

Seeking Alpha: Excess Risk Taking and Competition for Managerial Talent

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April 2011

Abstract

We present a model of labor market equilibrium in which managers are risk-averse, managerial talent (“alpha”) is scarce, and firms seek alpha, that is, compete for this talent. Firms provide efficient long-term compensation, which allows for learning about managerial talent and assigning of managers to tasks based on their talent, when managers are not mobile across firms. In this case, firms can insure low-quality managers since high-quality managers have limited outside options. In contrast, when managers can move across firms, high-quality managers can fully extract ex post the rents due to their skill, which prevents firms from providing co-insurance among their employees. In anticipation, risk-averse managers may churn across firms before their performance is fully learnt and thereby prevent their efficient assignment to tasks. The result is excessive risk-taking with pay for short-term performance and build up of long-term risks. As the model is suited for the financial sector, we conclude with analysis of policies to address the externality in compensation among financial firms.

JEL classification: D62, G32, G38, J33.

Keywords: short-termism, executive compensation, managerial talent, managerial turnover.

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Acknowledgments: We are grateful to Ulf Axelson, Philip Bond, Mike Burkart, Michael Fishman, Hendrik Hakesen, Spagnolo ? and participants in the 2010 AEA Meetings, the Third Conference on Financial Integration and Stability in Mannheim, 2010 EFA Meetings, 2010 Mitsui Conference at University of Michigan and Arizona State University for helpful comments and discussions. We acknowledge financial support from the Europlace Institute of Finance, Inquire Europe and BNP Paribas Hedge Fund Center at HEC Paris.

“The dirty secret of bank bonuses is that these practices have arisen not merely due to a culture of arrogance; the more pernicious problem is a sense of insecurity. Banks operate in a world where their star talent is apt to jump between different groups, whenever a bigger pay-packet appears, with scant regard for corporate loyalty or employment contracts. The result is that the compensation committees of many banks feel utterly trapped. ... [A]s one banker says: “These bonuses are crazy - we all know that. But we don’t know how to stop paying them without losing our best staff.” Against that background, what the members of some compensation committees are quietly starting to conclude is that the only real solution is to start clamping down on the whole “transfer” game. “If Fifa can stop clubs poaching other players and ripping up contracts, then why can’t the banks do the same?” asks one... It is time, in other words, for bankers and regulators to take a leaf out of football’s book and start debating not just the issue of pay, but also the poaching culture that is at the root of those huge bonus figures.” – Tett (2009)

1 Introduction

Excess risk-taking by financial institutions and overly generous managerial pay are regarded by many as key factors contributing to the 2007-09 crisis.¹ In particular, it has become commonplace to blame banks and securities companies for offering compensation packages that reward managers (and more generally, other risk-takers such as traders and salesmen) generously for undertaking investments with high returns in the short run but with large “tail risks” that emerge only in the long run. As governments have been forced to rescue failing financial institutions, politicians and the media have stressed the need that managerial pay packages be cut and incentive systems based on options and bonuses be reined in, made more sensitive to long-term performance, and in some extreme cases be outright eliminated.² As the huge costs of bank rescues have become apparent, political pressure for such executive pay curbs has mounted around the world. It is natural to ask whether these limitations to

¹See, for example, Rajan (2005, 2008), Richardson and Walter (2009) and Bebchuk, Cohen and Spamann (2009).

²For instance, in 2008 the German government included in its bank bailout plan the clause that banks accepting state aid must cap annual salaries of their executives at Euro 500,000, and may also be required to forgo bonuses and dividend payments. Similarly, in early 2009 the U.S. government has imposed a cap of \$500,000 on the compensation of top executives at companies that received significant federal assistance. Also in the United Kingdom, Sweden and Switzerland, governments have set limits on financiers’ compensation as part of their efforts to rescue their banking systems.

managerial pay are the right policy response to the problem, or are simply dictated by public anger at the wrongdoings of financial institutions' managers. Indeed, it is crucial to ask what is in fact the root of the problem, that is, which market failure in compensation practices has led to rewards for short-term pay at the expense of a build-up of tail risks.

The argument that we explore in this paper is that the root of the problem is the difficulty of rewarding managerial talent when managers can pick projects with long-term or tail risk and the market allows them to move across firms before that risk materializes. Intuitively, the idea is that in this situation managers have an incentive to take large tail risks in order to raise their short-term performance and pay, while moving rapidly from one firm to another, reducing their effective tenure at any firm and thereby the extent to which they can be held responsible for project failures. With such possibility of managerial churning, firms' competition for managerial talent induces a negative externality, insofar as each firm provides an "escape route" to the managers of others. This is to be contrasted with the case where the market for managerial talent is not very competitive, so that managers are more likely to be stuck with their initial employer and their types discovered relatively early.

More specifically, we consider a setting with a continuum of firms, risk-averse managers and scarce managerial talent. We model managerial talent as "alpha", that is, the ability to generate high returns without incurring high risks: lacking such talent, managers can generate high returns only by taking correspondingly high risks. However, risk emerges only in the long run. So managerial talent can be identified only if managers who have chosen potentially risky projects remain for a sufficiently long period of time with their initial employers: if they leave earlier, the long-term performance of the projects that they have initiated may depend on the way these projects have been managed by their successors.

In such a setting, if managers were tied to their initial employer, then over time firms could tell apart the talented from those which are not and insure them against the risk of finding out that they are not talented by cross-subsidizing them at the expense of the talented ones. So there are two efficiency gains. First, there is a risk-

sharing gain. Second, there is a gain in the allocation of managerial talent: once the better managers are identified, they can be safely assigned to risky projects, while the less talented ones would be constrained to take the safe ones.

However, competition for managers can prevent each of these welfare gains from being fully realized. If firms compete aggressively with each other in the labor market (“seeking alpha”), then managers can leave before the long-term risks that they have incurred materialize. In particular, managers anticipate that the few managers who are discovered over time to be the high alpha type will extract all rents from their firms by generating competitive offers rewarding their alpha. This would prevent firms from subsidizing the other managers. In other words, managers face skewed performance rewards once there is a competitive labor market: high alpha types extract all rents, and low alpha get no subsidy. Now, if risky projects have a greater expected return (even when chosen by a manager of unknown quality) than safe ones, then risk-averse managers are driven to choose risky rather than safe project, get a higher pay than they would from the safe project, but then move to another firm before the risk of their project has materialized. At the other firms, they are then going to replicate the same behavior. In the aggregate, managers will be moving continuously from one firm to the next, in each they will choose the risky project irrespective of their ability to avoid (or control) the implied risks, and the talented managers will never be identified.

Viewed in a broader perspective, one economic purpose of the firm is to gather information about its employees’ talents and use it to allocate them efficiently to projects. Such efficient allocation of talent is also considered to be the key role of a competitive market for managers (see Gabaix and Landier, 2008, among others). But, as shown by our model, when projects have risks that materialize only in the long-term, there may be a dark side to the market for managers, as it destroys the boundary of the firm that encapsulates its employees: short-run labor market opportunities interfere with the long-run information gathering function of the firm. Indeed, this dark side gets exploited by managers as they prefer to take on projects with tail risks and use the labor market to move across firms delaying the resolution of uncertainty about their talent.

