Financial Reporting and Moral Sentiments*

Radhika Lunawat
(*University of California-Irvine*)
Timothy W. Shields
(*Chapman University* and *Economic Science Institute*)
Gregory Waymire
(*Emory University* and *Economic Science Institute*)

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ABSTRACT

Adam Smith posits in *Theory of Moral Sentiments* that we self-regulate our conduct in anticipation of others' moral judgments. The mechanism is an "Impartial Spectator," a fictitious individual constructed in the mind who helps us predict whether our actions will earn others' approval or disapproval. We hypothesize that financial reporting activates this mechanism and leads managers to make investment and resource sharing decisions that are better aligned with investor interests. We test this hypothesis with an experiment where we manipulate the availability of a financial report that reveals the manager's reinvestment and self-compensation to the investor. Our evidence shows that financial reporting better aligns a manager's reinvestment and resource sharing actions with investor interests *even though the investor can impose no cost or confer no reward on the manager*. This effect is robust to equalizing the relative power of the two individuals by giving the investor the right to terminate the game at any point and take a sizable portion of the assets. Our evidence is important because it suggests that at least part of financial reporting's economic value derives from implicating human moral judgments in addition to its traditional contracting or valuation functions.

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Introduction

Louis Brandeis (1914, 92) called for transparent corporate financial reporting to combat the evils of monopoly when he declared that "sunlight is said to be the best of all disinfectants." Brandeis' quotation suggests that the anticipation of public revelation of questionable behavior can itself deter such behavior, which raises two deeper questions. First, what is the underlying mechanism by which anticipation of a public report about behavior can lead to prospective changes in behavior even when the actor bears no pecuniary cost for taking an action? Second, how could financial reporting implicate such a mechanism?

One commonly-used term to describe an internally-driven mechanism for self-regulating conduct is "Conscience," which Merriam-Webster's defines as "the moral goodness or blameworthiness of one's own conduct, intentions, or character together with a feeling of obligation to do right or be good."[1] Adam Smith (1812, 375) invokes the metaphor of an Impartial Spectator, a hypothetical "man within the breast," who "does not feel himself worn out by the present labor of those whose conduct he surveys" and is not "solicited by the importunate calls of their present appetites." Regardless of the label we apply to this (unobservable) mental force, it provides a means by which we can evaluate and self-regulate our own conduct in anticipation of how others will judge us if they become aware of our actions and intentions beyond the consequences of our actions.[2]

Smith and Wilson (2017) provide a framework that we use to hypothesize how a financial report can implicate moral sentiments that leads managers to self-regulate their own behavior. In the Smith-Wilson framework, an individual's judgment of her own action is a function of whether it will be praised by another party (i.e., whether it can be observed and judged favorably by others) and whether that action is inherently praiseworthy regardless of its observability by others. For present purposes, the main insight from Smith and Wilson (2017) is that a financial report can have value because it can alter a manager's actions in anticipation of how an investor will evaluate the moral appropriateness of a manager's actions as well as any monetary payoff revealed by the report. The two managerial decisions of interest in this study are a manager's decision to reinvest resources that can increase joint gains (rather than take a personal salary) and the ultimate division of resources between the investor and management over the course

[1] The definition of "conscience" is taken from Merriam-Webster available at https://www.merriam-webster.com/dictionary/conscience.

[2] "(T)he prudent man is always both supported and rewarded by the entire approbation of the impartial spectator, and of the representative of the impartial spectator, the man within the breast. To him their present, and what is likely to be their future situation, are very nearly the same: he sees them nearly at the same distance, and is affected by them very nearly in the same manner. He knows, however, that to the persons principally concerned, they are very far from being the same, and that they naturally affect them in a very different manner. He cannot therefore but approve, and even applaud, that proper exertion of self-command, which enables them to act as if their present and their future situation affected them nearly in the same manner in which they affect him" (Smith 1812, 374-5).

of the firm's life. We hypothesize that financial reporting has value in part because it allows an investor to observe managers' investment and resource division actions and evaluate the propriety of these actions, which lead the manager to choose more jointly beneficial actions than would be taken in the absence of financial reporting.

The idea that managerial behavior can be altered solely by the moral judgments of investors differs from the more traditional view that the value of reporting stems from its explicit use in contracts that lessen agency conflicts due to separation of ownership and control (Berle and Means 1932; Jensen and Meckling 1976). The agency problem arises in part because a corporation has an indefinite life with permanent investment where retention of capital (in lieu of paying out all earnings each period) can skew the power of managers vis-à-vis investors. In this view, financial reporting information has value because its use in contracts helps align management and shareholder interests – e.g., through a management compensation plan tied to reported earnings (Watts and Zimmerman 1986; Milgrom and Roberts 1992). Our hypothesis stands in contrast to this view in that financial reporting can also have value independently of its contracting function.

We test our hypotheses using an experiment that embodies several features of the modern corporation. Our baseline firm is a "reinvestment game[3]" based on a multi-period, two-person investment-trust game (King-Casas et al. 2005; Basu et al. 2009).[4] The two players include an investor and a trustee (i.e., manager), both of whom know that the game will last only six periods. The investor is endowed every period with new resources that can be invested at the start of that period, and the trustee divides the total payoff at the end of each period between a "salary" for herself, a "dividend" to the investor, and a reinvestment of remaining resources into a common account that will earn future returns identical to new investments by the investor. The total amount that the trustee divides every period equals the product of the total amount invested (i.e., new investment plus the amount reinvested) and a positive multiplier taking on a value of 1, 2, or 3 drawn with equal probability (Lunawat 2013). At the end of the sixth period, the trustee divides the total amount remaining between herself and the investor as she sees fit.

The only information available to the investor in the baseline firm is the amounts sent to her as dividends by the trustee. The overall wealth is maximized when the investor invests her entire endowment and the trustee reinvests her funds in every period – i.e., a deadweight loss occurs whenever investment (in periods 1-6) or reinvestment (in periods 1-5) is less than the maximum. As with a real corporation, these losses increase over time

[3] The reinvestment game is due to Lunawat (2009) and LaRiviere, McMahon and Neilson (2017).

[4] In the original Berg, Dickhaut, and McCabe (1995) one-period trust-game, the investor sends any portion of her endowment to the trustee, who receives three times the amount sent. The trustee returns any portion of the amount received back to the investor and the task is over.

since the compounding of investment returns over multiple periods can generate sizable gains.

We manipulate two factors within a 2X2 between-subjects design to identify the effects of two motives for ethical trustee behavior: avoid being blameworthy and/or avoid being terminated. Our primary manipulation concerns the provision of a financial report to the investor at the end of each period. Investors with reporting are informed of the total earnings for the period, the amount of salary that the trustee paid to herself during the period, and the common account balance that was reinvested to earn returns during the next period. This manipulation allows us to directly test whether financial reporting *per se* has economic value since, within our experiment, a report reveals whether the trustee made payments to herself that created deadweight losses or divided resources unequally during or at the end of the game. That is, the investor learns with certainty whether the trustee behaved cooperatively increasing total wealth available and sharing the wealth generated from reinvestment.

Our second manipulation provides a decision right to the investor that at least partly lessens power advantage of the trustee over the investor. With liquidation the investor has the option of terminating the game at the end of any period ($t < 6$) and receive 40% of the common account balance at the time that the liquidation option is exercised. Within our reinvestment game, the liquidation option offers a contractual feature whereby the investor has more equal power in her relationship with the trustee, but exercise of the option entails an opportunity cost since early liquidation removes the possibility of larger earnings in later periods.

The treatment without financial reporting or liquidation is the *Baseline* treatment. The treatment with financial reporting, but without liquidation, is the *Reporting* treatment. The treatment without financial reporting, but with an investor liquidation option is the *Liquidation* treatment. The treatment where both financial reporting and liquidation are present is referred to as the *Both* treatment. The primary difference between the *Liquidation* and *Both* treatments is that financial reporting allows the investor to know the common account balance and salaries taken by the manager with certainty when exercising the liquidation option in the *Both* treatment.

Our interest in the liquidation option stems from the neoclassical view that incentives are difficult to align in the absence of any explicit economic payoffs that vary with the manager's behavior. That is, this view accords no possibility to behaviors being solely influenced by moral considerations. Because the addition of the liquidation option complicates identification of causal forces, it is useful mainly to gauge whether persons in a similar experiment facing the possibility of being "fired" by an employer exhibit any behavioral differences when financial reporting is available. This allows us to provide evidence on the question of whether the provision of financial reports has similar effects in a setting where the relative power differences between the trustee and investor are more equal than in our comparison of the *Reporting* and *Baseline* treatments.

We test two hypotheses about differences in trustee behavior in the presence of financial reporting. First, we expect that a trustee acting so as to seek praise and/or avoid blame will reinvest larger amounts (and take lower salaries and pay lower investor dividends) with financial reporting (the *Reporting*/*Both* treatments) compared to without financial reporting (the *Baseline*/*Liquidation* treatments). This occurs because the trustee can demonstrate praiseworthy conduct by reinvesting larger amounts rather than taking a personal salary or paying higher interim dividends when reporting is available. Second, we hypothesize that, holding all else equal, investors will obtain higher return on investment with financial reporting than without (where the investor does not learn the total wealth generated by the firm and the amount taken by the trustee).

Our main experimental results concern the self-regulation of trustee behavior when financial reporting is available. As predicted, trustees pay themselves lower salaries, pay lower interim dividends, and have higher reinvestment rates with financial reporting than without. In addition, investors with financial reporting receive higher return on investment than without.

Interestingly, treatments where a liquidation option can be exercised show that the welfare effects of the liquidation option are ambiguous. While investor payoffs decrease when there is an option to liquidate, the difference is not significant. However, trustees' payoffs are significantly lower when there is an option to liquidate.

Our evidence is important because it suggests that the value of corporate financial reporting arises in part because it implicates moral sentiments in humans. In this sense, our findings suggest that a fundamental part of financial reporting's value likely comes from its ability to activate moral sentiments that support cooperation. Of course, our findings do not imply anything about the importance of moral sentiments in reporting relative to contracting and valuation purposes. Indeed, if one views our liquidating option as a contracting device, it is clear that these forces also operate in the *Liquidation* and *Both* treatments that we examine.

The next section of the paper develops the basis for the specific hypotheses we examine in our experiments, and the following section describes our experimental design. We then present evidence from our experiments and a final section concludes the paper and discusses the implications of our findings.

Theory & Hypothesis Development

Self-interested behavior is the foundation upon which Adam Smith built the theory presented in *The Theory of Moral Sentiments* (*TMS*).[5] Smith posits that experience

[5] Smith (1790 III.I.45) states "(T)o the selfish and original passions of human nature, the loss or gain of a very small interest of our own, appears to be of vastly more importance, excites a much more passionate

teaches us how to moderate our "self-love" to cooperate and secure gains from exchange. Self-interest is crucial because it allows us to judge *ex ante* the consequences of our actions for others; because others are self-interested (like us), we can predict the likely hurtful or beneficial effects of our actions since we have previously experienced such effects from others' actions.[6] Thus, we judge others' conduct and reward praise-worthy actions or punish blame-worthy actions.

Smith's Impartial Spectator (i.e., Conscience) is the cumulative result of experience in judging the appropriateness of others' actions. This Impartial Spectator is the internal mechanism wherein we gradually come to see ourselves more like others do because the Spectator presents a mirror-like image of our contemplated actions.[7] We ultimately seek to have our actions be viewed by others as praise-worthy and avoid having them be seen as blame-worthy. As a result, we develop a sense of empathy for others because by living in society with others we learn to moderate our own self-love.[8]

Vernon Smith and Bart Wilson provide a utilitarian framework that is useful for hypothesizing how the tenets of *Moral Sentiments* translate to individual actions in the laboratory and the real world (Smith, 2017; Smith and Wilson, 2017). In the Smith-Wilson framework, utility is jointly determined by monetary payoffs and non-monetary factors reflecting the propriety of the action being considered (i.e., the approval or disapproval of our actions by others). The utility function includes components for taking praise-worthy/blame-worthy actions, a component for taking visible actions, and the cross-product of these components.

