AUDITING, GOVERNANCE AND REPORTING: AN EXPERIMENTAL INVESTIGATION

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ABSTRACT. We use a controlled laboratory setting to experimentally examine the role of auditing and market-based-governance in restraining managerial expropriation and inaccurate financial reporting. Managerial expropriation is broadly defined as the enabling of all actions that opportunistically transfer wealth from investors to managers through understatement of realizable income. Similarly, auditing is broadly defined as all the auditing and governance systems that increase the likelihood of accurate reporting of realizable income. Market-based governance is operationalized by a device (poison pill) that entrenches managers. The results of the experiment reveal that the market converges to equilibrium even without auditing. However, auditing reduces expropriation, attracts more capital and thereby increases the overall welfare, after accounting for the cost of auditing. Further, we show that poison pill adoption results in a demand for more audit and lower net inflow of capital. The effect of poison pill on expropriation is mixed. These findings have significant implications for regulators and policy makers in that the social welfare is likely to be higher under a regime of minimum audit and governance standards compared to a regime without such mandates.

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1. INTRODUCTION

The need to avoid future audit and governance failures such as Enron, Tyco and World-Com has renewed the interest of, regulators, executives, auditors, investors and academicians in understanding the role of auditing in improving transparent reporting and reducing expropriations by managers. Managers can expropriate investor wealth in at least two ways. First, by understating the true performance of the firm, managers can expropriate the difference between the "achievable" and "achieved" performance. For example, in a study spanning 31 countries, Leuz et al. (2003) argue that if the governance and/auditing is weak, managers of the firm engage in the consumption of private control benefits such as related party transactions, empire building and other "hidden" transactions that effectively transfer wealth from investors to managers. The second way in which managers transfer wealth from investors to themselves is by earnings management, a notion that is supported by extensive empirical literature (Healy and Wahlen, 1999; Bruns Jr. and Merchant, 1990; Burgstahler and Dichev, 1997; Burgstahler and Eames, 2003; Christie and Zimmerman, 1994; Dechow et al., 1996; DuCharme et al., 2004; Richardson, 2000). Numerous empirical studies have examined the effectiveness of audit and internal governance mechanisms in restraining such expropriation and opportunistic earnings management behavior of managers. These studies have ranged, from the studies on auditor independence (Frankel et al., 2002; Ashbaugh et al., 2003; DeFond et al., 2002; Larcker and Richardson, 2004), to the effect of the internal corporate governance mechanism such as board independence and audit committee structure on managerial reporting behavior (Klein, 2002a; Klein, 2002b; Becker et al., 1998). Srinidhi and Sen (2007b) show that weakening of the market-based corporate control mechanisms in the form of adopting poison pills increases earnings management and decreases the value-relevance of earnings. Further, there is evidence that managers increase their compensation after poison pill adoption (Srinidhi and Sen, 2007a; Bebchuk et al., 2002). The overall findings of these studies support the contention that audit quality and strong governance mechanisms restrain earnings management and other expropriating behaviors of managers but managers try to weaken these mechanisms by creating economic bonds with the auditors and by adopting poison pills (Gompers et al., 2003; Srinidhi and Sen, 2007b).

We use a controlled laboratory setting to experimentally examine the role of auditing and market-based-governance in restraining managerial expropriation and inaccurate

financial reporting. Our study is motivated by two primary considerations. First, empirical studies are limited in their ability to manipulate audit and governance variables in a controlled manner and in isolating the contexts under which the effect of auditing can be investigated. A laboratory-based controlled experiment involving human participants overcomes these limitations by creating settings in which the experimenter can vary the incentives and the choice set of the participants. The experimenter can also introduce specific variations in the treatment variables, document the decisions made by the participants and evaluate the results under different regimes¹. Second, few empirical studies in the literature have addressed the issue of private benefits of control and other non-financial perquisite consumption by managers in situations of weak audit and governance. One reason for this lack of empirical analysis is that the data on such private consumption is decidedly hidden from view and is neither accessible to the investor nor to the researcher. In such a situation, only an experimental investigation or an analytical formulation can yield insights that can help regulators and policy makers in devising policies to constrain such expropriation. By its very nature, analytical formulations need to make a number of assumptions that cannot be validated in practice. Even in the presence of an analytical analysis, an experimental investigation will offer a richer set of insights into the phenomenon.

Prior literature identifies three roles of auditing - (i) signaling by managers of private information to investors and other external parties; (ii) deep-pocket hypothesis which holds that auditors provide a means of recovering investment losses from bankrupt firms and (iii) reduce agency costs by providing assurance that accounting numbers are fairly and accurately presented (Chow et al. 1988). Of these, audit quality is mainly associated with the third role, namely the reduction of agency costs between investors and managers in the presence of information asymmetry. Clearly, auditing cost itself is an agency cost in this relationship. Agency costs do not benefit anyone and therefore, contracts are devised to minimize the total agency costs. To the extent that incurring audit costs reduces more of the other agency costs, it becomes part of the optimal contract. Our view of auditing derives from this framework and therefore, its main benefit is in reducing the information risk faced by investors in the presence of information asymmetry between investors

¹The one potential drawback of an experimental approach being that it does not completely capture the richness of real settings.

and managers². The information risk in financial statements mainly stem from the accruals which are added to the underlying realized cash flows to determine the earnings. Managers have little discretion in reporting the realized cash flows³ per se. The accruals are determined both by the inherent characteristics of the firm as well as the discretion employed by managers in choosing accounting methods and estimates about the future⁴.

Auditing reduces information risk in two ways. First, the auditors independently assess the reasonableness of the estimates and the appropriateness of accounting methods used by managers to compute the accruals. Based on the private information that they gather during the course of their audit(s), they seek economic justification for deviations of managerial estimates from their own independent estimates. Further they examine the design of and compliance with the internal control procedures to ensure that the numbers being produces truly represent the estimates of managers. To the extent that they cannot find adequate justification, they conduct detailed substantive tests to verify the reported amounts⁵ and negotiate with the managers to change the reported amounts to more justifiable amounts. The second way in which the auditor influences information risk is by having a credible threat of costly qualification. Managers, in order to avoid the possibility of such qualification, become more disciplined in their reporting and thereby decrease the information risk to the investors.

In a similar vein, governance practices restrain private consumption as well as opportunistic reporting behavior by managers. Governance practices could originate from the

²Prior literature (Francis et al., 2004; Francis et al., 2005; Ecker et al., 2006; Easley and O'Hara, 2004) has shown that lower quality earnings represents a systematic information risk that cannot be diversified away by investors and therefore results in increased costs of debt and equity for the reporting firm. The usefulness of auditing derives therefore from a reduction in the agency cost and the resulting decrease in the cost of capital of the firm.

³There is extensive literature on real earnings management (Bushee, 1998; Roychowdhury, 2006) that shows that managers could make decisions that change cash flows. However, once cash flows are realized, there is not much discretion in what gets reported.

