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ABSTRACT

While businesses require funding to start and grow, they also rely on human capital, which affects how they raise funds. Labor market frictions make financing labor different than financing capital. Unlike capital, labor cannot be owned and can act strategically. Workers face unemployment costs, can negotiate for higher wages, are protected by employment regulations, and face retirement risk. I propose using these frictions as a framework for understanding the unique impact of a firm's workforce on its capital structure. For instance, high leverage often makes managing labor more difficult by undermining employees' job security and increasing the need for costly workforce reductions. But firms can also use leverage to their advantage, such as in labor negotiations and defined benefit pensions. This research can help firms account for the needs and management of their workforce when making financing decisions.

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1. INTRODUCTION

The neoclassical firm produces output from two inputs: capital and labor. Acquiring these inputs requires funds and often external financing, raising the question of the optimal mix of debt and equity financing. Capital structure research has mostly focused on financing the capital input to production. This is a natural starting point in that acquiring capital often requires large upfront payments, can be pledged as collateral, and represents the tangible value of a business. But the organization of a firm's workforce also factors prominently into its financial structure.

Most early capital structure research did not model labor explicitly or in great detail. Nevertheless, Modigliani & Miller's (1958) assumption that investment is held constant applies equally to investments in human capital and physical assets. Most finance theories implicitly assume that labor is supplied in a frictionless spot market, where wages equal the marginal product of labor in each period. In practice, however, labor markets are rife with frictions and employment relationships typically span multiple periods. As a result, a firm's sources of financing affect its ability to recruit, train, and retain an effective workforce. Incorporating labor market frictions into finance theories enriches our understanding of capital structure determination and reveals how firms' financial structures are shaped by workforce considerations.

The key to understanding the unique impact of a firm's workforce on its capital structure decisions is to understand how labor is different than capital. Labor can do things that capital cannot (Autor et al. 2003; Levy & Murnane 2005; Autor & Dorn 2013). For example, employees can solve unstructured problems for which rules do not exist and process new information, deciding what is relevant in a flood of undefined data. Their creativity produces valuable tangible and intangible assets in the form of new ideas, processes, and know-how. They can also

execute complex, non-routine tasks that require physical dexterity and flexible interpersonal skills.

Hiring employees, however, exposes a firm to labor market frictions. Unlike capital, people cannot be owned and can act strategically. They can choose where to work and whether to quit, forcing employers to be sensitive to their needs. As a result, various underlying labor market frictions and human factors affect firms' financing choices, such as whether to take on additional debt or fund their employees' pensions. In Section 2, I describe the implications of employees' option to quit their job, which is most often motivated by dissatisfaction with job security or pay. Unlike machines, people face large costs in unemployment and can organize into labor unions that negotiate for higher wages and improved working conditions. In Section 3, I discuss labor market regulations and norms, which impose labor-specific adjustment costs that impede workforce downsizing and nominal wage cuts. Finally, unlike machines, people face retirement risk and worry about providing for themselves if they are unable to continue working. Historically, this concern led many employers to offer deferred compensation in the form of defined benefit pensions, which promise regular payments during retirement regardless of the value of the assets invested in the fund backing the promise. Defined benefit pensions are essentially another form of corporate debt, wherein the firm borrows from its employees. In Section 4, I describe how such arrangements affect other sources of the firm's financing and most often increase its financial leverage.

2. ABILITY TO QUIT

The most obvious difference between labor and capital is ownership. Firms can own machines, but in an economy without human slavery, they cannot own people or force them to work against their will.

Understanding the implications of employees' freedom to leave their job begins by examining why employees quit. Clark (2001) used data on labor market stints from the British Household Panel Survey to examine the determinants of worker resignations. He associated them with workers' job satisfaction along seven dimensions. Two job characteristics emerged as most important to retaining workers: job security and pay. Employees value job security because job loss is costly, and they can bargain collectively to try to boost their pay. A firm that takes on risky debt increases its workers' expected unemployment costs and may advantage the firm in collective bargaining. These labor market frictions thus affect firms' capital structure choices.

2.1. Unemployment Costs

Employees value job security because getting laid off from a job can be costly. Laid-off workers often endure significant reductions in consumption (Gruber 1997), long delays before reemployment (Katz & Meyer 1990), and significant wage cuts after returning to work (Gibbons & Katz 1991; Farber 2005). Drawing on longitudinal U.S. Social Security records from 1974 to 2008, Davis & von Wachter (2011) estimate the earnings loss associated with being displaced in a mass layoff event. Discounting at a 5% annual rate over 20 years after job loss, they find that laid-off men lose an average of 1.4 years of predisplacement earnings when the national unemployment rate is below 6%. These losses are even more severe for workers laid off during recessions. The losses amount to a staggering 2.8 years of predisplacement earnings for individuals laid off when the unemployment rate exceeds 8%.

Various labor market frictions complicate laid off workers' search for a suitable job: the search is costly (Diamond 1982; Mortensen 1986; Mortensen & Pissarides 1994); there is a limited supply of match-specific job opportunities (Lazear 2009); the worker's productivity is difficult to discern in advance (Harris & Holmstrom 1982); collective bargaining may limit

firms' hiring (Dunlop et al. 1944; Freeman & Medoff 1984), and so on. These frictions do not only cause the unemployed to lose earnings. They can also lead to lower achievement by their children in school (Stevens & Schaller 2011); the loss of their home (Hsu et al. 2018); divorce (Charles & Stevens 2004); stress-related health problems (Burgard et al. 2007); or even death (Sullivan & von Wachter 2009).

An employee's job security typically relies on the firm's financial condition. Distressed firms often discharge workers to reduce costs (e.g., John et al. 1992; Kang & Shivdasani 1997), especially firms with large predistress debt obligations (Ofek 1993; Asquith et al. 1994; Sharpe 1994; Calomiris et al. 1997; Hanka 1998). To confirm that financial leverage causes distressed firms to restructure and lay off employees, one must differentiate the effects of their financial distress from those of their economic distress. That is, when economic conditions tighten, firms' demand for labor decreases irrespective of their leverage position. Before one can conclude that people seeking job security should prefer employment at less indebted firms, one must confirm that the financial constraints associated with leverage do indeed make jobs less secure.

Researchers have approached this challenge of empirically separating financial from economic distress by examining discrete financial events, such as when firms face large amounts of debt maturing or default. Benmelech et al. (2011) find that, in any given year, firms with maturing long-term debt reduce their labor force more than firms without maturing long-term debt.[1] Applying a similar empirical approach using hand-collected data from the Great

[1] In two other natural experiments, Benmelech et al. (2011) show that positive (negative) shocks to bank loan supply, caused by state-level deregulation and bank losses in unrelated markets, decrease (increase) local unemployment. Chodorow-Reich (2014) finds that reduced credit supply accounts for between one-third and one-half of the employment declines at small and medium firms in the wake of the 2008–2009 financial crisis. Duygan-Bump et al. (2015) provide complementary evidence for the financial crisis and find similar results for the 1990–1991 recession.

Depression, Benmelech et al. (2018) conclude that financial constraints accounted for 10% to 33% of the aggregate decline in employment of large firms between 1928 and 1933.

Other researchers investigate the effects of discrete credit events, typically by comparing firms experiencing credit events to firms that are not. If the latter experience similar economic conditions, then the difference in outcomes can be attributed to the distressed firm's borrowing and the credit event. A potential limitation of this approach is that the source of cross-sectional variation in firms' debt levels and contract terms is often not known definitively and could be correlated with an omitted variable. Nevertheless, showing that comparison firms are unaffected or that the distressed firms' outcomes manifest immediately around the credit event make it unlikely that an omitted variable impacts the results.

Credit events are often associated with dramatic reductions in employment. Hotchkiss (1995) finds that employment decreases by about 50% around a bankruptcy filing; Agrawal & Matsa (2013) find that bond defaults lead firms to decrease employment by at least 27% in the two years surrounding a default; and Falato & Liang (2016) find that covenant violations cause firms to cut their workforces by about 10%. Based on U.S. employer-employee linked data, Graham et al. (2016) report that 76% of workers separate (including both layoffs and quits) from bankrupt firms within three years of a bankruptcy filing, a 27% increase above the 60% separation rate among matched control firms. Furthermore, wages decrease for both retained and separated workers: the present value of earnings losses over the seven years after bankruptcy is 63% of prebankruptcy annual earnings. Being productive does not necessarily spare an employee from these cuts. Examining Swedish data, Caggese et al. (2018) show that financial constraints can distort firms' firing decisions, suboptimally favoring the termination of employees with steep productivity profiles or lower firing costs.

To avoid the insecurity of employment at distressed firms, people prefer to work elsewhere. Analyzing data from a leading online job search platform, Brown & Matsa (2016) examine the impact of corporate distress on firms' ability to attract job applicants. Distressed firms attract fewer and lower-quality applicants to open positions, particularly for jobs with higher educational requirements.[2] These reductions appear to be aggravated by the firms' financing, as applications decrease more among firms with greater preexisting leverage, maturing debt, and more debt covenants. Furthermore, the reductions are tied directly to job security, as applications decrease more in states where unemployment insurance offers workers less protection from job loss. Concerned about job security, job seekers are also less willing to relocate out of the state to work at a distressed firm. Financial distress thus reduces firms' access to the national labor market and reduces the quality of the applicant pool.

