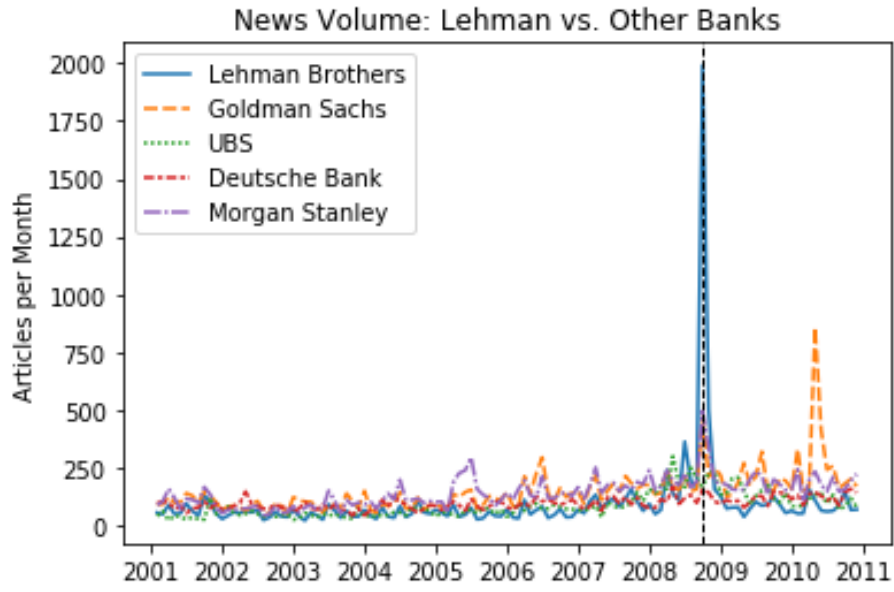
**Panel 1:** progressing to vice president or above by January 2019

Seniority	No matching	n = 1	n = 2	n = 5
Analyst & Associate	5.69%	3.88%	4.50%	5.88%*
Standard Error	(0.035)	(0.042)	(0.038)	(0.035)
Analyst	6.36%	3.78%	4.53%	7.06%
Standard Error	(0.032)	(0.053)	(0.048)	(0.044)
Associate	3.79%	6.27%	3.25%	1.38%
Standard Error	(0.059)	(0.055)	(0.045)	(0.039)

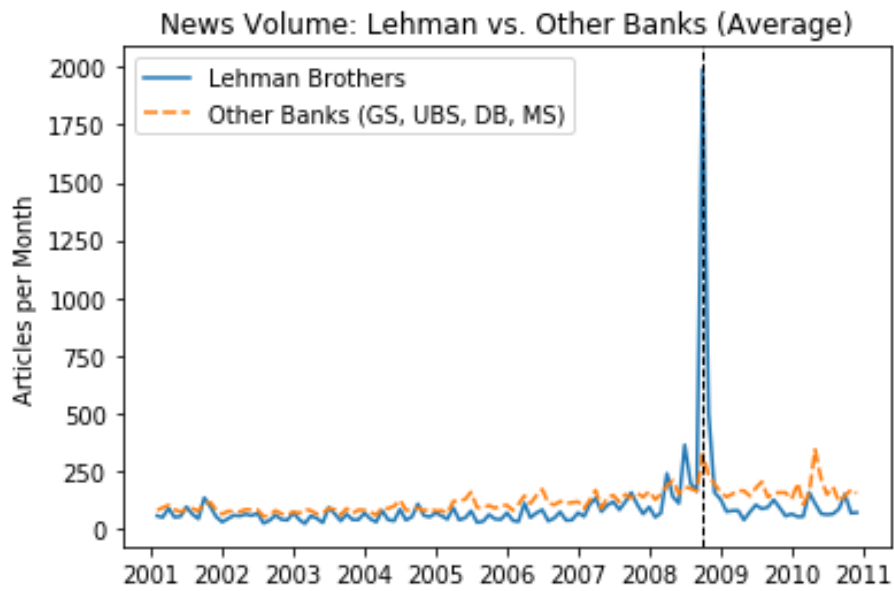
**Panel 2:** progressing to managing director or above by January 2019