To summarize, competition in the market for managers generates an inefficiency due to the contractual externality among firms. Indeed, the inefficiency is stronger the greater is the probability that a manager who leaves his employer will be hired by another firm. Therefore, the strength of the externality is predicted to correlate with the turnover rate of managers. The empirical prediction is that in markets and countries where there is greater managerial turnover, firms take greater risks, other things being equal. They would also reap greater short-term returns, but at the cost of inefficiently large risks. The financial sector appears to fit these criteria quite well since trader and sales skills are highly fungible across firms.³

Hence, we also bring our analysis to bear on the current policy proposals and interventions, primarily in the financial sector, aimed at introducing long-term features such as clawbacks in compensation or capping the salaries and/or bonuses of top managers (at all or at least some of the leading firms in the sector), primarily in the financial sector. Though none of these policies explicitly addresses the managerial turnover issue, we show that constraints on deferring compensation aggravate the problem of managerial churning. We also show that an appropriately chosen salary cap restores the employers' ability to cross-subsidize less talented managers at the expense of more talented ones. Thus, a salary cap can allow risk-sharing even in a regime where the managerial market features no obstacles to mobility. The same outcome could be obtained by "taxing mobility", namely, charging a sufficiently large tax on the income of managers who switch employers. This would effectively eliminate ex-post competition for managerial talent (so that the tax would not be paid in equilibrium), but may be relatively harder to implement in practice.

The paper is organized as follows. Section 2 discusses the related literature. Section 3 lays out the structure of the model. In Section 4 we solve for the equilibrium. In Section 5 we examine the effectiveness of various possible policy interventions. Section 6 concludes.

³The propensity to take on tail risks appears to be related to banking revenues being increasingly tied to trading activity relative to interest and fee based activities (Stiroh, 2004).

2 Related literature

At a broad level, our paper is related to the large literature on executive compensation and corporate governance. Our novelty is to focus on the role of managerial turnover and study its effect on risk-taking. Our main result is to show that such turnover enables managers to extract short-term rents from firms, and leads to the buildup of inefficiently large long-term risks.

On the one hand, this result is related to the “pay without performance” view of Bebchuk and Fried (2004). But they attribute the rent extraction to CEO control over the board of directors and compensation committees, whereas we attribute it to the presence of a competitive labor market which forces firms to match the outside options of employees. On the other hand, our result presents a countervailing force to the benefits arising from competitive labor markets through efficient matching. Gabaix and Landier (2008) present matching models à la Rosen (1981) in which the rise in CEO pay is due their scarce talent and its efficient matching to larger firms. In contrast, in our setting competition for talent among firms results in less efficient matching of managers to projects within each firm.

The fact that managerial turnover introduces an externality across firms in setting their compensation can be considered as a corporate governance externality which has been the focus of several recent papers. Hermalin and Weisbach (2006) recognize that such externalities may be one rationale for regulatory governance standards. Acharya and Volpin (2009) and Dicks (2009) formalize this argument in a model where a firm’s corporate governance is a strategic substitute for governance in other firms as it lowers a manager’s reservation wages. Cheng (2009) shows that earnings management in one firm may cause earnings management in other firms in the presence of relative performance compensation.

In empirical work on governance externalities, Acharya, Gabarro and Volpin (2009) show how (weak) governance can be used as a strategic tool to attract better managers and provide empirical support for their channel. Cremers and Grinstein (2009) document the importance of managerial turnover and its effect on compen-

sation, focusing in particular on whether mobility is primarily within the industry or also from outside of the industry. Using data on public firm CEOs' turnover in 1993-2005, they document that pay for luck and relative performance compensation is more prevalent in industries with outsider CEOs.

In contrast to these papers on governance externalities, our focus is on a dynamic setting in which firms need time to learn about their employees and allocate them to proper tasks, but this is hindered by managers' ability to generate offers from other firms before their type is fully learnt. Our setup is similar to Harris and Holmstrom (1982), who develop a model of long-term labor contracts for risk-averse workers with unknown ability. Our paper extends their model by exploring the implications for the assignment of manager to a project; and the endogenous revelation of manager's talent. In this respect, our paper is closer to Holmstrom and Ricart I Costa (1986), who emphasize the role of capital rationing as a way to counterbalance manager's incentives to overinvest in a model with career concerns.

Another dynamic setting with some similarity to ours is that of Axelson and Bond (2009), who show that smart workers may be "too hard to manage", because their high outside options make them respond less to firing incentives. Finally, in another recent paper that is related to our work, Makarov and Plantin (2010) develop a model of active portfolio management in which fund managers may secretly gamble in order to manipulate their reputation and attract more funds. They show that such trading strategies may expose investors to severe losses and are more likely to occur when fund managers are impatient, their trading skills are scalable and generate higher profit per unit of risk. Our analysis differs from theirs in that we focus on the effect of mobility across firms on risk-taking by managers.

Our paper is motivated by the anecdotal evidence of trader churning in the financial sector (see Tett, 2009, cited in the introductory quote) and the competitive "search for yield" (which we interpret as "seeking alpha") on part of financial firms. The financial crisis of 2007-09 has provided a rich laboratory to learn how compensation and governance may have affected risk-taking, especially the buildup of tail risks in the financial sector during 2003-07. Rajan (2005) was one of the first to warn

about excessive risk taking in financial institutions driven by short-termist pay packages, what he termed as “fake alpha” in Rajan (2008). However, as of yet there is lack of full agreement on the role of pay packages in the financial sector’s risk-taking. Fahlenbrach and Stulz (2009) present evidence that bank CEOs lost a significant portion of their long-run compensation that was in the form of restricted stock-based pay and conclude thus that pay excesses were not the likely cause of the risk-taking at financial firms. Bebchuk, Cohen and Spamann (2009) contend this view, by documenting that bank CEOs, including those of Bear Stearns and Lehman Brothers, had paid out to themselves huge payoffs prior to the crisis and that these payoffs far exceeded the amounts they lost eventually. So they argue that bank management did benefit from short-term compensation that was not tied to long-run performance, as is the case in our model with managerial churning.

Chen, Hong and Scheinkman (2009) also present evidence linking compensation and risk-taking at financial firms over the period 1992-2008 that is consistent with payouts to top management being tied to short-term risk-taking incentives for at least a fraction of firms – an outcome that they attribute to the influence of institutional investors (who turn over their holdings relatively more frequently). Acharya, Cooley, Richardson and Walter (2009) argue that during 2003-07 a new banking model emerged, prone to “manufacturing tail risks”, largely in response to to the mispricing of government guarantees accorded to too-large-to-fail financial institutions and the erosion of bank franchise values in traditional interest and fee businesses.

None of these papers examine explicitly the role of employee turnover in generating risk-taking incentives. The introductory quote by Tett (2009) compared the Wall Street turnover of traders and salesmen to the poaching of players across football clubs and recognizes that the real issue in addressing compensation in the financial industry is that of addressing the poaching culture of employers and the related high mobility of employees across firms. In another thought-provoking piece, Smith (2009) explicitly refers to the role of turnover in entrenching the culture of bonus without performance on Wall Street.⁴ Our model suggests that to nail down this issue, it

⁴An extended quote borrowed from Smith (2009) runs as follows: “*In time there was significant*

would be necessary for empirical work to also examine (depending on data availability) compensation and turnover of traders and sales force, since their skills are most fungible across firms and they have the greatest direct control over risk-taking.

