Cross-Country Variations in Capital Structures: The Role of Bankruptcy Codes[1]

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Abstract

We investigate the impact of bankruptcy codes on firms' capital-structure choices. We develop a theoretical model to identify how firm characteristics may interact with the bankruptcy code in determining optimal capital structures. A novel and sharp empirical implication emerges from this model: that the *difference* in leverage choices under a relatively equity-friendly bankruptcy code (such as the US's) and one that is relatively more debt-friendly (such as the UK's) should be a *decreasing* function of the anticipated liquidation value of the firm's assets. Using data on the US and the UK over the period 1990 to 2002, we subject this prediction to both parametric and non-parametric tests, using different proxies for liquidation values and different measures of leverage. In support for the theory, we find that our proxies for liquidation value are both statistically *and* economically significant in explaining leverage differences across the two countries. In contrast, many of the other factors that are known to affect within-country leverage (e.g., size) cannot explain differences in leverage across countries.

1 Introduction

A central challenge facing financial economics today is integrating finance theory with legal frameworks so that cross-country comparisons of financial data is facilitated. This paper is concerned with one such question: the impact of bankruptcy codes on firms' capital structures.

Even a casual glance at bankruptcy codes across countries indicates a remarkable degree of divergence in the rights accorded to claimholders in the event of default on debt contracts. In some countries, the code overwhelmingly favors debtholders, particularly secured debtholders. To quote Davydenko and Franks (2008) on the UK code:

> In many circumstances, a secured creditor [in the UK] can liquidate the company and realize the collateral without heeding the interests of other claimants, and his actions cannot be challenged in the courts.

In other countries, equityholders are afforded substantial rights. Perhaps the most prominent example of this is Chapter 11 of the US code which allows (even a solvent) firm to suspend interest and principal payments on debt for at least 120 days during which equityholders have the exclusive right to come up with a proposal for reorganization.

Except in an idealized Coasian world, providing control rights to parties who hold non-linear claims on the firm will result in at least some inefficiencies. Debtholders with their concave claims on firm value may force "too many" liquidations, i.e., they may liquidate firms which are worth more as going concerns. Conversely, equityholders with their convex claims may induce "too many" continuations, i.e., they may continue some firms when there is greater value from termination. In either case, deadweight losses result that represent costs of financial distress.

As a leading determinant of these deadweight costs, the bankruptcy code should have a direct effect on the capital structure choices of firms. From an empirical standpoint, the question is *how* this effect operates, and what it implies for comparing capital structures across bankruptcy codes. Existing theory does not provide a clear pointer. While the *normative* question of designing optimal bankruptcy codes has been the subject of a number of papers (see below), the *positive* question of how bankruptcy codes affect capital structures does not appear to have been investigated in the theoretical literature.

The empirical evidence too is limited. A cross-country study by Rajan and Zingales (1995) finds that at an aggregate level, firms in Germany and the UK—two countries with debt-friendly codes relative to the US—are much less leveraged than US firms. However, the study finds that other G-7 countries too use more leverage than the UK and Germany, and as much or more leverage than the US, though their bankruptcy codes are not as equity-friendly as the US code. In particular, "hard" bankruptcy codes (ones that favor debtholders) do not by themselves lead to a lower use of debt.

To undertake meaningful empirical analysis, it is necessary to have an idea of *how* bankruptcy codes might affect capital structure choices, in particular, how firm characteristics may interact with the bankruptcy code in this process.[1] We develop a simple theoretical model for this purpose. Our model utilises the usual static trade-off between tax benefits and bankruptcy costs, but has the feature that bankruptcy costs are endogenously determined as a function of the bankruptcy code in place. Section 2 relates our model to the literature.

A sharp and novel implication emerges from the model: that the difference in leverage chosen under a relatively equity-friendly code (such as the US's) and that under one that is more debt-friendly (such as the UK's) should, ceteris paribus, be a decreasing function of the anticipated liquidation value of the firm. This means any comparison of capital structures across bankruptcy codes must include a non-trivial role for the liquidation value of the firms' assets.

A simple and compelling intuition underlies this result. When firms in our model are in default on debt payments, control rights and continuation decisions are regulated by the bankruptcy code in place. The code may transfer control rights to debtholders or allow them to remain with equityholders. The *relative* debt-friendliness of a code is parametrized by the likelihood with which control is transferred to debtholders.

The non-linearity of debt and equity claims leads, in general, to inefficiencies in financial distress (too many liquidations by debtholders, too many continuations by equityholders), and so to deadweight losses.[2] Equityholders determine the optimal level of debt to raise initially by trading off these deadweight losses against the tax benefits of debt. The capital structure is the firm's means of "unwinding" the negative effects of distress: if the deadweight losses from distress are high, the firm acts to reduce these losses by carrying less debt.

Now, intuitively speaking, a low liquidation value makes continuation more likely to be optimal. This reduces the severity of deadweight losses from excessive continuations but increases the severity of deadweight losses from excessive liquidations. As a consequence, a relatively equity-friendly system will use more debt than one that is more debt-friendly. But as liquidation values increase, continuation becomes progressively less likely to be optimal; that is, excessive continuations begin to pose relatively more of a problem and excessive liquidations relatively less of one. This leads to a declining difference in leverage between the relatively equity-friendly and relatively debt-friendly codes. At high liquidation values, the difference eventually turns negative; liquidation is now more likely to be optimal, leading to lower deadweight losses and higher lever-

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[1] One can always interact country dummies in a regression with firm-specific characteristics, but without a theory it is difficult to know what to expect of the coefficients. As Rajan and Zingales (1995) note in their concluding remarks: "[A] better understanding of institutions can provide us enough inter-country variation so as to enable us to identify the fundamental determinants of capital structure."

[2] To be sure, renegotiations outside the code may eliminate some of these inefficiencies. We assume only that there are frictions that result in some remaining inefficiency. Theoretical models exist that validate such an assumption in related settings (e.g., Gertner and Scharfstein (1991) or Dewatripont and Tirole (1994)).

age under the relatively debt-friendly code. This monotone behavior of the difference in leverage as liquidation values increase forms the hypothesis we test in the remainder of the paper.

We examine a large set of firms from the US and UK (viz., all US and UK firms covered by Worldscope from 1990 to 2002 except financial institutions and utilities). The US and the UK suggest themselves as natural candidates for test of our theory. Among other things, both have well-developed equity markets; banks in neither country take stakes in companies to whom they lend; and the difference between their bankruptcy codes is sharp and maps well onto our theoretical structure with the US code being more equity-friendly than the UK code.[3] Under our theory, the difference in leverage between US and UK firms should be decreasing in liquidation value.

We measure firm leverage in two alternative ways. The first is standard book leverage: the sum of short-term debt, short-term portion of long-term debt and long-term debt, divided by total assets. The other is to treat cash as negative debt and look at "net leverage," leverage net of cash and cash equivalents. This correction is of obvious importance if firms react to anticipated distress costs by managing cash reserves rather than (or in addition to) altering the choice of direct leverage.

We proxy for anticipated liquidation value of the firm's assets in two (inverse) ways. One is through *asset-specificity*, a notion proposed by Williamson (1988) and Shleifer and Vishny (1992). The idea is that firms whose assets are *specific* (for example, in the form of machinery and equipment that cannot be readily redeployed outside the industry) are likely to experience lower liquidation values because they may suffer from "fire sale" discounts in auctions for asset sales, particularly when other firms in the industry are also in distress. The second proxy we employ is the fraction of the firm's assets that are *intangibles*. The motivation here is just that intangible assets (such as goodwill) of a firm are not easily transferable to other firms.[4] Both proxies are *inversely* related to liquidation values: a higher degree of either lowers the liquidation value of the firm. Thus, recast in these terms, the hypothesis we test is that the difference in leverage between US and UK firms should be an increasing function of the proxy.

Our first series of tests utilizes regression analysis. We pool the cross-section and the time-

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[3]An extended comment is important here. It has been argued by some authors (e.g., Skeel (2003)) that the application of the US Chapter 11 bankruptcy code has been significantly less equity-friendly since 2001 than in the past. It is important to note that this does not affect the empirical basis of our work. First, our data relates to the years 1990-2002, a period where the US code was widely acknowledged as equity-friendly. Second, as long as the US code remains *relatively* more equity-friendly than the UK code, this is all we need.

[4]While this proxy is also theoretically appealing, empirical support for it as a determinant of liquidation costs is less robust relative to that for asset-specificity (Acharya, Bharath and Srinivasan, 2007). A comparison of intangibles across countries is also made more difficult by differences in accounting practices such as goodwill-accounting. Relatively, the measurement of specific assets in the form of machinery and equipment is less subject to such differences. Nonetheless, we employ both these proxies in our empirical work.

series of leverage levels of firms in the US and the UK, and look to explain the cross-sectional variation in leverage with an interaction effect between the bankruptcy code (country dummy) and our proxy for liquidation values (asset-specificity/intangibles). We test the theoretical prediction is that the coefficient on the liquidation proxy should be higher for the US than the UK using both panel estimation and the Fama-MacBeth (1973) methodology. Throughout, we control for the other firm characteristics (size, profitability, book-to-market, and industry) that are known to affect leverage, allowing for effects of these variables to also vary across the two countries.

We find support for the theory and more strongly so when leverage is measured net of cash. The difference in the coefficients on the proxies is positive as the theory predicts and is statistically significant. Of equal importance, the difference is also economically significant in explaining leverage differences between the US and the UK.[5] In contrast to this role of liquidation values, we find that the other factors known to affect firm leverage within a country—size, profitability and Q—cannot explain leverage differences across the two countries. The differences in the US and UK coefficients of these factors are often not statistically significant, and, more problematically, the sign of the difference flips around being positive sometimes and negative sometimes.

We supplement our regression results with a series of non-parametric tests that do not pre-suppose any functional-form relationship between the variables. We use a bucketing approach in which we pool all the firms in the sample in a given year, and sort the pool into five quintiles based on the proxy, with Quintile 5 representing the highest value of the proxy and Quintile 1 the lowest. Each quintile is then divided into US and UK firms. We use two measures of leverage for each quintile: the median debt-to-assets and the mean debt-to-assets for firms in that quintile.

For each quintile, we compute the difference between the leverages of US and UK firms in that quintile. Call these differences $d_1, \ldots, d_5$. Then, our theory predicts that we should have $d_k - d_n > 0$ whenever $k > n$. This "difference of differences" test is met comfortably, with somewhat stronger results for asset-specificity than intangibles. As with the regression analysis, we find that the theory is even more strongly supported if we measure leverage net of cash and cash equivalents.

Finally, we address the concern that factors other than our proxy may be driving the results by expanding the test to control for these factors. To this end, we use the procedures suggested by Heckman, Ichimura, and Todd (1997, 1998) to match each US firm in a given year to firms in the UK in that year. (We employ both matching algorithms described in Heckman, et al.) The matching processes utilize several factors including profitability, market-to-book and size, in addition to the proxy for liquidation values. Once the matching is done, the difference in leverage

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[5]In particular, a one standard deviation shock to asset specificity (intangibles) to a firm in the US and the UK is of the order of 25% (16%). All else being equal, the estimated coefficients in Table 2, Column 4 (8) imply a differential effect on net leverage between the US and the UK of 2.15% (5.02%), which is roughly the difference in median net leverage between the two countries.

is computed between the US firm and its matched UK firms. Sorting the US firms into quintiles, we perform all the difference-of-differences tests again. We continue to find strong support for the theory regardless of the measure of leverage, the proxy, or the matching algorithm. Figure 1 summarizes this result by presenting a time-series plot of the difference of differences (between Quintiles 5 and 1).[6]

Thus, the regression and non-parametric results are both supportive of a role of bankruptcy codes and induced liquidation costs in driving cross-country differences in leverage. However, we acknowledge that further empirical work is warranted to understand the issue fully. For instance, while our liquidation cost proxies explain the cross-country differences well, they do not necessarily imply lower leverage. On the one hand, our theoretical analysis suggests a non-linear relationship between leverage and liquidation costs which is worthy of separate enquiry. On the other hand, static models of capital structure have been found inadequate on a number of dimensions and dynamic structural analysis may help shed light on the exact role of liquidation costs.

The remainder of this paper is organized as follows. Section 2 indicates the related literature. Sections 3 and 4 present our theoretical model and the main theoretical result. Section 5 presents the results of our empirical analysis. Section 6 concludes. The appendix contains the proof of the paper's main theoretical result.

2 The Related Literature

On the theoretical front, a number of papers have examined the implications of bankruptcy codes on various corporate decisions (an incomplete list would include White (1994), Cornelli and Felli (1997), Povel (1999), and Bebchuk (2002)), but no paper has, to our knowledge, looked at the capital structure implications of bankruptcy codes and empirically tested these implications.[7] Three papers which examine related *normative* issues are Dewatripont and Tirole (1994), von Thadden, Berglof and Roland (2003), and Berkovitch and Israel (1999).

