

Agency and Transparency in Financial Markets

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ABSTRACT

We analyze incentive effects of transparency on delegated portfolio management. When portfolio return is observable, disclosure of portfolio composition decreases expected return and lowers the investor's ability to identify the manager's actual type. More information about the portfolio return before renewal of management agreement also decreases expected return, while, conditionally, it may provide more information about manager's actual ability.

Key Words: transparency; career concern; delegated portfolio management

JEL Classification: D82; G32; J33; L21; M12

Finansal Piyasalarda Vekillik ve Şeffaflık

ÖZET

Bu çalışmada finansal piyasalardaki şeffaflığın (kamuyu aydınlatmanın) yetkilendirilmiş portföy yönetimi üzerindeki teşvik etkileri analiz edilmiştir. Portföy getirisinin gözlemlenebilir olduğu durumda, portföy kompozisyonunun ifşa edilmesi, portföyün beklenen getirisini düşürmekte ve yatırımcının portföy yöneticisinin gerçek yatırım kabiliyetini de öğrenmesini güçleştirmektedir. Portföy yönetim anlaşmasının yenilenmesinden önce yatırımcının portföy getirisini gözlemlemesi de, portföyün beklenen getirisini düşürmekte, fakat bazı şartlara bağlı olarak yatırımcının portföy yöneticisinin yatırım kabiliyeti hakkında daha fazla bilgi edinmesini sağlamaktadır.

Anahtar Kelimeler: şeffaflık, kariyer kaygısı, yetkilendirilmiş portföy yönetimi

JEL Sınıflaması: D82; G32; J33; L21; M12

INTRODUCTION

Investors widely invest their money in financial markets through delegating management of it to financial institutions. For example, in the US, institutional investors held more than half of the total corporate equities at the end of 2009. Similarly, in the UK, institutional investors own more than 70% of the stock market in 2010. Thus, investment of more than half of the equities in financial markets is controlled by money managers and can be subject to agency problems.

One of the themes that may create an agency problem in financial markets is the transparency of financial institutions. Although transparency of financial institutions is widely discussed by both policymakers and academics, less attention is given to potential influences of transparency on the agency relation between the investors and the fund managers.

In this paper, we focus on this interaction in financial markets. We analyze incentive effects of transparency over a career-concerned manager's

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portfolio choice and portfolio return. We argue that more observation on composition of a career-concerned manager's portfolio choice or on the portfolio return may lead him to choose riskier and "noisier" portfolios in order to prevent information revelation from these observations about his managerial ability. Specifically, we show that when the portfolio return is observed, increasing transparency over composition of manager's portfolio choice certainly lowers the investor's welfare. It decreases expected return and lowers the investor's ability to screen the manager's actual ability. Similarly, more information about the portfolio return definitely lowers expected return, while it conditionally may or may not improve the investor's ability to identify the manager's actual type.

There are a handful of papers mentioning potential adverse incentive effects of transparency (see e.g. Cremer, 1995: 275-95; Maskin and Tirole, 2004: 1034-1054; Prat, 2005: 862-877; Fox and Weelden, 2011: 142-150). Among others, the closest papers to ours belong to Prat (2005: 862-877) and Fox and Weelden (2011: 142-150). Prat (2005: 862-877) argues that under some conditions, learning actions of a career-concerned expert may lead him to ignore valuable signals, whereas learning the consequence of the expert's actions has never such an effect. Fox and Weelden (2011: 142-150) further show that the latter result is sensitive to cost structure: when priors about the state of world is sufficiently strong, observing the consequence of a career-concerned expert's actions may also lead him to disregard useful private signal, so decreases principal's welfare. Differently from these papers, we point out another channel in which more transparency over portfolio choice (the action) and the portfolio return (the consequence) leads adverse incentive effects: in our setting, increasing transparency leads the manager to choose portfolios that reduce informativeness of signals about his type, rather than the ones maximizing investor welfare. Moreover, to our knowledge, this is the first paper that studies incentive effects of each type of the transparency regime on both alignment of principal and agent interests and information revelation about manager's actual ability.

