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CAPITAL STRUCTURE AND CORPORATE STRATEGY

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Abstract

In this chapter we review and discuss empirical studies that examine how a firm's financing choice affects its strategic decisions and relationships with its nonfinancial stakeholders, such as its customers or workforce. Generally, high leverage appears to inhibit a firm's ability or willingness to compete aggressively, especially against well-financed competitors. Debt also disciplines the manager–worker relationship, preventing managers from hoarding labor during economic downturns. Many of the studies also indicate that the firm's relationships with its customers can be disrupted by concerns over the firm's long term viability. A second purpose of this study is to highlight and discuss approaches researchers have taken to address endogeneity. Because the firm chooses leverage in advance, most of the studies we consider focus on exogenous shocks—either to the firm's competitive environment or to its leverage ratio. For each study, we describe the particular endogeneity problem and then discuss each author's approach to it, emphasizing differences between approaches when they arise.

1. Introduction

The connection between how a firm is financed and its other business choices is one of the most intensely examined issues in corporate finance. When considering this issue, it is convenient to think about a firm's decisions as generally falling into one of two broad categories—investment activity and corporate strategy. While in practice these decisions are linked, thinking about a firm's investment activity and corporate strategy separately allows us to better isolate the effects of capital structure on each.¹ The focus of this chapter is on the interaction between the firm's capital structure choice and corporate strategy issues that go beyond the investment choice. In particular, we consider how capital structure affects a firm's interaction with its nonfinancial stakeholders and competitors.

We define *nonfinancial stakeholders* as parties that have either a direct or indirect interest in the firm's long-term viability. These parties include customers who may be concerned about the quality of the firm's product or may anticipate additional interaction with the firm after an initial purchase, workers who develop firm-specific human capital, and suppliers who may require an investment in relationships with the firm. Each of these parties may demand compensation for the costs they will bear if the firm goes out of business, thus imposing "financial distress" costs on a firm whose capital structure introduces the possibility of bankruptcy. In addition, a firm can also face financial distress costs that arise from the actions of its *competitors*, who may choose to compete more aggressively when the firm is financially weakened.

These theories suggest that financial distress can be costly, and that the potential for incurring these financial distress costs will influence the firm's capital structure choices. Moreover, the theories suggest that a firm's financial condition will influence both its own and its stakeholders' strategic decisions. Although the majority of our discussion focuses on identifying and quantifying how leverage affects these strategic decisions, it is useful to think about this as a key step in determining optimal capital structure. For example, we will later see that firms undertaking leveraged buyouts (LBOs) may, in some circumstances, face more intense competitive pressure from rivals. The standard trade-off theory (discussed in detail by Frank and Goyal in Chapter 12) prescribes that firms take these additional pressures into account when deciding whether or not to follow through with the LBO. Similarly, if an LBO increases competition from a firm's rivals, then will a LBO firm have an incentive to stockpile cash rather pay out dividends?

¹ It has long been recognized that a firm's debt-to-equity mix can influence both its ability to invest and the characteristics of the projects it selects (Jensen and Meckling, 1976; Myers, 1977). When bankruptcy is possible, the incentives of those directing the firm's investment decisions may not lead them to make choices that maximize firm value. Examples of such conflicts of interest between equity holders and creditors are well known in the literature: asset substitution, debt overhang, choice of inferior investments with short payoff horizons, and refusal to liquidate. We refer to these costs as *investment inefficiencies* brought about by the potential for bankruptcy.

The stakeholder/competition theories have been tested in two different ways. The first type of test uses firm characteristics to proxy for the firm's sensitivity to stakeholder concerns, and it examines whether these characteristics are associated with lower leverage ratios. Most notably, Titman and Wessels (1988) find that firms with more unique or specialized products, as measured by high R&D/sales and selling expenses/sales ratios, tend to be less levered. This evidence suggests that less debt is used when financial distress is likely to be particularly costly to customers, suppliers, and workers.

The second type of study, which is the main focus of this review, investigates the extent to which leverage affects the relationships between firms and their stakeholders and competitors. This more recent literature examines how debt affects wages, the level of employment, sales, and product market prices. Although many of these studies present evidence of financial distress costs, it is often difficult to identify the specific sources of these costs. For example, although a financially distressed firm may experience declining sales and market share, these could potentially be caused by aggressive rival firms or by customers wary of doing business with a struggling company. In some cases, the empirical methodology allows us to directly identify which of a firm's specific relationships are impacted by financial distress; in others, the results may only be suggestive.

We begin with a group of studies that specifically focus on how debt affects a firm's relationship with its workers. Studies by Bronars and Deere (1991), Sharpe (1994), and Hanka (1998) focus on slightly different aspects of this relationship. The studies by Sharpe and Hanka primarily demonstrate that debt disciplines management by reducing a firm's ability to "hoard" labor during bad times, thereby increasing the sensitivity of the firm's employment to demand. Bronars and Deere present a model in which debt protects shareholder wealth by reducing the funds potentially available to labor unions; these authors then present empirical evidence supporting the contention that debt is used to deter the threat of unionization.

We then consider papers that address how financial distress can arise from disruptions in the firm–customer relationship. As noted originally by Titman (1984), a firm whose products require future servicing or maintenance may be particularly concerned about how its capital structure influences customer perceptions about its long-term health. We review two studies that contribute to our understanding of how debt affects the firm–customer relationship—Opler and Titman (1994) and Zingales (1998). While each paper presents evidence consistent with a customer-based explanation for sales and market-share declines, both explicitly consider the interaction between capital structure and competition as well.²

² "A notable omission from the the set of stakeholder-firm relationships we examine herein is that between a firm and its suppliers. Only very recently (since the final draft of this review article and its publication) has a study specifically explored this issue. In a forthcoming paper, Banerjee, Dasgupta, Kim (2007) examine both sides of a relationship where a customer constitutes a significant portion of a supplier's sales (generally 10% or more). The authors find that in such situations, both the supplier and customer maintain low leverage ratios—the former to maintain financial slack in case the relationship deteriorates, and the latter to induce customer-specific investments from the dependent supplier. Importantly, this finding is only present among industries producing durable products, where long-lasting relationships between customers and suppliers are likely to be important."

As already mentioned, a firm can also face financial distress costs through the actions of its *competitors*, since excess debt may make the firm more vulnerable to the predation of its rivals. Most studies that examine this possibility consider shocks to either leverage or competition. Phillips (1995) focuses on sharp increases in leverage in four manufacturing industries, and Chevalier (1995a, 1995b) and Chevalier and Scharfstein (1996) analyze the prices at local supermarkets after LBOs. In each of these studies, debt is shown to influence the prices charged for products, the market shares gained or lost, or the probability of exit or entry into the market. Perhaps more importantly, because of both the nature of the products and the empirical design, the observed changes in sales, market shares, or market presence are likely to be due to interactions with other firms, as opposed to interaction with nonfinancial stakeholders (such as customers).

Complementing these studies that examine competitive responses to dramatic changes in capital structure, Khanna and Tice (2000, 2005) examine competitive responses to competition shocks. The authors investigate how discount department retailers respond when Wal-Mart enters their market, with an eye on what determines the incumbent's ability to compete. Finally, Campello (2003) documents the effects of capital structure on product market competition for a large cross section of industries over a number of years.

A secondary purpose of this survey is to discuss endogeneity problems that arise in empirical corporate finance research in general and to describe how researchers studying capital structure explicitly deal with this problem. As we will see, virtually all empirical studies that attempt to shed light on the connection between capital structure and a firm's corporate strategy potentially suffer from significant endogeneity problems. Indeed, one theme we consistently find in these studies is a careful approach to endogeneity.

We begin our survey of the interaction between capital structure and its effect on real decisions by the firm with a brief review of the classical endogeneity problem in regression, after which we discuss ways in which academic researchers have addressed the issue. In contrast to the work by Li and Prabhala (Chapter 2), who provide a more detailed treatment of econometric techniques that address these endogeneity issues, our discussion is intended to provide economic intuition of the causes and solutions to endogeneity problems. As such, the "solutions" to endogeneity we discuss are often more clever than technically complicated, exploiting opportunities to approach the problem in such a way that mitigates the potentially confounding affects of endogeneity.

2. Endogeneity

Endogeneity is probably the most significant problem plaguing researchers in empirical corporate finance. Statistically, endogeneity means that the model's errors are not truly *random*, since they are partially predictable from information contained in the explanatory variables. Practically, endogeneity means that a regression is misspecified in a way that makes identifying a causal effect between two economic variables difficult, if not impossible.

How does endogeneity arise? One way is through reverse causality. For example, consider a regression with firm sales as the dependent variable and potential determinants of sales (including leverage) on the right-hand side. Although it is certainly possible that leverage can influence sales, it is *also* possible that sales can influence leverage. If poorly performing firms raise more debt capital than their better performing counterparts, then a negative relationship will arise, but not for the reason suspected.

Another related type of endogeneity can arise when the researcher is not able to control for important determinants of the dependent variable. For example, suppose that one wished to explain the debt ratios of firms in a cross section (as in Titman and Wessels, 1988). One of the posited determinants of leverage is the uniqueness of the firm's products, one proxy for which is the firm's ratio of research-and-development (R&D) costs to sales. However, another determinant of leverage is a firm's growth opportunities, since these firms may have the incentive and ability to engage in costly asset substitution; more importantly, growth firms often invest heavily in R&D. These observations in tandem highlight why including *only* R&D-to-sales may prove difficult to interpret. If the coefficient on R&D-to-sales is negative, is it because the uniqueness of the firm's products imposes costs on the firm's customers, or is it because the firm's flexibility in investment imposes potential costs on would-be creditors?