Dewatripont and Tirole (1994) study a model in which the capital structure of the firm plays a key role in resolving managerial moral hazard. There is no specific reference to a bankruptcy code in their paper. Rather, securities in their model play a dual role, not only conferring income streams on their holders, but also stipulating contingent control rights. (It is assumed that control rights may be transferred as stipulated.) For example, the optimal outcome in their model involves, under some assumptions, the transfer of control rights to debt holders following poor performance and equity holders following good performance.

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[6]Data for the figure are from Panel C, Table 6 of Section 5.2.

[7]We note that the essence of the link between bankruptcy codes and corporate decisions is contained in the seminal work of Jensen and Meckling (1976) on agency conflicts between managers, shareholders and creditors.

In our model too, securities confer income streams on their holders and the capital structure is used to unwind agency costs. However, a key difference is that control rights in our model are regulated by the bankruptcy code; thus, agency costs too depend on the bankruptcy code under which the firm operates. It is this feature that enables us to make predictions about optimal capital structures under different bankruptcy codes. In our minds, there are two aspects to the bankruptcy code. One is to determine who gets to make decisions concerning continuation or liquidation of the firm (or, more generally, to raise financing to continue operations, or to close down the firm). The other is to provide a framework (and a threat-point) for negotiation over future cash-flow rights. We focus on the first point. There is no renegotiation of promised cash flows in our paper, consistent with renegotiation with dispersed public creditors being hard.

In contrast, existing literature has primarily focused on the second issue. For instance, Berglöf and von Thadden (1994) on bargaining over future cash flows in the event of a default in a model that rationalizes two empirical observations: that firms tend to have both short-term and long-term debt, and that short-term debt tends to be senior to long-term debt. Another example is Davydenko and Strebulaev (2007) who study a model in which there is a deadweight cost of liquidation, and equity- and debt-holders negotiate over the savings in deadweight costs from not liquidating the firm.

Extending this second strand of literature, Berglöf, Roland and von Thadden (2003) integrate the problem of designing corporate bankruptcy rules into a theory of optimal debt structure. Their focus is on employing multiple debtholders and designing the security rights and bankruptcy rules in an optimal fashion to maximize firm-value. In this sense, their goal too is normative. In contrast, our objective is explicitly positive and takes the allocation of control rights in bankruptcy as exogenously specified to determine capital structure effects of the bankruptcy code.

Berkovitch and Israel (1999) examine a complementary question to ours, viz., the design of the *optimal* bankruptcy code. They show that the optimal code for a country depends on a combination of whether the debt in that country is mostly bank- or market-based, and the quality of information acquisition. They identify under what conditions a creditor chapter alone is optimal and when it should be combined with a debtor chapter.

Our model presumes inefficiency in outcomes in bankruptcy. Gertner and Scharfstein (1991) study the possible non-alignment of managerial and creditor interests with firm-value maximization, particularly in bankruptcy. Coordination problems among public debtholders in their model result in inefficiencies in the workout process. Berkovitch and Kim (1990) also analyze how the nature of leverage-induced conflicts of interest (underinvestment and overinvestment) depends upon the specific structure of firm's leverage. They argue that firms with growth options may retain the flexibility of issuing additional senior debt in order to reduce the underinvestment problem. Given lack of data on the exact structure of leverage in the cross-country context, we develop a theory aimed at deriving sharp, testable implications for the level of total leverage of

firms.

On the empirical side, there is, to our knowledge, no paper that has tested the interaction of the creditor-friendliness of a code with the aniticipated liquidation costs in explaining the cross-section of leverage patterns across firms in different countries. An exception is Giannetti (2003) which examines the effect of creditor rights in seven European countries focusing on *unlisted* firms and finds that firms in countries whose bankruptcy codes favor creditor rights can obtain loans more easily against intangible assets.

There are a number of other cross-country papers, of which we already mentioned Rajan and Zingales (1995). Franks, Nyborg, and Torous (1996) present a detailed comparison of US, UK, and German bankruptcy systems along several dimensions. They note that the equity-friendly nature of the US code gives managers a strong incentive to over-invest and leads to ex-post violations of the absolute priority rule. In contrast, absolute priority is generally adhered to in the debt-friendly UK code, but at the cost of premature liquidations and underinvestment.

In other empirical work, Claessens and Klapper (2005) document the usage of bankruptcy in 35 countries over the period 1990–1999, and find that stronger creditor rights are generally associated with greater use of bankruptcy. Antoniou, Guney and Paudyal (2002) investigate the determinants of leverage for French, German and British firms using panel data with a focus on the convergence of capital structure to a target maturity structure. A historical perspective on the evolution of the US and UK codes is provided by Franks and Sussman (2005), while Davydenko and Franks (2008) analyze the effect of bankruptcy codes in France, Germany and the UK on the recovery rates and collateral requirements of bank-based contracts.

3 The Theory

We consider a firm operating a project with risky cash flows and financed by equity and debt. The firm's realized cash flow provides it both immediate cash (to service its debt) and information about continuation cash flows/liquidation values that may be expected from the project. If the cash flows generated by the project are insufficient to meet debt payments, the firm is in distress. We assume that debt is issued to dispersed, public bondholders and is thereby non-renegotiable. Hence, control rights and continuation decisions in distress are regulated by the bankruptcy code in place. As long as full renegotiation is not possible or renegotiation outcomes are influenced by the nature of the bankruptcy code (as a reservation option for parties involved), the overall thrust of our results survives. The bankruptcy code may transfer control of the project to debtholders or it may allow control to remain with equityholders. All agents are risk-neutral and the risk-free rate of interest in the model is normalized to zero. A detailed description of the model follows.

Figure 2 summarizes the time line and key aspects of the model. There are three dates,

$t = 0, 1, 2$. On date 0, the firm needs to make an investment of an amount I to undertake a positive net present-value project. The firm chooses the mix of debt and equity in its capital structure to fund this investment. The debt matures on date 1. Date 2 represents a summary of the continuation possibilities for the firm after maturity of the debt. If the firm has inadequate cash flows to meet debt service requirements on date 1, the bankruptcy code comes into play. Note that we do not model the optimal maturity structure of the firm's debt; rather, our focus is on the equityholders' optimal choice of the face value F of debt.

We elaborate on the model in two steps. First, we discuss the structure of cash flows on dates 1 and 2. Then, we discuss the role of the bankruptcy code in determining how control rights beyond date 1 are allocated.

Cash Flows & Liquidation Values

The firm generates random cash flows at date 1 and—in the event it is not terminated—also at date 2. The date 1 cash flow, denoted x, is distributed uniformly on an interval $[0, H]$:

$$x \sim U[0, H]. \tag{1}$$

After observing x, the decision on liquidation/continuation is taken which determines date 2 cash flows. Both continuation and liquidation values depend on x. Before we describe these cash flows, it is useful to recount what we would like them to satisfy. For inefficiency in either direction to be possible, we must have at least two possible continuation values, one of which is superior to liquidation and one of which is inferior. Second, for the "optionality" (i.e., the non-linearity) in the debtholders' and equityholders' claims to have a non-trivial effect on their continuation/liquidation decisions, there must be uncertainty regarding continuation cash flows.

To capture these requirements in a simple but effective manner, we adopt the following structure. If the firm is continued beyond period 1, the continuation cash flow y has the distribution

$$y = \begin{cases} Lx, & \text{with prob } q \\ 0, & \text{with prob } 1 - q \end{cases} \tag{2}$$

where $L \geq 2$. The value of the probability q is unknown at date 0, but it is also revealed at date 1 *before* continuation decisions are made. The ex-ante distribution of q is given by

$$q = \begin{cases} \overline{q}, & \text{with prob } 1/2 \\ \underline{q}, & \text{with prob } 1/2 \end{cases} \tag{3}$$

where $0 < \underline{q} < 1/2 < \overline{q} < 1$. This means there are two possible expected continuation values, $\overline{q}Lx$ and $\underline{q}Lx$.

If the firm is liquidated, it realizes a value αx. The parameter α governs the liquidation value of the firm's assets. We assume that

$$\underline{q}L < \alpha < \overline{q}L. \tag{4}$$

Thus, given any x, it is uniquely ex-post efficient to continue the firm if $q = \overline{q}$ and to liquidate the firm if $q = \underline{q}$. In particular, the degree of inefficiency from

- continuing a firm when $q = \underline{q}$ is measured by $(\alpha - \underline{q}L)$, and

- liquidating a firm when $q = \overline{q}L$ is measured by $(\overline{q}L - \alpha)$.

As we show below, the optimal debt structures and firm values under the two codes are intimately related to these measures. Modeling liquidation value of the assets directly is a convenient reduced-form to derive analytical results in what follows. In Appendix A, we provide a possible underlying structure that justifies our assumptions. In particular, we assume that firm's assets are a mix of non-specific assets, that can be liquidated costlessly, and specific assets, whose liquidation entails deadweight costs for the firm. Hence, the parameter α can be considered a metaphor for the degree of asset-specificity of the firm's assets.

The Bankruptcy Code and Control Rights

All payments to debtholders are financed out of firm cash-flows. If $x \geq F$ on date 1, the debt is paid off and the firm becomes an all equity firm. The excess cash flow $(x - F)$, net of taxes (see below), goes to equityholders. For $x < F$, the firm cannot meet its contractual payment fully and is in financial distress or "default." It pays the available amount x to debtholders and is in arrears for the remaining amount $(F - x)$; debtholders get first claim on any further cash flows until they have been fully paid off.

Further cash flows depend on whether the firm is continued or liquidated at this point. The bankruptcy code in place determines who gets to make this decision. With probability $\pi \in [0, 1]$, the code transfers control to debtholders; with probability $1 - \pi$, control remains with equityholders. The number π is exogenous and parametrizes the relative debt-friendliness of the code; the higher is π, the more the code favors debtholders. For example, $\pi = 1$ corresponds to a perfectly debt-friendly code: control is transferred to creditors with certainty in distress.

Finally, we denote by τ the tax rate of the firm. Taxes are paid on gross cash flows, but debt provides a tax shield to the firm. That is, at date 1, the firm pays taxes only if $x \geq F$;

for $x < F$, there are no taxes at date 1. As is common in corporate finance models, we assume the tax shield is based on the face value of debt, so the tax paid at date 1 is $\tau(x - F)^+$. For simplicity, we assume that there are no taxes to be paid at date 2. This simplifies notation and makes the presentation cleaner. However, this assumption is not necessary for our results. It is easy to show that our results—in particular, the central result, Proposition 1—are unaffected if the firm must pay taxes at date 2 when it is not in distress.

A parenthetical comment is relevant here. The combination of control rights and the non-linear payoffs of the claimholders together generate inefficiencies in our model (too many liquidations when control rights are assigned to debtholders, too many continuations when they are assigned to equityholders). Renegotiation between claimholders may be able to eliminate some of these inefficiencies. We do not model renegotiation between the claimholders in this paper, but it is easy to see that our results remain valid as long as there are frictions or costs that result in *some* remaining inefficiency. Dewatripont and Tirole (1994) provide a theoretical model of such frictions; see also Gertner and Scharfstein (1991) where coordination problems among public debtholders result in inefficiencies in the workout process.

The Choice of Leverage

Debt provides a tax shield but creates the prospect of distress and inefficient continuations. Debtholders with their concave payoffs may liquidate firms that are worth more as going concerns. Equityholders with their convex claims may continue firms when there is more value in liquidation. There are deadweight losses that result in either case. Equityholders trade-off these deadweight losses against the tax benefits of debt in arriving at the optimal level of debt to raise initially.[8]

Let $F_\pi^*(\alpha)$ denote the optimal level of debt chosen given the liquidation-value parameter α and a bankruptcy code of debt-friendliness π. Our objective is to characterize the dependence of F^* on π and α. We turn to this now.

4   The Main Result

Our main theoretical result, derived under some mild restrictions on parameter values, is Proposition 1. In words, the proposition says that

- for low liquidation values α, a relatively equity-friendly code involves a greater use of debt

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[8]Miller (1977) questions whether debt has tax benefits once personal taxes are included in the analysis. We do not model personal taxes in this paper, but note that other authors, such as DeAngelo and Masulis (1980) have provided arguments why even in the presence of personal taxes, there is still a tax-shield effect. Our model only needs that some tax benefit from debt exist.

than a relatively debt-friendly one, but at high liquidation values, the reverse is true; and

- the *difference* in debt levels between the relatively equity-friendly code and the relatively debt-friendly one decreases as liquidation value increases.

The second result forms the basis of our empirical work later in the paper.

Proposition 1 *Let $\pi_1 < \pi_2$. There is $\alpha^* \in (\underline{q}L, \overline{q}L)$ such that*

1. $F^*_{\pi_1}(\alpha) > F^*_{\pi_2}(\alpha)$ *if $\alpha < \alpha^*$.*

2. $F^*_{\pi_1}(\alpha) < F^*_{\pi_2}(\alpha)$ *if $\alpha > \alpha^*$.*

Further, $[F^*_{\pi_1}(\alpha) - F^*_{\pi_2}(\alpha)]$ is strictly decreasing in α.

