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"Performance Pricing as a Screening Mechanism in Debt Contracts"

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Performance Pricing as a Screening Mechanism in Debt Contracts*

Andrei Kovrijnykh and Valeri Nikolaev†

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Abstract

We motivate performance pricing grids in debt contracts as an optimal screening mechanism. When the performance measure is self-reported and asymmetrically verifiable, the optimal screening menu of contracts is a collection of decreasing step functions of reported financial performance. Our model predicts a positive correlation between the steepness of performance pricing grid and the firm's future economic performance. We find that, controlling for firm-specific heterogeneity, companies entering credit agreements with steeper performance pricing slopes exhibit significantly higher future economic performance. Namely, the steepness of the performance pricing grid is positively related to future ROA, cash flow from operations, coverage of interest, and profits per unit of debt. This evidence supports the screening explanation for performance pricing.

*Preliminary and incomplete. Please, do not quote.

†University of Chicago Booth School of Business, 5807 S. Woodlawn Avenue, Chicago, IL 60637

1. Introduction

We describe a setting where lenders use accounting-based performance pricing grids to screen borrowers with different credit risk. A borrower is offered a menu of contracts, each specifying the interest rate as a function of the borrower's accounting-based performance measure. An important difference of our model from a standard screening problem is the assumption that the actual output realization is unobservable. Instead, both the borrower's type and the level of performance are *reported* by the borrower in our model.

Although accounting regulations are designed to limit the borrower's freedom to misrepresent performance, they often imposes a higher verification standard for recognition of economic gains than losses (Watts 2003). Large literature on accounting conservatism establishes that managers adopt conservative reporting to recognize anticipated future losses in current period, while deferring recognition of gains until the periods in which they are realized (e.g., Basu 1997).

The existence of asymmetric verification standards and asymmetry in recognition of gains versus losses is often explained by the presence of contracting demands, particularly the demands from debt markets (e.g., Ball 2001; Ball, Kothari, and Robin 2000, Watts 2003). An implicit assumption behind this explanation is that managers have incentives to overstate accounting performance. While this assumption is indeed justified in multiple economic settings, we take the asymmetry in verification of gains vs. losses as given and hence consider a setting where managers have discretion to understate their current period performance.

Incentives to understate performance in debt markets are closely related to managers' incentives to divert cash flows (Diamond 1984; Bolton and Scharfstein 1990) The important distinction between these two cases is that manager does not have to steal cash flows from shareholders in order to mislead debtholders via under-reporting. Nevertheless, the discretion to understate accounting performance limits contracting possibilities in an important way. Namely, it rules out the possibility of a risk-sharing contract, which requires repayment to be increasing in a firm's performance. This type of contract does not work with the accounting-based performance measures because firms facing such repayment schedule will understate their performance in order to pay less. The requirement for the interest rate to be non-increasing function of reported performance is especially important for the design of screening contracts.

We show that the contracts in the optimal screening menu specify a grid of performance intervals and the corresponding interest rate for each interval. The interest rate is fixed as long as the performance measure is within a specified interval and drops discretely as the performance measure increases to fall into the adjacent interval. Based on our theoretical model, we predict that firms with favorable private information about their future performance will choose steeper pricing schedules. We test this hypothesis by constructing a "steepness" measure for a performance pricing schedule and using it as a regressor to explain the firm's future performance. We show that firms choosing a contract with a steeper schedule of interest rates exhibit stronger economic performance in the future.

Performance pricing grids is a relatively new contracting provision (Asquith, Beatty, and Weber 2005) and there has been relatively little research that attempts to understand the use of performance pricing either from theoretical or empirical perspectives. Asquith et al. (2005) view performance pricing as a valuable re-contracting feature that avoids costly renegotiations. They also introduce the idea that performance pricing can be a way to address adverse selection problem. However, they do not analyze this from a theoretical point of view or test directly for adverse selection hypothesis.

There are two studies that formally analyse the use of performance pricing to mitigate asymmetric information problems. Manso, Strulovici, and Tchistyi (2010) show that performance pricing cannot be explained by trade-off theory of the capital structure as it leads to early default and hence destroys the value of equity. However, they argue that in line with the pecking order theory, performance pricing can be viewed as an inexpensive screening device. Their empirical tests support this idea by showing that companies that include performance pricing provisions, exhibit higher credit ratings in the future. The intuition behind their theoretical result is that performance pricing generally reduces contracting efficiency as it leads to early defaults. As a result, this contracting feature can be viewed as a costly way to signal a firm's credit quality. Koziol and Lawrenz (2009) argue that bond issuers can use rating-triggered coupon changes (step-up provisions) either to signal their credit risk or to mitigate risk-shifting. They argue that the stucture of the contract must be different under these two different motives and find evidence in favor of the signalling hypothesis.

The main feature distinguishing our study from Manso et al (2010) and Koziol and Lawrenz (2009) is that we analyze performance pricing based on accounting information provided by the borrower, and not on credit ratings. From the theoretical prospective, this distinction has several important aspects. First, accounting-based performance measures are self-reported. This introduces another layer of adverse selection on top of the screening problem, and imposes restrictions on the types of contracts that lenders can use. Second, accounting-based measures are typically continuous, and therefore offer richer possibilities in contract design. Finally, the incentives of a third party – credit rating agencies – are isolated when accounting-based measures are used.

Indeed, the incentive problem of a rating agency is a potentially important consideration when interpreting the results from the rating-based debt contracts as evidence of signalling or screening. Kraft (2010) proposes an alternative explanation for the positive association between the use of rating-based performance pricing and higher future credit ratings. She argues that rating agencies cater to the firms that have rating-based performance pricing provisions in in their debt contracts. In favor of this interpretation, credit rating adjustments in response to an adverse shock are less favorable for the firms with accounting-based performance-pricing provisions, than for the firms that with rating-based provisions.

Another aspect in which our analysis complements the existing literature is that we quantify the strength of informational signal contained in the performance pricing provision. While the focus of the prevous work was on whether performance pricing provisions are present in the contract, we only consider contracts that contain performance pricing provisions, and a measure of steepness for each performance-pricing grid. In line with the screening hypothesis, we show that steep performance pricing grids are more revealing about the future firm's performance.

This paper contributes to the literature on design of financial contracts in the presence of information asymmetry (e.g., Leland and Pyle 1977, Diamond 1984). More specifically, it considers the role of performance pricing in the presence of information asymmetries and complements an earlier study by Manso et al. (2009) (see discussion above). Our study is also related to empirical studies by Asquith et. al. (2005) and Beatty, Dichev and Weber (2002) interested in understanding of the economic role of performance pricing in debt markets. These studies several potential explanations for performance pricing, including that performance pricing alleviate moral hazard and the agency costs of debt, which we leave for future research.

2. The Model

We consider a risk-neutral firm that requires one unit of capital to finance a one-period investment project. The firm faces a risk-neutral bank, representing a perfectly competitive lending industry. The firm's project can be of either type B or type G, known to the firm but not to the bank. The project returns y_i are distributed on $\mathbb{R}_+$ according to the c.d.f. F_i, $i \in \{H, L\}$ (and the corresponding p.d.f. f_i), with the likelihood ratio $f_H(y)/f_L(y)$ strictly increasing in y.[1]

The bank's task is to design a menu of contracts to separate projects of type H from projects of type L.[2] Unlike in the standard screening model, the bank never observes the true realization

[1] Intuitively, the monotone likelihood condition means that the higher is the output, the more likely it is to be generated by a project of type H.

[2] For sake of brevity we leave it to reader to adapt the standard argument for why no pooling equilibrium exists in this game, and why every contract must yield zero profit to the bank. The details can be found in the original screening papers by Rothschild and Stiglitz (1976) and Wilson (1977). We also make the standard assumption that

of the firm's output y, but instead has to rely on the firm's accounting report $\hat{y}$ for contracting purposes. Hence, the debt contract maps the firm's report $\hat{y}$ into either a repayment $R(\hat{y}) \leq \hat{y}$, or a state of default. We define the state of default as an outcome, in which the firm's payoff is zero, and the bank collects $y - d$, where d is the cost of default.

We assume that the firm cannot overreport it's output, but is free to report any number below the true realization of the output, $\hat{y} \leq y$. [3] In what follows, we will focus on the contracts inducing the firm to reports it's output truthfully. Although, by the revelation principle, this restriction is without loss of generality, the truth-telling requirement imposes some intuitive restrictions on the shape of the contracts. We summarize these restrictions in the following claim.

Claim 1 *A debt contract satisfying the truth-telling requirement must have the following properties :*

1. *Repayment $R(\hat{y})$ must be weakly decreasing in the firm's reported performance.*

2. *If report $\hat{y}_0$ leads to default, any report $\hat{y} < \hat{y}_0$ must also lead to default.*

Proof: The first property follows from the observation that the firm will find it profitable to lie and report y_1 instead of y_0, if $y_1 < y_0$ and $R(y_1) > R(y_0)$. To verify the second property, observe that if $y_1 < y_0$, and y_0 leads to default while y_1 does not, the firm will find it profitable to lie and report y_1 instead of y_0, and collect the payoff $y_0 - R(y_1) \geq y_0 - y_1 > 0$.