The analysis that follows explores endogeneity problems of this sort, along with the solutions various authors offer to mitigate potential bias. In many cases, the authors take advantage of an exogenous shock that is unlikely to be correlated with most (or any) of the potentially endogenously determined variables in the system. In others, careful instruments for the endogenous variable are employed in a reduced-form model that is free of bias. Some authors argue that transformed variables (often in lagged form) remove the potential for an endogenous relationship. As will become clear, there are more often than not several potential sources of endogeneity in a single study; many authors choose to deal directly with the most prominent endogeneity threats, treating the remainder with robustness checks. One feature of endogeneity is that it is often far easier to recognize than to adequately treat. Indeed, the approaches we examine often differ significantly, reflecting the difficulty faced in treating potentially endogenous relationships.

3. The determinants of capital structure choice

If a firm's leverage is affected by its relationships with nonfinancial stakeholders and competitors, then cross-sectional differences in debt levels should be observed among firms that differ in their sensitivities to these relationships. For example, firms that experience a deterioration in their stakeholder relationships when they encounter financial distress would, all else equal, be expected to choose lower debt ratios. A primary contribution of Titman and Wessels's (1988) study is to empirically document relations between a firm leverage choice and its attributes, many of which proxy for how sensitive the firm's stakeholders are to its financial distress.

The basic empirical framework is an application of the LISREL system originally developed by Karl Jöreskog and Dag Sörbom.³ The main advantage of employing this framework is that it allows for debt ratios to be determined by a family of *unobservable* firm attributes, which are specified as linear functions of *observable* proxies. The model includes eight attributes that the authors identify as potentially affecting a firm's leverage ratio: collateral value of assets, nondebt tax shields, growth, uniqueness, industry classification,⁴ size, volatility, and profitability. For the eight unobservable attributes, the authors specify fifteen observable variables (obtained mainly from accounting data for each firm), each of which proxies for one or more of the attributes.⁵ The analysis can be thought of as proceeding in two steps. First, the authors measure each of the firm's eight attributes by relating them to the observable proxy variables (the measurement model). Second, observed leverage ratios are related to each of these measured attributes (the structural model). Both steps are estimated simultaneously.

The authors measure short-term, long-term, and convertible debt (each divided by either book or market value of equity), regressing each dependent variable separately on the family of measured attributes defined in the measurement model. With regard to short- and long-term debt, only uniqueness proved a statistically significant determinant of leverage in each specification of the model. Firms offering unique products, as measured by the ratios of R&D, selling expense to sales, and labor quit rates exhibit lower debt ratios, whether measured in relation to either book or market values of equity. In addition, although an industry dummy, intended to measure the required service and maintenance associated with a firm's products, was generally statistically insignificant (with one exception), the point estimate of its partial effect was negative in every specification of either short- or long-term debt. The authors interpret the combination of this evidence as supportive of Titman (1984), which predicts lower debt ratios for firms whose liquidation imposes significant costs on its workers, customers, and suppliers.

One of the indicators of uniqueness—how often workers voluntarily left their jobs (quit rates)—reliably predicted debt ratios; firms in industries with high quit rates exhibit high leverage. One interpretation of this evidence is that in industries where workers quit frequently, financial distress is unlikely to be particularly costly to workers. We now proceed to a more recent class of studies that investigates in more detail the interaction between debt and this class of nonfinancial stakeholders.

³ LISREL is an acronym for *LI* near *Structural REL*ationships. Technically, LISREL is a computer program developed to do covariance structure analysis. Such covariance structural models are widely used in economics, marketing, and psychology. Source: *Introducing LISREL, a Guide for the Uninitiated*, Diamantopoulos, A., Siguaw, J. (2002).

⁴ The authors isolate with a dummy variable firms that produce heavy equipment and machinery, since these firms are likely to require future servicing and maintenance.

⁵ The family of observable proxies includes information from the balance sheet (ratio of intangible assets to total assets, ratio of inventory plus gross plant and equipment to total assets), income statement (depreciation over total assets, R&D-to-sales ratio), and statement of cash flows (ratio of capital expenditures-to-total assets). Many proxies are allowed to proxy for more than one firm attribute.

3.1. Debt and the firm–worker relationship

Sharpe (1994) and Hanka (1998) each consider how debt affects a firm’s relationship with its employees. Their basic findings are that firms with high leverage pay lower wages, fund pensions less aggressively, and provide less job security to their workers during downturns. Consistent with the preceding discussion regarding endogeneity, both studies carefully consider potentially omitted variables that may bias their estimates.

Sharpe considers this issue explicitly, acknowledging that although employment growth (one of the dependent variables he estimates) should be related to current and expected sales growth, sales growth is an endogenous variable that may also depend on employment. Alternatively, both sales and employment may mutually depend on factors unobserved by the econometrician. Sharpe estimates pooled regressions for multiple firms over time of the form:

$$\begin{aligned} \Delta E_{it} = & (\beta_1 + \beta_3 \text{LEV}_{i,t-2} + \beta_5 \text{SIZE}_{i,t-2}) \Delta S_{i,t+1} \\ & + (\beta_2 + \beta_4 \text{LEV}_{i,t-2} + \beta_6 \text{SIZE}_{i,t-2}) \Delta S_{i,t} \\ & + (\beta_0 + \beta_7 \text{LEV}_{i,t-2} + \beta_8 \text{SIZE}_{i,t-2}) + u_{i,t} \end{aligned} \quad (1)$$

in which E refers to the number of employees at year end, LEV to book leverage, SIZE to inflation-adjusted capital stock, and S to sales. All changes are divided by their initial levels. The point of estimating (1) is to investigate how leverage affects a firm’s sensitivity of employment to its current and future sales. Sharpe’s primary interest is to ask whether leverage or size affects a firm’s tendency to “hoard labor” during downturns. The signs of β_3 and β_4 indicate whether employment changes in highly levered firms are more sensitive to shocks in current and future sales than those of their less levered counterparts. Similarly, coefficients β_5 and β_6 tell us whether a firm’s size influences how sensitive its employment is to current and future sales shocks.

The preceding specification must address a number of endogeneity issues. One is that sales and employment growth are mutually dependent, since changes in employment can certainly cause changes in sales (think about reducing the size of the sales force). To address this issue, changes in sales, ΔS , are regressed against a set of macroeconomic instruments that are presumably exogenous from the perspective of each firm. These instruments include changes in interest rates, ratios of inventories to sales, growth in industrial production, and the Consumer Price Index (CPI) inflation rate. By effectively asking whether firms with different leverage ratios react differently to changes in the business cycle (which are presumably not predictable by firms), Sharpe is able to isolate the effect of size and leverage on unexpected shocks to a firm’s demand.

Sharpe’s argument that size is largely exogenous seems reasonable; however, leverage is certainly not exogenous, having been chosen by management simultaneously with the firm’s employment level. To address the problem of simultaneity, Sharpe uses lags of both book (alternatively market) leverage and size in his empirical model. The hope is that leverage *levels* chosen at least a year in the past are not correlated with

changes in current employment, after controlling for current and future sales growth with macroeconomic instruments. Sharpe does *not*, however, assume that using lagged leverage ratios solves the endogeneity problem. Indeed, he acknowledges that firms may select their debt ratios based in part on the costs associated with adjusting their labor forces; that is, firms with more flexible labor forces may be less risky and thus able to choose higher debt ratios. We discuss this matter in more detail later in this chapter.

Sharpe estimates Equation (1), separately for durables and nondurables from 1959 to 1985. While it is indeed the case that leverage increases a firm's employment sensitivity to sales, the impact is more pronounced in the subsample of firms that produce durable goods.⁶ In the durable category, a firm with zero debt lays off 8% of its workers in response to a 10% decline in sales, while a firm with 100% debt reduces its workforce by 11.5%. This finding is important in its own right. For example, one direct implication is that a highly levered firm may have difficulty attracting employees and inducing them to build firm-specific human capital if highly levered firms are viewed as providing more risky employment.

Sharpe acknowledges, however, that interpreting the impact of leverage on a firm's sales elasticity of employment should be done carefully. As mentioned previously, all of Sharpe's findings are consistent with firms optimally choosing capital structures that reflect their labor-adjustment costs. For example, as we mentioned earlier, a firm's debt choice may reflect the *specificity* of the human capital it affords its employees. If the knowledge and skills imparted to a firm's workers are transferable to other firms, then layoffs are not particularly costly events; therefore, firms offering fungible human capital may choose high-debt levels. Sharpe's evidence is also consistent with other interpretations, such as that advanced by Jensen (1986 1989). This alternative suggests that debt provides discipline to managers who incur psychological costs from laying off their workers during recessions. Sharpe's finding of asymmetry between hiring and firing (debt increases layoffs during recessions but does not increase hiring during expansions) is consistent with this interpretation.

Hanka motivates his work largely from Sharpe's study, claiming that although the results are suggestive, its design makes it difficult to infer increased layoff risk due to leverage. Again, endogeneity is the culprit, this time from omitted variables. What if, Hanka argues, the observed correlation between debt and employment reductions is due to factors that were not included as controls, such as poor historical performance or low-growth opportunities? Using a set of variables from 1950 to 1993 including wages, funding of pensions, and use of seasonal employees, Hanka augments Sharpe's analysis by explicitly controlling for determinants of these dependent variables. He finds that highly levered firms pay lower wages, are more likely to lay off their employees, and fund pensions less generously, conclusions that largely agree with those advanced by Sharpe.