The Proof of Proposition 1

The intuition behind Proposition 1 was outlined in the Introduction. A sketch of the proof of the result is presented in Appendix B; complete details are available upon request.

5 Empirical Analysis

Our theoretical model predicts that, ceteris paribus, the difference in leverage observed under a relatively equity-friendly code and that observed under a more debt-friendly one should decrease in liquidation values. How well does this conform to patterns of leverage seen in the data? The remainder of the paper addresses this question.

The obvious candidate countries for testing this hypothesis are the US and the UK. There are important similarities that make the comparison meaningful. Both have well-developed and well-functioning equity markets; in both countries, banks do not take equity stakes in firms to whom they lend. And, of course, one bankruptcy code (the UK's) is relatively more debt-friendly than the other (the US').[9]

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[9]As noted in the Introduction, Skeel (2003) and others have argued that since 2001, the application of the US code has become significantly more debt-friendly than in past years. The Bankruptcy Reform Act of 2005 may have further hastened this movement. In the meanwhile, changes in the UK code implemented in 2004 have made that code less debt friendly than in the past. All of this means that the difference between the two codes may be narrowing. However, these changes largely occur after the period covered by our sample, which is 1990-2002. If the differences in the code continues to narrow and the codes eventually resemble each other, our theory predicts that there should be no observed difference in leverage across the two codes attributable to liquidation values.

Using a large database of firms from these countries, we subject the hypothesis to a substantial number of tests. We use multiple measures of leverage, different proxies for measuring liquidation value, and, most importantly, both non-parametric and regression-based econometric approaches. Further, within each approach, we examine the impact of treating cash as negative debt in computing leverage, and of controlling for other factors (size, book-to-market, profitability and industry) that are known to affect leverage.

Our principal empirical finding is simply stated: Across the tests, and for each measure of leverage and each proxy for liquidation value, there is support in the data for our model's main prediction. This support gets stronger when cash is treated as negative debt.

A detailed description follows. The regression results are described first in Section 5.1 and the non-parametric tests are the subject of Section 5.2. Some preliminaries first.

The Data Set   We look at all firms in the US and UK covered by Worldscope from 1990 to 2002 except financial institutions and utilities. This results in around 1,100 firms a year in the UK and over 4,000 firms a year in the US. The exact construction of variables employed in our empirical work is contained in Appendix C.

Panel A of Table 1 provides a summary characteristics of our overall sample. In general, these characteristics are similar to those reported in Rajan and Zingales (1995). For example, the difference in the mean (median) Debt to Book Assets between the US and the UK is about $+4.5\%$ ($+4\%$) in our data set; and the aggregate Debt to Book Assets, which is the assets-weighted average of the ratio, is greater for the US by about 13%. These numbers are comparable to those reported in Rajan and Zingales (and, in fact, unreported numbers for 1991, the year for which Rajan and Zingales report their statistics, are even closer). Moreover, we find that these differences in leverage between the US and the UK are quite stable in the time-series during the period 1990 to 2002, with the sample mean (median) Debt to Book Assets being 22.17% (19.68%) for the US and 17.62% (15.76%) for the UK. It is interesting to note though that when debt is calculated as net of cash, the leverage numbers in the UK are not that different on average from those in the US. Overall, the result that the average leverage is higher in the US than in the UK appears to be driven by large firms in the US (as evidenced in the comparison of size-weighted averages). We will show below, however, that there are economically important differences in the cross-sectional patterns of leverage in the two countries.

Measuring Firm Leverage   We use two basic measures of firm-level leverage. The first is the usual measure of book leverage: total book debt (short-term debt plus short-term portion

of long-term debt plus long-term debt) divided by book value of assets.[10] The second is "net leverage," book leverage net of cash and cash equivalents. As we have mentioned earlier in the paper, this correction is necessary if firms attempt to manage financial distress costs using cash reserves rather than (or in conjunction with) the level of debt.[11]

Proxying for Liquidation Value   We proxy for expected liquidation values in two ways. Each proxy is inversely related to liquidation values. The first proxy is a firm's *asset-specificity*, the second is the fraction of the firm's assets that are *intangibles*.

Asset-specificity involves the the intuitive idea that firms whose assets tend to be *specific* (that is, not readily redeployable outside of the industry) are likely to experience lower liquidation values because they may suffer from "fire-sale" discounts in cash auctions for asset sales, especially when firms within an industry get simultaneously into financial or economic distress. Since industry cycles are often key drivers of firm-level default, asset-specificity suggests itself as a(n inverse) proxy for expected liquidation values.

Empirical support in favor of this idea has been provided by Pulvino (1998) for the airline industry, and especially by Acharya, Bharath, and Srinivasan (2007) who look at the entire universe of defaulted firms in the US over the period 1981 to 1999; see also Berger, Ofek, and Swary (1996) and Stromberg (2000). We adopt the definition of asset specificity that has been employed in the latter three papers: asset specificity is measured by the Book Value of Machinery and Equipment divided by the Book Value of Assets. Land and Property are not considered specific assets but are viewed as being fungible across industries.

Our second proxy, the fraction of total assets comprising of Intangibles,[12] is based on the simple thesis that liquidation proceeds are lower for firms with a large proportion of non-physical assets since these assets, for example goodwill, are not easily sold or transferable to other firms.

While this second proxy is also theoretically appealing, empirical support for it as a determinant of liquidation costs is less robust relative to that for asset-specificity (Acharya, Bharath and Srinivasan, 2003). Furthermore, a comparison of intangibles across countries is rendered difficult by differences in accounting practices such as goodwill-accounting. Relatively, the measurement of specific assets in the form of machinery and equipment is less subject to such differences.

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[10]We also tried a quasi-market-value measure of leverage in which the value of assets is calculated by replacing the book value of equity with its market value, but this does not affect the results much.

[11]Our theoretical model does not include a role for cash. However, if we assume that any surplus cash carried over by the firm from time 0 to time 1 can be seized by the creditors if there is a default, only the net-of-cash debt matters. This too is a motivation for using this second measure of leverage.

[12]Intangibles are assets such as goodwill (cost in excess of net assets purchased), patents, copyrights, trademarks, formulae, franchises of no specific duration, capitalized software developments and computer programs, organizational costs, customer lists, capitalized advertising cost, licences of no specific duration, mastheads (newspapers), capitalized servicing rights, and purchased servicing rights.

Given this, we prefer asset-specificity from an operational standpoint, but we report our results for both the proxies.

Summary statistics for both proxies (and other firm characteristics) are reported in Panel A of Table 1. There do not appear to be any striking differences between the US and the UK on average in asset-specificity or intangibles, except that the larger firms in the UK have far lower intangible assets ratios compared to smaller firms, relative to the US.

Since these proxies are each inversely related to liquidation value, the hypothesis we test is that the difference in leverage between an equity-friendly code and a debt-friendly code is an *increasing* function of the proxies.

5.1 Regression Analysis

Our first set of empirical tests employs regression analysis. We examine a number of alternative specifications, and employ both panel estimation as well as the Fama and MacBeth (1973) methodology. Throughout our empirical analysis, data are Winsorized at 2% to avoid the effect of outliers. We note at the outset that depending on the liquidation cost proxy we employ (specificity, intangibles or both), our regression samples differ somewhat from the overall sample. Panels B, C and D of Table 1 repeat the summary statistics provided in Panel A of Table 1 for these three cases, respectively. While there are naturally some differences that arise from such sample selection (for instance, firms are larger in the restricted samples), the general pattern that the US firms are relatively more levered than the UK firms continues to hold. Also, averages of the other balance-sheet characteristics for restricted samples are within acceptable tolerance bounds around their values for the overall sample in Panel A.

We discuss the panel estimation first. The dependent variable in the regressions is, of course, firm leverage. We measure firm leverage by both book leverage and leverage net of cash. In the broadest specification, the independent variables in the panel estimation are year dummies, country dummies, and five firm characteristics (interacted with country dummies). The four firm characteristics are: (i) the proxy for liquidation values (i.e., asset-specificity or intangibles), (ii) profitability, defined as EBITDA divided by book value of assets, (iii) logsale defined as the logarithm of net sales, (iv) Q or market-to-book ratio, defined as the ratio of [book value of assets − book value of equity + the market value of equity] to the book value of assets, and (v) industry of the firm. Summary statistics of the profitability, size (logsale) and Q are presented in Table 1. Note that all characteristics including leverage (except industry of the firm) are measured relative to total assets of the firm.

We estimate eight variants of this specification based on whether (a) the proxy for liquidation value is asset-specificity (Columns 1-4) or intangibles (Columns 5-8), (b) leverage is measured by book leverage (Columns 1-2 and 5-6) or leverage net of cash (Columns 3-4 and 7-8), and

(c) whether industry dummies are included as common effects to both countries (odd-numbered columns) or industry times country dummies are included (even-numbered columns). All specifications include country and year dummies. All standard errors are corrected for heteroskedasticity as well as for clusters at the level of an individual firm.

Table 2 presents the estimates. Our hypothesis is that, ceteris paribus, the difference between US and UK leverage increases in the proxy value. In terms of the regression, this says that the estimated coefficient on the proxy should be higher for the US than for the UK. That is, the difference in these coefficients should be positive (and statistically significant). The bottom rows of Table 2 provide the t-statistic of this difference and the one-sided p-value that the difference is non-negative.

As Table 2 shows, this test is met at conventional levels of statistical confidence except in columns 1 and 2 (where significance is marginal), and with generally stronger results when cash is measured as negative debt (i.e., when net leverage is employed). Of equal importance, the numbers in the table are also of economic significance in explaining capital structure differences between the countries.

Consider, for example, the broadest panel specification where industry times country dummies are employed and leverage is measured net of cash (Column 4 in the table). The estimated coefficients on asset-specificity for explaining net leverage in this regression are 24.88% for the US, and 16.25% for the UK. The difference of 8.53% is statistically significant with a robust, firm-clustered t-statistic of 3.53. Moreover, for a firm with an asset specificity of 30% (roughly the median asset-specificity in our sample), this predicts a difference in leverage of $8.53 \times 0.3 = 2.56\%$. This is roughly the difference in median net leverage between the two countries. As noted in the Introduction, the numbers are even stronger when we consider intangibles.

Table 3 confirms that similar results obtain when the Fama and MacBeth (1973) approach is adopted, that is, where a cross-sectional version of the panel specification is run in each year and the coefficients averaged across the years. For brevity, we only report results with book leverage net of cash. Whether we employ asset-specificity as liquidation cost proxy (Columns 1-2) or employ intangibles (Columns 3-4), the hypothesis is uniformly met. In Columns 5-6, we revert to the panel specification but include both specificity and intangibles on the right hand side as potentially orthogonal proxies for liquidation costs. The hypothesis that the difference in coefficients between the US and the UK is positive is met for both measures of liquidation costs.

It is useful to also discuss the difference in coefficients on other firm characteristics – profitability, size, and Q – between the US and the UK. The first observation is that across Tables 2–3, the effect of profitability on leverage is mostly negative, that of size is positive, and that of Q is negative, consistent with the rest of the literature. However, the difference in coefficients between the US and the UK is not robust for any of these firm characteristics, the difference flipping between positive and negative signs across tables without much statistical significance

(exact t-statistics are available upon request).

We believe this to be an important result. While these characteristics have found support for explaining leverage variations within a country, they are unable to explain cross-country variations in leverage. In contrast, measures of liquidation costs are able to explain such variations: Given the variation in bankruptcy codes across countries, liquidation costs become the first-order determinant of cross-country variations in leverage.

Effect of Other Institutional Differences   In addition to bankruptcy codes, the literature has focused on three other key institutional differences between countries: (1) taxes, (2) nature of financial system, that is, bank-oriented versus market-oriented, and (3) nature of ownership and control, that is, dispersed ownership or concentrated ownership of the firm. The US and the UK are similar along the second and the third dimension: Both countries are generally considered to be market-oriented economies with dispersed ownership. How does a difference in tax rates affect our conclusions?

As an aside, but an important one, note that tying down the empirical effect of taxes on leverage is a tricky issue, rendered especially difficult by the need to identify the relevant marginal personal tax rate. This point is developed in detail from a computational standpoint for the US by Graham (2000) and for the context of G-7 countries by Rajan and Zingales (1995). Graham (2000), for example, shows that on average the capitalized tax benefit of debt equals 9.7 percent of firm value but falls to as low as 4.3 percent if measured net of personal taxes. Furthermore, he argues that there is an apparent puzzle in the literature as to why firms, particularly the large ones, do not increase their leverage in order to exploit better the available tax shields.

