A Positive Theory of Information for Debt Contracting: Implications for Financial Reporting*

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Abstract

Debt contracting creates demand for information by lenders for several related but distinct decisions. Lenders gather information ex ante for *screening* the borrower. Lenders also collect information when the contract is in effect to assess the *suitability* of the initial contract terms. Finally, lenders monitor *compliance* with negotiated contract terms using information collected ex post. In this study I examine these three decisions and discuss what features of information are useful to the lender within each decision context. These features include whether the information is *hard* or *soft*; whether it is *predictive* or *reflective*; and whether the information includes just *persistent* components or whether it also admits *transient* information. I continue by considering how publicly reporting financial information is potentially useful to the lender for each decision. I conclude by discussing potential avenues for future research suggested by this decision framework.

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1 Introduction

Debt is one of the oldest economic conventions in human history; Graeber (2011) proposes that debt predates both money and barter exchange and traces its history over 5,000 years to Bronze Age Sumer. Contemporary business enterprises use debt extensively, and accounting theory posits that debt contracting is a key driver of contemporary accounting practice (Watts and Zimmerman 1978, 1986; Watts 2003). Although the nature of exchange and business transactions has evolved from ancient times to the present, certain aspects of debt remain timelessly constant. Specifically, the party advancing resources (the lender) needs to estimate the likelihood that the party receiving resources (the borrower) will be able to repay the debt at a stipulated future date. That is, any debt transaction creates lender demand for information about the borrower's future economic performance, financial position, and capacity to pay. As debt came to comprise formal contractual arrangements, the assessment and enforcement of these contracts created further demand for information by lenders. The objective of this paper is to define the full decision context of lenders, understand lenders' demand for information for each decision, and characterize what features make information useful based on lenders' demand.

In the second section of the paper, I discuss the various decisions made by lenders and how information is used in each decision context. Lenders have three distinct, but related, decisions to make related to any debt contract. First, the lender must decide whether to enter a contract with a prospective borrower and the terms to offer if a loan is extended. Second, when the borrower and lender agree to a contract, the lender in subsequent periods must assess if the contract terms remain suitable, or if it would be preferable to change certain terms based new information revealed after contract initiation. For example, new information received following contract initiation may suggest the borrower is riskier than originally expected and the interest rate on the loan is too low.

Third, the lender must assess whether the borrower has followed the requirements and limitations stipulated in the contract. These decisions give rise to demand for information, and because the decisions are distinct so is the information the lenders demand. I term the information for these three decisions as information for *screening*, *suitability*, and *compliance*.

In the third section, I examine what features make information useful for each of the lenders' three decisions. I consider the temporal orientation of the information in terms of whether the information refers to past events and transactions (*reflective*) or conveys expectations of future activities and values (*predictive*). I also consider whether the information is from *hard*, verifiable sources, for example, information generated from observable transactions, or whether it is *soft*, for example, qualitative or subjective information. Finally, I consider the implications of information that is relatively *permanent*, where information reported in one period tends to also apply to future periods, versus information that is *transient*. I argue that different features are required for each of the lender's demands: screening requires predictive, permanent information that can be hard or soft; compliance requires hard, reflective information that includes permanent and transient components; and information to assess suitability has a mixture of these features.

Having developed theory linking the demand for information in debt contracting to the desired features of information, I next turn to the information generated by the firm financial accounting system, which I term *reported financial information*, to consider if and how this information satisfies the demands of lenders. I draw the following conclusions. First, based on the timeliness of reported financial information and the availability of information from other sources, reported financial information is less useful for screening borrowers in many cases; this is particularly the case when private information is available to lenders. Second, the features of reported financial information suggest that this information is useful for both assessing the ex post

suitability of loan contracts and (especially) compliance. Third, the theory suggests that screening and suitability are substitutes. That is, holding the information environment of the borrower equal, the more information the lender can gather through screening the lower the demand for information to assess suitability ex post is. This has implications for financial reporting as a source of information because screening and suitability demand different features for information to be useful. Fourth, and related, compliance information demand has a complex and ambiguous relation with screening information demand. Lenders with strong screening may use more information-contingent provisions, particularly those unconditionally limiting borrower actions, creating a positive relation between screening and compliance. On the other hand, poor screening may lead to greater demand for ex post transfer of control rights, indicating an inverse relation between screening and compliance.

I conclude the study by proposing several testable hypotheses suggested by the theory. First, the theory allows for predictions linking accounting standards to changes in the features of information. For example, shifting accounting standards towards fair value (more predictive and softer than historic cost information) should make financial reporting more useful for screening but less useful for compliance. Second, changes in disclosure regulation can also affect the usefulness of accounting information for different decisions. For example, expanded safe harbor regulations encourage forward-looking disclosures which reduce lender reliance on financial reporting.

Third, the theory suggests a more complex, nuanced view of earnings quality. Following the view from Dechow, Ge, and Shrand (2010) that earnings quality is context-specific, research can develop multiple measures of debt-based earnings quality focusing on the three decisions that lenders make. Such metrics could also incorporate the trade-offs between the decisions. Fourth,

the theory predicts a significant role for private information in debt contracting, particularly in the screening role. Although researchers currently lack a data source of private information for a broad set of borrowers, this represents a particularly promising and important direction for future work in debt contracting.

This is the first study to explicitly consider the multiple decisions that lenders make and what information features are useful for making these decisions. Unlike the literature which examines equity investors' demand for information — which focuses on the amount, timing, and risk of future cash flows — the explicit contractual nature of debt introduces new demand for information currently unstudied in the literature. The upshot is that we must consider not just *whether* information is useful for contracting, but for *which decision* it is useful. This more refined viewpoint expands the literature's view of information for debt.

This study also has significant implications for our understanding of reported financial information and its role in debt contracting. Some studies focus on how lenders and borrowers use reported financial information in the process of debt contracting; many studies focus on ex-post use of information, particularly covenant compliance (e.g., Sweeney 1994; DeFond and Jiambalvo 1994; Dichev and Skinner 2002), while others focus on ex-ante use of information (e.g., Francis, LaFond, Olsson, and Schipper 2005; Bharath, Sunder, and Sunder 2008). The theory in this study provides consilience between these two often conflicting demands and yields testable predictions on what features of information is useful depending on the specific circumstances of the borrower. This further has implications for understanding the quality of reported financial information for debt contracting, in that specific decisions require different specific information features.

The paper proceeds as follows. I define the lender's demand for information and discuss the three specific decision contexts the lender faces in Section 1. I describe features of information

and link these to the lender's decisions in Section 3. I examine reported financial information and when and how it is useful for debt contracting, and present testable implications of the theory in Section, 4. I provide concluding thoughts in the final section.