3 Model

There are N profit-maximizing firms, which live forever and are owned by risk-neutral principals (employers or shareholders), and a continuum of risk-averse agents (managers), who live for T discrete periods. Managers maximize the expected utility, given by $U = E[u(\bar{W})]$, over final (or date- T) wealth \bar{W} , where the utility function $u(\bar{W})$ is increasing and concave. The assumption that managers only care about final wealth not only avoids dealing with intertemporal optimization problems (which are not central to the analysis), but more importantly puts no limits on deferring compensation: payments can be deferred to the end of the employment period, at no cost for the employer. Each employer can condition its own compensation package on the manager's resignation date, and as we explain below, also on managerial type if it is learnt during the employment relationship. But the employer cannot encroach on the future compensation that the manager may earn from subsequent employers after resigning – a realistic assumption about the legal reach of each employment contract.

Managers have no initial wealth and have limited liability, so that their wealth cannot be negative at any point in time. For simplicity, there is no discounting: the interest rate is normalized to zero.

erosion of the simple principles of the partnership days. Compensation for top managers followed the trend into excess set by other public companies. Competition for talent made recruitment and retention more difficult and thus tilted negotiating power further in favor of stars. Henry Paulson, when he was CEO of Goldman Sachs, once remarked that Wall Street was like other businesses, where 80% of the profits were provided by 20% of the people, but the 20% changed a lot from year to year and market to market. You had to pay everyone well because you never knew what next year would bring, and because there was always someone trying to poach your best trained people, whom you didn't want to lose even if they were not superstars. Consequently, bonuses in general became more automatic and less tied to superior performance. Compensation became the industry's largest expense, accounting for about 50% of net revenues."

3.1 Projects and managers

Managers can run one new project per period. Each project is “long term”, that is, lasts for two periods so that each manager runs two projects in steady state (except in the first and the last periods). Not all managers are equally talented: a fraction $p \in (0, 1)$ of managers are good (type G) and a fraction $1 - p$ are bad (type B). Managers themselves initially do not know their own type.

Firms are endowed with a continuum of projects of two types:

(i) safe projects S yielding y at the end of the second period, irrespective of the ability of the manager in charge of it;

(ii) risky projects R yielding x in the first period and either 0 or $-c$ in the second period, depending respectively on whether it is matched with a good or bad manager.

The dependence of the risky project’s payoff on the manager’s type can be interpreted as a reflection of his ability in managing the risky project. Good managers add value to a risky project by reducing its risk (for simplicity, to zero, which is the same level as risk of the safe project), without reducing its expected payoff. In this sense, good managers generate “alpha”, in that they improve the risk-return tradeoff of the firm that employs them. Conversely, bad managers can generate the same short-run return r but only at the future cost c .

A key assumption is that if a manager initiates a project of type R , his ability becomes known *only if* he remains in charge of it for *both* periods. The assumption that the project’s first-period performance is uninformative captures the idea that failure is an infrequent event (“tail risk”), so that it takes time to screen a person’s ability to manage a risky project. If each period is taken to last several years, the wait to ascertain the quality of a match can be considerable.

By the same token, if a manager leaves after one period, the quality of the project can no longer be gauged. We assume that the project is liquidated for its expected value. Alternatively, the project’s completion is entrusted to a specialized department of the company. In either case its outcome becomes totally uninformative about the skills of the manager who initiated it. In liquidation, the project is pooled together

with all other incomplete projects. Denoting by λ the fraction of risky projects initiated by good managers in this pool, the average payoff of the pool is $x - (1 - \lambda)c$. Thus, if the pool of projects to be completed were initiated by a large random sample of managers, then $\lambda = p$ (by the law of large numbers). If instead the pool were entirely made of projects started by bad managers, then $\lambda = 0$. Crucially, the payoff $x - (1 - \lambda)c$ is independent of the ability of the individual initial manager, as it reflects the skills of the average manager who left before completing his project. Therefore, this payoff conveys no information about the quality of the manager who initiated the project.

We assume that

$$x - (1 - p)c > y > x - c. \tag{1}$$

The left-hand side inequality indicates that the expected payoff of project R exceeds that of project S if the manager is of unknown quality: this captures the idea that accepting a greater risk entails a higher expected return. The right-hand side inequality indicates that the expected payoff of a safe project exceeds that of a risky one if the manager is known to be bad. The implication of assumption (1) is that it is optimal to assign bad managers only to safe projects, and good ones only to risky projects. Assigning bad managers to risky projects would imply excessive risk-taking.

3.2 Market for managerial talent

In each period, the pool of projects available to a firm includes at least one safe and one risky project per manager. Therefore, managers – not projects – are the scarce factor of production, since only they can start a new project. Companies can precommit to long-term wage contracts. Compensation can be contingent on (i) the manager’s decision to stay or resign; (ii) the observed payoff of the project initiated in the previous period (if the manager stays). As we will see, this precommitment prevents firms from exploiting any informational advantage that they may gain over their competitors by gauging their employees’ ability.

We assume that firms initially bid competitively for managers, anticipating their future performance: this ensures that managers extract entirely the expected profits

that they will generate over the course of their tenure. While *ex ante* there is perfect competition for managerial talent, *ex post* switching costs may prevent it: over time, managers may make location- or firm-specific investments or develop location- or firm-specific tastes, so that it becomes difficult or impossible for other firms to poach them. To bring out the implications of *ex-post* competition for managerial talent, we will focus on the two polar cases where switching costs are either prohibitively high – the “non-competitive regime” – or totally absent – the “competitive regime”. In both regimes, managerial performance is assumed to be publicly observable: if a manager’s ability becomes known to the current employer, it becomes equally known to outside employers.⁵

The difference between these two regimes may be seen in practice as capturing the changing relationship between bank managers and their employers: in the past, banking used to entail much local knowledge, so that over their careers bank managers developed employer- and location-specific skills; currently, banking is less local, due to technological change and new financial products. In turn, company loyalty has probably lost considerable appeal in the world of finance.

3.3 Time line

A representative manager lives for T periods, from 1 to T , each comprised between two adjacent dates, from $t = 0$ to $t = T$. We denote by $W(t)$ the compensation agreed in the contract that he signs with the employer hiring him in period t . Recall that we assumed that $W(0) = 0$ and $W(t) \geq 0, \forall t$. The sequence of actions is as follows:

⁵However, note that this assumption is inessential in our context, due to the multiperiod nature of the employment relationship. To see why, suppose that a manager’s performance were visible only to his current employer. Then, in the competitive regime a manager who turned out to be good could be hired by an outside employer, who could condition his pay on his type and assign him to a risky project for at least two periods; in turn, the manager would not move so as to allow the new employer to verify that he is good. So even in an opaque labor market, outside offers would be conditioned on the manager’s true type, if this has become known to the manager (and current employer). Thus, the real difference between the two regimes cannot reside in the private or public nature of information about managerial performance, but in the presence or absence of barriers to managerial mobility.