⁴For example, managers estimate the useful life of each asset, the amount of doubtful debts, the amount of future warranty expenses, the obsolescence of inventory, loan loss reserves, etc. They also choose the method of depreciating assets, the method of accounting for inventory and a variety of other accounting methods.

⁵The extent and the nature of the tests are planned and executed to minimize the audit risk. The size, reputation and the litigation potential influence the determination of audit risk and thereby affect the extent and nature of audit tests.

regulatory and legal framework (such as the board composition, the requirement of audit committee, the procedures for nominating and voting for directors, the handling of shareholder proposals etc.) or from the market in the form of corporate control (Martin and McConnell, 1991; Grossman and Hart, 1988; Dahya and Powell, 1998). While a number of empirical studies on governance have focused on the board characteristics, relatively fewer studies have investigated the market-based governance that comes from the market for corporate control. The set of studies that have examined these perspective have investigated the effect of poison pills and other anti-takeover provisions on the wealth and the governance of the firm (DeAngelo and Rice, 1983; Pound, 1987; Harris, 1990; Comment and Schwert, 1995; Datta and Iskandar-Datta, 1996; Borokhovich et al., 1997; Sundaramurthy, 2000). While the evidence is mixed regarding the wealth effects, there seems to be a general agreement that management gets entrenched by adoption of anti-takeover provisions and is thereby able to increase its expropriation (Bebchuk et al., 2004; Bebchuk et al., 2002).

Auditing and corporate governance mechanisms form two important factors that restrain managerial expropriation and reporting. The interaction between the board effectiveness and auditing is shown to be complementary (Carcello et al., 2002) in the sense that a stronger board demands higher levels of audit. Overall, the gist of empirical studies is that expropriation and opportunistic reporting behavior of managers are both curbed by strong auditing, effective boards and in the presence of a strong market for corporate control.

Our experimental set-up captures the basic elements of the above relationships. We first develop a theoretical framework to establish the expected relationships in a context which is more structured but less varied than the real world. For our analytical model we assume the existence of managers of different "types," where the type space represent differences in inter-temporal preferences of managers. Relatively "patient" mangers have higher discount factors, while relatively "myopic" managers have lower discount factors. This provides us with some novel insights which are then tested through our experiment. The main contention from our theoretical framework is that under certain conditions there exists a separating equilibrium such that differences in managerial reporting behavior is driven by their inherent differences in inter-temporal preferences as captured through their discount factors.

In our experiment, in a multi-period setting, we allow the managers to report in every period a return that could be different from what they observe. Under-reporting results in direct expropriation similar to the real-life phenomena of perquisite consumption, private benefits of control and empire building. This reduces the residual amount available for investment in the subsequent periods. On the other hand, over-reporting, particularly in the early periods, could help the managers in attracting more investments from different investors and increase the "firm" size and their own expected future compensation. This is akin to managers who have stock interest in the firm engaging in income-increasing earnings management that increases the stock price and results in greater compensation. In this scenario, investors are allowed to choose a costly audit and different levels. An effective audit results in the "true" earnings being revealed but the effectiveness of audit is determined by the level chosen by the investor. This is theoretically equivalent to an imperfect audit that decreases the extent of earnings management but does not eliminate it. We also have a treatment (poison pill) that does not allow the investor to switch his/her investment to another manager. This treatment simulates the entrenchment of the manager. In this setting, we study (i) whether the investment levels drop to zero in the absence of an audit; (ii) the effect of audit on expropriation; (iii) whether higher audit levels are associated with higher levels of investments; and (iv) the effect of poison pills on the level of audit, the expropriation level and the overall welfare level.

The experimental results support our hypothesis regarding the differences in expropriation levels being driven by the presence of different "types" of managers. In early periods of all treatments we find relatively higher expropriation and audit levels (where applicable). But this metamorphoses into low expropriation and low audit in later periods through manager selection, where investors reward "patient" managers with more investment and punish "myopic" ones with bankruptcy. We also find that the investment level does not drop to zero in the absence of an audit. This is supportive of the contention that reputation and the need to attract more capital disciplines the managers to some extent and this allows the market to function in the absence of an audit. However, we also show that the level of expropriation drops with audit level; that higher investment levels are associated with higher audit levels; and the overall pay-off is higher when audit levels are allowed to vary rather than fixing them. We also find that firms with poison pills attract higher levels of audit but less capital. Further, we find that even with higher levels of audit, there is more expropriation in the firms with poison pills than in other firms. Our findings contribute to the literature in two important ways. First, our results show that auditing is desirable but not necessary for the market to function. Second, these results confirm the empirical findings which show a lower level of expropriation and earnings management when governance and audit levels are high. Empirical findings suffer from the endogeneity problem, i.e., that governance and auditing decisions are not necessarily driving less expropriation and better reporting but rather, are simply the outcomes of the same underlying variables such as managerial ethics etc. By exogenously controlling the parameters in the experiment, we show that the empirical findings are not driven by endogeneity alone. Third, we show that the market-driven governance is a substitute rather than complementary to auditing. In other words, if there is a weakening of the market for corporate control, more auditing is demanded to substitute for the disciplining effect.

The rest of the paper is organized as follows. In the next section, we develop the theoretical framework. The third section develops and presents the hypotheses. In the fourth section, we provide the experimental design. The results and their discussion is given in Section 5. The last section concludes the paper.

2. Environment

To begin with we set up the environment for our experiment, where we first discuss the investor's decision problem and then the manager's.

2.1. Investors. Let there be 'n' investors where each investor has an initial endowment of ω_0 . The investor decides on the level of investment ' I_t ' in every period 't' with a manager. The investment yields an actual return of ' α ,' where $\alpha \in [a, b]$ is a random variable with a density function $f(\alpha)$ such that the expected value of α is $\mu_{\alpha} > 0$ and standard deviation is σ_{α} . The actual value of α gets revealed only to the manager and the investor just observes the return ' $\hat{\alpha}$ ' reported by the manager. WLOG the safe asset is assumed to pay zero rate of return. Given a choice of I_t and a reported return of $\hat{\alpha}_t$ by the manager, the earnings for an investor in period t (v_t) is given as

$$v_t = (1 - \beta)\hat{\alpha}_t I_t$$

where $I_t \leq v_{t-1}$, $\forall t \geq 0$, since borrowing is not allowed. Given that the investor has a discount factor ' δ_I ', the present discounted value of the future stream of earnings for the

investor is given by:

(2.1)

$$\Upsilon = \omega_0 + \sum_{t=1}^{\infty} \delta_I^{t-1} \upsilon_t$$

$$= \omega_0 + (1-\beta) \sum_{t=1}^{\infty} \delta_I^{t-1} \hat{\alpha}_t I_t$$

2.2. Managers. Let there be two types of managers: (i) Patient (P) - with a discount factor of δ_P and (ii) Myopic (M) - with a discount factor of δ_M , where $1 > \delta_P > \delta_M > 0$. Let β be the manager's compensation from the reported return ($\hat{\alpha}$), where $1 > \beta > 0$. Let there be 'm' managers where π_0 is the fraction of patient managers and $1 - \pi_0$ of myopic managers. As mentioned earlier managers can observe the actual return (α_t) in each period 't' subsequent to which they make their choice regarding the reported return ($\hat{\alpha}_t$). The investors get to observe only the reported return by the manager. Importantly, in any given time period there is one identical draw of the random variable α for all investment-manager pairs, i.e. in each period all managers see the same return α .

