Money Doctors

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June 11, 2012

Abstract

We present a new model of money management, in which investors delegate portfolio management to professionals based not only on performance, but also on trust. Trust in the manager reduces an investor's perception of the riskiness of a given investment, and allows managers to charge higher fees to investors who trust them more. Money managers compete for investor funds by setting their fees, but because of trust the fees do not fall to costs. In the model, 1) managers consistently underperform the market net of fees but investors still prefer to delegate money management to taking risk on their own, 2) fees involve sharing of expected returns between managers and investors, with higher fees in riskier products, 3) managers pander to investors when investors exhibit biases in their beliefs, and do not correct misperceptions, and 4) despite long run benefits from better performance, the profits from pandering to trusting investors discourage managers from pursuing contrarian strategies relative to the case with no trust. We show how trust-mediated money management renders arbitrage less effective, and may help destabilize financial markets.

[1] The authors are from CREI and UPF, Harvard University, and University of Chicago, respectively. We are grateful to Charles Angelucci, Nick Barberis, John Campbell, Roman Inderst, Sendhil Mullainathan, Lubos Pastor, Raghuram Rajan, Jonathan Reuter, Josh Schwartzstein, Charles-Henri Weymuller, Luigi Zingales and Yanos Zylberberg for extremely helpful comments.
Disclosure: Shleifer was a co-founder of LSV Asset Management, a money management firm, but is no longer a shareholder in the firm. Shleifer's wife is a partner in a hedge fund, Bracebridge Capital. Vishny was a co-founder of LSV Asset Management. He retains an ownership interest.

1. Introduction

It has been known since Jensen (1968) that professional money managers underperform passive investment strategies net of fees. Gruber (1996) estimates average mutual fund underperformance of 65 basis points per year; French (2008) updates this to 67 basis points per year. Even such poor performance of mutual funds is only the tip of the iceberg. Many investors pay substantial fees to brokers and investment advisors, who then direct them toward the mutual funds that underperform (Bergstresser et al. 2009, Chalmers and Reuter 2012, Del Guercio, Reuter and Tkac 2010, Hacketal, Haliasos, and Japelli 2011). Once all fees are taken into account, some studies find 2 percent investor underperformance relative to indexation[2]. This evidence is difficult to reconcile with the view that investors are comfortable investing in a low fee index fund on their own, but nonetheless seek active managers to improve performance.

In fact, performance seems to be only part of what money managers seek to deliver. Many leading investment managers and nearly all registered investment advisors advertise their services based not on past performance but on trust, experience, and dependability (Mullainathan et al. 2008). Some studies of mutual funds note that investors hiring advisors must be obtaining some "intangible benefits" or "babysitting". In this paper, we take this perspective seriously, and propose an alternative view of money management, based on the idea that investors do not know much about finance, are too nervous or anxious to take risk on their own, and hence hire money managers and advisors to help them invest. Managers may have skills such as knowledge how to diversify or even ability to earn an alpha, but *in addition* they provide investors with peace of mind. Just as most patients needing care visit a doctor they trust, investors hire managers they trust to help them make risky investments. We focus on individual investors, but similar issues apply to institutional investors (Lakonishok et al. 1992).

[2] Berk and Green (2004) argue that low net of fee alphas result from competition among investors for access to more skilled managers, who charge higher fees. This theory is challenging to reconcile with negative average after-fee performance, with large fees many investors pay to brokers and advisors who help choose funds, and with the evidently negative relationship between fees and gross-of-fees performance (e.g., Gil-Bazo and Ruiz-Verdu 2009).

Critically, we do not think of trust as deriving from past performance. Rather, trust describes confidence in the manager, based on personal relationships, familiarity, persuasive advertising, connections to friends and colleagues, communication and schmoozing. There are (at least) two distinct aspects of such confidence and trust. The first, stressed by Guiso, Sapienza, and Zingales (2004, 2008) and Georgarakos and Inderst (2011), sees trust as security from expropriation or theft. Another aspect of trust, emphasized here, has to do with reducing investor anxiety about taking risk. With US securities laws, most investors in mutual funds probably do not fear that their money will be stolen; rather, they want to be "in good hands."

We think of money doctors as families of mutual funds, registered investment advisors, financial planners, brokers, bank trust departments, and others who give investors confidence to take risks. Some investors surely do not need advice, and invest on their own, although research by Calvet, Campbell, and Sodini (2007) suggests that many such investors do not diversify properly. But many other investors, ranging from relatively poor employees asked to allocate their defined contribution pension plans (Chalmers and Reuter 2012) to millionaires hiring "wealth managers," rely on experts to help them take risk. And just as doctors guide patients toward treatment, and are trusted by patients even when providing routine advice identical to that of other doctors, in our model money doctors help investors take risk and are trusted to do so even when their advice is costly, generic, and occasionally self-serving.

We present a model of the money management industry in which the allocation of assets to managers is mediated by trust. We model trust as reducing the utility cost for the investor of taking risk, much as if lower anxiety reduces the investors' subjective perception of the risk of investments. Managers differ in how much different investors trust them: an investor who trusts a manager a lot perceives risky investments guided by this manager as substantially less risky. This simple formulation has significant implications. Other things equal, an investor would prefer to make a given investment with the manager he trusts most, enabling this manager to charge the investor a higher fee and still keep him. Even if managers compete on fees, these fees do not fall to cost, and substantial market segmentation remains. In fact, in our model fees

are proportional to risks taken, with higher fees in riskier asset classes. Net of fees, investors consistently underperform the market, but experience less anxiety and take more risk than they would investing on their own. A very simple formulation based on trust thus delivers some of the basic facts about money management that the standard approach finds puzzling.

In this framework, under rational expectations managers charge high fees but at the same time enable investors to take more risk. Investors are better off. There are no distortions in investment allocation between asset classes. Interesting issues arise, however, when investors do not hold rational expectations, and perhaps want to invest in hot asset classes or new products they feel will earn higher returns. Empirical evidence supports the role of investor extrapolation in financial markets (e.g., Lakonishok, Shleifer and Vishny 1994, Hurd and Rohwedder 2012, Yagan 2012). Would trusted money managers correct investors' errors, or pander to their beliefs? In our model, managers have a strong incentive to pander, precisely because such pandering gets investors who trust the manager to invest more, and at higher fees. Trust-mediated professional money management does not work to correct investor biases. In equilibrium, money managers let investors chase returns by proliferating product offerings.

We also consider the dynamics of professional money management, and in particular the possibility that, over time, funds flow to better performing managers (Chevalier and Ellison 1999). In this context, we ask whether professional managers have an incentive to pursue contrarian strategies and try to beat the market. We present a dynamic model in which managers have the ability to earn an alpha, and are rewarded for doing so by attracting fund flows. We nevertheless find that these performance incentives are significantly moderated in a model with trust, because a manager must trade off the benefits of attracting future funds due to his superior performance against the cost of discouraging current clients who want to invest in hot sectors. Keeping the current clients might be more lucrative than trying to attract new ones, especially when manager-specific trust is important. This is because manager-specific trust: i) allows managers to charge high fees in hot assets, and ii) reduces investor mobility to better performing managers. Even in a dynamic model, then, we see strong pressures to pander to

client biases, modest flows of funds toward better-performing managers, and only a weak incentive to bet against market mispricing. This result has implications for the effectiveness of professional arbitrage, market efficiency, and stability of financial markets.

Our paper connects with several areas of research. Since Putnam (1993), economists have studied the role of trust in shaping economic and political outcomes (e.g., Knack and Keefer 1997, La Porta et al. 1997). In finance, this research was pursued most productively by Guiso, Sapienza, and Zingales (2004, 2008) who show that trust in institutions encourages individuals to participate in financial markets, whether by opening checking accounts, seeking credit, or investing in stocks. We take a related perspective, except that we stress the anxiety-reducing aspects of manager-specific trust, rather than trust in the system.

In addition to voluminous research on poor performance of equity mutual funds, some papers document net of fees underperformance by bond mutual funds (Blake, Elton and Gruber 1993, Bogle 1998) and hedge funds (Asness, Krail, and Liew 2001). An important finding of this work is that fees are higher in riskier (higher beta) asset classes, so that managers appear to be paid for taking market risk. One would not expect this feature in a standard model of delegated management, in which only superior performance – alpha – should be rewarded. Trust, however, naturally accounts for this phenomenon.

Following Campbell (2006), financial economists have considered the nature and the consequences of investment advice. Some of these studies suggest that investment advice is so poor that managers chosen by the advisors underperform the market even before fees. Gil-Bazo and Ruiz-Verdu (2009) find that the highest fees are charged by managers with the worst performance. This finding is consistent with a central prediction of our model that managers cater to investor biases. An audit study by Mullainathan, Noeth, and Schoar (2012) similarly finds that advisors direct investors toward hot sector funds, pandering to their extrapolative tendencies. In contrast, unbiased investment advice is ignored (Bhattacharya et al. 2012).

Our study of incentives in money management follows, but takes a different approach from, the traditional work on performance incentives (e.g, Chevalier and Ellison 1997, 1999). Two recent papers that address some of the issues we focus on here, but in the traditional context in which reputations are shaped entirely by performance, are Guerrieri and Kondor (2011) and Kaniel and Kondor (2011). Closer to our work are the papers by Inderst and Ottaviani (2009, 2012), which focus on distorted incentives to sell financial products arising both from the difficulties of incentivizing salesmen to sell appropriate products and from actual kickbacks. Hackethal, Inderst, and Meyer (2011) find empirically that investors who rely more heavily on advice have a higher volume of security transactions and are more likely to invest in products which salesmen are incentivized to sell. Our focus is on the incentives of the money management organization itself when its clients choices are mediated by trust.

Several papers ask whether agents have incentives to conform or be contrarian. Outside of finance, Prendergast (1993), Morris (2001), and Mullainathan and Shleifer (2005) present models in which agents pander to principals. In finance, a large literature starting with Scharfstein and Stein (1990) and Bikhchandani, Hirshleifer, and Welch (1992) describes the incentives for herding and conformism. The novel feature of our model is its focus on trust as distinct from performance in shaping incentives.