2 The Lender's Demand for Information

2.1 General information demand

My objective in this study is to understand how lenders use information in debt contracting. Because my ultimate objective is to link the demand for information with the outputs of the financial reporting system, I focus on information that is *external* to the borrower. I do not consider the *internal* information of the borrower; that is, the information used by the borrower for internal decision-making purposes related to borrowing. With a focus on external information, I consider the lender's demand for information throughout the contracting process.

As a starting point, it is important to define the precise decision contexts that information must serve for the lender. There are a wide range of possible decisions related to debt contracting that the lender makes, such whether to offer a contract, which terms to include if the contract is offered, and the appropriate level of monitoring once the contract is in effect. Each of these decisions, however, leads to a single, ultimate question for the creditor: Will the borrower be able to pay back the debt (including any required payments of principal and interest)?[1] The borrower's ability to repay is a function of a combination of his cash flows and the liquidation value of his assets; in short, the various sources of value that the borrower can produce over the life of the loan and deploy at maturity. Considering cash flows and liquidation value collectively as the borrower's *value*, the lender's objective in information search is to understand the borrower's future value

[1] I assume that if the borrower *can* pay, he *will* pay. That is, I ignore the idea of strategic default by the borrower, where the threat of default is used by borrowers to extract concessions in renegotiation from the lender.

when the debt matures and must be repaid—the *borrower's future value*.[2] The lender's expectations of the borrower's future value influence virtually all the other decision related to the debt, including the provisions of the debt contract that are offered to the borrower. Thus, understanding and estimating the borrower's future value is the key driver of the lender's demand for information.

Prior to entering a contract, the lender must assess the borrower's future value, which I term V.[3] I assume that the borrower's future value is stochastic and can be described with some distribution $f(V)$. This function embeds the lender's expectations of the riskiness of the borrower, i.e., the range and frequency of possible borrower value outcomes the lender expects could obtain in the future. The lender uses this distribution to estimate her expected payoff function from a potential debt contract. The lender's payoff function covers two separate ranges based on the amount the lender expects to receive from the borrower. Define I as the principal of the debt, the amount that the borrower receives if the contract is initiated. Further, define r as the interest rate the lender charges as compensation for lending. For a given I and r, for points where V is expected to fall below $I(1+r)$ the lender expects to receive V; this is the *default* state, where the borrower's value is insufficient to cover the required interest and principal payment. For points on the distribution where the expected value is greater than $I(1+r)$, the *solvency* state, the lender expects to receive $I(1+r)$. Since the borrower's payoff is capped at principal plus interest, this amount is

[2] An extensive literature examines the complementary role of earning and book values in valuation. Ohlson (1995) provides a model linking earnings and book values in an accounting-based valuation model. Empirical studies examining the joint role of earnings and book values in firm value include Hayn (1995), Burgstahler and Dichev (1997), Penman (1998), Barth, Beaver, and Landsman (1998), and Collins, Pincus, and Xie (1999).

[3] The lender is interested in the lender's value when the debt matures, plus any intermediate periods when payments are due. The maturity and intermediate payment dates are themselves variables in lender's formulation of the debt contract terms. Thus, in assessing the borrower ex-ante the lender considers a range of possible repayment schedules. For expositional simplicity, I consider a single future date under consideration by the lender; that is, no intermediate payments. The framework can easily be adapted to admit intermediate payments.

what the borrower receives when $V > I(1+r)$, regardless of the magnitude of V. I illustrate the lender's expected payoff based on the level of V in Figure 1.

Based on this expected payoff function, the lender prices the loan and selects loan terms that provide a fair return on capital.[4] That is, based on the lender having rational expectations of $f(V)$, she sets a contract that provides her required rate of return in expectation.[5] I focus exclusively on the pricing of the loan to provide a relatively simple structure to understand the lenders' demand for information. In debt contracting the reality is much more complex. For example, loan contract design balances a variety of non-pricing terms, such as loan size, maturity, collateral, and other provisions such as covenants. Additionally, lenders' perspectives on a "fair return on capital" are likely to vary based on risk aversion and economic conditions. The structure here admits both these sorts of variation, but I forgo their explication in the interest of parsimony. Using this simple structure, I argue that a) the lender's expected payoff is closely linked to $f(V)$ and b) the expected payoff function is the key determinant of the lender's debt contracting decisions. Thus, the lender's information search can be considered to focus on understanding the parameters of $f(V)$.

One point is worth discussing before proceeding. I use the term "value" (i.e., with reference to "the borrower's future value") in general terms. It is meant to convey the borrower's capacity to repay the loan, whether through cash flows, liquidation of assets, or some combination of the two. Researchers typically structure analytical models of debt contracting (e.g., Aghion and Bolton 1992) with debt being used to fund a finite-period investment project, with the investment being liquidated at debt maturity. Realistically, borrowers do not need to fully liquidate at loan maturity, but either have sufficient cash to repay their debt or use refinancing or recapitalization

[4] I assume a competitive lending market with neither the borrower nor the lender having an advantage in the negotiation. If competitive conditions shift in favor of one party or the other this would influence contract terms, but this would be incremental to the effects discussed here.

[5] For exposition purposes, I refer to the borrower as "he" and the lender as "she."

to pay down their existing commitments. The concept of value in this paper is meant to capture the borrower's repayment capacity. As such, it should not be conflated with other concepts of value such as market or exchange values.

There are two key drivers to the lender's expectations of the borrower's future value: the expected future *state* and the borrower's *action*. Each has important and distinct implications for *f(V)*. The state (often termed the *state of nature*) captures the anticipated economic and business conditions relevant to the sphere in which the borrower operates. I view expectations of the state as unrelated to the actions that the borrower takes. Expectations of the future state involve projections about the future state of the macro-economy, including broad changes in demand and supply for the goods or services that the borrower provides; expectations of the availability and cost of financing; and conjectures on future geopolitical and regulatory changes. The state can be a function of the entire economy, the borrower's sector or industry, or be specific to the borrower. The future state is relevant to *f(V)* but out of the control of the borrower.

The second driver, the borrower's action, captures the range of possible activities and efforts that the borrower can undertake. This driver of *f(V)* is, by definition, under the control of the borrower, and it has long been a subject of the contracting literature (e.g., Holmstrom 1979). Specifically, the principal-agent literature focuses on how a principal (the lender in the debt contracting scenario) motivates the proper action by the agent (the borrower). In the debt contracting literature, the resolution of this sort of conflict has been discussed in Smith and Warner (1979), Kalay (1982), Garleanu and Zwiebel (2009), and many others.