Assume that a decision-maker (DM) *i* obtains utility from taking an action that depends on the context (C) of that action and the DM's judgment of the action's appropriateness given that context:

$$U_i(action|C) = \delta_i(C) + \alpha_i(C,B)V + \gamma_i(C,B)PW + \beta_i(C,B)V\,PW \qquad (1)$$

joy or sorrow, a much more ardent desire or aversion, than the greatest concern of another with whom we have no particular connexion."

[6] "Every faculty in one man is the measure by which he judges of the like faculty in another. I judge of your sight by my sight, of your ear by my ear, of your reason by my reason, of your resentment by my resentment, of your love by my love. I neither have, nor can have, any other way of judging about them." (Smith, 1790, I.I.29)

[7] "We should view ourselves, not in the light in which our own selfish passions are apt to place us, but in the light in which any other citizen of the world would view us." (Smith, 1790, III.I.100).

[8] "When he views himself in the light in which he is conscious that others will view him, he sees that to them he is but one of the multitude in no respect better than any other in it. If he would act so as that the impartial spectator may enter into the principles of his conduct, which is what of all things he has the greatest desire to do, he must, upon this, as upon all other occasions, humble the arrogance of his self-love, and bring it down to something which other men can go along with." (Smith, 1790, II.II.11)

Our focus is on the resource allocation decisions of trustees to share resources with investors – e.g., to pay dividends versus keep resources for personal use in the form of salary.

The context, *C*, under which the action is judged includes the game structure, history, choice alternatives, and the vector of all payoffs, allowing observed choice alternatives to signal intentions. *V* is a binary valued indicator variable, which takes on the value 1 if the DM's action is visible to the partner, and zero otherwise. *V* is equivalent to whether the partner can observe the action; by definition, actions that remain unknown to a partner cannot subject to others' moral evaluation. *PW* represents what the DM believes about how the Impartial Spectator would morally evaluate the DM's action, and is equal to 1 if the action will be praised, -1 if the action would be seen as blameworthy, and 0 if the action is neutral. *B* is an indicator variable that denotes if the action is blameworthy or not.

The functions $\delta_i(.), \alpha_i(.), \gamma_i(.), \text{and } \beta_i(.)$ provide context dependent weightings that determine how *V* and *PW* map into the utility of the DM. $\delta_i(.)$, $\gamma_i(.)$, and $\beta_i(.)$ are strictly positive, but $\alpha_i(.)$ is negative when the action is blameworthy (i.e., *PW* = -1). The magnitude of the weights $\alpha_i(.), \beta_i(.)$ and $\gamma_i(.)$ are greater when the action is blameworthy rather than neutral or praiseworthy (i.e., *B* = 1).

The first term $\delta_i(C)$ is the weighted monetary payoff and represents the purely selfish component of utility. This utility from the payoff is then modified by three other factors that depend on whether the action can be observed by a partner and the nature of the judgment that will likely be made by a third-party with complete knowledge of outcomes and the DM's internal motives (i.e., the Impartial Spectator).

The second term, $\alpha_i(C, B)V$, represents the propriety associated with an action when that action is observed by the partner and thus can be subject to praise or blame. For a given context this term is positive and the same value for neutral or praiseworthy action, but negative for blame-worthy action, capturing Smith's premise that humans will seek to avoid being seen as blame-worthy because it generates personal disutility.

When a partner cannot observe the DM's actions, $\alpha_i(C, B)\ V$ has no impact on utility. Yet, the Impartial Spectator still judges the individual's action *even though it cannot be observed*. Thus, the individual obtains utility from an action that is inherently praise-able even when it remains unseen by others.[9] The third term $\gamma_i(C, B)PW$ captures this effect and is positive for praise-worthy actions and negative for blame-worthy actions. This effect is akin to Andreoni's (1989) "warm-glow" for praise-worthy actions.

[9] "Man naturally desires, not only to be loved, but to be lovely." (Smith, 1790, III.I.8). The term 'lovely' has a different connotation today than in Smith's time. Smith meant that not only do we desire to be praised, but also to be praiseworthy.

The final term, $\beta_i(C,B)V\ PW$, captures the additional propriety experienced when an observable action is judged as either blame-worthy or praiseworthy and zero otherwise. In a given context the absolute value of the combined terms $\alpha_i(C,PW)PR + \beta_i(C,B)V\ PW$ is greater for actions judged as blame-worthy rather than praise-worthy, capturing Smith's premise that losses loom larger than gains.[10]

Prior experimental evidence is consistent with eq. (*1*) in single-period settings when agents' actions are visible (Smith and Wilson, 2017, 2018). In our Reinvestment game (and for public corporations), investors' investment is seen by the trustee with or without financial reporting. Likewise, a dividend paid by a trustee is seen by the investor with or without financial reporting. The key differences induced by our experimental manipulation of financial reporting are that the investor acquires knowledge of (a) the trustee's choice to reinvest the current period's earnings versus take a salary (which reduces reinvestment), and (b) the amount of available resources from which a dividend can be paid in any period.

Trustee behavior in the interim periods

In a world without financial reporting, the only opportunity available to a trustee desiring to take a praise-able action in periods 1-5 is to pay a dividend. Yet, the payment of an interim dividend in any period 1-5 has ambiguous effects on the trustee's utility. While the current sharing of resources by the trustee has favorable effects on trustee utility, this utility gain could be offset by the opportunity cost of lower future earnings. Thus, the net of these two factors may be viewed as praise-worthy or neutral. However, even if the action is viewed as neutral, paying a dividend increases the trustee's non-monetary utility via $\alpha_i(.)$ even in the absence of financial reporting.

With financial reporting all trustee actions and total resources available are known by the investor at all times, including reinvestment in interim periods. From the perspective of the investor, reinvestment increases potential future earnings due to compounding, even though there is no certainty these will be shared. Assuming reinvestment is viewed as either praise-worthy or neutral, then the trustee's non-monetary utility again increases by $\alpha_i(.)$ and expected monetary utility may also increase. That is, because reinvestment can be observed, the marginal utility of paying an interim dividend is likely lower for a trustee because financial reporting is available to make his reinvestment choice observable compared to a world where there is no reporting. Thus, a trustee acting in accordance with eq. (*1*) who seeks out neutral or praise-worthy behavior will be less likely to pay interim dividends when financial reporting is present.

[10] For praiseworthy actions, the third and fourth terms operationalize the opening line of *Moral Sentiments*: "How selfish 'soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it." (Smith, 1790, I.I.1).

From the investor's point of view (which the trustee should see as a mirror-like perspective of the Impartial Spectator), syphoning off a salary and reducing reinvestment is utility-decreasing. Decreasing reinvestment results in lower future earnings generated from compounding, a harmful action that the investor will judge as blame-worthy. Taking a salary during an interim period decreases non-monetary utility by $\gamma_i(.)$, but in the presence of financial reporting utility is additionally decreased by $\alpha_i(.)$ and $\beta_i(.)$. If trustees act in accord with eq. (*1*) and avoid taking blame-worthy actions, then the trustee will take a lower salary with financial reporting.[11] These predicted effects lead to our first hypothesis:

> **H1**: In the presence of financial reporting, a trustee will take a lower salary for herself and pay lower interim dividends to the investor, both of which result in increased reinvestment.

Trustee behavior in the final period

In general, we expect that investors will earn greater profits in the reinvestment game when financial reporting is available. To see this, consider a one-period version of an investment game with possible multipliers similar to those in our experimental setting. That is, the players play a one-shot investment game with multipliers drawn from a distribution with a minimum of 1 and a maximum of 1,092, and the trustee then divides the total available between herself and the investor.[12] We expect that an investor would earn greater returns from playing this game with financial reporting since a financial report reveals the total amount of resources that the trustee divides. The presence of financial reporting means that the investor knows the total resources taken by the trustee for herself, which means the trustee's resource sharing decision can be evaluated in terms of its fairness and the sacrifice of resources made by the trustee. That is, the trustee's resource division action becomes an action that is praise-able. Notice that in all treatments, the trustee's final period action bears no pecuniary cost; as this is the end of the game, the investor cannot react to this action.

Within the reinvestment game, the theory in *TMS* suggests a trustee will also be guided by the Impartial Spectator in choosing how to divide resources between herself and the investor after the final period. The final dividend to the investor is bounded between zero and the total wealth controlled by the trustee at the end of period 6. In the Reinvestment game, the amount of resources to be divided after the sixth period (W_6)

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[11] "A wise man may frequently neglect praise, even when he has best deserved it; but, in all matters of serious consequence, he will most carefully endeavour so to regulate his conduct as to avoid, not only blame-worthiness, but, as much as possible, every probable imputation of blame." (Smith, 1790, III.I.36)

[12] The minimum is where the investor invests once and realized multiplier is 1 in that and subsequent periods. The maximum is where the investor invests the same amount in each period and the realized multiplier in every period equals the maximum of 3, so the effective multiplier is equal to $3^6 + 3^5 + 3^4 + 3^3 + 3^2 + 3^1$.

equals λ_6 (I_6 + R_5) where λ_6 equals the multiplier in period 6, I_6 equals the investor's period 6 investment, and R_5 equals the amount reinvested at the end of period 5.

A trustee behaving in accordance with equation (1) will be concerned with two points over the interval [0, W_6]. The first is the minimum dividend that must be paid to avoid blame and be seen as neutral (DN). The second is the minimum dividend that must be paid to earn praise (DP). A trustee is guided to set these levels according to what her Impartial Spectator believes are appropriate given available wealth, dividends previously paid by the trustee, past salaries taken by the trustee, and past investment levels of the investor. These alternatives are likely ordered by amount as follows: 0 < DN < DP < W_6.

The final dividend choice by a trustee who adheres to equation (1) will be either 0, DN, and DP. Table 1 shows utility components at these dividend levels for the *Baseline* treatment where no reporting occurs and the treatments where the investor is informed of the terminal wealth to be divided by the trustee. The level at which the final dividend payment changes from blame-worthy to neutral (DN) or from neutral to praiseworthy (DP) depends upon the context, which includes the history of past investment by the investor as well as prior dividends to the investor and salaries taken by the trustee. That is, DN and DP are expected to be lower if interim dividends are greater. DP can be higher if prior salary is more positive as a higher level is needed to reach an appropriate share of the wealth generated. At the same time, higher salary decreases the amount of terminal wealth.

We posit that the blame-worthy level is at a minimum equal to the amount where the investor is made financially worse off by interacting with the trustee, a definition consistent with Rousseau et al. (1998). This requires that the investor took a risk, ceded control to the trustee, and that the trustee succumbed to opportunism and did not reciprocate the trustee, i.e., the total of all dividends returned is less than the total of all investments. This is the minimum level at which the investor's trust has been reciprocated. A praiseworthy level is one where after the final dividend the investor has shared an appropriate share of the wealth generated above the investor's total investment.

Comparing the choice between a final dividend of zero versus DN indicates that a trustee with financial reporting will prefer to pay a dividend of DN rather than zero only if the utility loss of foregone wealth (i.e., utility of wealth of paying dividend of zero and keeping all $\delta(W)$ versus paying dividend $\delta(W\text{-}DN)$) is less than the utility gain from avoiding observable blame-worthy conduct (i.e., nonmonetary utility when the dividend is viewed as neural, $\alpha(PW=0)$, versus what the dividends is viewed as blameworthy, $\alpha(PW=\text{-}1)$ -

$\beta(PW=-1) - \gamma(PW=-1)$).[13] This is also true for a trustee with financial reporting, who wants to avoid being seen blame-worthy.