A few observations based on the above graph will be useful for the analysis that follows. First, the bank must break even in expectation, because it represents a competitive industry. Let R_{RF} denote the competitive (risk-free) interest rate, which must also be the bank's expected payoff in

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there are sufficiently many firms of type L in the economy so that separation of the types is feasible.

[3]This assumption is a stylized way of modeling asymmetry in misreporting costs. In practice, accounting rules and verification procedures are primarily designed to limit overreporting of earnings, while underreporting is often encouraged in the form of conditional conservatism. In a dynamic setting, underreporting can be implemented through deferred recognition of economic gains: creation of excess reserves, manipulating timing and contractual terms of sales, etc. Finally, the impossibility of overreporting is just a simplification: our results on the shape of equilibrium contracts can be straightforwardly generalized to the case of finite convex overreporting costs.

equilibrium. Second, any debt contract that generates positive expected payoff for the bank must entail a non-zero probability of default. Consider a contract that generates the expected payoff $R_0 > 0$ for the bank. Then all reports $\hat{y} < R_0$ must lead to default under this contract. Indeed, if for some $\hat{y}_0 < R_0$ the contract specifies a repayment, this repayment must be lower than $\hat{y}_0$, and therefore lower than R_0. But the truth-telling condition requires in this case that for all reports higher than $\hat{y}_0$ the repayment must be lower than $R(\hat{y}_0)$, and therefore lower than $\hat{y}_0$, while for any report lower than $\hat{y}_0$ feasibility dictates that repayment is also lower than $\hat{y}_0$. In this case the bank cannot possibly collect R_0 in expectation, because the repayment is lower than R_0 for every report. Therefore, every report lower than R_0 must lead to a default. In light of this argument, it will be convenient to describe a debt contract i by a pair $\left(\underline{y}_i, R_i(\hat{y})\right)$, where $\underline{y}_i$ is the default threshold, such that any report $\hat{y} < \underline{y}_i$ leads to default, and $R_i(\hat{y})$ is the function specifying repayment for any $\hat{y} \geq \underline{y}_i$.

Finally, observe that out of any two contracts generating the same expected payoff for the bank, the firm prefers the one that entails lower probability of default. This follows immediately from the fact that the total surplus in the lending relationship is $E(y) - d\,\Pr(\mathrm{D})$. Since the bank's payoff is the same under both contracts, and the expected output is always the same, the firms expected payoff decreases linearly in the probability of default at rate d. This implies, in particular, that out of all possible contracts generating the expected payoff of R_{RF} for the bank, the firm prefers a flat rate contract that leads to default whenever $\hat{y} < R_F$, and otherwise requires to pay R_F, where R_F is the solution to

$$R_F \Pr\left[y > R_F\right] + \left[E(y|y < R_F) - d\right] \Pr\left[y \leq R_F\right] = R_{RF}. \tag{1}$$

The competitive pressure will induce the bank to offer the most attractive contract to the firm, from the set of all possible contracts that generate R_{RF} for the bank and induce truth-telling. Therefore, in equilibrium the bank will offer to a firm a menu of contracts of contracts

$\left\{\left(\underline{y}_i^*, R_i^*(\hat{y})\right)\right\}_{i=L,H}$ that minimizes the probability of default for both types subject to the following conditions:

(1) firms holding projects of either type find it incentive-compatible to report the project type truthfully,

$$E_H\left[y - R_H^*(y)\left|y > \underline{y}_H^*\right.\right]\left[1 - F_H\left(\underline{y}_H^*\right)\right] \geq E_H\left[y - R_L^*(y)\left|y > \underline{y}_L^*\right.\right]\left[1 - F_H\left(\underline{y}_L^*\right)\right], \qquad (2)$$

$$E_L\left[y - R_L^*(y)\left|y > \underline{y}_L^*\right.\right]\left[1 - F_L\left(\underline{y}_L^*\right)\right] \geq E_L\left[y - R_H^*(y)\left|y > \underline{y}_H^*\right.\right]\left[1 - F_L\left(\underline{y}_H^*\right)\right]. \qquad (3)$$

(2) the bank breaks even on contracts of both types, so that expected profit is equal to the risk-free rate

$$E_H\left[R_H^*(y)\left|y > \underline{y}_H^*\right.\right]\left[1 - F_H\left(\underline{y}_H^*\right)\right] + \left[E_H\left(y\left|y \leq \underline{y}_H^*\right.\right) - d\right]F_H\left(\underline{y}_H^*\right) = R_{RF}, \qquad (4)$$

$$E_L\left[R_L^*(y)\left|y > \underline{y}_L^*\right.\right]\left[1 - F_L\left(\underline{y}_L^*\right)\right] + \left[E_L\left(y\left|y \leq \underline{y}_L^*\right.\right) - d\right]F_L\left(\underline{y}_L^*\right) = R_{RF}. \qquad (5)$$

It is straightforward to verify that condition (2) is redundant – the incentive compatibility condition for type L is satisfied whenever the incentive compatibility condition for type H is satisfied. The remaining three conditions will be satisfied with equality in equilibrium.

The first step in characterizing the specific form of equilibrium contracts is to observe that there is no cost in providing the best possible alternative to a firm holding project L. A "flatter" repayment schedule slackens the incentive compatibility constraint for type L, as we formally demonstrate below.

Claim 2 *In equilibrium the bank offers a flat-rate contract to the firms holding project of type L:* $\left(\underline{y}_L^*, R_L^*(\hat{y})\right) = (R_L, R_L)$, *where* R_L *is a constant that solves*

$$R_L\left[1 - F_L(R_L)\right] + \left[E_L\left(y\left|y \leq R_L\right.\right) - d\right]F_L(R_L) = R_{RF}.$$

Proof: The proof is by contradiction. Suppose a pair of contracts $\left\{\left(\underline{y}_i^*, R_i^*(\hat{y})\right)\right\}_{i=L,H}$ satisfies conditions (2)-(5), as well as truth-telling conditions of Claim 1, and $\left(\underline{y}_L^*, R_L^*(\hat{y})\right)$ is not a flat-rate contract. In this case, there exists another pair of contracts,$\left\{\left(\underline{y}_H^*, R_H^*(\hat{y})\right), (R_L, R_L)\right\}$, also satisfies the same conditions, and the default threshold R_L is strictly lower than $\underline{y}_L^*$. The last step, $R_L < \underline{y}_L^*$, is straightforward to verify. Suppose for certainly that $\hat{y}_1 < \hat{y}_2$ and $R_L^*(\hat{y}_1) > R_L^*(\hat{y}_2)$. If $R_L^*(\hat{y}_1) > R_L$, then the result follows immediately, since $R_L^*(\hat{y}_1) \leq \underline{y}_L^*$. If $R_L^*(\hat{y}_1) \leq R_L$, then $E_L\left[R_L^*(y)\,|y > \hat{y}_2\right] < R_L$. But since the bank's payoff under both contracts is R_{RF}, there must exist $\hat{y}_3$ such that $R_L^*(\hat{y}_3) > R_L$. Since $\underline{y}_L^* \geq R_L^*(\hat{y}_3)$, we immediately have $\underline{y}_L^* > R_L$. Given this result, it is straightforward to verify that the incentive compatibility condition (3) is indeed satisfied for the pair $\left\{\left(\underline{y}_H^*, R_H^*(\hat{y})\right), (R_L, R_L)\right\}$. Recall that the firm's payoff in this case can be written as $E_L(y) - R_{RF} - d\,\Pr(\mathrm{D})$. Substituting for the probability of default under the two contracts, we obtain

$$E_L(y) - R_{RF} - dF_L(R_L) > E_L(y) - R_{RF} - dF_L\left(\underline{y}_L^*\right).$$

This, combined with (3) yields the result: the incentive compatibility for type L is satisfied with inequality for the pair of contracts $\left\{\left(\underline{y}_H^*, R_H^*(\hat{y})\right), (R_L, R_L)\right\}$. Therefore, the firms holding projects of type L are strictly better off under the contract (R_L, R_L) than under $\left(\underline{y}_L^*, R_L^*(\hat{y})\right)$, and will also prefer the contract $(R_L + \varepsilon, R_L + \varepsilon)$ to $\left(\underline{y}_L^*, R_L^*(\hat{y})\right)$ for a sufficiently small $\varepsilon > 0$. But $(R_L + \varepsilon, R_L + \varepsilon)$ yields higher payoff to the bank, and therefore the pair$\left\{\left(\underline{y}_i^*, R_i^*(\hat{y})\right)\right\}_{i=L,H}$ cannot be an equilibrium menu of contracts. Since we have arrived to a contradiction by only assuming that $\left(\underline{y}_L^*, R_L^*(\hat{y})\right)$ was not a flat-rate contract, the claim statement follows.