In section 2 we present our basic model of trust and delegation. In section 3, we solve the model and show that even the simplest specification delivers some of the basic facts about the industry. In section 4 we consider money managers' incentives to pander to their clients in a static model with no benefits to managers of superior performance. In section 5, we study a dynamic model in which managers can earn an alpha, leading investors to update their estimates of managerial skill based on past performance. We show that incentives to pander remain strong even in that model. Section 6 discusses some aggregate implications of our model.

2. The Basic Setup

There are two periods $t = 0,1$ and a mass 1 of investors who enjoy consumption at $t = 1$ according to a utility function that we specify below. At $t = 0$, each investor is endowed with one unit of wealth. There are two assets. The first asset is riskless (e.g. treasuries), and yields $R_f > 1$ at $t = 1$. The second asset is risky (e.g., equities or bonds): it yields an excess return R over the riskless asset, but has a variance of σ. The risky asset is in perfectly elastic supply and riskless borrowing is unrestricted. One can view this setup as a small open economy where the supply of assets adjusts to demand. We are thus looking at the portfolio choice problem by taking asset prices and expected returns as given.

At $t = 0$, each investor i invests the shares x_i and $1- x_i$ of his wealth in the risky and riskless asset, respectively. The investor can perfectly access the riskless asset but not the risky asset. The reason is that the risky asset requires management (e.g., to create a diversified portfolio) and the investor lacks the necessary expertise. Without expert money managers, the investor cannot take risk. This implies, in particular, that even an index fund investment requires a manager or an advisor; the investor does not want to do it on his own. The assumption of no homemade risk taking might seem too strong, but it enables us to make the points most clearly[3]. It also sharpens the analogy to medicine, in which patients seek medical advice for all but the simplest and safest treatments.

To implement the risky investment x_i the investor hires one of two managers, A or B (for simplicity he cannot hire both). Our key assumption is that delegation requires investor trust. We capture investor i's lack of trust toward manager j = A, B by a parameter $a_{i,j} \geq 1$ that multiplies the investor's baseline risk aversion. That is, the cost to an investor i of bearing one unit of risk with manager j is given by $a_{i,j}/2$. This idea is formalized by assuming that each investor i has the following quadratic utility function:

[3] One way to formally model this assumption is to assume $a_{i,i} = \infty$, i.e. that investors have infinite anxiety when taking risks on their own (perhaps because they are very uncertain – relative to managers – on how to build risky portfolios or how to react to market events). It is not important that investors do not take any risk on their own, but rather that they take more risk with a manager than on their own.

$$u_{i,j}(c) = \mathbb{E}(c) - \frac{a_{i,j}}{2}\mathrm{Var}(c).$$

One can view $a_{i,j}$ as the anxiety suffered by investor *i* for bearing risk with manager *j*. This specification is thus very different from the standard approach to the delegation problem, in which investors seek advice to achieve a better risk return combination rather than to gain some comfort or confidence in taking risk.

Half of the investors trust A more than B, the other half trust B more than A. The anxiety suffered by investor *i* for bearing risk with his most trusted manager is equal to *a*. The anxiety suffered by the same investor for bearing risk with his least trusted manager is equal to a/τ_i, where $\tau_i \in [0,1]$. That is, an "A-trusting" investor *i* suffers anxiety $a_{i,A} = a$ with manager A and $a_{i,B} = a/\tau_i$ with manager B; a "B-trusting'' investor *i* suffers anxiety $a_{i,A} = a/\tau_i$ with manager A and $a_{i,B} = a$ with manager B. Parameter τ_i captures the relative trust of investor *i* in his *least* trusted manager, measuring the extent to which the two managers are substitutes from the standpoint of investor *i*. An investor with $\tau_i = 1$ views the two managers as perfect substitutes, while an investor with $\tau_i < 1$ views his least trusted manager as an imperfect substitute for the most trusted one. In particular, when $\tau_i = 0$, an investor suffers infinite anxiety when investing with his least trusted manager.

Investors are heterogeneous in the extent to which they trust one manager more than the other. In particular, in the population of investors τ_i is uniformly distributed on $[1-\theta, 1]$. Differential trust τ_i is independent of whether an investor trusts A or B more. Parameter $\theta \in [0,1]$ captures the dispersion of trust in the population: the higher is θ, the greater is the number of investors who trust one manager substantially more than the other. At $\theta = 0$, investors are homogenous in the sense that they trust the two managers equally: this will be an important benchmark case of Bertrand competition. With dispersion in trust levels, managers have some market power with respect to investors who trust them more, and would optimally charge fees above zero even in a competitive market. Trust is permanent and does not depend on or change with returns.

At $t = 0$, the two money managers compete in fees to attract clients. Each manager j = A, B optimally chooses what fee f_j to charge per unit of assets managed. Based on the fees simultaneously set by managers, each investor optimally decides how much to invest in the risky asset and under which manager. At $t = 1$, returns are realized and distributed to investors.

Figure 1: Timeline

3. Equilibrium fees and the size of money management

3.1 The investor's portfolio problem

The expected utility of an investor i delegating to manager j an amount $x_{i,j}$ of risky investment is equal to:

$$U(x_{i,j}, f_j) \equiv R_f + x_{i,j}(R - f_j) - \frac{a_{i,j}}{2} x_{i,j}^2 \sigma.$$

The investor's excess return net of the management fee is equal to $R - f_j$. By investing in the riskless asset, the investor obtains no excess return and pays no fees.

Given the fee f_j, the investor chooses a portfolio $x_{i,j}$ maximizing $U(x_{i,j}, f_j)$. This portfolio is given by:

$$\hat{x}_{i,j} = \frac{(R - f_j)}{a_{i,j}\sigma}. \quad (1)$$

The optimal portfolio is riskier ($\hat{x}_{i,j}$ is higher) if the investor hires a more trusted manager (having lower $a_{i,j}$). This effect plays a critical role in determining the fee structure. The utility obtained by investor i under manager j is then equal to:

$$U(\hat{x}_{i,j}, f_j) \equiv R_f + \frac{(R - f_j)^2}{2a_{i,j}\sigma}.$$

The investor chooses A over B provided $U(\hat{x}_{i,A}, f_A) \geq U(\hat{x}_{i,B}, f_B)$, which is equivalent to:

$$\frac{a_{i,B}}{a_{i,A}} \geq \frac{(R - f_B)^2}{(R - f_A)^2}\,. \tag{2}$$

The investor chooses manager A over manager B provided the investor's relative trust for A is sufficient to compensate for the relative excess return (net of fee) promised by B. Because of constant absolute risk aversion, higher variance σ of investment reduces overall risk taking but not the choice between A and B. That choice is pinned down only by the differential anxiety and excess return obtained by the investor with the two managers.

3.2 Management fees and risk taking

Denote by $x^*_{i,j}$ the optimal amount invested by i under manager j after a manager is optimally selected in light of equation (2). Then, at a fee structure (f_A, f_B), the profit of money manager j charging f_j is equal to:

$$\pi_j(f_A, f_B) = f_j \cdot \int_i x^*_{i,j}\, di\,, \tag{3}$$

which is the product of the fee f_j and assets under management. The profits of manager j depend on his competitor's fee f_{-j} via the assets under management.

Let us derive the profits of A. If A charges a higher fee than B, namely if $f_A \geq f_B$, then the right hand side of Equation (2) is above one. Manager A does not attract any B trusting investors (for whom $a_{i,B}/a_{i,A} < 1$); he can only attract some A-trusting ones. These are the A-trusting investors who have sufficiently low trust in B that they prefer to stick with A despite the

higher fee, and they are identified by the condition $\tau_i \leq (R - f_A)^2/(R - f_B)^2$. In this case, assets under A's management are equal to:

$$\frac{(R - f_A)}{a\sigma} \cdot \int_{1-\theta}^{\max[1-\theta,(R-f_A)^2/(R-f_B)^2]} \frac{1}{2\theta} d\tau. \tag{4}$$

Expression (4) is the product of the wealth invested by each of the A-trusting investors times the measure of them that chooses manager A. When $f_A \geq f_B$, the profits of manager A are the management fee f_A times the wealth under management in Equation (4).

Consider now the case in which A charges a lower fee than B, namely $f_A < f_B$. Because the right hand side of Equation (2) is below one, manager A attracts all A-trusting investors as well as some B-trusting investors. The latter investors are those with sufficiently high trust in A, namely with $\tau_i \geq (R - f_B)^2/(R - f_A)^2$. By Equation (1), each B-trusting investor places under A's management only a fraction τ_i of the wealth invested under A by A-trusting investors. In this case, assets under A's management are equal to:

$$\frac{(R - f_A)}{a\sigma} \cdot \left[\frac{1}{2} + \int_{\max[1-\theta,\ (R-f_B)^2/(R-f_A)^2]}^{1} \tau \cdot \frac{1}{2\theta} d\tau\right]. \tag{5}$$

Expression (5) is the sum of the assets invested by A-trusting investors plus the assets invested by the B-trusting investors who found it optimal to switch to A. When $f_A > f_B$, the profits of A are equal to the product of the management fee f_A and the assets under management in (5).

Putting this together, for any (f_A, f_B), the profits $\pi_A(f_A, f_B)$ of manager A are equal to:

$$\begin{cases} f_A \cdot \dfrac{(R - f_A)}{a\sigma} \cdot \dfrac{\max[1-\theta, (R-f_A)^2/(R-f_B)^2] - (1-\theta)}{2\theta} & if\ \ f_A \geq f_B \\ f_A \cdot \dfrac{(R - f_A)}{a\sigma} \cdot \left[\dfrac{1}{2} + \dfrac{1 - \max[1-\theta, (R-f_B)^2/(R-f_A)^2]^2}{4\theta}\right] & if\ \ f_A < f_B \end{cases}. \tag{6}$$

The profit of manager A increases in the fee charged by B, since a higher f_B reduces investors' net excess return under B, thus increasing A's clientele. In contrast, a higher f_A exerts an ambiguous effect on the profits of A: on the one hand it increases the surplus extracted by the

manager, on the other hand it reduces assets under management (by reducing both investment by his clients on the intensive margin and the size of his clientele on the extensive margin).