(i) In period 1, the manager is hired by a firm that pledges to pay him a final compensation $W(1)$, possibly conditional on his type (if it ever becomes known) and on his decision to stay or leave the firm in any given period. The manager is also assigned to project S or R .

(ii) In period 2, the manager decides whether to stay with the previous employer or switch to a new one. If he stays, the manager is assigned to a new project S or R . At the end of the period, the project assigned in period 1 pays off. If the manager was assigned to project S , his type remains unknown. If instead he was assigned to project R , the second-period payoff of the initial project reveals his type. Finally, if the manager switches to a new firm, he will receive from his new employer a newly agreed compensation $W(2)$, will start a new project in the new firm, and his type remains unknown.

(iii) In any subsequent period from 3 to $T - 2$, the sequence of moves is the same as under (ii) with appropriate change of time indices.

(iv) In the penultimate period $T - 1$, the manager is assigned to the final project of his career (either project S or R), which he completes in period T .

Therefore, over the course of his career a manager carries out $T - 1$ projects, and by the end of his career he totals a compensation that is the sum of those awarded by the various employers that may have hired him: $\bar{W} = \sum_{t=1}^{T-1} W(t)$, where the terms inside the sum are zero for any period t in which the manager remains with the previous employer.

4 Equilibrium

In this section we start by considering the equilibrium choices of managers in the two alternative settings: the non-competitive and competitive regime, respectively. If there is no *ex-post* competition, good managers cannot be poached by outside employers even if their talent has been revealed by their performance with the current employer. As in this regime good managers cannot switch to a new employer, their equilibrium wage will not reflect their type. When the market for managers is com-

petitive, instead, managers who have been revealed to be good may have an incentive to switch to a new employer, and their equilibrium wage will exceed that offered to bad managers. But in this regime there are also situations in which managers have the incentive to leave the company immediately after undertaking a risky project, so that their type will not be learnt. In this case, their equilibrium wage will obviously not reflect their ability.

4.1 Non-competitive regime

In this section we show that if the market for managers is non-competitive, the equilibrium outcome coincides with the first-best outcome. The first-best outcome features two characteristics: (i) productive efficiency, that is, optimal allocation of managers to projects, and (ii) optimal risk-sharing, that is, complete insurance of managers by firms (as the latter are risk neutral).

To ensure productive efficiency, the type of managers must be learnt as early as possible in their employment history, so as to assign bad managers to safe projects and good ones to risky projects in every subsequent period. Since the manager will not switch to a new employer, the optimal policy is clearly to assign him to a risky project in periods 1 and 2 of his career and for the subsequent $T - 3$ periods to risky projects if good and to safe ones if bad. This policy ensures that in expectation the manager will generate profits (2) over his career. Any other policy would generate lower expected profits. Formally, by assumption 1, the maximum life-time expected profit per manager, which as of period 1 is:

$$\Pi^* = 2[x - (1 - p)c] + (T - 3)[px + (1 - p)y]. \quad (2)$$

The first term is the expected period-1 and period-2 profits from the risky project undertaken at $t = 0$ and $t = 1$ by a manager of unknown quality (because it takes two periods to learn manager's type, the manager is still of unknown type at $t = 1$, and hence, assigning him to the risky project yields the highest profit by assumption 1); while the second term is the sum of the expected continuation payoffs of the two groups of managers in periods 3 through T , weighted by their respective frequencies.

To guarantee optimal risk-sharing, managers must be paid a fixed compensation, i.e. a salary that is not contingent on their quality. Under our assumption of *ex-ante* competition among firms, managers extract the entire social surplus, so that on a per-period basis their compensation must equal the average future profit that they will generate:

$$w^* = \Pi^* / (T - 1) = px + (1 - p) \frac{2(x - c) + (T - 3)y}{T - 1}. \quad (3)$$

So managers' final wealth is $\bar{W} = \Pi^*$ and their utility is

$$U^* = u(\Pi^*), \quad (4)$$

while firms earn zero expected profits. Notice that $w^* \in (y, x)$: the first-best per-period salary is comprised of the profit generated by the safe project and the highest profit generated by a risky project. In the non-competitive regime, this salary cannot be outbid by outside employers even for managers who have been recognized to be good.

This argument proves the following result:

Proposition 1 (Equilibrium under no competition) *Without ex-post competition for managers, the first-best outcome is attained in equilibrium.*

Note that optimal risk-sharing requires the firm not to condition the salary on the quality of the employees, even though it uses this information in allocating them to different types of projects. This implies that good managers will subsidize bad ones, but in the non-competitive regime, the assumption is that switching costs prevent them from leaving the company to avoid paying this subsidy.

4.2 Competitive market for managers

When there is *ex-post* competition for managerial talent, the first-best allocation characterized above may no longer be an equilibrium. Before we show this, we state a tie-breaking assumption: a manager prefers to stay with his current employer if the outside employer's offer is not strictly better than his current compensation. This

assumption can be motivated with the presence of a tiny switching cost even in the competitive case.

The key observation is that ompetition changes the outside options for managers who chose the risky project and remained at least two periods with an employer: since in this case outside employers can infer the manager’s ability, they will bid the wage up to x for good managers, and offer y to bad ones. Since the first-best salary w^* in (3) is smaller than x and greater than y , good managers will leave, while the bad ones will stay. Hence, the salary w^* would entail losses for the initial employer, and the cross-subsidization required to provide optimal risk-sharing becomes infeasible.

Notice, however, that the initial employer can offer a contract that is more effective in deterring good managers from leaving. The most effective such contract (consistent with zero expected profits) is one that makes the entire date- T compensation Π^* contingent on the manager never leaving the firm. In other words, the firm will pay nothing if the manager leaves at any time in his career.⁶ Consider a manager who has been revealed to be good in period 2. If he were to stay with the initial employer, his final wealth would be Π^* . If instead he were to leave at the end of period 2, he would earn a final wealth $(T - 3)x$ from the new employer, given that there is perfect competition. The comparison between $(T - 3)x$ and Π^* yields a cutoff value \hat{T} , which defines the maximum time horizon that allows the firm to retain its managers through the contract just described:

$$\hat{T} = 3 + 2 \frac{x - (1 - p)c}{(1 - p)(x - y)}. \quad (5)$$

If $T \leq \hat{T}$ the first-best allocation can be sustained even in the competitive regime, while if $T > \hat{T}$ it cannot. Intuitively, if the manager’s employment horizon T is very short, then he must spend a large fraction of his remaining career with an employer just to be recognized as being of good quality: in the extreme, if his career were to span three periods ($T = 3$), he would spend 2/3 of it proving his quality to the initial employer and only 1/3 with a new one; since $\hat{T} > 3$, the new employer would not be able to offer him a sufficiently attractive deal. Hence, the first-best would be

⁶Recall that, having zero initial wealth and limited liability, the manager cannot be penalized more than this.

feasible. If instead the manager is younger, i.e., $T > \hat{T}$, then the contract that defers all compensation Π^* to the final date T and pays nothing if the manager resigns at any time, would not deter the manager from leaving. Then, the first-best would not be feasible.