Rajan and Zingales (1995) examine how changes in tax laws during 1983 to 1990 that affected the relative attractiveness of debt, dividends and retained earnings (taking account of personal as well as corporate taxes) in turn affected the relative allocation of pre-tax corporate income across these categories. They find that if one uses personal taxes at the highest income bracket, then results are overall consistent with a shift in allocation based on shift in relative attractiveness of debt, dividends and retained earnings induced by tax changes (in five G-7 countries). However, using average taxes this is not the case. They conjecture thus that while taxes cannot be ruled out as playing a role in explaining international capital structure variation, it is important for researchers to consider both personal and corporate taxes and employ the correct effective tax rates in each case.

These challenges notwithstanding, we provide a qualitative discussion as to why we do not think that our results are driven solely by differences in corporate tax rates between the US and the UK. In our model, firms choose optimal capital structure to balance the tax-shield benefits of debt with the agency costs that arise in bankruptcy and which in turn depend on the bankruptcy code. Our result is that the difference in leverage between the US and the UK is increasing in

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liquidation costs. Suppose that the corporate tax rate is greater in the US than in the UK. This has indeed been the case for most of our sample period of 1991 to 2002, the statutory corporate tax rate in the US having been around 39.3%, whereas in the UK, it having declined from 33% to current levels of 30%. In this case, at high levels of liquidation costs, where firms in the US have greater leverage than firms in the UK, the difference in leverage between the US and the UK would widen even further, while at low levels of liquidation costs, the difference in leverage between the two countries would narrow. In effect, difference of the coefficients on the liquidation proxies in our regression analysis (or the difference of differences in leverage in our non-parametric analysis of the next section) should in fact become larger.

Now note that if there were no role played by differential agency costs which are influenced by the bankruptcy code, then the effect of the higher US tax rate on leverage would be *independent* of the liquidation costs. In other words, a higher tax rate in the US can contribute partly to the observed positive difference in coefficients between the US and the UK, but this partial contribution arises only in the presence of a differential bankruptcy code, and, in turn, a differential nature of agency costs, between the two countries.[13] We conclude that the primary driver of our identified cross-country pattern in leverage between the US and the UK is the differences in bankruptcy code between these countries over our sample period.

5.2   Non-Parametric "Matching" Tests

The regression analysis imposes a linear relationship between leverage and our liquidation proxy. To supplement these results, we undertake a second set of tests which is non-parametric. The tests rely on "bucketing" the firms in our sample according to the value of the proxy. We pool all firms in the sample in a given year and divide the pool into five quintiles based on the proxy. Quintile 5 represents the highest degree of the proxy and Quintile 1 the lowest. Each quintile is then broken up into US firms and UK firms. Firms are re-grouped into quintiles at the beginning of each year. The distribution of firms into quintiles for each country, averaged across years, is shown in Table 4, which also shows the average specificity and intangibles cutoffs that determine the quintiles.

We measure the leverage of each quintile using both the *mean* leverage of firms in that quintile, and their *median* leverage. Employing medians has the advantage that outliers are less likely to drive the results, whereas employing means has the advantage that more cross-sectional information is utilized. This gives us two basic measures of leverage for each quintile: median debt to book assets and mean debt to book assets. Under our hypothesis, the difference in

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[13]Note that were the tax rate to be greater in the UK than in the US, then the net effect would be to lower the difference of differences in leverage between the two countries as a function of liquidation costs. This would bias us against finding the results we have identified.

leverage between US and UK firms should be higher for higher quintiles. Thus, if we take the difference in leverage between US and UK firms in a given quintile (say, Q5) and subtract from this the difference in leverage in a lower quintile (say, Q1), this "difference of differences" should be positive. We check if this is indeed the case.

We begin with a basic check: whether the difference of differences between Q5 and Q1 (the highest and lowest values of the proxy) is positive for each of our proxies. Table 5 presents the results in this context. The upper panel of the table looks at asset-specificity as the proxy while the lower panel considers intangibles. The left halves in each panel consider the two median measures of leverage, while the right halves consider the mean measures. The difference of differences is presented for each measure of leverage for each year from 1992 to 2002 in Panel A and from 1990 to 2002 in Panel B. (Intangibles data is available from 1990 for most firms in our sample, but data on Machinery and Equipment becomes available only from 1992.)

As Table 5 shows, the time-series average of difference of differences is 9.54% (5.13%) when median (mean) leverage is employed as the measure of leverage, and asset-specificity is the liquidation proxy. Moreover, the difference of differences is positive and of roughly similar magnitude in every single year from 1992 to 2002.[14] The results are similar with a substantially positive time-series average of the difference of differences when intangibles are the proxy. However, the numbers are not as uniformly positive as in Panel A. In all four cases, however, the one-sided p-value for the significance of the mean difference of differences (averaged across yearly values) is close to zero.

Note that our model predicts that for low liquidation values, the debt levels in the UK should be lower than those in the US, and at high liquidation values, we should see the reverse pattern. The two parts of this prediction (rather than the difference of difference we have focused on so far) are also individually confirmed in Table 5 when liquidation costs are proxied by asset-specificity. In particular, for median debt to total assets, it is uniformly the case that debt level of Q5 (high asset-specificity, so low liquidation values) in the US exceeds that of Q5 in the UK; conversely, we also have that debt level of Q1 in the US is below the debt level of Q1 in the UK. The first pattern in fact holds uniformly for most of Table 5 whereas the second holds somewhat less uniformly for mean debt to total assets and when liquidation costs are proxied by intangible assets.

Building on these findings, we then examine a more "continuous" test. That is, rather than use only Quintiles 1 and 5, we examine the difference of differences computed using successive quintiles. For $n = 5, 4, 3, 2$, we compute the difference of differences between Quintiles n and

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[14]A number of papers have argued about the "stickiness" of capital structure decisions from a theoretical as well as an empirical standpoint (Fisher, Heinkel, and Zechner, 1989, Hennessy and Whited, 2005, Leary and Roberts, 2005, Strebulaev, 2007). Hence, we present our difference of differences results in every single year of the sample for both measures of debt.

$n-1$. Table 6 presents these inter-quintile difference of differences computed in several different ways. The left half of Panel A is computed using asset-specificity as the proxy, and the right half of the panel using intangibles. For specificity as the proxy, average over the sample period of the inter-quintile difference of differences is positive and significantly so. Indeed, 34 out of 44 inter-quintile differences have the right sign, the exceptions arising mainly in the difference between quintile 2 and quintile 1. The results are similar, but slightly weaker, for intangibles. The average of the inter-quintile differences is positive, except for the difference between quintile 2 and quintile 1. The fraction of inter-quintile differences with the correct sign (30 out of 44) is smaller than in the case of asset-specificity. These results lend empirical support to our theory that the effect of bankruptcy codes on capital structures should interact with the anticipated liquidation values of firms.[15]

Panel B of Table 6 illustrates that treating cash as "negative debt" makes the results substantially stronger. The time-series average of the difference of differences using Quintiles 5 and 1 on the basis of asset-specificity is 23.21% for median leverage, the corresponding number for the classification based on Intangibles being 15.30%, and both are statistically significant.

Our final series of non-parametric tests consists of ensuring that characteristics other than our proxy for liquidation values are not driving our results. A large body of empirical literature has identified a set of cross-sectional determinants that affect corporate capital structures. While some of these effects have been recently attributed to mechanical relationships arising from stickiness in capital-structure changes (Hennessy and Whited, 2005, Strebulaev, 2007), we take these determinants on face value and check if our results are affected when we control for their effect. In particular, we use the four determinants employed by Rajan and Zingales (1995): (a) Tangibility defined as the book value of property, plant and equipments (PPE) or fixed assets divided by the book value of total assets, (b) Market-to-book defined as the ratio of the book value of assets less the book value of equity plus the market value of equity all divided by the book value of assets, (c) Logsale defined as the logarithm of net sales, and (d) Profitability defined as EBITDA divided by book value of assets.

We control for these capital-structure determinants through the matching procedures proposed in Heckman, Ichimura and Todd (1997, 1998). These procedures enable matching each firm in the US (the "treatment sample") in a given year to firms in UK (the "control sample") for that year, where the matching is based on the four determinants described above plus the proxy for liquidation values (asset-specificity or intangibles). We utilize both suggested by Heckman et al: the Near Neighbour technique where we employ ten nearest neighbouring firms in the UK to

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[15]One potential concern is that the variation in capital structures in the US is larger than that in the UK, and that therefore, the difference of differences we compute is positive due to a purely mechanical reason. To verify that this is not driving our results, we have also computed the difference of differences as $[F_{US}(\alpha_l)/F_{US}(\alpha_h)] - [F_{UK}(\alpha_l)/F_{UK}(\alpha_h)]$. This measure of difference of differences (between the extreme quintiles) is also generally positive over the sample period.

form the control sample for each treated firm in the US, and the Local Linear technique where a "composite" UK firm is created from the neighbouring firms for each treated firm in the US. The difference in leverage is then computed between a US firm and its matched sample of UK firms. The US firms are then sorted into quintiles on the basis of their asset-specificity or Intangibles. Finally, inter-quintile difference of differences is computed for each pair of successive quintiles and also between Q5 and Q1.

The results from this matching exercise are presented in Table 6. For brevity, the table only reports results for book leverage and the Near Neighbour matching method. The table shows strong support for our theory; indeed, the numbers here are as strong or even stronger than in earlier tables. For instance, the difference of differences between Quintiles 5 and 1 has an average value over the sample period of 8.53% when asset-specificity is used to form quintiles, while the corresponding number is 5.34% when intangibles are used to form quintiles. More generally, the inter-quintile differences continue to have the right sign as well (except, as earlier, the $Q2-Q1$ difference for intangibles). The magnitudes of these inter-quintile differences are similar to those in Panel A, but there are even fewer violations of the theory: negative entries occur in only 5 out of 44 observations for the asset-specificity results, and only 10 out of 44 observations for the results with Intangibles.

6   Conclusion

This paper has made two contributions. The first is to develop a theoretical model aimed at delivering sharp testable implications to relate a firm's capital structure choice to the bankruptcy code under which a firm operates. The model indicates that a key factor influencing capital structure choice is the firm's anticipated liquidation value. More precisely, it predicts that firms with low liquidation values will employ greater leverage under a bankruptcy code that favors equity-holders (an "equity-friendly system" or EFS) than under one that favors debt holders (a "debt-friendly system" or DFS); and that the difference in optimal debt levels under EFS and DFS should itself be a decreasing function of the degree of liquidation values.

The paper's second contribution lies in testing this theoretical prediction using data from the US (a country with an equity-friendly bankruptcy code) and the UK (which has a debt-friendly code). We find the data backs the theory strongly. In particular, the difference between leverage ratios in the two countries depends on anticipated liquidation values in the manner predicted by the theory.

Several future directions of investigation are indicated by these results. Some of the issues that need further study are asymmetric information between equity- and debt-holders, the role of managers, and the possibility of renegotiation in bankruptcy. On the empirical front, a theoretical

model encompassing some of these issues would enable extending the analysis to data from other countries whose codes cannot easily be classified currently.

A   An Expanded Model

Our existing model supposes that after observing x and $q \in \{\underline{q}, \overline{q}\}$, the firm can either continue or liquidate. If the firm is continued, it receives cash flows of

$$\begin{cases} Lx, & \text{with probability } q \\ 0, & \text{with probability } 1 - q \end{cases}$$

If it is liquidated, it receives αx, where $\alpha \in \{\underline{q}L, \overline{q}L\}$.

The objective of the expanded model presented below is to suggest a setting in which the liquidation value is (a) derived endogenously as a consequence of selling the company as a going concern, (b) α declines as the proportion of specific assets increases, and (c) the restriction $\alpha \in \{\underline{q}L, \overline{q}L\}$ holds.

A simple way to ensure (a)-(c) is to assume that the buyer pays the expected value of the cash flows (expectations taken over both the distribution of q and the cash flows given q) less a discount for asset specificity. In particular, we assume that q is company specific, and that a new management would have to verify its own q. We also assume that there are two possible buyers for the assets. Those within the industry may buy it at full price, but those from outside will only buy at a discount. The ex-ante discount reflects the likelihood the firm will have to use a buyer from outside the industry.

If we let θ denote the fraction of specific assets, and $g(\theta) < 1$ this discount related to firm's asset-specificity, then the expected liquidation value is

$$\alpha = \frac{1}{2} \left(\underline{q}L + \overline{q}L \right) g(\theta).$$

It is clear that $\alpha < \overline{q}L$, and under the additional assumption that $g(\theta) > 2\underline{q}L/(\underline{q}L + \overline{q}L)$, that is, when the discount due to asset-specificity is not exorbitantly large, we also obtain that $\alpha > \underline{q}L$. In this case then, all three conditions are satisfied.

B   Proof of Proposition 1

Fix F. We follow the steps outlined in text.

Step 1: Identifying the Continuation Decisions

Fix an arbitrary level of debt F. The first step in the proof is to identify the continuation/liquidation decisions that will be taken by debtholders and equityholders, respectively, given F.