⁶ As Sharpe indicates, "if there is any effect of leverage or size on the cyclical of employment and sales, it should be more easily detected among firms in industries for which cyclical fluctuations are a more dominant feature of the dynamics" (p. 1062).

Hanka's empirical tests use leverage as an explanatory variable to explain dependent variables that relate to employment. Similar to Sharpe's study, Hanka's tests suffer from two important potential sources of endogeneity: (1) reverse causality: leverage is selected by firms, perhaps taking into account the costs they face of changing the size of their workforces, and (2) omitted variables: employment is determined by a complex set of factors, for which many are difficult to control with proxies.

In some cases, it is possible to identify the likely direction of the endogeneity bias, which can potentially strengthen the results. For example, Hanka mentions that if firms select low-debt levels when facing high costs of financial distress, then high-debt levels should predict fewer employment reductions, since a choice of high leverage indicates a low probability of financial distress and accompanying layoffs. This would bias the results against finding the observed empirical results.⁷ Regarding the omitted variables problem, Hanka is particularly careful to attempt to control for potential determinants of employment such as growth opportunities and performance, which may be correlated with leverage.

Hanka presents results from a censored regression of employment layoffs on various sets of controls.⁸ In a model without controls for divestitures, performance, and growth opportunities, debt is seen to be positively related to layoffs. A firm that increases its debt from the 10th to the 90th percentile increases its layoffs by 140%. When controls for asset sales are added, this effect is cut in half; when controls from current and prior performance are added, the effect is halved yet again. While controls for operating efficiency and divestitures remove a significant amount of debt's impact on employment reductions, debt is still seen to play a role in a firm's employment policy.

As Hanka argues, however, debt's strong correlation with performance makes it "difficult to be sure that the effects of performance have been completely purged from the results." Hanka addresses this concern by forming portfolios based on performance (ROA) and debt. As he notes, if performance (rather than debt) is driving the results, then employment reductions should increase with declining performance, regardless of leverage. However, Hanka presents evidence that this is clearly *not* the case. While poorly performing firms do indeed lay off more employees than their better performing counterparts, the leverage effect is just as strong—often more so. For the most levered quartiles, firms with both better performance and lower debt exhibit less employment

⁷ Sharpe mentions that reverse causality may occur if characteristics related to the dependent variable (cost of employment reductions) influence a firm's choice of a dependent variable (leverage). Hanka acknowledges that if firms facing low costs of reducing their workforces choose higher debt levels, then the resulting estimates may be biased. This type of endogeneity, unlike that mentioned in the paper's body, would bias the magnitude, but not the sign of the resulting estimate. The combination of the above arguments causes Hanka to argue that although "endogeneity may bias the magnitude of the empirical results, [it] cannot easily cause their sign to be opposite that of the true causal relation" (p. 252).

⁸ Hanka argues that a Tobit specification—where employment increases are censored at zero—is appropriate, since the goal of the model is to measure debt's impact on a worker's probability of being laid off. Although such a model ignores variation with regard to *increases* in employment, Hanka mentions that the results are still significant without censoring.

reduction; since worse performance should increase employment reductions, it is hard to argue that debt fails to influence a firm's layoff decision, even after controlling for performance. Hanka thus addresses the potential endogeneity from omitted variables through both regression controls, as well as through nonparametric tests that apply dependent sorts on the potentially endogenous variable of interest.

Hanka also presents evidence that firms with higher debt ratios pay lower wages, after controlling for size, industry, changes in employment, and the fraction of assets depreciated (to capture life-cycle effects). A firm that increases its leverage from the 10th to 90th percentile pays about \$2300 less annual wage per employee, which is slightly less than 8% of the average of \$28,000. In accompanying tests, Hanka also shows that highly levered firms fund pensions less generously and that more levered firms are more likely to rely on seasonal employees.

Hanka's interpretation is that debt "disciplines" managers, forcing them to make choices that may be personally unpleasant. These results, as well as those in Sharpe, are thus consistent with Jensen's (1986) free cash flow theory. One may also be able to develop an explanation for these results based on Myers (1977) debt overhang theory; a highly levered firm may underinvest in its employees when they are financially distressed or financially constrained. Finally, these results are also consistent with the idea that firms with more flexible labor forces can handle higher debt loads. In other words, it may be the nature of the labor force that generates observed capital structures rather than the capital structures influencing employment policy. While both Hanka and Sharpe are aware of this endogeneity problem, there is no apparent way to unambiguously determine the direction of causality in this case.

In the next paper we discuss views the firm–employee relationship through the perspective of labor unions, showing how debt can also alter this dynamic in a way that benefits shareholders. Bronars and Deere (1991) develop a model in which union behavior depends on the firm's capital structure—debt induces unions to act less aggressively.⁹ In the first of two model specifications, a labor union faces the choice of either forcing the firm into bankruptcy and then negotiating with creditors or accepting a lower wage. Because creditors are assumed to operate the firm with an efficiency loss, it can be shown that the union's optimal strategy is to accept lower wages and avoid bargaining over a smaller surplus. In a second specification, the union forms and sets its wage simultaneously. When bankruptcy is costly for workers,¹⁰ "the union will moderate its demands in the face of outstanding debt." In either specification, debt shields funds that would otherwise flow from shareholders to workers; the empirical implication is that firms facing a greater threat of unionization use debt more aggressively.

Empirically, this can be written as:

$$DE_{fi} = X_{it}\beta + \gamma\pi_{fi} + \varepsilon_{fi}, \quad (2)$$

⁹ See also Dasgupta and Sengupta (1993) and Perotti and Spier (1993).

¹⁰ Bronars and Deere mention that such costs may arise from job loss or organizing another (perhaps unsuccessful) union drive.

where DE_{fi} is firm f 's debt-to-equity ratio in industry i , X_{it} is a vector of control variables, π_{fi} is the (unobserved) probability that firm f is unionized, and ε_{fi} is an error term. Since whether or not a firm is unionized is a binary variable, Bronars and Deere use the *industry average* for unionization as a proxy for the threat of unionization at the firm level. Thus, two firms with differing union status within the same industry are treated as having identical threats of unionization.

Bronars and Deere face a potential bias due to the way both the threat of unionization and leverage are measured. Consider, for example, the null hypothesis that the threat of unionization has no impact on a firm's choice of leverage—in this case, firm leverage and the threat of unionization should be uncorrelated. However, when unions form unexpectedly, market values of equity decline (to reflect potential wealth transfers from equityholders to the union), which increase the measured values of firm leverage. Thus, if we compare unionization and debt ratios across industries, there will be a positive correlation due to the negative impact on equity value caused by unionization. In this case, the null hypothesis may still be valid, despite positive correlation between average unionization rates and leverage levels.

Bronars and Deere correct for this potential bias in two ways. First, they estimate a model that measures the equity loss when unionization campaigns are successful. An adjustment factor for each industry is calculated, based on that industry's unionization rate and the average fraction of equity lost after successful campaigns.¹¹ The second adjustment is based on the idea that higher wages earned by union workers come out of the pockets of equityholders. By taking the present value of the union rents and adding them back to the observed equity values, the authors produce estimates of equity values when facing only the *threat* of unionization, not its actual occurrence.

Although regression results using the second (that based on the union wage premium) adjustment yielded an insignificant coefficient on unionization rates, the majority of Bronars and Deere's results are strongly supportive of a positive relation between the threat of unionization and debt ratios.¹² In both regressions using the first adjustment to equity as well as those with an alternative leverage measure that does not require adjustments (debt-to-margin and debt-to-paid in capital), debt ratios are strongly positively related to the unionization rates in their industries.

3.2. *Debt and the firm–customer relationship*

The remainder of the studies we examine in this chapter show how capital structure affects a firm's sales and/or market share. As we will see, these studies present us with at least

¹¹ The authors note that because they are adjusting the dependent variable (leverage) by an adjustment factor that is itself a function of one of the regressors (unionization rate), coefficients are downward biased.

¹² In Bronars and Deere's setting, it may be tempting to ask why labor unions do not explicitly bargain over the debt ratio. The reason is that labor laws specifically prohibit unions from negotiating over issues that do not directly influence workers.

two empirical hurdles. The first problem is endogeneity; although we are interested in debt's effect on a firm's sales and market share, we suspect that shocks to sales influence observed debt ratios. Second, even if we can properly infer the correct direction of causality, it may still be difficult to identify *how* the observed changes in performance occur (i.e., through customers or competitors). In this section, we focus on the aspects of two studies (Opler and Titman, 1994; Zingales, 1998) that relate to the firm–customer relationship.

The issues considered in these studies were originally explored by Altman (1984), who attempts to measure both the direct costs (i.e., those paid explicitly by the creditor(s) in the event of reorganization/liquidation such as legal fees) and indirect costs (e.g., losses of sales and foregone profits) of bankruptcy for a sample of 19 firms following bankruptcy filing. Altman interprets the observed loss in sales as evidence of financial distress costs; specifically, he “assumes that the prospect of bankruptcy will often lead to lower than expected earnings.” However, Altman admits that his results are also consistent with the alternative interpretation that “lower than expected earnings could cause the management to declare bankruptcy.”