Brown & Matsa's (2016) estimates suggest that the ripple effect of distress on labor supply is sizable. For comparison, consider the effect of distress on consumers of durable goods. Consumers' demand for durable goods decreases when a producer is in distress because consumers worry that parts and servicing will become harder to obtain. Hortaçsu et al. (2013) find that the prices of used automobiles decrease when the manufacturer is in distress. They estimate that a 1,000-basis-point increase in a manufacturer's credit default swap spread decreases the price of a used car by $68 (or 0.5%). The labor market impacts appear to be 40 times larger, as Brown and Matsa find that the same size of shock decreases the volume of

[2] Job seekers are unlikely to explicitly track firms' leverage decisions, financial statements, or credit default swap spreads; more likely, their perceptions are based on indirect sources, such as media reports, online searches, and word of mouth. Although the specific sources that job seekers use to learn about firms' risk have not been studied, evidence suggests they are informative. Using survey responses, Brown & Matsa (2016) show that job seekers' perceptions of firms' financial condition track firms' credit default swap spreads and accounting data.

applications by about 20% and increases wages by a similar margin.

Financially distressed firms also struggle to retain their existing employees. Using matched employer-employee data from Sweden, Baghai et al. (2017) show that employees with short tenures, a lot of industry experience, and high general human capital are the most likely to depart firms before they enter bankruptcy. They estimate that employees with the highest ability are 30% more likely to leave a firm approaching financial distress than are average employees.

With labor supply reduced, employees often require higher wages, additional benefits, or improved working conditions to compensate them for the unemployment risk associated with working for a distressed firm. This additional compensation is referred to as a compensating wage differential. The idea that a wage differential must compensate employees for bearing unemployment risk dates back to eighteenth-century Scottish economist Adam Smith (1976, p. 120):

> The wages of labor in different occupations vary with the constancy or inconstancy of employment. . . .What he earns, therefore, while he is employed, must not only maintain him while he is idle, but make him some compensation for those anxious and desponding moments which the thought of so precarious a situation must sometimes occasion. . . .The high wages of those workmen, therefore, are not so much the recompense of their skill, as the compensation for the inconstancy of their employment.

Rosen (1986) summarizes the theoretical literature formalizing this idea, and empirical evidence supports its importance. Abowd & Ashenfelter (1981) find that compensating differentials for unemployment risk vary across industries and amount to up to 14% of total wages in the presence of significant unemployment risk. Topel (1984) estimates that a 1-

percentage-point increase in anticipated unemployment raises an individual's wage by about 1% in the presence of mean unemployment insurance wage replacement. Li (1986) and Hamermesh & Wolfe (1990) find that 14%-41% of total interindustry wage differentials are due to the differences in unemployment risk.

Because financial leverage can reduce job security, an increase in leverage raises the costs required to compensate workers for their greater risk of unemployment. Even an employee without any bargaining power will receive this compensating differential, because the differential does not provide them with any of the surplus created by the employment relationship. Rather, the differential is required to make them as well off as they would be working at an unlevered firm with greater job security.

Estimating the magnitude of compensating wage differentials for financial leverage is not straightforward. Even if one could isolate exogenous variation in corporate leverage and use it to estimate its true causal effect on wages, this quantity likely provides a biased estimate of the compensating wage differential, because leverage also affects wages through other channels, including reducing agency problems (Jensen 1989) and countering employees' bargaining power (see Section 2.2.1). As a consequence, the results of research correlating leverage and wages are mixed (e.g., Lichtenberg & Siegel 1990; Hanka 1998; Cronqvist et al. 2009; Chemmanur et al. 2013; Michaels et al. 2018). To overcome these challenges, researchers have instead estimated leverage-related compensating wage differentials indirectly.

Graham et al. (2016) estimate how much of a wage premium firms would need to offer risk-averse workers to fully compensate them for their exposure to potential earnings losses in the event that the firm went bankrupt. Using a 5% real discount rate, they estimate the present value of employees' aggregated earnings losses within six years after bankruptcy to be 21.5% of

firm value. This figure excludes income from unemployment insurance. If employees require the same level of expected utility to accept employment at firms with different financial distress risk (i.e., require the same risk-adjusted present value of expected wages), then levered firms with higher probabilities of bankruptcy will have to raise wages to compensate employees for the greater expected earnings losses due to bankruptcy. The present value of wage premia should equal the expected present value of the earnings losses due to bankruptcy.

Graham et al. (2016) account for employees' risk aversion by overweighting the probability of bankruptcy in their calculation. Specifically, they use risk-neutral probabilities of default from Almeida & Philippon (2007), which are calibrated from risk premia in the bond market. Because most employees are less diversified than bond investors, this approach is conservative in that it likely undervalues the present value of the earnings losses to undiversified employees. Assuming a risk-free rate of 2.5% and that the firm will employ workers indefinitely, Graham et al. estimate an implied wage premium of 7.46% of firm value for a BBB-rated firm.

In practice, however, firms are unlikely to pay such a high premium, which overtakes the tax benefits of debt even without considering other costs of financial distress (see Table 5 of Graham et al. 2016). The premium estimated by Graham et al. (2016) is substantially greater than those implied by direct estimates of the compensating differential for unemployment risk. Topel (1984) finds that, for every additional percentage point in unemployment risk, average equilibrium wages increase by 0.93%. This effect is moderated by the unemployment insurance system, and Topel estimates that compensating wage differentials would increase to 2.5% in the absence of unemployment insurance benefits. Agrawal & Matsa (2013) combine these figures with estimates for the probability of unemployment conditional on default and the probabilities of default associated with different credit ratings. Agrawal & Matsa's calculation uses natural

probabilities because Topel's estimate of the wage premium already accounts for employees' risk aversion. Agrawal & Matsa assume that the firm will employ workers until it defaults and use a risk-free rate of 6.9%, the average 10-year Treasury rate from 1962 to 2009. Discounting at a higher interest rate yields a lower estimate, so the magnitude of the wage differential will vary with interest rates over time. To facilitate a comparison with Graham et al., I recalculate Agrawal & Matsa's estimates assuming a risk-free rate of 2.5% and report the results in Table 1.

Even without unemployment insurance (as in the calculation in Graham et al. 2016), I estimate that a BBB-rated firm pays a wage premium of 2.94% of firm value, which is about 60% smaller than the premium implied by the realized wage losses. There are at least five potential reasons for the difference between these estimates. First, the estimates in Table 1 account only for unemployment risk, whereas Graham et al. (2016) also include the wage losses of employees who continue to work at a bankrupt firm. Second, Graham et al. might overestimate employees' risk-adjusted wage loss if they tend to move to less risky jobs after the bankruptcy. Third, Topel might underestimate the compensating differential for unemployment risk if employees in risky industries are negatively selected in ways he cannot observe. Fourth, some of the compensating differential might be paid as nonwage benefits, such as better health insurance or an insured pension, which are not included in Topel's calculation. Finally, although workers tend to correctly rank firms' distress risk (see footnote 2), they might underestimate the probability, leading them to require a smaller risk premium than would be expected on the basis of their true risk exposure.

Regardless of the exact size of the premium, the labor supply considerations that it reflects affect firms' financing policies. Titman (1984) was the first to propose this idea in his seminal paper on the indirect costs of financial distress; Berk et al. (2010) model the labor supply

considerations explicitly. Although they model a friction related to the observability of employees' productivity (Harris & Holmstrom 1982), other labor market frictions imply a similar result. The key insight is that labor market frictions that make unemployment costly for employees affect a firm's optimal capital structure. This consideration can be understood as an additional term in the trade-off weighed by firms when taking on additional leverage:

$$NPV[Debt\ Issue] = NPV[Tax\ Shield] + NPV[Costs\ of\ Financial\ Distress] + \Delta\ Labor\ Expense \quad (1)$$

In the traditional trade-off theory of capital structure, a firm that issues debt balances the value obtained from debt tax shields with the potential value lost should the debt cause the firm to encounter financial distress (e.g., Graham 2000). The net present value (NPV) of the costs of financial distress is the product of the probability of financial distress and the magnitude of appropriately discounted, ex post direct and indirect costs of distress. Leverage's effect on labor supply can be represented as an additional term in this equation. Because debt financing increases both the probability of the firm undergoing financial distress and the probability of layoffs, it raises the compensation that employees require to bear unemployment risk. Unlike the costs of financial distress, which typically refer to ex post costs that are realized if the firm eventually becomes financially distressed, the final term in Equation (1) represents costs paid ex ante before distress sets in.