The distinction between a final dividend of DN versus DP is more complicated. In all treatments trustees experience utility loss of foregone wealth, $\delta(W-DN) - \delta(W-DP)$. If the level is DN, all trustees experience nonmonetary utility gain of $\alpha(PW=0)$. However, when the dividend level is DP the trustees with financial reporting experience nonmonetary utility gain of $\alpha(PW=1) + \beta(PW=1) + \gamma(PW=1)$) as the investor can assess the dividend as praiseworthy given knowledge of the wealth generated. Without financial reporting, the investor's receiving the same dividend level will not likely be viewed as praiseworthy in the absence of knowledge about the wealth available for the dividend, which can be provided by a financial report. In this respect, financial reporting provides the context that allows others to judge the trustee's final dividend payment decision.

This logic suggests that a trustee in treatments with financial reporting is more likely to prefer a final dividend of DP over DN vis-à-vis a trustee without financial reporting. This suggests our second hypothesis:

> **H2**: In the presence of financial reporting, a trustee is more likely to reciprocate with higher final distribution than would a similarly-situated trustee in a firm where financial reporting is not present, controlling for past dividends and salary.

The theory from *TMS* that lies behind H1 and H2 differs from the standard neoclassical alternative that management behavior is driven solely by monetary rewards. Within the context of equation (1), the neoclassical perspective suggests that only the first term in equation (1), $\delta(.)$, factors into resource allocation by the trustee. Prior research using variants of the Berg, Dickhaut, and McCabe (1995) trust game find there is typically a distribution of voluntary investment and trustee reciprocity (Ostrom and Walker, 2003; Kurzban and Houser 2005; Johnson and Mislin 2011; Balliet and Van Lange 2013).

While this evidence suggests that a purely neoclassical view of self-interested behavior where the Impartial Spectator exerts no effect on behavior is incomplete, it still can provide a useful point of departure for evaluating investor and trustee behavior in our Reinvestment game experiment. Under our *Baseline* and *Financial Reporting* treatments, an investor has no recourse to impose a cost on a trustee that has behaved (or is expected to behave) in a purely selfish fashion.

[13] For simplicity, we omit notation for the other context of the game, which includes these payoffs as well as history, and only denote the payoff which differs between choices. To further avoid notational clutter, we drop the subscript for the individual. Last, recall that when B equals 1, the weighted coefficient $\alpha(.)$ is negative.

Effect of investor rights to liquidate

A natural question about our experiment is whether trustee behavior within the Reinvestment game would change if the relative power of the actors were more equal. To evaluate this, we created two treatments identical to the *Baseline* and *Financial Reporting* treatments except that the investor was given a decision right to "fire" the trustee by liquidating the firm and receiving 40% of the total wealth available in any period (1-5) prior to the end of the experiment. We label these as the *Liquidation* and *Both* treatments to reflect availability of an investor liquidation option that could change the total wealth generated and its distribution between the investor and trustee relative to the *Baseline* and *Reporting* treatments. We do not offer specific hypotheses about the effects of the liquidation option manipulation except to note that we expect H1 and H2 to apply to a comparison between the *Liquidation* and *Both* treatments. Thus, in lieu of stating a specific hypothesis about the effect of the liquidation option, we instead pose a research question about the effects of financial reporting in the presence of a liquidation option:

> **RQ1**: Does financial reporting increase trustee resource sharing and wealth creation in the Reinvestment game when a liquidation option is available that lessens power differences between the trustee and the investor?

Experimental Task

Reinvestment Game

Consider a game that will last a finite number of periods as depicted in Figure 1. The trustee is endowed with a production technology that defines the gains generated by investment during the period. The results from investment are represented by a stochastic multiplier that can assume a value of 1, 2, or 3 with equal probability. The total earnings from investment during the period equal the realized multiplier (either 1, 2, or 3) multiplied by the total amount invested at the start of the period.

The amount invested at the start of the period can come from one of two sources. First, the investor receives a new endowment of capital (5 monetary units, or MUs) every period. Second, beginning at the end of period 1, the trustee can choose to reinvest additional resources, rather than take a salary or pay a dividend, that can generate earnings identical to those generated by new investments from the investor. At the end of every period 1 – 5, the trustee receives earnings from investment and then divides this amount among: (1) a "salary" for herself that is put into the trustee's private account, (2) a "dividend" to the investor that is put into the investor's private account, and (3) a reinvestment that is placed in a joint savings account that can generate earnings in the next period.

At the end of the final period, the trustee receives earnings and divides this between a final payment to the investor and a final payment to herself. Thus, the total earnings for the experiment obtained by the investor equals the sum of endowments not invested in periods 1 – 6, interim dividends received during periods 1 – 5, and the final distribution in

period 6. The total earnings obtained by the trustee equals the salaries taken in periods 1 – 5 and the final distribution taken in period 6.

Our Reinvestment game differs from a standard multi-period Investment game in an important way.[14] In the standard game, the earnings generated in a given period must be paid out to either the trustee or investor. Thus, the level of resources available to generate earnings come entirely from new investment funds available to the investor. In this sense, the provision of funds to generate earnings is controlled entirely by the investor – i.e., power over continuing the game is entirely in the hands of the investor. In the Reinvestment game, resources subject to multiplication are contributed by both new investment by the investor and reinvestment by the trustee. Further, the fact that funds can be reinvested implies that earnings are subject to compounding interest effects – reinvested earnings mean that the total pie available for multiplication can swamp the total available in the standard game after only a few periods.[15]

Most importantly, the relative power of the investor and trustee favors the trustee since the level of reinvestment by the trustee can grow through time relative to any new contributions by the investor. Assuming the investor invests her entire endowment, the trustee pays no interim dividends to the investor and takes no salary for herself, and the average multiplier is realized in all periods, the level of reinvestment is double the level of investor contribution after only one period and twelve times greater after four periods. The rapidly escalating resources controlled by the trustee means that the power over the partnership's resources has naturally drifted towards the trustee without the two parties changing their overall behavior.[16] In this way, the control over resources by managers that motivated the concern of Berle and Means (1932) over separation of corporate ownership and control are present in our Reinvestment game.

In the Standard Investment game, each period the investor can demonstrate trust by investing and the trustee can demonstrate trustworthiness by returning earnings greater than investment.[17] The demonstrability of trustworthiness is more complicated in the Reinvestment game. If the trustee takes advantage of compounding, trustworthiness can be determined unambiguously only in the last period: any earnings the trustee distributes to the investor decreases the potential earnings in the next period, which affects both parties' maximum earnings. If the trustee intends to share the last period's earnings with

[14] The repeated version of Berg, Dickhaut, and McCabe's (1995) 'Trust Game'.

[15] To numerically illustrate, assume: (i) the game lasts six periods, (ii) the investor always invests five, and (iii) the multiplier equals two in each period, and (iv) the trustee reinvests everything when possible. In the Standard Investment Game there would 60 for the investor and trustee to split, compared to 630 in the Reinvestment game.

[16] To numerically illustrate, instead assume the investor only invests five only in the first period instead of all periods in the Reinvestment Game. There would be 320 at the end of period 6 for the investor and trustee to split compared to 360 if the investor invested every period.

[17] We define trust as willfully ceding resources or control to another with the expectation that the other intends to reciprocate and not be opportunistic, and (ii) trustworthiness as not succumbing to opportunism so as to reciprocate the resources or control that another has vested with trust.

the investor, distributing earnings to the investor in interim periods decreases investor wealth.

As such, the observable behavior of a trustworthy trustee before the final period can appear identical to that of a selfish trustee who intends to not share when making the final resource division after the final period. In other words, the investor must hope that the trustee will not "loot the firm" by taking all the gains earned in future periods and leaving nothing for the investor. The trustee also must believe that the investor will trust her to not cheat her in the absence of a dividend in the interim periods. If this does not occur, the trustee's decision to pay a dividend in interim periods could cause the game to revert back to the Standard Investment game. In other words, to achieve maximum earnings, both parties must delay the gratification of immediate rewards and trust that their partner will not seize the larger pie created by compounding. This requires that the subject exhibit *prudence*, one of the philosophical cardinal virtues.[18]

Treatments and Parameters

We manipulate two factors within a 2X2 between-subjects design where all subject pairs play the Reinvestment game. Our primary manipulation regards the provision of a financial report to the investor at the end of each period. In the *Baseline* treatment only the trustee can observe the balance of her personal account, the realized multiplier, earnings, and the joint-savings account.[19] In contrast, the investor in the *Reporting* treatment is informed of the total earnings for the period, the amount that the trustee paid to herself during the period, and the joint-savings account to be reinvested in the next period. This manipulation allows us to directly test whether financial reporting *per se* has economic value since, within our experiment, the report can reveal whether the trustee made payments to herself that created deadweight losses or divided resources unequally at the end of the game. That is, the investor learns with certainty the extent to which the trustee shared wealth from investment over the course of the game.

Our second manipulation involves a decision right provided to the investor that, at least in part, equalizes the power of the investor and the trustee. Specifically, once the trustee has made her allocation decision, the investor in the *Liquidation* treatment has the option of terminating the game at the end of any interim period 1 – 5 and receiving 40% of the common account balance at the time the liquidation option is exercised. Within the Reinvestment game, a liquidation option lessens the relative power of the trustee over the investor, but entails a cost of foregone earnings since early liquidation

[18] The Merriam-Webster dictionary defines prudence as a) the ability to govern oneself by the use of reason, and b) skill and good judgment in the use of resources. McCloskey (2006) provides an extended discussion of the role of prudence in generating gains from trade.

[19] The problem of self-dealing, as operationalized in Lunawat, Waymire, and Xin (2018) in a Standard Investment game with multiple periods, is exacerbated due to higher variance of earnings that provides cover for a trustee to seize earnings. At the same time, self-dealing can be costly to the trustee as it limits the earnings that could be generated in later periods.

removes the possibility of larger earnings in later periods. The treatment where both reporting and liquidation are present is referred to as the *Both* treatment.

Experimental Procedures

The experiment was conducted at Chapman University's Economic Science Institute (ESI). A total of 286 participants were recruited from a participant pool consisting primarily of undergraduate students with each being randomly assigned to a single session. There were three sessions of each of the four treatments. All sessions except one contained 24 participants; a single session of the *Reporting* treatment contained only 22 participants. The authors' institutions obtained Internal Review Board (IRB) approval for this experiment. The IRB approval requires us to not use deception.

In all treatments the game lasted six periods and participants were aware of this. We used the same set of stochastically-generated multipliers for each treatment so that variation in outcomes is due to variation in behavior. We randomly generated unique sequences of six multipliers for each firm in the *Baseline* treatment and then used these sequences for firms in the *Reporting*, *Liquidation*, and *Both* treatments. This technique provides variation in multipliers between groups within a treatment, but no variation in the distribution of multipliers across treatments.

Each session lasted approximately an hour and was sequenced as follows. Participants were seated at visually isolated workstations and interacted with each other anonymously over a local computer network. Next, an experimenter read the instructions aloud while each participant followed along with their own printed copy of the instructions. The instructions (available in the appendix along with screenshots of the experiment) explain the experimental procedures and payoffs used in the experiment. After reviewing instructions, participants answered several quiz questions via the computer to ensure that they understood the instructions (available in the appendix). The experimenter privately answered any questions regarding the experimental procedures. Each participant was assigned a role, labeled "Person A" for the investor and "Person B" for the trustee, and remained in that role for the entire experiment. In each of six periods the investor first made her investment decision, then the trustee made her allocation decision, both were then given feedback (the extent of which was manipulated between treatments), and finally the investor had the option to liquidate the partnership in the *Liquidation* and *Both* treatments.