The expected state and the expected action of the borrower collectively dictate the parameters of *f(V)*.[6] Therefore the lender's information search focuses on information about the state and borrower action. Importantly, the state and borrower action also interactively affect the lender's expected future payoff from the loan. Some actions strictly reduce the lender's payoff and are thus likely to be unconditionally prohibited (or limited). For example, paying a liquidating dividend to shareholders after borrowing leaves the lender's payoff function unconditionally lower (i.e., there is no state of nature where such a dividend increases the lender's expected payoff, assuming the lender is not also a shareholder.) In such cases, the lender imposes a penalty on the borrower (e.g., immediate acceleration of loan principal) if the borrower takes such an action. The borrower can decide whether the benefit of paying the dividend is worth the cost of lender's response, or whether they will precommit in the contract to not taking such an action (Smith and Warner 1979; Kalay 1982). Whichever the case, the lender seeks to understand which actions are unconditionally harmful or beneficial, regardless of the expected future state.

There are also actions that are beneficial in some future states but detrimental to others (in terms of the lender's expected payoff); in the contract these sorts of actions are addressed conditionally. For example, consider the simple case of two possible future states (S_H, S_L) and two possible actions by the borrower (A_H, A_L). If, for example, A_H yields a higher expected payoff in either S_H or S_L, then A_L should be contractually prohibited or sufficiently penalized that the borrower does not take it. However, it is likely that different actions are optimal based on which state of nature obtains. For example, taking *P* to be the lender's expected payoff, it is possible that a high action may optimize in the high state, while the low action may optimize in the low state;

[6] The expected value of borrower firm value should properly be termed *f(V|s,a)*, i.e., the distribution of future value is conditioned on possible future states (*s*) and actions (*a*). I use the term *f(V)* for exposition simplicity, with *s* and *a* implicitly incorporated.

that is, $E[P|S_H, A_H] > E[P|S_H, A_L]$ but $E[P|S_L, A_L] > E[P|S_L, A_H]$. This suggests that the lender seeks information on not only the future state and action independently, but also on how they interact.

2.2 Lender decisions

Unlike for common stock and other equity shares, where the contract between issuers and investors is implicit, the contract between borrowers and lenders is explicit. This introduces additional demand for information that is not present in the equity context. In this section, drawing on the framework laid out in the prior section, I present three different decisions that give rise to the lender's demand for information, each related in some way to *f(V)*. First, the lender seeks information ex ante to determine *f(V)* and set appropriate contracting terms; I term this ex ante acquisition of information *screening*. Second, after the contract is in effect, the lender uses information ex post to determine if the original contract terms are appropriate; I term the information acquired for this purpose information to assess *suitability*. Third, if the contract has provisions that are triggered by realized information, the lender gathers information to determine the whether the borrower has violated any of the original terms of the contract; I term this role of information *compliance*.

2.2.1 Screening

Prior to entering a debt agreement with a borrower, the lender collects information to determine a) whether to offer a contract and b) what terms to offer if she opts to offer a contract. This pre-contracting information acquisition of *screening* information entails the lender developing expectations of the future state of nature and the borrower's potential future actions. The lender uses this information about state and action (and their expected interaction) to estimate *f(V)* and determine the appropriate contract terms to offer.

The degree to which *f(V)* can be specified is a function of the information environment (i.e., the amount of information that is available) and lender's ability in collecting and processing information (i.e., the cost to the lender). The amount of screening information the lender acquires is a function of information availability and processing costs, and represents a cost-benefit trade-off; the lender should expend resources collecting information to the point where the marginal benefit of that information is equal to the marginal cost.[7] Holding the lender's ability to collect and process information equal, when the borrower's information environment is rich—that is, when there is a lot of readily available information about the borrower that the lender can access and process at a low cost—the lender collects a large amount of information and be able to develop a relatively precise estimate of *f(V)*. In contrast, when the borrower's information environment is opaque, the lender stops collecting information when the cost becomes too high—even if the estimate of *f(V)* is not very precise.

The same logic follows for the lender's skill and facility in collecting and processing information. Holding the borrower's information environment constant, the cost at which the lender can acquire and process information decreases her demand for information. If a creditor has experience with a firm or industry, or has expertise in analyzing certain types of information, the cost is lower, and the amount of information collected should increase. Similarly, a lender lacking savvy, skill, or experience collects relatively less information as the marginal benefit from the information is lower than for a more capable lender.

[7] In practice, this is more complex. Although the price of acquiring screening information is passed on to the borrower should the parties agree to a debt contract, the lender may also expend resources on screening only to decide not to offer a contract (i.e., the borrower's prospects as sufficiently poor that the lender cannot design a contract that provides her required rate of return). This represents a case where the lender plausibly bears some of the contracting costs. I expect that this cost is ultimately subsidized by other borrowers who enter contracts with the lender; that is, the lender increases her required rate of return to cover the screening costs of unmatched borrowers.

Consider the extreme case where a borrower's information environment is completely transparent. Further, assume that the lender can acquire and process this information at no cost. Considering the information environment and lender cost jointly, assume that the lender can develop an estimate of *f(V)* with sufficient precision to write a *complete contract*. A complete contract, in this context, is one where the lender can anticipate all possible future states during screening and stipulate a required borrower action for every possible future state. In this scenario, which I term *perfect screening*, all contract-relevant information is available to the contracting parties ex ante. Under the further assumption that both parties agree to the content and implications of the screening information, there is no scope for ex post changes to the contract. In other words, with complete screening information, the only further demand for information in the contract is for determining whether the borrower has taken an unconditionally or conditionally prohibited action (see the discussion of compliance in Section 2.2.3.) The complete debt contract is satisfactory to both lender and borrower over the term of the loan.[8]

2.2.2 Suitability

It is very unlikely that the conditions for writing a complete debt contract hold in practice. First, information acquisition and processing are not costless, so even a skilled lender approaches a threshold where the marginal benefit of screening expenditures ceases to be justified. Second, even if information is available, it may be insufficiently reliable – for example, the information may be too noisy or biased – to be useful for contracting. Third, there is likely information that is unknown and unknowable ex ante and will only be revealed ex post. This sort of uncertainty means

[8] It is important to note here that this does not imply a certain outcome in terms of the debt contract. Under perfect screening, the lender can determine with certainty the distribution of the borrower's future value. Screening may yield a distribution where the lender pays in full 60% of the time and defaults 40% of the time, with the lender receiving less than full principal and interest. The borrower's outcome is still stochastic, but the parameters of the distribution of outcomes are fully known.

that, even if no frictions exist due to lack of useful contracting information, the two parties cannot write a complete contract.[9] This leads to an *incomplete contract*, where some states, actions, or state-action pairs are not or cannot be included in the initial contract.

I describe two distinct motives for information acquisition after the debt contract has begun. The first is acquisition of information to determine whether the initial contract remains suitable ex post. The *suitability*, or appropriateness, of the contract is based on a comparison of the expectations embedded in the original contract terms and the ex post realized outcome of the borrower, e.g., the borrower's performance. The suitability decision implicitly assumes that the contract is incomplete, where the determination of suitability involves determining whether the original contract terms have been rendered inefficient due to the realized state, the borrower action, or the combination of state and action.