The profits of manager A increase in the risky asset's gross excess return: a higher R encourages any investor to put more money under management, which increases the preference of A-trusting investors for A. Indeed, manager A allows these investors to take more risk than manager B by reducing their anxiety, which is particularly valuable when the excess return is high. Second, a higher dispersion of trust θ exerts an ambiguous effect on profits: it increases them when A offers a lower net return than B ($f_A \geq f_B$), but decreases them otherwise.

By the same logic, at any (f_A, f_B), the profit $\pi_B(f_A, f_B)$ of manager B is equal to:

$$\begin{cases} f_B \cdot \dfrac{(R - f_B)}{a\sigma} \cdot \left[\dfrac{1}{2} + \dfrac{1 - \max[1 - \theta, (R - f_A)^2/(R - f_B)^2]^2}{4\theta}\right] & if \;\; f_A \geq f_B \\ f_B \cdot \dfrac{(R - f_B)}{a\sigma} \cdot \dfrac{\max[1 - \theta, (R - f_B)^2/(R - f_A)^2] - (1 - \theta)}{2\theta} & if \;\; f_A < f_B \end{cases}, \qquad (7)$$

The properties of (7) are analogous to those just discussed in the case of Equation (6).

Given profits $\pi_A(f_A, f_B)$ and $\pi_B(f_A, f_B)$, a competitive equilibrium in pure strategies is a Nash Equilibrium in which each manager j optimally sets his fee f_j by taking his competitor's equilibrium fee f_{-j}^* as given. Formally, an equilibrium is a profile of fees (f_A^*, f_B^*) such that:

$$\begin{aligned} f_A^* &\in argmax_{f_A} \;\; \pi_A(f_A, f_B^*) \\ f_B^* &\in argmax_{f_B} \;\; \pi_B(f_A^*, f_B) \end{aligned}.$$

There is a unique competitive equilibrium in our model. This equilibrium is symmetric (owing to the symmetry of the managers' profit functions), and is characterized below.

Proposition 1 *In the unique, symmetric, equilibrium of the model, fees are equal to:*

$$f_A^* = f_B^* = \left(\frac{\theta}{1 + \theta}\right) \cdot \frac{R}{2}. \qquad (8)$$

Each investor delegates his portfolio to his most trusted manager and the total value of assets under management (which is equally split between A and B) is given by:

$$\int_i \left(x_{i,A}^* + x_{i,B}^*\right) di = \left(\frac{2+\theta}{1+\theta}\right) \cdot \frac{R}{2a\sigma}. \quad (9)$$

The equilibrium fee charged by each manager is a constant fraction of the excess return *R.* Intuitively, the manager extracts part of the expected surplus *R* that he enables the investor to access. The fraction of excess return extracted by the manager increases in the dispersion of trust θ. When $\theta > 0$, investors are willing to take more risk with their most trusted manager than with the least trusted one (or on their own). This imperfect substitutability in anxiety allows both managers to charge positive fees. When the dispersion of trust becomes maximal (i.e., $\theta = 1$), the two managers have huge market power and extract 1/4 of the excess return from their investors. When, in contrast, investors trust both managers equally, $\theta = 0$, investors would take the same amount of risk with both managers. Perfect competition between these managers drives fees to zero. The model predicts that fees should be higher in sectors where dispersion of trust is higher, perhaps owing to the absence of a market index or more generally of established measures of risk. Higher variance σ exerts only a second order effect on investor utility, so fees are independent of it.

In our model, management fees are not a compensation for abnormal returns (alpha) but rather a way to share risky returns (beta) between the investor and the manager. The gross return of the managed portfolio equals the market excess return *R*, but the net return exhibits a negative alpha once fees are netted out. The model thus immediately delivers the most fundamental fact about delegated portfolio management, namely that professional managers earn negative market-adjusted returns net of fees. The reason is that investors are willing to pay for anxiety reduction rather than for alpha.

Consider finally the size of the money management industry. Potentially, the assets under management may be higher than the initial wealth of investors, which in the aggregate is

normalized to 1. This case occurs when the expected excess return R is so high that investors wish to lever up, borrowing at the riskless rate (by setting $x_{i,j}^{*} > 1$) in order to expand the scale of their risk taking. The size of the money management industry increases in the excess return R, decreases in the general level of distrust or anxiety a, and decreases in the dispersion of trust θ. A higher R increases the surplus generated by the risky investment, increasing risk taking, but also increases management fees, which decrease risk taking. The former effect is stronger, so the higher excess return R boosts the size of the industry. A higher general level of trust (i.e., a lower a) brings more assets out of the mattresses and into the financial system, a finding documented empirically by Guiso, Sapienza, and Zingales (2004, 2008). At the same time, higher variance of trust θ increases money managers' market power, increases management fees, and thereby reduces the size of the industry. Conditional on investors' trust in their preferred money manager, assets under management are too small owing to management fees. Still, in this simple model money management has a valuable social role:

Corollary 1 *The presence of money managers improves investors' welfare relative to a world in which everyone invests on his own. The social benefit of money management is equal to:*

$$\frac{R^2}{8a\sigma}\left(\frac{2+\theta}{1+\theta}\right)^2.$$

The benefit of money management is to increase risk taking, and this benefit is larger the higher is the risk adjusted return R/σ, the higher is average trust a, and the lower is θ.

The basic model might thus help shed light on the central finding of the literature on financial advice, namely that many investors seek it despite extremely high cost and poor investment performance (e.g., Bergstresser et al. 2009, Chalmers and Reuter 2012, Del Guercio et al. 2010). In our view, investors see themselves as better off with the advice than without it since advice alleviates their anxiety about risk and enables them to take more risk. Chalmers and Reuter (2012) actually show empirically that, among the investors predicted based on their

demographic characteristics to use financial advisors, those who actually use them hold portfolios with sharply higher betas (.4 higher) than those who do not use advice. As investors are increasingly asked to choose how to allocate their savings, rather than participate in, say, defined benefit plans, they need to make choices about risky investments or just put money in the bank. Financial advice in our model helps them take risk, even when it is generic (or worse). With positive expected returns to risk taking, advice makes investors better off.

4. Multiple Financial Products

So far, we allowed money managers to offer investors a single, well diversified, risky portfolio (e.g., the S&P 500). In reality, institutions such as mutual fund families, financial planners, and brokerage firms offer a broad range of assets and sector-specific investment options and investors individually choose how much to invest in each of them. To understand this practice, we allow money managers to break down their product line into specialized asset classes and then let investors choose among them. These asset classes are also portfolios assembled by the manager - so trust is still important - but they individually are not fully diversified (e.g., they consist of only industrial or high-tech stocks).

We examine this model under two alternative assumptions. First, in section 4.1, we consider the case of rational expectations, so that investors and managers accurately anticipate the distribution of future returns. The questions we ask in this setup are: first, what is the relationship between the fee charged for each risky asset and the asset's expected return? And second, does trust-mediated money management distort wealth allocation across assets?

In section 4.2, we revisit the issue of investment distortions when investors do not hold rational expectations, but money managers do. For example, investors might extrapolate returns on some assets and chase categories that previously performed well, or seek to invest in new products. Extrapolation has been discussed extensively in behavioral finance, both with respect to individual securities and markets (e.g., Lakonishok, Shleifer, and Vishny 1994, Barberis,

Shleifer, and Vishny 1998), and with respect to mutual funds (e.g., Lamont and Frazzini 2008). In Section 4.2, we allow for such investor misperceptions and ask whether money managers find it profitable to pander to investor tastes, or to choose fees to correct their errors. This approach also allows us to address what appears to be the empirically relevant possibility of investment advisors underperforming passive strategies even before fees (Malkiel 1995, Gil-Bazo and Ruiz-Verdu 2009, Del Guercio et al 2010), as well as to study the determinants of product proliferation in the money management industry.

The formal structure works as follows. There are two uncorrelated risky assets, 1 and 2. Asset z = 1, 2 yields excess return R_z with variance σ_z. Without loss of generality, we assume that asset 1 has lower risk and return than asset 2, namely $R_2 \geq R_1$ and $\sigma_2 \geq \sigma_1$. Let $x_{z,i}$ denote the wealth invested by a generic investor i in asset z = 1, 2. We then have:

Lemma 1 *For any total amount* $(x_{1,i} + x_{2,i})$ *of risky investment, investors' optimal portfolio places a relative share* $\frac{x_{1,i}}{x_{2,i}} = \left(\frac{R_1}{\sigma_1}\right) / \left(\frac{R_2}{\sigma_2}\right)$ *of wealth in asset 1 relative to asset 2.*

This optimal portfolio represents the normative benchmark of our analysis, under the assumptions of rational expectations and no management fees. In this respect, it is useful to view the excess return R and the variance σ of the risky asset in the previous section as those delivered by the optimal portfolio of Lemma 1.

4.1 The link between fees and risk under rational expectations

Money managers offer assets 1 and 2 separately, and at different fees, to investors. We seek to describe the equilibrium fee structure and the resulting pattern of risk taking. At t = 0, each manager j = A, B optimally sets the fees $(f_{1,j}, f_{2,j})$ for investing in asset 1 and 2, respectively. Given fees $(f_{1,j}, f_{2,j})$, each investor i decides whether to invest in asset z = 1, 2 under manager A or B and how much to invest in each asset. By so doing, investors choose - in a decentralized fashion - the composition of their portfolios. Managers affect portfolios via the

equilibrium fee structure $(f_{1,j}, f_{2,j})$. We assume that investors correctly perceive the return of different assets, but relax this assumption in Section 4.2.