Seniority	No matching	n = 1	n = 2	n = 5
Analyst & Associate	1.43%	-3.35%	-3.85%	-2.95%
Standard Error	(0.028)	(0.039)	(0.035)	(0.024)
Analyst	0.38%	-4.90%	-4.39%	-7.22%
Standard Error	(0.042)	(0.047)	(0.039)	(0.038)
Associate	5.89%	-5.26%	-2.73%	2.28%
Standard Error	(0.052)	(0.081)	(0.067)	(0.057)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

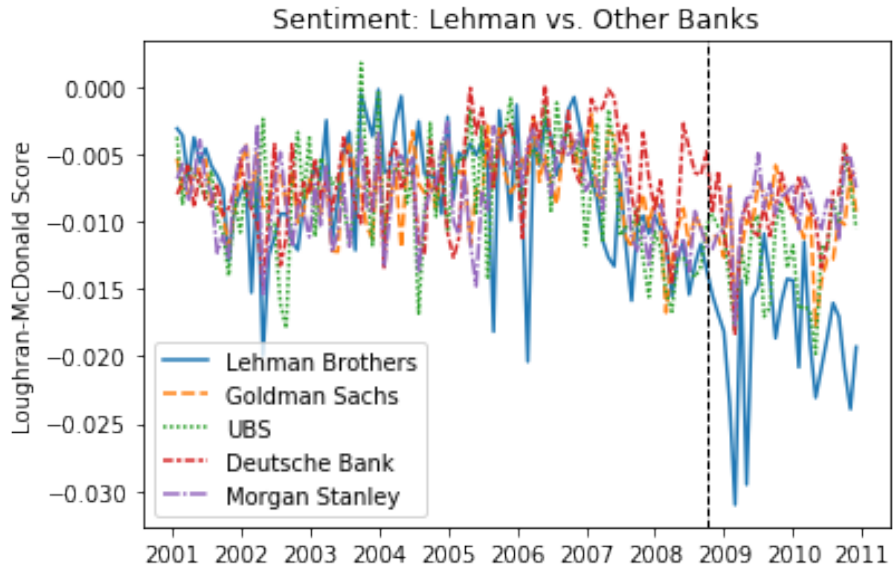


(a)

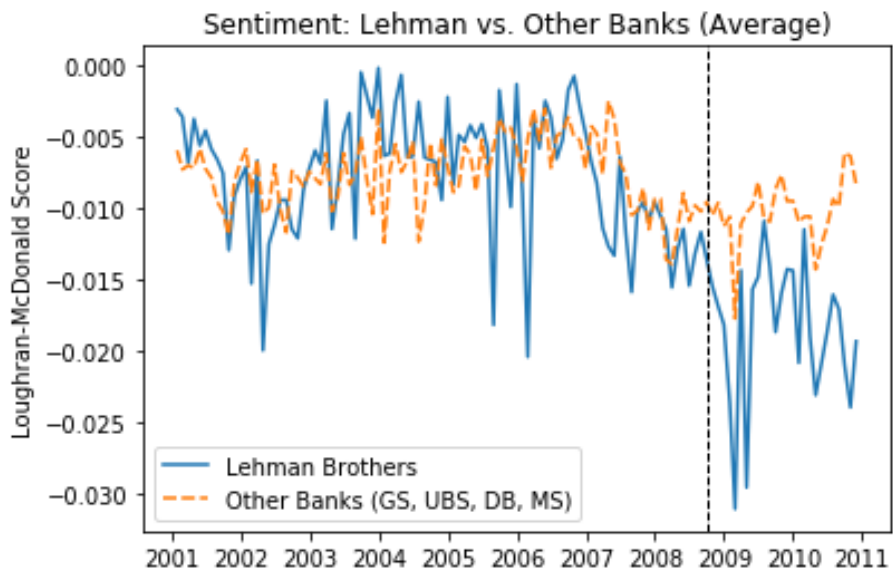


(b)