The earnings for a manager (ϕ_t) in period 't' given his choice of $\hat{\alpha}_t$, the investor's choice of I_t and the value of the random variable α_t is given by:

$$\phi_t = (\beta \hat{\alpha}_t I_t + (\alpha_t - \hat{\alpha}_t) I_t = [\alpha_t - (1 - \beta) \hat{\alpha}_t] I_t$$

where the first component " $\beta \hat{\alpha}_t I_t$ " is managerial compensation and the other " $(\alpha_t - \hat{\alpha}_t)I_t$ " is managerial expropriation. Therefore the present discounted value of the managers future earnings (Φ) is given by:

(2.2)
$$\Phi = \sum_{t=1}^{\infty} \delta_j^{t-1} \phi_t$$
$$= \sum_{t=1}^{\infty} \delta_j^{t-1} \alpha_t I_t - (1-\beta) \sum_{t=1}^{\infty} \delta_j^t \hat{\alpha}_t I_t$$

where we assume that if in any period the total invested amount with a manager goes to zero, then the manager goes bankrupt and has no future earnings.

Initially in period 1, each investor is matched with a manager at random, where the investor does not know the true type of the manager. He knows the prior probability (π_P) of matching with a 'Patient' manager. Subsequently the investor is allowed to switch managers at the beginning of every period. Therefore, in each period (except the first) each investor has to first decide on choosing a manager and then choose the level of investment with that manager. Every investor observes the $\hat{\alpha}_t$ reported by all managers

and not just their own. Note that as all investors are identical, hence if one investor decides to change their manager all other investors (except one!) would make the same change. Finally we consider an infinite time horizon.

3. Design

All the subjects in our experiments were drawn randomly on a voluntary basis from City University of Hong Kong students, both undergraduate and graduate. Each subject was assigned one of two roles: Managers and Investors. The auditing task in the experiment is performed by computer automatons. All the experiments consisted of three rounds. We first describe the design for the control treatment, which excludes auditing and corporate governance variables. The design of auditing and poison pill treatment is described later. Each treatment consists of three rounds with each round comprising multiple periods.

3.1. Round I. This round consists of 6 investment periods. At the beginning of the first period, half the subjects are randomly assigned as 'managers' and the other half as 'investors' for the rest of the experiment. Each investor is randomly matched with a manager, where the matching remain fixed for the duration of this round. Before the round begins all investors are assigned a fixed endowment (ω_0) of 3000 units of experimental money, where a part or whole of it can be used for investment. In each period t the investor chooses an investment level I_t . The rate of actual return (α_t) generated in any period t is determined through the following stochastic relation:

$$\alpha_t(\epsilon_t) = \gamma + \epsilon_t$$
, where $\epsilon_t \sim N(0, \sigma^2)$ and $\gamma \in (0, 1)$ is a constant

Both γ^6 and σ are treatment variables, where high values of σ reflect higher variability in returns for any given level of investment. For an investment I_t in period t, the Actual Cash Flow (ACF_t) can be expressed as:

$$ACF_t(I_t, \epsilon_t) = (1 + \alpha_t)I_t$$

The nature of the ACF function will be revealed to all the subjects in the experiment, but the exact realization of the ACF for a chosen investment level in a period is only revealed to the manager. The manager then decides on the level of cash flow to report to the Investor in each period t, termed as the Reported Cash Flow (RCF_t) . This allows for the manager to expropriate some part of the cash flow by reporting an RCF that is lower

⁶For the experiments we used two values of γ , 0.15 in some treatments and 0.30 in others.

than the ACF, where $RCF_t \leq ACF_t^7$. The manager gets compensated in each period t through the following payoff function (ϕ_t) :

$$\phi_t = \beta . RCF_t + (ACF_t - RCF_t) = ACF_t - (1 - \beta) RCF_t$$

where, the constant $0 < \beta < 1$ is the manager's compensation fraction and is used as a treatment variable. Also note that if $\phi_t = \beta ACF_t$, if $RCF_t = ACF_t$. The investor's payoff (v_t) in period t is equal to the remaining reported earnings⁸ after compensation, i.e.

$$v_t = (1 - \beta) RCF_t$$

The investor has the option of re-investing in each period all the reported earnings from the previous period or of saving all or a part of it. The investor also has the option of using these savings for investments in future periods of the same round or in future rounds. This scenario is continued for all periods of the first round during which the investors cannot withdraw or switch their investments from the manager they are matched with.

3.2. Round II. This round also consists of 6 investment periods. At the beginning of Round II, the actual and reported cash flows, total investments and investment returns for all the investor-manager pairs are revealed to all the investors and the managers. The investors then choose whether to continue with the same manager as in Round I or switch to another manager. This opens the possibility of multiple investors matched with a manager. Once an investor chooses a manager they are remained matched with for the all the subsequent periods in Round II. Any manager left without an investor is declared as "bankrupt," which automatically results in his/her exit from the experiment. All investors carry-over their earnings from the end of the first round. Like before, they can choose to invest any individual amount they desire, up to their total retained earnings. The investment levels of all investors matched with the same manager are revealed to each

⁸The terms "earnings" and "cash flows" are used interchangeably. For the purpose of this experiment, we suppress accruals that reflect the difference between earnings and cash flows. The focus of the study is not on accruals but on expropriation and overall performance over multiple periods.

⁷In our experiment we allow the manager to expropriate through under-reporting of earnings, while in reality managers could over-report. Over-reporting allows expropriation since it potentially inflates the value of the firm, thus increasing the proceeds from stock options most managers hold as compensation. But allowing for over-reporting in the experiment design leads to potential issues of borrowing and hence negative earnings that are difficult to enforce. Furthermore, our intent is to study expropriation behavior and hence to that extent the actual mechanics are relatively unimportant.

other. The payoffs for the managers in each period would be determined in exactly the same way as in the previous round. The level of investment with a manager for any given period would be the cumulative investment from all investors investing with that manager in that period. The payoff for the investors would also be similar to Round 1, with the proviso that in case of multiple investors, each investor shares the reported earnings after managerial compensation in proportion to their individual level of investment.

3.3. Round III. This round is identical to the second round, except that the number of periods is deliberately kept uncertain. Even though the subjects are not aware⁹ in what exact period the game would end they are aware that this is the last round. Hence the data from this round is not reliable due to possible "end-game" effects. The subjects though are fully compensated in accordance with their earnings from this round.