Each participant was paid a $7 participation fee in addition to payoffs from the Reinvestment game after signing a receipt. Experimental earnings in MUs from the Reinvestment game were exchanged for U.S. dollars at a rate of 10 to 1. On average subjects earned $9.85 in addition to their participation fee.

Results

Unless stated otherwise, test results (Z-statistic and p-value) are from the Wilcoxon rank-sum test. The significance level is five percent. When we report results "with financial reporting" we combine the results of the *Reporting* and *Both* treatments. Likewise, when we report results "without financial reporting", we combine the results of the *Baseline* and *Liquidation* treatments.

Overall, we find that financial reporting increases wealth. Table 2 reports wealth generated by firms with financial reporting (Mdn = 133.0) was significantly greater than wealth generated by firms without financial reporting (Mdn = 88.5), Z = 2.491, p = .013. We calculate a measure, *efficiency*, that summarizes joint behavior of the trustee and investor in the firm independent of the random multipliers the firms drew. Efficiency is measured as the wealth generated by the firm divided by the wealth that could have been created if (a) the investor always invests the maximum and (b) the trustee always reinvests the maximum, and (c) the firm was not liquidated. As with wealth, efficiency generated by firms with financial reporting (Mdn = 21%) was significantly greater than efficiency generated by firms without financial reporting (Mdn = 35%), Z = 2.704, p < .01.

We start by examining the causes for the greater wealth and efficiency, providing evidence in support of H1. Next, we examine the final distribution, providing evidence in support of H2. Last, we examine the effect of investor's liquidation option and address RQ1.

Reasons for Increased Wealth: Reinvestment and Investment in Interim Periods

Our first hypothesis is that trustees will be more likely to reinvest when a financial report is provided so the investor can observe reinvestment. Evidence for the hypothesis H1 is shown in Table 3. Trustees in firms with financial reporting took a significantly smaller salary (Mdn = 2.0) than trustees in firms without financial reporting (Mdn = 3.4), Z = 2.671, p < .01. Also consistent with H1, trustees in firms with financial reporting paid significantly smaller dividends (Mdn = 1.4) than did trustees in firms without financial reporting (Mdn = 2.6), Z = 2.845, p < .01. The combined effect of lower salaries and lower dividends in firms with financial reporting created significantly higher reinvestment (Mdn = 22.4) than in firms without financial reporting (Mdn = 9.8), Z = 2.530, p = .011. Cumulatively, these results support H1. The presence of financial reporting is consistent with trustee actions that seek to avoid blame or seek praise. These behaviors, all things being equal, create wealth through consistently higher reinvestment rates.

While not predicted, we also find that investors invested significantly more in firms with financial reporting (Mdn = 4.3) than in firms without financial reporting (Mdn = 3.6), Z = 2.498, p = .013. In the reinvestment game, investment creates, in part, the upper bound for both dividends and salaries. Yet, despite higher investment in the presence of financial reporting, we find lower dividends and lower salaries. The combined effect of greater investment and reinvestment is shown in Figure 2, where we report the frequency of high investment and high reinvestment based on being above 50 percent of what was

possible; for the investor investing at least half the endowment, and for the trustee reinvesting at least half of the earnings. There is significant shift in investment and reinvestment (i.e., to the upper right-hand quadrant) in the presence of financial reporting ($Z = 2.586$, $p < .01$).

The effect of greater investment in combination with smaller salaries, and smaller dividends lead to higher joint savings in treatments with financial reporting, which creates the potential for compounding future earnings. This effect is powerfully obvious in Figure 3, where we plot the joint savings account balance of non-liquidated firms across periods. This illustrates how compounding increase faster in the presence of financial reporting.

The Effects of Financial Reporting on the Final Distribution

In the final period, the trustee's last action is to allocate earnings between herself and the investor. The trustee does not receive any reaction from the investor after this choice. Any blame or praise assigned by the investor will have to be conjectured visa-via the Impartial Spectator. Likewise, if blame-worthy trustee was mimicking a praise-worthy type in the interim period, in choosing the final distribution her character would be revealed.

If the investor has no liquidation option or has chosen not to exercise an available option to liquidate, the trustee divides any earnings between herself and the investor after the final period. The final period's earnings available to be divided between the investor and trustee will be an increasing function of past investments, and a decreasing function of past dividends and salary. We control for these effects when testing our second hypothesis.

Our second hypothesis H2 is that a trustee will reciprocate past investment to a greater degree when financial reporting is present. We estimate the relationship between the final distribution received by investor and her past investments controlling for past dividends and salary in the following model:

$$\begin{aligned} Investor\ Final\ Distribution & \\ &= \beta_0 + \beta_1 FinacialReporting + \beta_2 Investments^2 \\ &+ \beta_3 FinancialReporting \times Investment^2 + \beta_4 PriorDividends \\ &+ \beta_5 PriorSalary + \varepsilon \end{aligned} \qquad (2)$$

FinancialReporting is a dummy variable with a value of one if financial reporting is present. *Investments²* is the sum of squared past investments, i.e., $INV_1^2 + INV_2^2 + \cdots INV_6^2$. *PriorDividends* is the sum of past dividends paid out by the trustee to the investor, weighted by the expected effect the dividend has upon last period earnings at the time paid, i.e., $DIV_1 \times 2^5 + DIV_2 \times 2^4 + \cdots + DIV_5 \times 2^1$. *PriorSalary* is the sum of

past salaries taken by the trustee, also weighted by the expected effect the salary has upon the last period earnings, i.e., $SAL_1 \times 2^5 + SAL_2 \times 2^4 + \cdots + SAL_5 \times 2^1$.[20]

Regression results are reported in panel B of Table 4. The estimation sample excludes economies that have been liquidated, or economies with zero earnings in the final period, since the trustee has no observable choice in these cases. The main coefficient of interest is β_3, which shows the marginal effect of past investment on the final dividend in the presence of financial reporting. We expect this coefficient to be positive.

Consistent with prior research, we find the coefficient on squared investments is positive and significant. Most importantly, the estimated value of β_3 equals 0.456, which is significantly greater than zero at p < 0.05. The total coefficient on investment with reporting ($\beta_2 + \beta_3$) is approximately 73% larger than without reporting (β_3), giving support to H2.

We also find that the intercept for economies with financial reporting ($\beta_0 + \beta_1$) insignificantly different from economies without reporting (β_0). We also find coefficients on prior dividends and prior salaries both negative and significant, both of which are as expected.[21]

Our hypothesis development assumed that the cutoff DN for the investor judging a neutral versus blame-worthy final dividend did not require financial reporting, but the cutoff DP for judging a neutral versus praise-worthy final dividend would require financial reporting. To validate this assumption, we computed $DN = Max\{\sum_{t=1}^{6} INV_t - \sum_{t=1}^{5} DIV_t, 1\}$ and $DP = 40\%\, REINV_5 + INV_6$ for each firm. DN denotes the point where at which the trustee pays a dividend in the last period and that dividend is large enough such that the investor is not financially worse off for investing; the return on investment is non-negative. DP denotes the point where a trustee pays a dividend such that the investor is ex-post indifferent to (hypothetically) liquidating the firm after period 5 or investing in period 6.

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[20] Ostrom and Walker (2003) show that in standard one-shot trust games, higher investments lead to higher returns on investment (defined as return less investment scaled by investment). Their work suggests a quadratic relationship between investment and the final dividend returned by the trustee. Others show model fit of return on investment is better when using a quadratic model (Gómez-Miñambres, Schnider, and Shields, 2018).

21 We evaluated the robustness of these results by estimating similar models to that in eq. (2) where we keep the same functional form but apply different weights to investments and/or prior dividends and salary. Alternative Model 1 uses the sum of investments ($INV_1 + INV_2 + \cdots INV_6$) rather than the sum of squared investments, which results in lower adjusted R squared than the model reported, indicating poorer fit. Alternative Model 2 weights prior dividends and salaries by the number of periods left (i.e., $DIV_1 \times 5\ DIV_2 \times 4 + \cdots + DIV_5 \times 1$), rather than the exponential weight used above. This also results in lower adjusted R squared compared to reported results. Despite the alternative weightings, all models have comparable directional effects – i.e., prior dividends and salary decrease the final dividend, investment increases it, and the financial reporting increases return on investment).

As per Panel A of Table 1, if a final dividend was less than DN, we classify it as blame-worthy; if greater than DP, we classify it as praise-worthy. If the final dividend lies between DN and DP, we classify it neutral. In those cases where DP as constructed above was less than or equal to DN, we classify the ending dividend as neutral. This happens in firms when either investors invested small amounts and/or trustees pays dividends in prior period in excess of investment, leaving little for reinvestment.

Figure 4 shows a bar graph with the percentage of observations where the final distribution to the investor is classified as blame-worthy, neutral, or praise-worthy for firms with and without financial reporting. The percentage of cases classified as blame-worthy is similar for reporting and no reporting firms – there is no significant difference for the economies with reporting ($Z = 0.56$, $p = .57$). In contrast, financial reporting induces a marked shift in frequency when moving from neutral to praise-worthy levels ($z = 2.114$, $p = .034$).[22] These results are consistent with the proposition that trustees avoid blame-worthy actions, as these are easily recognized even without financial reporting, but are more likely to undertake costly praise-worthy actions only when these actions can be distinguished from neutral actions by others because such actions are rendered observable by reporting.

The Effects of Investors' Right to Liquidate

When we report results "with liquidation" we combine results of the *Liquidation* and *Both* treatments (N = 72). Likewise, when we report results "without liquidation", we combine the results of the *Baseline* and *Reporting* treatments (N = 71). 7 of 36 investors exercised the liquidation option without financial reporting (*Liquidation* treatment) and 6 of 36 exercised the option with financial reporting (*Both* treatment).

Overall, we fail to find an effect due to liquidation as we did with financial reporting. We find no significant differences between wealth with liquidation (M = 184, Mdn = 88, SEM = 29) and without liquidation (M = 210, Mdn = 118, SEM = 28), nor significant differences in efficiency with liquidation (M = 26%, Mdn = 24%, SEM = 3%) and without liquidation (M = 40%, Mdn = 33%, SEM = 3%). Likewise, we find no significant differences in average investment (with liquidation: M = 3.8, Mdn= 4.1, SEM = .1; without liquidation: M = 3.5, Mdn = 3.6, SEM = .2) or average reinvestment (with liquidation: M = 30.1, Mdn = 9.9, SEM = 4.9; without liquidation: M = 30.9, Mdn = 20.8, SEM = 3.8). These results sharply contrast the results with and without financial reporting in Tables 2 and Tables 3. However, one outcome appears significantly different with and without liquidation: Total Trustee Payoff. Trustees earned significantly more without liquidation (M = 156, Mdn =

[22] We perform three alternative specifications to test the robustness of this shift from neutral to praise-worthy levels. In the first test, we don't reclassify cases to neutral when the level DP was less than DN. In the second and third tests, we use 45% and then 50% instead of 40% in calculating DP. In all cases there as significant shift in frequency when moving from neutral to praise-worthy levels with financial reporting (p values of .031, .040, and .041 for the tests, respectively).

76, SEM = 25) than they earn with liquidation (M=109, Mdn = 49, SEM = 17), Z = 2047, p = 0.04.

To determine the effect of financial reporting controlling for liquidation, we construct three measures of maximum wealth generation and compare results between treatments with and without financial reporting. The first measure, Maximum Investment, is a binary measure that is one if the investor invested her full endowment every period and zero otherwise. The second measure, Maximum Reinvestment, is binary measure that is one if the trustee reinvested earnings in periods 1-5, and zero otherwise. The last measure is Maximum Efficiency, which is the cross-product of Maximum Investment and Maximum Reinvestment. These measures are reported on Table 5.