Denote by $x_{i,j,z}$ investor *i*'s optimal investment in asset *z* = 1, 2 under manager *j* = A, B. Given the management fee $f_{z,j}$, the analysis of Section 3 implies that the investor chooses:

$$\hat{x}_{i,j,z} = \frac{(R_z - f_{z,j})}{a_{i,j}\sigma_z}. \tag{10}$$

The investor places more wealth in the asset having the highest risk adjusted excess return (net of fees). With this investment strategy, the analysis of Section 3 immediately implies that a generic investor *i* delegates his investment in asset *z* to manager A (rather than B) provided the utility he earns from holding *z* is higher under manager A. This is equivalent to:

$$\frac{a_{i,B}}{a_{i,A}} \geq \frac{(R_z - f_{z,B})^2}{(R_z - f_{z,A})^2}, \tag{11}$$

Expression (11) says that the relative trust of investor *i* in manager A is sufficient to compensate for the relative excess return promised by B on risky asset *z*.

Define $x^*_{i,j,z}$ as the optimal investment after (11) is taken into account. Then, at *t* = 0, money managers set their fees $(f_{1,A}, f_{2,A}, f_{1,B}, f_{2,B})$. The profit of money manager *j* is equal to:

$$\pi_j(f_{1,A}, f_{2,A}, f_{1,B}, f_{2,B}) = f_{1,j} \cdot \int_i x^*_{i,j,1} + f_{2,j} \cdot \int_i x^*_{i,j,2}, \tag{12}$$

which is the sum of the fees obtained from assets under management in the two risky assets.

Given the additive objective function in (12), manager A maximizes the sum of two profit functions – one for asset 1, the other for asset 2 – each of which is identical to that in Equation (6), but defined for a different return-variance configuration. The same principle holds for manager B, whose overall profit function adds two asset-specific versions of Equation (7). By solving for the Nash equilibrium of this game, we can characterize the market equilibrium:

Proposition 2 *In the unique, symmetric, competitive equilibrium fees are equal to:*

$$f_{z,A}^{*} = f_{z,B}^{*} = \left(\frac{\theta}{1+\theta}\right) \cdot \frac{R_z}{2}. \tag{13}$$

Investors take risk only with their most trusted manager and they select asset shares:

$$\frac{x_{i,j,1}^{*}}{x_{i,j,2}^{*}} = \frac{R_1/\sigma_1}{R_2/\sigma_2}, \qquad for\ all\ i,j. \tag{14}$$

The total amount of assets managed (equally split between A *and* B*) is equal to:*

$$\int_i \sum\nolimits_{z=1,2} \left(x_{i,A,z}^{*} + x_{i,B,z}^{*}\right) di = \left(\frac{2+\theta}{1+\theta}\right) \cdot \sum\nolimits_{z=1,2} \frac{R_z}{2a\sigma_z}. \tag{15}$$

As in Section 3, manager specific trust ($\theta > 0$) allows money managers to get paid for taking risk, and in particular to extract a fixed share of the excess return of any asset they offer to investors. As a consequence, manager specific trust helps explain the fact that money managers charge higher unit fees for investing in high return-high risk asset classes. For example, Bogle (1998) finds that higher expense ratio bond funds tend to offset their higher fees by taking both more credit risk and more duration risk. Our model further predicts that the link between fees and return should be steeper when trust dispersion θ is higher. Perhaps this prediction might shed light on incentive fees in hedge funds and private equity funds, where trust plays such a fundamental role in mediating investments.

When investors correctly perceive the return of different assets, they choose the optimal portfolio mix of Lemma 1 (see Equation (16)). The size of the money management industry does not change relative to the case in which managers offer the portfolio of Lemma 1, because under the sharing rule of Equation (13) the total fee paid by investors for taking risk is the same constant share of the portfolio's expected return. As we show next, these results change when investors misperceive the returns of different assets.

4.2 Investors' misperceptions, product proliferation and pandering

Suppose now that investors have potentially erroneous (but homogeneous) beliefs concerning the excess returns created by the two risky assets. The perception of variances is correct. Investors believe that the excess return of asset z is $R_{z,e}$, where subscript e denotes investors' expectation. Beliefs are erroneous whenever $R_{z,e} \neq R_z$ for at least one asset z = 1, 2. We focus on the case in which investors invert the ranking among excess returns, namely $R_{1,e} \geq R_{2,e}$. We refer to asset 1 as the "hot asset" and asset 2 as the "cold asset". One justification for this assumption is that after observing a streak of relatively high returns in asset 1, investors become too optimistic about it (Barberis, Shleifer, and Vishny 1998). This implies, owing to mean reversion, that asset 2 is actually the one in which the investment is most profitable. The best strategy from the investor's viewpoint is contrarian. In this section, we consider the manager's static incentives; in Section 5 we examine the possibility that superior performance attracts more funds under management.

To extend Proposition 2 to the case in which investors misperceive excess returns, it suffices to note that risk taking by investors in Equation (10) and their choice of manager in Equation (11) are shaped by the perceived return $R_{z,e}$ of asset z and not by its true return R_z. As a consequence, management fees are equal to a constant fraction of investors' perceived return:

$$f_{z,A}^* = f_{z,B}^* = \left(\frac{\theta}{1+\theta}\right) \cdot \frac{R_{z,e}}{2}, \tag{16}$$

and investors allocate their wealth across assets according to their perceived returns, namely:

$$\frac{x_{i,j,1}^*}{x_{i,j,2}^*} = \frac{R_{1,e}/\sigma_1}{R_{2,e}/\sigma_2}.$$

In this situation, the following property holds:

Corollary 2 *In the unique, symmetric, equilibrium prevailing when managers offer the two assets separately, fees are higher for investing in the hot asset than in the cold asset and investors invest too much in hot assets relative to the case of Lemma* 1.

Because managers optimally extract a constant fraction of an asset's perceived return, total fees are higher for "hot" assets, such as growth stocks as compared to value stocks, or specialty funds compared to diversified funds, but investors still want to disproportionally invest in them. Money managers maximize their profits by encouraging, or at least not discouraging, investors to take excessive risks in hot asset classes. In this sense, competition incentivizes money managers to pander to investors' biases rather than to correct them.

Money managers could in principle correct investor misperceptions by suitably choosing their fees so as to effectively debias investors. To do so, managers would need to set a higher fee on the hot asset class so that investors choose to hold the two assets in the proportions dictated by Lemma 1. Equivalently, money managers could directly offer investors the optimal portfolio of Lemma 1 rather than the two assets separately. It is evident from the above analysis that money managers do not have the incentive to do so. To see why, consider the managers' equilibrium profits. Given the perceived returns $(R_{1,e}, R_{2,e})$, a manager's equilibrium profit is proportional to the average squared perceived return across the two assets:

$$\frac{1}{2}\sum_{z=1,2}\frac{R_{z,e}^2}{\sigma_z}. \tag{17}$$

Intuitively, a higher perceived return on asset class z benefits the manager in two multiplicative ways. First, it increases the fee charged by the manager. Second, it increases investors' risk taking and thus the asset base over which the fee is collected. These effects imply that a manager's profits are quadratic in each expected return $R_{z,e}$.

Denote by $s_{z,e} = R_{z,e}/\sqrt{\sigma_z}$ the Sharpe ratio perceived by investors for asset $z = 1,2$. We can rewrite the profit in Equation (17) as:

$$E(s_{z,e})^2 + var(s_{z,e}), \tag{18}$$

where mean and variance are computed by weighting each asset by 1/2. The manager benefits from giving freedom of choice to investors owing to both the average Sharpe ratio and its variance. The higher is the average Sharpe ratio that investors think they can expect to attain by choosing assets, the greater is the risk they take and the higher is the manager's income. In addition, for a given average Sharpe ratio, the manager benefits from the variance of Sharpe ratios across assets arising from the potential volatility of investor sentiment. Such volatility enables managers to extract very high fees from investors chasing hot asset classes. From the viewpoint of the manager, although chasing returns causes under-investment in cold assets, it is more than offset by the greater risk taking and by the greater fees charged in hot assets.

Corollary 2 might help account for a great deal of evidence mentioned in the introduction about poor performance of mutual funds, their high fees, and the negative relationship between performance and high fees. Poor performance in our model results from investing in overvalued assets, which investors prefer when they form extrapolative expectations. Such a portfolio allocation in turn enables managers or advisors to charge higher fees. In fact, in our model higher fees are precisely a consequence of managers pandering to investor preference for assets that are overvalued. The model thus accounts for the findings of Gil-Bazo and Ruiz-Verdu (2009) and Del Guercio et al (2010). It is also consistent with the evidence of Mullainathan et al. (2012) that advisors direct investors toward hot sector funds.

Both the proliferation of investment options and the prevalence of fund families naturally arise in our model. Mutual fund families can be interpreted as a vehicle to harness trust and increase profits across multiple asset classes (Massa 2003). Proliferation of investment options within asset classes helps raise demand for risky assets (and fees) from trusting investors who chase returns. The same interpretation would apply to private wealth management firms with extensive in-house portfolio capabilities. A trusted advisor has a

strong incentive to offer a wide range of products to his clients, who can then move funds around while paying the advisor's fees.

The central role of fees in the above reasoning highlights the importance of investors' trust for giving managers the incentive to pander to investor biases. It is precisely because trust allows the manager to extract some surplus that he benefits from encouraging investors to chase hot sectors. If markets were highly competitive, then managers would see limited benefits from exploiting investor misperceptions, and might choose to act benevolently and encourage their clients to invest appropriately. The next section formally investigates this issue by considering the case in which investors use ex-post performance of a money manager to infer his ability.

5. Investor extrapolation and pandering by money managers

The previous section showed that in our model money managers have strong incentives to pander to investors' misperception of returns. The static setup of the analysis, however, excludes by assumption the classic motive that managers have for investing in undervalued assets, namely to earn superior returns, establish a reputation for being skilled, and attract clients. We now introduce this motivation for contrarianism into our model by allowing managers to earn a positive alpha and attract funds. We show how trust limits the effectiveness of this force: when θ is higher, the incentive for pandering over contrarianism is stronger, and money doctors are more likely to pander to investors' biases than they are when θ is lower.

To see this formally, suppose that there are three periods $t = 0, 1, 2$ and two generations of one period lived investors, one born at $t = 0$, the other born at $t = 1$. We simplify the analysis by assuming that now managers select portfolios for their clients, rather than using fees to direct portfolio selection. At the cost of greater complexity, we could have continued with the more decentralized framework of the previous sections.