Our paper is also related to Hermalin (1993: 127-135). He analyzes effects of managers' career concerns on their risk taking behavior. He points out that career concerns of managers may lead them to construct high risky portfolios and contractual schemes do not always correct the problem. Our paper shares the idea with Hermalin (1993: 127-135) that risky investments may provide less information about an agent's type than that of safer investments. However, our paper differs both in its setup and more importantly the questions it addresses. We analyze instead the optimal transparency regime under career concerns.

I. Model

To make our point, a simple model as the following will be sufficient. We

$$t \in \{1, 2\}$$

consider an economy with two dates, $t=1, 2$. A risk-neutral investor (principal) chooses a manager (agent) from a competitive managerial labor market

to delegate fund management in each period. Managers differ in their managerial ability. Both the investor and the manager initially do not know the actual ability of the manager. However, it is common knowledge that unknown managerial ability θ is normally distributed with mean $\bar{\theta}$ and variance $var(\theta)$. Thus, all parties' prior assessment about managerial ability is $\bar{\theta}$.

In each period, the employed manager chooses a risky portfolio (or asset) from a continuum of portfolios and his expertise lies in generating "alpha" for the investment. In other words, managers with higher abilities generate higher risk-adjusted expected return.² The return function is given by,

$$\pi_t = \theta_t + s_t$$

where θ_t denotes managerial ability in generating higher risk-adjusted expected return and s_t denotes stochastic component of a portfolio, which is normally distributed with mean $\mu_{s,t}$ and variance $var(s_t)$. Each portfolio in the feasible set is identified by its stochastic component s_t and differs in its expected value and the degree of risk. Similar to Palomino and Prat (2003), we define the set of feasible portfolios, P as the following:

$$[P = \{ \mu_{s,t}, var(s_t) \mid var(s_t) \in R^+, -\infty < \mu_{s,t} \leq f(var(s_t)) \}$$

where the function $f(\cdot)$ is twice differentiable, strictly concave, and has a

$$\mu^* = f(var(s^*))$$

maximum at μ^* . The function $f(var(s_t))$ constitutes the boundary of the set and can be considered as *efficient frontier*.³

In the feasible set P, portfolios with higher variances than $var(s^*)$ are second-order stochastically dominated and have lower expected values μ^*

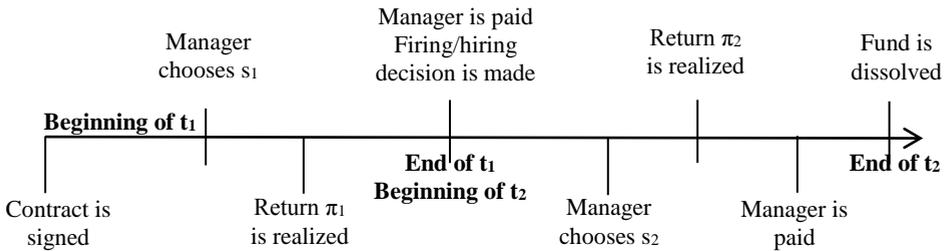
than μ^* . Hence, neither a risk-averse nor a risk-neutral individual in principle should choose such kind of portfolios. However, as we show in the analysis section, increasing transparency indeed induces career-concerned managers to choose this kind of portfolios.

² Rajan (2008) identifies some sources of alpha as discovering undervalued assets, activism, financial entrepreneurship and financial engineering. Chevalier and Ellison (1997: 1167-1200), Sirri and Tufano (1998: 1589-1622) provide evidence for that principals evaluate risk-adjusted performance of managers and pay for alpha.

³ One caveat is that our results do not critically depend on the specified properties of the feasible portfolio set. This structure enables us to highlight the scope of the moral hazard problem. However, in another setting where the investor and the manager have finite risk tolerance and portfolios have the same expected return, differing only in their variance, qualitative results of the paper remain same.

Managers are risk neutral and their per-period utility, u_t , is increasing function of managerial compensation, w_t . As our aim is to point out incentive effects of different transparency regimes under career concerns, contractual schemes do not affect our results in any important way. Therefore, we assume for the analytical convenience that the manager is compensated with fixed management fee and there is no lending or borrowing. Although the fund manager's compensation does not depend on his portfolio choice, this portfolio choice still indirectly affects the manager's utility through its effect on manager's lay-off risk.