Table 5 shows that the percentage of trustees that consistently reinvest the maximum possible is more frequent with financial reporting. Examining results where liquation was not available, in the *Reporting* treatment, 32.4% of the trustees reinvest the maximum amount in every period compared to only 8.3% in the *Baseline* treatment, Z = 2.493, p = .013. A similar effect is observed for treatments where liquidation is possible – 25% of *Both* trustees always reinvest the maximum compared to only 2.8% in the *Liquidation* treatment (Z = 2.707, p = .007).

Table 5 shows the percentage of firms where we observe maximum efficiency – i.e., both investment and reinvestment are equal to the maximum possible. Examining results where liquation was not available, only 2.8% of the firms in the *Baseline* treatment achieve maximum efficiency compared to 17.1% in the *Reporting* treatment, a significant difference (Z = 2.016, p = .043). When liquidation was possible, no firms achieved maximum efficiency in the *Liquidation* treatment, but 13.9% did in the *Both* treatment with financial reporting. This increase was significant (Z = 2.302, p = .021). These results, higher maximum reinvestment and higher maximum efficiency with financial reporting, both with and without an option to liquidate, support the premise inherent in RQ1: financial reporting enables wealth creation.

We fail to find a significant difference in maximum investment after controlling for liquidation. When liquidation was not available, 25% and 37% of investors invested their entire endowment in the *Baseline* and *Reporting* treatments, respectively. When liquidation was available, 19% and 28% of investors invested their entire endowment in the *Liquidation* and *Both* treatments, respectively.

Conclusion

Our goal in this paper has been to experimentally evaluate whether financial reporting has economic value even when it fulfills no contracting or valuation function. We posit specifically that financial reporting leads to self-regulation of a manager's behavior by subjecting it to investors' moral evaluation. Anticipation of such moral evaluation activates approval-seeking behavior by the manager, which translates into more efficient

resource allocation by the manager. Central to the development of our hypotheses is what Adam Smith refers to as "moral sentiments." Smith's conception of human morality is also echoed in Kautilya's *Arthashstra* (Shyam and Sunder 2008), a work that predated the *Theory of Moral Sentiments* by a few thousand years. This underscores the foundational nature of our study.

Our experiment is based on a multi-period reinvestment game where a trustee (i.e., manager) chooses to allocate profits from investment to either a salary for herself, a dividend to the investor, or a reinvestment of resources for another period, which would then be available to generate future earnings. An investor subject and a trustee subject play the reinvestment game for six periods. After the sixth period, the trustee divides available resources as she sees fit. This experimental game is similar to the corporate form in that initial investment by investors serves as "seed capital" required for the firm to operate, but reinvestment allows managerial power over firm resources grows relative to investor power. Within our experiment, the main manipulation concerns the availability of financial reporting where the investor learns each period's earnings and assets reinvested by the manager. A second manipulation allows the investor to liquidate the investment early, which allows us to evaluate whether the effect of reporting depends on the relative power of the investor and the trustee.

We hypothesize that financial reporting has two effects on trustee behavior within our experiment. The first is that managers will pay lower interim dividends when reporting is present because reinvestment becomes observable to the investor and thus subject to her moral approval (which will be inferred by the trustee). A second effect arises because reporting makes the manager's final distribution choice completely transparent. Because reporting allows the investor to know the total resources available for paying the final distribution, the manager knows that the investor will judge unambiguously whether the choice is generous or stingy. The result is that the manager will pay a higher return on investment with reporting controlling for past dividends and salaries. We find strong evidence supporting both hypothesized effects – trustees pay lower interim dividends and higher final distributions when financial reporting is present.

Our findings provide direct support for Brandeis' century-old conjecture that financial reporting is the quintessential sunlight that renders managerial behavior transparent and can induce more virtuous managerial behavior. Extant accounting research predicates on the premise of divergence between the interests of investors, which are purportedly represented by standard setters and other regulators, and the managers of business organizations (e.g. Dye, Glover and Sunder 2015). In contrast, our findings suggest that financial reporting may implicate foundational aspects of human conduct and how we infer others' motives from what we can observe. That is, the value of financial reporting may be that it activates moral sentiments that alter managerial probity and shape managers' concern about the effects of their actions on others. Thus, the accountability produced by financial reporting may be deeply rooted in forces that have a long evolutionary history in our species.

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Appendix

Instructions (Liquidation Treatment)

Introduction

This is an experiment on decision-making. Various research agencies have provided funds for this research. During the experiment you will earn money in an experimental currency unit (ECU). We will denote ECU with the $ symbol. At the end of the experiment earned ECU will be converted to US dollars at a rate of 10 ECU to 1 US dollar. Your earnings are dependent upon your decisions, other's decision, and upon chance. Earnings will be added to your show-up payment. You will be paid in cash at the end of the experiment and nobody except the cashier will know what you have earned. It is very important that you remain silent throughout the experiment and do not look at other people's work. If you have any questions, or need assistance of any kind, please raise your hand and an experimenter will come to you. If you talk, laugh, exclaim out loud, etc., you will be asked to leave and you will not be paid. We expect, and very much appreciate, your adherence with these policies.

Everyone in today's experiment will be randomly assigned into a partnership with an assigned role of either **Person A** or **Person B**. You and the other person in your partnership will make choices that will determine your payoffs. You will be partnered with the same person throughout the entire experiment. You will remain in the role of Person A or Person B for the entire experiment.

The Experiment

You will be asked to make deposits into a **Joint Savings account** and personal accounts in a number of periods. The total amount deposited in the **Joint Saving account** is subject to multiplication every period allowing it to grow over time. The experiment will last 6 periods.

Each period proceeds as follows.

First, Person A receives $5 in new funds and then decides how much of the $5 to send to Person 2 with the remainder going to his/her personal account. Person A can send $0, $1, $2, $3, $4 or $5. The amount Person A does not send to Person 2 is automatically deposited into his/her personal account (denoted as the **Person A account**).

Next, the amount sent by Person A and the **Joint Savings account** balance from the prior period are added together. The total is multiplied by 1, 2, or 3. All values for this multiplier are equally likely. Person B receives the multiplied amount and then decides how to distribute the amount received by making deposits into either (1) the **Person A account**, (2) the **Person B account**, or (3) the **Joint Savings account**. These three deposits must equal the amount received by Person B.

Person A and Person B keep the amounts deposited into their personal accounts.

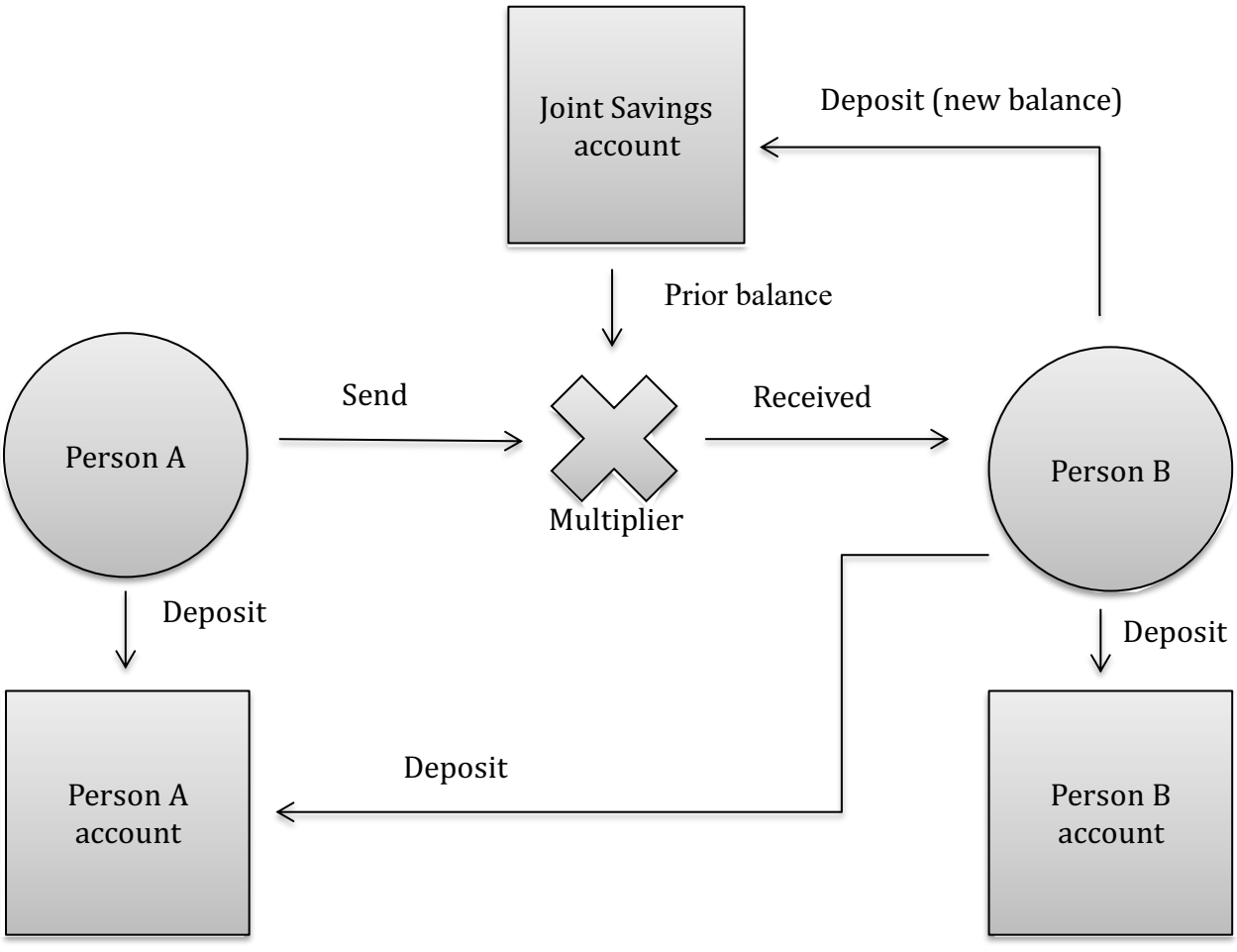
Before describing the stages in detail, we will explain what is meant by **Joint Savings account**.

Joint Savings account.

At the beginning of period 1, the **Joint Savings account** is empty. When Person B receives a multiplied amount in second stage of the first period, Person B decides on a split of the amount received through deposits into three accounts:

(1) **Person A account** (amount returned to Person A),
(2) **Person B account** (amount kept by Person B), and
(3) **Joint Savings account** (amount carried forward and subject to multiplication next period).

The amount carried forward in the **Joint Savings account** at the end of the first period will be added to the amount that Person A sends in the second period. This total will be multiplied and Person B receives the multiplied total. Person B then decides on the 3-way split of the total multiplied amount into the **Person A account**, the **Person B account**, and the **Joint Savings account** to be carried forward into the next period. This process is repeated every period of the experiment and illustrated in the diagram below.