Although the term labor expense is convenient shorthand, not all of the costs of leverage's effect on labor supply are pecuniary, or even operate through employees' compensating differential, broadly defined to include pay, benefits, and working conditions. Another important cost is incurred when leverage reduces employees' investments in firm-specific human capital. Unlike general human capital, which is valued by all potential employers, firm-specific human capital involves skills and knowledge that have productive value for only

one particular employer (Becker 1962). Becker (1962), Parsons (1972), and Lazear (2009) show that employees are reluctant to specialize their human capital to an employer, particularly when they face an inflated probability of job loss. Jaggia and Thakor (1994) incorporate this cost into an optimal capital structure model. Because leverage can reduce job security, it discourages investments in firm-specific human capital and is particularly costly for firms relying on such capital in production.[3] As explained by Stewart Myers (Myers et al. 1998, pp. 18–19):

> To succeed a corporation requires a co-investment of financial capital from the outside and human capital that is built up inside the business. . . . When you ask people to make an investment of human capital in your firm, you do not then do things—like raising the leverage ratio too high—that would needlessly put that investment at risk.

When firms design their financing structure, they decide how much capital to borrow and how much to raise from equity investors. Firms can reduce their wage and other labor-related costs by choosing more conservative financial policies (i.e., ones that rely less on borrowing). These benefits of reducing leverage increase with employees' unemployment risk, which is affected by both the probability of being laid off and the costs borne by employees upon a layoff. In Figure 1, I show the relation between leverage and layoffs at the industry level. Figure 1 depicts a correlation, but not necessarily a causal relation. Leverage, measured as the ratio of total debt to the market value of total assets in 2016, is computed from Compustat data. The layoff rate, which includes all involuntary separations initiated by the employer, is the annual average over 2001–2015 from the Job Openings and Labor Turnover Survey (JOLTS) of the

[3] At the same time, debt could motivate employees to work harder. Although a disciplining role of debt is most often applied to managers (e.g., Grossman & Hart 1982), it could also apply to the workforce more broadly (Kale et al. 2015).

Bureau of Labor Statistics. In the relation presented in Figure 1, I control for other differences in labor turnover from JOLTS: rates of hires, quits (voluntary separations), and other separations (retirements, transfers, deaths, and disability). As shown by the regression line, a 1-percentage-point increase in the layoff rate is associated with a 5.8-percentage-point decrease in leverage ($SE = 1.3$; $p < 0.001$).

The correlation between layoffs and capital structure shown in Figure 1 might not reflect a causal relation. High industry volatility, for example, could lead to both high layoff propensities and conservative financial policies. To more precisely measure and identify the impact of worker unemployment costs on financial policy, Agrawal & Matsa (2013) examine changes in unemployment insurance benefits as shocks to the final term in Equation (1). Because unemployment is less costly when employees are eligible for more generous unemployment insurance benefits, they require a lower compensating differential per unit of layoff risk. Unemployment insurance benefits are determined at the state level and revised regularly. Agrawal & Matsa find that increases in state-mandated unemployment benefits lead to increases in corporate leverage. A 100-log-point increase in the maximum total unemployment insurance benefit is associated with firms maintaining greater average ratios of debt to assets by 4.5 percentage points, or about 15%.

The magnitude of a worker's unemployment risk is also affected by employment protection legislation and household structure (e.g., the availability of a spouse to work). Employment protection shields employees from unemployment risk. Baghai et al. (2017) show that Swedish firms used lower leverage after legislation reduced employment protection and gave them more flexibility to lay off employees. This reduction is consistent with what we would expect if unemployment insurance were weak enough that employment protection legislation had

a large effect on employees' unemployment risk (see Section 3.1). Insurance within a household can also reduce the costs of unemployment. He et al. (2017) find that firms with higher leverage are more likely to employ people who live in households with alternative sources of labor income, which make them less vulnerable to distress if they are laid off. In essence, risky firms tend to match with risk-tolerant workers.

Conservative capital structures have also been linked to human capital specificity. Titman & Wessels (1988) show a positive association between workforce voluntary quit rates and firm leverage ratios at the industry level. They reason that employees with high levels of firm-specific human capital would find it costly to leave their jobs. More recently, Kim (2015) examines responses to new manufacturing plant openings and concludes that firms increase financial leverage when their employees' human capital is more general due to greater local job opportunities. Furthermore, Bae et al. (2011) show that firms with highly rated employee relations use less leverage, and speculate that this is due in part to these firms' need for employees to make firm-specific investments. Because of the composite nature of their measure of employee relations, their result could also be related to various other labor market considerations discussed in this article, including unionization (Section 2.2), employee equity ownership (Section 2.4), and retirement benefits (Section 4).

2.2. Labor Negotiations

Employees' ability to withhold their labor as a means of negotiating higher pay is another major difference between labor and capital. Once capital is purchased, it is available to the firm; employees, on the other hand, may choose not to work at any time. Although the firm can commit to a compensation level over a contract period, workers cannot be forced to work against their will. By threatening to strike or quit, workers can potentially negotiate for a higher wage.

Both employees and capital providers need to be paid at least their opportunity costs: the amount the employee would be paid elsewhere for similar work and the return the capital provider would earn investing in another project with similar risk. But some projects generate more value than is required to satisfy these opportunity costs. In such cases, the project's rents must be divided between the firm's stakeholders through an explicit or implicit bargaining process, which provides one or more stakeholders with a payoff greater than his opportunity cost (a supernormal profit). The less replaceable party has an advantage in this negotiation. If it is more difficult for the employee to find another job, then more of the surplus will go to the investor; but if it is more difficult for the firm to find another worker, then more will go to the employee.

Most employees are replaceable and thus powerless when they bargain individually. (Exceptions, which include employees with key talents or who embody the firm's organizational capital or intellectual property, are discussed in Section 2.3.) But when employees unionize and bargain collectively, they can threaten to strike and shut down the business. Unlike individual workers, employees' collective actions can also threaten the firm's organizational capital—the productive capacity embedded in a firm's organization and its "people relationships" (Prescott & Visscher 1980; Tomer 1987). From the capital provider's perspective, these threats are viewed as a holdup problem. Holdup problems are not unique to providers of labor. Suppliers of specialized materials, for example, can hold out for higher prices. But a firm's typical levers for dealing with the potential holdup of physical capital—vertical integration (Monteverde & Teece 1982) and long-term contracting (Joskow 1987)—are not available when contracting with employees. Unionized firms often use financial leverage instead.

2.2.1. Strategic debt

Notions of using debt as a means to partially control wage demands date back to Baldwin (1983), if not before, and formal models have been developed by Bronars & Deere (1991), Dasgupta & Sengupta (1993), Perotti & Spier (1993), Sarig (1998), Matsa (2006), and Hennessy & Livdan (2009). In labor negotiations, unions often demand some of a firm's realized excess liquidity—its operating cash flow net of any required debt payments. To improve their future bargaining position, firms with strong unions can reduce expected future liquidity by including more debt in their capital structure. Just as leverage can be used to remove excess liquidity that might otherwise be spent unprofitably (on poor projects, unwarranted diversification, or wasteful perks; Jensen 1986), leverage can be used to influence labor negotiations. In both cases, debt reduces managerial flexibility and discretion.

These capital structure models predict that leverage should increase with supplier bargaining power (e.g., unionization rates). This prediction holds among US firms. Figure 2 shows the conditional correlation between market leverage and union coverage from 1990 to 2016, controlling for industry and year fixed effects. The leverage data are from Compustat, and union coverage is measured at the industry-year level using the Current Population Survey of the Bureau of Labor Statistics. The industry fixed effects ensure that the relation is identified from changes in the union coverage rate over time as opposed to any fixed differences across industries. A 10-percentage-point increase in union coverage is associated with a 2.0-percentage-point increase in leverage ($SE = 0.6$; $p < 0.001$, adjusted for clustering at the industry level).

The relation shown in Figure 2 is consistent with other cross-sectional analyses. Bronars & Deere (1991), Hirsch (1991), and Matsa (2010) show that unionization rates are correlated with financial leverage at the industry and firm levels, while Cavanaugh & Garen (1997) show

that the correlation increases with rough proxies for the specificity of a firm's assets. However, these results may be affected by omitted variable bias: unions are more likely to organize in established, profitable firms and industries, which may also have a greater capacity for debt.

To overcome this bias, Matsa (2010) uses states' adoption of right-to-work laws in the 1950s and states' repeal of unemployment insurance work stoppage provisions in the 1960s and early 1970s as sources of exogenous variation in union power. Right-to-work laws prohibit employment contract provisions that require employees to join or financially support a union. The laws expose unions to a free rider problem by allowing nonunion employees to benefit from collective bargaining without paying union dues. Work stoppage provisions allow strikers to collect unemployment benefits during a labor dispute if their employer continues to operate at or near normal levels, effectively insuring unionized workers against failed strikes. After states adopt legislation that reduces union bargaining power, unionized firms reduce debt relative to otherwise similar firms in other states. Matsa finds that the ratio of debt to firm value decreases by up to one-half after a right-to-work law is passed, and up to one-fifth after a work stoppage provision is repealed. Consistent with a causal interpretation, financial policy is unaffected in industries with a low union presence.