Opler and Titman are primarily concerned with measuring financial distress costs in a way that mitigates this inference problem caused by reverse causality. They do so by identifying industries that are economically distressed rather than directly identifying financially distressed firms. They then measure the financial leverage of firms within these economically distressed industries two years prior to the industry's decline, and they assume that the more highly levered firms within these industries are more likely to be financially distressed than their more conservatively financed counterparts in these industries. Thus, if a firm's financial distress affects sales and other performance measures, the more highly levered firms should do worse than their less levered counterparts in these time periods.

Specifically, Opler and Titman examine data for the 20-year period spanning from 1972 to 1991, and they run regressions of the following form:

$$\begin{aligned} \text{Firm performance} = & \alpha + \beta_1 \text{Log(Sales)} + \beta_2 \text{Lagged industry-adjusted profitability} \\ & + \beta_3 \text{Industry-adjusted investment/assets} \\ & + \beta_4 \text{Industry-adjusted asset sale rate} \\ & + \beta_5 \text{Distressed industry dummy} \\ & + \beta_6 \text{High leverage dummy} \\ & + \beta_7 \text{Distressed industry dummy X High leverage dummy} + \varepsilon \end{aligned}$$

in which a “distressed industry” takes a value of one when the industry median sales growth is negative and the median stock return is below -30% . Firm performance is measured with industry-adjusted sales growth, industry-adjusted stock returns, and industry-adjusted operating income. Since financial distress costs are likely to be the highest for firms experiencing both economic (as measured by the distressed industry

dummy) and financial distress (as measured by the high leverage dummy), the main interest is in the coefficient of the interaction term, given by β_7 above.

The coefficient estimates on leverage (β_6) are negative when the measures of performance are either industry-adjusted stock returns or industry-adjusted sales growth, indicating that highly leveraged firms performed worse than their peers with lower leverage even in *good* times. The interaction term is also statistically significant and negative in each empirical specification, indicating that this effect is magnified in downturns. Specifically, during industry declines, a firm in the most leveraged decile experiences industry-adjusted sales declines of 25% more than its peers in the least leveraged decile. When operating income is the dependent variable, the coefficient on the interaction term is no longer significant.

Throughout the paper, Opler and Titman express concern about three possible sources of endogeneity bias:

- **Self-selection.** First, it is likely that firms with the highest costs of financial distress choose the lowest debt ratios.¹³ While it is impossible to correct for this bias in the data, the authors argue that endogeneity of this type would bias the estimates toward zero. In other words, the tests may underestimate the effect of financial distress.
- **Reverse causality.** Although high leverage levels may lead firms to experience poor performance, poor performance may also lead to higher observed leverage levels (either because distressed firms borrow more, or because their market values decline, which increases their leverage ratios). This is potentially the most serious endogeneity problem and is largely addressed by the empirical design itself. First, the study controls for past profitability. In addition, Opler and Titman compare the performance of firms with high and low leverage in industry downturns (which are largely unanticipated when leverage choices are made) and argue that if having a high-debt ratio is costly, then it should be more costly during industry downturns that can cause the highly levered firms to become distressed.
- **Omitted Variables.** Leverage may serve as a proxy for other firm characteristics that are difficult to control for. Suppose, the authors argue, that poorly run firms fail the fastest in industry downturns and that these firms are also highly leveraged. If this is the case, then even if financial distress is not costly, there will be a negative correlation between leverage and performance. Opler and Titman attempt to mitigate this concern by measuring leverage with book values, since its correlation with profitability is lower than when market values are used.

Although the results of these performance regressions suggest that financial distress is costly, Opler and Titman acknowledge that further analysis is warranted. They claim, for example, that sales declines could be evidence of “efficient downsizing” and that

¹³ Although firms with different capital structures are likely to be different along some dimensions, there exists a theoretical rationale for identical firms to be financed differently. For example, in Shleifer and Vishny (1992) firms that are ex-ante identical choose different debt ratios.

the stock return evidence may be driven by a pure leverage effect.¹⁴ To investigate this possibility, they ran the same regressions after trifurcating the sample along three dimensions: size, research and development as a percentage of sales, and industry concentration.¹⁵ Consistent with Baxter (1967), Titman (1984), and Maksimovic and Titman (1991), Opler and Titman find that the interaction term is more pronounced (more negative) among firms that invest heavily in research and development. Since these firms are most likely to offer unique products, and those that benefit from a long-term relationship between the customer and firm, the evidence is consistent with sales declines arising from customers wary of doing business with a struggling firm that may not survive to service and maintain its products. This R&D effect is also found with respect to stock returns. Regarding competitor-driven financial distress costs, Opler and Titman report that sales and market values of equity decline in concentrated industries, where the benefits to predation are likely to be the highest. Finally, they examine asset sales, investment rates, and employment growth rates between firms with high leverage and those with low leverage during industry downturns. Neither asset sales nor investment of highly leveraged firms during industry downturns exceeds those of firms with lower leverage. This finding suggests that manager-driven cost-cutting is not likely to be the explanation for the poor performance differential.

Zingales's (1998) study of the trucking industry's deregulation in 1980 also attempts to separate losses driven by customers and those caused by predating rivals. Like many of the other studies we examine, Zingales recognizes the potential for endogeneity to bias results in studies of the interaction between product markets and leverage. In particular, he notes not only that reverse causality may arise if trucking firms are able to adjust their capital structures in anticipation of deregulation, but also that spurious correlation between leverage and performance can arise if unobservable characteristics are not adequately controlled for in the explanatory variables.

The event Zingales examines is the unanticipated¹⁶ deregulation of the U.S. trucking industry between 1978 and 1979. During this time, the Interstate Commerce Commission (ICC) largely reversed its policy regarding new service applications into the industry and liberalized rate-setting practices. With such deregulation, trucking firms began to engage in intense price competition, which decreased their market values relative to the

¹⁴ Consider, for example, two firms that differ only in their leverages. When industry returns are negative, the more highly levered firm will experience comparatively lower returns purely from leverage, even in the absence of financial distress costs.

¹⁵ The authors also investigate asset sales, exit, employment, and investment, in hopes of shedding light on whether the observed sales declines could have arisen from management acting optimally in response to economic distress. The bulk of the evidence (employment being the exception) did not favor a manager-driven explanation.

¹⁶ Because part of the paper's appeal is based on the exogeneity of the shock, Zingales is careful to defend the deregulation event against the criticism that it was anticipated. First, Zingales reviews the *S&P Outlook* newsletter during the years around his study, and he concludes that 1977 was the "watershed" date (his measures of leverage, therefore, were collected prior to this date). Second, the author notes that market values of equity in the trucking sector suffered serious declines from 1978 to 1980, evidence that the deregulation event was largely unanticipated by the market.

preregulation environment. The result was that, for most firms, their ratio of debt to market value of equity (largely represented by trucking firms' operating certificates) was exogenously increased,¹⁷ which provides a natural experiment to examine the effects of capital structure on the product market environment.

The main class of results addresses whether more efficient firms were most likely to have survived the deregulation, regardless of their financing arrangement. The basic model has the following form:

$$Pr\{\text{survival in 1985}\}_i = f(X_i^{1977}, Lev_i^{1977}) + \varepsilon_i$$

where X_i^{1977} refers to a vector of proxies for the level of operating efficiency, Lev_i^{1977} is the net debt-to-capital ratio (calculated as total debt minus cash reserves divided by total debt plus equity), and ε_i is a mean zero noise term. The elements of X_i^{1977} intended to capture efficiency are the log of sales, fraction of intangible assets, return on sales, proportion of wages over total costs, and nine regional dummies. Since leverage is related to profitability, and since profitability affects survival, a spurious correlation between leverage and exit may arise if determinants of survival (other than leverage) are not included in the empirical model. Return on sales is intended to control for the efficiency of each motor carrier, a control that is crucial in defending a relation between eventual exit and ex-ante leverage. Size is included as another proxy for efficiency (since the largest firms may be the most efficient) and also serves to control for access to financing. The fraction of intangible assets is important because it potentially measures the monopoly rents enjoyed by a carrier prior to deregulation through its operating certificates. Finally, the proportion of a firm's operating expenses dedicated to wages and benefits provides a measure of the firm's sensitivity to union demands. As we have already seen, the threat of unionization is likely to affect a firm's choice of leverage (Bronars and Deere, 1991) and may also eventually affect its probability of survival. Regional dummies are included to account for potential heterogeneity across different geographical areas.

Zingales's regression indicates that highly levered firms, even after accounting for their operating efficiency, are less likely to survive deregulation than their more conservatively financed rivals. This result is robust to several specifications of operating performance and even to the ex-ante probability of default as developed by Altman (1973). More interesting perhaps are the results presented for different segments of the trucking industry, the less-than-truck (LTL) and truckload (TL) segments. The larger LTL segment provides smaller hauls (less than 10,000 lb), relying on large investments in hubs and distributional networks. Because the value of LTL firms depends largely on customer service and on developing relationships with clients, liquidation would likely be very costly for this segment.¹⁸ In contrast, the TL segment provides shipment service

¹⁷ Zingales notes that between 1977 and 1982, the market values of trucking firms fell substantially.

¹⁸ Liquidation of an LTL firm would likely destroy much of the value derived from firm-specific investments made by customers and employees. In contrast to firms with more tangible assets, recovering value from intangible assets in liquidation would likely require additional investments of organizational capital.

with loads greater than 10,000 lb, and is characterized by more intense postregulation competition and easier-to-finance capital investments. Since the value of TL firms is derived mostly from heavy trucks and equipment (as opposed to the comparatively poor collateral value of LTL assets), financial distress should be less costly for TL firms.