Numerical Example

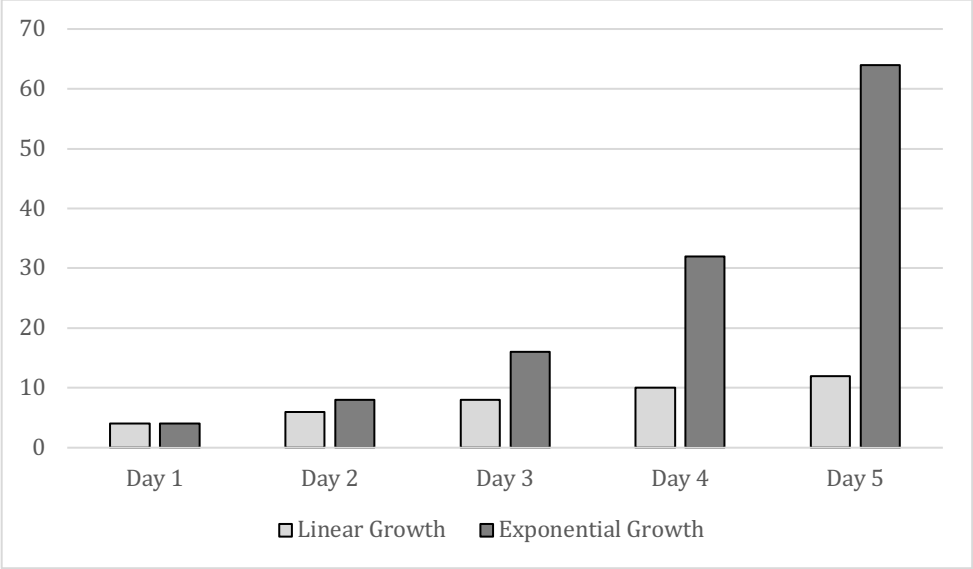
Suppose Person A sends \$3 to Person B in period 1. Since this is the first period and the **Joint Savings account** is empty, only the \$3 sent by Person A is multiplied. Suppose the random multiplier for period 1 equals 2. Then, the multiplied total that Person B receives is \$6 (\$3 × 2). Person B next decides on a 3-way split of the total \$6 received. One possibility is for Person B to keep \$1 by depositing this amount into the **Person B account**, return \$3 to Person A by depositing this amount in the **Person A account**, which leaves \$2 to be carried over to the **Joint Savings account** for period 2.

Now the **Joint Savings account** equals \$2 at the start of period 2. If Person A sends \$4 to Person B in period 2, the total to be multiplied is \$6 (\$2+\$4). If the multiplier for period 2 is 3, then the total multiplied amount equals \$18 (\$6 × 3). If Person B deposits \$4 into the **Person A account** and \$6 into the **Person B account**, then \$8 (\$18 – \$4 – \$6) is the **Joint Savings account** balance to be carried over to the third period.

The **Joint Saving account** grows exponentially, where the rate of growth is the multiplier. Exponential growth differs from linear growth, where the growth amount is just a constant number.

To illustrate the difference, consider the following example of linear growth. Imagine that you invest \$2 today, and every day the investment grows by \$2. It grows today, tomorrow, and so on for 5 days. At the end of the first day you have \$4, tomorrow \$6, the next day \$8, the next day \$10, and on the last day \$12.

Now consider an example of exponential growth, where you put \$2 in the first day, and that doubles each day. At the end of the first day you have \$4, tomorrow you have \$8, the next day \$16, the next day \$32, and \$64 at the end of the day 5. This is depicted below:



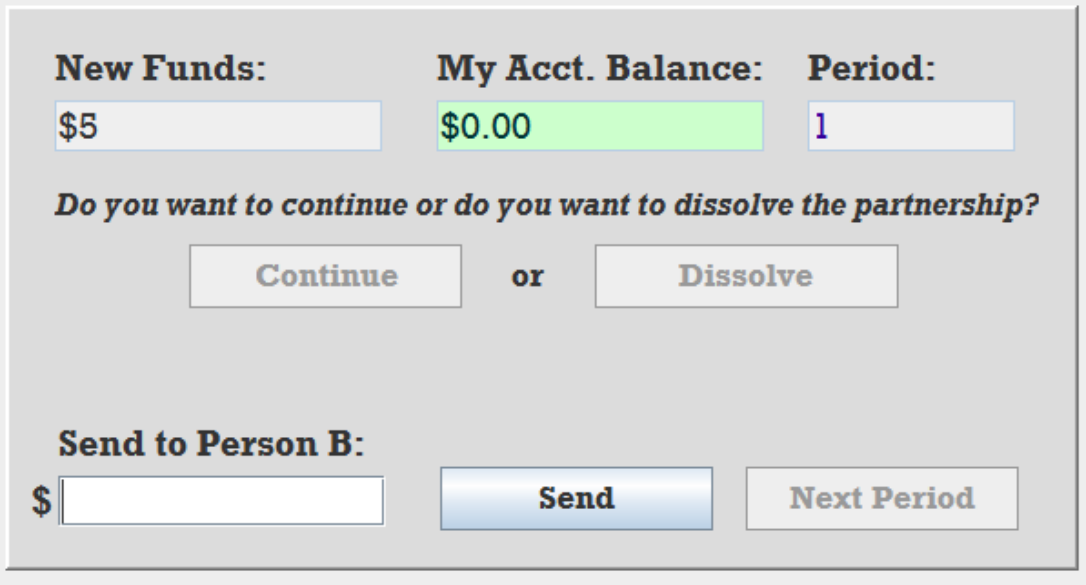
Now we illustrate how Person A's and Person B's will input their decisions.

Person A's Decision
Every period Person A receives $5 new funds and decides how much to send to Person B. The remainder, if any, is deposited into the **Person A account**. For example, if Person A sends $5 to Person B, then nothing can be deposited into the **Person A account**. Alternatively, if Person A sends nothing to Person B, then $5 is deposited into the **Person A account.**

The amount sent by Person A and the **Joint Savings account** at the end of the prior period are added together and multiplied by 1, 2, or 3 (all values are equally likely). The amount received by Person B equals the multiplied amount (multiplier times the total of amount sent and **Joint Savings account**).

Starting in Period 2, Person A must decide whether to continue or dissolve the partnership with Person B. If Person A decides to dissolve the partnership, then Person A receives 40% of the balance in the **Joint Savings account** at that point, which is automatically deposited into the **Person A account**. The remaining 60% is deposited into the **Person B account**. The partnership is now over and both Person A and Person B will not make any further decisions in the experiment. In this, and all future periods, the $5 in new funds is automatically deposited into the **Person A account**. If Person A decides to continue, then Person A decides how much to send to Person B.

Person A will see the following on their screen:



Screen 1

Person A must decide how much to send to Person B by entering an amount in the blank box. Person A can send $0, $1, $2, $3, $4 or $5.

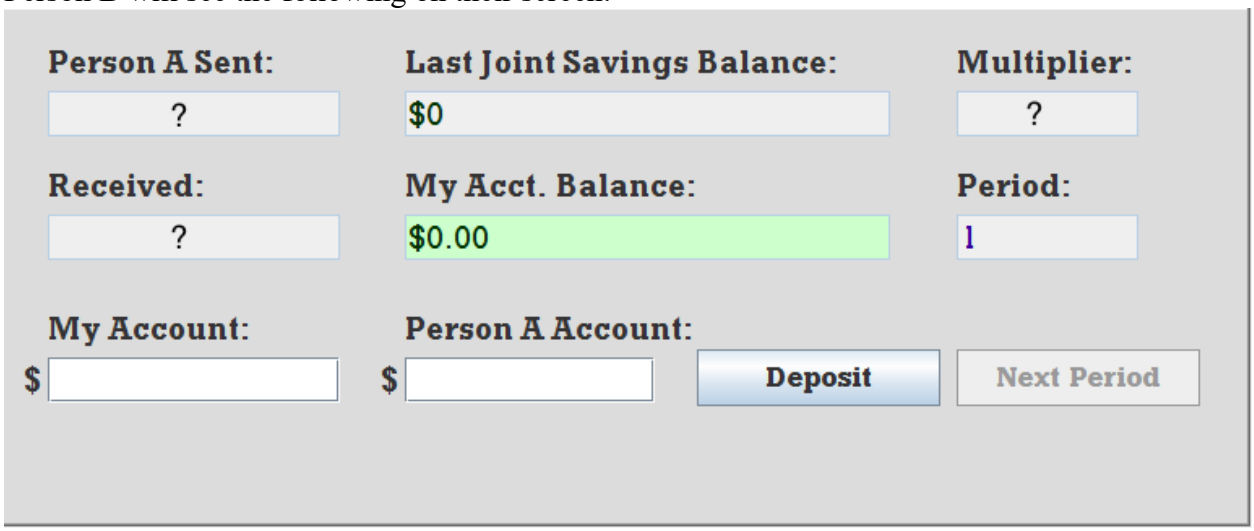
Person B's decision

In stage 1, the amount sent by Person A's is added to the **Joint Savings account** from the prior period. Recall that the **Joint Savings account** at the beginning of period 1 is empty.

The total is multiplied before Person B receives it. The total is multiplied by 1, 2, or 3 (there is an equal chance of each value).

Person B decides on how the multiplied amount received is to be divided between deposits into three accounts. Person B decides how much to deposit in the **Person B account**, into the **Person A account**, and remainder is deposited into the **Joint Savings account**. If the total amount received by Person B equals zero, Person B cannot make any decision except to deposit zero into each account.

Person B will see the following on their screen:



Screen 2

Person B must decide how much to deposit in his/her account and how much into Person A's account by entering amounts in the blank boxes above. Person B can deposit $0, $1, … up to the amount received, into each account, but the total deposited into both accounts cannot exceed the amount received. Whatever is not deposited into the **Person B account** or **Person A account** is automatically deposited into the **Joint Savings account.** For the example screen above, recall the Joint Savings account is empty at the start of Period 1. During the experiment, the amount sent by Person A, the multiplier, and amount received denoted with '?' will be filled in.

In the last period, Person B decides on a 2-way split of the multiplied amount received by him / her instead of the 3-way splits in previous periods. S/he decides how much of the total amount to deposit in to Person A account and how much to deposit in Person B account.

Feedback
Throughout the experiment Person A and Person B will see the history of their decisions. However, the information Person A sees differs from the information Person B sees.

For example, Person A sees the following upon their screen at the end of period 1. Amounts denoted with a '?' will be filled in. Since it is the first period, beginning balances are zero. After each period is complete, the table will be updated with a new row.

Person A History

My Account History

Period #	Beginning Balance	I Deposited	Person B Deposited	Ending Balance
1	0	?	?	?

Screen 3

The information shown to Person B differs. For example, Person B will see the following at the end of period 1. During the experiment, amounts denoted with a '?' will be filled in depending on Person A's and Person B's decisions. Since it is the first period, beginning balances are zero. After each period is complete, the table will be updated with a new row.

Person B History

My Account History

Period #	Beginning Balance	I Deposited	Ending Balance
1	0	?	?

Person A Account History

Period #	Beginning Balance	Person A Deposited	I Deposited	Ending Balance
1	0	?	?	?

Earnings History

Period #	Beginning Joint Savings	Person A Send	Multiplier	Earnings
1	0	?	?	?

Joint Saving Account History

Period #	Earnings	Deposited Into Person A Account	Deposited Into My Account	Ending Balance
1	?	?	?	?

Screen 4

Notice that Person B is shown the multiplier, the Joint Savings Account, and how much they deposited into their own account **(Person B account**). Person A will never be directly told the multiplier, the balance in the Joint Savings Account, or the amount Person B deposited into the **Person B account**. This difference between what Person A sees and what Person B sees is summarized below:

Information	Who sees it
Person A deposits into the **Person A account**	Person A and Person B
Person B deposits into the **Person A account**	Person A and Person B
Balance of the **Person A account**	Person A and Person B
Person B deposits into the **Person B account**	Person B
Balance of the **Person B account**	Person B
Person A sends to Person B	Person A and Person B
Person B deposits into the **Joint Savings account**	Person B
Multiplier drawn	Person B
Multiplied amount received by Person B	Person B

Completion of the Experiment

Once all periods have been completed, you will be paid your earnings in US dollars plus your 7 US dollar show up fee. Experimental currency (ECU) will be converted to US dollars at the rate of 10 ECU to 1 US dollar.