Before we characterize the equilibrium contract for the type H, it is useful to describe some properties of this contract. First of all, it must satisfy the incentive compatibility constraint for type L, (3), and the bank's break-even constraint for type H, (4). Now, for a given default threshold R_H, what repayment schedule generates the lowest possible payoff for a firm with a project of type L, given that it generates R_{RF} for the bank on a project of type H? Clearly, this schedule must penalize low-output outcomes to the maximum extent, since they are more likely for a project of type L. In fact, it is straightforward to verify that this is best achieved under a schedule

$$R_S(\hat{y}) = \begin{cases} R_H, \text{ if } \hat{y} \leq \hat{y}^*, \\ 0, \text{ if } \hat{y} > \hat{y}^*, \end{cases} \tag{6}$$

where $\hat{y}^*$ is such that the bank breaks even, $R_H \left[F_H(\hat{y}^*) - F_H(R_H)\right] + \left[E_H(y \,|y \leq R_H) - d\right] F_H(R_H) = R_{RF}$.[4]

However, if we hold the default threshold and the bank's expected payoff under project H fixed for a contract, we effectively hold fixed the payoff on a project of type H for this contact. Indeed, the sum of the bank's and the firm's payoffs is $E(y) - dF_H(R_H)$, which is a constant for the given default threshold. But then the firm's expected payoff is also a constant, $E(y) - dF_H(R_H) - R_{RF}$. Therefore, the schedule (6) is the "cheapest" way to satisfy the incentive compatibility constraint for type L, in the following sense: any other contract satisfying (3), (4), and truth-telling conditions entails a higher probability of default. The following claim is a straightforward consequence.

Claim 3 *In equilibrium the bank offers a step-function contract to the firms holding project of type H: $\left(\underline{y}_H^*, R_H^*(\hat{y})\right) = (R_H, R_S(\hat{y}))$, where $R_S(\hat{y})$ is given by (6), and R_H solves*

$$E_L\left[y - R_L \,|y > R_L\right]\left[1 - F_L(R_L)\right] = E_L\left[y - R_S(\hat{y}) \,|y > R_H\right]\left[1 - F_L(R_H)\right].$$

The equilibrium menu of contract that we have characterized so far consists of a flat rate contract, and a step-function contract. While the step-function contract bears some resemblance to the performance pricing contracts observed in reality, the resemblance is even more striking when one considers the screening problem with more than two types of projects. The generalization is

[4] This is a direct consequence of the monotone likelihood ratio assumption, and there is simple argument by contradiction. Nevertheless, it might be more useful for the reader's intuition to have a constructive argument here. We are working on it.

straightforward and resulting solution is a collection of decreasing step functions.[5]

Similarly to a standard screening problem, the contracts of the higher quality borrowers are characterized by higher sensitivity of interest rates fo the performance metric. In the subsequent sections, we provide empirical evidence supporting this prediction.

3. Data and Performance Pricing Slope Proxies

We use the intersection of Compustat (Merged Fundamental Annual File) and CRSP database to measure firms' performance and other firm characteristics. Performance pricing data as well as the loan characteristics are taken from Dealscan. We merge loans from Dealscan to the fiscal years in which they are issued on Compustat using the Dealscan-Compustat link (August 2010 vintage) constructed and maintained by Michael Roberts and WRDS (see Chava and Roberts 2008). Our sample covers the period 1981-2009 (although Dealscan data is sparse before 1995). If a loan contract has several credit facilities, we aggregate the information in these facilities at a deal (contract) level. We further require non-missing information on a number of firm and loan characteristics (used as control variables) as well as the information on the performance measures described below. As the he sample size varies depending on the type of analysis, we provide additional details with respect to our sample in each table. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values.

We measure future economic performance using a broad set of performance indicators. These include return on assets (ROA), operating cash flow scaled by assets (CFO), coverage of interest (Coverage), average interest on outstanding debt, EBITDA-to-Debt ratio (EBITDA/Debt), and stock returns (Return). These variables are measured over three-year periods starting after the year of loan issuance. All variable definitions are provided in Appendix A.

In total Dealscan performance pricing information is available for over 25,000 loan facilities

[5]We will provide details in future drafts.

(each facility has several grid points, resulting in over 112,000 observations in total). Measuring the slope of performance pricing also requires several research design choices. First, there is a host of different indicators (measures) in terms of which performance pricing grid is formulated. These indicators are listed in Table 1. The table shows that in 45% of cases performance pricing grid is based on "Total Debt to Cash Flow Ratio". The second and the third most popular choices are "Senior Debt Rating" and "User Condition" used in 25% and 7% of cases, respectively (it is not clear what financial ratio User Condition stands for; it is typically a less common financial ratio). Other measures include, leverage, maturity, interest coverage, debt-to-net-worth ratio, etc. The use of these remaining measures, however, is relatively infrequent. Note that the number of observations drops down significantly when we link the data to Compustat (due to presence of private borrowers), aggregate the data at deal level, and impose non-missing data requirements (even in case of Total Debt to Cash Flow Ratio, our sample is down to approximately 3,000 observations). Given this, and because different performance pricing indicators are comparable in terms of the pricing grid slope, we limit our analysis to the first and most popular performance pricing indicator only (Total Debt to Cash Flow Ratio).

This choice fits well with our objective. Ideally, we would like to test the screening hypothesis on the type of performance pricing grid as closely as possible linked to firm's performance. Note that performance pricing grids need not only be used for screening purposes that we study. For example, pricing grids may also be used to alleviate the need for costly contract renegotiation following changes of economic conditions (Asquith, Beatty, and Weber 2005). Thus, to improve the power of our tests, we are interested in a measure that quickly reflects changes in firms' performance and hence debt-to-cash flow ratio is likely to be superior in this regard compared to other measures, (e.g. credit ratings). Note that credit ratings lack timeliness and are typically used when accounting information provides poor information about company's credit risk (Ball, Bushman and Vasvari 2008; Christensen and Nikolaev 2010). However, we also run an analysis that uses a dummy variable for performance pricing grid being present, which avoids the need to restrict the sample to total-debt-to-cash-flow.

We construct three alternative, but related proxies to measure steepness of performance pricing grid, as discussed next.

Slope Proxy 1: For each loan facility, we compute the slope of performance pricing schedule by minimizing the sum of squared deviations of interest rates defined for different levels of performance measure from the fitted line. In other words, we regress the level of interest on the pricing grid on the corresponding level of total-debt-to-cash-flow ratio. We use mean value or a boundary of each performance measure (depending on whether the interval is closed or open), as a regressor. In case a loan has several facilities with different slopes, we select a highest slope coefficient. As the distribution of slope coefficients has pronounced skewness, we further take a natural logarithm of OLS slope coefficient.

Slope Proxy 2: For each loan facility, we take the difference between the highest and the lowest credit spread on the pricing grid, and divide it by the difference between the corresponding levels of total-debt-to-cash-flow ratio. In case a loan has several facilities with different slopes, we select a highest slope coefficient. As for in the previous case, we also take a natural logarithm of the coefficient to avoid excessive skewness.

Slope Proxy 3: We take an average of the two preceding proxies and construct a fraction rank of the resulting average. This proxy varies between 0 and 1, with higher levels indicating greater steepness of performance pricing schedule.

Note that the slope coefficient is not well defined in cases where the pricing grid specifies only of one cut-off value. Such cases are relatively infrequent and are excluded from the analysis.

3.1. Descriptive statistics

Table 2 presents the descriptive statistics. As can be seen from the table, the data availability for variables used in the analysis varies from around 3,000 in case of Slope Proxies to 8,000 in case of firm and loan characteristics. (only observations with non-missing values of all control variables are included). Companies in the sample exhibit, on average, 2% return on assets and 9% cash-to-assets ratio. Companies in the sample tend to be larger and somewhat more levered than an average Compustat firm.

Pearson correlation statistics are presented in Table 3. Slope Proxies 1 to 3 exhibit high positive correlations over 90%. The slope proxies exhibit correlations with a number of firm and contract specific characteristics. Their highest correlation is with credit spread that varies between 42-43% across three proxies. Such correlation is consistent with predictions from our model that riskier companies will have contracts with steeper pricing grids. Consistent with this argument, larger companies, less volatile companies and companies that are able to borrow greater amounts tend to use flatter pricing grids. Such correlations highlight the need to control for firm-specific heterogeneity in our setting and likely explain relatively low and often statistically insignificant correlations between the slope proxies and future performance measures.

3.2. Determinants of Performance Pricing Slope Proxies

Table 4 presents a multivariate analysis of performance pricing slope proxies. Multivariate tests reveal that the slope of performance pricing is associated with a number of firm and contract characteristics in interpretable ways. Larger companies, companies with fewer growth opportunities (as suggested by book-to-market ratio) and more levered firms tend to exhibit lower performance pricing slope coefficients. Such findings are consistent with lower amount of information asymmetries in these types of companies and hence less need for high-powered pricing grid. Most of contract characteristics exhibit association with the three slope proxies. Deals of greater size, longer maturity, and those that do not require collateral tend to exhibit less steep pricing grids. These contractual terms are likely indicating lower lever of agency problems in such companies which intuitively explains these associations. In contrast deals that are dispersely owned and exhibit heavier reliance on performance covenants typically have steeper pricing grids. As discussed above, credit spread continues to exhibit strong positive correlation with the steepness of pricing grid. Overall, the evidence suggests that performance pricing slope is an important parameter of the contracting process.