3.4. Audit Treatment. For this treatment we modify the design in order to examine how auditing impacts manager and investor choices. In this treatment, before every period in each round, the investors make two choices: First, the amount of investment like before and second, the level of audit. The audit mechanism is performed through a computer automaton¹⁰. If there is more than one investor for a firm, each submit an audit level, one of which is chosen with a probability equivalent to the share of each investor in the total investment. The investor's choice of audit level (but not the result of the audit) is revealed to the manager before they decide on the reported earnings. Once the manager after observing the ACF chooses a RCF, the audit process generates an Audit Revealed Cash Flow (ARCF), where by design higher audit level choice by investor results in a higher probability that Audit Revealed Cash Flow (ARCF) is the same as the Actual Cash Flow (ACF).

The investor's audit decision can be represented as choosing an audit level ($\kappa \in [0, 1]$), where κ represents the probability with which ARCF = ACF. The audit involves a cost (a deadweight loss), which is taken out from the cash flow. The audit cost function $[C(\kappa)]$ has the property that $C'(\kappa) > 0$, $C''(\kappa) > 0$ and C(0) = 0. In other words, the audit

⁹However, based on previous experience with other treatments and the time already spent in the experiment, we expect them to have developed expectations about the end of the experiment.

¹⁰We realize that our choice of auditor as an automaton done primarily to simplify the design precludes us from analyzing strategic interactions between managers and auditors.

costs increase at an increasing rate with audit quality¹¹, such that audit levels that nearly ensure perfect revelation of ACF, become prohibitively expensive. In our design, $C(\kappa)$ is a treatment variable that reflects "differential cost" audit regimes.

The manager now gets compensated on the basis of the ARCF, where note that for a chosen level of audit quality κ , the expected value of ARCF = κ ACF + $(1 - \kappa)$ RCF. Of course, if RCF = ACF, then ARCF = ACF = RCF for all values of κ . The managerial earning function $(\tilde{\phi}_t)$ for each period t is now given by:

(3.1)
$$\tilde{\phi}_t = \kappa(\beta . RCF_t) + (1 - \kappa) \left[(\beta . RCF_t) + (ACF_t - RCF_t - C(\kappa_t)) \right]$$
$$= \beta . RCF_t + (1 - \kappa) \left(ACF_t - RCF_t - C(\kappa_t) \right)$$

Similarly, investor earnings¹² (\tilde{v}_t) in each period t is given by:

(3.2)

$$\tilde{v}_t = \kappa \left(ACF_t - \beta .RCF_t - C(\kappa_t) \right) + (1 - \kappa)(1 - \beta)RCF_t \\
= (1 - \beta)RCF_t + \kappa \left(ACF_t - RCF_t - C(\kappa_t) \right)$$

3.5. Other Corporate Governance Variables. We now consider the introduction of a couple of corporate governance variables in addition to audit; "Poison Pill" and "Founder Investor."

Poison Pill: In the treatments where a poison pill¹³ is available, managers are allowed to adopt poison pill once at the beginning of Round II, which is observable by the investors before they make their choice of a manager. Once introduced, poison pills are not allowed to be withdrawn during the rest of the Round II & also Round III. If an investor chooses a manager who has adopted a poison pill, then the investor cannot leave that manager for the rest of the experiment. Poison pill adoption is a public event and will be observable by all investors.

Founder Investor: This treatment is meant to capture the distinctive flavor of corporate governance issues pertaining to Hong Kong in particular and similar

¹¹The terms "audit quality" and "audit level" are used interchangeably. Even though there is a difference between the two in real life, a higher audit effort by a qualified auditor generally results in a higher audit quality but increases the audit fee.

¹²In case of multiple investors the earnings are shared in accordance with the proportion rule introduced earlier.

¹³Poison pills are anti-takeover devices that prevent the managers from being fired for underperformance. This entrenchment effect is captured here by the removal of shareholder rights of withdrawal and switching.

Asian market structures in general. If in Round II or III any manager has an original investor (i.e., the investor from Round I) still matched with him/her, then that investor termed the "Founder Investor" has the ultimate right to choose level of audit quality in case of multiple investors in that firm.

4. Hypotheses

The main data collected from the experiment includes firm-wise realized, manager reported and audit revealed cash flows; investor and manager payoffs (expropriation and compensation separately); audit decisions; poison pill adoption decisions and invocation of founder investor rights when applicable. From these data we test our main hypotheses, which can be categorized into two broad groups: One, dealing with audit treatments, both where it is a decision choice and in others where it's exogenously set and other, dealing with treatments with the availability of poison pill and founder investor right. Regarding the treatments where there is a lack of availability of audit control, there is still a considerable disincentive against expropriationary behavior. This is due to the fact that while immediate gains from expropriation would be high but it would be at the cost of less investments at best and bankruptcy at worst, in the future. Conversely, more truthful reporting while leading top less current earnings would more likely lead to greater investments in the future and hence, significantly higher potential earnings in the future. Therefore, this would dictate that "patient" managers who care more about such "reputational" consideration would choose a fair degree of truthful reporting especially in the initial stages of the game, while the more "myopic" ones would expropriate more.

Hypothesis 1: In the absence of audit there is a sharper separation of managers in terms of expropriationary behavior, leading to a greater fall in expropriationary behavior from Round 1 to 2.

4.1. Audit. In the audit treatments we are primarily interested in the effectiveness of the auditing process in improving investor confidence, through higher investment and earnings. Related to this is the deterrent effect of audit on manager expropriation behavior (or salutary effect on truthful reporting) and finally the optimality of audit choice by investors. Optimality or effectiveness of audit decisions is investigated by comparing investor earnings in treatments where audit was an investor decision making variable to treatments where either it was exogenously fixed or not available. The above discussion can be more succinctly captured through the following set of hypotheses:

- **Hypothesis 2:** Treatment with voluntarily chosen audit levels gives higher payoffs to the investors.
- **Hypothesis 3:** Managers of firms with higher audit expropriate less and report more accurately.

Hypothesis 4: Firms with higher audit attract more capital.

4.2. Other Corporate Governance Variables. Regarding corporate governance variables other than audit, i.e. poison pill and founder investor we are interested in investigating how they interact with audit decision in influencing investor and manager behavior. Since poison pill is an entrenchment device for the manager, hence it is surmised that investors who choose a poison pill adopting manager would counteract the greater tendency towards more expropriationary behavior by managers with higher audit level choice. But since higher audit levels come with even larger deadweight losses hence such managers would attract less investment though they might earn higher earnings. The presence of founder investor in a firm removes control of audit level from other investors which would likely have an adverse effect on the overall investment in the firm. These issues are tested through the following hypotheses:

- **Hypothesis 5:** Firms with poison pills under-perform, attract less capital, and have more expropriation and higher managerial payoffs than other firms.
- **Hypothesis 6:** Investors in firms with poison pills demand higher audit levels than in firms without poison pills.
- **Hypothesis 7:** Firms with Founder Investor attract less capital and under-perform other firms.