Lemmas 1 and 2 identify these decisions. Lemma 1 shows that debtholders will always choose to liquidate the firm when $q = \underline{q}$ (which is efficient), but may also sometimes choose to liquidate the firm when $q = \overline{q}$ (which is inefficient). More precisely, when $q = \overline{q}$, debtholders will continue the firm if x is sufficiently small but for larger x will inefficiently liquidate the firm. Intuitively, if x is low relative to F, then debtholders' remaining claims are sufficiently large that all future cash flows will accumulate to them; thus, it is as if they own the firm, so the efficient continuation decision is chosen. But when x is large, the concavity of debtholders's claims kicks in, and an inefficient continuation is chosen.

Lemma 2 provides the corresponding result for the case where equityholders make the decision. In this case, the outcome is efficient when $q = \overline{q}$ (equityholders always opt to continue) but there is a region of inefficiency when $q = \underline{q}$ since equityholders sometimes choose to continue rather than liquidate. The intuition is analogous to the debtholders' case, and is driven in this case by the convexity of equityholders' payoffs.

To see these results, suppose first that the date-1 cash flow satisfies $x \geq F$. Then, debtholders receive the full amount F owed to them, while equityholders receive the net-of-taxes amount $(1 - \tau)(x - F)$. The firm now becomes an all-equity firm. After observing q, equityholders will thus decide to continue if and only if it is efficient to do so (i.e., if and only if $q = \overline{q}$), and will liquidate the firm otherwise. Therefore, conditional on x and q, and given $x \geq F$, the expected value of the firm at date 1 (including the date 1 cash flow x) is given by

$$
\begin{array}{ll}
x - \tau(x - F) + \overline{q}Lx, & \text{if } q = \overline{q} \\
x - \tau(x - F) + \alpha x, & \text{if } q = \underline{q}.
\end{array}
\tag{5}
$$

For $x < F$, the firm is in default and the bankruptcy code comes into operation. Suppose first that debtholders are making the continuation/liquidation decision. If they decide to continue the firm, they have a senior claim of $(F - x)$ on date 2 cash flows. Given q and the distribution (2) of date 2 cash flows, the expected payoff of debtholders from continuation is

$$
q \ \min(Lx, F - x).
\tag{6}
$$

If the debtholders decide on liquidation, their payoff is $\min(\alpha x, F - x)$. Hence, debtholders choose to continue the firm if and only if

$$
q \ \min(Lx, F - x) \ \geq \ \min(\alpha x, F - x).
\tag{7}
$$

Lemma 1 *Suppose $x < F$. If debtholders are choosing between continuation and liquidation:*

1. *If $q = \underline{q}$, then debtholders always liquidate the firm. This is ex-post efficient.*

2. *If $q = \bar{q}$, then defining $x^* = \bar{q}F/[\bar{q} + \alpha]$:*

   - *debtholders continue the firm for $x \in [0, x^*)$. This is again ex-post efficient.*
   - *debtholders liquidate the firm for $x \in [x^*, F)$. This is ex-post inefficient.*

Proof The lemma is established by examining (7) for a series of cases.

Case 1 $(F - x) \leq \alpha x < Lx$, i.e., $x \geq F/[1 + \alpha]$.

In this case, debtholders receive $F - x$ in the state Lx under continuation and nothing in the other state for an expected value of $q(F - x)$. They also receive $F - x$ for certain under liquidation. Thus, debtholders choose to liquidate in this case for both $q = \bar{q}$ and $q = \underline{q}$.

Case 2 $\alpha x < (F - x) \leq Lx$, i.e., $F/[1 + L] \leq x < F/[1 + \alpha]$.

In this case, debtholders receive αx under liquidation, while under continuation, they receive $F - x$ in the state Lx and nothing otherwise. Thus, debtholders choose to continue if and only if $q(F - x) > \alpha x$, i.e., if and only if

$$x \ < \ \frac{qF}{q + \alpha}. \tag{8}$$

If $q = \underline{q}$, we have

$$\frac{qF}{q + \alpha} \ < \ \frac{F}{1 + L}. \tag{9}$$

Since the right-hand side of (9) is the lowest admissible value of x in this case, this means there is no value of x here that satisfies (8). This means debtholders always liquidate the firm for $q = \underline{q}$.

When $q = \bar{q}$, we have

$$\frac{qF}{q + \alpha} \ > \ \frac{F}{1 + L} \tag{10}$$

from our assumption that $\overline{q}L > \alpha$. This means there are values of x that satisfy (8). In particular, debtholders choose to continue the firm for

$$x \in \left[\frac{F}{1+L}, \frac{\overline{q}F}{\overline{q}+\alpha}\right),$$

and they choose to liquidate the firm for

$$x \in \left[\frac{\overline{q}F}{\overline{q}+\alpha}, \frac{F}{1+\alpha}\right).$$

Case 3 $\alpha x < Lx < (F - x)$, i.e., $x < F/[1 + L]$.

In this case, debtholders receive αx under liquidation, while under continuation, they receive Lx in the state x and nothing otherwise. Then, debtholders continue the firm if and only if $qLx > \alpha x$ or, what is the same thing, if and only if $q = \overline{q}$. Thus, for $q = \overline{q}$, there is continuation for $x \in [0, F/[1 + L])$ and for $q = \underline{q}$ there is liquidation over this region. $\square$

The next result, Lemma 2, identifies the counterpart of this result when equityholders get to make the continuation decision. We assume that if equityholders are indifferent between continuation and liquidation, they choose the decision that benefits debtholders. Given $x < F$ and q, the expected payoff to equityholders from continuing the firm is evidently

$$q \max[Lx - (F - x), 0],$$

while their payoff in liquidation is

$$\max[\alpha x - (F - x), 0].$$

Thus, equityholders choose continuation if and only if

$$q \max\left[Lx - (F - x), 0\right] > \max\left[\alpha x - (F - x), 0\right]. \tag{11}$$

Lemma 2 *Suppose $x < F$. If equityholders are choosing between continuation and liquidation:*

1. *If $q = \overline{q}$, then equityholders continue the firm. This is ex-post efficient.*

2. *If $q = \underline{q}$, then defining x_1^* and x_2^* by*

$$x_1^* = \frac{F}{1+L} \qquad \text{and} \qquad x_2^* = \frac{F}{1 + \left(\frac{\alpha - \underline{q}L}{1 - \underline{q}}\right)},$$

we have:

- For $x \in [0, x_1^*]$, the firm is liquidated. This is ex-post efficient.
- For $x \in (x_1^*, x_2^*]$, equityholders continue the firm, This is ex-post inefficient.
- For $x \in (x_2^{**}, F)$, equityholders liquidate the firm. This is ex-post efficient.

Proof Once again, we consider three regions of x.

Case 1 $(F - x) \leq \alpha x < Lx$, i.e., $x \geq F/[1 + \alpha]$

In this case, equityholders receive positive payoffs under both liquidation and under continuation. They choose to continue iff

$$q\left[Lx - (F - x)\right] \; > \; [\alpha x - (F - x)],$$

that is, if and only if

$$x \; < \; x_2^*, \tag{12}$$

where, as in the statement of Lemma 2, we define

$$x_2^* \; = \; \frac{F}{1 + \left(\frac{\alpha - qL}{1 - q}\right)}.$$

When $q = \overline{q}$, we have $qL > \alpha$. In this case, $x < F$ implies (12) necessarily holds, so equityholders always choose to continue.

When $q = \underline{q}$, we have $qL < \alpha$. Moreover, $\alpha < L$, so $[(\alpha - qL)/(1 - q)] < \alpha$. This implies

$$\frac{F}{1 + \alpha} \; < \; x_2^*.$$

Thus, equityholders liquidate the firm for

$$x \; > \; x_2^*$$

and continue the firm for

$$x \in \left[\frac{F}{1 + \alpha}, x_2^*\right].$$

Case 2 $\alpha x < (F - x) \leq Lx$, i.e., $\frac{F}{1 + L} \leq x < \frac{F}{1 + \alpha}$

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In this case, equityholders receive positive payoffs in the state Lx at date 2, but receive nothing under liquidation. Thus, equityholders always decide to continue.

Case 3 $\alpha x < Lx < (F - x)$ i.e., $x < \frac{F}{1+L}$.

In this case, equity has zero value under both continuation and liquidation. The choice is made in debtholders ' interest. This means for there is continuation for $q = \bar{q}$ and liquidation for $q = \underline{q}$.

Summarizing, for $q = \bar{q}$, equityholders decide to continue in all three cases. For $q = \underline{q}$, they continue in Case 1 only if $x \leq x_2^*$, always continue in Case 2, and always liquidate in Case 3. This is exactly the statement of Lemma 2. $\qquad\square$

Step 2: Identifying the Initial Firm Value

Once we have identified continuation decisions for any F, we can go back to time 0 and calculate the expected value of the firm given F. The expressions are algebraically lengthy (see Appendix B), but after some work, they simplify into a very intuitive form. Specifically define $\overline{V}$ to be the date-0 expected value of an all-equity firm without taxes. Such a firm necessarily involves efficient continuations (continue if $q = \bar{q}$, liquidate otherwise), so we have:

$$
\overline{V} = \frac{1}{H} \left\{ \int_0^H x\,dx + \frac{1}{2} \int_0^H \bar{q}Lx\,dx + \frac{1}{2} \int_0^H \alpha x\,dx \right\} = \frac{H}{2}\left[1 + \frac{1}{2}\bar{q}L + \frac{1}{2}\alpha\right]. \tag{13}
$$

Next, we need to compute firm value when there is debt and attendant agency problems. For $x < F$, if the firm is continued, then its expected value at date 1 (including the date 1 cash flow x) conditional on q and x is $x + qLx$; if it is terminated at this point, this expected value is $x + \alpha x$. Thus, from expression (5) and Lemma 1, we obtain the following expressions for the expected value of the firm on date 1 conditional on x and q, and conditional on the debtholders making the decisions in distress:

1. For $x \geq F$: the firm value is $x - \tau(x - F) + \bar{q}Lx$ if $q = \bar{q}$, and is $x - \tau(x - F) + \alpha x$ if $q = \underline{q}$.

2. For $x < F$ and $q = \underline{q}$: the firm value is $x + \alpha x$.

3. For $x \in [0, x^*]$ and $q = \bar{q}$: the firm value is $x + \bar{q}Lx$.

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4. For $x \in (x^*, F)$ and $q = \bar{q}$: the firm value is $x + \alpha x$.

Similarly, when equityholders get to make the decisions in distress, Lemma 2 leads to the following expressions for the expected value of the firm on date 1 conditional on x and q:

1. For $x \geq F$: Same as above.

2. For $x < F$ and $q = \bar{q}$: $x + \bar{q}Lx$.

3. For $q = \underline{q}$ and either $x \in [0, x_1^*]$ or $x \in [x_2^*, F)$: $x + \alpha x$.

4. For $q = \underline{q}$ and $x \in (x_1^*, x_2^*)$: $x + \underline{q}Lx$.

The expected value of the firm at date 0 may now be found by integrating these continuation firm values over the ex-ante distributions of x and q. Since (a) $x \sim U[0, H]$ and $\bar{q}$, (b) $\underline{q}$ are equiprobable, and (c) when in distress, continuation/liquidation decisions are made by debtholders with probability π and equityholders with probability $1 - \pi$, the expected value of the firm at date 0 is

$$
\begin{aligned}
V(F) \;=\; \frac{1}{H} \Bigg\{ & \int_0^H x\,dx - \int_F^H \tau(x - F)\,dx + \frac{1}{2}\int_F^H \bar{q}Lx\,dx + \frac{1}{2}\int_F^H \alpha x\,dx \\
& + \pi \times \frac{1}{2}\left[\int_0^{x^*} \bar{q}Lx\,dx + \int_{x^*}^F \alpha x\,dx + \int_0^F \alpha x\,dx \right] \\
& + (1 - \pi) \times \frac{1}{2}\left[\int_0^{x_1^*} \alpha x\,dx + \int_{x_2^*}^F \alpha x\,dx + \int_{x_1^*}^{x_2^*} \underline{q}Lx\,dx + \int_0^F \bar{q}Lx\,dx \right] \Bigg\} \quad (14)
\end{aligned}
$$

This expression can be simplified and put into the following intuitive form.

$$
\begin{aligned}
V(F) \;=\; \overline{V} \;-\; \frac{1}{H}\Bigg\{ & \int_F^H \tau(x - F)\,dx \;+\; \pi\,\frac{1}{2}\int_{x^*}^F (\bar{q}L - \alpha)\,x\,dx \\
& + (1 - \pi)\frac{1}{2}\int_{x_1^*}^{x_2^*} (\alpha - \underline{q}L)x\,dx \Bigg\}. \quad (15)
\end{aligned}
$$

The first term in the parenthesis represents the value loss from the taxes that a levered firm would pay at date 1. The second term corresponds to the agency costs of debt when debtholders make

the continuation/liquidation decision. The value loss from excessive liquidations in this case is $(\bar{q}L - \alpha)$; the range of x values overwhich inefficient liquidations occur is $[x^*, F)$, where x^* is identiified in Lemma 1. The third term captures the agency costs of debt when equityholders make the continuation/liquidation decision. The value loss from excessive continuations in this case is $(\alpha - \underline{q}L)$; the range of x values over which inefficient liquidations occur is $[x_1^*, x_2^*)$, where x_1^* and x_2^* are identiified in Lemma 2.