Figure 1: Volume of news articles per month between 2001 and 2011. September 2008 is highlighted by the black dotted vertical line. Panel (a) depicts news article mentions separately for Lehman Brothers, Goldman Sachs, UBS, Deutsche Bank, and Morgan Stanley. Panel (b) averages news article mentions of non-Lehman banks (Goldman Sachs, UBS, Deutsche Bank, and Morgan Stanley) each month.



(a)



(b)

Figure 2: Average Loughran-McDonald scores between 2001 and 2011. September 2008 is highlighted by the black dotted vertical line. Panel (a) depicts average monthly LM scores separately for Lehman Brothers, Goldman Sachs, UBS, Deutsche Bank, and Morgan Stanley. Panel (b) averages monthly LM scores of news articles mentions of non-Lehman banks (Goldman Sachs, UBS, Deutsche Bank, and Morgan Stanley) each month.

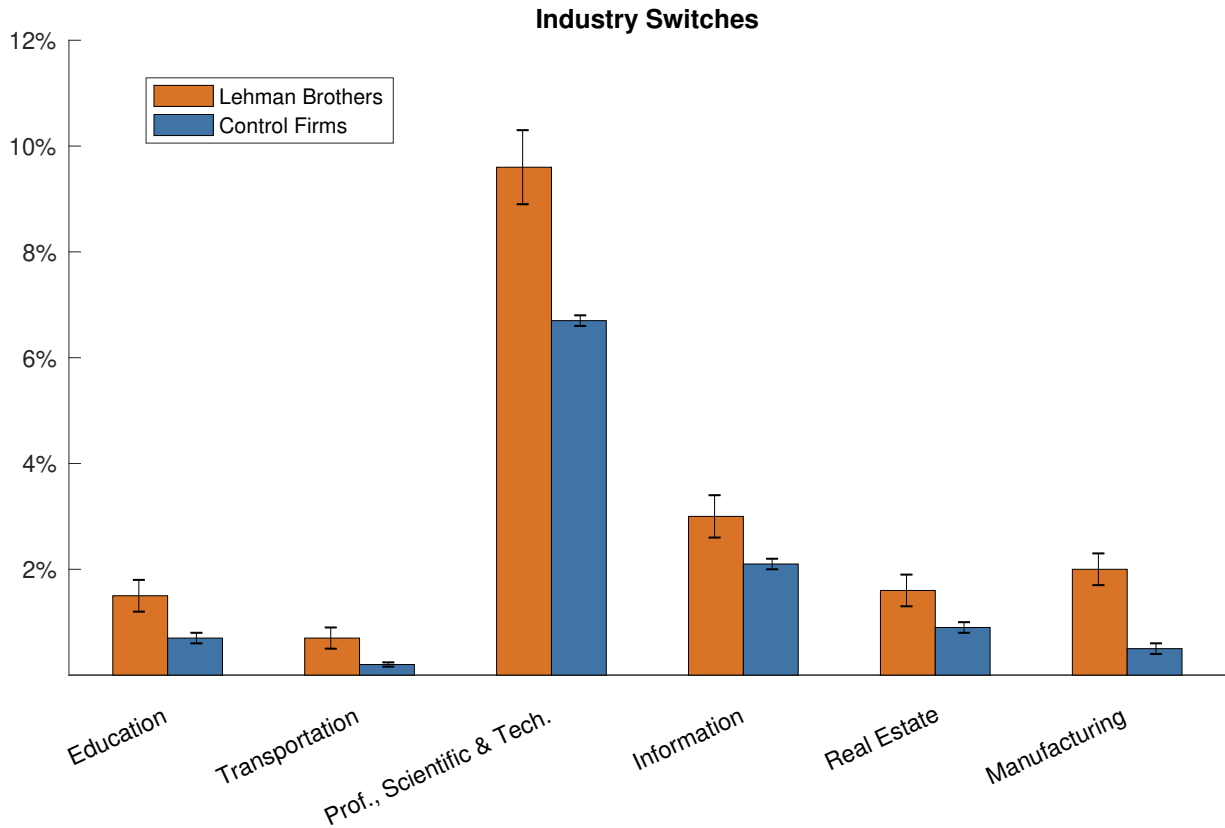


Figure 3: Likelihood of joining specific non-financial-services industries for Lehman Brothers employees versus employees of Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS. For each employee of the considered banks in January 2008, we identify the industry (two-digit NAICS code) of that employee's employer as of January 2019.