4.3. **Regression Equations.** All regression were run using Round II data only, since Round I, meant for creating histories, had exogenous restrictions on investor choice of manager, poison pill availability etc., while Round III would have potential end-game effects. We ran regressions for manager's expropriation behavior, investors earnings, investment or capital inflows and choice of audit level. To estimate the different treatment effects, we create the following dummy variables for different treatment variables:

VARDUM: The dummy variable for the treatments where audit level is chosen voluntarily. It's defined as

$$VARDUM = \begin{cases} 0 & \text{for non-variable audit treatments} \\ 1 & \text{for variable audit treatments} \end{cases}$$

LOWDUM: The dummy variable for treatments where the audit level is exogenously fixed at 0.5, such that

$$LOWDUM = \begin{cases} 0 & \text{when audit level is not fixed at } 0.5 \\ 1 & \text{when audit level is fixed at } 0.5 \end{cases}$$

HIGDUM: The dummy variable for treatments where the audit level is exogenously fixed at 0.75, such that

$$HIGDUM = \begin{cases} 0 & \text{when audit level is not fixed at } 0.75\\ 1 & \text{when audit level is fixed at } 0.75 \end{cases}$$

ALPDUM: The dummy variable for the expected return on investment (α) , where

$$ALPDUM = \begin{cases} 0 & \text{when } \alpha = 1.15 \ (\alpha_1) \\ 1 & \text{when } \alpha = 1.30 \ (\alpha_2) \end{cases}$$

BETDUM: The dummy variable for managerial compensation (β), where

$$BETDUM = \begin{cases} 0 & \text{when } \beta = 0.05 \ (\beta_1) \\ 1 & \text{when } \alpha = 0.15 \ (\beta_2) \end{cases}$$

GAMDUM: The dummy variable for audit cost parameter (γ) , where audit cost $C(\kappa)$ for κ level of audit is given by $C(\kappa) = \gamma(\kappa I)^x$, where I is investment 0 < x < 1 is a constant. GAMDUM is defined as

$$GAMDUM = \begin{cases} 0 & \text{when } \gamma = 10 \ (\gamma_1) \\ 1 & \text{when } \gamma = 15 \ (\gamma_2) \end{cases}$$

PPTDUM: The dummy variable for the poison pill availability treatment, where

$$PPTDUM = \begin{cases} 0 & \text{when poison pill is not available} \\ 1 & \text{when poison pill is available} \end{cases}$$

PPCDUM: The dummy variable for whether the poison pill when available was actually chosen or not by a manager in Round II, where

$$PPCDUM = \begin{cases} 0 & \text{when poison pill is not chosen} \\ 1 & \text{when poison pill is chosen} \end{cases}$$

FDTDUM: The dummy variable for the founder investor treatment, where

$$FDTDUM = \begin{cases} 0 & \text{when founder investor right is not available} \\ 1 & \text{when founder investor right is available} \end{cases}$$

FDPDUM: The dummy variable for the presence of a founder investor in a firm in treatments where founder investor rights are available. The dummy gets defined as

$$FDPDUM = \begin{cases} 0 & \text{when founder investor absent} \\ 1 & \text{when founder investor present} \end{cases}$$

We begin by testing the various hypotheses associated with manager's expropriation behavior with regard to audit level (Hypothesis 2) and poison pill choice (Hypothesis 4). For manager expropriation we look at the ratio of the difference between ACF and RCF over ACF in each period and average it over number of investors. We call this variable manager's average intended expropriation (INTEXPRO RATE). This is regressed on the the variables of interest through the following equation:

(4.1)
INTEXPRO RATE =
$$\delta_{10} + \delta_{11}AUDLEV + \delta_{12}ACF + \delta_{13}NUMINV$$

 $+ \delta_{14}BETDUM + \delta_{15}PPTDUM + \delta_{16}PPCDUM + \epsilon_{16}PPCDUM + \epsilon_$

where, AUDLEV is the audit level (chosen by investors in some treatments and exogenously fixed in others), ACF as defined before is the actual cash flow, NUMINV is the number of investors matched with a manager and BETDUM, PPTDUM & PPCDUM are the dummy variables as defined earlier.

Next we are interested in testing the hypothesis that in voluntary audit level treatment, there is optimal audit choice. Optimality of audit choice would imply that in voluntary audit control treatments, investment rate and investor earnings are higher while intended managerial expropriation is lower compared to treatments with no audit or exogenously chosen audit levels. For investment rate we use the ratio of total investments over cumulative earnings of investors at the beginning of the period (INVST RATE), for investor earnings we use the ratio of investor earnings over ACF per period (INVEARN RATE) and for intended expropriation we use INTEXPRO RATE as defined earlier. All of these are then regressed separately through the following equations:

(4.2a) INVST =
$$\delta_{20} + \delta_{21}VARDUM + \delta_{22}LOWDUM + \delta_{23}HIGDUM + \epsilon_2$$

(4.2b) INVEARN =
$$\delta_{20} + \delta_{21}VARDUM + \delta_{22}LOWDUM + \delta_{23}HIGDUM + \epsilon_2$$

(4.2c) INTEXPRO =
$$\delta_{20} + \delta_{21}VARDUM + \delta_{22}LOWDUM + \delta_{23}HIGDUM + \epsilon_2$$

where, VARDUM, LOWDUM and HIGDUM are the dummy variables for the different audit treatments as defined earlier and α and β are the parameter values for investor return and managerial compensation respectively.

Through our next regression, we test hypotheses regarding the variables affecting the firm's ability to attract capital, i.e. investment with managers. These variables include audit levels (Hypothesis 3), poison pill (Hypothesis 4) and Founder Investors (Hypothesis 6). For measuring investment with manager, we use the ratio of total investments over total endowment or cumulative earnings of investors at the beginning of the period (INVST RATE).

(4.3)

$$INVST RATE = \delta_{30} + \delta_{31}AUDLEV + \delta_{32}BEGEARN + \delta_{33}ALPDUM + \delta_{34}BETDUM + \delta_{35}PPTDUM + \delta_{36}PPCDUM + \epsilon_3$$

where BEGEARN measures the cumulative earnings of the investor at the beginning of a period and is there to investigate any potential "endowment effect¹⁴." Endowment effect would work through loss aversion and would dictate that investors with higher endowments

 $^{^{14}}$ See Kahneman and Tversky (1991) and Kahneman and Tversky (1992) for a detailed exposition of loss aversion and endowment effect.

would be more averse to prospective losses and hence invest less, other factors being equal. ALPDUM, BETDUM, PPTDUM and PPCDUM are dummy variables as defined earlier.

Finally, we test our hypotheses on audit level choice, specifically that managers with poison pill would have investors who demand higher audit levels (Hypothesis 5). As defined earlier, we let AUDLEV denote the audit level choice. Also we only consider treatments with *voluntary audit choice* for this regression, since in other treatments audit level was not a decision variable.

(4.4)

$$AUDLEV = \delta_{40} + \delta_{41}PPTDUM + \delta_{42}PPCDUM + \delta_{43}BEGEARN + \delta_{44}ALPDUM + \delta_{45}BETDUM + \delta_{46}GAMDUM + \delta_{47}INVST RATE + \epsilon_4$$

where BEGEARN which investigates any potential "endowment effect" would have two opposite effects. One, higher endowments would tend to lower audit levels since higher audit is more costly, but higher endowments due to the higher loss aversion behavior would also have the effect increasing audit levels in order to protect against losses due to manager expropriation behavior.