Zingales runs the survival model for three subgroups, those that derived (1) less than 30% of the revenues from LTL shipments, (2) between 30 and 70% from LTL, and (3) more than 70% from LTL activity. Interestingly, only in the groups deriving significant revenues from LTL shipments—where service is important—did prior leverage levels negatively affect the probability of surviving the deregulation. LTL firms derive significant value from intangible assets—distributional networks, hubs, and customer relationships—which likely imposes significant costs on these firms in the event of a restructuring. In contrast, the trucks and trailers of TL firms are redeployed with comparative ease, increasing the appeal of workouts for firms in this segment. The differential impacts of firm leverage on liquidation for each segment highlight the important role of customer-driven financial distress. When LTL firms actually face a liquidation/restructuring decision, deterioration of the firm-customer relationship may have caused irreparable loss of value to the point where a workout is infeasible or impossible.

Zingales considers that debt may affect a firm's ability to compete (and therefore, to eventually survive) by either reducing its ability to invest or hampering its competitive position (either because of predation or deterioration in its relationships with nonfinancial stakeholders). Zingales indeed finds some evidence that debt leads to less investment. Specifically, in his examination of trucking firms' investments until 1980 (to prevent bias from liquidating firms dropping out of the sample), he finds that the most highly levered firms invested less than those with less debt. Furthermore, the linkage between investment and leverage was strongest in those firms eventually forced out of the industry; there was no statistically significant relation between debt and investment for those firms that survived the deregulation. While this evidence is important, Zingales notes that this evidence is in itself unable to distinguish between alternative stories that may generate negative correlation between leverage and investment. For example, some highly leveraged firms may have been viewed as viable firms by the market and were supplied the necessary funds to survive the deregulation. Others were not viewed as favorably, were unable to obtain the necessary financing to maintain investment, and were forced to exit the industry.

Zingales also shows that in addition to investing less aggressively, highly leveraged firms began charging lower prices, starting approximately two years after deregulation (1982). A number of explanations are consistent with this evidence: (1) well-financed rivals engage in predation (Telser, 1966; Bolton and Scharfstein, 1990), and (2) they are induced to compete more aggressively (Brander and Lewis, 1986), and (3) customers of highly leveraged firms demand compensation for the possibility of bankruptcy (Titman, 1984).¹⁹ Unfortunately, the fact that trucking companies compete on a national

¹⁹ It should be noted that Chevalier and Scharfstein (1996) and Dasgupta and Titman (1998), discussed later in this chapter, provide models in which more highly levered firms charge higher prices.

scale renders it virtually impossible to define a local market in which to examine prices. Thus, although predation may represent part of the explanation for the price declines after deregulation, Zingales is unable to directly test this hypothesis. Instead, Zingales argues that the distinction between the services provided by LTL and TL carriers allows him to test an implication that applies to only one of the above possible explanations.

Because so much of an LTL carrier's value is related to its customer service, Zingales argues that if price declines for highly leveraged firms are *most* significant in this sector, then this would serve as evidence in favor of customer-driven financial distress. In contrast to the other explanations that should affect the LTL and LT segments relatively equally, price declines attributable to customers wary of doing business with a potentially bankrupt firm should be disproportionately present in the segment where customer service is most important. Although a pool of all firms (both TL and LTL) exhibits the result that highly leveraged firms charge lower prices, Zingales splits the sample by percentage of revenue derived from each segment, showing that firms deriving significant (more than 30%) revenue from LTL activity are almost totally responsible for the observed declines. Zingales interprets this evidence that "leveraged carriers discount their services to compensate consumers for the risk associated with the probability of default of the carrier."

While this interpretation may indeed reflect the most important source of financial distress among LTL firms, one cannot completely eliminate the possibility that predation is playing an important role as well. The reason is that predation is most effective in situations where some type of capital is destroyed (i.e., where actual deterioration of a firm's business occurs, as opposed to temporary depression of prices). Since entry into the TL segment is relatively easy, it is difficult to imagine that predatory pricing would be particularly effective in this segment.

3.3. *Debt and competition*

Until now, we have focused on how the possibility of financial distress alters a firm's relationship with its customers and employees. In this section, we shift our attention to how capital structure may influence a firm's ability or willingness to compete with its rivals. Most studies rely on natural experiments involving either the firm's product market environment or leverage—and sometimes both. Phillips (1995) and Chevalier (1995a, 1995b) empirically investigate the interaction between product market outcomes and capital structure by examining competitive responses to sharp increases in leverage. A subsequent group of studies by Scharfstein and Chevalier (1996), Khanna and Tice (2000, 2005), and Campello (2003) analyze shocks to competitive environments, exploring how differences in ex-ante capital structure are associated with differential responses and competitive outcomes. In both classes of studies, all these authors seek to investigate how debt influences a firm's position in its competitive environment, whether measured by pricing, market share, or likelihood of surviving.

Phillips's (1995) study examines sharp leverage increases in four industries—fiberglass, tractor trailers, polyethylene, and gypsum—in order to explore the impact on firms' competitive strategies as they relate to production, market share, and price setting. In each of the industries Phillips studied, the largest firm had undergone an LBO, resulting in at least a 25% increase in the debt-to-value ratio. Furthermore, each industry is relatively homogeneous; reducing the likelihood that differential product quality may influence the ensuing results. In nonparametric tests, Phillips shows that in three of the industries (fiberglass, tractor trailers, and polyethylene), the largest firms undertaking leveraged buyouts *lost* market share, as measured by three-year percentage of sales in the industry. In the final industry (gypsum), the industry's leading firm *increased* its market share from 47.7 to 51.1%, despite an increase in its debt-to-value ratio from 35 to 90%.

Phillips's main tests of capital structure's interaction with product markets are conducted at the industry level. To isolate the effect of debt on aggregate supply, Phillips estimates industry-level supply models for each of the four industries. Since the dependent variable in each equation is price, and because price and quantity are simultaneously determined, Phillips estimates each of his supply equations with two-stage simultaneous equations.²⁰ He also presents a reduced-form equation for each industry in which industry quantity is regressed on the exogenous variables from the price equation. In all specifications, input prices and scales of production are included as controls.

The results from these regressions for each industry indicate that debt influences product prices. In particular, the average debt ratio is positively associated with product prices in every industry except gypsum, where it is significantly negative. Furthermore, Phillips's reduced-form equations indicate that the industry *quantity* is negatively related to industry debt ratio for the same three industries, gypsum (again) representing the only exception.

Chevalier and Scharfstein (1996) and Dasgupta and Titman (1998) each present models where firms compete by setting price (i.e., Bertrand competition) in which debt commits the leveraged firm to behave less aggressively. The results in three of the four industries considered by Phillips (e.g., fiberglass, insulation, and tractor trailer) are consistent with these models. Phillips's findings in the gypsum industry, where the increase in debt led to stronger competition, is more supportive of models by Brander and Lewis (1986) and Maksimovic (1988) where firms compete by setting prices (e.g., Cournot competition). Since gypsum is a commodity with relatively low barriers to entry it is likely that the Cournot assumptions are more applicable. In addition, since overinvestment is likely to be less sustainable in a highly competitive industry, it is less likely that increased leverage will result in reductions in capacity investments.

²⁰ Phillips's methodology is a two-stage simultaneous equation framework in which instruments are used for price in the demand equation and for quantity in the supply relationship. In the demand equation, input prices (potentially including the price of oil and/or electricity, wages, etc.) are the instruments for product price.

Kovenock and Phillips (1997) add to Phillips (1995) by considering how leverage recapitalization affects individual firm investment and plant closure decisions. In addition, Kovenock and Phillips (1997) recognize the potential endogeneity problem in Phillips (1995), namely, that if firms undertaking LBOs are able to anticipate the effects of their recapitalizations, then any direct effect of debt on a firm's decisions may be obscured.

In their paper studying 10 industries, Kovenock and Phillips (1997) control for the endogeneity of the capital structure decision directly through a two-stage approach. In stage one, they run a logistic regression that explains the firm's decision to recapitalize as a function of industry variables, including capacity utilization and market concentration. In stage two, they examine both the decision to exit the industry and to close plants (in separate regressions), but importantly, they include the *predicted probability* of recapitalization from the first stage.²¹ The main result is that high leverage appears to make firms more passive, increasing plant closures and decreasing investment. However, this effect is found only in highly concentrated markets, which the authors interpret as agency problems being "more prevalent in concentrated industries, where the discipline of the market does not weed out nonoptimizing firms (pg. 771)."

Chevalier also takes advantage of the sharp increases in leverage following LBOs in two closely related papers on the supermarket industry. She uses LBOs in grocery store chains to study the effect of changes in capital structure, exploring competitive responses to exogenous shocks in leverage. The primary endogeneity problem is that LBOs may be chosen with their anticipated consequences in mind, which complicates the inferences that can be made regarding the effect of leverage on prices. Suppose, for example, that LBOs are chosen in instances where competition was anticipated to be increasing.²² Finding that LBOs preceded more competitive price setting would therefore not be surprising, but it would have little to do with the leverage increase itself.

As Chevalier (1995a) notes, "the local-market nature of supermarket competition helps to 'clean out' the endogeneity of the LBO in the study of entry, exit, and expansion." In other words, because the LBO choice is made by the firm at the *national* level, the competitive responses of its rivals in any *local* area play only a minor role in the LBO decision. Therefore, because Chevalier's analysis is conducted at the local level, the sharp increases in leverage brought about by an LBO can be viewed as exogenous, reducing the probability that the resulting estimates suffer from endogeneity bias.