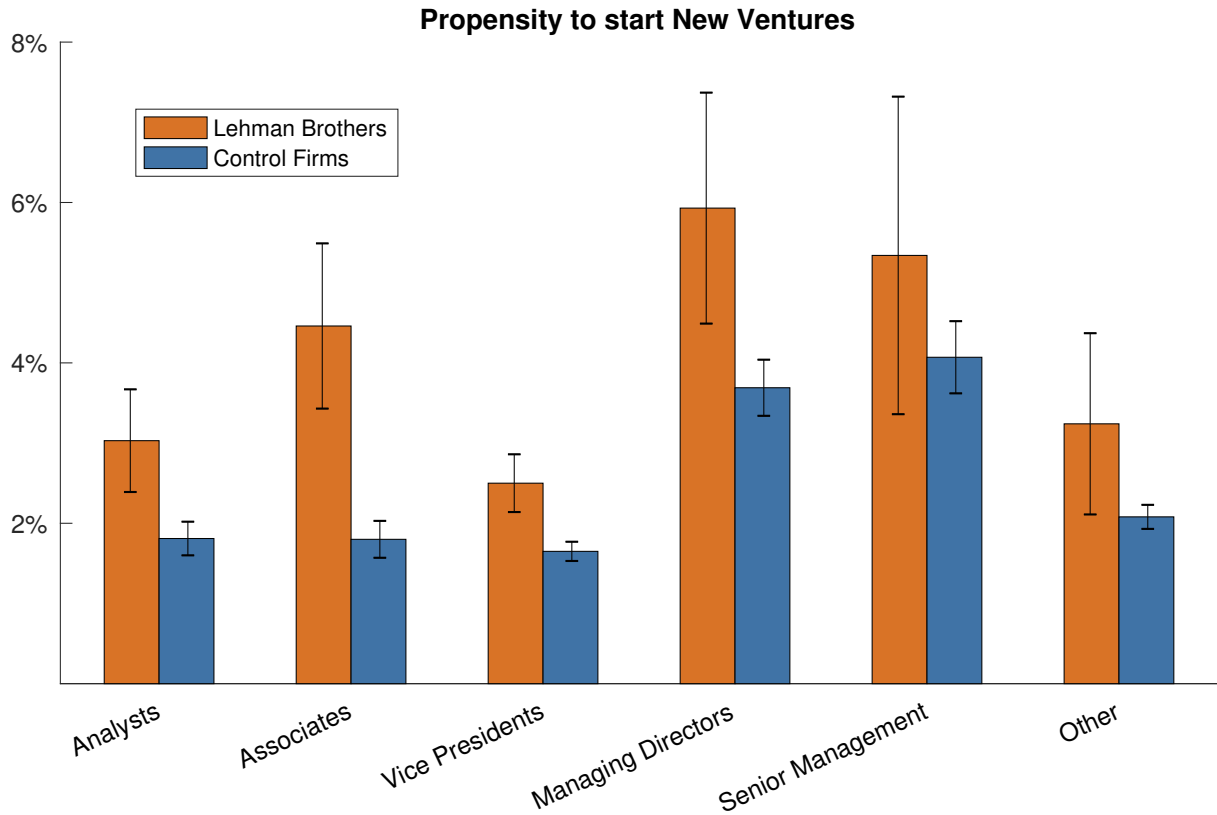


Figure 4: Likelihood of engaging in entrepreneurship between January 2008 and January 2019 by individuals employed at Lehman Brothers as of January 2008 and those employed at the control set of banks (Goldman Sachs, Morgan Stanley, Deutsche Bank, and UBS) as of January 2008.

# Appendix

## A Example Employee Profiles

Lehman employee		Matched non-Lehman employee	
Gender:	Female	Gender:	Female
Age in 2008:	24	Age:	24
Education:	Columbia University, B.A., Economics, Politics 2006 UPenn Wharton MBA, 2012	Education:	UT Austin B.S., Chem.Eng., Finance, 2006 Columbia University MBA & MPH, 2013
Experience:	Lehman Brothers, 2006-2008 Analyst Metalmark Capital, 2008-2010 Private Equity Associate GE Capital, 2012-2014 Investment Associate BoA Merrill Lynch, 2014— Vice President	Experience:	Goldman Sachs, 2006-2008 Analyst Taconic Capital, 2008-2010 Analyst Analysis Group, 2013-2014 Senior Analyst Flatiron Health, 2015-2017 Quantitative Sciences Manager Perot Jain, L.P., 2017— Principal

Lehman employee		Matched non-Lehman employee	
Gender:	Male	Gender:	Male
Age in 2008:	29	Age:	29
Education:	Binghamton University, 2003 B.S. Finance & Economics	Education:	HKUST, 2003 B.S. Economics & Finance
Experience:	Lehman Brothers, 2005-2008 Associate XL Group Investments, 2008— Senior Portfolio Manager	Experience:	UBS, 2003-2009 Associate Director Abacus Asset Mgmt, 2009-2016 Responsible Officer FansWiFi, 2015-2018 Co-Founder HBFS, 2018— Chief Operating Officer