5. Results

To compare our results from different treatments, we group the data into four main categories: (i) No Audit (i.e. treatments where audit control was not available), (ii) Low Audit (i.e. treatments where audit level was fixed at 0.5), (iii) High Audit (i.e. treatments where audit level was fixed at 0.75), and (iv) Variable Audit (i.e. treatments where investors had full audit control). We provide data for the main variables of interest which include investment and audit decisions (wherever applicable), investor and manager earnings, manager's reporting behavior and finally the results on bankruptcy rate and poison pill adoption rate. The data is averaged over all periods in a round and is compiled separately for treatments without the availability of poison pill and those from treatments where poison pill was available. The data is presented in a tabular form and for greater expositional convenience is also presented through graphs containing histograms for some of the important variables of interest.

We concentrate first on aggregate data from all treatments without the availability of poison pill, which is averaged over all periods in each round and presented in table 1^{15} .

¹⁵Regarding the table, Invst Rate refers to ratio of investment to endowment, AudLev is the audit level choice, AudCost is the ratio of audit cost to ACF, InvEarn Rate is the ratio of period investor earnings to

	No Audit		Lo	w Au	dit	High Audit Var Aud			dit			
	Rd1	Rd2	Rd3	Rd1	Rd2	Rd3	Rd1	Rd2	Rd3	Rd1	Rd2	Rd3
#Obs	536			480			256			964		
Invst Rate	0.33	0.56	0.49	0.51	0.6	0.52	0.745	0.78	0.79	0.62	0.66	0.69
AudLev	na	na	na	0.5	0.5	0.5	0.75	0.75	0.75	0.62	0.49	0.72
AudCost Rate	0	0	0	0.15	0.05	0.07	0.11	0.05	0.05	0.19	0.07	0.06
InvEarn Rate	0.71	0.88	0.72	0.76	0.85	0.80	0.80	0.89	0.87	0.72	0.79	0.83
IntExpro Rate	0.22	0.05	0.18	0.18	0.145	0.28	0.18	0.13	0.15	0.2	0.14	0.18
ActExpro Rate	0.22	0.05	0.18	0.08	0.05	0.12	0.05	0.04	0.02	0.09	0.09	0.11
ManEarn Rate	0.29	0.13	0.26	0.11	0.09	0.14	0.09	0.08	0.06	0.14	0.15	0.14
Bnkp Rate	na	0.64	0.75	na	0.65	0.78	na	0.625	0.625	na	0.56	0.66

TABLE 1. Aggregated Round Data for all Treatments w/o Poison Pill

One of our main hypothesis was regarding the presence of managers with different intertemporal preferences reflected through their discount factors. As evidence in support of such an hypothesis, one would expect that in Round 2 investors would be more likely to select managers who demonstrated behavior consistent with being a patient type in Round 1 thus weeding out the myopic managers. As discussed in the following paragraphs

ACF, IntExpro is the ratio of manager's intended expropriation to ACF, ActExpro is the ratio of actual expropriation to ACF, ManEarn is the ratio of manager period earnings to ACF and Bnkp Rate is the rate of managerial bankruptcy.

the data on intended expropriation by mangers, audit level choice and investment rate conclusively provide evidence in support of such a contention.



FIGURE 1. Mean Managerial Intended Expropriation Rate

From figure 1 which captures data on intended expropriation (IntExpro Rate) by managers, we see evidence consistent with the presence of different manager types: Patient and Myopic. We would expect patient managers to choose more truthful reporting, while myopic ones would indulge in more expropriation. For all treatments in the Poison Pill not available case, we observe that the intended expropriation on average falls significantly in Round 2 compared to Round 1. Managers who are active in Round 2 (i.e. not rendered bankrupt) tend to be the more patient ones and thus there is a fall in intended expropriation going from Round 1 to 2. While all four audit control groups demonstrate this behavior, it gets more sharply observed in the No Audit group, where it falls from 0.22 to 0.05. This is so because investors generally observe actual expropriation rather than intended expropriation. With audit control (especially high levels like in the High Audit treatments) the signal that investors would get about the manager "type" given their reporting behavior gets dampened because of audit. Therefore investors face greater informational constraints in distinguishing between manager types, hence patient managers have less incentive to separate themselves from myopic or impatient ones. But in the no audit case, intended expropriation and actual expropriation are exactly same. Therefore, it is more rewarding for patient managers to expropriate less, thereby signaling their true type to investors.

The data on managers earnings rate (ManEarn Rate) from figure 2 also provides evidence similar to intended expropriation expropriation as expected. The manager's per period earnings on average falls from 0.29 in Round 1 to 0.13 in Round 2. One could



FIGURE 2. Mean Manager Earnings Rate

use this data to to question the effectiveness of truthful reporting by patient managers, given that in general higher expropriation is shown to be more profitable for the manager. But this is a short-term (myopic) viewpoint ignoring the long-run advantages of truthful reporting resulting in more investors and higher investments in the long-run. In our experiments the managers who survived longer made significantly more money.

FIGURE 3. Mean Investment Rate

This is also confirmed by the rise in investment rate (Invst Rate) in Round 2 compared to Round 1 as can be seen from figure 3. While the investment rate in general rises for all four treatments, the rise is especially dramatic from the No Audit case (from 0.33 to 0.56). Again this can be explained by the fact that separation of different manager "types" is more acute in the no audit case, hence investors are more confident that their chosen manager is patient and less inclined towards expropriation. But interestingly comparing Round 2 and 3 data we observe a sharp increase in intended expropriation and managerial earnings especially in the no audit and low audit case. This seemingly belies our earlier evidence on myopic managers beng weeded out. But we believe that this is evidence of end game effects in Round 3, i.e. even patient managers' incentives in favor of low expropriation (leading to lower per round earnings) are gone with realization that the game is about to end. We especially see a sharper rise in Round 3 intended expropriation by managers in the No Audit and Low Audit treatments since in these treatments investors lack effective audit control to dissuade managers from expropriation.

FIGURE 4. Mean Audit Level

With relation to the interaction between audit choice and expropriation the evidence is quite interesting. We would expect that high audit level choice would dampen manager's intention to expropriate (i.e. a negative relationship between the two variables), but our results are actually to the contrary; from figure 4 on average audit choice we observe that going from Round 1 to 2 in the Variable Audit case (Var Audit) there is a fall in average audit level from 0.61 to 0.47 accompanied by a corresponding fall in intended expropriation from 0.2 to 0.14. Similarly, from Round 2 to 3 there is both an increase in audit level and intended expropriation. This seemingly paradoxical result makes sense once we incorporate our earlier behavioral hypothesis of the presence of different manager types. Patient types are less likely to expropriate while myopic impatient) types are more likely to do so. In Round 1, there is a fair representation of both types in the population, hence there is fairly "high" levels of intended expropriation on average. Investors respond to this behavior by choosing on average "high" levels of audit. But in Round 2, investors manage to weed out most of the myopic managers through bankruptcy and hence, they expect lower levels of expropriation from the remaining patient managers. They respond to an expected fall in expropriation behavior, a belief which gets borne out, through lower audit levels. In Round 3, expropriation levels rise due to end-game effects, where even patient managers start expropriating at higher levels and investors expecting this behavior

increase audit control. This behavioral explanation gets further evidence in it's support from data in the No Audit case. In this case there is no audit control, hence any changes in expropriation is independent of audit. We see exactly similar direction of movement (actually even starker) from Round 1 to 2 to 3 for the intended expropriation, confirming our Hypothesis 1.