Chevalier (1995a) shows that LBOs "soften" product market competition, as measured by the entry and expansion decisions of rivals of firms that undertook LBOs. Chevalier's (1995b) second paper explores in greater depth one particular dimension in which firms compete—prices. She finds that LBOs have significant impact on the local prices

²¹ The authors also use a "high-debt" dummy variable in addition to the predicted probability of recapitalization, finding similar results.

²² For example, Jensen (1986) suggests that increased debt focuses managerial attention and reduces the incentives to pursue wasteful expenditures. If competition is likely to increase, then perhaps shareholders see a greater need for the disciplining role of debt.

supermarkets charge for their goods; however, the direction of the post-LBO price changes depends on the financial structure of the LBO firm's rivals. When its competitors are less leveraged themselves, LBOs lead to decreased prices, which can be viewed as evidence of opportunistic predation by less financially constrained rivals. When competitors are also highly leveraged, prices rise following LBOs, evidence that supports Chevalier's earlier study showing that LBOs soften product market competition.

Chevalier (1995a) examines data from 85 Metropolitan Statistical Areas (MSAs) obtained from industry publications. To explain the expansion choice, she runs an ordered probit (+1 for expansion, -1 for retrenchment), conditioning on various market controls including changes in population, the Herfindahl Index, and the size of each store, as well as the market share of rival firms that had previously undertaken an LBO. When this model is run only for incumbent firms that were not themselves recapitalized by LBOs, the marginal effects of market leverage strongly suggest that high concentrations of LBOs soften product market competition. For example, if a firm with a 10% market share undertook an LBO, this shock would increase the probability that a non-LBO rival firm would add stores by approximately 6.5%.

As mentioned previously, the main alternative to Chevalier's hypotheses is that LBO decisions are endogenous and may have been driven by firm characteristics that are related to investment or pricing choices. For example, the "weakest" firms may have been LBO targets. Although the experimental design itself largely alleviates this concern, Chevalier presents evidence that LBO firms did not exhibit significant differences in pre-LBO performance. In particular, comparison of accounting data for the 31 publicly traded firms in 1985, including operating margins, market-to-book ratios, and ratio of capital expenditures to assets, indicates almost no evidence that the "types" of firms selected for LBOs were materially different. In addition, Chevalier tests the reactions of stock prices to LBO announcements for their rivals. Since a firm's stock price tends to increase following a rival's LBO, Chevalier concludes that the LBO itself likely softened the expected future competition, rather than the alternative hypothesis.²³ However, it is also possible that the positive stock price responses of the rivals reflected the possibility that they themselves face an increased probability of undergoing an LBO.

Although Chevalier argues that product market competition changes substantially following LBOs, her 1995 study in the *American Economic Review* does little to shed light on the mechanism through which such shifts may occur. For example, do LBO firms compete less aggressively in the pricing arena (i.e., underinvesting in market share)? Does heightened leverage lead to underinvestment in other areas, perhaps eliminating or delaying renovations or store upkeep? Chevalier (1995a) specifically examines the former possibility, asking whether LBOs cause price changes in the supermarket industry. Prices may fall after LBOs, Chevalier argues, if deep-pocketed rivals predate on their more financially constrained rivals. Alternatively, prices may rise when one or more firms in a local market undertakes an LBO, consistent with either leverage-induced

²³ Note that the positive stock price reactions indicate that the LBOs were largely surprises, making ex-ante strategizing in anticipation of the imminent recapitalizations unlikely.

underinvestment in market share (as discussed in Chevalier and Scharfstein, 1996, and Dasgupta and Titman, 1998) or the reversal of underpricing due to agency problems (Jensen, 1989).²⁴

Chevalier examines price changes around the time of an LBO, specifically comparing prices from one month prior to the LBO to prices after the LBO (the post-LBO prices are measured from one to six months after the event date). To control for local market conditions that may have influenced supermarket prices, she includes changes in local unemployment as well as price changes in nongrocery items, finding that the coefficients on both are statistically insignificant for all specifications. Of most interest are the coefficients on factors expected to influence either predation by rivals or the willingness of competing firms to accommodate higher prices.

Chevalier finds that the coefficient for the share of supermarket chains in the city that had undertaken LBOs prior to the time window is positive for all specifications and is usually statistically significant. In other words, prices rise when a firm that competes with other highly leveraged rivals undertakes an LBO itself. Importantly, Chevalier runs the test again with data from a time window that completely predates the LBO event (for example, examining price changes from month -6 to month -1) Under this specification, she finds “absolutely no relationship between the LBO share of rival firms in the city and price change in the period *prior* to the LBO” (p. 1105). This evidence addresses the possibility that price changes occurring after the LBO date may simply be extensions of a preexisting time trend.

In the same empirical model as previously described, Chevalier finds that the coefficient for the store market share of the largest non-LBO chain in the city is negative for all six specifications and is significant at the 1% level for the longer time windows. This suggests that prices are likely to fall in the presence of a single, large, non-LBO competitor, which can be interpreted as evidence of predation. When the regression is run for the period preceding the LBO, the market share of the largest non-LBO chain has no discernible relationship to local price changes. This again suggests that the LBO itself, rather than a preexisting trend or anticipation of the leverage change, represents the reason for the ensuing price change.

Chevalier then extends her analysis to show that price declines following LBOs accomplish the rivals' presumed goal of driving highly leveraged rivals from the market. With a probit model of exit by LBO firms, Chevalier shows that declines in the grocery price index contributes positively to exit, as would be predicted by a predation explanation.²⁵ These pieces of evidence in tandem suggest that falling prices after LBOs are most likely the result of predation by more conservatively financed rival firms.

²⁴ According to Jensen, managers derive utility from large empires, which in the current application, may lead undisciplined agents to inefficiently depress prices to maximize market share rather than profits. To the extent that an LBO aligns incentives of managers and shareholders inefficiently, low prices should rise, reflecting the newfound (and proper) incentives of management.

²⁵ When the probit model is examined for the time prior to the LBO, no relationship is observed between prices and firm exit, indicating that relatively long periods of declining prices are not alone sufficient to drive firms from the market.

Chevalier and Scharfstein (1996) present a model in which a firm's reliance on external finance alters its incentive to build market share, leading highly leveraged firms to *increase* prices during market downturns. This argument may provide an alternative explanation to Opler and Titman (1994), who show that highly leveraged firms lose sales and market shares to their more conservatively financed rivals (possibly because highly leveraged firms refuse to cut prices) and that this effect is most pronounced during downturns. Debt effectively shortens the firm's horizon by introducing the possibility of liquidation, so that firms relying on external capital have incentives to take actions that boost immediate profits, even at the expense of long-run market share. The main implication is that the output prices of liquidity-constrained firms are predicted to exhibit countercyclicality; they raise prices more (or cut them less) in recessions than their more conservatively financed rivals. Furthermore, the model predicts that even the prices of *unconstrained* rivals are expected to exhibit some—albeit a lesser—degree of countercyclicality, since price markups of the *constrained* firms influence the competitive strategies (in this case, prices) of their rivals.

Chevalier and Scharfstein explore three closely related empirical predictions: (1) more financially constrained firms exhibit more countercyclical pricing, (2) when firms face more financially constrained rivals, their markups should exhibit higher countercyclicality, and (3) industry-average markups should increase when firms within an industry are more financially constrained.

As Chevalier and Scharfstein note, perhaps the most direct of these three hypotheses would be “to relate firm-specific measures of the markup to measures of corporate liquidity.” However, as also mentioned, just as leverage is likely to affect prices (through the mechanism proposed), prices are also likely to affect leverage. It is easy to imagine examples in which a shock to a firm's leverage may lead it to raise prices, which may in turn damage its market share and firm value, which may further impact its leverage. To minimize this problem of reverse causality, the authors examine exogenous events that impose liquidity constraints on some firms more than others, investigating whether those facing stricter liquidity constraints raised their prices relative to their less constrained rivals.

Chevalier and Scharfstein use local-market pricing data from the supermarket industry to test their hypothesis that liquidity constraints cause firms to reduce their investment in market share. In one of their tests, average supermarket prices for several cities were regressed against a set of explanatory variables that include each city's sensitivity to oil price shocks as well as the importance of national chains in the local market.²⁶

In 1986, the price of oil fell by nearly 50%, inducing severe recessions in several states, including Texas, Louisiana, Oklahoma, Wyoming, and Alaska. Although grocers operating in these states experienced a negative shock, the impact was less severe for national chain stores, whose parents had operations in states relatively insensitive to the oil price spike. The national chain stores in these states could therefore afford to

²⁶ The authors use an index of grocery prices, which is a weighted average of prices for each city. The data were provided by the American Chamber of Commerce Researchers Association (ACCRA).

capture market share from their rivals by cutting prices deeply in recessions. Examining city-average prices for the six quarters spanning 1985:4–1987:1, the authors find that price declines are most severe in oil-sensitive cities containing a significant national supermarket chain presence. As they argue, the effect of price declines in these cities is quite large. For a given city in an “oil state,” an increase of one standard deviation in the fraction of stores owned by national chains from its mean of 0.35 to 0.58 decreases the expected percentage change in the local price index from -0.020 to -0.045 . Chevalier and Scharfstein also present evidence showing that firms that recently did a leveraged buyout increase prices more in severe declines than their less levered counterparts.