The sequence of events is as follows. At the beginning of the first period, the investor chooses a fund manager at random. The employed manager invests in a portfolio. Then, the first-period return is realized, the manager is paid and at the end of the first period, the investor either rehires the manager for the second period, or picks a new one from the managerial labor market. In the second period, the rehired or the newly employed manager chooses a portfolio. The second-period return is realized, the manager is paid and the firm is dissolved.



We identify outcomes in delegated portfolio management under following two information structures: (i) the investor observes both the manager's choice of portfolio and the return on it. We refer this case as *Full Transparency*. This information structure also constitutes the benchmark for our analysis. (ii) only the portfolio choice or the portfolio return is transparent, but not both. We label this case as *Partial Transparency*. We also distinguish two types of *Partial Transparency*. First, the investor observes the return, but does not observe the choice of portfolio. Second, the investor observes the portfolio choice, whereas he does not observe the return before renewal of the contract (i.e. before the second period). The second information structure represents, for example, a principal-agent relationship between an investor and a pension fund, which invested in long-term assets, and the investor cannot commit not to renegotiate the contract before the realization of return.

II. Analysis

We proceed backwards, starting with the analysis of the second period. As the firm dissolves at the end of this period, the manager, either the rehired or the new one, has no career concern. Then, the assumption of fixed management fee ensures that the manager is indifferent between choosing any portfolio, including the optimal one.⁴

This result is independent of whether the principal observes only the portfolio choice, the portfolio return, or both. This is because as the perception on the manager's ability in the second period has no effect on his current compensation and the manager has no career concern in this period, the information provided by realized return, portfolio choice has no direct/indirect effect on manager's utility.

Since the managerial incentives and so, the portfolio choice in this period is same for all managers, what matters for maximizing the second-period return is the managerial talent. This leads the managerial turnover decision to be solely based on the comparison of expected managerial abilities. Any manager chosen in the labor market will have an expected ability $\bar{\theta}$. This yields the firm's *firing rule*: the principal hires a new manager for the second period if and only if the expected ability of the already employed manager is less than $\bar{\theta}$.

We now turn to analysis of the first-period equilibrium. In this period, the manager takes into account that his portfolio choice can affect the investor's assessment of his ability. Now, transparency over portfolio choice and portfolio return interdependently plays a critical role in the emergence of moral hazard problem. To shed light on this interdependency, we analyze transparency under two cases.

A. Full Transparency

As a benchmark, we start with the analysis of *Full Transparency* and then compare the equilibrium outcome with the ones obtained in the *Partial Transparency*. For the analysis of *Full Transparency*, assume for now that the investor observes not only the portfolio return, but also the portfolio choice, before making managerial turnover decision. However, we still assume that both the investor and the manager initially do not know the actual ability of the manager. Upon observing the first-period portfolio choice and return, the investor's expectation about managerial ability $\hat{\theta}$ will be function of both the prior estimate of managerial ability and the observed outcome. Specifically, the posterior belief is represented by the following equation:

⁴ For clarity, we assume that when the manager is indifferent between any portfolio choices, he chooses the optimal one with the highest expected value, μ_3^* .

$$\begin{aligned} \hat{\theta} &= \frac{\frac{1}{\text{var}(\theta)}\bar{\theta} + \frac{1}{\text{var}(s_1)}[(\pi)_1 - \mu_{s,1}]}{\frac{1}{\text{var}(\theta)} + \frac{1}{\text{var}(s_1)}} \\ &= \frac{\text{var}(s_1)\bar{\theta} + \text{var}(\theta)[(\pi)_1 - \mu_{s,1}]}{\text{var}(\theta) + \text{var}(s_1)} \end{aligned} \quad (1)$$

Bayesian updating implies that the posterior belief on the manager's ability will be weighted average of the prior estimate $\bar{\theta}$ and what is observed $[(\pi)_1 - \mu_{s,1}]$. Moreover, variance of the prior estimate $\text{var}(\theta)$ and the portfolio variance $\text{var}(s_1)$ determine the weights in belief formation.