FIGURE 5. Mean Investor Earnings Rate

Regarding the optimality of audit choice by investors in the Variable Audit case, from figure 4 again we observe that in the Variable Audit (Var Audit) case that investors in general choose audit levels in between those of the high and low audit cases. Therefore it would lead us to believe that the optimal audit is somewhere in between the two extreme cases. But one of the main criteria for optimal audit choice would be the corresponding investor performance. Through figure 5 on investor earning rate (InvEarn Rate) we observe that investor earning in the variable audit case does not compare favorably to those in the other audit treatments, especially to that in the High Audit case¹⁶. Therefore the optimality of audit choice in the Variable Audit treatment is seriously questioned. The end-game effect is also reflected in the audit level choice (AudLev) by investors in the Variable Audit treatment, where average audit levels jump up from 0.47 in Round 2 to 0.68 in Round 3 in response to higher expropriationary behavior by managers.

Next we analyze the data, provided in Table 2^{17} , from the treatments where poison pill was available. We observe that the data generally supports all our earlier hypothesis from

¹⁶The results are tempered by the fact that we used two values of expected investment return (α), $\alpha_1 = 1.15$ and $\alpha_2 = 1.30$. In all the High Audit case treatments α_2 was used, while the other cases had some treatments with α_1 .

¹⁷All variables in the table have exactly the same terminology as in Table 1 described earlier. The new additions are with respect to poison pill. Round 2 data is now split between manager-investor interaction

	Low Aud					High Aud			Var Aud			
	Rd1	Rd2		Rd3	Rd1	R	Rd2		Rd1	Rd2		Rd3
		PPN	PPY			PPN	PPY			PPN	PPY	
# Obs	556			496			464					
Invst Rate	0.48	0.69	0.66	0.64	0.66	0.7	0.52	0.53	0.8	0.82	0.66	0.69
AudLev	0.5	0.5	0.5	0.5	0.75	0.75	0.75	0.75	0.695	0.56	0.72	0.58
AudCost Rate	0.26	0.05	0.23	0.06	0.21	0.08	0.12	0.07	0.09	0.04	0.08	0.09
InvEarn Rate	0.64	0.8	0.74	0.82	0.75	0.885	0.84	0.71	0.83	0.91	0.79	0.65
IntExp Rate	0.25	0.17	0.28	0.19	0.14	0.15	0.23	0.42	0.14	0.14	0.11	0.27
ActExp Rate	0.15	0.10	0.12	0.12	0.03	0.0	0.01	0.14	0.05	0.03	0.085	0.2
ManEarn Rate	0.19	0.17	0.14	0.19	0.07	0.04	0.045	0.16	0.08	0.07	0.13	0.23
Bnkp Rate	na	0.45	0.81	0.72	na	0.41	0.71	0.66	na	0.48	0.73	0.59
PP Rate	na	0.	44	na	na	0.	44	na	na	0.	.34	na

TABLE 2. Aggregated Round Data for all Treatments w/ Poison Pill

the no poison pill treatments. Specifically, we can now observe the optimality of audit level choice in the Variable Audit case more clearly, where the audit choice is somewhere in between the low and high cases and both investor earning rate (InvEarn Rate) and

where the manager did not choose the poison pill (PPN) and where he did (PPY). PP Rate refers to the rate of poison pill adoption by managers in Round 2, the only round where the choice was available.

especially investment rate (Invst Rate) compare very favorably to the corresponding values in the other two exogenously fixed audit level cases.

Comparing firms (groups) which had poison pill with those that did not, Round 2 data reveals that investor earnings from managers with no poison pill is significantly more than that for the managers with poison pill (see figure 5). Also, from figure 1, manager's intended expropriation level is higher in the case where they have the poison pill as opposed to where they do not for both the High and Low Audit case, but not for the Variable Audit case. This result can be explained by the fact that, for a manager with the poison pill in the exogenously fixed Audit level treatments, not only does he have the investors entrenched with him but also the investors are unable to strategically change audit control in response to his expropriation behavior. Therefore high levels of expropriation are resorted to by the manager. But in the Variable Audit case investors have the ability to change audit level in response to expropriation behavior even if they are entrenched with the manager. This provides a disincentive for the managers, since higher audit means higher likelihood that their untruthful reporting of earnings (i.e. under-reporting) would not pass audit scrutiny, thus resulting in lower compensation¹⁸. Regarding ratio of manager earnings to ACF (ManEarn Rate), we observe that while managers with poison pill earn significantly more than those without for the variable Audit case, the differences (if any) for the other two cases are significant. In general, we can conclude from the above discussion that the results support our Hypothesis 5. Also, from the data on audit levels in the Variable Audit see, we see a highly significant increase in audit level choice for investors with poison pill managers (0.73) compared to audit choice with managers with no poison pill (0.56), thereby confirming our Hypothesis 6.

Next we look at the interaction between poison pill choice by managers and their likelihood of going bankrupt, in other words investors proclivity to avoid managers with poison pill. We would generally expect managers who choose poison pill to be more likely to be avoided by investors and hence, would have a greater rate of bankruptcy. From figure 6, we can see that the data from all three audit treatments are strongly consistent with such an expectation. In Round 2 the bankruptcy rate for poison pill managers (PPY) is 0.81, 0.71 and 0.73 for the Low, High and Variable Audit treatments respectively, while it is

¹⁸Note if a manager chooses a RCF < ACF, i.e tries to expropriate through under-reporting but is detected by audit scrutiny, i.e. ARCF = ACF, then his compensation is lower (β RCF) than what it would be if he had reported truthfully (*beta* ACF).

FIGURE 6. Mean Bankruptcy Rate

0.45, 0.41 and 0.48 for the corresponding no poison pill managers (PPN)¹⁹. In our experiments investors faced with the choice between relatively patient managers with poison pill or relatively myopic ones without poison pill, choose to go more with the ones without the poison pill.

5.1. Regression Results.

We first consider the results provided in Table 3 for the set of regressions in Equation (4.2). We run the regressions separately for treatments with and without poison pill. Since we didn't run any no audit treatment with poison pill availability, hence we drop the the dummy variable for low audit treatment for the poison pill treatments. Looking at the results for the no poison pill treatments, we observe that though the voluntary or variable audit treatment does better compared to the no audit and low audit treatments in terms of investment level, but compared to the high audit treatment it does worse. Similarly in case of investor returns the high audit treatment does best. For intended expropriation, none of the coefficients are significant. Therefore the optimality of the audit choice in the voluntary audit treatment is put severely in doubt. But interestingly when we consider the treatments with poison pill, the voluntary audit control case does significantly better

¹⁹While the results here are as expected, it is instructive to note that there is a potential for a reverse relationship between poison pill adoption and bankruptcy. Poison pill choice by managers is a strategic one driven by the trade-off between increasing returns from the entrenchment of investors but also lower expected returns due to less investors or even bankruptcy. Therefore poison pill adoption by managers has a potential signaling effect about their types. Managers who report truthfully and hence earn investors good returns are more likely to choose poison pill since they are less likely to be shunned by investors. Similarly, it is possible that managers who had high levels of expropriation in Round 1 are less likely to choose the poison pill.