It is instructive to see how this cutoff value responds to changes in the other two main parameters of the problem. In Panel A of Figure 1, we show that an increase in the fraction of good managers, p , expands the range of values of T for which the first-best allocation can be achieved (for instance, for p very close to 1 it can be achieved even for very large T): intuitively, the cost of subsidizing bad managers is quite low because there are few of them. In Panel B, instead, we see that an increase in the excess profitability of a well-managed risky project over that of a safe one, $x - y$, reduces the range of values of T for which the first-best allocation can be achieved: when these excess profits are large, outside employers can lure away a good manager even if his remaining job tenure is relatively short.

The previous argument focused on a manager who switches employer at the end of period 2. But a manager who does not want to switch to a new employer at that point in time will not want to deviate later, since the profits from quitting would be even lower. Moreover, no manager will want to switch employer at the end of period 1, since at that time he would still be of unknown quality for an outside employer: therefore, switching would not yield a better offer from another employer, and may lead to penalty by his initial employer paying him zero.

The following proposition summarizes the results so far:

Proposition 2 (First-best region under competition) *With a competitive managerial market, the first-best outcome can be attained in equilibrium if and only if the manager's employment horizon is sufficiently short, i.e. $T \leq \hat{T}$, where \hat{T} is defined by expression (5).*

Recall that an important assumption made in deriving this result is that there are no constraints on withholding compensation to a manager who resigns. In practice, however, legal restrictions assumed away in the previous argument may exist:

it may be illegal to write an employment contract where the manager is denied any compensation for past employment just because he chooses to switch to a new employer. This is also because in practice at least a portion of the total compensation is paid in the form of salary, to fund intermediate consumption (possibly because otherwise managers would be unable to achieve the desired consumption smoothing due to borrowing constraints). In conjunction with limited liability, such salary payments could not be reclaimed by the initial employer, and therefore they reduce the parameter region where the first-best can be attained, compared to the region described in Proposition 2. Intuitively, the more the firm is constrained in deferring compensation, the lower is the penalty that it can threaten to inflict on resigning managers, and therefore the smaller is the parameter region for which it can attain the same employees' loyalty as in the non-competitive regime – and offer the implied risk-sharing to them. This point is formally stated in the following result:

Corollary 1 (First-best region with limited pay deferral) *If part of the total compensation is paid as non-recoverable per-period salary $\underline{w} > 0$, the maximum time horizon for which the first-best outcome can be attained is:*

$$\widehat{T}(\underline{w}) = 3 + 2 \frac{x - (1-p)c - \underline{w}}{(1-p)(x-y)}, \quad (6)$$

which is strictly decreasing in \underline{w} .

What happens when the first-best cannot be attained, that is, when $T > \widehat{T}$? To answer this question, we need to consider the subgame-perfect equilibrium of the model. In each period t the manager chooses whether to stay or to leave, while the firm chooses whether to assign him to the safe or the risky project. Every time a manager is hired, perfect competition among firms implies that he is offered the contract that maximizes his continuation utility, conditional on the information on the manager's quality available at that stage. The contract specifies the manager's final compensation, conditional on him staying or leaving, and conditional on his type (if known). Given that the market for managers is perfectly competitive, the contract that maximizes the manager's continuation utility must also yield the same utility that the manager would obtain from leaving (in other words, his outside option).

In the proof of Proposition 3 we will focus on the following candidate equilibrium: the manager is assigned to project R and changes employer in every period for the first K periods, earning the expected payoff $x - (1 - p)c$ per period, with $K \in \{0, T - 3\}$. After being hired by the employer in period $K + 1$, he is assigned to project R in period $K + 1$ and $K + 2$, earning the expected payoff $x - (1 - p)c$ in each of the two periods. From period $K + 3$ onwards, the manager is assigned to project R if found to be good, earning x per period, and project S otherwise, earning y per period. Hence, given K , the manager's expected utility is

$$pu(W_G) + (1 - p)u(W_B). \quad (7)$$

where $W_G \equiv (K + 2)[x - (1 - p)c] + (T - 3 - K)x$, is the final wealth of a good manager, and $W_B \equiv (K + 2)[x - (1 - p)c] + (T - 3 - K)y$, is the final wealth of a bad manager. The critical variable in this choice is K , the number of periods in which the manager “churns” jobs. Churning is a way for the manager to delay the revelation of his type and thus obtain insurance. This comes at the cost of greater inefficiency, as the bad types should be assigned to the safe project rather than the risky one. Therefore, the trade-off is between insurance, which is obtained with delay of type revelation or the choice of a higher K , and productive efficiency, which comes with earlier type revelation or a lower K . If $K = 0$, the manager does not leave the firm after the first period. He is given very limited insurance but achieves productive efficiency. Conversely, if $K = T - 3$, the manager achieves perfect insurance, at the cost of very limited productive efficiency. The optimal K maximizes the expression (7) above.

Proposition 3 (Churning equilibrium region under competition) *With a competitive managerial market, for $T > \hat{T}$ the equilibrium outcome is as follows: the manager is assigned to project R and changes employer in every period for the first K^* periods. Afterwards, he stays with the employer and is assigned to project R in periods $K^* + 1$ and $K^* + 2$, and from period $K^* + 3$ onwards to project R if he is good and project S if he is bad. K^* is such that*

$$\frac{u'(2[x - (1 - p)c] + (T - 3)y + K^*[x - (1 - p)c - y])}{u'(2[x - (1 - p)c] + (T - 3)x - K^*(1 - p)c)} = \frac{pc}{x - y - (1 - p)c}. \quad (8)$$

Proof: The proof of this result is organized in three steps. First, recall that the optimal allocation of projects is to assign a risky project to managers that are good and of unknown type; while managers of bad quality only should be assigned to safe projects. This result follows from the assumption that the output associated with the assignment of a risky project to a manager of unknown quality, $x - (1 - p)c$, is greater than the output associated with a safe project, y .

Second, given that firms are perfectly competitive ex ante and ex post, they pay all rents to managers. Hence, a manager of good quality is paid x per period; while a manager of bad quality is paid y per period. Instead, a manager of unknown quality is paid $x - (1 - p)c$.

Third, as the only reason to leave a firm is to preserve uncertainty about one's type, in a given period $t \in [2, T - 1]$ churning makes sense only if in all periods $t' < t$, the manager has chosen to churn. Otherwise, his type is already known and there is no reason to churn. Conversely, if a manager chooses to stay in a given period $t \in [2, T - 1]$, he has no reason to leave in all periods $t'' > t$. This is because his type is already known and again there is no reason to churn. Therefore, the subgame-perfect equilibrium simplifies to the optimal choice of the number of periods K of churning that maximizes manager's expected utility in expression (7) above.