Simple calculations show that the expected value of the posterior belief, $E[\hat{\theta}]$, is equal to the prior assessment about managerial ability, $\bar{\theta}$. Moreover, the variance of the posterior belief, $\hat{\theta}$, is equal to

$$\begin{aligned} \text{var}(\hat{\theta}) &= \frac{(\text{var}[(\theta)])^2(\text{var}(\theta) + \text{var}(s_1))}{(\text{var}(\theta) + \text{var}(s_1))^2} \\ &= \frac{(\text{var}(\theta))^2}{\text{var}(\theta) + \text{var}(s_1)} \end{aligned} \quad (2)$$

Equation (2) shows that the variance of the posterior belief, $\text{var}(\hat{\theta})$, is inversely related to portfolio variance, $\text{var}(s_1)$. As the portfolio is riskier and has greater variance, the variance of the posterior belief will be smaller.⁵ The reason behind this result is the following: the posterior belief is weighted average of the prior belief and the observed outcome. The prior belief is deterministic, whereas the observed outcome, π_t , is stochastic. Therefore, as the known variance of the portfolio increases, the weight put on the stochastic observation decreases, so does the variance of the posterior belief.

The career-concerned manager who tries to reduce his lay-off risk uses this effect strategically. The firm's optimal firing rule gives manager an incentive to minimize his likelihood of being below average. Although the choice of portfolio does not affect the mean of the expected managerial ability, it does the variance of the expectation. Thus, in order to minimize the likelihood of his assessed ability to be below average, the manager tries to minimize the variance of the posterior belief about his ability. This leads manager to strategically choose the riskiest portfolio available and to make the signal of observed outcome uninformative as much as possible. However, this portfolio has lower expected

⁵ This result is previously provided by Hermalin (1993: 127-135).

return than that of optimal one characterized with μ_s^* and it is also second-order stochastically dominated. Hence, when both the portfolio choice and the return are transparent, the equilibrium outcome is suboptimal from the perspective of the investor. Following result summarizes these findings.

Proposition 1 *When both the composition of portfolio choice and the portfolio return are transparent, a career-concerned manager chooses the riskiest portfolio available. The chosen portfolio has lower expected return than μ_s^* and it is second-order stochastically dominated.*

B. Partial Transparency

Now, to assess the impact of reducing transparency on the investor's welfare, we proceed by characterizing equilibrium outcomes under *Partial Transparency*. We consider two possibilities under this information structure. First, we analyze the case in which the investor still observes the portfolio return as he does under *Full Transparency*, but now he does not observe the portfolio choice of the manager.⁶

Under non-transparent portfolio choice, since the investor cannot observe the portfolio choice, the weights put on the prior belief and on the observed outcome are constant and they do not depend on manager's unobserved choice of portfolio. Rather, the weights are determined by the investor's belief on which portfolio the manager would choose. Let \tilde{s}_1 denotes the portfolio that the investor inferred to be chosen by manager and $\mu_{\tilde{s},1}$, $[\text{var}(\tilde{s})_1]$ denote corresponding mean and variance. Now, the equation for the posterior belief can be written as

$$\hat{\theta} = \frac{[\text{var}(\tilde{s})_1]\bar{\theta} + \text{var}(\theta)[(\pi)_1 - \mu_{\tilde{s},1}]}{\text{var}(\theta) + [\text{var}(\tilde{s})_1]} \tag{3}$$

Moreover, mean and variance of the posterior belief are given by,

$$E[\hat{\theta}] = \bar{\theta} + \frac{\text{var}(\theta)[(\mu)_{s,1} - \mu_{\tilde{s},1}]}{\text{var}(\theta) + [\text{var}(\tilde{s})_1]} \tag{4}$$

$$\text{var}(\hat{\theta}) = \frac{\text{var}(\theta)^2(\text{var}(\theta) + \text{var}(s_1))}{(\text{var}(\theta) + [\text{var}(\tilde{s})_1])^2} \tag{5}$$

There are two important implications of these new mean and variance equations. First, (4) indicates that the expected value of managerial ability now depends on the difference between the actual mean of the chosen portfolio, $\mu_{s,1}$, and the mean of the portfolio that the investor believed to be chosen, $\mu_{\tilde{s},1}$.

⁶ One can consider that the presented portfolios combine many assets, at least more than two assets, so the investor cannot deduce the manager's choice of portfolio by observing portfolio return.

Therefore, the expected managerial ability can be greater or less than $\bar{\theta}$, depending on the inferred and actual mean of the portfolio choice. Second, since the weights are fixed, an increase in the variance of unobserved portfolio choice does not decrease the variance of the posterior belief. Rather, conversely to the case in *Full Transparency*, the variance of the posterior belief increases with an increase in the variance of unobserved portfolio choice, $var(s_1)$.