Lehman employee	Matched non-Lehman employee
Gender: Male	Gender: Male
Age in 2008: 35	Age: 35
Education: University of Chicago B.A. English Literature, 1994 University of Chicago M.B.A., 2002	Education: Villanova University B.S. Finance, 1996 Villanova University M.B.A., 2003
Experience: [Unspecified gap, 1994-1996]  Accenture, 1996-2000 Manager <b>Lehman Brothers, 2001-2008</b> Vice President Credit Suisse, 2008-2016 Director Wells Fargo, 2016— Managing Director	Experience: Neuberger Berman, 1996-1997 Assistant Supervisor KPMG, 1997-2000 Senior Consultant J.P. Morgan, 2000-2001 Business Analyst <b>Deutsche Bank, 2001-2011</b> Director TD Bank, 2011-2016 Senior Vice President (SVP) TD Bank, 2016— SVP & Head, Oper. Risk Mgmt

Lehman employee	Matched non-Lehman employee
Gender: Female	Gender: Female
Age in 2008: 39	Age: 39
Education: [Undegraduate unknown]  Sapienza University Doctor of Law (J.D.), 1998 Fordham University, Master of Law, 2002	Education: Georgetown University B.S. Foreign Service, 1995 St. John's University Juris Doctor (J.D.), 1998
Experience: Clifford Chance, LLP, 1999-2004 Associate <b>Lehman Brothers, 2004-2008</b> Director Credit Agricole, 2009-2018 Executive Director Credito Fondiario, 2018— Head of Deal Execution 32	Experience: Clifford Chance, LLP, 1998-2000 Associate, Funds Group [Law firm in NY], 2001-2006 Associate <b>Morgan Stanley, 2006-2018</b> Executive Director [Law firm in SF], 2018— Special Council