To determine the ongoing suitability of the contract, the creditor collects information after loan initiation but prior to maturity. This information, like screening information, is collected and processed at some cost. In terms of determining the ongoing suitability of the contract, the lender seeks information to answer two related questions. First, does the realized state and borrower action fit into the range of expectations embedded in the original contract terms? Second, if the state and action suggest a deviation from the original expectations, what implications does this deviation have for the contract going forward?

To determine contract suitability, the lender must assess the state of nature that has obtained in the period following contract initiation. This sort of state verification allows the lender to determine whether the realized state was considered in the set of possible outcomes in the original

[9] I differentiate uncertainty from risk following Knight (1921). In the structure discussed in this study, uncertainty implies one or more of the parameters of *f(V)* is unknown at the time of contracting. Risk, in contrast, implies that all parameters of *f(V)* are known. See Demerjian (2017) for a detailed discussion.

contract. For example, the lender may have considered forecasts of economic growth between −2% and 2% when writing the contract. If the realized economic growth is 1%, then the contract is within the range of the original contract terms (at least in terms of economic growth forecasts) but if realized economic growth is 5% or -4% these cases are outside of the boundaries of the original contract. State verification is likely to be costly because the realized state of nature may be complex for the lender to assess.

Conditional on the realized state being within the original set considered during screening, the lender then collects information to determine whether the borrower's action was appropriate given the state. Unlike complete contracting, where each state is, by definition, linked to an optimal action, the state-action linking under incomplete contracting is necessarily less precise. Thus, rather than trying to stipulate state-action pairs ex ante, the lender verifies the state ex post and determines whether a different action (or actions) would be discernibly superior under the realized state. This is potentially accomplished by examining the borrower's outcome (e.g., reported performance), which incorporates the effects of state and borrower action. If the lender deems the borrower's action appropriate given the realized state, the lender demands no further information and is satisfied with the current contract remaining in force.

If the lender's information search suggests that either the state is outside of the original set assessed, or the borrower's action is suboptimal given the current state (or both), the lender seeks information to determine what implications the state and action have on the borrower's future value. In this sense, the lender rescreens the borrower, now with an updated information set based on the realization of new, post-contracting information.[10] Rescreening is triggered by information suggesting the state, borrower action, or state-action combination are not suitable relative to the

[10] The original process of screening can be viewed finding information at t=0 to determine the distribution of V: $f(V|\Omega_0)$. Rescreening involves a similar assessment, but for subsequent periods t>0: $f(V|\Omega_t)$.

original contract. Whether the lender wants to change the terms of the contract is dictated by the information acquired during rescreening. Ex post rescreening is very similar to ex ante screening; it only differs because it involves an updated information set.

2.2.3 Compliance

The second way that lenders use ex post information is in determining contract *compliance*. As I discuss earlier, borrowers and lenders can write contracts that explicitly include information-contingent outcomes. As an example, a contract could include a punishment interest rate if the borrower takes a prohibited action. To determine whether a limited or prohibited action has taken place, the lender collects information after contract initiation. This information links a contractible signal to the borrower's action or a state-action pair.

Contract terms written directly on information come in several forms. The first contract term is used to determine whether the borrower has taken a restricted action. Actions can be unconditionally prohibited—forbidden under all circumstances—or conditionally prohibited based on the realized state of nature. Like information gathered related to the suitability of the contract, the lender gathers information about the state of nature and the borrower's actions prior to the measurement date. Unlike information used to assess suitability, this information is compared to contractually defined information variables and compliance with the contract terms is formally and explicitly determined. Whereas a deviation from suitability may cause a lender to seek additional information (i.e., rescreening) and potentially attempt to change the terms of the contract ex post, a contract being out of compliance typically has direct, contractually stipulated implications, such as specific changes to the contract if the borrower is found to be out of compliance.

The above description implicitly assumes that action or state-action combinations that are prohibited can be cost-effectively inferred with ex post information; this would be an ex ante assumption, in the sense that the lender would be confident during screening that a prohibited action or state-action combination would be detectable ex post, and that the relevant information could be defined and readily measured. In some cases, particularly a moral hazard setting where actions are difficult to observe, and the incomplete contracting setting where optimal state-action combinations are difficult to stipulate (even if actions were observable), the contract might include information based-triggers even when the information is imprecise. To address these cases, the lender sets ex ante thresholds that the borrower must maintain to comply with the contract. The threshold is linked to the state of nature, the borrower's action, or both, and is designed to provide a heuristic for the lender to know if she may want to change the contract ex post.

Following this logic, a contract could be set to require the borrower to maintain some minimum threshold of a performance metric.[11] The use of borrower performance is a heuristic meant to capture state or state-action combinations that are unobservable or difficult to verify. For example, the complexity of contemporary corporations makes it difficult to contractually stipulate state-action combinations even to a first approximation. Moreover, even when the past state can be verified it is difficult to ex post verify the borrower's set of actions, which are broad and diverse. The use of performance or some other proxy for state-actions allows the lender to approximate when reassessment of the contract might be necessary. Following the above example, if the borrower experiences good performance (and maintains the performance threshold) the contract continues in force. If the borrower has poor performance (and fails to maintain the threshold) the

[11] I used the term "performance" very broadly; it is meant to convey how borrower outcomes relate to the original expected distribution of future value *f(V)*. In this sense, "good" performance would be an outcome that implies the borrower is on the right-hand side of *f(V)*, and "bad" performance on the left-hand side.

lender wants to a) assess the implications of the borrower's failure to maintain the threshold (i.e., rescreen the borrower) and b) be able to change the contract if she deems this necessary. The compliance role, in this case, is to seek information about whether the borrower has remained in compliance with the contractually stipulated threshold.

I summarize the lender's decisions and corresponding demand for information in Figure 2. Screening information involves the collection of information about the borrower ex ante to determine whether to offer a loan and if so, what terms to include. The lender also collects information ex post to determine the ongoing suitability of the contract, which may trigger rescreening. Finally, the lender collects information to determine whether the borrower has remained in compliance with any information-contingent provisions in the contract.

2.3 Complementarity and substitution in lender decisions

The three decisions discussed above do not exist independently of one another. In this section, I provide an assessment of the circumstances that would give rise to demand for information in each decision context. As a starting point, the demand for information related to any decision—screening, suitability, or compliance—is a function of the information set available for the firm. In the incomplete contracting setting that I focus on in this study, lenders collect information to screen the borrower and learn about the expected states and actions and how these affect the distribution of the borrower's future value. The optimal amount of screening is a function of the information environment of the borrower. If the borrower's information environment is relatively rich and transparent, and much is known about the borrower's future value, relatively little screening information is needed to write the contract.