Although the aggregate impact of collective bargaining on the capital structures of U.S. firms surely decreased as private-sector unionization declined after the 1950s (Dickens & Leonard 1985), collective bargaining remains prominent in much of the industrialized world: the share of private-sector workers covered by collective bargaining agreements is 24% in Japan, 32% in Canada, 35% in the United Kingdom, 50% in Australia, and 63%-99% in Continental Europe and Scandinavia (Visser 2006). Studies find that firms around the world use leverage strategically to influence their bargaining with workers. Using legal variation across 28

countries, Ellul & Pagano (2017) show that firms use higher leverage when employees have greater bargaining power, stronger seniority in liquidation, and weaker rights in restructuring. In addition, Gorton & Schmid (2004) show that German firms subject to codeterminiation laws (requiring partial employee corporate control) have greater leverage than other firms.

High leverage appears to be effective in diminishing labor's bargaining position, as it appears to deter strikes (Myers & Saretto 2016), enable workforce reductions (Atanassov & Kim 2009), and facilitate substantial wage concessions (Benmelech et al. 2012) at unionized firms. Hanka (1998) finds that debt is also negatively correlated with employment, wages, and pension funding, and positively correlated with the use of part-time and seasonal employees. Sarig (1998), in contrast, finds that the share of profits received by employees is positively related to a firm's leverage. To the extent that leverage is endogenous to a firm's financial condition and the bargaining environment, however, some of these correlations may not have a causal interpretation. Furthermore, a firm's weakened financial condition can limit its ability to use leverage strategically (Ellul & Pagano 2017).

2.2.2. Operating leverage

Unionization makes it harder for a company to adjust its labor inputs and thus increases the proportion of the company's costs that are fixed as opposed to variable. Fixed costs must be paid irrespective of the company's sales volume, product market demand, or overall economic conditions. A firm's reliance on fixed as opposed to variable costs is referred to as its operating leverage. Increasing operating leverage could moderate unions' effect on financial leverage (for more discussion on operating leverage unrelated to unionization, see Section 3). Union contracts often make it more difficult for firms to cut wages or lay off employees. For example, Atanassov & Kim (2009) show that, in countries with strong union laws, poorly performing firms sell assets

more often than they lay off large numbers of workers. Economies with greater worker bargaining power are also more likely to enact employment protection legislation (Saint-Paul 2002). Cross-industry correlations suggest that the elevated operating leverage associated with unionization increases business risk (Chen et al. 2011). Economies in which labor bargaining takes place at the industry rather than firm level might offer a window into unions' effect on leverage through the operating leverage channel. When labor bargaining is at the industry level, as in Sweden, debt's strategic role is lessened and the operating leverage channel might dominate. Kvistrum & Kågerman (2012) indeed find that Swedish firms with higher unionization rates have lower leverage ratios.

2.2.3. Supply of debt

Unionization could also affect the supply of debt. On the one hand, unions could increase the supply of debt if their negotiating positions have the byproduct of protecting creditors' wealth. For example, unions might discourage the firm from taking investments that increase the firm's risk of distress and put both the unionized workers' wage premium and lenders' debt payments at risk. Unions might also oppose takeovers, which threaten not only workers (Shleifer & Summers 1988; Pagano & Volpin 2005) but also bondholders (Warga & Welch 1993). Consistent with this view, Chen et al. (2012) find that bond yields are lower in unionized industries.

On the other hand, unionization could hurt bondholders in default states, because unionized workers are entitled to special treatment in bankruptcy court. Senior, unsecured creditors stand to lose the most. Consistent with this view, Campello et al. (2018) find that closely won union elections significantly reduce bond values even though they do not increase default risk. They show that unionization is associated with longer and more costly proceedings

in bankruptcy court. Bankruptcies of unionized firms are less likely to result in liquidations and are more likely to be followed by a subsequent refiling. In pricing debt claims, rational lenders would anticipate such costs and decrease their supply of credit to unionized firms.

2.3. Key Talent, Organizational Capital, and Intellectual Property

A firm's inability to prevent employee mobility can also create distress risk that is unrelated to unemployment costs or labor bargaining. A firm is particularly vulnerable to the departure of employees who possess hard-to-replace talents or who embody the firm's organizational capital or intellectual property. Eisfeldt & Papanikolaou (2013) and Donangelo (2014) embed labor mobility in production-based models of asset pricing. Employees' option to leave a firm when better opportunities arise makes bad times worse for shareholders who are left with capital that is less productive. To compensate investors for bearing this risk, firms with more mobile workers or greater organizational capital earn about 5% higher average returns.

The growing prevalence of organizational capital and intellectual property in the economy is increasing the importance of labor mobility risk. Falato, Kadyrzhanova, & Sim (2013) find that firms' reliance on intangible capital rose from about 25% of net book assets (assets minus cash holdings) in 1970 to more than 85% in 2010. Organizational capital comprises a substantial component of intangible capital, estimated to account for 29% ("firm-specific human and structural resources"; Corrado, Hulten, & Sichel 2009, p.670) to 52% (Falato, Kadyrzhanova, & Sim 2013) of intangible capital in 2003. Organizational capital is more important in the health, high-tech, and finance industries than in manufacturing and consumer industries (Eisfeldt & Papanikolaou 2014). The majority of the remaining intangible capital is intellectual property.

Labor mobility risk may encourage firms to reduce their financial borrowing to mitigate the potential costs of financial distress triggered by mobility events. For example, when employees hold the firm's intellectual property, their ability to quit and transfer this property elsewhere, perhaps to a competitor, poses a risk. This risk is greatest for property that is protected by secrecy but not by patents, such as propriety information about the firm's customers, suppliers, prices, costs, future business plans, formulas, practices, processes, or designs. Financial slack enables a firm to respond more aggressively to labor mobility and intellectual property losses, and Klasa et al. (2018) show that worker mobility risk leads firms to choose more conservative capital structures. They find that firms increase leverage by about 15%, relative to sample means, after legal rulings recognize the inevitable disclosure doctrine, which prevents workers with such secrets from working for a rival firm.

2.4. Equity Ownership

Firms can also use broad-based employee stock or option ownership to help retain employees. Although stock and stock options are thought of as incentive tools for senior executives (for a survey, see Frydman & Jenter 2010), they typically provide only minimal incentives for rank-and-file employees at large firms, because each employee's effort has a trivial effect on the value of his or her stock holdings. However, because stock and stock option grants typically have a vesting period, they make it more costly for employees to leave the firm. Furthermore, Oyer (2004) argues that deferring equity-based compensation increases retention even more than does deferring cash payments. If employees' reservation wages are correlated with their firm's performance, and compensation contracts are costly to adjust, then equity ownership will retain employees by giving them a raise when labor demand increases while cutting pay when labor demand decreases.

Broad-based employee equity-based compensation may also benefit the firm in other ways. First, it can help attract employees who are optimistic about the firm's prospects and more willing to invest in firm-specific human capital (Salop & Salop 1976; Oyer & Schaefer 2005; Bergman & Jenter 2007). Second, if employees are more informed than investors about the firm's prospects, then their acceptance of stock-based pay sends a positive signal about the firm's value to the equity market (Lazear 2004). Third, financially constrained firms can conserve cash by substituting equity-based compensation for cash wages (Core & Guay 2001). Fourth, entrenched management can use employee stock ownership plans to thwart hostile takeover bids (Chaplinsky & Neihaus 1994; Kim & Ouimet 2014). Finally, in certain circumstances, equity-based pay can be used as employee incentives (Lazear & Oyer 2012; Kim & Ouimet 2014).

In sum, employee mobility has wide-ranging implications for a firm's financial strategy. For the most part, labor mobility encourages firms to reduce leverage. Reducing leverage increases employees' job security, giving them more reason to stay employed at the firm. Similarly, firms can offer employees equity ownership with vesting requirements to promote employee retention. Reducing leverage also offers the firm more financial flexibility to reinvest when departing employees take organizational capital or intellectual property with them, and to manage the business cycle when collective bargaining agreements limit its flexibility to downsize the workforce. But too much financial flexibility can backfire if it encourages rent-seeking, especially by a labor union during collective bargaining. A unionized firm has an incentive to increase its financial leverage to weaken its balance sheet and negotiate a lower wage rate.

3. LABOR MARKET REGULATIONS AND NORMS

Both physical and human capital are costly to adjust, and these adjustment costs can influence firms' financing strategies. Some labor adjustment costs—like training requirements—are similar to those affecting physical capital, but others arising from labor market regulations and norms are unique to labor.

Adjusting the capital stock (or its utilization) can be costly, as it disrupts production by reassigning and restructuring tasks; new equipment takes time to install and shifts other inputs away from current production (Hamermesh & Pfann 1996). Furthermore, many capital goods lack a secondary market. Once installed, such capital has little or no value unless it is used in production. This irreversibility can make firms hesitant to purchase new capital (McDonald & Siegel 1986; Dixit & Pindyck 1994).

In a similar way, the costs of hiring, training, and firing make labor costly to adjust (Oi 1962). It typically takes 27–50 hours to recruit, screen, and interview candidates for a single vacancy (Mishra 2015). Firms also usually provide new employees with formal and informal training. In the first 3 months of work, a new employee spends about 30% of his or her time in training (Frazis et al. 2000). In addition to the direct cost of trainers and materials, the costs include the opportunity costs of lost production not only from experienced employees providing informal training but also from the new employees themselves. In survey responses, the average firm reports that replacing a blue-collar worker costs about $2,600 and replacing a white-collar worker costs about $9,500, in 2017 dollars (Dube et al. 2010).