## B Additional Tables

Table B1: Differences in the likelihood of experiencing a career break between those who were employed at Lehman Brothers as of January 1, 2008 and those who were employed at Goldman Sachs, Deutsche Bank, Morgan Stanley, and UBS. Career breaks are identified as one year or more of contiguous lack of reported employment in an employee's profile between January 1, 2008 and December 31, 2019. Column 1 reports the results from a probit regression of career breaks on initial employer (Lehman Brothers versus other banks). Columns 2-4 match each Lehman Brothers employee to the most similar  $n$  employees of the other banks first based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. We vary the number of matches  $n \in \{1, 2, 5\}$ . All coefficients are reported as marginal effects.

Seniority	No matching	n = 1	n = 2	n = 5
Full Sample	3.34%***	1.40%***	1.86%***	1.27%***
Standard Error	(0.003)	(0.004)	(0.003)	(0.003)
Analyst	0.43%	-1.07%	0.91%	2.11%***
Standard Error	(0.010)	(0.010)	(0.008)	(0.007)
Associate	-1.54%	1.21%	0.99%	-1.13%
Standard Error	(0.014)	(0.013)	(0.011)	(0.011)
Vice President	3.73%***	2.69%***	2.22%***	2.40%***
Standard Error	(0.006)	(0.007)	(0.006)	(0.005)
Managing Director	5.15%***	2.17%	3.76%**	1.80%
Standard Error	(0.016)	(0.019)	(0.015)	(0.014)
Senior Management	6.84%***	10.90%***	9.76%**	5.92%***
Standard Error	(0.020)	(0.024)	(0.018)	(0.017)
Other	4.25%***	7.36%***	2.00%***	2.64%***
Standard Error	(0.005)	(0.006)	(0.005)	(0.004)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

Table B2: Differences in the likelihood of experiencing a career break by 2011 between those who were employed at Lehman Brothers as of January 1, 2008 and those who were employed at Goldman Sachs, Deutsche Bank, Morgan Stanley, and UBS. Career breaks are identified as one year or more of contiguous lack of reported employment in an employee’s profile between January 1, 2008 and December 31, 2019. Column 1 reports the results from a probit regression of career breaks on initial employer (Lehman Brothers versus other banks). Columns 2-4 match each Lehman Brothers employee to the most similar  $n$  employees of the other banks first based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. We vary the number of matches  $n \in \{1, 2, 5\}$ . All coefficients are reported as marginal effects.

Seniority	No matching	n = 1	n = 2	n = 5
Full Sample	4.59%***	2.48%***	2.45%***	2.39%***
Standard Error	(0.003)	(0.004)	(0.003)	(0.002)
Analyst	2.75%***	1.15%*	1.02%	1.30%*
Standard Error	(0.007)	(0.015)	(0.006)	(0.005)
Associate	1.90%*	-0.17%	0.90%	0.99%
Standard Error	(0.010)	(0.009)	(0.009)	(0.008)
Vice President	5.15%***	2.91%***	2.62%***	2.73%***
Standard Error	(0.004)	(0.006)	(0.005)	(0.004)
Managing Director	6.39%***	1.67%	3.17%**	3.14%***
Standard Error	(0.011)	(0.016)	(0.013)	(0.010)
Senior Management	4.80%***	7.52%***	5.19%***	2.95%**
Standard Error	(0.013)	(0.019)	(0.013)	(0.012)
Other	4.85%***	2.93%***	0.94%***	2.64%***
Standard Error	(0.004)	(0.004)	(0.003)	(0.004)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

Table B3: Differences in outcomes (likelihood of experiencing a career break and likelihood of industry switches) between those employed at Lehman Brothers as of January 1, 2008 versus those employed at Goldman Sachs and Morgan Stanley. Career breaks are identified as six or more months of contiguous lack of reported employment in an employee’s profile between January 1, 2008 and December 31, 2019. Industry switches are identified as holding a position outside of the broad 2-digit NAICS code (52) corresponding to the financial services industry as of the end of the sample period, January 2019. Columns 1 and 3 report the results from a probit regression of career breaks on initial employer. Columns 2 and 4 match each Lehman Brothers employee to the most similar employee of Goldman Sachs or Morgan Stanley based on role (exact match) and then based on age, gender, education, and skills using propensity score matching. All coefficients are reported as marginal effects.