To determine Bayesian equilibrium, we consider three polar alternatives: the portfolios with the highest and the smallest variances and the optimal portfolio with the highest expected return, μ_s^* . Consider first that the principal's belief is that the manager would choose the portfolio with the highest variance. If it is the case, the manager can deviate with an off the equilibrium portfolio choice: he can increase expectation on his ability by choosing any other portfolio with higher expected return (i.e., the optimal portfolio) instead of choosing the one with the highest variance. This implies that the investor's belief is inconsistent with the manager's strategy. Thus, this case does not constitute Bayesian equilibrium. Next, consider that the investor's belief is that the manager would choose the portfolio with the smallest variance. Again, the manager can increase the posterior belief by choosing, for example, the optimal portfolio. Thus, this belief of investor is also inconsistent with the manager's strategy. Actually, equations(4) and(5) indicate that any belief that the manager would choose a portfolio other than the optimal portfolio with maximum expected return is inconsistent with the manager's strategy because the manager has incentive to deviate by choosing the portfolio with maximum expected return. However, if the investor's inference is that manager's portfolio choice would be the optimal portfolio, this constitutes a consistent belief. Since the optimal portfolio yields the highest expected return, μ_s^* , the manager can do no better by deviating with another portfolio choice with smaller expected return. Hence, in Bayesian equilibrium, the manager's unique strategy is to choose the optimal portfolio. The following lemma summarizes this discussion.

Lemma 1 *Suppose that the portfolio return is transparent, whereas the manager's portfolio choice is not. In equilibrium, the career-concerned manager chooses the optimal portfolio, maximizing investor welfare.*

Lemma 1 indicates that reducing transparency with concealed portfolio choice improves the current expected return. Still, one can consider that although non-disclosure of portfolio choice may solve moral hazard problem, benefits of disclosing composition of the portfolio may outweigh through information revelation about manager's ability. It may be expected that since the principal has more observation on manager under *Full Transparency*, it may be easier to screen the manager's actual ability. However, comparing variances of posterior beliefs under these two cases indicates that the equilibrium outcome under concealed portfolio choice is also better for information revelation about the manager's actual ability. Since the equilibrium portfolio choice under concealed portfolio

choice has smaller variance than the one under *Full Transparency*, the observed portfolio return under concealed portfolio choice provides more information about the manager's type. Therefore, comparing equilibrium outcomes under *Full Transparency* and concealed portfolio choice shows that non-disclosure of portfolio choice is not only better for maximizing current expected return, but also for identifying the manager's actual type.

Proposition 2 *When the portfolio return is observable, disclosing manager's portfolio choice both decreases expected portfolio return and lowers the investor's ability to evaluate the manager's actual type. Compared to the equilibrium outcome under Full Transparency, the investor is strictly better off under concealed portfolio choice.*

The other form of *Partial Transparency* is that the principal observes manager's portfolio choice, the action, while he does not observe the return before renewal of the contract (i.e., before the second period). This information structure models environments where investors cannot commit not to renegotiate the contract before the realization of return (i.e., a principal-agent relationship between an investor and a pension fund), or where it is difficult for investors to completely evaluate the return. Since this case involves pre-return performance evaluation, the posterior belief on managerial ability is equal to the prior belief on it. The manager cannot effect the posterior belief by his portfolio choice. Therefore, the manager is indifferent between any portfolio choices.

Lemma 2 *Suppose that the manager's portfolio choice is observable, whereas the return is not. In equilibrium, the career-concerned manager is indifferent between any portfolio choices.*

Lemma 2 implies that keeping the return concealed mitigates the agency problem. However, the concealed return prevents any information revelation about manager's ability. Thus, the equilibrium under *Full Transparency* is superior to the equilibrium under the concealed return for information revelation about manager's ability, if there is no available portfolio with infinite variance. However, if there is at least one portfolio with infinite variance, *Full Transparency* regime is no better than the concealed return case even for identifying the manager's actual ability. This is because if a portfolio with infinite variance is available under *Full Transparency*, this portfolio choice makes the observed return totally uninformative. Overall comparison of these two information scenarios leads following result:

Proposition 3 *Disclosing portfolio return decreases expected return unconditionally, while it increases the investor's ability to screen the manager's actual type if portfolio variances are finite. Otherwise, the investor is certainly better off under the case of concealed return.*

III. Discussion and Conclusion

After the Financial Crisis of 2008, many regulatory frameworks have been amended to increase transparency in financial markets. In 2009, the European Union proposed Alternative Investment Fund Manager Directive which aimed, among others, to increase transparency over fund management. Similarly, in the US, the Hedge Fund Transparency Act of 2009 introduced a bill imposing tighter disclosure requirements for hedge funds.

We have analyzed two kinds of transparency regime that may help to figure out some incentive implications of these policy frameworks: *Full Transparency* and *Partial Transparency*. Overall comparison of these information structures through their effects on aligning investor - manager preferences and on information revelation about manager's actual ability indicates that the investor welfare is highest when the composition of managers' portfolio choice is non-disclosed. This transparency regime both ensures the manager to take the action yielding the first-best outcome and it provides the most information about the manager's type. Considering the effect of transparency on alignment of principal and agent interests, the case of concealed portfolio return is also definitely superior to *Full Transparency*, while superiority between these two information structures through their effects of information revelation about manager's ability depends on availability of portfolios with infinite variance.

A testable prediction of our model is that disclosure of portfolio composition decreases expected return. In fact, findings of various empirical studies provide supporting evidence for this prediction. For example, empirical analysis of Agarwal et al. (2013: 739-783) indicates that hedge funds with more confidential holdings have higher risk adjusted performance compared to their counterparts. Shi (2012) provides a more direct evidence on adverse effects of transparency. She examines effects of SEC's portfolio disclosure obligation that comes into effect when a fund's assets exceed \$100 million. She shows that this discontinuous change in disclosure obligation results to a sudden drop in funds' performances, whereas there is no such drop for funds that are not subject to this obligation. Further, she shows that fund performance decreases both in disclosure periods and as fraction of assets disclosed increases. All of these findings are consistent with our prediction that increasing transparency may decrease expected return.

To conclude, implications of transparency can be more complex than it seemed at first glance. When designing policies for information revelation, one needs to take into account its possible adverse incentive effects. In this regard, one direction for further research may be to analyze optimal contracts and the transparency regime in a unified framework.

References

- AGARWAL, Vikas, WEI, Jiang, YUEHUA, Tang and Yang BAOZHONG (2013), "Uncovering Hedge Fund Skill from the Portfolio Holdings They Hide", *Journal of Finance*, 68 (2), 739-783.
- CHEVALIER, Judith and Glenn ELLISON (1997), "Risk Taking by Mutual Funds as a Response to Incentives", *Journal of Political Economy*, 105, 1167-1200.

- CREMER, Jacques (1995), "Arm's Length Relationships", *Quarterly Journal of Economics*, 110(2), 275-95.
- FOX, Justin and Richard V. WEELDEN (2012), "Costly Transparency", *Journal of Public Economics*, 96, 142-150.
- HERMALIN, Benjamin (1993), "Managerial Preferences Concerning Risky Projects", *Journal of Law, Economics and Organization*, 9, 127-135.
- MASKIN, Eric and Jean TIROLE (2004), "The politician and the judge", *The American Economic Review*, 94(4), 1034-1054.
- PALOMINO, Frédéric, and Andrea PRAT (2003), "Risk Taking and Optimal Contracts for Money Managers" *RAND Journal of Economics*, 34, 113-37.
- PRAT, Andrea (2005), "The Wrong Kind of Transparency", *The American Economic Review*, 95(3), 862-877.
- RAJAN, Raghuram (January 2008), "Bankers' Pay Is Deeply Flawed", *Financial Times*, <http://www.ft.com/cms/s/0/18895dea-be06-11dc-8bc9-0000779fd2ac.html>, (09/01/2008).
- SHI, Zhen (2012), "The Impact of Portfolio Disclosure on Hedge Fund Performance, Fees, and Flows". *Working paper, Arizona State University*.
- SIRRI, Eric R. and Peter TUFANO (1998), "Costly Search and Mutual Fund Flows", *Journal of Finance*, 53, 1589-1622.