4. Implementation and Results

Empirical literature directly testing for the presence of information asymmetries in contractual relationships developed in the context of insurance markets. Notable contribution to this literature are by Chiappori and Salanie (1997, 2001). These authors provide a discussion of methodological issues and note that the most robust and least restrictive way to test for presence of information asymmetries in insurance market is to examine conditional correlation between insurance contract type and future outcomes. Namely, conditional on observable to insurer characteristics, choice of contract is not independent from occurrence of accident, a prediction following from an important theoretical study by Rothschild and Stiglitz (1976). Chiappori and Salanie (1997) point out that, while more sophisticated structural tests can also be implemented to test structural models of adverse selection, such tests are typically more sensitive to modeling assumptions (e.g., about objective function or preferences). Given this, we follow their reduced form approach and effectively test for correlation between contract design choices and ex post performance outcomes, conditional on a set observable information at the date of contract initiation.

Our model predicts that in the presence of adverse selection, there is a positive conditional correlation between the steepness of the pricing grid and future performance realizations for observationally equivalent companies. This is a reduced form approach because it does not directly test for causal relationship between contract design and future performance. For example, conditional correlation may indicate that managers with private knowledge of future performance self-select into steeper pricing grid contracts. Alternatively, it may be the case that managers who are willing to work hard (and hence expect to perform better) choose steeper slopes. In the later case the contract helps companies to achieve the desired outcome.

An important empirical issue in empirical tests of adverse selection is that of unobserved (by researcher) heterogeneity (e.g., Chiappori and Salanie 2001). In private debt markets this issue is admittedly more pronounced than in insurance markets where typically there is a well defined set of individual attributed recorded by insurance company in determining coverage. In our setting we do not observe information collected and processed by the lender and hence it becomes important to develop a comprehensive set of control variables. A specific issue that follows from our model is that credit risk in general is also expected to be positively associated with the slope of performance pricing. Hence, conditioning on contracts with higher pricing slopes is expected to select companies with stronger performance, but is also expected to select companies with higher risk in general. This clearly complicates empirical tests. To address the issue we use a comprehensive set of firm characteristics and also include other contract characteristics, such as credit spread, to control for unobserved to a researcher heterogeneity. Credit spread is expected to be a comprehensive summary proxy for borrower's risk characteristics in excess for firm-specific characteristics observed by researcher (e.g., management talent).

We employ the following empirical model:

$$Performance(t+1;\, t+4) = \alpha_0 + \alpha_1 PP\, SlopeProxy(t) + \sum \alpha_k Conditioning\, Variables(t) + \epsilon(t)$$

Coefficient α_1 indicates the sign of partial correlation between performance measures and performance pricing slope, conditional on a set of control variables. This test is econometrically equivalent to two step procedure where we first regress both a performance measure and the slope proxy on a set of conditioning variables, save two sets of residuals and than compute (now conditional) correlations between these residuals (see Greene 2003, Section 3.3). We expect α_1 to be positive if the slope of performance pricing is used to screen the borrowers.

4.1. Presence of Performance Pricing and Future Performance

Before we test the screening hypothesis with respect the the steepness of performance pricing slope, we perform analysis that involves only the indicator variable for the presence of performance pricing. Such analysis is similar in spirit to that in Manso et al. (2009) but involves a broader set of performance measures. One advantage of this analysis is that it does not require a measure of performance pricing slope and hence is based on a larger sample.

Table 5 presents a regression of six different proxies for a company's future performance on performance pricing indicator and a set of control variables. The evidence in the table suggests that companies that employ performance pricing exhibit significantly higher levels of future ROA, operating cash flows per dollar of assets, and coverage of interest and EBITDA per dollar of debt. As expected, such companies also exhibit lower level of average interest rate. No statistically significant association is present with respect to future return on assets. Such finding is not surprising information in revealed by performance pricing feature may be reflected in the prices at the time or even before the final approval of the credit agreement. These results hold, controlling for the current level of performance in the year a company enters the contract, firm characteristics, and contract characteristics. We do not discuss the results on control variables since we are ultimately testing for conditional correlation and do not develop as set of predictions with respect to these variables. Note, however, that many of the associations of future performance proxies and ex ante firm and contract characteristics are interpretable. Overall, the analysis in Table 5 confirms and extends prior results in Manso et al. (2009).

4.2. Steepness of Performance Pricing Grids and Future Performance

This section considers a number of different proxies for firm's future economic performance (one at a time):

Return on Assets. Table 6 presents the estimates from least squares regression of ROA(t+1; t+3) on the three proxies of performance pricing slope. Slope Proxies 1 to 3 all exhibit positive and statistically significant association with return on assets in the presence of control variables. In terms of economic magnitudes, one standard deviation increase in performance pricing slope, roughly translates in 0.8 percent higher return on assets, which represents a considerable economic effect. Given this, we cannot reject the null hypothesis of zero conditional correlation between performance pricing slope and realized future performance. In turn this implies that information asymmetry about future economic performance present between borrowers and lenders influences the design of performance pricing schedules. The signs on control variables are generally similar to those in prior analysis. Next, we measure performance as operating cash flow, a variable that lenders arguably a more likely to be concerned with.

Operating cash flow to assets ratio. Table 7 presents the estimates from a multivariate regression of future operating cash flow to assets ratio measured over three year period on the three proxies for pricing grid steepness. The coefficients on all three proxies are statistically significant and exhibit meaningful economic magnitudes. The effects are even somewhat larger than in case of ROA. The coefficients on control variables are similar to those in prior tables. Overall, the evidence here is also in line with the screening hypothesis. Next, we move on to another measure of borrower's private information as reflected by average cost of debt a company incurs in years following contract initiation.

Cost of Debt. Table 8 presents the analysis of the future cost of debt, as reflected by the ratio of average interest rate a company incurs on its liabilities. Note that for this borrower type proxy we expect a negative association with the steepness of performance pricing grid. Indeed, all the three Slope Proxies exhibit a significantly negative association with future interest rate. One standard deviation increase in performance pricing slope is roughly associated with 20 basis points lower interest rate on total firms liabilities. Economically, this is a considerable magnitude. The coefficients on control variables generally are similar to those in Table 4. Next, we examine future performance in terms of two most popular ratios in terms of which debt contracts are written. Namely, we examine future average interest coverage and EBITDA-to-Debt ratio.

Coverage of interest and *EBITDA-to-Debt ratios.* Table 9 presents analysis based on future coverage while Table 10 relates to EBITDA-to-Debt (note that we do not use Debt-to-EBITDA as it has less attractive distributional properties due to small denominator problem; for the same reason we take the log of interest coverage). The evidence indicates that in line with the screening hypothesis, companies with higher performance pricing slopes exhibit higher coverage of interest ratios in the future. This is in line with the evidence in prior tables. Similarly, performance pricing slope exhibits a positive conditional association with EBITDA-to-Debt ratio.

To summarize, both jointly and individually, our tests strongly indicate that the hypothesis of a positive conditional correlation between performance pricing slope and future performance realizations cannot be rejected. Such evidence is in line with performance pricing being used by lenders to screen the borrower's types. In particular, our analysis highlights the importance of how steep the performance pricing grid is as a way to distinguish between different types of lenders.

5. Conclusion

We show that under that assumption that managers can manipulate accounting based performance downwards, accounting-based performance pricing grids represent an optimal screening contract via which lenders separate borrowers of different type. In our model a borrower is offered a menu of contracts each of which specifies the interest rate as a function of the borrower's accounting-based performance measure. We show that the optimal contract is a decreasing step function of firm's future performance, which is commonly observed in practice.

A direct implication of our model is that the borrowers with better private information about their future cash flows self-select into contracts with steeper performance pricing schedules. To test this prediction we measure of the slope of performance pricing grids empirically. We develop empirical proxies for performance pricing grid steepness and focus on a most popular type of performance pricing grids formulated in terms of debt-to-EBITDA ratio. Controlling for firm-specific heterogeneity we find that companies entering credit agreements with steeper performance pricing slopes exhibit significantly higher economic performance measured over three years following the year of the contract initiation. The slope of performance pricing is positively related to future return on assets, operating cash flows, interest coverage, profits per unit of debt, and even stock performance. Jointly, our evidence supports the screening explanation for performance pricing.

References

[1] Paul Asquith, Anne Beatty, and Joseph Weber. Performance pricing in bank debt contracts. *Journal of Accounting and Economics*, 40(1-3):101–128, December 2005.

[2] R. Ball, S.P. Kothari, and A. Robin. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics*, 29(1):1–51, 2000.

[3] Ray Ball. Infrastructure requirements for an economically efficient system of public financial reporting and disclosure. *Brookings-Wharton Papers on Financial Services*, pages 127–69, 2001.