Under incomplete contracting, some states, actions, and state-action combinations are not included in the contract. While these contracts still involve screening, under incomplete contracts

screening is inherently incomplete. This gives rise to demand for information demand to assess suitability. The amount of demand depends on the overall uncertainty about the borrower as well as the degree of incompleteness in screening. For example, when there is considerable uncertainty about a borrower but also a rich information environment, screening is the principal source of information demand. Conversely, a borrower with a similar level of uncertainty but a dearth of information for screening creates greater demand for suitability information. This suggests, holding the information environment of the borrower equal, that screening and suitability demands for information are substitutes.

The demand for compliance information is a function of how many information-contingent provisions are included in the debt contract. The relation between these provisions and screening information demand is ambiguous. During screening, the lender may identify actions that are unconditionally value-reducing and set contract provisions that limit these actions. This suggests a positive correspondence between screening and compliance information demand. Alternatively, a lower level of screening leads to a greater demand for ex post assessments of suitability, which in turn requires provisions such as financial covenants to allocate contingent control ex post. This suggests a negative correspondence between screening and compliance information demand and a positive correspondence between suitability and compliance information demand.

3 Features of Useful Information in Each Decision Context

In this section, I describe features that make information useful for decision-making and link them to the three lender decisions: screening, suitability, and compliance. Based on the diversity of decisions that lenders make, it should not be surprising that the three decisions each demand different features from the information.

3.1 Information features

3.1.1 Hard and soft information

The first feature of information I examine is whether the information is *hard* or *soft*. Following Liberti and Petersen (2019), I define information as hard when it is quantitative, easy to store, and objective. Information is soft when it is difficult to represent numerically, context-specific, and subjective. Examples of hard information include financial statement data, particularly those that have been evaluated by external auditors, and records of transactions between unaffiliated parties on organized exchanges, such as stock or bond market transactions. Hard information is generally considered to be more trustworthy and reliable for decision-making due to the layers of external validation that often accompany it.

Examples of soft information include firm forecasts and projections of future activities; records of transactions between related parties or not from organized markets; private information communicated directly from a firm; and outside parties' assessment or analysis of a firm. Due to a lack of observability and validation from outside parties, soft information is more likely to be subject to error and bias than hard information. An advantage of soft information is its timeliness; unlike hard information, which often requires interaction with outside parties (such as transactions or formal external validation), soft information can be produced and shared more quickly than hard information. Another key difference between hard and soft information is that soft information is potentially more subjective, in the sense that opinions, views, and perspectives all fall into the category of soft information.

3.1.2 Reflective and predictive information

Lenders collect information that points either backward at past activities or forward towards future values. Here I distinguish between these two temporal orientations. I define

information as *reflective* if it links to past activities or values. When information is reflective it can be useful for confirmation purposes; for example, verification of past states or actions likely involves reflective information. Information is *predictive* if it provides forward-looking information. This can include projections, forecasts, and unrealized value estimates. Reflective and predictive information are not mutually exclusive categories.

The temporal orientations described in this section and the hardness or softness of information are conceptually separate, but they do interact. Reflective information tends to be harder than predictive information because predictive information is often more subjective or difficult to verify ex ante (e.g., forecasts). There are, however, counterexamples. An example of soft, reflective information is a qualitative assessment of past performance: a disclosure might state "prior quarter results for the company were strong." Hard, predictive information is less common, but one example is disclosed sales backlog.

3.1.3 Permanence and transience

The third feature of information I consider is the *permanence* or *transience* of information. These refer to how much of the information persists from period to period. Permanent components of information are those that are expected to be persistent into the future, over some determinant time interval. The timing of this assessment of permanence is important; while all firms experience change over long enough time periods, some information is relatively fixed over shorter time periods.

The transient components of information are those that are not expected to persist. These can entail information pertaining to one-time events that are not expected to recur, or current conditions of a firm that have a limited duration. Transient information can be thought of as "unusual", "non-recurring", or "one time" items, and more generally "shocks." Permanence and

transience exist on a continuum, so information can be considered relatively permanent or transient while having aspects of both.

3.2 Information features for specific decisions

3.2.1 Information features for screening

Screening, as it involves the collection of information to determine to appropriate loan contract terms, must be predictive. Specifically, for information to be useful for screening, it must provide the lender a means to assess the value of the borrower at specific points of time in the future, particularly when cash payments are meant to take place. The lender's screening assessment of borrower future value flows is like the use of information by prospective equity holders prior to making an investment.

The nature of this predictive information suggests that screening information can be either hard or soft to be useful. In some cases, hard information provides lenders useful insights on the borrower's future value; for example, if the current realized cash flows of the borrower are persistent, these can serve as a verifiable number upon which the lender can make projections.[12] Soft information, particularly unverifiable estimates and projections, investment plans and profitability forecasts, are clearly useful for screening. As discussed earlier, this soft information has inherently subjective and thus likely subject to both bias and error. The lender must decide whether predictive, soft information is sufficiently useful to justify the possible error that is introduced by using it.

Finally, screening is concerned with the value and cash flows of the borrower in the future. If there are past events that are purely transient and do not have implications for future value, the lender wants to ignore this information and focus on those things that persist over the term of the

[12] This being said, the extent to which the cash flows are persistent is a matter of judgment, so there is an inherent softness for any information that is predictive, even when it is based on verifiable information.

loan. As such, lenders are likely to focus on the permanent components of information and ignore transient aspects.

3.2.2 Information features for suitability

The lender collects information to assess the ex post suitability of the contract as originally written. The information that the lender collects is likely to be related to the information collected in screening but takes an ex post rather than ex ante perspective. This perspective has important implications for what qualities are useful to the lender, because rather than projecting *future* states and borrower actions, the lender is assessing *realized* states and activities.

In terms of hard and soft information, both sorts of information are still useful for assessing suitability. In some cases, the hard information such as transaction records provide information as to whether the borrower's performance is within the original terms set in the contract. Similarly, soft information, including estimated valuations of assets and preliminary assessments of investment options, could similarly provide useful inferences. Relative to screening, suitability is likely to require somewhat harder information; if information is sufficiently difficult to verify—i.e., the lender cannot necessarily trust it—it is not useful to establish concurrence with original contract terms. This differs from screening, where particularly difficult to verify information can be discounted. But broadly, screening and suitability information are similar in terms of admitting both hard and soft information.

One of the main ways that information for assessing suitability differs from information for screening is in terms of the temporal orientation. Whereas screening requires information that is predictive, determining suitability also incorporates reflective information. In assessing suitability, the lender must make two decisions. First, the lender assesses whether the current situation is within the boundaries of the original contract. This assessment is backward-looking:

the lender wants to determine the realized state and the actions of the borrower since contract initiation and understand whether these state-action set originally written in the contract. To understand the state and particularly the borrower's actions required backward-looking information. The second, coincident decision is whether the realized state-action of the borrower has implications going forward. That is, the lender rescreens the borrower conditional on newly received information. Rescreening, like screening, requires predictive information. This suggests that decisions about suitability require both reflective and predictive information.