The first order condition is

$$-pu'(W_G)(1-p)c + (1-p)u'(W_B)[x-y-(1-p)c] = 0, \quad (9)$$

where $W_G \equiv (K+2)[x-(1-p)c] + (T-3-K)x$ and $W_B \equiv (K+2)[x-(1-p)c] + (T-3-K)y$. The first term is negative (W_G is decreasing in K), while the second is positive by assumption (1) (W_B is increasing in K). The second order condition is satisfied as

$$pu''(W_G)[(1-p)c]^2 + (1-p)u''(W_B)[x-y-(1-p)c]^2 < 0$$

given that $u''(\cdot) < 0$. ■

The equilibrium is described graphically in Figure 2 in the space (W_G, W_B) . Point A on the 45° line represents the final wealth obtained by churning for $T - 3$ periods:

in such case the manager obtains the same wealth independently on its type. Point B in the figure represents instead the case in which the manager chooses not to churn. In such a case his final wealth if his type is good (W_G) is much greater than his wealth if his type is bad (W_B). By setting the number of churning periods K between 0 and $T - 3$, the manager can choose any point on the line between A and B. The optimal choice on that line depends on the probability of being a good type p and the utility function $u(\cdot)$: in particular, it depends on the marginal rate of substitutions between the two states of the world (the state in which the type is Good and the state in which the type is Bad) and thus on the degree of risk-aversion of manager. Intuitively, a more risk-averse manager will choose a higher K to smooth consumption more between the two states. A less risk averse manager will choose a lower K to maximize expected wealth. As shown in the graph the solution is point C, where the indifference curves of the manager are tangent to the segment A-B.

Proposition 3 has a testable cross-sectional prediction: that all else equal, that is, with same residual uncertainty about type, junior managers are more likely to churn than senior ones, and therefore more likely to be associated with excess risk-taking by firms (indeed, if type uncertainty were greater for juniors, it would only strengthen their incentives to churn). Since in the equilibrium with competition K^* can be taken as a measure of the pervasiveness of churning, it is interesting to investigate how it responds to changes in the parameters of the problem. We establish these comparative statics results for the case in which managers have a power utility function:

Proposition 4 (Comparative statics in the churning equilibrium) *If managers have a power utility function $u(w) = \frac{w^{1-\gamma}}{1-\gamma}$ (with $\gamma \geq 0$), then the optimal number of churning periods is*

$$K^* = \max \left\{ \frac{(T-3)(x-gy) - 2(g-1)[x - (1-p)c]}{g[x - y - (1-p)c] + (1-p)c}, 0 \right\}, \quad (10)$$

where $g \equiv \left[\frac{pc}{x-y-(1-p)c} \right]^{\frac{1}{\gamma}} > 1$. K^* is increasing in the managers' employment horizon T and degree of relative risk-aversion γ , and is decreasing in the cost of project completion c .

Proof: The result that in (10) K^* is increasing in T is immediate. To establish the other results, first notice that clearly g is decreasing in γ . Then, differentiating (10) with respect to g , we find

$$\begin{aligned} \frac{dK^*}{dg} = & - \{ [2[x - (1-p)c] + (T-3)y] [g(x-y) - (g-1)(1-p)c] \\ & + [(T-3)(x-gy) - 2(g-1)[x - (1-p)c]] [x-y - (1-p)c] \} \\ & \cdot [g(x-y) - (g-1)(1-p)c]^{-2}. \end{aligned}$$

This derivative is negative, because all the terms in square brackets are positive. It follows that K^* is increasing in γ . Next, the derivative of (10) with respect to c is

$$\begin{aligned} \frac{dK^*}{dc} = & - \frac{2[x + gy - 2(1-p)c] + (T-3)(x-gy)}{[g(x-y) - (g-1)(1-p)c]^2} (1-p)(g-1) \\ & + \frac{1}{\gamma} pg^{\frac{1}{\gamma}-1} \frac{x-y}{[x-y - (1-p)c]^2} \frac{dK^*}{dg} < 0. \end{aligned}$$

since $dK^*/dg < 0$ (as just shown). ■

These results are intuitive. A longer employment horizon T makes the manager more averse to revealing his type, because the implied risk refers to a larger future cash flow, and therefore induces him to churn for a longer interval. By the same token, a more risk-averse manager will seek more insurance, and therefore churn longer. The cost of project completion c has the opposite effect, since it captures an efficiency loss arising from the manager's departure and therefore can be regarded as the cost of churning (which they pay for in their wages).

4.3 Extensions

We have assumed so far that it is firms that assign managers to risky or safe projects. This assumption can be easily relaxed. Because managers receive all value added from the projects, the results would not change if they could choose the projects themselves. In fact, a bad manager would efficiently choose a safe project; while the other managers (whether good or of unknown type) would choose the risky project, as they are the projects that maximize their utility.

In contrast, the assumption of symmetric information between firms and managers is critical. If managers knew their type, then there would be no insurance in equilibrium that can be obtained through churning. In fact, good managers would stay in their initial firm so that they are revealed as good and can enjoy higher pay. Bad managers would then also be revealed and assigned to safe projects from period 2 onwards.

Finally, the assumption that firms can commit to a long-term incentive scheme does not affect the solution in the presence of a competitive market for managers. In fact, the competitive market for managers makes sure that at any point in time the firm pays the manager the entire value added that they produce. However, in the case of no competition, lack of commitment by the firm implies that the firm extracts all the value added produced by managers. In other words, while firms can insure managers, they do so by driving managerial utility down to the reservation value (which is normalized to zero in the model). Hence, managers are better off without competition for managers when firms can commit but prefer competition when firms cannot commit. We leave the analysis of this latter case for future research.

4.3.1 Learning about manager's type

Let c be stochastic: $\tilde{c} = C$ with probability π and $\tilde{c} = 0$ otherwise, where π is a very small probability and C is a large loss (tail risk). After the observation of a loss C , the firm learns for sure that the manager is of bad quality, $p_0 = 1$. If instead the manager stays for 2 periods and the firm observes a realization $\tilde{c} = 0$, the firm updates the probability that the manager is of good quality. Using Bayes' rule,

$$p_1 \equiv \Pr(G|\tilde{c}_t = 0) = \frac{\Pr(\tilde{c}_t = 0|G) \Pr(G)}{\Pr(\tilde{c}_t = 0|G) \Pr(G) + \Pr(\tilde{c}_t = 0|B) \Pr(B)} = \frac{p}{p + (1 - \pi)(1 - p)} > p$$

In general, such updating happens after the observation of n^{th} realization of $\tilde{c} = 0$ following $n - 1$ realizations of $\tilde{c} = 0$:

$$p_n = \frac{p}{p + (1 - \pi)(1 - p)} p_{n-1} = \left(\frac{p}{p + (1 - p)\pi} \right)^{n-1} p \equiv \xi^{n-1} p$$

The critical difference in this setup is that, even if a manager stops churning after K periods, his type is not necessarily learnt immediately. In particular, the expected

productivity (and thus the outside option) of a manager that had n realization of $\tilde{c} = 0$ is $x - (1 - p_n)c$.

In this setup, a good type will receive a final wealth

$$W_G \equiv (K + 2)[x - (1 - p)c] + (T - 3 - K)(x - c) + pc \sum_{i=1}^{T-3-K} \xi^i$$

The critical difference from the case before is the last term: each period $n \in \{1, T - K - 3\}$ after the first $K + 2$ period the good manager accumulates his outside option $x - (1 - p_n)c$, where p_n is given above.