Step 3: Identifying Optimal Leverage

The next step is to identify the value of F that maximizes initial equity value. Given any F, let $D(F)$ be the time-0 present value of the expected amount received by debtholders, given the continuation policies identified in Lemmas 1 and 2. We assume debt is fairly priced, so given a promised payment of F, $D(F)$ is the amount equityholders are able to raise at time 0, so equityholders must provide the remaining investment $[I - D(F)]$. Equityholders now pick F to maximize their return net of investment, that is, to maximize $[V(F) - D(F)] - [I - D(F)]$. But this just involves maximizing the date–0 expected value of the firm, $V(F)$.

As the expression for $V(F)$ indicates, choosing the optimal F involves a trade-off. On the one hand, increasing F increases the tax benefit at date 1. On the other, increasing F increases the regions over which inefficient continuations and deadweight losses result. We show that $V(F)$ is strictly concave as a function of F, and derive the optimal F, denoted $F_\pi^*(\alpha)$.

Differentiating (15) with respect to F, we obtain

$$
\begin{aligned}
\frac{dV}{dF} &= \frac{\tau}{H} \int_F^H dx - \frac{1}{2}\pi \left[\frac{(\bar{q}L - \alpha)F}{H} - \frac{(\bar{q}L - \alpha)x^*}{H}\frac{dx^*}{dF} \right] \\
&\quad -\frac{1}{2}(1-\pi)\left[\left(\frac{(\alpha - \underline{q}L)}{H}x_2^*\right)\frac{dx_2^*}{dF} - \left[\frac{(\alpha - \underline{q}L)}{H}x_1^*\right]\frac{dx_1^*}{dF} \right] \\
&= \tau - \frac{\tau F}{H} - \frac{1}{2}\pi\left[\frac{\bar{q}L - \alpha)F}{H} - \frac{(\bar{q}L - \alpha)}{H}\frac{\bar{q}F}{(\bar{q}+\alpha)}\frac{\bar{q}}{(\bar{q}+\alpha)}\right] \\
&\quad -\frac{1}{2}(1-\pi)\frac{(\alpha - \underline{q}L)F}{H}\left(\frac{1}{\left[1 + \left(\frac{\alpha - \underline{q}L}{1-\underline{q}}\right)\right]^2} - \frac{1}{[1+L]^2}\right) \\
&= \tau - \frac{\tau F}{H} - \frac{1}{2}\pi\frac{(\bar{q}L - \alpha)F}{H}Z_D - \frac{1}{2}(1-\pi)\frac{(\alpha - \underline{q}L)F}{H}Z_E \quad (16)
\end{aligned}
$$

where Z_D and Z_E were defined in the text (expressions (**??**) and (**??**), respectively). The second-

derivative of V with respect to F is

$$\frac{d^2V}{dF^2} = -\frac{\tau}{H} - \frac{1}{2}\pi\frac{(\overline{q}L-\alpha)}{H}Z_D - \frac{1}{2}(1-\pi)\frac{\alpha-\underline{q}L}{H}Z_E < 0. \tag{17}$$

The last inequality follows since $\alpha \in (\underline{q}L, \overline{q}L)$ by assumption, and $Z_D, Z_E > 0$. (Recall the inequality pointed out earlier that $L > (\alpha - \underline{q}L)/(1 - \underline{q})$. This implies $Z_E > 0$.)

Thus, $V(F)$ is strictly concave as a function of F, so the optimal value of F is where the first-order condition equals zero. This is precisely the value of F identified in (**??**):

$$F_\pi^*(\alpha) = \frac{\tau H}{\tau + \frac{1}{2}\pi\left(\overline{q}L - \alpha\right)Z_D + \frac{1}{2}(1-\pi)\left(\alpha - \underline{q}L\right)Z_E}$$

The terms $(\overline{q}L - \alpha)$ and $(\alpha - \underline{q}L)$ measure the severity of inefficient continuation/liquidation decisions made in distress, while the terms Z_D and Z_E are related to the ex-ante likelihoods of these regions of inefficiency. Thus, the denominator is τ plus the agency costs of distress. As expected, optimal leverage increases in the tax rate τ, and decreases in the agency costs of distress.

Step 4: Completing the Proof

Pick $\pi_1 < \pi_2$. We are required to show the existence of $\alpha^* \in (\underline{q}L, \overline{q}L)$ such that the conditions of Proposition 1 are met.

For simplicity, let $F_1(\alpha)$ and $F_2(\alpha)$ denote $F_{\pi_1}(\alpha)$ and $F_{\pi_2}(\alpha)$, respectively. A simple computation using (**??**) shows that $F_1 < F_2$ if and only if $f(\alpha) < 0$ where

$$f(\alpha) = (\overline{q}L - \alpha)Z_D - (\alpha - \underline{q}L)Z_E.$$

As $\alpha \downarrow \underline{q}L$, $f(\alpha) > 0$, so $F_1 > F_2$. As $\alpha \uparrow \overline{q}L$, $f(\alpha) < 0$, so $F_1 < F_2$. Thus, for all suitably low α, the relatively equity-friendly code π_1 involves the use of more debt than the relatively debt-friendly code π_2, but at all suitably high α, this is reversed with the debt-friendly code using greater leverage.

To complete the proof, it can be shown that $f(\alpha)$ is strictly decreasing in α for $\alpha \in (0.36\overline{q}L, \overline{q}L)$. As long as $0.36\,\overline{q} \leq \underline{q}$ (roughly, the high state is not more than three times better than the low state—this is the mild technical condition mentioned at the top of Section 4), $f(\alpha)$ is monotone decreasing for all admissible values of α, so there is a unique crossover point α^* as mentioned in the statement of Proposition 1. The details of proving that $f(\alpha)$ is strictly decreasing in α for $\alpha \in (0.36\overline{q}L, \overline{q}L)$ involved primarily tedious algebra and hence are omitted.

C Variable Exclusion Criteria and Construction Procedures

The variables are constructed using the Worldscope dataset from year 1990 to 2002. We exclude financial institutions (SIC between 6000 and 7000) and utility industries (SIC greater than 9000). We exclude firm-years with Debt to Total Assets (Book Value) that are greater than one. The 5-digit number before each item corresponds to the data items starting with "WC" in Worldscope dataset.

The variables are constructed as follows:

- Debt to Total Assets (Book value): (03051 Short term debt and current portion of long term debt + 03251 Long term debt)/02999 Total assets.

- Cash: (02001 Cash and short-term investments)/02999 Total assets.

- Net Debt to Total Assets (Book value): (03051 Short term debt and current portion of long term debt + 03251 Long term debt − 02001 Cash and short term investments)/02999 Total assets.

- Tangibility: (02501 Property, Plant and Equipment)/02999 Total assets.

- Sales: Log(01001 Net sales or revenues).

- Profitability: (18198 Earnings before interest, taxes and depreciation (EBITDA))/02999 Total assets.

- Size: 02999 Total assets.

- Asset Specificity: (18377 Machinery and equipment)/02999 Total assets.

- Intangibles: (02649 Other Intangible Assets)/02999 Total assets.

- Q: (02999 Total assets + 08001 Market capitalization − 03501 Common equity)/02999 Total assets.

- Industry: We classify firms into 8 groups by their industry as Agriculture ($SIC < 1000$), Mining ($1000 <= SIC < 1500$), Construction ($1500 <= SIC < 1800$), Manufacturing ($2000 <= SIC < 4000$), Transportation ($4000 <= SIC < 5000$), Wholesale ($5000 <= SIC < 5200$), Retail ($5200 <= SIC < 6000$), and Services ($7000 <= SIC < 9000$).

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Figure 1: Difference of Differences: Time-Series Behavior

This figure plots the difference of differences between Quintiles 5 and 1 for the two proxies (asset-specificity and intangibles) after controlling for several factors using the matching procedure suggested by Heckman, Ichimura, and Todd (1997, 1998) as explained in Section 5.2. The data is from the Near Neighbor column of Table 6.
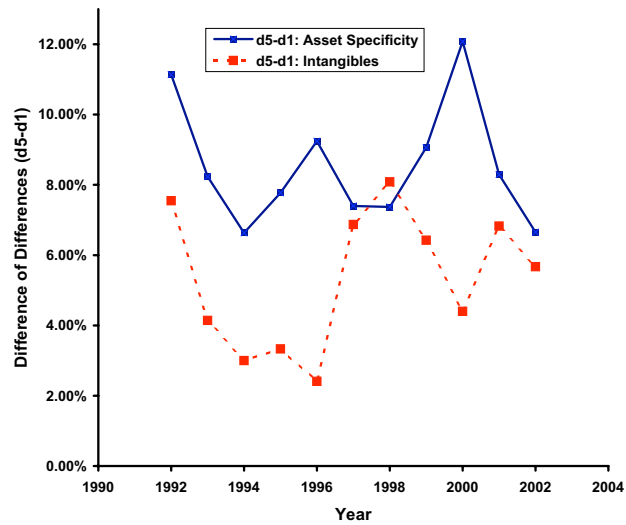
Figure 2: The Timeline of Our Model

t=0
- Firm owners choose optimal level of debt F
- Investment is undertaken

t=1
- Debt payment F is due.
- Cash-flow x is realized.
- Debt is paid off (x>F) or firm defaults (x<F).
- Continuation prospect q is realized:
  $q = \bar{q}$ or $q = \underline{q}$, each with prob 0.5.
- Continuation or liquidation decision is made depending on the bankruptcy code.

t=2
- Continuation or liquidation payoffs are realized.

Table 1: Descriptive Statistics

In each panel, leverage measures are calculated from 1990 to 2002 for US and UK firms. The book column employs book value of assets and the market column employs market value of assets. Size-weighted mean ratios are obtained by summing the numerator across all reporting firms in a country in each year and dividing by the denominator components summed across the same firms. The median and size-weighted mean ratios are computed first year-by-year and country-by-country, and then the average of the yearly ratios is reported. Each panel also reports similarly computed summary statistics on leverage determinants (Specificity, Intangibles, Profitability, Log of Sales and Q) from 1990 to 2002 for US and UK firms.

Panel A considers all non-financial firms in our sample. Panel B (resp. Panel C) considers only those firms used in the regressions in Columns 1-4 (resp. Columns 5-8) of Table 2; in these regressions, Specificity (resp, Intangibles) is used as the liquidity cost proxy. Panel D considers only those firms used in the regressions in Columns 5-6 of Table 3; in these regressions, both specificity and intangibles are used as liquidity cost proxies.

Panel A: Leverage Measures and Summary Statistics for Regressors by Country

| | | Debt to Total Assets | | Net Debt to Total Assets | | Summary Statistics for Regressors | | | | |
		Book	Market	Book	Market	Specificity	Intangibles	Profitability	Sales	Q
UK	Obs	16,526	16,526	16,519	16,519	9,381	5,744	16,642	16,476	16,878
	Mean	17.62%	14.52%	4.36%	5.64%	29.54%	13.12%	8.86%	11.00	1.73
	Std Dev	14.20%	13.64%	25.30%	20.06%	22.53%	17.10%	16.98%	2.06	1.26
	Median	15.76%	11.09%	8.25%	5.67%	24.27%	5.63%	12.08%	10.93	1.33
	Size-Weighted Mean	22.53%	15.42%	14.64%	9.74%	19.30%	4.30%	12.81%	20.03	1.48
US	Obs	59,970	60,072	59,965	60,067	43,443	35,983	55,383	58,549	61,314
	Mean	22.17%	18.63%	4.87%	3.91%	29.65%	14.98%	5.31%	11.99	1.99
	Std Dev	18.80%	18.47%	34.38%	42.58%	26.37%	15.26%	23.22%	2.18	1.83
	Median	19.68%	13.44%	10.63%	6.91%	21.40%	9.57%	11.33%	11.98	1.34
	Size-Weighted Mean	35.46%	18.41%	29.75%	14.76%	24.25%	10.10%	16.07%	22.30	1.92