Seniority	Breaks from employment		Industry switches	
	No matching	Closest 1 match	No matching	Closest 1 match
Full Sample *	2.19%***	1.17%***	0.12%	-1.83%**
Standard Error	(0.004)	(0.004)	(0.006)	(0.007)
Analyst	-1.34%	-2.11%**	-4.83%***	-3.49%
Standard Error	(0.011)	(0.007)	(0.018)	(0.021)
Associate	-1.04%	-2.86%*	0.33%	-0.16%
Standard Error	(0.012)	(0.015)	(0.022)	(0.028)
Vice President	3.56%***	4.73%***	2.24%**	-0.80%
Standard Error	(0.006)	(0.008)	(0.011)	(0.012)
Managing Director	4.99%***	5.00%**	7.42%***	-2.75%
Standard Error	(0.015)	(0.021)	(0.026)	(0.035)
Senior Management	7.42%***	10.28%***	7.82%*	3.82%
Standard Error	(0.023)	(0.026)	(0.044)	(0.052)
Other	1.87%***	4.77%***	-1.65%*	-2.18%
Standard Error	(0.006)	(0.006)	(0.009)	(0.016)

\*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% level, respectively.

## C Sentiment Examples

Articles are assigned a Loughran-McDonald Score (*LM Score*) using a word list from company 10-K filings containing 353 positive words and 2,354 negative words (see Loughran and McDonald (2011)). Here are some examples of financial news articles with varying degrees of sentiment according to their *LM Scores*. Positive words are marked in blue and negative words are marked in red.

Score: **0.0159** (99th percentile)

(Standard & Poor's) Oct. 27, 2006: Standard & Poor's Ratings Services said today that it affirmed its 'A+/A-1' long- and short-term counterparty credit ratings on Lehman Brothers Holdings Inc. (Lehman) and related subsidiaries. The outlook is stable. "The ratings on Lehman reflect the firm's **strong** franchises in institutional securities trading, investment banking, and asset management," said Standard & Poor's credit analyst Tom Foley. In addition, the firm has **exceptional** liquidity, **strong** cost controls, and **excellent** risk management. These **strengths** are partially offset by Lehman's continued exposure to credit risks in its leveraged finance and real estate businesses relative to its capital base. We expect Lehman to continue on its current course over the near term.

Score: **0.00604** (95th percentile):

(Dow Jones Newswires) November 4, 2002: Lehman Brothers on Monday said it is planning several adjustments to its widely followed fixed-income indexes, adding Canadian corporate bonds into its Global Aggregate Index and changing inclusion dates for government securities, as well as launching a separate Danish Mortgage Index. Beginning Jan. 1, approximately 128 Canadian corporate and agency bonds with a market value of about \$108 billion will be added to Lehman Brothers Global Aggregate Index, the firm said in a press release. To qualify for the index, Canadian corporate bonds must have the equivalent of \$300 million par amount outstanding, Lehman Brothers said. Forty Canadian Treasury bonds, with a market value of \$173 billion, already contribute to the index, the firm said. Also **effective** Jan. 1, all bonds, including U.S. Treasury's, will be eligible for inclusion to the indexes on their issue date, rather than settlement dates. U.S. Treasury's, in particular, historically used settlement date as the determining factor in the Lehman indexes. "Under the new rules, a Treasury security issued in January but settling in February will now contribute to February returns. Historically, such securities did not contribute to returns until March," Lehman Brothers