[4] S. Basu. The conservatism principle and the asymmetric timeliness of earnings. *journal of Accounting and Economics*, 24(1):3–37, 1997.

[5] Patrick Bolton and David S Scharfstein. A theory of predation based on agency problems in financial contracting. *American Economic Review*, 80(1):93–106, March 1990.

[6] Pierre-Andre Chiappori and Bernard Salanie. Empirical contract theory: The case of insurance data. *European Economic Review*, 41(3-5):943–50, April 1997.

[7] Pierre-Andre Chiappori and Bernard Salanie. Testing for asymmetric information in insurance markets. *Journal of Political Economy*, 108(1):56–78, February 2001.

[8] Douglas W Diamond. Financial intermediation and delegated monitoring. *Review of Economic Studies*, 51(3):393–414, July 1984.

[9] Ilia D. Dichev, Anne L. Beatty, and Joseph P. Weber. The Role and Characteristics of Accounting-based Performance Pricing in Private Debt Contracts. *working paper*, 2002.

[10] Christian Koziol and Jochen Lawrenz. Optimal design of rating-trigger step-up bonds: Agency conflicts versus asymmetric information. *Journal of Corporate Finance*, 16(2):182 – 204, 2010.

[11] Pepa Kraft. Do Rating Agencies Cater? Evidence from Rating-Based Contracts. *working paper*, 2010.

[12] Hayne E Leland and David H Pyle. Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance*, 32(2):371–87, May 1977.

[13] G. Manso, B. Strulovici, and A. Tchistyi. Performance-sensitive debt. *Review of Financial Studies*, 23(5):1819–54, 2010.

[14] Michael Rothschild and Joseph E Stiglitz. Equilibrium in competitive insurance markets: An essay on the economics of imperfect information. *The Quarterly Journal of Economics*, 90(4):630–49, 1976.

[15] R.L. Watts. Conservatism in Accounting Part I: Explanations and Implications. *Accounting horizons*, 17(3):207–222, 2003.

Appendix A: Variable Definitions

Firm performance and other characteristics

All firm characteristics are measured as of the end of fiscal year preceding a loan issuance and are truncated at 1% cutoffs at both tails to remove outliers.

ROA = Return on assets defined as a ratio of income before extraordinary items, divided be beginning of period assets.

CFO = Cash flow from operatios divided by total assets.

Interest Coverage = Ratio of EBITDA (earnings before extraordinary items, interest, and depreciation) divided by total interest expense.

Return = CRSP Monthly returns continuously compounded over 3 year periods following a debt issue.

Size = natural logarithm of market capitalization.

B/M = Book-to-market ratio measured as a ratio of book value of shareholders equity divided by its market value.

Leverage = Ratio of long-term debt to total assets.

Dividend Yield = ratio of dividends paid to common shareholders to end of period market capitalization.

Tangibility = Net value of property, plant and equipment divided by total assets.

Std.(Returns) = Standard deviation of daily returns from CRSP measured over a year preceding a loan.

Beta = security beta measured by regressing individual security daily stock returns from CRSP on a return on value weighted index; beta is measured over the year preceding a loan issue.

Spread = All-in credit spread over LIBOR (or another benchmark) measured in basis points.

Maturity = natural logarithm of loan maturity measured in years.

Secured = 1 if a loan is secured, and 0 otherwise.

Lending Frequency = Number of loans a company issued in the five years preceding a current loan.

Syndicate Size = natural logarithm of the number of syndicate members.

NCovenants = Negative covenants.

PCovenatns = Number of *performance covenants.* These are financial "maintenance" covenants formulated in terms of accounting profitability. Classification is based on Christensen and Nikolaev (2010).

CCovenants = Number of c*apital covenants.* These are the financial "maintenance" covenants formulated in terms of capital structure ratios. Classification is based on Christensen and Nikolaev (2010).

NCovenants = Number of negative covenants that restrict certain managerial actions, namely, dividend restrictions, capital expenditure restrictions, and cash sweeps that require a company to repay a portion of a loan if assets sales, debt issuance, equity issuance, etc.

Table 1: Types of performance pricing grids

The table shows the frequency distribution of performance pricing grid types. The data of grid types is taken from on Dealscan database and is summarized at a facility level.

Performance Pricing Type	**Number of Obs.**	**Percentage**
"Liquidity Ratio"	1	0.0%
"Loan to Value Ratio"	2	0.0%
"Current Ratio"	2	0.0%
"Quick Ratio"	2	0.0%
"Debt to Equity Ratio"	2	0.0%
"Subordinated Debt Rating"	4	0.0%
"Net Income"	4	0.0%
"Moody's Rating"	9	0.0%
"EBITDA"	10	0.0%
"Borrowing Base"	19	0.1%
"Availability"	38	0.1%
"Commercial Paper Rating"	45	0.2%
"Senior Leverage"	57	0.2%
"Debt Service Coverage"	200	0.8%
"Outstandings"	493	1.9%
"Debt to Tang. Net Worth"	511	2.0%
"Fixed Charge Coverage"	570	2.2%
"Interest Coverage"	628	2.5%
"Senior Debt to Cash Flow"	888	3.5%
"Maturity"	1103	4.3%
"Leverage"	1356	5.3%
"User Condition"	1656	6.5%
"Senior Debt Rating"	6395	25.2%
"Total Debt to Cash Flow Ratio"	11387	44.9%
Total Number of Loan Facilities	**25382**	100.0%

Table 2: Descriptive Statistics

The table provides descriptive statistics for variables used in subsequent analysis. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics is taken from Dealscan database, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities, we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables. Further, depending on the test, we require the information on performance measures, and performance pricing slope proxies. The details on construction of performance pricing Slope Proxies are provided in Section 3. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. Performance measures, such as return on assets (ROA), cash-flow-to-assets ratio (CFO), etc., are measured over three-year periods following the year of loan issuance. All variable definitions are provided in Appendix A.

Variable	N	Mean	Std. Dev.	p25	Median	p75
Slope Proxy1	3045	3.772	0.479	3.536	3.884	3.980
Slope Proxy2	3031	5.085	0.498	4.820	5.135	5.317
Slope Proxy3	3031	0.506	0.290	0.254	0.496	0.744
ROA	7988	0.022	0.089	-0.003	0.035	0.071
CFO	7900	0.091	0.080	0.047	0.089	0.136
Interest	7712	0.037	0.020	0.023	0.035	0.049
Int. Coverage	7611	13.416	27.115	3.035	5.783	12.312
EBITDA/Debt	7846	0.230	0.199	0.121	0.196	0.305
Return	7902	-0.407	0.957	-1.032	-0.478	0.037
Size	7988	6.443	1.735	5.226	6.451	7.637
B/M	7988	0.569	0.433	0.296	0.470	0.724
Leverage	7988	0.236	0.192	0.072	0.217	0.354
Div. Yield	7988	0.009	0.018	0.000	0.000	0.011
Tangibility	7988	0.315	0.246	0.109	0.247	0.488
STD.(Return)	7988	1.332	0.344	1.078	1.299	1.559
Beta	7988	0.858	0.511	0.480	0.807	1.181
Log(Amount)	7988	18.981	1.441	18.099	19.114	19.979
Maturity	7988	1.497	0.412	1.365	1.609	1.792
Spread	7988	174.941	117.099	75.240	150.000	250.000
Secured	7988	0.636	0.481	0.000	1.000	1.000
Lending Freq.	7988	2.408	2.088	1.000	2.000	4.000
Syndicate Size	7988	1.678	1.052	0.693	1.792	2.485
PCovenants	7988	2.070	1.073	1.000	2.000	3.000
CCovenants	7988	0.431	0.601	0.000	0.000	1.000
NCovenants	7988	2.887	2.308	1.000	2.000	5.000

Table 3: Pearson Correlations

The table provides pairwise Pearson correlation coefficients for variables used in subsequent analysis. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics is taken from Dealscan database, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities, we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables, performance measures, and performance pricing slope proxies; see Table 2 for details on the number of observations available for each variable. The details on construction of performance pricing Slope Proxies are provided in Section 3. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. Performance measures, such as return on assets (ROA), cash-flow-to-assets ratio (CFO), etc., are measured over three-year periods following the year of loan issuance. All variable definitions are provided in Appendix A.