I also expect that lenders should find both permanent and transient information to be useful in assessing suitability – in a way that mirrors the demand for reflective and predictive information discussed above. In determining the suitability of the contract, the lender is interested in all events that occurred with the borrower since the contract began. Transient information is useful in assessing the current state of the borrower when the contract is being assessed. For example, if a transient event has caused a sharp decline in borrower performance – an unexpected decline in the borrower's future value outside the bounds of the original contract – the original contract may be rendered unsuitable. If this is the case, the lender reassesses the borrower's prospects going forward. This second decision focuses more on permanent components of information. Thus, suitability assessments admit both permanent and transient information.

3.2.3 Information features for compliance

Information used for compliance purposes focuses on understanding whether the borrower has violated any information-contingent terms written in the contract. Unlike screening and suitability, which involve the lender collecting information and then using it to make some judgment (Should the loan be offered and with what terms? Is the initial loan contract appropriate based on the borrower's realized condition?), compliance does not require judgement. Rather,

compliance requires information to determine whether contractual terms or thresholds have been violated, often for the purpose for legal enforcement.

The key feature of compliance information is that is must be hard. This fact ties to the role of legal enforcement in contracts. Specifically, if a contract stipulates a threshold the borrower must maintain, the numbers upon which threshold compliance is assessed must be unambiguous, measurable, and objective. If the borrower and lender find themselves in disagreement over a contractual threshold, compliance may need to be determined through legal proceedings, which requires hard, verifiable information. Soft information, in contrast, is too subjective or ambiguous to be useful for determining compliance, particularly in the legal setting.

The compliance thresholds in contracts are set against past activity—this relates to the hard information—so this information is inherently reflective. The logic is like that for requiring hard rather than soft information: predictive information is soft by nature (difficult to verify), so not useful for compliance. Like information for suitability, information for compliance purposes is comprehensive, including transient components. This, again, ties to the idea that all aspects of value are relevant for the compliance role, not just the permanent components of information.

To summarize, the lender's information demand varies based on the decision being made. This section describes three parameters of information and how they relate to the screening, suitability, and compliance decisions. The key insight from this discussion is that the lender demands different features from information depending on what aspect of debt contracting is under consideration. Information for screening should be predictive and persistent, and either hard or soft. Information for compliance, in contrast, is more likely to be hard, reflective, and include transient components. Information for assessing contract suitability is between screening and

compliance, admitting a mix of hard and soft information, is both predictive and reflective, and can include both permanent and transient components.

4 Implications for Financial Reporting

I next consider the role of reported financial information, for example, the financial statements that publicly traded firms are required to file with the SEC, in providing information to lenders. Evidence suggests that reported financial information is an important source of information for lenders (Bharath et al. 2008). In the first part of this section, I consider which decisions for which reported financial information may be useful, and reasons why it may not be useful for other decisions. In the second part of this section, I summarize empirical evidence of how reported financial information is included in debt contracts. I also reconcile findings from the accounting literature on debt contracting design, particularly those studies that focus on the modification of reported financial numbers in debt contracts. I conclude this section by suggesting several avenues for future research.

4.1 For which lender decisions is financial reporting information useful?

Lenders use information from a variety of sources in contracting. This includes reported financial accounting information (e.g., from SEC mandated filings such as form 10-K or 10-Q), reported non-financial information (e.g., narrative disclosures in 10-K filings), voluntary public disclosures (e.g., earnings forecasts), information privately disclosed from the borrower to the lender, including both financial and non-financial information, and information from other information intermediaries (e.g., analyst forecasts). In the accounting literature, many studies have examined how the first source, reported financial information, is used by lenders (e.g., Ahmed, Billings, Morton, and Stanford-Harris 2002; Francis et al. 2005; Bharath et al. 2008; Zhang 2008;

Costello and Wittenberg-Moerman 2011). Here I consider if and how reported financial information may be useful in the lender's three decisions.

Reported financial information could provide information about the borrower's ability to repay the loan in the future; that is, reporting financial information could be useful for screening. For example, studies could examine the association between reported financial information from the period preceding loan initiation and features of the loan such as the loan pricing or loan covenants (e.g., Francis et al. 2005). The implication of these studies is that the reported financials *provide* information to lenders, in the sense that the information in reported financials *causes* changes in the lender's assessment of the borrower and thus affect loan terms. While I agree that reported information is likely to be associated with loan terms, the usefulness of reported financial information for screening depends critically on lender's access to private, pre-contracting information.

The availability of private information to lenders depends on the debt market. In the private bank loan market, borrowers communicate information privately to lenders during screening (Chi, Jin, Owens, and Ton 2021). Fama (1985) notes, in fact, that this is a key advantage that banks have relatively to more arm's length lenders, such as the public bond market. Reported financial information provides new information to lenders only if this information has not been provided earlier through private channels. Because we cannot observe private information as researchers we must speculate as to the content of private communicated information and how this information relates to publicly reporting financial information. Given that financial reporting is generally released on a quarterly basis, it seems likely that any public information has been preempted by private disclosure prior to the release of the publicly reported financials. For this reason, I argue

that reported financials are unlikely to be a timely source of information for screening, particularly when private information is available during screening.

Additionally, reported financials are unlikely to fully satisfy the information demand of the lender for screening even if they were timely. As I discuss in Section 2.2, lenders demand screening information that is predictive and permanent, and either hard or soft. Reported financial information is unlikely to satisfy several of these dimensions. Most notably, reported financial information if primarily reflective, typically focused more on reporting the results of past transactions than on projecting future activities. This goes along with the fact that reported financial information must be sufficiently verifiable to be evaluated by an outside auditor. This precludes some important information from inclusion in reported financials, such as projections, forecasts, and evaluations of future investment opportunities. In short, even if reported financials were providing new information to the lender, this information is likely to be insufficient on its own to appropriately screen the borrower.

Reported financials may provide more useful information for assessing suitability. Since the assessment of contract suitability requires more reflective information than does screening, it is likely that reported financials could be useful in this role. This is particularly true because the timeliness concerns with screening information are not in place. Similarly, suitability requires a harder quality to the information, and since reported financials focus on verifiability, this demand is also likely to be satisfied.

Extending this logic, I expect reported financial information is most likely to be useful in the compliance role. Compliance requires reflective, hard information that is potentially useful in legal proceedings related to covenant violations. The audit requirement makes reported financials ideal for this role, as these confirmed, verified numbers should be sufficient to trigger contracting

provisions. This idea underlies the discussion in Watts (2003) about the importance of conservative accounting for debt contracting purposes.