The final wealth of a bad manager depends on whether (and when) he is found out for sure, that is, it depends on whether $\tilde{c} = C$ at any point in time in his career. If a bad manager is found out j periods after $K + 2$ with $j \in \{0, T - K - 4\}$, his final wealth is

$$W_B^j \equiv (K + 2)[x - (1 - p)c] + (T - 3 - K)y - j(y + c - x) + pc \sum_{i=1}^j \xi^i$$

In fact, he accumulates his outside option $x - (1 - p_n)c$ each period between 1 and j and he is assigned to the safe task for all remaining periods $T - 3 - K - j$. Each of these cases happen with probability $\pi(1 - \pi)^j$. If he is lucky enough to avoid any realization of $\tilde{c} = C$ (which happens with probability $(1 - \pi)^{T-3-K}$) then his final wealth is equal to W_G above.

The manager's problem is to maximize his expected utility as a function of K :

$$\max_K \left[p + (1 - p)(1 - \pi)^{T-3-K} \right] u(W_G) + (1 - p) \sum_{j=0}^{T-4-K} \pi(1 - \pi)^j u(W_B^j).$$

As in the basic case, W_G is decreasing in K while W_B^j is increasing in K . Hence, intuitively the same results can be derived in this case.

5 Policy interventions

The model presented in the previous sections highlights that competition for managerial talent induces inefficiencies in two ways: first, it limits risk-sharing opportunities

that firms can offer to managers; second, it induces excess risk taking and therefore a loss of productive efficiency. In this section we consider which policy interventions can limit or eliminate these inefficiencies. Such public interventions are warranted by the fact that in our churning equilibrium, no individual bank has the incentive to deviate and unilaterally stop competing for other banks' managers: in the words of the initial quote by Tett (2009), banks "feel utterly trapped", and only the intervention of a public authority (such as FIFA for soccer) can stop banks from poaching employees from each other.

5.1 Clawbacks and long-term indexing

Several recent proposals to reform managerial compensation in financial institutions are based on the idea that it would be desirable to defer ("claw back") a part of the managerial compensation and index this deferred compensation to long-term managerial performance. The idea behind such proposals is to address excess risk-taking. Note that excess risk-taking also arises in our "churning equilibrium". Hence, it is desirable to discourage managers from taking projects that are likely to be highly profitable in the short run but feature "tail risk".

However, in our benchmark setting deferring compensation would be inconsequential. The model places no constraints on deferral of managerial compensation: indeed, in the above analysis compensation is already assumed to be paid at the end of the manager's career. Even in the churning equilibrium, it is inessential whether in each period the employer pays the manager's compensation for that period or defers it to some future date: the essential point is that the compensation cannot be made contingent on the manager's type. In such an equilibrium, long-term indexing would be ineffective, because the past performance of the manager is uninformative about his type (his "true alpha").

It is true instead that anything that constrains the firms' ability to defer compensation is inefficient. As shown by Corollary 3, if for some exogenous reason firms cannot defer compensation entirely and make payments contingent on the employees' loyalty, then the parameter region where the first-best outcome obtains shrinks.

5.2 Salary caps

Another very frequently mentioned policy proposal is to impose a cap on managerial compensation. How would such a policy change the equilibrium in our model with managerial competition? Specifically, would it make churning – and the associated excess risk taking – less attractive to managers?

Suppose that policy-makers were to introduce a salary cap on the per-period compensation of managers, at the first-best level w^* . Such a cap would indeed prevent employers from poaching high-quality managers from each other in the competitive regime, and make the perfect risk-sharing and no-churning outcome sustainable in equilibrium. To see this, consider the candidate equilibrium where each employer offers the wage w^* to all his managers, and assigns them optimally once their type becomes known. Then, due to the salary cap, a competing employer could not poach the managers who have proved to be good from their current employer. Moreover, churning for K periods would not be an equilibrium: in that case, on a per-period basis he would earn utility (7) which is smaller than the first-best utility $u(\Pi^*)$, so that he would not deviate from an employer who offered him w^* .

So a binding price cap would guarantee efficient risk-sharing between employees by shutting down competition for good managers. It would also simultaneously ensure the avoidance of excess risk-taking by firms, since it would discourage managers from churning across firms to avoid revealing their true ability. This highlights that current policy proposals about caps on the pay of top managers of financial institutions may have an efficiency rationale, not just a basis in ethical and political concerns (though this efficiency rationale is yet to be spelled out by those proposing caps). Indeed, according to the model, an appropriately set pay cap would raise the expected utility of managers themselves.

5.3 Taxing mobility

An effect similar to that of a salary cap could be achieved by a tax on managerial mobility: suppose that the compensation of a manager who switches to a new em-

ployer were taxed at a higher rate than that of a loyal manager. If the tax is set at a sufficiently high rate, it would effectively move the economy to the first-best even if the managerial labor market is competitive, as it would effectively block *ex-post* competition for managerial talent. Note that such a tax would never be paid in equilibrium, since managers would not switch to other employers. Therefore, the policy prescription arising from the model is to “throw sand in the wheels of the managerial labor market”.

To see this, consider the equilibrium where each employer pays the first-best compensation Π^* to all his managers, and assigns them optimally once their type becomes known. After the first two periods, managers learn their type. Hence, the good manager could leave and obtain a utility $u((T - 3)x)$. As shown in Section 4, this deviation is profitable if $T > \hat{T}$, where \hat{T} is given in (5). Then, a tax on mobility

$$\tau \geq u((T - 3)x) - u(\Pi^*) \quad (11)$$

would prevent this deviation. Notice this condition would also ensure that there is no deviation after the third period because the benefits of deviating in period $H > 2$ (i.e. $u((T - 1 - H)x)$) decreases in H while the cost of deviating (i.e. the loss of $u(\Pi^*)$) does not change. With such a tax on mobility (11), a competing employer could not poach the managers who have proved to be good from their current employer.

5.4 Investments in “alpha”

As discussed above, both a salary cap and the equivalent tax on managerial mobility would redistribute income from good to bad managers. In the current setting this redistribution prevents managerial churning and facilitates productive allocation of talent. We note, however, that the redistribution could have a negative effect on efficiency in a richer setting in which managers invest in their quality *ex ante* at a private cost – for instance, by taking an MBA they can raise their probability p of being a good manager. In this case, capping their salary – and therefore their lifetime compensation – would reduce the “average alpha” of managers in equilibrium.

Moreover, in the real world preventing reallocation of managerial talent may have

efficiency costs that are not captured by the present model: if both managers *and* firms are heterogeneous, they may both learn gradually about the quality of their match, so that it may be efficient for bad matches to be dissolved and new ones be formed. Also, limiting or preventing managerial mobility may confer market power to firms, and thereby create holdup problems. In our setting, this would be inconsequential because of *ex-ante* competition, but in reality this assumption may not hold either. Such considerations are worthy of further modeling in the context of our setup which focused exclusively on one dark side to managerial mobility.

6 Conclusions

In this paper we showed that the market for managers has a dark side, in that it allows them to take on projects with short-term rewards at the cost of exposing firms to long-run or tail risks, since they can move across firms before these risks are realized. If the market for managers is effectively shut (for example, due to firm-specificity of managerial investments), then the outcome is improved in that it features less inefficient risk-taking. This is associated with two benefits: (i) firms can learn about their managers' types over time and use this information to achieve production gains, because employees do not leave; and, (ii) firms can offer insurance gains to their employees, because the better employees can be used *ex post* to subsidize the worse ones, and thereby all employees can be insured against the risk arising from the value of their own human capital *ex ante*. We do not intend to suggest that there is no economic value to the market for managers and employees, but simply highlighting the counterintuitive possibility that the market for managerial mobility pierces through essential firm boundaries and fundamentally interferes with firms' ability to generate information about employees.