At t = 0, managers choose their fees and select portfolios for the first generation of investors who entrust them their wealth. At t = 1, investors belonging to the new generation are born, they update their beliefs on managerial ability based on interim returns, and choose managers. Returns do not influence trust, so the distribution of trust among investors toward A and B is the same at t = 0 and t = 1. The return of asset z = 1, 2 in period t = 1, 2 under manager j = A, B is now given by:

$$\tilde{R}_{z,j,t} = R_z + V_j + \epsilon_{j,t}. \tag{19}$$

In (19), R_z is the excess return of asset class z, which we assume to be deterministic. V_j captures the ability of manager j to assemble a portfolio of sector z assets, $\epsilon_{j,t}$ is a serially uncorrelated shock capturing the manager's luck in constructing his portfolio. Managers and investors are symmetrically uninformed about V_j, which is normally distributed with mean zero and variance v at t = 0. The distribution of luck $\epsilon_{j,t}$ is also normal, with mean zero and variance η.

The main simplification of Equation (19) is that all volatility in returns is manager-specific. As a consequence, there is no motive for diversifying portfolios across assets z = 1, 2. It is optimal for the investor to invest only in asset 2, because (as previously assumed) it has the highest true expected return. Of course, if a manager panders to investors, he invests all their capital in asset 1, because investors expect asset 1 to deliver the highest return. We could add a diversification motive to the model, but at the cost of added complexity.

We denote by ω_j the portfolio share that manager j invests in asset class 1. Because now the manager also chooses the expected return of the portfolio, it is useful to express fees per unit of return. Formally, we denote by φ_j the fee charged by the manager per unit of return, so that the total fee is equal to $\varphi_j R_j$. This change in notation renders the model more tractable by separating the decision of which return to deliver from its division between the manager and the investor. None of our previous results change under this reformulation. Denote by (φ_j, ω_j)

the fee and portfolio chosen by the manager at t = 0, and by (φ_j', ω_j') the fee and portfolio chosen by the manager at t = 1. Figure 2 represents the timeline of the model.

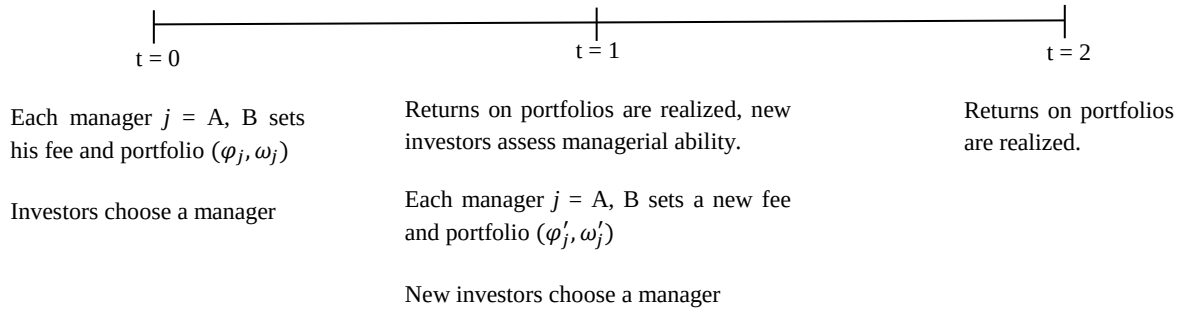

Figure 2: Timeline of the model with managerial skill

Before solving the model, consider how investors assess managerial ability after observing portfolio returns at t = 1. Denote the realized return of manager j at t = 1 by:

$$\tilde{R}_{j,1} = \omega_j \tilde{R}_{1,j,1} + (1-\omega_j)\tilde{R}_{2,j,1} = \omega_j R_1 + (1-\omega_j)R_2 + V_j + \epsilon_{j,1}. \qquad (20)$$

To infer ability, investors: i) compute the difference between the realized return $\tilde{R}_{j,1}$ and their ex-ante expectation of it, and ii) divide that unexpected return into a skill and a luck component. The attribution of unexpected returns to skill or luck is determined with Bayesian updating. We assume throughout that investors do not update their beliefs about assets 1 and 2.[4]

With Bayesian updating, investors allocate a share $v/(v+\eta)$ of a portfolio's unexpected return to the skill of its manager, and the remaining portion to luck. In particular, after observing returns $\tilde{R}_{j,1}$, investors' posterior belief about the ability of manager j is normally distributed with mean $\tilde{V}_j = \left[\omega_j(\tilde{R}_{1,j,1} - R_{1,e}) + (1-\omega_j)(\tilde{R}_{2,j,1} - R_{2,e})\right]\left(\frac{v}{v+\eta}\right)$ and variance $v\eta/(v+\eta)$. From the perspective of t = 0, then, the future assessed ability of manager j is normally distributed with mean:

[4] Formally, the investor has a concentrated prior on the assets' returns. We could allow the investor to make Bayesian updating both on managerial ability and on excess return, but this would greatly complicate the analysis. It is however easy to study the model under the assumption that investors mechanically downgrade an asset after observing its bad performance.

$$\mathbb{E}\tilde{V}_j = \left[\omega_j(R_1 - R_{1,e}) + (1-\omega_j)(R_2 - R_{2,e})\right]\left(\frac{v}{v+\eta}\right), \quad (21)$$

and variance v. The critical property of Equation (21) is that the manager can systematically inflate his assessed ability (i.e., he can boost $\mathbb{E}\tilde{V}_j$) by investing more in the undervalued asset 2. Because this asset is undervalued, increasing investment in it (reducing ω_j) generates an abnormally positive return $(R_2 - R_{2,e})$, and induces investors to upgrade their estimates of managerial skill.[5] This effect is stronger the higher is the signal to noise ratio v/η.

This effect creates the classic motive for contrarianism: invest in undervalued assets, obtain positive abnormal returns, establish a favorable reputation, and attract more clients in the future. We now solve for the equilibrium for the model to see how this effect plays out against the incentive to pander described in Section 4.

5.1 Updating on managerial ability and market equilibrium at *t* = 1

Consider how managers compete at t = 1 after the returns $(\tilde{R}_{A,1}, \tilde{R}_{B,1})$ on initial portfolios are realized. Given investors' average ability assessments $(\tilde{V}_A, \tilde{V}_B)$ at $t = 1$, each manager assembles a new portfolio ω_j' and sets a new fee φ_j'. Note the critical asymmetry: holding portfolios constant, the more able manager delivers a higher excess return than the less able one, looking more attractive to investors. Formally, if at t = 1 manager j chooses portfolio ω_j', then investors expect the resulting excess return to be normally distributed with mean:

$$R_{j,e}' = \omega_j' R_{1,e} + \left(1 - \omega_j'\right)R_{2,e} + \tilde{V}_j, \quad (22)$$

and variance $\sigma_j' = \frac{v\eta}{(v+\eta)} + \eta$. In line with Section 3, for a given portfolio-fee bundle (φ_j', ω_j'), an investor i optimally delegates his portfolio to manager A if and only if:

[5] Again, this logic goes through under the alternative assumption that upon observing an unexpectedly high return investors upgrade their beliefs over both managerial ability and the return of the asset in which the manager's portfolio is intensive. The main shortcoming in this case is that the algebra is substantially more complex. The real restriction in our analysis concerns the naivete of investors, who are assumed not to infer anything about asset quality when seeing the manager's portfolio choices at t = 0.

$$\frac{a_{i,B}}{a_{i,A}} \geq \frac{\left(R'_{B,e}\right)^2(1-\varphi'_B)^2}{\left(R'_{A,e}\right)^2(1-\varphi'_A)^2}. \tag{23}$$

In equation (23), $1-\varphi'_j$ is the share of return going to investors under manager *j*. By exploiting equation (23), one can derive the profit functions of the two managers, which are analogous to those in Equations (6) and (7). In these profit functions, the payoff of manager *j* increases in the perceived excess return $R'_{j,e}$ of his portfolio: the higher is such excess return, the higher are his assets under management and the total fee he can charge. We thus obtain:

Lemma 2 *In equilibrium, at t = 1 both managers set* $\omega_j^*\left(\tilde{V}_A, \tilde{V}_B\right) = 1$ *for all* $\left(\tilde{V}_A, \tilde{V}_B\right)$.

At *t* = 1 all managers invest in the hot asset class 1, because we assumed that investors' perceptions of returns do not vary over time. Not much would change if we allowed investor perceptions to vary: at *t* = 1 all managers would invest in whatever asset is expected by investors to yield the highest return. This is not surprising. In the last period, both managers pander because they see no reputational gain from being contrarian.

In light of Lemma 2, investors expect manager *j* to return $R'_{j,e} = R_{1,e} + \tilde{V}_j$. Although managers choose identical portfolios, their expected returns differ owing to perceived ability differences. This asymmetry, as well as the nonlinearity of profit functions, implies that we cannot solve for equilibrium fees in closed form. We characterize the key properties of the model by linearly approximating fees and profits around the unique symmetric equilibrium that prevails at *t* = 1 if managers have zero average ability $\tilde{V}_A = \tilde{V}_B = 0$. This is a good approximation provided the variance v of ability is low (so that the curvature of the profit function plays no role).

Proposition 3 *For given posterior average abilities* $(\tilde{V}_A, \tilde{V}_B)$, *the linear approximation of managerial fees at t* = 1 *around* (0, 0) *is given by*:

$$\varphi_j^*(\tilde{V}_A, \tilde{V}_B)R_{1,e} = \left(\frac{\theta}{1+\theta}\right) \cdot \frac{R_{1,e}}{2} + \rho_j(\theta)\tilde{V}_j - \rho_{-j}(\theta)\tilde{V}_{-j}, \tag{24}$$

where $\rho_j(\theta)$, $\rho_{-j}(\theta)$ *are positive coefficients. The corresponding linear approximation of profits at* $t = 1$ *around* (0,0) *is given by*:

$$\pi_j(\tilde{V}_A, \tilde{V}_B) = \frac{R_{1,e}}{2a\sigma'}\{\gamma_0(\theta) + \gamma_1(\theta)\tilde{V}_j - \gamma_2(\theta)\tilde{V}_{-j}\}, \tag{25}$$

where $\gamma_1(\theta)$, $\gamma_2(\theta)$ *are also positive coefficients*.