4.2 Evidence on the use of financial information in debt contracts

We, as researchers, cannot observe what information lenders use when screening or assessing an existing loan for suitability. Rather, we can only infer based on outcomes how the lender uses information. As I discuss above, even a significant association between reported financial information and loan contract features is not sufficient to infer that this information is used in screening. It could be that a correlated omitted variable—unobserved private information disclosed by the borrower to the lender—is driving this relation.

Inferring the use of information for assessing suitability is similarly constrained because we generally cannot observe the lender's action. There is reason, however, to believe that financial information may be used by lenders to assess suitability. Smith and Warner (1979) describe a variety of covenants used in debt contracts. One class of covenant is affirmative, or positive, covenants. These covenants stipulate actions the borrower must take over the course of the contract; examples include maintaining insurance on assets, following applicable laws, and paying taxes. One common affirmative covenant is the requirement that the borrower furnish periodic financial statements to the lender. The pervasive existence of this covenant suggests a demand for financial reporting by lenders. Although we cannot be certain that lenders use this information for assessing suitability, the continued use of the covenant suggests that a) lenders demand information because it is useful or b) the provision of reported financial information to lenders is not used but is sufficiently low cost that it persists as a "neutral mutation" (Leftwich 1983). While it is difficult to distinguish between these two explanations without being able to observe the

lender's post-contract actions, this covenant is consistent with ex-post information demand for suitability purposes.

While the evidence linking screening and reported financial information is not entirely clear, we do know that a variety of debt contract provisions are written explicitly on information from reported financial information. These include restrictive, or negative, covenants, where borrower actions are explicitly limited or restricted. One example of a negative covenant written on reported accounting information is dividend restrictions (Smith and Warner 1979; Kalay 1982; Watts and Zimmerman 1986). Some debt contracts include performance-contingent pricing, where the interest rate spread over the index rate is adjusted based on reported financial performance (Asquith, Beatty, and Weber 2005).

A common debt contract type of provision written on reported financial information is financial covenants. These provisions require the borrower to maintain a threshold level of an accounting-based financial metric, such as net worth, interest coverage, or the ratio of debt-to-EBITDA. Failure to maintain the threshold leads to technical default, where control rights revert to lenders. Risk of non-compliance is theorized to be a driver of discretionary financial reporting behavior (Watts and Zimmerman 1986; Sweeney 1994; DeFond and Jiambalvo 1994; Dichev and Skinner 2002).

Debt contracting provisions written on financial reporting information have a strong link to the compliance role. For each type of provision, financial reporting information has a direct compliance or enforcement aspect, for example changing the interest rate (performance pricing) or reallocating control rights (financial covenants). From this standpoint, we would expect that financial reporting information used would be hard, reflective, and incorporate both permanent and transient components. Financial reports from US GAAP satisfy these three features. Curiously,

however, information from GAAP is often modified in contracts (Leftwich 1983). A common modification is the removal of non-recurring or transient items that are allows under GAAP (Li 2010, 2016; Demerjian 2011). Demerjian and Owens (2016) develop a set of standard financial covenant definitions and find that financial covenants are typically written on a variant of net income which focuses on persistent operations. This suggests that financial covenants likely do not serve a purely compliance role, but also serve a role to help the lender assess suitability. This provides further evidence of an ex post role for reported financial accounting information beyond compliance, and illustrates the multiple demands on information in debt contracting.

4.3 Directions for Future Research

In this section I present several testable implications of the theory in this study. This is not intended as an exhaustive list, but rather introduce topics researchers could pursue.

4.3.1 The role of accounting regulation

Recent years have seen a shift in accounting standard setting in the United States away from the income statement perspective and towards the balance sheet perspective (Dichev 2008). Consequently, accounting standards have shifted away from the matching of expenses with revenues and toward the valuation of assets and liabilities on the balance sheet. These approaches, while not mutually exclusive (e.g., the "dirty surplus" in US GAAP allows for partial satisfaction of both objectives) have different implications for debt contracting. Frankel, Seethamaraju, and Zach (2008), Demerjian (2011), and Demerjian, Donovan, and Larson (2016) examine how changing accounting standards have affected debt contract design.

The theory and decision framework in this paper suggest several testable implications of the evolution of US GAAP standards. One consequence of a shift towards the balance sheet approach is more extensive use of fair values. Fair values, which are typically measured as

estimated exit prices, are inherently more forward-looking and predictive than the reflective historical prices that have traditionally been reported on the balance sheet. More extensive use of fair values makes financial reporting more useful for screening, but arguably less useful for compliance.[13] Research could examine whether screening of borrowers has improved over time as fair value becomes more pervasive. Superior screening should lead to more complete contracts; this should lead to fewer financial covenants (as there is less reason to reallocate control rights ex post); less frequent renegotiations of loans (as the initial contract terms are more likely to remain suitable); and a closer association between initial loan terms and borrower future performance. Finally, cross-jurisdiction differences in accounting standards, their implementation, and enforcement allows for a deeper understanding of what features of financial reported information are useful for debt contracting.

4.3.2 The role of disclosure regulation

Financial reporting information is not a monopoly source of information for lenders. To the extent that other sources of regulated sources of information exist, these may affect the usefulness of reported financial information for lenders. For example, the 2005 SEC Securities Offering Reform loosened gun-jumping provisions, thus allows firms to issue more forward-looking information under safe harbor provisions. As a competing source of information, disclosure could reduce the reliance of lenders on reported financial information.

The consequences of changing disclosure regulation are diverse and relate to the nature of the disclosure regulation change. Using the example from above, a regulation change that encourages more forward-looking disclosure should reduce lender reliance on reported financial information for screening. The testable implications of this change is a) better screened borrowers

[13] This latter prediction is explored in Demerjian (2011).

(see the consequences of this in the prior section) and b) a lower correspondence between reported financial information and debt contract provisions.

4.3.3 Earnings quality for debt

Dechow et al. (2010) discuss how earnings quality is a context specific. That is, the features that make earnings useful depends on the decision or decisions the earnings information is being used to make. While there are a variety of metrics used to assess earnings quality (e.g., accruals models, mapping to cash flows, persistence, smoothness), these metrics focus, either explicitly or implicitly, on decision making related to equity investment (Schipper and Vincent 2003). The framework in this study presents an opportunity to enhance the definition of earnings to bring into sharper focus the role of reported financial information for debt contracting; this is consistent with Dechow et al.'s suggestion to "...examine accounting choices that are irrelevant to quality characteristics of interest to equity markets..." (pg. 389) and develop measures of quality related to debt decision making.