No.	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1	Slope Proxy 1	1																								
2	Slope Proxy 2	.98	1																							
3	Slope Proxy 3	.92	.92	1																						
4	ROA	-.03	-.02	-.02	1																					
5	CFO	-.01	.01	.01	.54	1																				
6	Interest	.06	.04	.04	-.29	-.19	1																			
7	Coverage	-.02	.00	.01	.30	.30	-.43	1																		
8	Ebitda/Debt	-.01	.01	.03	.61	.59	-.24	.52	1																	
9	Return	.03	.04	.03	.32	.26	-.13	.11	.21	1																
10	Size	-.29	-.29	-.29	.20	.21	-.28	.05	.06	.04	1															
11	B/M	.13	.13	.13	-.19	-.20	.10	-.09	-.15	.10	-.38	1														
12	Leverage	-.02	-.03	-.05	-.08	-.03	.59	-.32	-.21	.03	.04	-.07	1													
13	Div. Yield	-.06	-.07	-.07	.07	-.02	-.02	-.08	-.09	.02	.18	.07	.08	1												
14	Tangibility	-.01	-.01	-.03	.02	.26	.19	-.08	.06	.06	.07	.03	.29	.13	1											
15	STD.(Return)	.26	.25	.26	-.32	-.19	.21	-.02	-.09	-.11	-.52	.20	-.05	-.27	-.10	1										
16	Beta	-.09	-.09	-.11	-.04	.02	-.15	.08	.00	.05	.31	-.16	-.07	-.11	-.08	.12	1									
17	Log(Amount)	-.23	-.24	-.23	.14	.16	-.02	-.12	-.07	.06	.76	-.18	.27	.18	.14	-.46	.16	1								
18	Maturity	-.14	-.15	-.13	.06	.10	.13	-.04	.03	.06	.03	-.07	.16	-.09	.06	-.19	.06	.24	1							
19	Spread	.43	.42	.42	-.33	-.23	.37	-.15	-.22	.00	-.48	.25	.14	-.13	-.02	.53	-.04	-.34	-.02	1						
20	Secured	.31	.30	.29	-.23	-.16	.32	-.11	-.13	-.01	-.50	.15	.13	-.23	-.04	.42	-.03	-.32	.11	.56	1					
21	Lending Freq.	.00	-.01	-.02	.02	-.01	.11	-.13	-.09	.01	.34	-.04	.28	.09	.11	-.18	.07	.40	.01	-.09	-.10	1				
22	Syndicate Size	-.17	-.18	-.19	.17	.17	-.04	-.09	-.01	.06	.64	-.15	.23	.15	.12	-.43	.12	.80	.24	-.36	-.31	.35	1			
23	PCovenants	.16	.13	.14	.00	.00	.23	-.02	.05	-.04	-.26	.02	.13	-.18	-.09	.15	-.07	-.09	.23	.23	.29	-.06	-.02	1		
24	CCovenants	.05	.05	.04	.00	-.08	-.08	.02	.02	-.06	-.10	.05	-.14	.05	.07	.05	-.09	-.20	-.23	-.11	-.09	-.03	-.16	-.32	1	
25	NCovenants	.08	.07	.09	-.11	-.08	.33	-.13	-.08	-.12	-.21	-.01	.19	-.11	-.01	.11	-.09	.04	.24	.24	.30	.01	.01	.33	-.12	1
26	PP Present	.	.	.	.16	.16	-.08	.02	.08	.04	.25	-.08	.07	.05	.07	-.26	.03	.35	.26	-.30	-.18	.10	.36	.10	-.14	.03

Table 4: Determinants of Performance Pricing Grid Slope

The table presents regressions of performance pricing grid Slope Proxies on firm and loan characteristics. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics is taken from Dealscan database, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities, we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables. Further, we require non-missing information on performance pricing Slope Proxies. The details on construction of performance pricing Slope Proxies are provided in Section 3. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. All variable definitions are provided in Appendix A. Robust t-statistics (clustered by firm) are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)
VARIABLES	Slope Proxy 1	Slope Proxy 2	Slope Proxy 3
Size	-0.0301**	-0.0217	-0.0120
	(-2.365)	(-1.609)	(-1.577)
B/M	-0.0559**	-0.0484*	-0.0362**
	(-2.368)	(-1.928)	(-2.474)
Leverage	-0.306***	-0.317***	-0.213***
	(-6.420)	(-6.419)	(-7.042)
Div.Yield	-0.709	-0.819	-0.467
	(-1.285)	(-1.444)	(-1.253)
Tangibility	0.0167	0.0255	-0.00877
	(0.423)	(0.617)	(-0.354)
STD(Return)	0.00220	-0.00946	0.0199
	(0.0618)	(-0.251)	(0.891)
Beta	-0.00418	-0.00764	-0.0208*
	(-0.224)	(-0.390)	(-1.789)
Log(Amount)	-0.0596***	-0.0726***	-0.0361***
	(-3.883)	(-4.606)	(-3.934)
Maturity	-0.109***	-0.116***	-0.0538***
	(-3.391)	(-3.518)	(-2.782)
Spread	0.00192***	0.00201***	0.00116***
	(14.40)	(14.29)	(14.53)
Secured	0.152***	0.159***	0.0841***
	(6.220)	(6.326)	(5.731)
Lending Freq.	0.0181***	0.0174***	0.00893***
	(3.730)	(3.413)	(2.908)
Syndicate Size	0.0321**	0.0290**	0.0132
	(2.385)	(2.104)	(1.609)
PCovenants	0.0280**	0.0198*	0.0126*
	(2.498)	(1.671)	(1.852)
CCovenants	-0.0162	-0.0159	-0.0163
	(-0.737)	(-0.679)	(-1.188)
NCovenants	-0.00726*	-0.00626	-0.00198
	(-1.684)	(-1.369)	(-0.755)
Constant	4.766***	6.308***	1.083***
	(19.98)	(25.46)	(7.678)
Observations	3095	3081	3081
R-squared	0.257	0.253	0.252

Table 5: Presence of Performance Pricing Grids and Future Performance.

The table presents regressions of future performance proxies on a dummy variable indicating the presence of a performance pricing grid, and a set of control variables. Performance measures, such as return on assets (ROA), cash-flow-to-assets ratio (CFO), etc., are measured over three-year periods following the year of loan issuance. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics are taken from Dealscan, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities, we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables and performance proxies. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. All variable definitions are provided in Appendix A. Robust t-statistics (clustered by firm) are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

VARIABLES	(1) ROA (t+1; t+4)	(2) CFO (t+1; t+4)	(3) Interest (t+1; t+4)	(4) Coverage (t+1; t+4)	(5) Return (t+1; t+4)
Perf. Pricing Dummy	0.00848***	0.00937***	-0.00244***	1.974**	0.0501
	(2.802)	(3.115)	(-4.347)	(2.218)	(1.571)
Size	-0.00234*	0.00395***	-0.00269***	2.833***	-0.0280*
	(-1.669)	(2.719)	(-9.856)	(6.692)	(-1.932)
B/M	-0.0269***	-0.0253***	0.000137	-3.144***	0.247***
	(-8.638)	(-9.041)	(0.227)	(-4.275)	(6.255)
Leverage	-0.0431***	-0.0488***	0.0501***	-34.02***	0.177**
	(-5.853)	(-6.760)	(32.14)	(-14.81)	(2.223)
Div.Yield	0.0232	-0.310***	0.00841	-79.97***	-1.498**
	(0.448)	(-5.388)	(0.680)	(-5.644)	(-2.357)
Tangibility	0.0104**	0.0994***	0.00499***	3.118**	0.163***
	(2.013)	(17.72)	(5.076)	(2.204)	(2.965)
STD(Return)	-0.0512***	-0.00920**	0.00477***	1.360	-0.497***
	(-10.85)	(-2.188)	(5.462)	(1.098)	(-10.55)
Beta	-0.00670***	-0.00403*	-0.00219***	1.852**	0.152***
	(-2.785)	(-1.801)	(-5.061)	(2.490)	(5.818)
Log(Amount)	-0.00269*	-0.00124	0.00198***	-4.201***	0.00908
	(-1.646)	(-0.750)	(6.385)	(-8.577)	(0.556)
Maturity	0.00165	0.00830***	0.00138**	1.438	0.0753**
	(0.594)	(2.956)	(2.489)	(1.591)	(2.452)
Spread	-0.000123***	-7.71e-05***	2.36e-05***	-0.0251***	0.000538***
	(-8.251)	(-6.011)	(8.650)	(-8.088)	(3.558)
Secured	-0.00680***	-0.00304	0.000713	-1.434	0.0540*
	(-2.614)	(-1.094)	(1.491)	(-1.389)	(1.787)
Lending Freq.	6.07e-05	-0.00210***	0.000376***	-0.529***	-0.0126*
	(0.106)	(-3.563)	(3.499)	(-3.395)	(-1.858)

Syndicate Size	0.00580***	0.00294*	-0.000311	-0.782	0.0174
	(3.462)	(1.884)	(-1.034)	(-1.603)	(0.965)
PCovenants	0.00750***	0.00505***	0.000753***	1.299***	-0.0302**
	(6.042)	(4.230)	(3.259)	(3.951)	(-2.252)
CCovenants	0.000156	-0.0107***	0.000699*	-1.838***	-0.0933***
	(0.0744)	(-5.173)	(1.785)	(-2.970)	(-4.125)
NCovenants	-0.00261***	-0.00204***	0.00106***	-0.554***	-0.0579***
	(-5.185)	(-4.199)	(11.05)	(-3.748)	(-9.849)
Constant	0.183***	0.0987***	-0.0114**	85.65***	-0.0937
	(6.876)	(3.819)	(-2.411)	(10.62)	(-0.345)
Observations	7988	7981	7859	7742	8071
R-squared	0.169	0.185	0.488	0.146	0.062

Table 6: Performance pricing grid slope and future return on assets.