Such labor adjustment costs effectively increase a firm's operating leverage by making its workforce and wage bill less flexible. Higher operating leverage increases the expected costs of financial distress, lowering the firm's optimal debt ratio (e.g., Mandelker & Rhee 1984; Mauer &

Triantis 1994). Many of these labor adjustment costs are directly analogous to capital adjustment costs. For example, the cost of training employees is analogous to that of installing equipment.

Other costs, however, are unique to labor. Various labor market regulations and norms without capital market analogs, such as employment protection legislation, minimum wages, and downward wage rigidity, further impede firms' flexibility to reduce employment and wages. Because these labor-specific adjustment costs effectively increase operating leverage and exacerbate financial distress, they influence firms' financing strategies.

3.1. Employment Protection Legislation

Labor market regulations that protect employment by increasing firing costs make firms' workforces less flexible during downturns (e.g., Messina & Vallanti 2007). Such regulations are associated with lower leverage.

In Figure 3, I use data from countries in the Organisation for Economic Co-operation and Development (OECD) to show the conditional correlation between market leverage and employment protection from 2006 to 2014, controlling for country and year fixed effects. The leverage data are from Amadeus, and employment protection is measured at the country-year level using Version 1 of the OECD's index measuring the strictness of employment protection for individual dismissals of employees on regular contracts. The index includes the administrative complexity of dismissal procedures; notice and severance requirements for no-fault dismissals; and the definition of, process for assessing, and compensation for unfair dismissals. The country fixed effects ensure that the relation is identified from changes in employment protection over time as opposed to any fixed differences across countries. In this sample period, the employment protection index has a standard deviation of 0.6, with higher scores representing stricter regulations. A 1-point increase in employment protection is

associated with a 9.0-percentage-point decrease in leverage (*SE* = 4.8; $p = 0.073$, adjusted for clustering at the country level).

When examining components of the index individually, leverage is most correlated with the length of the notice period required for no-fault individual dismissals. Using the same specification as for Figure 3, a 1-standard-deviation increase in the notice period for a worker with 4 years of tenure is associated with an 11.4-percentage-point decrease in leverage (*SE* = 1.7; $p < 0.001$, adjusted for clustering at the country level). Leverage is also negatively correlated with the strictness of regulations of collective dismissals and the use of fixed-term and temporary employment contracts, but these relations are not statistically significant at conventional levels.

Simintzi et al. (2015) were the first to show a relation between leverage and country-level employment protection. The relation illustrated by their analysis is robust to alternative specifications, estimation strategies, and measures of employment protection. They show that countries display similar trends to other countries before adopting a labor market reform and different leverage levels afterwards. Employment protection is most constraining for firms whose production process entails frequent workforce adjustments. When Simintzi et al. divide the firms within each country according to their industry's labor turnover in the United States, they find that employment protection lowers leverage more in industries with more employee turnover.

Kuzmina (2013) reaches a similar conclusion when exploiting variation in employment protection within Spain. In Spain, as in many European countries, there are two types of employment contracts—fixed-term and permanent—that differ in the job security they provide. Fixed-term contracts account for 24% of employment in Spain and 15% in Europe overall. When an employee with a permanent contract is dismissed in Spain, the firm is often forced to defend the fairness of the dismissal in court and must pay the worker 33–45 days of wages per year of

tenure. In contrast, a firm may without penalty simply choose not to renew a fixed-term contract when it expires. Some fixed-term contracts are renewed weekly, providing the firm with an option to adjust its labor force almost immediately; even if a fixed-term worker is dismissed early, severance is only 0–12 days of wages. As a result, firms are much more likely to cut fixed-term rather than permanent workers when they encounter adverse business conditions. Fixed-term contracts provide firms with more employment flexibility, making labor costs more variable.

In the late 1990s, Spanish regional governments introduced subsidies, ranging from about €1,600 to more than €15,000 per employee, for hiring workers on permanent contracts. Exploiting variation in firms' eligibility for subsidies based on their location, initial fixed-term contract usage, and (imputed) gender composition, Kuzmina (2013) finds that firms eligible for higher subsidies use fewer fixed-term workers and lower financial leverage. Her estimates imply that completely prohibiting temporary employment contracts would lead the average firm to reduce its indebtedness by 3.6 percentage points, or about 6.3%. Consistent with these findings, Caggese & Cuñat (2008) find that financially constrained firms, which are more vulnerable to liquidity shocks and thus place greater value on flexibility, hire more temporary workers than do other firms.

Although firing costs are typically lower in the United States than in Europe, Serfling (2016) shows that more modest employment protection regulation also affects capital structure decisions in the United States. Employment in the United States is mostly at will, which means that employers are free to terminate any employee for any reason, or no reason, with or without prior notice, and without risk of legal liability. Serfling (2016) focuses on the good-faith exception to at-will employment. This common law exception, which was adopted by 14 US

state courts between 1977 and 1998, prevents an employer from discharging an employee out of bad faith, malice, or retaliation. If an employer is found to have done so, employees can recover contractual losses and punitive damages.

Serfling (2016) finds that adopting the good-faith exception increases firms' operating leverage and decreases their financial leverage. After the good-faith exception is adopted, firms are less likely to discharge employees following an earnings decline, employment flows are less volatile, and variation in employment is less sensitive to earnings variations. In addition, earnings are less persistent, and changes in earnings become more sensitive to changes in sales. Presumably as a result, market leverage ratios decrease by 1.0 percentage point, or about 3.6%, after the good-faith exception's adoption.

Employment protection also has a countervailing effect on leverage. Because higher firing costs make layoffs less likely, they decrease employees' unemployment risk, which in turn lowers the compensating wage differential that they require to accept employment at a levered firm (see Section 2.1).

Table 2 presents the results from an augmented version of Serfling's (2016) analysis, in which leverage is regressed on employment protection, unemployment insurance generosity, and their interaction. The results reveal the dual effects of employment protection on firms' leverage. Over an unemployment spell, the average maximum benefit available from states' regular unemployment insurance systems during this sample period (1967–1995) is about $4,700.

In states with greater unemployment insurance benefits, employees are better protected against unemployment risk. In these states, employment protection increases firms' operating leverage and distress risk but has less impact on employees' unemployment risk and compensating wage differential. The estimates reported in Table 2 suggest that firms in states

with unemployment insurance generosity 1 standard deviation above the mean ($7,000) reduce leverage by 1.9 percentage points ($SE = 0.8$, $p < 0.05$), or 6.9%, after the good-faith exception is adopted.

In states with low unemployment insurance benefits, however, employment protection both increases firms' distress risk (decreasing optimal leverage) and decreases employees' unemployment risk (increasing optimal leverage). On net, the leverage of a firm is less affected in these states. Indeed, the estimates reported in Table 2 suggest that firms in states with unemployment insurance generosity 1 standard deviation below the mean ($2,400) do not adjust leverage after the good-faith exception is adopted (estimate = 0.01 percentage points, or 0.04%; $SE = 0.51$; $p = 0.98$).

3.2. Minimum Wages

High minimum wages could also reduce operating flexibility and increase the costs of financial distress, which would reduce a firm's optimal leverage ratio. Gustafson & Kotter (2017) examine the effects of U.S. federal minimum wage policy between 1987 and 2012. They find that Compustat firms respond to a binding federal minimum wage by increasing operating and financial flexibility, shifting from capital expenditures to operating leases, and decreasing leverage. Labor-intensive firms reduce leverage use by about 10% after a 10% increase in the minimum wage. Consistent with financial distress costs being a consideration, the decrease is concentrated at below investment grade-rated firms.

3.3. Downward Wage Rigidity

Through a similar channel, downward wage rigidity could also reduce firms' leverage. In many developed economies, firms are reluctant to cut nominal wages, even during recessionary

periods when unemployment is high (Dickens et al. 2007). For example, Kahn (1997) estimates that from 1970 to 1988, downward wage rigidities protected approximately 9.4% of U.S. wage earners from a nominal wage reduction. Surveys of U.S. hiring managers find that concerns for both fairness and adverse selection in quits play roles in explaining why firms typically refrain from cutting wages in recessionary periods (Blinder & Choi 1990; Bewley 1995; Campbell & Kamlani 1997). Many firms keep wage differentials between workers smaller than productivity differentials because they are concerned that large wage differentials for similar workers would harm morale and lead some employees to reduce their efforts. Because wages are compressed, firms that need to reduce payroll would rather lay off their overpaid, least productive employees than lose their underpaid, productive workers through quits.

Downward wage rigidity is akin to raising a firm's operating leverage, because rigid input prices reduce its cash flow during recessions. Schoefer (2015) shows that this constraint can lead firms to reduce hiring and other profitable investments. Firms' optimal leverage ratio is lower to avoid exacerbating this constraint.

In these various ways, labor market regulations and norms introduce frictions that make it more costly for firms to reduce their wage bill. By making firms' operating costs less flexible, employment protection, minimum wages, downward wage rigidity, and other labor market frictions increase firms' operating leverage and thus reduce the firms' optimal financial leverage.