In Equation (24) the fee charged by a manager rises with his assessed talent $\tilde{V}_j$ and decreases with the assessed talent of his competitor $\tilde{V}_{-j}$. A manager estimated to be more talented: i) attracts more clients, and ii) has more surplus to extract from them (because he delivers higher expected returns). Both effects drive up his fee. In contrast, a manager facing a more able competitor must cut his fee in order not to lose too many clients. These considerations translate into equilibrium profits, which in Equation (25) increase in the manager's own estimated talent and decrease in that of his competitor. The sensitivity of profits to managerial ability depends on trust. Trust reduces investor mobility, which has two effects. First, higher trust allows the talented manager to extract more from his trusting client. Second, higher trust reduces the pool of clients a manager can gain. As we show in the next section, these effects shape the tradeoff between pandering and contrarianism.

5.2 Equilibrium at *t* = 0: The pandering vs. contrarianism tradeoff

At $t = 0$ managers choose a fee and a portfolio (φ_j, ω_j) to maximize their expected discounted profits, where the discount factor is assumed to be equal to $\delta \in [0,1]$. The inter-temporal linkage between a manager's strategy at $t = 0$ and his future payoff at $t = 1$ is due to updating of ability. A manager placing a higher share ω_j of his portfolio in the overvalued asset 1 realizes that doing so reduces his own assessed talent by Equation (21), which reduces his future fee and profit by Proposition 3.

To see this formally, denote by $h(\tilde{V}_j|\omega_j)$ the $t = 0$ (normal) distribution of average ability at t = 1 conditional on the manager choosing portfolio ω_j at t = 0. Denote by $\pi_j(\varphi_A, \varphi_B, \omega_A, \omega_B)$ the profit of the same manager j at t = 0 and by $\pi_j(\tilde{V}_A, \tilde{V}_B)$ the manager's equilibrium profits at t = 1 when the assessed abilities are $(\tilde{V}_A, \tilde{V}_B)$. At t = 0, then, the manager's optimal strategy solves:

$$\max_{\varphi_j, \omega_j} \ \pi_j(\varphi_A, \varphi_B, \omega_A, \omega_B) + \delta \iint \pi_j(\tilde{V}_A, \tilde{V}_B) h(\tilde{V}_A|\omega_A)\, h(\tilde{V}_B|\omega_B) d\tilde{V}_A d\tilde{V}_B. \qquad (26)$$

The portfolio ω_j affects not only current profits but also future profits via the conditional distribution of managerial ability $h(\tilde{V}_j|\omega_j)$.

The equilibrium $(\varphi_A^*, \omega_A^*; \varphi_B^*, \omega_B^*)$ at t = 0 is a Nash Equilibrium where each manager maximizes (26) taking as given the other manager's strategy. Simple inspection of the first derivative of the discounted profit of a given manager, say A, with respect to his investment ω_A in the overvalued asset illuminates the pandering vs. contrarianism tradeoff:

$$\frac{\partial \pi_A(\varphi_A, \varphi_B, \omega_A, \omega_B)}{\partial \omega_A} + \delta \iint \pi_j(\tilde{V}_A, \tilde{V}_B) \frac{\partial h(\tilde{V}_A|\omega_A)}{\partial \omega_A} h(\tilde{V}_B|\omega_B) d\tilde{V}_A d\tilde{V}_B. \qquad (27)$$

The first term is weakly positive and captures the marginal benefit of pandering: by increasing ω_A, the manager attracts more clients and charges a higher fee, increasing current profits. The second term is negative and captures the marginal cost of pandering: by investing more in the overvalued asset, the manager reduces his future ability (in a first order stochastically dominated sense), thereby reducing his assets, fees, and profits at t = 1.

To see the role of trust, suppose that the managers pander ($\omega_A = \omega_B = 1$) and consider the incentive for A to deviate to contrarianism $\omega_A = 0$. In the absence of trust ($\theta = 0$), manager A sees no cost of deviating. True, after investing in asset 2 at t = 0 the manager loses his clients to B. However, when $\theta = 0$ his current profits are zero anyway! Deviating to contrarianism is thus beneficial, for it allows A to gain a reputation, many new clients, assets, and profits at t = 1 (this is the second term in (27)). Hence, when $\theta = 0$, the classic motive for

contrarianism is strong and there is no equilibrium in which both managers pander. Matters are different when trust is strong (θ is high). Now both managers make large profits from pandering at t = 0. When deviating to contrarianism, A must cut fees and profits at t = 0. Although in the future A is likely to look more skilled than B, he will not attract many new clients precisely because θ is high. In this case, the incentive to become a contrarian is too low.

To fully characterize the conditions under which pandering does and does not prevail, we exploit the characterization of future profits of Proposition 3 (i.e., Equation (25)).[6] We simplify the algebra by assuming that the extent of misperception is the same across the two asset classes and equal to $\Delta = R_{1,e} - R_1 = R_2 - R_{2,e}$. We can now establish:

Proposition 4 *In equilibrium, manager j either behaves as a full panderer* ($\omega_j = 1$) *or as a full contrarian* ($\omega_j = 0$). *Pandering by both managers* ($\omega_A = \omega_B = 1$) *is an equilibrium provided*:

$$\delta < \frac{a}{v\left(R_2 - R_{2,e}\right)}\left(\frac{2v\eta + \eta^2}{v + \eta}\right)^2 \cdot m(\theta), \tag{28}$$

where $m(\theta)$ *increases in* θ. *Since* $m(0) = 0$, *when* $\theta = 0$ *there is never an equilibrium in which both managers pander.*

Proposition 4 is the key result of this section. It is precisely the presence of manager-specific trust that makes possible the existence of an equilibrium in which both managers pander to investor misperceptions. When manager-specific trust is strong (θ is sufficiently high) investor mobility is low. This implies, first, that the manager can charge high fees to his clients at t = 0, extracting much of the return they expect. If the manager deviates to contrarianism, he will have to cut his fee, losing substantial profits at t = 0. Second, a high θ implies that the manager does not benefit much from contrarianism because, even if he earns a

[6]The t = 0 profit is not linearized (unlike that at t = 1). This is akin to focusing on cases where hot and cold sectors bring sharply different returns (i.e., $R_{1,e} - R_{2,e}$ and Δ are large), so that linearization is not viable at t = 0. We thus capture the case where investor misperception is large relative to updating of ability. We later discuss what happens when both misperceptions and updating of ability are small.

higher return, he is unable to attract many new clients in the future. By reducing the extent to which managers can gain market share based on their ability, trust reduces the manager's incentive to bet against investors' beliefs.

Of course, Equation (28) shows that it is not always the case that pandering is optimal in equilibrium, even if $\theta = 1$. For this to be the case, the future profits from contrarianism should be sufficiently discounted (i.e. δ should be low), assessments of managerial ability should not be too sensitive to performance (i.e. $\Delta\left(\frac{v}{v+\eta}\right)$ cannot be too large), and investors should be sufficiently bullish about the hot sector (i.e. $R_{1,e}/R_{2,e}$ must be sufficiently high).

When instead there is no trust ($\theta = 0$), at least one money manager, or both, specializes in the cold asset 2. In particular, the appendix proves that when $\theta = 0$ there is a threshold $\hat{\delta}$ such that neither manager panders in equilibrium provided $\delta > \hat{\delta}$. In this case, all money doctors behave benevolently, prescribing the right treatment to their clients.

To sum up, the model says that when fees/profits are low, money managers have the incentive to gain market share in the future by investing in undervalued assets today. When instead fees/profits are high, money managers have the incentive to exploit their current market power by pandering to investors' beliefs. These different equilibrium configurations have important social welfare implications. Because the return in the cold sector is higher than in the hot one (i.e., $R_2 > R_1$), managers behaving as "benevolent doctors" facilitate desirable financial intermediation, while panderers "abuse" investor trust, reducing social welfare.

6. Implications.

An important message of our model of money management mediated by trust is that, in many circumstances, managers have a strong incentive to pander to their investors' beliefs. The incentive for contrarianism is much weaker than it would be if clients were foot-loose. In situations when investor beliefs are misguided, and highly correlated across investors, money

managers pursue similar strategies pandering to these misguided beliefs, while dividing the market based on the trust of their clients.

This message has a number of significant implications. First, it suggests that the forces of arbitrage in financial markets might be weaker than one might have thought. Previous research has focused on the limits of arbitrage because arbitrage is risky, or because arbitrageurs have limited access to capital (e.g., DeLong et al. 1990, Shleifer and Vishny 1997). Here we show that, in effect, professional money managers who are perfectly capable of arbitrage themselves turn into noise traders, because doing so brings them higher fees from their trusting investors. With massive amounts of investor wealth guided by such trust relationships, capital following noise trading strategies is increased, and arbitrage capital correspondingly diminished. In equilibrium, markets become more volatile.

Second, when many investors seek a particular hot product, such as internet stocks or bonds promising a higher yield without extra risk, competing money managers cater to their demands and help destabilize prices. The technology bubble in the US saw mutual funds shifting into technology stocks, and even so-called "value investors" turning to "growth-at-the-right-price" strategies, which essentially amounted to chasing the bubble. More recently, prime money market funds shifted into short term "safe" liabilities of financial institutions yielding higher rates than Treasury bills. We have not modeled endogenous price determination here, but one can see how such investment strategies can be destabilizing. In particular, as more money managers cater to investor beliefs, prices of securities investors favor will tend to rise, which will only encourage these strategies in the short run, as well as improve managerial reputations (see Barberis and Shleifer 2003). The long run in which contrarianism pays becomes even longer and less attractive from the viewpoint of profit-maximizing managers.