Panel B: Leverage Measures and Regressor Summary Statistics for the Restricted Sample used in Table 2, Coumns 1-4

| | | Debt to Total Assets | | Net Debt to Total Assets | | Summary Statistics for Regressors | | | | |
		Book	Market	Book	Market	Specificity	Profitability	Sales	Q	Intangibles
UK	Obs	9,148	9,148	9,147	9,147	9,148	9,148	9,148	9,148	3,397
	Mean	18.05%	14.98%	5.32%	5.68%	29.50%	9.04%	11.27	1.69	11.39%
	Std Dev	14.50%	14.02%	24.89%	21.11%	22.89%	17.48%	1.98	1.24	14.97%
	Median	16.13%	11.57%	8.81%	5.86%	24.32%	12.19%	11.18	1.32	5.26%
	Size-Weighted Mean	26.22%	18.37%	18.45%	12.89%	32.09%	13.36%	19.58	1.52	6.38%
US	Obs	39,018	39,018	39,015	39,015	39,018	39,018	39,018	39,018	25,489
	Mean	21.50%	17.70%	2.81%	5.52%	30.17%	5.25%	11.80	2.07	15.94%
	Std Dev	18.79%	18.41%	35.39%	28.02%	26.28%	22.88%	2.22	1.79	16.22%
	Median	18.37%	11.88%	8.66%	5.20%	22.02%	11.33%	11.77	1.44	10.17%
	Size-Weighted Mean	25.53%	15.35%	19.20%	11.17%	35.40%	12.95%	21.74	1.67	10.25%

Panel C: Leverage Measures and Regressor Summary Statistics for the Restricted Sample used in Table 2, Coumns 5-8
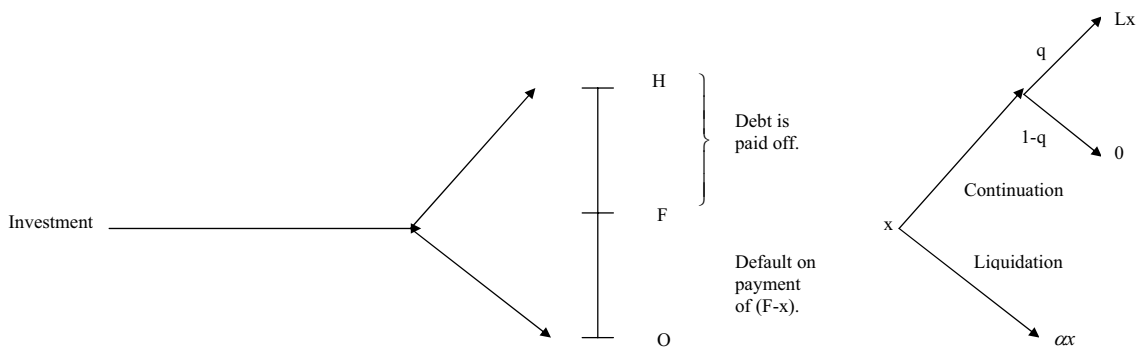
| | | Debt to Total Assets | | Net Debt to Total Assets | | Summary Statistics for Regressors | | | | |
		Book	Market	Book	Market	Intangibles	Profitability	Sales	Q	Specificity
UK	Obs	5,385	5,385	5,381	5,381	5,385	5,385	5,385	5,385	3,397
	Mean	19.77%	15.65%	7.67%	8.14%	12.56%	8.76%	11.17	1.87	27.51%
	Std Dev	14.38%	13.78%	24.33%	18.04%	16.43%	17.58%	2.18	1.47	20.08%
	Median	18.73%	12.69%	11.57%	7.47%	5.49%	12.22%	11.01	1.41	22.63%
	Size-Weighted Mean	27.18%	17.53%	20.97%	13.26%	11.65%	13.22%	19.14	1.60	17.53%
US	Obs	32,364	32,364	32,364	32,364	32,364	32,364	32,364	32,364	25,489
	Mean	24.16%	19.65%	10.43%	10.93%	15.17%	7.97%	12.34	1.90	28.26%
	Std Dev	18.53%	18.14%	30.65%	23.71%	15.58%	19.10%	2.12	1.53	23.54%
	Median	22.68%	15.31%	15.13%	9.71%	9.70%	12.18%	12.34	1.38	21.57%
	Size-Weighted Mean	28.02%	17.41%	22.91%	13.85%	12.06%	13.06%	21.89	1.61	23.15%

Panel D: Leverage Measures and Regressor Summary Statistics for the Restricted Sample used in Table 3, Columns 5-6

| | | Debt to Total Assets | | Net Debt to Total Assets | | Summary Statistics for Regressors | | | | |
		Book	Market	Book	Market	Specificity	Intangibles	Profitability	Sales	Q
UK	Obs	3,397	3,397	3,396	3,396	3,397	3,397	3,397	3,397	3,397
	Mean	18.88%	15.19%	7.31%	7.59%	27.51%	11.39%	9.53%	11.55	1.79
	Std Dev	13.48%	13.03%	22.83%	17.44%	20.08%	14.97%	16.17%	2.05	1.38
	Median	18.18%	12.85%	10.92%	7.20%	22.63%	5.26%	12.31%	11.37	1.35
	Size-Weighted Mean	24.79%	15.94%	17.61%	10.55%	26.73%	11.92%	12.83%	18.43	1.57
US	Obs	25,489	25,489	25,489	25,489	25,489	25,489	25,489	25,489	25,489
	Mean	23.52%	18.78%	8.53%	9.38%	28.26%	15.94%	6.57%	12.11	2.00
	Std Dev	18.73%	18.23%	31.93%	24.43%	23.54%	16.22%	21.01%	2.17	1.65
	Median	21.56%	13.65%	13.73%	7.96%	21.57%	10.17%	11.83%	12.09	1.45
	Size-Weighted Mean	26.42%	15.90%	20.73%	12.12%	34.31%	13.04%	13.14%	21.52	1.67

Table 2: Regression Results 1

This table reports results from OLS regressions of book leverage (Columns 1-2 and 5-6) and net book leverage (Columns 3-4 and 7-8) of US and UK firms on liquidation cost proxies (Specificity in Columns 1-4 and Intangibles in Columns 5-8), Profitability, Sales and Q interacted with each country dummy and their robust standard errors clustered at the firm level. Finally, time, country, and industry/industry-by-country dummies are included as indicated in each specification. The second panel reports t-statistics for the null hypothesis that the coefficient on the independent variable is the same for US and UK. The final panel reports p-values for the null hypothesis that the US-UK coefficient difference is non-negative. All variables are winsorized at 2% level.

	Proxy = Specificity				Proxy = Intangibles			
	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6	Col 7	Col 8
Specificity * UK	5.63%	4.73%	16.94%	16.25%				
	[4.27]	[3.43]	[8.37]	[7.63]				
Specificity * US	6.97%	6.82%	24.71%	24.88%				
	[9.59]	[9.11]	[21.41]	[20.80]				
Intangibles * UK					4.34%	2.84%	21.97%	18.60%
					[2.42]	[1.56]	[8.24]	[6.85]
Intangibles * US					18.95%	19.20%	49.30%	50.00%
					[16.59]	[16.61]	[31.14]	[31.00]
Profitability * UK	-13.40%	-12.77%	0.14%	1.83%	-3.96%	-3.95%	13.94%	14.50%
	[7.47]	[7.16]	[0.04]	[0.48]	[2.05]	[2.08]	[3.44]	[3.65]
Profitability * US	-10.17%	-10.23%	-1.56%	-1.64%	-10.54%	-10.45%	-2.50%	-2.40%
	[13.16]	[13.25]	[1.03]	[1.08]	[10.86]	[10.78]	[1.46]	[1.40]
Sales * UK	1.77%	1.92%	3.14%	3.40%	1.73%	1.89%	2.91%	3.28%
	[10.71]	[11.58]	[11.10]	[11.89]	[9.97]	[10.78]	[10.78]	[12.29]
Sales * US	1.93%	1.89%	4.85%	4.75%	1.93%	1.87%	4.29%	4.19%
	[22.20]	[21.41]	[32.28]	[31.25]	[20.69]	[19.72]	[29.06]	[28.10]
Q * UK	-1.54%	-1.69%	-5.11%	-5.42%	-1.73%	-1.83%	-4.98%	-5.17%
	[9.29]	[10.01]	[14.33]	[15.10]	[10.08]	[10.61]	[13.64]	[14.22]
Q * US	-2.29%	-2.23%	-5.40%	-5.30%	-2.67%	-2.61%	-5.66%	-5.56%
	[31.88]	[31.08]	[37.19]	[36.42]	[30.58]	[29.60]	[35.35]	[34.43]
R-squared	16.79%	17.61%	30.91%	31.59%	15.89%	16.89%	28.25%	29.07%
Observations	48,166	48,166	48,162	48,162	37,749	37,749	37,745	37,745
constant	yes	yes	yes	yes	yes	yes	yes	yes
industry dummy	yes	no	yes	no	yes	no	yes	no
industry * country	no	yes	no	yes	no	yes	no	yes
country dummy	yes	yes	yes	yes	yes	yes	yes	yes
year dummy	yes	yes	yes	yes	yes	yes	yes	yes

H0: Difference of coefficients between US and UK is zero

	t-stats	t-stats	t-stats	t-stats	t-stats	t-stats	t-stats	t-stats
Specificity	0.9	1.33	3.39	3.53				
Intangibles					6.92	7.62	8.93	9.99

H0: Difference of coefficients between US and UK is less than or equal to zero

	p-value	p-value	p-value	p-value	p-value	p-value	p-value	p-value
Specificity	0.19	0.11	0.00	0.00				
Intangibles					0.00	0.00	0.00	0.00

Table 3: Regression Results 2

This table reports results from Fama-MacBeth regressions of net book leverage of US and UK firms on liquidation cost proxies (Specificity in Columns 1-2 and Intangibles in Columns 3-4), Profitability, Sales and Q interacted with each country dummy and their robust standard errors clustered at the firm level. Finally, time, country, and industry/industry-by-country dummies are included as indicated in each specification. The second panel reports t-statistics for the null hypothesis that the coefficient on the independent variable is the same for US and UK, and the third panel p-values for the null that the US-UK difference is non-negative. All variables are winsorized at 2% level. The coefficients are estimated cross-sectionally in each year and averaged and the t-statistics for average coefficients are computed as per Fama and MacBeth (1973) methodology. Columns 5-6 repeat the panel specification of Table 2 employing both Specificity and Intangibles together as liquidation cost proxies.

| | Fama-MacBeth | | | | Panel Specification | |
| | Proxy = Specificity | | Proxy = Intangibles | | Both Proxies | |
	Col 1	Col 2	Col 3	Col 4	Col 5	Col 6
Specificity * UK	17.30%	13.42%			22.58%	23.61%
	(4.30)	(1.56)			[7.56]	[7.47]
Specificity * US	23.46%	23.57%			32.17%	32.32%
	(4.84)	(4.92)			[21.70]	[21.26]
Intangibles * UK			29.50%	23.26%	30.69%	24.78%
			(0.97)	(0.82)	[8.88]	[6.96]
Intangibles * US			49.06%	50.02%	64.51%	64.22%
			(12.1)	(12.2)	[35.86]	[35.14]
Profitability * UK	-19.31%	-18.68%	-4.11%	0.25%	12.18%	15.24%
	(-0.4)	(-0.4)	(-0.0)	(0.00)	[2.49]	[3.14]
Profitability * US	-7.21%	-7.31%	-9.99%	-9.91%	-4.36%	-3.00%
	(-0.4)	(-0.4)	(-0.5)	(-0.5)	[2.50]	[1.71]
Sales * UK	2.57%	2.98%	2.88%	2.89%	2.72%	3.03%
	(1.28)	(1.55)	(5.07)	(2.60)	[8.45]	[9.43]
Sales * US	4.93%	4.84%	4.37%	4.26%	3.75%	3.58%
	(7.34)	(6.74)	(10.1)	(8.53)	[23.19]	[21.80]
Q * UK	-6.28%	-7.02%	-3.51%	-5.93%	-4.79%	-4.62%
	(-1.8)	(-1.6)	(-0.5)	(-1.3)	[10.93]	[10.36]
Q * US	-5.80%	-5.71%	-6.17%	-6.06%	-4.95%	-4.65%
	(-4.9)	(-4.8)	(-6.2)	(-5.8)	[30.25]	[28.17]
R-squared	32.19%	32.95%	30.74%	31.76%	35.12%	35.01%
Constant	yes	yes	yes	yes	yes	yes
Industry dummy	yes	no	yes	no	yes	no
Industry*Country	no	yes	no	yes	no	yes
Country dummy	yes	no	yes	no	yes	yes
Year dummy					yes	yes

H0: Difference of coefficients between US and UK is less than or equal to zero

	p-value	*p*-value	*p*-value	*p*-value	*p*-value	*p*-value
Specificity	0.00	0.00			0.01	0.02
Intangibles			0.03	0.01	0.00	0.00
Observations					28,885	28,885
Observations by year						
1992	1,401	1,401	1,349	1,349		
1993	2,725	2,725	1,522	1,522		
1994	3,865	3,865	2,214	2,214		
1995	4,229	4,229	2,519	2,519		
1996	4,745	4,745	2,960	2,960		
1997	5,062	5,062	3,372	3,372		
1998	5,798	5,798	4,332	4,332		
1999	5,642	5,642	4,602	4,602		
2000	5,316	5,316	4,568	4,568		
2001	4,833	4,833	4,377	4,377		
2002	4,302	4,302	3,982	3,982		

Table 4: Quintile Cut-Offs

We report the distribution of firms into specificity quintiles. We pool all firms in US and UK and distribute them into quintiles based on their specificity or intangibles. We compute the distribution of firms for each year and report the time series mean of the distribution.