Quiz Questions

Treatment differences noted in italics. Correct answer denoted in parenthesis.

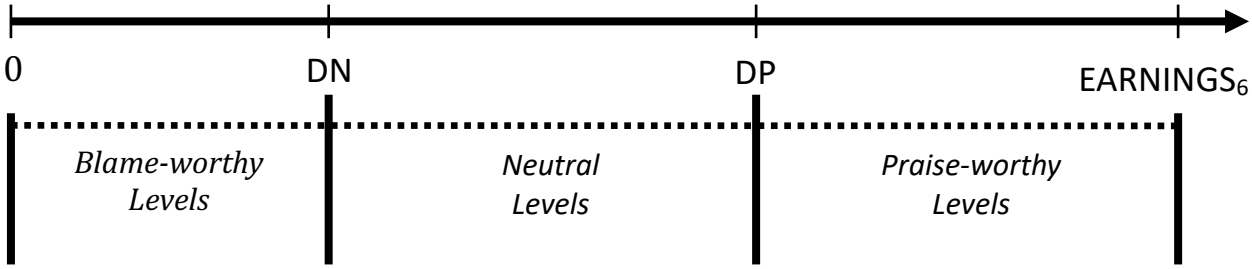
1. How many people are in the partnership?
   a. 1
   b. 2
   (b)
2. The ending balance in the **Person A account** and the **Person B account** can never decrease from last period?
   a. True
   b. False
   (a)
3. The ending balance in the **Joint Savings account** can never decrease from last period?
   a. True
   b. False
   (b)
4. Will both amount send by Person A and the last period's **Joint Savings account** balance be multiplied before Person B decides how to split it?
   a. Yes
   b. No
   (a)
5. Is each multiplier value (1, 2, or 3) equally likely in each period?
   a. Yes
   b. No
   (a)
6. Person A will be explicitly told the multiplier and the balance in the **Joint Savings account**?
   a. Yes
   b. No
   (a: *if Reporting or Both treatments*)
   (b: *if Baseline or Liquidation treatments*)
7. Suppose that Person A sends 3 to Person B, and Person B and deposits 5 in the **Person A account**. How much was added to the **Person A account** this period?
   a. 3
   b. 5
   c. 7
   d. 8
   (c)
8. Suppose Person B receives 9, deposits 2 to the **Person A account**, and deposits 3 to the **Person B account**. What is the **Joint Savings account** balance?
   a. 2
   b. 4
   c. 6
   d. 9
   (b)
9. Suppose the **Joint Savings account** balance is 40 at the start of the period and Person A chooses to dissolve the partnership. How much of the **Joint Savings account** balance gets automatically deposited into the **Person A account**?

a. 0
b. 16
c. 24
d. 40

(b: *only asked in Liquidation and Both treatments*)

Table 1
Trustee Choices of Final Distribution

Panel A: Possible Values to Investor Chosen by Trustee



Legend:

DN = Minimum level need to avoid blame
DP = Minimum level to obtain praise from Impartial Spectator
$EARNINGS_6$ = Earnings in the final period (Maximum Amount to Investor)

Panel B: Comparison of Trustee Utility choosing Final Distribution with and without Financial Reporting

$$U(action|C) = \delta(C) + \alpha(C,B)\,V + \gamma(C,B)\,PW + \beta(C,B)\,V\,PW$$

		Utility of monetary payoffs	Utility (disutility) of avoiding (not avoiding) being seen as blame-worthy	Utility (disutility) of acting praise-worthy (blame-worthy)	Utility (disutility) of being seen as praise-worthy (blame-worthy)
LEVEL		δ (C)	α (C,B)V	γ (C,B) PW	β (C,B) V PW
Blame-worthy 0 (PW = -1)	Without Reporting	> 0	<0	<0	<0
	With Reporting	> 0	<0	<0	<0
Neutral DN (PW = 0)	Without Reporting	smaller than paying 0	>0	0	0
	With Reporting	smaller than paying 0	>0	0	0
Praise-worthy DP (PW = 1)	Without Reporting	smaller than paying DN	>0 and equal to PW=0	0 or >0	0 or >0
	With Reporting	smaller than paying DN	>0 and equal to PW=0	>0	>0

Table 2
Summary Measures

	Wealth	Efficiency	Total Investor Payoff	Total Trustee Payoff
Without Financial Reporting	137.4	31%	45.2	92.2
N = 72	*88.5*	*21%*	*35.5*	*50.0*
	(15.1)	(3%)	(3.4)	(13.9)
With Financial Reporting	257.3	45%	84.6	172.7
N = 71	*133.0*	*35%*	*37.0*	*90.0*
	(36.4)	(4%)	(15.2)	(26.7)

Mean, *median*, (SEM) reported.

Total Investor Payoff: The balance of the Investor's private account at the end of the game. The sum of the 6 periods endowment, less the sum of investments, plus any interim dividends received, plus the amount received in final distribution or liquidation.

$$PAYOFF_{INVESTOR} = \sum_{t=1}^{6} 5 - \sum_{t=1}^{T} INV_t + \sum_{t=1}^{\max\{5,T\}} DIV_t + INVESTOR\_FIN_T \text{, where}$$

$$T = \min\{6, \text{period liquidated}\}$$

$$INVESTOR\_FIN_T = \begin{cases} DIV_6\,, & T = 6 \\ 40\% \times \text{Joint Savings account}_T, & T < 6 \end{cases}$$

Total Trustee Payoff: The balance of the Trustee's private account at the end of the game. This equals the sum of the salary kept by the trustee in interim periods (and not reinvested) plus the amount kept by the trustee in the final distribution or liquidation.

$$PAYOFF_{TRUSTEE} = \sum_{t=1}^{T} SAL_t + TRUSTEE\_FIN_T, \text{ where}$$

$$T = \min\{6, \text{period liquidated}\}$$

$$TRUSTEE\_FIN_T = \begin{cases} SAL_6\,, & T = 6 \\ 60\% \times \text{Joint Savings account}_T, & T < 6 \end{cases}$$

Wealth: The sum of the Investor payoff and Trustee payoff at the end of the game.

$$WEALTH = PAYOFF_{INVESTOR} + PAYOFF_{TRUSTEE}$$

Efficiency: The wealth divided by the hypothetical wealth (given the realized multiplier values) that might have been assuming the Investor invested the maximum amount each period, the Trustee reinvested the maximum the interim periods.

$$WEALTH/(5 + (5 + (5 + (5 + (5 + 5^{\lambda_1})^{\lambda_2})^{\lambda_3})^{\lambda_4})^{\lambda_5})^{\lambda_6}$$

Table 3
Investment and Reinvestment

	Average Investment	Average Dividend to Investor	Average Salary Taken by Trustee	Average Reinvestment by Trustee
Without Financial Reporting	3.4	3.0	3.7	20.8
N = 72	*3.6*	*2.6*	*3.4*	*9.8*
	(0.2)	(0.3)	(0.4)	(2.9)
With Financial Reporting	3.9	2.0	2.6	40.3
N = 71	*4.3*	*1.4*	*2.0*	*22.4*
	(0.1)	(0.3)	(0.4)	(5.2)

Mean, *median*, (SEM) reported.

Average Investment: The average investment in periods (1-6) if the firm had not been liquidated, else the average investment before the firm was liquidated.

$$\sum_{t=1}^{T} \frac{INV_t}{T}, \text{where } T = \min\{6, \text{period liquidated}\}$$

Average Dividend to Investor: The average amount returned by the Trustee in interim periods (1-5) if the firm had not been liquidated, else the average amount returned by the Trustee before the firm was liquidated.

$$\sum_{t=1}^{T} \frac{DIV_t}{T}, \text{where } T = \min\{5, \text{period liquidated}\}$$

Average Salary Taken by Trustee: The average amount the Trustee put into their own private account in interim periods (1-5) if the firm had not been liquidated, else the average amount the Trustee put into their own private account before the firm was liquidated.

$$\sum_{t=1}^{T} \frac{SAL_t}{T}, \text{where } T = \min\{5, \text{period liquidated}\}$$

Average Reinvestment by Trustee: The average amount the Trustee put into the common account in interim periods (1-5) if the firm had not been liquidated, else the average amount the Trustee put into the common account before the firm was liquidated.

$$\sum_{t=1}^{T} \frac{REINVEST_t}{T}, \text{where } T = \min\{5, \text{period liquidated}\}$$

Table 4
Final distribution

Panel A: Amounts

	Trustee Final Distribution	Investor Final Distribution
	81.9	22.0
Without Financial Reporting	*32.5*	*8.0*
N = 64	(15.7)	(3.9)
	167.4	68.5
With Financial Reporting	*72.5*	*10.5*
N = 64	(30.1)	(17.4)

Mean, *median*, (SEM) reported.

Trustee Final Distribution: The amount the Trustee put into their own private account in the final period. If the final period's earnings where zero, or the firm had been liquidated by the investor, then the Trustee's choice could not be observed, and as such, the number of observations is reduced.

Investor Final Distribution: The amount the Trustee put into the Investor's private account in the final period, if that choice could be observed.

Panel B: Results of best fit model

$$Investor\ Final\ Distribution = \beta_0 + \beta_1 FinacialReporting + \beta_2 Investments^2 + \beta_3 FinancialReporting \times Investments^2 + \beta_4 PriorDividends + \beta_5 PriorSalary + \varepsilon$$

Variable	Coefficient Value
Intercept	25.981***
Financial Reporting	-25.498
Investments^2	0.625***
Financial Reporting × Investments^2	0.456**
Prior Dividends	-0.194**
Prior Salary	-0.180***
Number of Observations	128
R Squared	0.279
Adjusted R Squared	0.249

Note: ** p < .05; *** p < .01

F(5, 122) = 4.52, Probability > F = .0008

Financial Reporting: Dummy variable equal to one if treatment is Reporting or Both

Investments^2: sum of squared investments, $INV_1^2 + INV_2^2 + \cdots INV_6^2$.

Prior Dividends: weighted dividends paid to the investor in interim periods, $DIV_1 \times 2^5 + DIV_2 \times 2^4 + \cdots + DIV_5 \times 2^1$.

Prior Salary: weighted salaries kept by the trustee in interim periods, $SAL_1 \times 2^5 + SAL_2 \times 2^4 + \cdots + SAL_5 \times 2^1$.

Table 5
Measures of Maximum Efficiency by Treatment

	Percentage of Economies Where in All Periods Maximum:		
Treatment	Investment	Reinvestment	Efficiency
Baseline	25.0	8.3	2.8
N = 36	(7.3)	(4.7)	(2.8)
Reporting	37.1	32.4	17.1
N = 35	(8.3)	(8.1)	(6.5)
Liquidation	19.4	2.8	0.0
N = 36	(6.7)	(2.8)	(0.0)
Both	27.8	25.0	13.9
N = 36	(7.6)	(7.3)	(5.8)

Mean, (SEM) reported.