	W/O	Poison Pi	11	With Poison Pill				
	Invst	Invearn	Intexpro	Invst	Invearn	Intexpro		
	Rate	Rate	Rate	Rate	Rate	Rate		
Constant	0.4298**	0.7977**	0.1709**	0.5858**	0.7221**	0.2330**		
	(0.015596)	(0.009828)	(0.015795)	(0.015799)	(0.009888)	(0.016510)		
LOWDUM	0.1277**	0.0082	-0.0007		 	r		
	(0.022928)	(0.014796)	(0.023742)	-	· – · ·	· – · ·		
HIGHDUM	0.3308**	0.0486*	-0.0079	0.0740**	0.09205**	-0.0797**		
	(0.028116)	(0.017472)	(0.027746)	(0.023031)	(0.014176)	(0.023348)		
VARDUM	0.2108**	-0.0439**	0.014459	0.2133**	0.13805**	-0.0935**		
	(0.019341)	(0.012075)	(0.019103)	(0.023031)	(0.014012)	(0.023109)		
# Obs	1799	1703	1184	1200	1120	788		

** significant at both 1% and 5% level

* significant at 5% but not 1% level number inside parenthesis denote std. error

TABLE 3. Regression Results for Optimality of Audit Control (Rounds 1 & 2)

compared to both the low and high audit cases for investment levels (higher), investor returns (higher) and intended expropriation (lower), thus providing strong evidence towards optimality of audit choices. A possible explanation for this difference between the treatments with and without poison pill could be explained by the fact that investors are much more careful about audit choices in the presence of poison pill, since the deleterious effect of making sub-optimal choices is potentially higher when they are investing with a manager who has adopted a poison pill.

Next we consider the results from the variable audit treatments provided in Table 4 for the set of regressions given in Equations (4.1), (4.3) and (4.4). The regressions for audit level choice (AUDLEV) and intended expropriation (INTEXPRO RATE) was done using data from Rounds 2 and 3^{20} in variable audit treatments while for investment rate (INVST RATE) we used only Round 2 data. Looking at the results for audit level choice (AUDLEV), we see that as expected the level of investment has a significant positive effect

 $^{^{20}}$ We used data from both Round 2 and 3 since we wanted to investigate the presence of end-game effects.

	AUDLEV	INVST RATE	INTEXPRO RATE	
Constant	0.3938**	0.4937**	0.33825**	
Constant	(0.051481)	(0.020837)	(0.040725)	
		0.1162**	-0.25815**	
AUDLEV	na	(0.022781)	(0.050909)	
INVST RATE	0.3730^{**}	na	na	
	(0.000011)		$-2.36 \times 10^{-6**}$	
ACF	na	na	(7.66×10^{-7})	
	$2.97 \times 10^{-5**}$	-0.0002**		
BEGEARN	$(9.92 \times 10^{-6}) \qquad (5.29 \times 10^{-6})$		na	
	-0.2049**	0.0747**	0.0362	
PPIDUM	(0.025046)	(0.017576)	(0.037628)	
DDCDUM	0.2127**	-0.1581**	-0.0747	
PPCDUM	(0.051611)	(0.035606)	(0.066408)	
DETDIM	-0.2900**	-0.0264	-0.16765**	
BEIDUM	(0.039211)	(0.022131)	(0.048787)	
		0.3586**	na	
ALPDUM	na	(0.021585)		
CAMDIN	-0.1455**		na	
GAMDUM	(0.038244)	na		
	0.0913**		0.1166**	
NDDUM	(0.022568)	na	(0.036359)	
$\# \overline{\mathrm{Obs}}$	810	588	338	

 ** significant at both 1% and 5% level

* significant at 5% but not 1% level

number inside parenthesis denote std. error

TABLE 4. Regression Results for Variable Audit Treatment

while increases in managerial compensation rate (captured through Betadum) and audit

cost parameter (captured through Gamdum) have significant negative effects. Interestingly, we observe a significant endowment effect, i.e. investors with higher endowments choose higher audit levels for their investment due to loss aversion (arising from potential managerial expropriation). We also observe a significant end-game effect since the coefficient of RDDUM, the dummy for Round 3 data, is significantly positive suggesting higher audit level choices on average in this round compared to the previous one.

Endowment effect is also observed from the result of the regression of investment rate, where the significantly negative coefficient suggests that investors with high endowments invested proportionately less due to loss aversion. Similarly the regression for managerial intended expropriation again provides evidence for end-game effects as the coefficient for Round 3 dummy is significantly positive. Managers also expropriate at a lower rate when the ACF is high and their compensation level is high. Another interesting result arises from the comparison between poison pill and no poison pill treatments. We observe that the coefficient for the poison pill treatment dummy (PPTDUM) is significantly negative in case of audit level choice and significantly positive for investment rate. This implies that in treatments where managers had the possibility of adopting a poison pill available to them but did not choose to do so, the audit level on average was lower and the investment rate higher. The coefficients for the poison pill choice dummy (PPCDUM) on the contrary had their signs reversed suggesting that managers who chose poison pill expectedly faced lower investments and higher audit levels compared to managers who did not do so.

6. CONCLUSION

We get strong evidence in support of our behavioral model of different manager types: Patient, with a high discount factor and Myopic, with a low discount factor. The data for both poison pill and no poison pill treatments shows separation of the two types in Round 1 through their reporting behavior. Patient managers are more likely to report truthfully, while myopic ones are more likely to be under-reporting in order to expropriate. The significant fall in expropriation behavior in Round 2 compared to Round 1, even in the absence of audit control in No Audit case, proves that the managers who survived the investor selection process in Round 2 were patient managers. This also explains the paradoxical result we get of audit levels being positively correlated to expropriation levels.

Our other hypotheses regarding audit choice and poison pills are also generally supported. We see that higher audit levels attract more investment and give higher payoffs to the investor (despite the deadweight loss associated with audit cost). The evidence though for the optimality of audit choice in the Variable Audit treatments is mixed. While in the treatments with poison pill, we observe better investor performance in the Variable Audit case compared to the other treatments of exogenously given audit levels, but in the treatments without poison pill we do not see any significant difference between investor performance in the Variable Audit treatment and the High Audit treatment. Regarding poison pill effects, as expected we observe that firms without poison pill attract more capital and deliver better investor returns than firms with the pill. Finally, as suspected we encounter strong end-game effects in Round 3 resulting in higher audit, more expropriation and higher manager earnings compared to that in Round 2.

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