The table presents regressions of future average return-on-assets (ROA) on performance pricing grid Slope Proxies, and a set of control variables. Average return-on-assets is measured over three-year periods following the year of loan issuance (as indicated in parentheses). The details on construction of performance pricing Slope Proxies are provided in Section 3. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics are taken from Dealscan, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables, Slope Proxies, and future ROA. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. All variable definitions are provided in Appendix A. Robust t-statistics (clustered by firm) are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

VARIABLES	Sign	(1) ROA(t+1, t+4)	(2) ROA(t+1, t+4)	(3) ROA(t+1, t+4)
Slope Proxy1	(+)	0.0161***		
		(3.911)		
Slope Proxy2	(+)		0.0168***	
			(4.018)	
Slope Proxy3	(+)			0.0287***
				(4.534)
Size		-0.00160	-0.00166	-0.00165
		(-0.774)	(-0.801)	(-0.791)
B/M		-0.0337***	-0.0330***	-0.0328***
		(-7.480)	(-7.318)	(-7.277)
Leverage		-0.0383***	-0.0373***	-0.0363***
		(-3.803)	(-3.683)	(-3.568)
Div.Yield		0.0457	0.0430	0.0416
		(0.506)	(0.477)	(0.462)
Tangibility		0.00881	0.00850	0.00912
		(1.142)	(1.100)	(1.181)
STD(Return)		-0.0417***	-0.0425***	-0.0432***
		(-6.173)	(-6.341)	(-6.417)
Beta		-0.00596*	-0.00593*	-0.00547
		(-1.702)	(-1.692)	(-1.560)
Log(Amount)		-0.00607**	-0.00588**	-0.00608**
		(-2.170)	(-2.098)	(-2.172)
Maturity		-0.00155	-0.00142	-0.00183
		(-0.284)	(-0.259)	(-0.334)
Spread		-0.000137***	-0.000138***	-0.000138***
		(-5.336)	(-5.334)	(-5.368)
Secured		-0.00736*	-0.00743*	-0.00722*
		(-1.939)	(-1.944)	(-1.889)
Lending Freq.		-0.00259***	-0.00267***	-0.00264***
		(-2.742)	(-2.834)	(-2.802)
Syndicate Size		0.00738**	0.00752***	0.00762***
		(2.568)	(2.619)	(2.659)
PCovenants		0.000348	0.000775	0.000749
		(0.169)	(0.378)	(0.365)
CCovenants		-0.00248	-0.00139	-0.00115
		(-0.672)	(-0.393)	(-0.326)
NCovenants		-0.00284***	-0.00290***	-0.00295***
		(-3.806)	(-3.891)	(-3.952)
Constant		0.215***	0.187***	0.261***
		(4.732)	(3.843)	(6.117)
Observations		3045	3031	3031
R-squared		0.150	0.151	0.151

Table 7: Performance pricing gird slope and future operating cash flow

The table presents regressions of future average operating-cash-flow-to-assets ratio on performance pricing grid Slope Proxies, and a set of control variables. Average operating-cash-flow-to-assets ratio (CFO) is measured over three-year periods following the year of loan issuance (as indicated in parentheses). The details on construction of performance pricing Slope Proxies are provided in Section 3. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics are taken from Dealscan, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables, Slope Proxies, and future CFO. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. All variable definitions are provided in Appendix A. Robust t-statistics (clustered by firm) are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

VARIABLES	Sign	(1) $CFO_{(t+1; t+4)}$	(2) $CFO_{(t+1; t+4)}$	(3) $CFO_{(t+1; t+4)}$
Slope Proxy1	(+)	0.0167***		
		(4.743)		
Slope Proxy2	(+)		0.0180***	
			(5.221)	
Slope Proxy3	(+)			0.0330***
				(5.699)
Size		0.00216	0.00208	0.00212
		(1.062)	(1.020)	(1.039)
B/M		-0.0316***	-0.0317***	-0.0314***
		(-8.654)	(-8.616)	(-8.523)
Leverage		-0.0457***	-0.0452***	-0.0438***
		(-5.156)	(-5.091)	(-4.905)
Div.Yield		-0.0916	-0.0874	-0.0880
		(-1.118)	(-1.066)	(-1.066)
Tangibility		0.0746***	0.0738***	0.0745***
		(10.33)	(10.23)	(10.36)
STD(Return)		-0.00226	-0.00221	-0.00300
		(-0.377)	(-0.367)	(-0.501)
Beta		-0.00724**	-0.00739**	-0.00686**
		(-2.391)	(-2.441)	(-2.271)
Log(Amount)		-0.000751	-0.000518	-0.000623
		(-0.303)	(-0.209)	(-0.252)
Maturity		-0.00169	-0.00128	-0.00159
		(-0.339)	(-0.257)	(-0.321)
Spread		-0.000102***	-0.000105***	-0.000107***
		(-4.567)	(-4.667)	(-4.815)
Secured		-0.00477	-0.00480	-0.00474
		(-1.239)	(-1.246)	(-1.233)
Lending Freq.		-0.00321***	-0.00325***	-0.00324***
		(-3.877)	(-3.943)	(-3.943)
Syndicate Size		0.00414*	0.00434*	0.00440*
		(1.829)	(1.920)	(1.955)
PCovenants		-0.00390**	-0.00373**	-0.00381**
		(-2.239)	(-2.138)	(-2.185)
CCovenants		-0.0185***	-0.0183***	-0.0180***
		(-5.159)	(-5.035)	(-4.972)
NCovenants		-0.00263***	-0.00269***	-0.00274***
		(-3.772)	(-3.856)	(-3.947)
Constant		0.101**	0.0685	0.146***
		(2.527)	(1.621)	(3.893)
Observations		3047	3033	3033
R-squared		0.172	0.173	0.175

Table 8: Performance pricing gird slope and future average interest rate.

The table presents regressions of future average interest rate on performance pricing grid Slope Proxies, and a set of control variables. Average interest rate (Interest) is defined as a ratio of interest expense to total liabilities and is measured over three-year periods following the year of loan issuance (as indicated in parentheses). The details on construction of performance pricing Slope Proxies are provided in Section 3. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics are taken from Dealscan, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables, Slope Proxies, and Interest. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. All variable definitions are provided in Appendix A. Robust t-statistics (clustered by firm) are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

VARIABLES	Sign	(1) Interest (t+1; t+4)	(2) Interest (t+1; t+4)	(3) Interest (t+1; t+4)
Slope Proxy1	(-)	-0.00398***		
		(-5.799)		
Slope Proxy2	(-)		-0.00416***	
			(-6.639)	
Slope Proxy3	(-)			-0.00703***
				(-5.941)
Size		-0.00258***	-0.00258***	-0.00258***
		(-5.910)	(-5.924)	(-5.918)
B/M		-0.000401	-0.000459	-0.000511
		(-0.463)	(-0.529)	(-0.588)
Leverage		0.0425***	0.0422***	0.0421***
		(19.80)	(19.69)	(19.50)
Div.Yield		0.00800	0.00808	0.00823
		(0.394)	(0.398)	(0.406)
Tangibility		0.00718***	0.00712***	0.00694***
		(4.666)	(4.619)	(4.509)
STD(Return)		0.00715***	0.00733***	0.00749***
		(5.155)	(5.270)	(5.377)
Beta		-0.00262***	-0.00262***	-0.00273***
		(-4.072)	(-4.082)	(-4.293)
Log(Amount)		0.00129**	0.00126**	0.00131**
		(2.290)	(2.248)	(2.334)
Maturity		0.00464***	0.00456***	0.00466***
		(4.222)	(4.162)	(4.255)
Spread		4.32e-05***	4.37e-05***	4.35e-05***
		(8.319)	(8.428)	(8.182)
Secured		0.00183**	0.00187**	0.00181**
		(2.392)	(2.449)	(2.382)
Lending Freq.		0.000736***	0.000758***	0.000749***
		(3.999)	(4.126)	(4.082)
Syndicate Size		0.000157	0.000133	0.000109
		(0.310)	(0.264)	(0.214)
PCovenants		0.000445	0.000375	0.000381
		(1.139)	(0.961)	(0.975)
CCovenants		0.000832	0.000598	0.000553
		(1.114)	(0.803)	(0.740)
NCovenants		0.00115***	0.00116***	0.00117***
		(7.541)	(7.595)	(7.662)
Constant		0.00128	0.00801	-0.0106
		(0.139)	(0.849)	(-1.229)
Observations		3009	2995	2995
R-squared		0.532	0.534	0.534

Table 9: Performance pricing gird slope and future coverage of interest.