Third, we have focused on trust-mediated investment choices in markets, but one could imagine similar considerations operating in banks. In the middle of a real estate bubble, shareholders or directors of a bank might think it most prudent and profitable to expand the

lending activity. A bank manager might wish to pander to that view, so as to raise her pay and keep her job. This incentive exists and might be strong despite the bankers' own views of the wisdom of real estate lending. For, as we have shown, the trust relationship raises the relative payoff from pandering versus contrarianism and long-term reputation building. The consequence is excessive lending to real estate, which in the short run only sustains the bubble, and reinforces the incentive to lend more.

In conclusion, however, we should not forget the central point of trust-mediated money management, namely that it enables investors to take risks, and earn returns, that they might otherwise not obtain. There are surely significant distortions in portfolio allocation, and possibly aggregate implications for banks and other financial institutions. Such distortions are inevitable when investors exhibit psychological biases, and are resistant to education and debiasing (e.g., Laibson 2009). When lack of knowledge further interferes with the ability of investors to identify experts they can rely on and trust, the ability of market competition to direct resources efficiently is even more limited.

7. Proofs

Proof of Proposition 1 Consider the expressions for $\pi_A(f_A, f_B)$ and $\pi_B(f_A, f_B)$ in Equations (6) and (7). For any $\theta \geq 0$, in equilibrium we must have:

$$\frac{R - f_A}{R - f_B} \in \left[\sqrt{1-\theta}, \frac{1}{\sqrt{1-\theta}}\right],$$

Otherwise only one manager makes zero profits. This manager could cut his fee and make some positive profits as well. This condition alone implies that when $\theta = 0$ the unique equilibrium features $f_A^* = f_B^* = 0$. When $\theta > 0$, the equilibrium must be interior to the above interval and satisfy the managers' first order conditions. When $f_A \geq f_B$ these first order conditions are:

$$f_A: \qquad (R - 2f_A) \cdot \left[\left(\frac{R - f_A}{R - f_B}\right)^2 - (1 - \theta)\right] - 2f_A\left(\frac{R - f_A}{R - f_B}\right)^2 = 0,$$

$$f_B: \qquad (R - 2f_B) \cdot \left[\frac{1}{2} + \frac{1 - \left(\frac{R - f_A}{R - f_B}\right)^4}{4\theta}\right] - \frac{f_B}{\theta}\left(\frac{R - f_A}{R - f_B}\right)^4 = 0.$$

The two above equations cannot be jointly satisfied for $f_A > f_B$. To see this, set $y \equiv \left(\frac{R-f_A}{R-f_B}\right)$ and solve the above first order conditions for f_A and f_B as a function of y. Next, impose the condition $f_A > f_B$. This identifies a quadratic equation in y that cannot be satisfied for $\left(\frac{R-f_A}{R-f_B}\right) > \sqrt{1-\theta}$. As a result, the only possible equilibrium featuring $f_A \geq f_B$ is symmetric, namely $f_A^* = f_B^*$. It is straightforward to check that in such equilibrium Equation (8) of Proposition 1 is met. When $f_A \leq f_B$, the same argument shows that $f_A^* = f_B^*$ is the only equilibrium fulfilling the above first order conditions. It is immediate to see that at this symmetric equilibrium the second order conditions are met (i.e. managers' objective functions are locally concave).

Proof of Corollary 1 Without managers, investors do not obtain any excess return. With money managers, each investor invests $x = \frac{R}{2a\sigma}\left(\frac{2+\theta}{1+\theta}\right)$ at excess return R under his most trusted manager. Owing to quadratic utility, the aggregate welfare gain is equal to that of Corollary 1.

Proof of Lemma 1 Given investment x_i, the optimal mixture $(x_{1,i}, x_{2,i})$ of assets 1 and 2 solves:

$$max_{x_{1,i}, x_{2,i}} \left[R_1 x_{1,i} + R_2 x_{2,i}\right] - \frac{a}{2}\left[\sigma_1 x_{1,i}^2 + \sigma_2 x_{2,i}^2\right],$$

subject to $x_{1,i} + x_{2,i} = x_i$. The first order conditions of the problem are equal to:

$$R_z - a\sigma_z x_{z,i} = \lambda \quad for\ z = 1,2,$$

where λ is the Lagrange multiplier attached to the constraint $x_{1,i} + x_{2,i} = x_i$. It is easy to see that the above first order conditions are satisfied at the portfolio of Lemma 1.

Proof of Proposition 2 Because investors separately choose the manager under which to invest a specific asset and the amount to invest in the latter, the profit of each manager *j* is separable in the two assets and equal to $\pi_j(f_{1,A}, f_{1,B}) + \pi_j(f_{2,A}, f_{2,B})$. Thus, managers compete on the two assets separately and, for each of those, equilibrium fees and investments follow from Proposition 1, yielding Equations (13), (14), and (15).

Proof of Corollary 2 The equilibrium under investors' misperception is found by replacing in Proposition 2 the true return of asset z with investors' expected return. The properties enunciated in Corollary 2 then follow.

Proof of Proposition 3 Suppose that at t = 1 investors assess average abilities to be $(\tilde{V}_A, \tilde{V}_B)$. Then, at policies $(\varphi_A, \varphi_B, \omega_A, \omega_B)$, manager maximizes the objective function:

$$\begin{cases} \varphi_A(1-\varphi_A)\cdot\dfrac{R_A^2}{a\sigma_A'}\cdot\left[\dfrac{R_A^2}{R_B^2}\cdot\dfrac{(1-\varphi_A)^2}{(1-\varphi_B)^2}-(1-\theta)\right] & if\ \ \varphi_A \geq z_1\varphi_B + z_2 \\ \varphi_A(1-\varphi_A)\cdot\dfrac{R_A^2}{a\sigma_A'}\cdot\left[2\theta+1-\dfrac{R_B^4}{R_A^4}\cdot\dfrac{(1-\varphi_B)^4}{(1-\varphi_A)^4}\right] & if\ \ \varphi_A < z_1\varphi_B + z_2 \end{cases}.$$

Where $R_A = \omega_A R_{1,e} + (1-\omega_A)R_{2,e} + \tilde{V}_A$, $\sigma_A' = \frac{v\eta}{(v+\eta)} + \eta$, $z_1 = R_B/R_A$, and $z_2 = (R_A - R_B)/R_A$. On the other hand, manager B maximizes the objective function:

$$\begin{cases} \varphi_B(1-\varphi_B)\cdot\dfrac{R_B^2}{a\sigma_B'}\cdot\left[2\theta+1-\dfrac{R_A^4}{R_B^4}\cdot\dfrac{(1-\varphi_A)^4}{(1-\varphi_B)^4}\right] & if\ \ \varphi_A \geq z_1\varphi_B + z_2 \\ \varphi_B(1-\varphi_B)\cdot\dfrac{R_B^2}{a\sigma_B'}\cdot\left[\dfrac{R_B^2}{R_A^2}\cdot\dfrac{(1-\varphi_B)^2}{(1-\varphi_A)^2}-(1-\theta)\right] & if\ \ \varphi_A < z_1\varphi_B + z_2 \end{cases}.$$

In the above objective functions, managers wish to maximize the perceived return on their portfolio. As a result, at t = 1 they set $\omega_A = \omega_B = 1$, investing in the hot asset. Consider now how fees are set, starting with the case where $\varphi_A \geq z_1\varphi_B + z_2$. This can only occur when $R_A \geq R_B$, which corresponds to $\tilde{V}_A \geq \tilde{V}_B$. We later discuss what happens when the reverse inequality holds, namely when $\tilde{V}_A < \tilde{V}_B$. If $\varphi_A \geq z_1\varphi_B + z_2$, the managers' first order conditions are:

$$\varphi_A: \qquad (1-2\varphi_A)\cdot\left[\frac{R_A^2}{R_B^2}\cdot\frac{(1-\varphi_A)^2}{(1-\varphi_B)^2}-(1-\theta)\right] - 2\varphi_A\frac{R_A^2}{R_B^2}\cdot\frac{(1-\varphi_A)^2}{(1-\varphi_B)^2} = 0,$$

$$\varphi_B: \qquad (1-2\varphi_B)\left[2\theta+1-\frac{R_A^4}{R_B^4}\cdot\frac{(1-\varphi_A)^4}{(1-\varphi_B)^4}\right] - 4\varphi_B\frac{R_A^4}{R_B^4}\cdot\frac{(1-\varphi_A)^4}{(1-\varphi_B)^4} = 0.$$

These conditions identify two equations $F_A(\varphi_A, \varphi_B, R_A, R_B) = 0$ and $F_B(\varphi_A, \varphi_B, R_A, R_B) = 0$. As we cannot characterize the equilibrium in closed form, we linearize the solution of the two above first order conditions around the symmetric equilibrium where $\tilde{V}_A = \tilde{V}_B = 0$, which is the symmetric equilibrium we studied in Proposition 1. Around (0,0), we have that $\varphi_j(\tilde{V}_A, \tilde{V}_B) \cong \varphi_j(0,0) + \frac{\partial\varphi_j}{\partial R_A}\tilde{V}_A + \frac{\partial\varphi_j}{\partial R_B}\tilde{V}_B$, for j = A, B. Proposition 1 showed that $\varphi_j(0,0) = \theta/2(1+\theta)$. To find $\frac{\partial\varphi_j}{\partial R_k}$, we must compute, at $\tilde{V}_A = \tilde{V}_B = 0$ (i.e., at returns $R_A = R_B = R_{1,e}$), the 2 by 2 matrix:

$$H(R_{1,e}) = \begin{pmatrix} \partial F_A/\partial\varphi_A & \partial F_A/\partial\varphi_B \\ \partial F_B/\partial\varphi_A & \partial F_B/\partial\varphi_B \end{pmatrix},$$

Which linearizes the first order conditions at $\tilde{V}_A = \tilde{V}_B = 0$. We then have, for all j = A ,B:

$$H(R_{1,e})\cdot\begin{pmatrix} \dfrac{\partial\varphi_A}{\partial R_j} \\ \dfrac{\partial\varphi_B}{\partial R_j} \end{pmatrix} = -\begin{pmatrix} \dfrac{\partial F_A}{\partial R_j} \\ \dfrac{\partial F_B}{\partial R_j} \end{pmatrix}.$$