Distribution of Firms into Specificity Quintiles

	Q1	Q2	Q3	Q4	Q5
UK	17.49%	18.40%	19.50%	23.23%	21.37%
US	20.54%	20.34%	20.11%	19.30%	19.70%
Specificity is at most	0.078	0.161	0.276	0.474	

Distribution of Firms into Intangibles Quintiles

	Q1	Q2	Q3	Q4	Q5
UK	30.92%	15.88%	13.88%	15.42%	23.90%
US	18.26%	20.66%	20.98%	20.73%	19.38%
Specificity is at most	0.023	0.067	0.143	0.287	

Table 5: Difference of Differences Tests

All firms are pooled and classified into quintiles on a yearly basis by their asset specificity in Panel A or intangibles in Panel B. We compute the means and medians of the book leverage for US and UK firms for each quintile. The table reports the difference in means and medians between the 5th quintile (highest asset specificity or intangibles) and the 1st quintile (lowest asset specificity or intangibles). We then compute the difference of the differences between US and UK. All variables are winsorized at 2% level. Time-series means of the difference of differences are reported in the last but one row of each panel. One-sided p-value of the mean difference of differences being non-negative is reported in the last row.

Panel A: Q5-Q1 Based on Asset-Specificity

	Median Debt to Total Asset				Difference of Differences	Mean Debt to Total Asset				Difference of Differences
	US		UK			US		UK		
	Q5	Q1	Q5	Q1	Debt to Total Asset	Q5	Q1	Q5	Q1	Debt to Total Asset
Observations	205	206	81	81		205	206	81	81	
1992	26.09%	9.65%	20.84%	18.81%	14.41%	26.91%	16.37%	20.90%	21.59%	11.24%
	379	379	177	175		379	379	177	175	
1993	24.67%	9.57%	17.56%	13.68%	11.23%	24.70%	16.45%	18.09%	17.46%	7.61%
	628	625	188	186		628	625	188	186	
1994	22.66%	9.76%	16.09%	11.38%	8.19%	23.25%	16.98%	16.68%	15.38%	4.97%
	715	711	187	185		715	711	187	185	
1995	23.25%	7.93%	16.98%	14.41%	12.74%	23.96%	17.19%	17.70%	16.99%	6.06%
	829	824	188	188		829	824	188	188	
1996	22.81%	4.51%	18.12%	13.26%	13.43%	24.59%	15.43%	18.91%	16.51%	6.76%
	918	920	179	179		918	920	179	179	
1997	24.71%	7.49%	18.66%	8.43%	6.99%	25.97%	17.92%	19.16%	14.56%	3.45%
	1108	1115	166	167		1108	1115	166	167	
1998	26.79%	8.09%	21.22%	11.91%	9.39%	27.68%	17.91%	21.37%	16.57%	4.96%
	1102	1100	153	154		1102	1100	153	154	
1999	26.39%	3.46%	21.58%	10.33%	11.68%	27.28%	14.29%	21.98%	16.43%	7.44%
	1012	1009	177	175		1012	1009	177	175	
2000	26.99%	3.13%	23.64%	5.84%	6.05%	27.47%	14.21%	22.58%	11.19%	1.87%
	879	879	186	183		879	879	186	183	
2001	26.00%	4.95%	24.78%	5.96%	2.22%	27.09%	15.79%	22.90%	11.87%	0.28%
	784	778	163	160		784	778	163	160	
2002	25.03%	6.10%	20.92%	10.56%	8.57%	26.45%	16.61%	22.17%	14.11%	1.78%
				Mean	**9.54%**				**Mean**	**5.13%**
				p-value	**0**					**0.0002**

Panel B: Q5-Q1 Based on Intangibles

	Median Debt to Total Asset				Difference of Differences	Mean Debt to Total Asset				Difference of Differences
	US		UK			US		UK		
	Q5	Q1	Q5	Q1	Debt to Total Asset	Q5	Q1	Q5	Q1	Debt to Total Asset
Observations	134	135	37	38		134	135	37	38	
1990	29.06%	22.52%	25.91%	17.48%	-1.88%	32.56%	24.03%	24.80%	17.33%	1.06%
	187	187	34	35		187	187	34	35	
1991	32.20%	19.56%	26.86%	17.92%	3.71%	33.01%	20.95%	22.59%	18.41%	7.88%
	240	239	34	34		240	239	34	34	
1992	29.50%	19.29%	26.16%	16.23%	0.28%	29.91%	21.60%	24.48%	15.47%	-0.70%
	277	276	32	33		277	276	32	33	
1993	28.84%	17.80%	21.04%	15.55%	5.55%	29.10%	20.64%	21.99%	17.41%	3.88%
	426	426	32	33		426	426	32	33	
1994	24.80%	20.03%	22.75%	13.95%	-4.03%	26.52%	20.87%	19.82%	14.46%	0.29%
	486	491	33	34		486	491	33	34	
1995	26.93%	18.54%	26.93%	16.21%	-2.34%	28.38%	20.71%	22.14%	15.96%	1.48%
	570	568	47	47		570	568	47	47	
1996	26.66%	19.44%	22.63%	17.52%	2.11%	28.04%	21.29%	21.92%	17.99%	2.82%
	653	656	54	54		653	656	54	54	
1997	29.53%	17.15%	15.20%	17.35%	14.54%	30.73%	21.16%	19.19%	16.48%	6.87%
	812	806	97	97		812	806	97	97	
1998	31.14%	16.24%	18.54%	19.20%	15.56%	31.63%	21.08%	20.96%	20.42%	10.00%
	819	820	145	148		819	820	145	148	
1999	27.75%	17.77%	17.28%	23.31%	16.01%	28.80%	21.35%	20.62%	22.88%	9.71%
	800	803	173	177		800	803	173	177	
2000	22.74%	14.12%	12.20%	16.65%	13.08%	25.74%	20.55%	16.56%	19.36%	8.00%
	736	734	184	187		736	734	184	187	
2001	24.84%	15.86%	11.49%	17.60%	15.09%	26.70%	20.73%	16.11%	20.21%	10.06%
	659	658	167	171		659	658	167	171	
2002	23.77%	15.85%	12.22%	18.24%	13.94%	25.72%	20.23%	17.06%	20.96%	9.39%
				Mean	**7.05%**				**Mean**	**5.44%**
				p-value	**0.0035**					**0.0002**

Table 6: Inter-Quintile Difference of Differences Tests

In Panels A and B, all firms are pooled and classified into quintiles on a yearly basis by their asset specificity or intangibles. We compute the means and medians of the book leverage for US and UK firms for each quintile. The table reports the difference in means and medians between the 5th quintile (highest asset specificity or intangibles) and the 1st quintile (lowest asset specificity or intangibles), the 5th quintile and the 4th quintile, the 4th quintile and the 3rd quintile, the 3rd quintile and the 2nd quintile, the 2nd quintile and the 1st quintile. We then compute the difference of the differences between US and UK. Panel A employs book leverage and Panel B employs book leverage net of debt.

In Panel C, each firm in the US is matched to firms in the UK based on the Near-neighbour (ten nearest neighbours) matching technique of Heckman, Ichimura and Todd (1997, 1998). The matching is based on Tangibility, Profitability, Log Sales, and Market-to-Book, and either Asset Specificity or Intangibles. Next, firms in the US are placed in quintiles based on their asset specificity or intangibles. The inter-quintile leverage difference for the US is the difference between book leverage of high asset-specificity or high intangibles (quintile n) and low asset specificity or low intangibles (quintile n-1) in the country. For UK, the leverage difference is computed using the matched firms for the US firms in quintile n and quintile n-1. The difference of differences is calculated by subtracting the inter-quintile leverage difference of the UK from the leverage difference of the US.

All variables are winsorized at 2% level. Time-series means of the difference of differences and one-sided p-values that the mean is non-negative are reported in the last rows of each panel.

Panel A: Inter-Quintile Difference of Differences

Year	Liquidity Proxy = Specificity					Liquidity Proxy = Intangibles				
	Q5 - Q1	Q5 - Q4	Q4 - Q3	Q3 - Q2	Q2 - Q1	Q5 - Q1	Q5 - Q4	Q4 - Q3	Q3 - Q2	Q2 - Q1
1992	14.41%	-1.77%	8.12%	3.01%	5.06%	0.28%	7.19%	-2.56%	2.91%	-7.26%
1993	11.23%	2.39%	2.54%	6.38%	-0.09%	5.55%	10.52%	-1.89%	-2.29%	-0.78%
1994	8.19%	1.33%	1.53%	6.68%	-1.35%	-4.03%	-3.15%	5.72%	1.79%	-8.39%
1995	12.74%	2.33%	-1.08%	6.53%	4.96%	-2.34%	-5.95%	0.08%	6.53%	-3.00%
1996	13.43%	1.01%	3.58%	3.69%	5.16%	2.11%	-1.59%	6.26%	-3.04%	0.48%
1997	6.99%	2.82%	6.69%	1.82%	-4.34%	14.54%	6.60%	4.30%	7.49%	-3.84%
1998	9.39%	3.22%	3.20%	0.07%	2.90%	15.56%	8.13%	2.41%	1.81%	3.22%
1999	11.68%	2.29%	2.17%	6.90%	0.31%	16.01%	3.76%	3.34%	5.49%	3.42%
2000	6.05%	0.12%	3.30%	3.87%	-1.24%	13.08%	4.21%	8.80%	-0.34%	0.41%
2001	2.22%	-1.00%	-0.22%	6.56%	-3.12%	15.09%	8.17%	6.88%	1.72%	-1.68%
2002	8.57%	0.48%	5.35%	-1.88%	4.62%	13.94%	7.98%	1.70%	3.68%	0.57%
Mean	9.54%	1.20%	3.20%	3.97%	1.17%	7.05%	3.66%	2.87%	2.15%	-1.63%
p-value	0.000	0.017	0.002	0.001	0.148	0.004	0.013	0.005	0.036	0.903

Panel B: Q5-Q1 with Leverage Measured using Net Debt

	Liquidity Proxy = Specificity	Liquidity Proxy = Intangibles
1990		23.50%
1991	31.73%	19.36%
1992	31.14%	6.00%
1993	22.23%	4.54%
1994	11.64%	2.06%
1995	21.11%	-0.15%
1996	29.23%	2.34%
1997	22.00%	17.80%
1998	21.97%	22.72%
1999	36.27%	24.44%
2000	19.78%	29.37%
2001	13.16%	24.47%
2002	18.26%	22.45%
Mean	23.21%	15.30%
p-value	0.000	0.000

Panel C: Inter-Quintile Difference of Differences with Heckman-matched US and UK firms

	Liquidity Proxy = Specificity					Liquidity Proxy = Intangibles				
	Q5-Q1	Q5-Q4	Q4-Q3	Q3-Q2	Q2-Q1	Q5-Q1	Q5-Q4	Q4-Q3	Q3-Q2	Q2-Q1
1992	11.13%	0.70%	4.16%	2.40%	3.87%	7.55%	5.99%	1.32%	0.17%	0.07%
1993	8.24%	1.33%	3.55%	-0.06%	3.41%	4.14%	5.27%	-1.27%	0.02%	0.12%
1994	6.63%	0.89%	2.74%	2.20%	0.81%	3.00%	4.56%	-0.63%	0.01%	-0.93%
1995	7.77%	2.05%	2.22%	2.34%	1.16%	3.33%	2.10%	1.06%	-0.72%	0.90%
1996	9.24%	1.91%	3.21%	2.99%	1.13%	2.41%	0.59%	1.51%	0.71%	-0.41%
1997	7.40%	3.31%	4.05%	2.30%	-2.26%	6.87%	3.83%	3.20%	1.33%	-1.49%
1998	7.37%	4.01%	2.35%	1.47%	-0.45%	8.08%	3.00%	3.58%	1.41%	0.10%
1999	9.06%	2.74%	1.76%	2.99%	1.57%	6.42%	1.28%	2.49%	4.87%	-2.22%
2000	12.08%	3.01%	4.51%	3.17%	1.40%	4.40%	1.14%	3.32%	0.78%	-0.84%
2001	8.29%	3.43%	2.34%	3.67%	-1.16%	6.83%	3.77%	2.73%	0.45%	-0.13%
2002	6.65%	3.21%	2.65%	3.46%	-2.67%	5.67%	3.07%	2.07%	0.94%	-0.41%
Mean	8.53%	2.42%	3.05%	2.45%	0.62%	5.34%	3.15%	1.76%	0.91%	-0.48%
p-value	0	0	0	0	0.1744	0	0.0001	0.0021	0.0331	0.9516