The table presents regressions of future average interest coverage ratio on performance pricing grid Slope Proxies, and a set of control variables. Average interest coverage ratio (Coverage) is measured over three-year periods following the year of loan issuance (as indicated in parentheses). The details on construction of performance pricing Slope Proxies are provided in Section 3. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics are taken from Dealscan, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables, Slope Proxies, and Interest Coverage ratio. Variables based on Compustat and CRSP data are truncated at both tails using 1% cutoff values. All variable definitions are provided in Appendix A. Robust t-statistics (clustered by firm) are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

VARIABLES	Sign	(1) Coverage (t+1; t+4)	(2) Coverage (t+1; t+4)	(3) Coverage (t+1; t+4)
Slope Proxy1	(+)	0.242***		
		(6.235)		
Slope Proxy2	(+)		0.255***	
			(6.844)	
Slope Proxy3	(+)			0.492***
				(7.785)
Size		0.136***	0.137***	0.138***
		(5.545)	(5.553)	(5.605)
B/M		-0.126***	-0.125***	-0.120***
		(-2.832)	(-2.789)	(-2.664)
Leverage		-1.724***	-1.716***	-1.692***
		(-16.72)	(-16.63)	(-16.36)
Div.Yield		-3.441***	-3.434***	-3.443***
		(-3.724)	(-3.720)	(-3.769)
Tangibility		0.0102	0.00768	0.0198
		(0.128)	(0.0959)	(0.249)
STD(Return)		-0.133*	-0.126*	-0.137*
		(-1.742)	(-1.650)	(-1.801)
Beta		0.0556	0.0548	0.0628*
		(1.490)	(1.470)	(1.694)
Log(Amount)		-0.206***	-0.203***	-0.204***
		(-7.310)	(-7.224)	(-7.268)
Maturity		-0.0737	-0.0659	-0.0677
		(-1.119)	(-1.000)	(-1.031)
Spread		-0.00251***	-0.00256***	-0.00262***
		(-9.682)	(-9.875)	(-9.880)
Secured		-0.144***	-0.147***	-0.149***
		(-2.948)	(-3.001)	(-3.079)
Lending Freq.		-0.0214**	-0.0222**	-0.0223**
		(-2.201)	(-2.292)	(-2.322)
Syndicate Size		-0.00320	-0.00141	-0.000551
		(-0.124)	(-0.0549)	(-0.0214)
PCovenants		-0.0267	-0.0250	-0.0257
		(-1.283)	(-1.200)	(-1.235)
CCovenants		-0.0917**	-0.0865*	-0.0819*
		(-2.058)	(-1.929)	(-1.836)
NCovenants		-0.0522***	-0.0521***	-0.0526***
		(-6.333)	(-6.313)	(-6.402)
Constant		5.992***	5.541***	6.618***
		(12.90)	(11.53)	(14.94)
Observations		2954	2941	2941
R-squared		0.437	0.439	0.442

Table 10: Performance pricing gird slope and EBITDA/Debt ratio.

The table presents regressions of future average EBITDA/Debt ratio on performance pricing grid Slope Proxies, and a set of control variables. Average EBITDA/Debt ratio is measured over three-year periods following the year of loan issuance (as indicated in parentheses). The details on construction of performance pricing Slope Proxies are provided in Section 3. We use the intersection of Compustat and CRSP database to measure firms' performance and other characteristics. Loan characteristics are taken from Dealscan, merged to Compustat using the Dealscan-Compustat link (see Section 3). The sample covers the period 1981-2009. In cases a deal has several credit facilities we aggregate the information in these facilities at a deal (contract) level. We limit the sample by requiring non-missing information on control variables, Slope Proxies, and EBITDA/Debt ratio. Variables based on Compustat and CRSP data are truncated at both tales using 1% cutoff values. All variable definitions are provided in Appendix A. Robust t-statistics (clustered by firm) are in parentheses; ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively.

VARIABLES	Sign	(1) EBITDA/Debt (t+1, t+4)	(2) EBITDA/Debt (t+1, t+4)	(3) EBITDA/Debt (t+1, t+4)
Slope Proxy1	(+)	0.0307***		
		(3.350)		
Slope Proxy2	(+)		0.0336***	
			(3.738)	
Slope Proxy3	(+)			0.0719***
				(5.209)
Size		0.0203***	0.0204***	0.0206***
		(3.710)	(3.715)	(3.751)
B/M		-0.0401***	-0.0397***	-0.0388***
		(-4.444)	(-4.362)	(-4.260)
Leverage		-0.166***	-0.165***	-0.160***
		(-8.599)	(-8.536)	(-8.254)
Div.Yield		-0.586***	-0.587***	-0.582**
		(-2.597)	(-2.598)	(-2.578)
Tangibility		0.0896***	0.0885***	0.0900***
		(4.512)	(4.439)	(4.526)
STD(Return)		0.00798	0.00800	0.00632
		(0.523)	(0.522)	(0.414)
Beta		-0.00932	-0.00949	-0.00828
		(-1.149)	(-1.169)	(-1.022)
Log(Amount)		-0.0435***	-0.0430***	-0.0428***
		(-6.924)	(-6.848)	(-6.836)
Maturity		0.000134	0.00128	0.00128
		(0.0100)	(0.0958)	(0.0961)
Spread		-0.000449***	-0.000457***	-0.000473***
		(-8.529)	(-8.617)	(-8.961)
Secured		-0.0143	-0.0145	-0.0152
		(-1.295)	(-1.298)	(-1.368)
Lending Freq.		-0.00160	-0.00177	-0.00182
		(-0.706)	(-0.784)	(-0.808)
Syndicate Size		0.00336	0.00360	0.00361
		(0.640)	(0.686)	(0.688)
PCovenants		-0.00107	-0.000578	-0.000845
		(-0.251)	(-0.134)	(-0.196)
CCovenants		-0.0141	-0.0122	-0.0117
		(-1.355)	(-1.170)	(-1.117)
NCovenants		-0.00308*	-0.00315*	-0.00322*
		(-1.687)	(-1.720)	(-1.762)
Constant		0.991***	0.925***	1.059***
		(9.640)	(8.606)	(10.83)
Observations		3046	3032	3032
R-squared		0.197	0.198	0.201

ANDREI KOVRIJNYKH

5807 South Woodlawn Avenue
Chicago, IL 60637

andrei.kovrijnykh@chicagobooth.edu
Phone: (773) 702-3990

EMPLOYMENT

Assistant Professor of Accounting, The University of Chicago Booth School of Business, July 2008 -present

EDUCATION

Ph.D. Economics U. of Chicago 2008
M.A. Economics CERGE-EI, Prague, Czech Republic 2001
B.A. Economics Novosibirsk State University, Russia 1998

INTERESTS

Executive Compensation, Strategic Reporting, Information Dissemination in Financial Markets

WORK IN PROGRESS

"Capital Structure, Project Selection, and Managerial Incentives", with Maxim Mironov
"Executive Compensation, Fraud, and Uncertainty", with Aiyesha Dey and Robert Davidson
"Financial and Real Innovation", with Alexander Popov

WORKING PAPERS

"The Screening Role of Performance Pricing," with Valeri Nikolaev
We motivate performance pricing grids in debt contracts as an optimal screening mechanism. When the performance measure is self-reported and asymmetrically verifiable, the optimal screening menu is a collection of decreasing step functions of reported financial. Our model predicts positive correlation between the steepness of performance pricing grids and the firm's future economic performance. We find that, controlling for firm-specific heterogeneity, companies entering credit agreements with steeper performance pricing slopes exhibit significantly higher economic performance. Namely, the steepness of the performance pricing grid is positively related to future ROA, cash flow from operations, coverage of interest, the average interest rate on a firm's debt, and profits per unit of debt. This evidence supports the screening explanation for performance pricing.

“Reporting Bias and Economic Shocks”, with Joseph Gerakos
We propose a parsimonious stochastic model of reported earnings that links misreporting to performance shocks. Our main analytical prediction is that misreporting leads to a negative second-order autocorrelation in the residuals from a regression of current earnings on lagged earnings. We find that the empirical distribution of this measure is asymmetric around zero with 73.6 percent observations being negative. Using this measure, we propose a methodology to estimate the intensity of misreporting and to create estimates of unmanipulated earnings. Our estimates of unmanipulated earnings are more correlated with contemporaneous returns and have higher volatility than reported earnings. Moreover, we find that firms in our sample subject to SEC AAERs have significantly higher estimates of manipulation intensity.

“Career Uncertainty and Dynamic Incentives”
When ability is career-specific, individuals can escape bad reputation in a career-concerns setting by changing their careers. The possibility of future career change makes collection of reputational rewards less likely and therefore dampens incentives. However, I show that the wage becomes more sensitive to the reputation since the market anticipates the workers with good career matches to exert more effort. This effect countervails the direct incentive-weakening effect of career uncertainty. In fact, equilibrium effort is higher for workers facing moderate career uncertainty if their effort is sufficiently responsive to incentives. One way to control the strength of reputational incentives is to manipulate the timing of information release: delaying the release of performance data weakens the incentives and can help avoiding excessive effort supply early in the career.

TEACHING

Instructor Managerial Accounting , Booth School of Business
Teaching Assistant University of Chicago 2002-2008, CERGE-EI 1999-2001

REFEREE

American Economic Review, Journal of Political Economy, Journal of Accounting Research, RAND Journal of Economics