Maximum Investment: A dummy variable which is one if the Investor invested her entire endowment.

$$MAX\_INVEST_t = \begin{cases} 1, & if\ INV_t = 5 \\ 0, & else \end{cases}$$

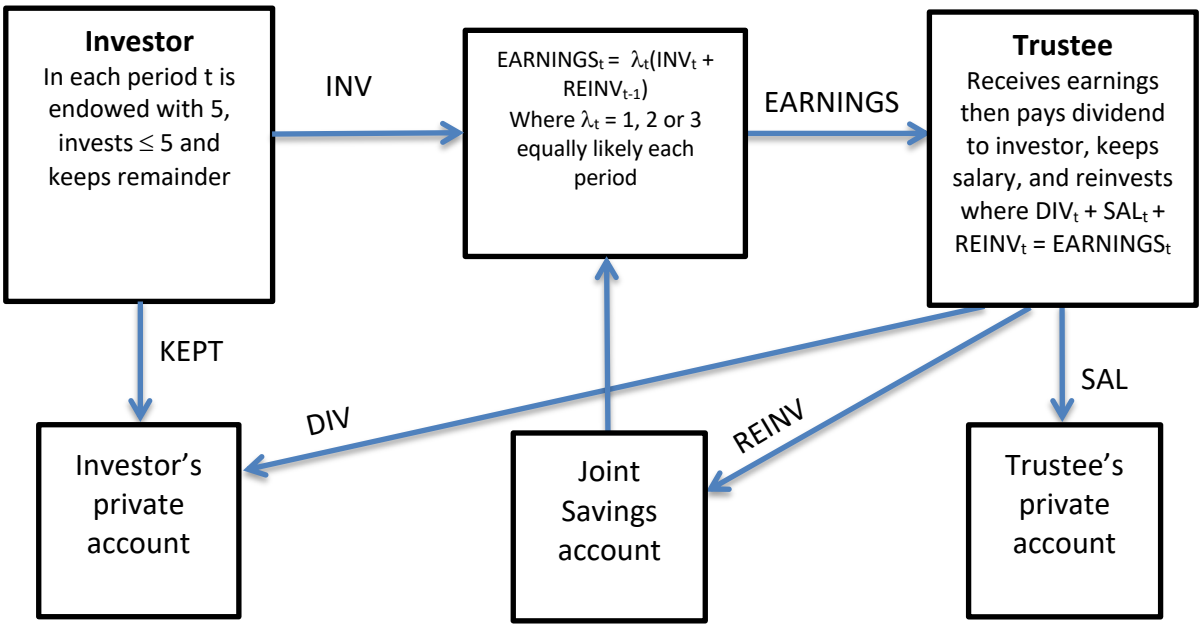
Maximum Reinvestment: A dummy variable which is one if the Trustee reinvested all earnings she received.

$$MAX\_REINVEST_t = \begin{cases} 1, & if\ REINV_t = EARNINGS_t \\ 0, & else \end{cases}$$

Maximum Efficiency: A dummy variable which is one if the Investor invested her entire endowment and the Trustee reinvested all earnings she received.

$$MAX\_INVEST_t \times MAX\_REINVEST_t$$

Figure 1
Baseline Version of the Reinvestment Game

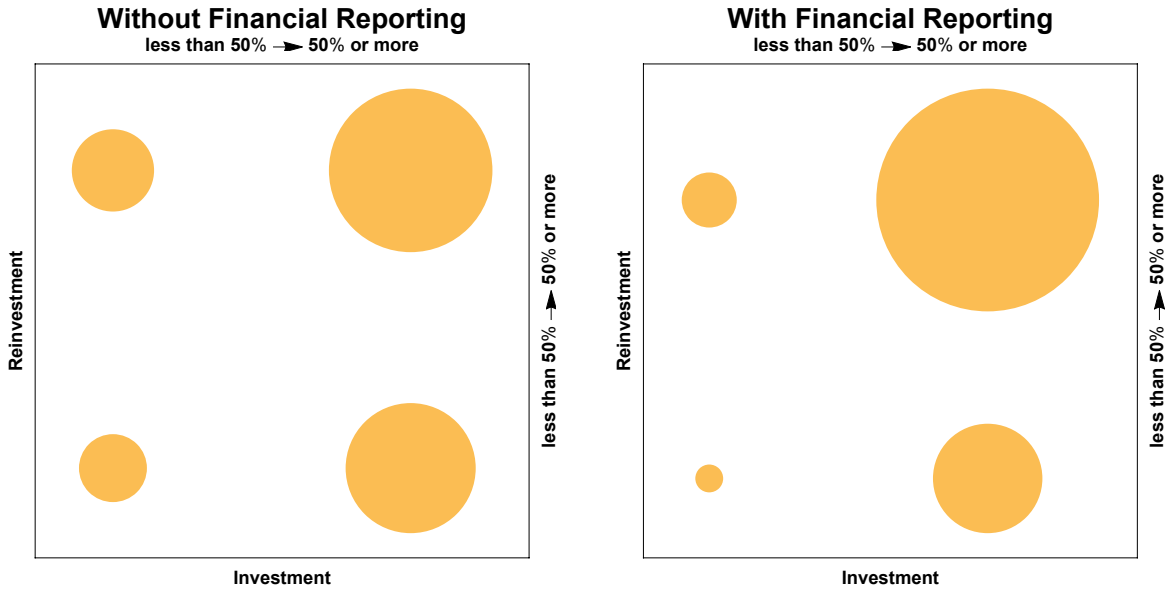


In the last period reinvestment is not possible due to game's end. The trustee thus chooses final distribution such that $DIV_6 + SAL_6 = EARNINGS_6$.

Reporting treatments: Investor sees earnings, reinvestment, balance of the joint savings account, salary, and the balance of the trustee's private account.

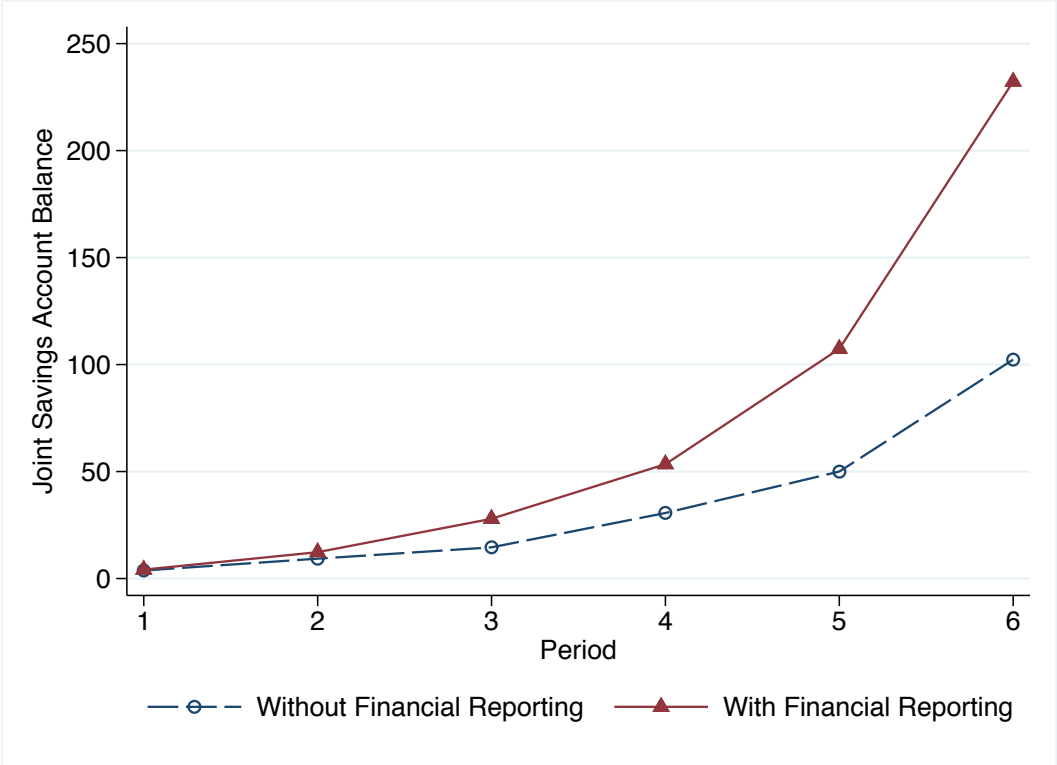
Liquidation treatments: At the end of periods 1-5, the investor can elect to dissolve the firm, which moves 40% of the joint savings account balance into the investor's private account and moves the remainder into the trustee's private account.

Figure 2
Bubble Charts of Investment and Reinvestment



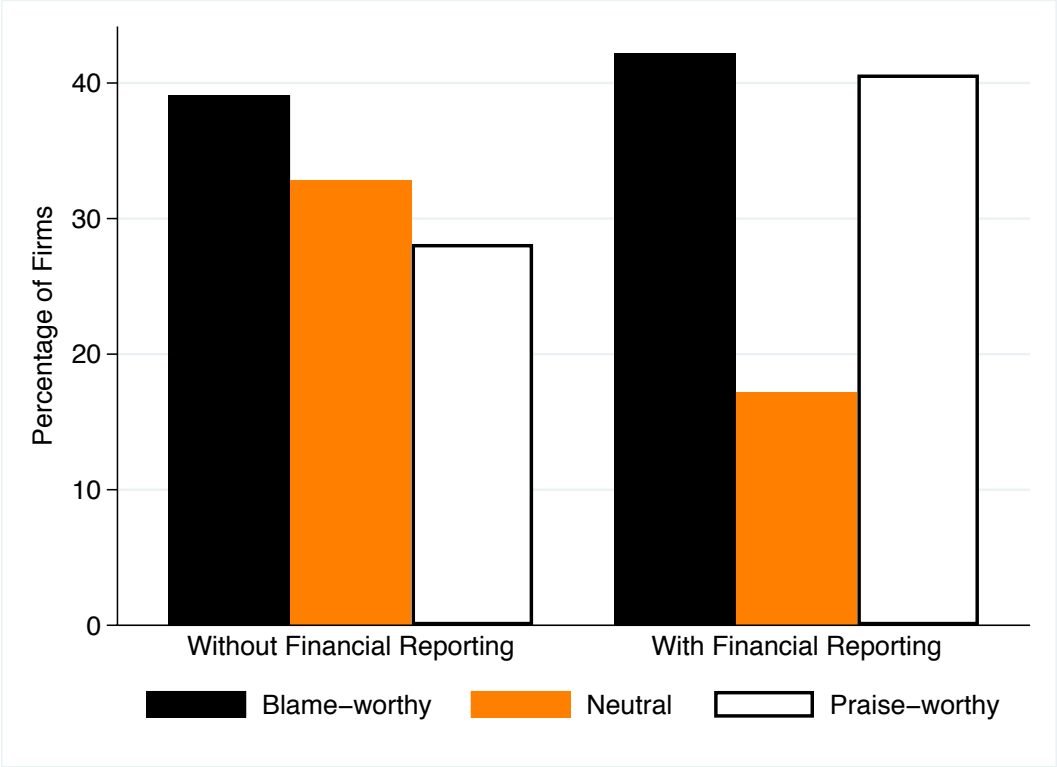
Note: Within each chart the firms are classified by investor behavior on the x-axis (average investment was less than or more than half the maximum the investor could invest of her endowment) and trustee behavior on the y-axis (average reinvestment the less than or more than half maximum percentage the trustee could reinvest of earnings). The bubble size reflects the number of economies falling into the classification, where the smallest bubble is 1.5 percent of firms in the treatment and the largest is 61 percent of firms in the treatment.

Figure 3
Joint Savings Account Over Time



NOTE: The average balance of the Joint Savings account of the non-liquidated firms graphed over the six periods. As the firm is dissolved in the last period and trustees are required to allocate earnings between themselves and the investors, we report the earnings before the final dividend in the last period.

Figure 4
Categorization of Final Distribution to Investor



NOTE*:* If the investor distribution was less than $DN = Max\{\sum_{t=1}^{6} INV_t - \sum_{t=1}^{5} DIV_t, 1\}$, then we classify the final distribution as blame-worthy; if it was greater than $DP = 40\%\ REINV_5 + INV_6$, then we classify the investor distribution as praise-worthy, otherwise we classify the distribution as neutral. In those cases where *DP* was less than or equal to *DN*, we classify the final distribution as neutral.