4. RETIREMENT RISK

A final difference between workers and machines is that workers must provide for themselves during retirement. In most developed countries, retirees have three potential sources of support: state-provided social security, occupational pension plans, and personal savings. In the United States, according to the National Compensation Survey as of March 2016, 18% of

private sector workers have access to a defined-benefit pension plan, which promises to pay them a regular amount during retirement regardless of the value of the assets in the fund backing this promise. The prevalence of such plans varies across industries, ranging from 76% in utilities to 3% in accommodation and food services. Because these plans are a form of corporate debt, they should be viewed as part of a firm's financing strategy.[4]

Defined-benefit plans are essentially deferred pay. In a Modigliani-Miller theorem for pensions, Blinder (1982) shows that pensions and wages are perfect substitutes in a world with perfect capital markets, no uncertainty, no taxes, no compulsory retirement, and worker compensation equal to worker marginal product. Under these conditions, pensions are irrelevant in that they do not affect savings, work, or retirement decisions. An employee who prefers a mix of pension and wages different than the firm offers could shift compensation from wages to pension by saving, or from pension to wages by borrowing.

In reality, firms offer pension plans because the assumptions in Blinder's (1982) theorem do not hold. First and foremost, pensions enable employees to avoid and defer taxes. Assets in a pension fund are not subject to the payroll tax and accumulate free of income tax until retirement, when most people are in lower tax brackets than during their working years. Firms can also use pension plans to attract, accumulate, and retain human capital. Pension benefits attract employees with low rates of time preference, which is valued by certain employers (Ippolito 1997). More importantly, defined benefit plans reduce labor turnover, especially among experienced employees, which benefits firms, for example, by avoiding transaction costs in hiring and by enabling firm investment in worker training.

[4] See Cocco (2014) for a survey of finance research related to defined benefit pension schemes.

Despite strong tax and operational incentives for firms to fully fund defined-benefit pension plans (Tepper 1981; Rauh 2006), many firms nonetheless choose to underfund these plans. A firm that underfunds its pension fund is essentially borrowing from its employees, which might be a desirable source of finance for a number of reasons. First, the forgone tax benefit might be cheaper than other sources of financing for a financially constrained firm (Cooper & Ross 2001). Second, it reduces the agency cost of external borrowing by giving managers an incentive to reduce risk shifting and to protect the company from insolvency (Jensen & Meckling 1976; Sundaram & Yermack 2007).[5] Third, it improves the firm's bargaining position with labor unions by holding back some of their compensation, thereby giving them a stronger stake in the firm's long-run success (Ippolito 1985; Benmelech et al. 2012). Fourth, it allows small risk-averse firms to share risk with their risk-averse workers (Arnott & Gersovitz 1980). Finally, because the government insures pension defaults in the United States, a distressed company has an incentive to underfund its pension plans to maximize the value of this insurance (Sharpe 1976).

Because defined-benefit plans are a form of corporate debt, they play an important role in the capital structures of firms that use them. Shivdasani & Stefanescu (2009) argue that, when assessing a firm's financing, pension liabilities should be consolidated with the firm's debt obligations. After all, firms are liable for their pension benefits, just like other corporate liabilities (Black 1980). Pension liabilities can be senior to or at par with unsecured financial liabilities, but are never junior to financial debt; like interest payments on debt, corporate pension contributions are tax deductible and failing to pay them can trigger bankruptcy.

[5] Among large firms, pension entitlements represent about 10% of an average CEO's compensation, often exceed the government insurance limits, and are associated with reduced firm risk (Sundaram & Yermack 2007; Wei & Yermack 2011).

Firms consider their pension assets and liabilities when making capital structure decisions. In Figure 4, I show the conditional correlation between financial leverage and pension liability in 1985–2016, controlling for the market-to-book ratio and firm and year fixed effects. Financial leverage includes both short- and long-term debt, while pension liability is the projected benefit obligation—the actuarial present value of the accrued benefits earned for past services rendered plus the projected benefits from future salary increases. Both types of liabilities are measured annually from Compustat data as fractions of the combined market value of the firm's operating and pension assets. The firm fixed effects ensure that the relation is identified from changes in leverage over time as opposed to any fixed differences across firms. A 10-percentage-point increase in pension leverage is associated with a 2.8-percentage-point decrease in financial leverage ($SE = 0.3$; $p < 0.001$, adjusted for clustering at the firm level).

Because this offset in leverage is only partial, firms' leverage ratios are greater when measured on a consolidated basis. The difference between balance-sheet leverage ratios and consolidated leverage ratios is often substantial. Shivdasani & Stefanescu (2009) show that, for Compustat firms with defined-benefit pension plans between 1991 and 2003, both book and market leverage are about one-third larger when calculated on a consolidated basis: average book leverage increases from 25% to 34%, while average market leverage increases from 20% to 27%. Bartram (2015) finds similar results on a sample of firms from 50 countries. Using data from WorldScope and DataStream between 2002 and 2009, he finds that consolidating pension and financial debt increases effective leverage by about a third, as firms reduce their financial debt by only 22 cents for every dollar of pension liability. On net, total leverage ratios of firms with pension plans are 23% higher than those of firms without pension plans.

5. CONCLUSION

In this article, I examine how a firm's workforce affects its optimal sources of finance. The needs of and risks posed by workers differ from those of physical capital; these disparities create labor market frictions that a firm must take into account when considering how to structure its financing. While physical capital constitutes the tangible value of a firm and can be pledged as collateral, firms do not hold title to labor and the human capital its employees possess. People can choose where to work and can quit their jobs at any time. Labor market frictions arise, for example, from the costs associated with job loss. Employees can also band together to improve their bargaining power and are often shielded by employment protection and other labor market regulations. In addition, workers are a source of corporate borrowing, sometimes at below-market rates, when they are willing to forgo some compensation until their retirement.

These unique features of labor among inputs to production have important implications for businesses structuring their financing. The analysis in this review aims to clarify how these implications can be organized according to the underlying labor market frictions that they reflect. State-of-the-art research has developed well beyond simply showing that labor affects finance. New empirical research in this area should interpret the interconnections between capital structure and labor market phenomena through the lens of these frictions. The largest research contributions will provide fresh insight on the corporate finance implications of these and other underlying labor market frictions.

There is irony in the timing of the recent renaissance in research on connections between a firm's capital structure and its workforce. Current trends in the labor market are reducing the relevance of some of the institutions discussed in this paper. Private-sector unionization rates in

the United States are in long-term decline (from 24.2% in 1973 to 6.4% in 2016; Hirsch & Macpherson 2003), as is the percentage of private-sector workers whose only employer-based retirement savings is a defined-benefit pension plan (from 28% in 1980 to 2% in 2014; Employee Benefit Research Institute 2017). These changes in labor market institutions only underscore the importance of researchers relating their findings to the underlying labor market frictions. Even with the diminished roles of unions and pensions, the underlying frictions remain: workers can act strategically to increase their pay and need to provide for their retirement. We can more easily understand the financing implications of new labor market institutions when we relate these institutions to the underlying frictions that they represent or are designed to address.

Other recent economic developments increase the importance of additional labor market frictions for firms. The growth of information technology and the knowledge economy presents new corporate financing considerations. In 2014, Facebook acquired WhatsApp, a company with only 55 employees and $60 million of funding, for $19 billion. WhatsApp's business model reflects a trend observable throughout the economy. Human capital (and the intangible assets that it creates) is becoming an increasingly critical asset for contemporary firms. As Zingales (2000) posits, employees in such firms are not automata operating valuable physical assets, but are valuable assets themselves, operating commodity-like physical assets. In such firms, labor mobility risk and the potential loss of firm-specific human capital are all the more important. The growing prominence of human capital in the modern economy (e.g., Corrado, Hulten & Sichel 2009; Autor 2014) underscores the importance of further integrating workforce considerations and labor market frictions into corporate finance research and practice.