A debt-focused measure of earnings quality would need to incorporate the often-conflicting decisions that lenders make. Features that make information useful for one decision may make it less useful for another. For example, forward-looking information is useful for screening but not useful for compliance. Recognizing the trade-offs inherent in lenders' decisions, this suggests a set of earnings quality metrics that capture the quality of borrower financial reporting for the different decisions the lender makes. These metrics could be used to reexamine key questions in debt contract design, such as the association between earnings quality and the cost of debt; the association between earnings quality and the inclusion and strictness of financial covenants; and how the initiation of debt contracts affects borrower earnings quality.

4.3.4 The role of private information

A key advantage of lenders in private debt contracting is the ability to collect private information from the borrower. Although private information is presumed to play an important role in private debt contracting, there is scarce quantification of this effect. This is likely due to difficulty in measuring private information. Recent studies by Demerjian, Donovan, and Jennings (2020) and Chi et al. (2021) indirectly assess private information, but to this point no study has provided systematic, large-sample evidence on the role or features of private information in debt contracting.

The theory in this study provides direction for hypotheses when researchers can access private information for analysis. To start, it is thought that private information consists of forecasts, projections, and other non-public information such as contract information and R&D progress (Kim and Zheng 2018). This is consistent with private information being predictive at least in part, consistent with a screening role. There are several interesting testable implications considering private information for screening. If the amount of private information could be quantified, researchers could examine whether private information serves as a substitute for publicly reported financial information for screening. If the features of private information could be measured this could lead to other predictions; for example, researchers could assess the "quality" of screening information using both public and private sources and measure contracting outcomes.

The theory also suggests that private information could play an ex post role in contracting, particularly in the "rescreening" aspect of assessing suitability. Another possible avenue for research would be examining the interaction of screening and suitability assessment for both public and private information. Finally, there is unlikely to be a role for private information in compliance, as it is insufficiently verifiable to be useful in enforcing debt provisions.

As this discussion suggests, having data on private information would open considerable doors to understanding debt contracting. Absent this data, the research on public information is must come with an important ceteris paribus caveat – the findings assume that private information is held equal. On this count the theory in this study also yields some insights. Specifically, it is more challenging to draw inferences related to lenders decisions that likely use private information (screening, possibly suitability) while inferences on decisions that do not use private information (compliance) are more likely to be valid.

5 Conclusion

I examine three related but distinct lender decisions in debt contracting, each of which generates demand for information. Lenders collect information for screening prior to loan initiation to estimate the distribution of the borrower's future value. The information for screening helps lenders understand the future state of nature, the borrower's actions, and the combinations of the two. In the context of incomplete contracts, the lender collects information after loan initiation and updates her assessment of the borrower's future value. The lender uses information to decide whether the initial contract is still suitable, or whether the contract should be changed based on the realized information. The lender also collects information to determine whether the borrower is in compliance with the contract terms.

I examine what features of information are useful for each decision, focusing on three features of information: whether it is hard or soft; whether it is predictive or reflective; and whether it includes only permanent components, or if it admits transient components as well. Linking these information features to the three decisions, I argue that each decision demands different information. Information for screening can be hard or soft, is predictive, and includes only

permanent components. Compliance information can only be hard, is primarily reflective, and can include permanent and transient components. Information to assess suitability blends features of the other two decisions.

The theory and framework in this study present a variety of avenues for future research. Several key insights guide this proposed research program. First, lenders demand information for a variety of decisions, and the features that make the information useful varies based on the demand. From this standpoint, the concept of "earnings quality for debt" must be viewed through the lens of these multiple decisions. Second, although the lender's decisions are distinct, each decision must be made at some point during the loan contracting process (from the pre-contracting negotiation period to loan maturity). The lender must balance the different information demands of the set of decision she is facing. Third, lenders use multiple information sources for making decisions. Understanding the features of information from each of these sources, and not focusing disproportionately on publicly reported financial information, is a key to developing a better understanding of debt contracting practice.

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Figure 1 – The lender's expected payoff
This figure illustrates the payoff to lenders for different levels of total firm value. *V* is total firm value. *I* is the principal of the debt, and *r* is the contracted interest rate.

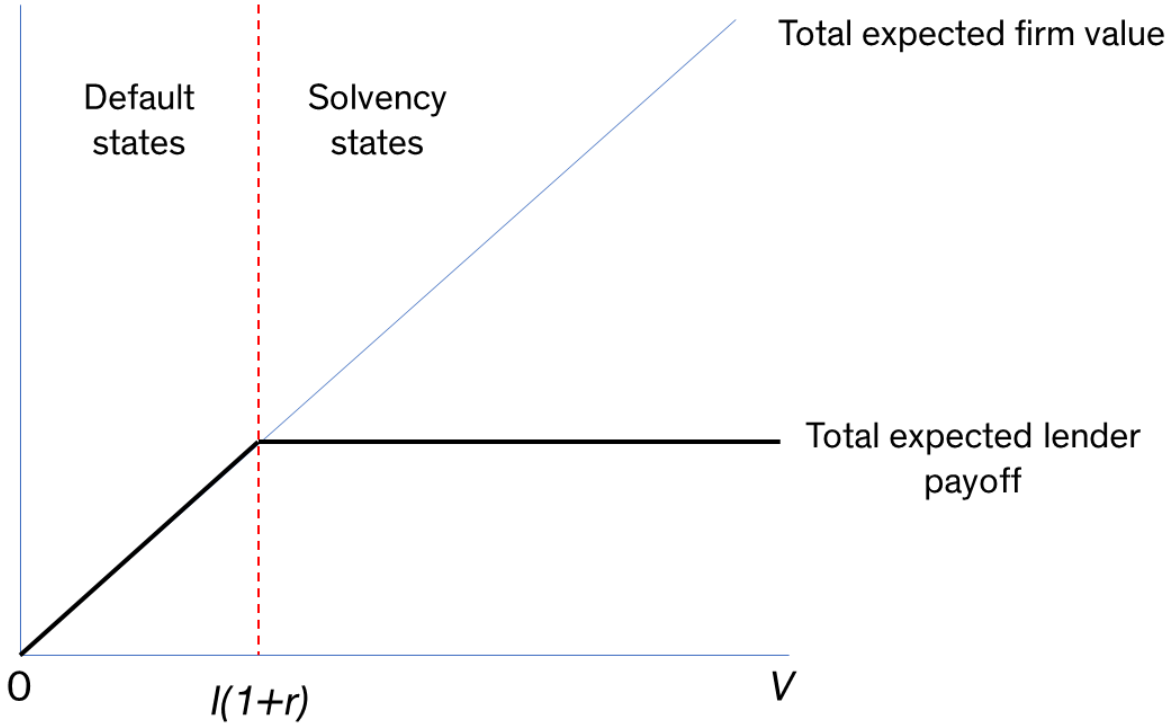

Figure 2 – Timeline of the lender's decisions and information demand
This figure illustrates three decisions of the lender and when they occur relative to initial contract negotiations, the initiation of the loan, and contract maturity.