said. The change is Lehman Brothers' effort to "bring everything in sync" when it comes to the timing of inclusion for securities, said Steve Berkley, head of index products at Lehman Brothers. Unlike Treasury's, corporate bonds are always included to Lehman indexes at the time of issuance, he said. Meanwhile, Lehman Brothers said it will launch on Dec. 1 a new Danish Mortgage Index, which will include investment-grade, fixed-rate mortgages with a minimum maturity of one year and outstanding par value of at least EUR 300 million. The index, which has an initial estimated market value of EUR 108 billion, will eventually be rolled into broader global indexes. But as of right now, returns on the Danish Mortgage Index will be reported "on a stand-alone basis," Lehman Brothers said. The firm also made other changes to its fixed-income indexes, including the launch of a series of custom "issuer-constrained" indexes that limit the contributions of specific issuers to a client's [desired](#) percentage, Lehman Brothers said.

Score: **-0.01049** (50th percentile)

(The Wall Street Journal) May 29, 2015: By Maureen Farrell In an appearance marking his return to the public eye, Richard Fuld Jr. insisted he doesn't want to play "woulda, coulda, shoulda" about the [collapse](#) of Lehman Brothers Holdings Inc. But the former chief executive, speaking Thursday to a crowd of more than 1,500 people at the Grand Hyatt hotel in midtown Manhattan, was unrepentant about his [late](#) firm's culture and its role in the financial crisis, largely placing the blame instead on misguided government and central-bank policy and irresponsible borrowers. At times jocular and reflective, the 69-year-old also flashed his combative side. When asked why he didn't simply ride off into the sunset after Lehman's [collapse](#), Mr. Fuld responded, "Why don't you just bite me?" He quickly followed up by saying he couldn't give up and felt he had "no choice" but to start his new firm, Matrix Advisors LLC. As the keynote lunch speaker at the 2015 Marcum MicroCap Conference in New York, Mr. Fuld spoke before a sympathetic crowd. His remarks, keenly awaited on Wall Street, were broadcast live for several minutes on CNBC. Mr. Fuld, who joined Lehman Brothers after college and spent 38 years there, has kept a low profile since the firm's [bankruptcy](#) in 2008. In speaking of his return to the public eye, he joked that he doesn't count his "wonderful time with Congress" as a public appearance and called the conference catering to small and midsize businesses the right venue for re-entering public life. Mr. Fuld's comments about Lehman were broadly consistent with his testimony before Congress in October of 2008, when he was

dubbed a "villain" by one U.S. representative and another said, "You don't acknowledge that you did anything wrong, and that is troubling to me." Mr. Fuld on Thursday reiterated that he had "no regrets." He outlined what he called the "perfect storm" of events that led to the financial crisis, saying "it all started with the government" and policies that subsidized cheap loans for people to buy homes in order to help them chase the American dream. The ex-bank executive later added lax regulators, homeowners who used equity on their houses "as ATM accounts" and the explosive growth of hedge funds as other contributors to the economic meltdown.

Score: **-0.03206** (10th percentile):

(Dow Jones Newswires) November 2, 2005: The New York Stock Exchange **fined** Lehman Brothers (LEH) \$500,000 in connection with a 2002 trade that regulators say gave the firm a profit and potentially **harmed** customers. The case involved a trading strategy of an unidentified stock moving into the Standard & Poor's 500 Index. That afternoon, Lehman had entered several transactions to sell about two million shares of the stock near the close of trading "that were **disruptive** and caused excess market volatility," regulators said. (This story and related background material will be available on The Wall Street Journal Web site, WSJ.com.) Regulators **allege** the Lehman trading behavior pushed the final price of the stock down to \$59 from \$59.61. They added that Lehman **benefited** from the **closing** trade through its own trading strategies and because it had pledged to buy shares from customers at a price 0.33 cent to two cents above the stock's **closing** price. A Lehman spokeswoman **declined** comment.

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