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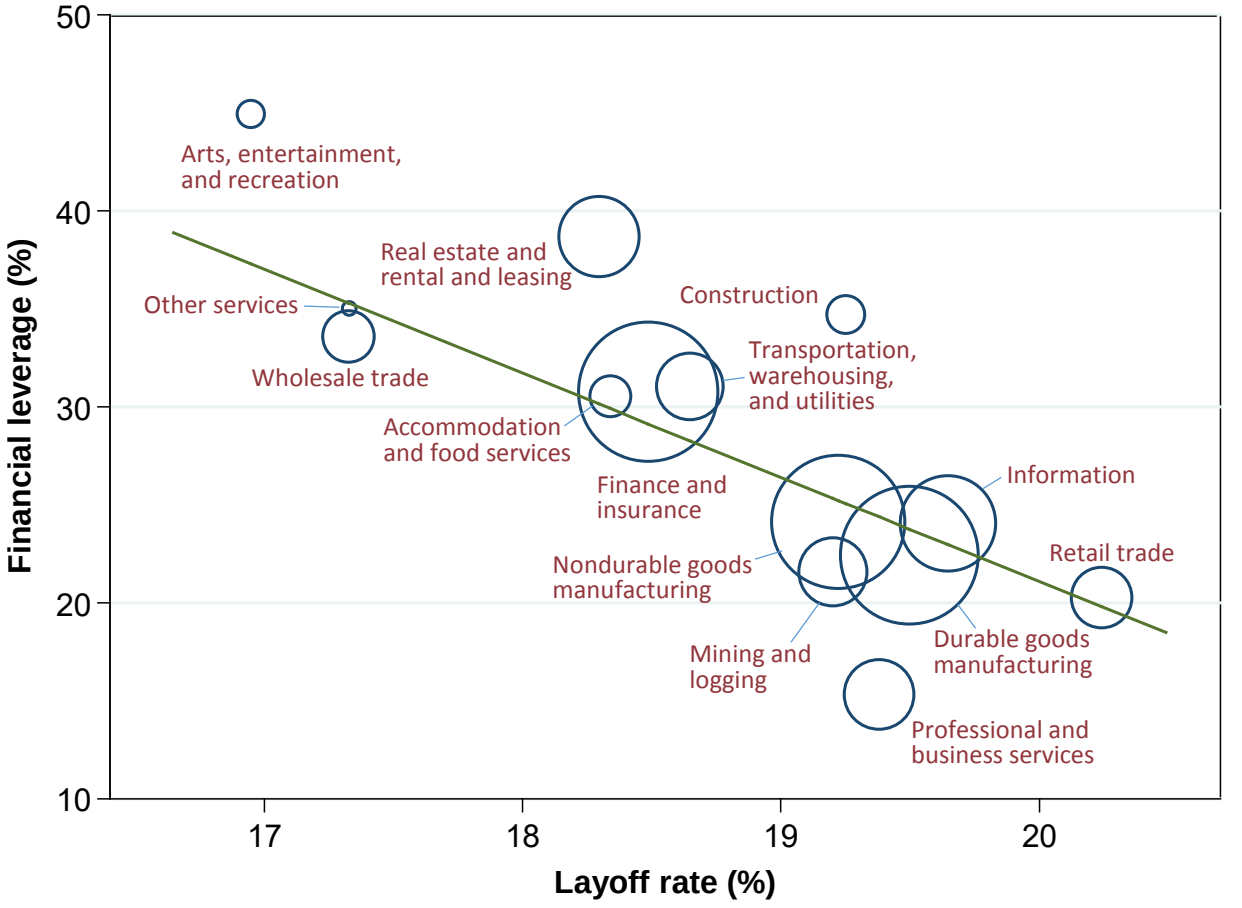

Figure 1. Layoff risk and leverage, 2016

This figure displays the recentered residuals from weighted regressions of industry average market leverage in 2016 and the industry average annual rate of layoffs and discharges in 2001–2015 on hiring, quit, and other separation rates. The regression line is weighted by the underlying number of firm observations, which is also represented by the size of the circles. The educational services, health care, and social assistance industries, which have lower layoff rates, are not displayed, but they do contribute to the regression line. Leverage data, which are winsorized at 1% tails, are from Compustat for all publicly traded firms incorporated in the United States and whose financial reports are denominated in US dollars; workforce turnover rates are from the Job Openings and Labor Turnover Survey.

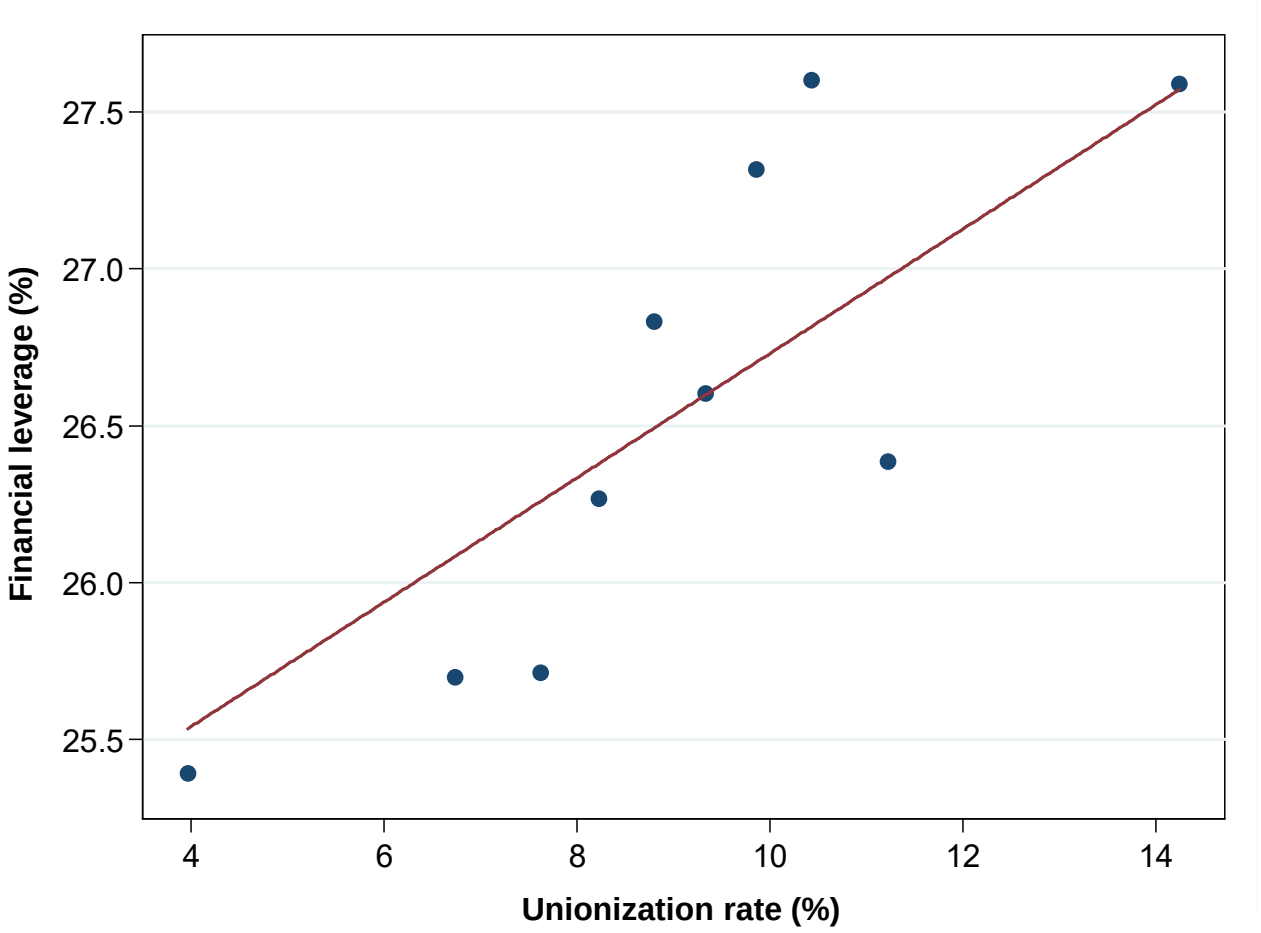

Figure 2. Unionization and leverage, 1990–2016
The binned scatter plot displays the average recentered residuals of regressions of firm market leverage and industry union coverage rate on industry and year fixed effects. The observations are grouped into 10 equal-sized union coverage bins and the regression line is shown. Leverage data, which are winsorized at 1% tails, are from Compustat for all publicly traded firms incorporated in the United States and whose financial reports are denominated in US dollars; union coverage rates are from the Current Population Survey (Hirsch & Macpherson 2003). Industry is defined using Census Industry Codes.