Besides our theoretical contribution that is especially suitable for understanding risk-taking in the financial sector, our line of research also suggests an empirical one. The immediate testable prediction of our model is that there should be a positive correlation over time between the mobility of senior managers and traders across financial institutions and their risk-taking. Moreover, according to the model, cross-

sectional differences between managers can make some of them more prone to switch jobs than others, for instance, because – in keeping with the model – they are at the start of their careers and have a lower degree of firm loyalty and firm-specificity of skills. Then our analysis implies a second testable prediction: the larger risks taken by financial institutions should be systematically related to the subset of managers (e.g., young traders with substantial type uncertainty) that are more likely to move across financial institutions. In other words, the hypothesis is that there is a group of highly rewarded managers who specialize in taking tail risks and move rapidly across employers.⁷ We plan to pursue empirically the full set of testable implications of our model in future research.

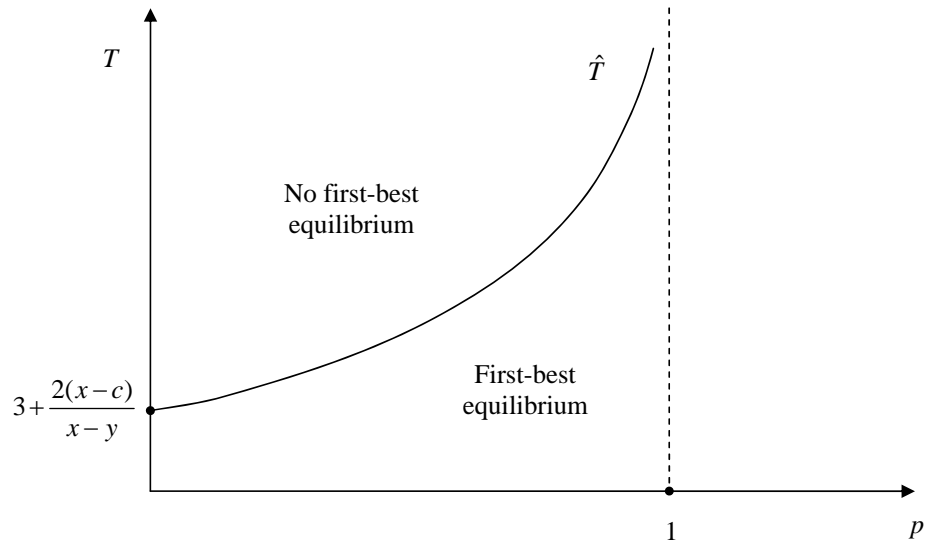
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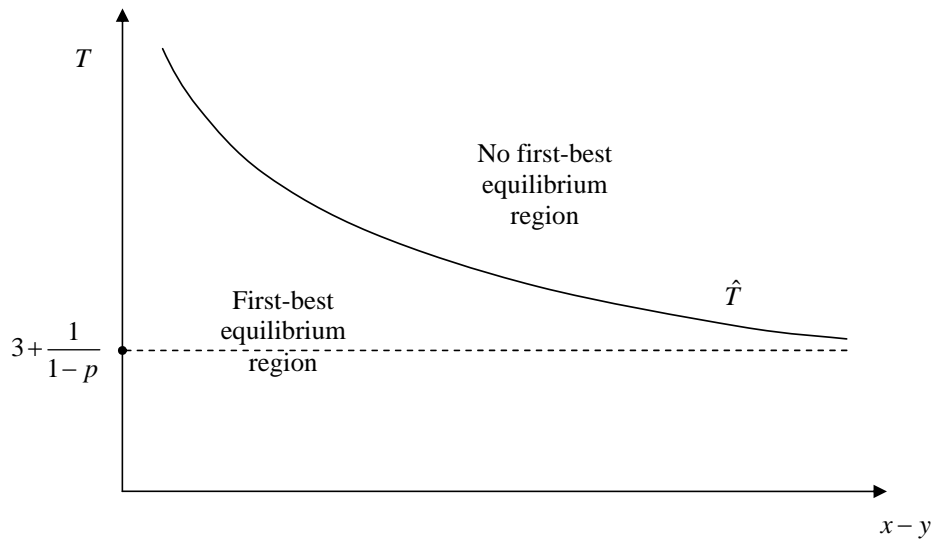
⁷Indeed, recent empirical work by Deuskar, Pollet, Wang and Zheng (2009) suggests that the turnover of managers from mutual fund industry to hedge-fund industry may be a potentially useful setting to test the implications of our theory. In particular, they find that best-performing mutual fund managers stay in-house and do hedge-fund style investments, whereas average performers switch to the out-of-house hedge funds.

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Panel A. First-best equilibrium, career duration (T) and fraction of good managers (p)



Panel B. First-best equilibrium, career duration (T) and excess return of risky project ($x-y$)

Figure 1. First-best equilibrium region

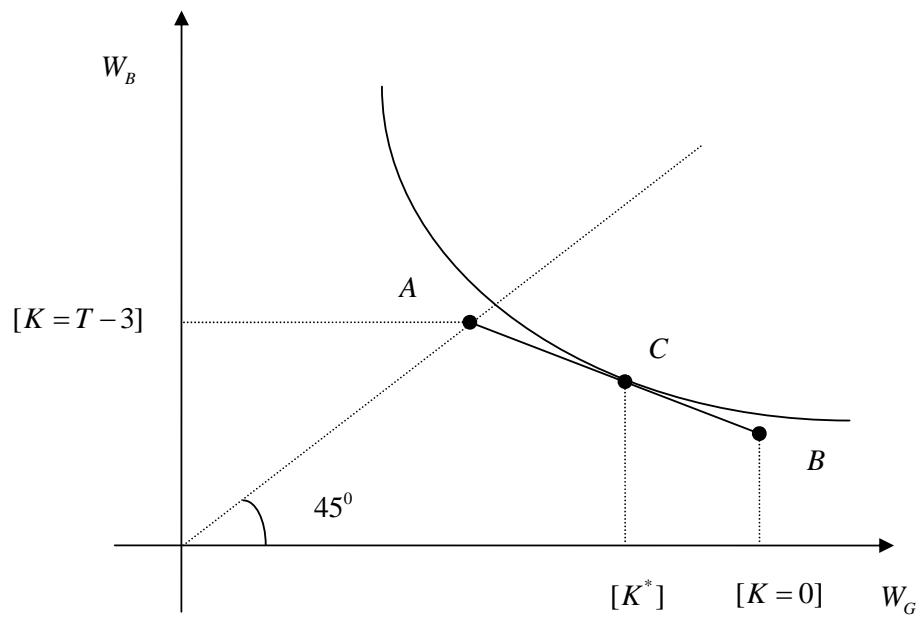


Figure 2. Churning equilibrium