The city-level tests address the relation between a firm’s capital structure and its investment decisions, largely ignoring the role debt may play in a firm’s competitive response to its rivals in the market. Using firm-level pricing data from the first quarter of 1991 to the last quarter of 1992, Chevalier and Scharfstein explore how leverage impacts a firm’s pricing, paying particular attention to how the financial position of rival firms influences this decision. As in the city-level tests, whether a store was owned by a firm that undertook an LBO is used as a proxy for being subject to financial constraints. While an LBO dummy may be viewed as endogenous, it is important to remember that the LBO decision is made at the *company* (as opposed to the store) level, such that a given firm’s response (or that of its competitors) is not likely to have motivated the recapitalization. In order to test the hypothesis that more financially constrained firms raise prices compared to their less constrained competitors, and that more constrained rivals magnifies this effect, the authors run regressions of the form:

$$\begin{aligned} \Delta \text{Price} = & \alpha (\text{LBO}) + b (\text{LBO} \times \Delta \text{EMP}) \\ & + c (\text{OLBOSHARE}) + d (\text{OLBOSHARE} \times \Delta \text{EMP}) \\ & + e (\Delta \text{EMP}) + f (\Delta \text{WAGE}) + \varepsilon \end{aligned}$$

in which LBO represents a dummy if the parent company had undertaken a leveraged buyout, ΔEMP is the percentage change in employment in the city’s state during the period, OLBOSHARE is the share of stores in the local market owned by an LBO firm, and ΔWAGE is the percentage change in wages for workers in sales occupations. The dependent variable is the percentage change in price for a firm’s price index for a particular city.

Three main results may be gleaned from this regression. First, LBO firms charge higher prices, as indicated by a significantly positive coefficient on the LBO dummy. Since this may reflect increases in *costs* for LBO firms rather than markups, the fact that the coefficient on the $\text{LBO} \times \Delta \text{EMP}$ interaction term is negative and significant is important. When local markets suffer, as measured by negative employment changes, LBO firms raise prices more than their less financially constrained rivals, which is consistent with the idea that the higher prices are caused by financial constraints rather than higher costs. Also of interest is the coefficient on the local share of LBO firms, OLBOSHARE, which is positive and significant, indicating that leverage causes rivals to increase prices.

Furthermore, the interaction term is negative and significant, indicating that slow economic growth magnifies the effect. In a city with low employment growth of 0.5% (one standard deviation below the mean), an increase in OLBOSHARE by one standard deviation from the mean of 14.9 to 30.0% would lead the non-LBO firm to more than double its price increase from 1.4 to 2.9%.

Campello (2003) builds on Chevalier and Scharfstein's study, first asking "Are markups more countercyclical in highly leveraged industries?" and second, "Does a firm's capital structure affect its ability to build market share, so that competitive outcomes are indeed influenced by a firm's financing mix and the financial condition of its competitors?" While these questions are linked, the empirical approach taken by Campello is quite different, so we consider each question separately.

Campello evaluates Chevalier and Scharfstein's (1996) theory of markup (i.e., prices over marginal costs) countercyclicality, specifically the implication that the possibility of bankruptcy reduces the incentives of firms to invest in building market share in downturns. He starts by extending Bil's (1987) analysis by comparing the cyclicality of markups in industries with different leverage, finding *higher* markup cyclicality in highly leveraged industries.²⁷ Using data from 20 manufacturing industries segregated by two-digit SIC codes (codes 20–39), Campello runs industry-level (the "i" index refers to industries) regressions of the form:

$$\text{Markup}_{i,t} = \eta + \alpha(-\Delta \text{Log}(\text{GDP})_t) + \beta \text{Leverage}_{i,t-1} \\ + \lambda[\text{Leverage}_{i,t-1}x(-\Delta \text{Log}(\text{GDP})_t)] + \varepsilon_{i,t}$$

where GDP is the gross domestic product, and markup and leverage are measured as industry averages. Unlike Chevalier and Scharfstein's (1996) study however, in which the authors' empirical design sidestepped the problem of having to observe marginal costs,²⁸ Campello constructs a markup measure that incorporates prices, hourly wages, the overtime rate, the number of hours employed (both regular and overtime), the number of workers, and gross output.²⁹ Campello finds a significantly positive coefficient on the interaction between industry leverage and macroeconomic declines, concluding that "these estimates suggest that negative shocks to demand prompt firms to raise

²⁷ Bil's (1987) empirically documents that while marginal costs are "markedly procyclical," output prices are not as responsive to fluctuations in the health of the economy. The result is that price-cost margins ("markups") are highly *countercyclical*.

²⁸ Chevalier and Scharfstein note that price increases could arise from either markup or from increases in marginal costs. The empirical design focuses on price changes for both local and national supermarkets in both oil and nonoil states. If prices increase more dramatically for local chains in oil states (as the authors find), then either: (i) markups of local chains are higher than national chains in oil states, or (ii) costs increase for local chains relative to national chains *only in the oil states*, which the authors argue is very unlikely. See Section II of the paper for more details.

²⁹ To construct the markup series, Campello gathered industry price data from the Bureau of Labor Statistics (BLS) *Producer Price Indexes*. Data on the number of production workers, the weekly average hours, and the average hourly wage were obtained from the BLS *National Employment, Hours and Earnings*.

price-cost margins more (or cut them less) in industries with more externally financed competitors.” In response to a 1% decline in gross domestic product (GDP), Campello estimates that a hypothetical “all-debt” industry would experience markups of 42% more than a “zero-debt” industry.

Since Campello takes industry leverage as exogenous, the strength of his conclusions regarding leverage-induced markup countercyclicality depends on his ability to adequately control for the determinants of industry leverage. Specifically, suppose that two industries differ in their abilities to respond to macroeconomic shocks, perhaps because the more flexible industry can efficiently scale down production in the face of recession. Given this, it is likely that the firms in the flexible industry will carry more debt.

To address this potential endogeneity problem, Campello follows Sharpe (1994), splitting the sample based on whether an industry’s sales are sensitive to the business cycle. If cross-sectional differences in macroeconomic sensitivities drive Campello’s results, then the coefficient on the interaction term should not be significant for firms with low sales-to-GDP sensitivities, yet it is. A second possibility is that debt may be used to finance expansions, so that firms with high utilization rates needing to expand will issue debt when the economy grows.³⁰ For this reason, Campello explicitly includes lagged industry capacity utilization as a control, finding that the results are unchanged.³¹ Campello is careful to control for several other potential factors that potentially drive cross-sectional differences in industry debt ratios, including as controls energy prices (which may affect product costs), industry capacity, the sensitivities of each industry to the business cycle, and industry concentration (which may alter a firm’s ability to collude by manipulating prices). Campello argues that his set of controls is sufficient to suggest that the debt level itself, rather than an omitted determinant of the debt level, induces the markup countercyclicality he observes.

The second class of tests Campello runs is conducted at the firm level. Like the industry-level tests, Campello’s firm-level tests capitalize on the exogeneity of macroeconomic shocks and examine how the sensitivity of a firm’s performance to macroeconomic shocks is influenced by the firm’s debt ratio. The empirical methodology proceeds in essentially three steps. First, for each quarter from 1976:1–1996:4, he sorts all manufacturing firms (SIC codes 200–399) into quintiles ranked by book debt-to-long-term assets. Then, for the highest and lowest quintiles, he runs *cross-sectional regressions* of the following form during time t :

$$\begin{aligned} \Delta \text{Log}(\text{Sales})_{i,t} = & \eta + \alpha_K \Delta \text{Log}(\text{Sales})_{i,t-1} + \cdots + \alpha_K \Delta \text{Log}(\text{Sales})_{i,t-4} \\ & + B_K \Delta \text{Log}(\text{PPE})_{i,t-1} + \cdots + \beta_K \Delta \text{Log}(\text{PPE})_{i,t-4} \end{aligned}$$

³⁰ In the presence of scale economies, decreasing marginal costs may then lead to markdowns for such expanding firms. Therefore, debt (issued when the economy grows) may appear to increase markup countercyclicality (since marginal costs decline, reducing prices) if it is used to finance expansions, but not for the reason posited in Chevalier and Scharfstein (1996).

³¹ The other control variables are intended to address other potential sources of endogeneity from omitted variables. See Section III of Campello (2002) for more details.

$$\begin{aligned}
& + \Lambda_1 \text{Log(Assets)}_{i,t-1} + \dots + \Lambda_4 \text{Log(Assets)}_{i,t-4} \\
& + \delta \text{Leverage}_{i,t-1} + \varepsilon_{i,t}
\end{aligned}$$

saving the vector of sales-to-leverage sensitivities δ_t for both the high- and low-leverage quintiles. All variables are converted to deviations from their industry means. During the final step, Campello runs two time-series regressions (one for each leverage quintile) of the form:

$$\delta_t = \eta + \varphi_1 \Delta \text{Activity}_{t-1} + \dots + \varphi_4 \Delta \text{Activity}_{t-4} + \gamma \text{Trend}_t + \varepsilon_t$$

where Activity is one of several proxies for downward macroeconomic shocks. The primary question such a regression addresses is whether or not highly leveraged firms have sales-to-leverage sensitivities that are themselves more sensitive to economic downturns. While Campello finds that in high-debt industries none of the Δ Activity coefficients are significantly different from zero, the opposite is true in low-debt industries, where the same coefficients are significantly negative in all but one of the specifications. Importantly, the negative impact of debt on sales growth during recessions is limited to industries *in which a firm's rivals have low leverage*. For example, consider two otherwise identical firms operating in a low-leverage industry, except that one is 10% above while the other is 10% below the (low) industry average. After a 1% decline in GDP, the sales growth of the more indebted firm is predicted to be 1.3% lower than the more conservatively financed rival. Were this same test applied in a “high-debt” industry, no differences between the firms’ sales growths would be observed.