After some tedious algebra, one can see that:

$$H(R_{1,e}) = \begin{pmatrix} -2 \cdot \dfrac{4-\theta+\theta^2}{2+\theta} & 4 \cdot \dfrac{1-\theta}{2+\theta} \\ 8 \cdot \dfrac{1+2\theta}{2+\theta} & -4 \cdot \dfrac{4+7\theta+\theta^2}{2+\theta} \end{pmatrix}.$$

Additional algebra shows that:

$$\frac{\partial F_A}{\partial R_A} = -\frac{\partial F_A}{\partial R_B} = \frac{2}{R_{1,e}} \frac{1-\theta}{1+\theta}, \quad \frac{\partial F_B}{\partial R_A} = -\frac{\partial F_B}{\partial R_B} = -\frac{4}{R_{1,e}} \frac{1+2\theta}{1+\theta},.$$

By using these expressions, and by solving the respective linear system, we find that:

$$\frac{\partial \varphi_A}{\partial R_A} = -\frac{\partial \varphi_A}{\partial R_B} = \frac{(1-\theta)(2+\theta)}{R_{1,e}(1+\theta)} \cdot \frac{(2+3\theta+\theta^2)}{[(4-\theta+\theta^2)(4+7\theta+\theta^2) - 4(1-\theta)(1+2\theta)]} > 0,$$
$$\frac{\partial \varphi_B}{\partial R_A} = -\frac{\partial \varphi_B}{\partial R_B} = -\frac{(1+2\theta)(2+\theta)}{R_{1,e}(1+\theta)} \cdot \frac{(2+\theta+\theta^2)}{[(4-\theta+\theta^2)(4+7\theta+\theta^2) - 4(1-\theta)(1+2\theta)]} < 0.$$

Thus, around (0,0) managerial fees increase in own ability and drop in the competitor's ability. By using the same procedure one can check that these properties also hold for $\tilde{V}_A < \tilde{V}_B$. The only difference when $\tilde{V}_A < \tilde{V}_B$ the above expression for $\frac{\partial \varphi_A}{\partial R_A}$ holds for $\frac{\partial \varphi_B}{\partial R_B}$ while $\frac{\partial \varphi_B}{\partial R_A}$ holds for $\frac{\partial \varphi_A}{\partial R_B}$. As a result of these computations, for any deviation of abilities from (0,0) it is possible to define coefficients $\rho_j(\theta) = \frac{\partial \varphi_j}{\partial R_j}$ and $\rho_{-j}(\theta) = \frac{\partial \varphi_j}{\partial R_{-j}} = -\frac{\partial \varphi_j}{\partial R_j}$ so that Equation (24) holds.

Consider now the linearization of profits. Using the envelope theorem, the total variation of manager k = A, B profits after a marginal increase in R_j, for j = A , B, is equal to $\frac{\Delta \pi_k}{\Delta R_j} = \frac{\partial \pi_k}{\partial \varphi_{-k}} \cdot \frac{\partial \varphi_{-k}}{\partial R_j} + \frac{\partial \pi_k}{\partial R_j}$. After some algebra, one can find that when $\tilde{V}_A > \tilde{V}_B$:

$$\frac{\Delta \pi_A}{\Delta R_A} = \frac{R_{1,e}}{a\sigma'} \cdot \frac{\theta}{1+\theta} \left[R_{1,e} \frac{\partial \varphi_B}{\partial R_A} + \frac{2+\theta}{2(1+\theta)} \right]$$
$$\frac{\Delta \pi_A}{\Delta R_B} = \frac{R_{1,e}}{a\sigma'} \cdot \frac{\theta}{1+\theta} \left[R_{1,e} \frac{\partial \varphi_B}{\partial R_B} - \frac{2+\theta}{2(1+\theta)} \right]$$

By plugging in the above equations the change in fees, we find $\frac{\Delta \pi_A}{\Delta R_A} > 0$, $\frac{\Delta \pi_A}{\Delta R_B} < 0$ and $\frac{\Delta \pi_B}{\Delta R_B} > 0$ and $\frac{\Delta \pi_B}{\Delta R_A} < 0$. The same properties are found to hold for $\tilde{V}_A < \tilde{V}_B$. Thus, for any deviation $(\tilde{V}_A, \tilde{V}_B)$ from (0,0) one can find the coefficients $\gamma_j(\theta) = \frac{\Delta \pi_j}{\Delta R_j}$, $\gamma_{-j}(\theta) = \frac{\Delta \pi_j}{\Delta R_{-j}}$ of Equation (25).

Proof of Proposition 4 Let us start with the case in which there is no trust, namely $\theta = 0$. In this case, there is Bertrand competition among money managers and we do not need to rely on the linearization of Proposition 3 to find the equilibrium. Suppose that in equilibrium managers pander ($\omega_A = \omega_B = 1$). In this equilibrium, managers make zero profits at t = 0. At t = 1, the manager with higher assessed ability captures the entire while the other makes zero profits.

Consider now the outcome attained at t = 1 by manager A. When $\tilde{V}_A > \tilde{V}_B$, he captures the full market. If $\tilde{V}_A \leq R_{1,e} + 2\tilde{V}_B$, the fee A can charge is restricted by what investors can obtain with manager B. In formulas, manager A charges a fee $f_A = \tilde{V}_A - \tilde{V}_B$ so that investors are just indifferent (but they all invest with A). At this fee, the manager's profit is proportional to

$(R_{1,e}+\tilde{V}_B)(\tilde{V}_A-\tilde{V}_B)$. If instead $\tilde{V}_A > R_{1,e}+2\tilde{V}_B$, manager A is so talented that he can act as a monopolist. As a result, he charges a fee $f_A = \left(R_{1,e}+\tilde{V}_A\right)/2$ and his profit is proportional to $\left(R_{1,e}+\tilde{V}_A\right)^2/4$. Thus, when $\theta = 0$ the future expected profit of manager A are proportional to:

$$\delta W_A(\omega_A,\omega_B) =$$

$$\delta\cdot\int_{-\infty}^{+\infty}\left[\int_{\tilde{V}_B}^{R_{1,e}+2\tilde{V}_B}(R_{1,e}+\tilde{V}_B)(\tilde{V}_A-\tilde{V}_B)+\int_{R_{1,e}+2\tilde{V}_B}^{+\infty}\frac{(R_{1,e}+\tilde{V}_A)^2}{4}\right]h\left(\tilde{V}_A,\tilde{V}_B|\omega_A,\omega_B\right)d\tilde{V}_A d\tilde{V}_B,$$

Where $W_A(\omega_A,\omega_B)$ is defined to be equal to the integral. Since the profit of manager A increases in $\tilde{V}_A$, the manager wishes to boost as much as possible his ability at *t* = 1. As a result, full pandering is never an equilibrium. If $\omega_A = \omega_B = 1$, the above expression is not just the expected profit at t = 1 but the entire profit that A can obtain across the two periods. As a result, both managers gain by deviating to contrarianism $\omega_j = 0$. By so doing, they do not lose any current profit (which is zero anyway), but boost future profits.

Consider now the possibility for both managers to act as contrarians, again when $\theta = 0$. By being contrarian, the two managers make zero profits in this period. If manager A deviates to pandering (i.e. he sets $\omega_A = 1$) he can attract the entire market at t = 0. The optimal fee is equal to $f_A^* = min\left(R_{2,e}-R_{1,e}, R_{2,e}/2\right)$, and the resulting gain in *t* = 0 profits is equal to $\frac{f_A^*(R_{2,e}-f_A^*)}{a(v+\eta)}$. Manager A then sees no benefit of deviating to pandering when the above gain is smaller than the second period cost. This is equivalent to:

$$\delta > \frac{(2v\eta+\eta^2)}{(v+\eta)^2}\frac{f_A^*\left(R_{2,e}-f_A^*\right)}{[W_A(0,0)-W_A(1,0)]}.$$

Under the above condition, the unique equilibrium prevailing for $\theta = 0$ is full contrarianism.

Consider the case in which there is trust, namely $\theta > 0$. We now look for conditions under which a pandering equilibrium with $\omega_A = \omega_B = 1$ emerges. In such an equilibrium, using the linearized profits of Equation (25), the expected profit of manager A at t = 1 is:

$$\mathbb{E}\pi_A = \frac{R_{1,e}}{2a\sigma'}\Big\{\gamma_0(\theta)+\gamma_A(\theta)\left[\omega_A(R_1-R_{1,e})+(1-\omega_A)(R_2-R_{2,e})\right]\left(\frac{v}{v+\eta}\right) - \gamma_{-A}(\theta)\left[\omega_B(R_1-R_{1,e})+(1-\omega_B)(R_2-R_{2,e})\right]\left(\frac{v}{v+\eta}\right)\Big\}$$

By contrast, at t = 0 the profit of the manager at full pandering is equal to:

$$\frac{\theta^2(2+\theta)}{2(1+\theta)^2}\cdot\frac{R_{1,e}^2}{a(v+\eta)}.$$

If manager A deviates to contrarianism, he loses his t = 0 profit but gains $\frac{R_{1,e}}{2a\sigma'}\gamma_A(\theta)(R_2-R_{2,e})\left(\frac{v}{v+\eta}\right)$ in the future. By substituting in the profit gain the condition for $\gamma_A(\theta)$ obtained in the case where $\tilde{V}_A \geq \tilde{V}_B$ (which would be on average true after a deviation to contrarianism), pandering remains an equilibrium provided:

$$\delta < \frac{a}{v\left(R_2-R_{2,e}\right)}\left(\frac{2v\eta+\eta^2}{v+\eta}\right)^2\frac{\theta(12+20\theta+9\theta^2+6\theta^3+\theta^4)}{(10+15\theta+6\theta^2+4\theta^3+\theta^4)}$$

Denote the ratio of polynomials on the left hand side by $m(\theta)$. Then, after some tedious algebra one can check that $m'(\theta) > 0$.

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