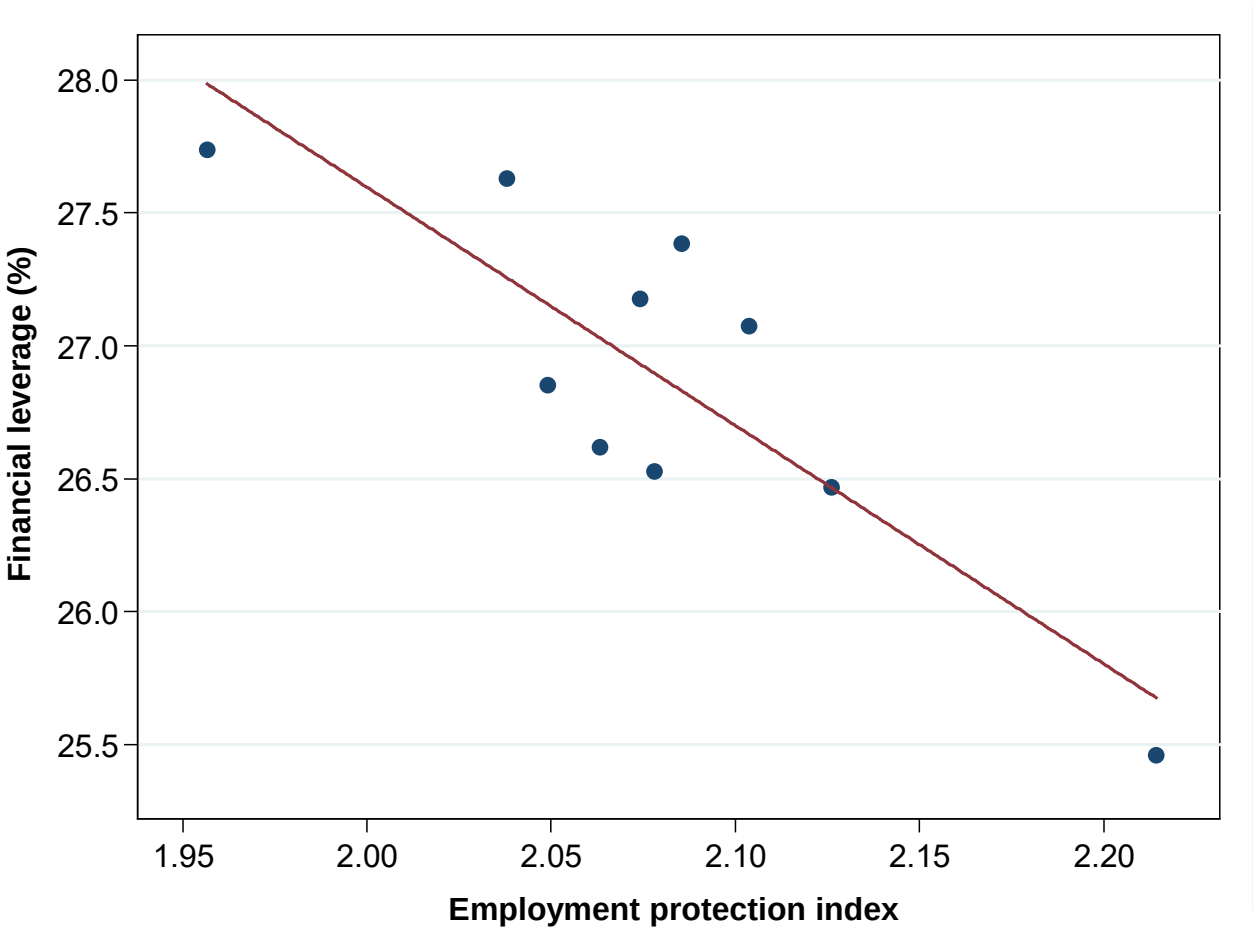

Figure 3. Employment protection and leverage, 2006–2014
The binned scatter plot displays the average recentered residuals of regressions of firm market leverage and an employment protection index on country and year fixed effects. The observations are grouped into 10 equal-sized employment protection bins and the regression line is shown. Leverage, which is winsorized at 1% tails, is calculated from consolidated financial statements obtained from Amadeus for all publicly traded firms with operating revenue ≥ €1 million, total assets ≥ €2 million, or employees ≥ 15; the employment protection index is from the OECD and measures the strictness of employment protection for individual dismissals of employees on regular contracts.

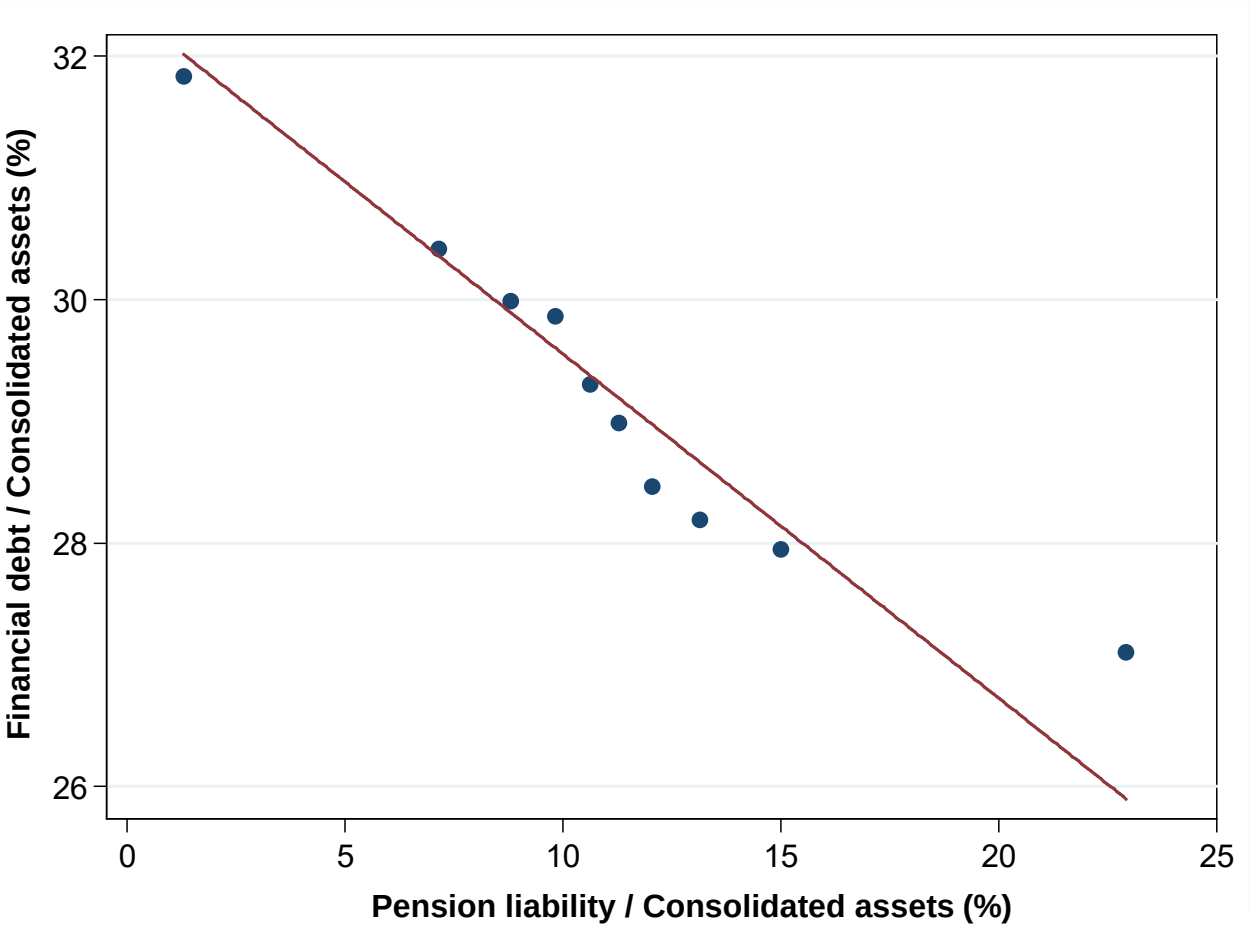

Figure 4. Pension liability and financial leverage, 1985–2016
The binned scatter plot displays the average recentered residuals of regressions of the ratios of pension benefit obligation and financial debt to the consolidated market value of total operating and pension assets on the market-to-book ratio and firm and year fixed effects. The observations are grouped into 10 equal-sized pension liability bins and the regression line is shown. The data, which are winsorized at 1% tails, are from Compustat for all publicly traded firms incorporated in the United States and whose financial reports are denominated in US dollars.

Table 1
Estimates of compensation for unemployment risk by credit rating

	Wage premium		
	Excluding	Including bankruptcies	
Credit rating	bankruptcies	With UI	Without UI
(1)	(2)	(3)	(4)
AAA	0.02	0.02	0.05
AA	0.10	0.11	0.29
A	0.12	0.13	0.34
BBB	1.01	1.09	2.94
BB	1.73	1.88	5.06
B	2.30	2.50	6.72

Notes: The estimates are fractions of firm value. Based on Topel's (1984) measures of the compensating wage differential for unemployment risk, the calculations follow Agrawal and Matsa's (2013) methodology but are based on a risk-free rate of 2.5%. The estimates in column (2) do not include compensation for job loss in bankruptcy. To compute the estimates in columns (3) and (4), I assume that bankrupt firms reduce employment by 50%. Columns (3) and (4) present the average compensating wage premiums assuming mean unemployment insurance (UI) wage replacement and no UI wage replacement, respectively.

Table 2
Employment protection, unemployment insurance, and financial leverage, 1967–1995

Dependent variable: *Financial leverage*

	Coefficient	Standard error
Good faith	-0.010**	0.005
Max UI benefit	0.005*	0.002
Good faith × *Max UI benefit*	-0.004**	0.002
R^2	0.76	
N	88,997	
Firm-year controls	X	
State-year controls	X	
Firm fixed effects	X	
Year fixed effects	X	

Notes: This table summarizes results from ordinary least squares regressions of market leverage on employment protection, unemployment insurance (UI) generosity, and their interaction. *Good faith* is an indicator of whether the state in which a firm is headquartered has adopted the good-faith exception to at-will employment, and *Max UI benefit* denotes the maximum benefit available, in thousands of dollars, over an unemployment spell from the state's regular UI system. *Max UI benefit* is demeaned with respect to its overall sample mean before it is interacted with *Good faith*. Data are from Compustat, and the specification and variable definitions are the same as in Table V, Panel B, column (5), of Serfling (2016), with the addition of the UI variable and its pairwise interactions with *Good faith*, *Implied contract*, and *Public policy.* Standard errors are clustered at the state level. * and ** denote statistical significance at the 10% and 5% levels, respectively.