Both Campello’s industry and firm-level evidence can be interpreted as supportive of Chevalier and Scharfstein’s theory that cash shortfalls induced by external finance reduce a firm’s incentive to invest in market share. It may also be the case however, that debt reduces a firm’s ability (rather than willingness) to compete with opportunistic rivals. If less levered firms predate on their more levered rivals during downward demand shocks, then highly leveraged firms in low-debt industries would lose market share in precisely the way Campello documents. In this way, his firm-level tests fail to distinguish between Chevalier and Scharfstein’s theory of liquidity-induced underinvestment and Telser’s (1966) and Bolton and Scharfstein’s (1990) predation models.

Our preceding discussion indicates that macroeconomic changes provide an exogenous source of variation that allows researchers to examine the effect of leverage on competition. An alternative way to examine these issues is to examine how firms respond to exogenous shocks to their competitive environments. Khanna and Tice (2000) examine precisely this issue, studying the rapid nationwide expansion of the discount retailer Wal-Mart during 1975–1996. They focus on how characteristics such as debt, ownership, focus, and profitability lead incumbent firms to react differently to Wal-Mart’s expansion into their respective regions.

As in each of the studies we have considered so far, such an investigation requires a careful treatment of endogeneity. In particular, since Wal-Mart’s entry into a particular market may be driven by the collective inabilities of incumbents to respond, it may be difficult to infer cause and effect between incumbent characteristics and competitive

responses. The concern is that perhaps Wal-Mart chooses to expand into regions with weak competitors and that these firms (perhaps because of a history of poor performance) may have high leverage. While it certainly would not be surprising to find that highly leveraged firms respond to Wal-Mart's entry less aggressively, it may be impossible to tell whether debt itself inhibits the incumbent's response, or whether debt is simply correlated with other characteristics that render incumbents less likely to respond aggressively.

Khanna and Tice convincingly argue that this is *not* the case. Wal-Mart's expansion decisions appear to be driven by its own distributional efficiencies rather than by characteristics of its potential competitors. The observation that incumbent characteristics play only "a relatively minor role" in the expansion decisions allows Khanna and Tice to analyze the effects of capital structure and other incumbent firm characteristics on the reactions to entry by Wal-Mart.

The main classes of tests are variations of an ordered probit in which incumbent actions are ranked by the degree of response aggressiveness to Wal-Mart. The dependent variable is the firm's response, ordered from most aggressive (adding stores, which is assigned a value of +1) to least aggressive (reducing the number of stores, assigned a value of -1). Although Khanna and Tice analyze the impact of many firm and market characteristics, we focus primarily on marginal effects of capital structure on the incumbent responses. When the sample is restricted to public incumbent firms, high debt-to-asset ratios are associated with less aggressive capital investments, as measured by expansion and retrenchment decisions. In particular, when all controls are evaluated at their mean values, an increase in the debt ratio of 10% decreases the probability of expansion by 2.7% and increases the probability of retrenchment by 3.5%.³²

Khanna and Tice also study whether or not the incumbent had undergone an LBO influences its response to Wal-Mart. Interestingly, they find that LBO firms mount *more* aggressive responses, which contrasts with the Chevalier evidence we described earlier. Khanna and Tice suggest that although this evidence may indicate that "LBO decisions are different from leverage decisions," they encourage a cautious interpretation due to the small number of LBOs in their sample and a potential endogeneity problem. Specifically, it might be the case that firms with more aggressive management were more likely to undertake LBOs.

Khanna and Tice (2005) expand on their earlier work in which they investigate Wal-Mart's decision to enter a particular market by considering Wal-Mart's location *within* that market. Interestingly, Wal-Mart places its stores closer to rival stores that are less efficient and more highly leveraged, consistent with the idea that leverage weakens a firm's ability to withstand competition.

In other results, Khanna and Tice (2005) present evidence suggesting predation on highly leveraged firms by more conservatively financed rivals. During the period

³² In addition, the authors find that firms more "focused" on the discount retailing business (as measured by discount retail sales divided by total firm sales), larger firms, and more profitable firms compete more aggressively with Wal-Mart.

1982–1995, they study market-level average prices in various metropolitan areas and consider whether prices charged by discount retailers were different between recessions and normal times. The authors find that higher industry leverage (averaged across all discounters within a given market) implies higher average prices during normal times, but lower prices during recessions. While this evidence suggests that leverage softens competition during downturns, even more compelling is that the price difference between normal times and recessions was greatest in markets with high-debt *dispersion*, suggesting predation as the mechanism driving the observed procyclicality in prices. Consistent with the authors' interpretation of predation, in markets with homogeneous capital structures, prices were no lower in recessions than in normal times.

Further evidence in support of a predation hypothesis comes from regressions examining the sensitivity of exit to price declines. Within the predation framework, price cuts during recessions should drive out financially troubled rivals, a result confirmed in the empirical analysis. In markets where firms have similar capital structures, the extent to which firms exit is not related to price cuts during recessions (even in markets where most firms are highly leveraged). However, in markets where only *some* firms are financially distressed, price cuts increase the probability that a highly leveraged firm is forced out of the market during downturns. Combining this result with those studying the procyclicality of prices between markets with different debt ratio dispersions, Khanna and Tice make a convincing case that predation is likely to be an important influence on prices and survival.

4. Conclusion

The studies surveyed in this chapter indicate that a firm's capital structure has a nontrivial effect on its relationships with competitors and nonfinancial stakeholders such as its workers, suppliers, and customers. Generally, the evidence from this literature suggests that debt magnifies the effects of economic downturns and predation, effectively making bad situations even worse for highly leveraged firms. During a recession or downward shock to profitability, a highly leveraged firm can expect to disproportionately lose market share and sales (Opler and Titman, 1994; Zingales, 1998; Campello, 2003), to lay off workers and pay lower wages (Sharpe, 1994; Hanka 1998), and to reduce investment to conserve cash (Chevalier and Scharfstein, 1995; Khanna and Tice, 2000). Debt also appears to render firms more susceptible to predation, as directly suggested by Chevalier's (1995a, 1995b) analysis of supermarket prices and indicated as a possibility in Zingales's (1998) study of deregulation in the trucking industry.

Perhaps just as interesting is what *cannot* be concluded about capital structure's effects on a firm's competitive strategy and relationship with its stakeholders. Since debt ratios are chosen by the firm, cross-sectional differences in capital structure result from cross-sectional differences in firm-level explanatory variables (e.g., the degree to which a firm's customers will be harmed in the event of liquidation). Since many of the determinants of capital structure are either unobservable or do not have good proxies, it is often

impossible to distinguish between the direct effect of debt on firm performance and that of an omitted variable(s) that partially determines the debt ratio.

For example, Sharpe (1994) finds that the employment choices of firms with higher leverage ratios are more sensitive to the business cycle. He argues that this finding is consistent with both Titman (1984), whereby firms with less firm-specific human capital (which is presumably destroyed during liquidation) choose higher leverage ratios, as well as with Jensen (1988, 1989), in which debt forces managers to lay off workers even if psychologically costly. A third possibility is that firms simply differ in how easily they can adjust the sizes of their labor forces and that these differences influence debt choices. While it would be interesting to understand whether highly leveraged firms lay off more workers in downturns because of differences in firm-specific human capital, agency problems, or cost structure, in most studies such precision is not possible. Further research will hopefully produce clearer answers to some of these questions.

Other promising areas of research include a consideration of the interaction between corporate governance and the impacts of leverage on a firm's competitive strategy. For example, continuing discussion of Sharpe's (1994) study, it would be interesting to understand whether the debt appears to provide more or less discipline between firms that differ in the strength of their corporate governance (e.g., independent corporate versus insider-dominated boards). Since strict corporate governance and leverage may both discipline management, interesting relationships may arise between governance and the effects of leverage on a firm's employment policy.

Also relatively unexplored are the implications for asset pricing that may arise from the impact of capital structure on product market competition. For example, if financial constraints make a firm more vulnerable to predation, and if predation is more likely to occur in economic downturns, then financially constrained firms will have higher betas and hence, higher costs of capital. However, as Chevalier (1995b) shows, this may not hold in every instance, since predation appears to require both a financially vulnerable victim and a well-financed competitor. Do highly leverage firms with deep-pocketed rivals face higher costs of finance than similarly leveraged firms in industries where predation is more difficult?

But perhaps the most important question is whether the effects of capital structure on a firm's relationships with its stakeholders and competitors are significant enough to play an important role in how firms actually determine their capital structures. For example, when a firm undertakes an LBO, is the anticipated response of competitors a first-order effect? Are the concessions made by firms whose customers depend on its long-term viability large enough to merit serious consideration by the firm? These issues were considered by Titman and Wessels (1988) and others in research that predates work examining the effect of debt on strategic choices, which is the focus of this chapter. Perhaps the next step in this research is to determine how the insights of this more recent literature can be used to refine these earlier cross-sectional tests. While we have anecdotal evidence to suggest that these stakeholder issues are serious concerns of management, we have little direct evidence describing how capital structure decisions explicitly take these issues into account.

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