A Literature Review of Career Concerns: Theories and Empirics

Desen Lin[†]

University of California, Santa Barbara

March, 2015

Abstract

The paper conducts a literature review on the topic of career concerns covering both theory and empirics. Career concerns describe a class of dynamic games with asymmetric information, endogenous feedback and reputational concerns. As a mixture of adverse selection and moral hazard, the principal-agent models of career concerns are grouped into three categories based on different interpretation of the agent's type: productivity, taste and preferences, and expertise. Career concerns possess explanatory power in many aspects of real life, from labor markets to social media, and from financial industries to political institutions.

Keywords: career concerns, principal-agent model, employer learning, reputation, adverse selection, moral hazard.

[†]desenlin@umail.ucsb.edu. Department of Economics, University of California, Santa Barbara. I want to express my gratitude to professor Peter Kuhn for recommending related literatures and providing me with constructive advice. All errors are mine.

1 Introduction

When asymmetric information arises, how to police moral hazard that transacting parties cannot contract contingent on the delivery of the good has brought about much discussion since 1980s. One thread of thoughts, pioneered by Fama (1980), reasons that *the lack of contingent pay doesn't really matter; the agent's career concerns will induce him to exert effort.* Fama's conjecture argues that reputation concerns mitigate the incentive problems. Moral hazard is resolved without explicit incentive contracts, since efficient implicit incentive contracts can be provided by the market.

Fama's conceptual idea gives birth to a plethora of research in both theories and empirics. The earliest attempt to characterize career concern in the principal-agent model is done by Harris and Holmström (1982) and Holmström (1999). Career concern is modeled in a spot labor market and as a sequential signal extraction process by the principal to learn the agent's productivity. Building early reputation as a highly productive type drives a worker to exert effort. Holmström (1999) finds that risk-aversion and discounting limit the market's ability to incentivize agents; Fama's conjecture is true only under very narrow assumptions.

There is no universal way of modeling *the type* of the agent. The common practice is that the type is never revealed directly to, but is messaged through the partially informative but possibly noisy signals to the principal. Signaling and hidden actions implies there is no explicit boundary of adverse selection and moral hazard; career concerns thus characterize the mixture of the two classical models. Due to the richness in the informational contexts, diverse understanding about the agent's type has sprung up, falling into three main categories. In the paper, they are named as *productivity* models, *taste and preferences* models, and *expertise* models, respectively.[1]

[1] The paper restricts its attention to career concerns models that (i) contain elements of both

The first generation of models, usually modeled in the Fama-Holström fashion with the employer-learning setting, assumes the agent's type is the ability to exert effort, *i.e.* productivity. The main goal is to investigate to what extent Fama's conjecture is true, what is the optimal incentive contract, and how risk trades off incentives. The models in the category typically feature independent normal distribution which is assumed in all aspects of randomness or biases for simplicity. See Harris and Holmström (1982) for wage dynamics and insurance-incentive tradeoff, Holmström (1999) for the discussion on Fama's conjecture, Gibbons and Murphy (1992) for optimal linear incentive contracts, and DeGroot (1970) for technical details about Bayes normal updating.

The second exposition of the type in career concerns goes beyond the basic employer-worker setting. The type is no longer summarized by specific parameters, but instead is represented by distinct forms of general preferences. In other words, the agent and the principal could have the same or incongruent taste of actions or the state of the world. If we apply the standard of career concerns as a mixture of adverse selection and moral hazard to the second class of models, it can be categorized as career concerns. So can the last interpretation of the type. Hidden information comes from asymmetric information about agent's true preference, congruent with principal's or not, while hidden action comes from agent's incentives to misreport the signal so as to build reputation by creating an endogenous type. Morris (2001) puts forward the first cheap-talk model in Crawford-Sobel style to study political correctness, pointing out possible perverse reputational effect due to career concerns.

---

moral hazard and adverse selection, and (ii) allow principals' offers to depend only on each agent's own history. Thus, the review excludes "rat race" models of careers such as Akerlof (1976) and Landers et al. (1996), because they are pure adverse selection models, and because they let principals condition their offers to any one agent on other agents' histories. The review also excludes career models such as where principals can use instruments other than one-period wage offers, such as promotion contracts.

Maskin and Tirole (2004) explains in a similar framework why politicians are usually elected while judges are appointed, from the prospective of career concerns.

The last interpretation of the agent's type is the expertise, the ability to learn the state of the world. Expertise is similar to, but different from the type discussed in the Fama-Holström models. Random productivity in the latter case is stochastic (*ex ante* homogeneous but *ex post* heterogeneous) and signaling is imperfect. The models about expertise exclude such type uncertainty, which is similar to the second class of models, but focus on how biased the agent can be in signaling process. The sources of the bias and the ways of killing it are also deeply investigated. Prendergast and Stole (1996) studies how investment managers become "stubborn" by overweighing past information and under-updating belief. Dasgupta and Prat (2003) argue that enhancement of trading volume in financial markets is due to career concerns of the portfolio managers, who are noisy traders involving in trade with negative returns. Gentzkow and Shapiro (2006) casts sight on media biases; they observe that media firms tend to slant towards readers' prior, making all market participants worse off.

There are several components shared in common by diverse formalizations of career concerns. First of all, the value of agent's reputation is translated into the principal's updated beliefs, through the observable history of signals. Reputation is thus relevant in both principal's and agent's decisions. Instead of inducing reputation through infinite repeated games, reputation in career concerns is valued even in finite horizon dynamic games with signal extraction and feedback. Moreover, in the employer-worker setting, long-term contracts are infeasible and the labor market is assumed to be a spot market.[2] Incomplete contract, or contract not contingent on

[2] There are two arguments for the spot-market assumption. First, for a finitely long-term contract, the finite periods can redefined as a big period with bigger and more complicated choice set, which is not structurally different from the spot market. Second, for the infinite horizon contracts, Gibbons and Murphy (1992) shows the assumption is equivalent to that long-term contracts exist but must be Pareto efficient at each period, *i.e.* the long-term contract is renegotiation-proof. This

future output, is the soul of the career concern problems. As to the survey papers about career concerns, refer to Gibbons and Waldman (1999), Lazear and Oyer (2007) and Oyer and Schaefer (2011).

The empirical tests or evidence of career concerns are not as extensive as the theoretical discussions. As career concern deals with dynamics and implicit contracts, high-quality panel data long enough in time are necessary to identify the incentives generated by the implicit contracts. Data from the financial markets are frequently used by researchers to empirically test career concerns, not only because data is relatively abundant and transparent, but also because the agency problem is commonly encountered in the financial markets.

Gibbons and Murphy (1992), Altonji and Pierret (2001), Chevalier and Ellison (1999) and Kahn and Lange (2014), either indirectly or directly, test the employer-learning model and find some support for the theory. Besley and Coate (2003) and Garicano et al. (2005) identify the perverse effect of career concerns in the political correctness model, from the public utility sector or the football pitch. Zitzewitz (2001) and Gentzkow and Shapiro (2006) observe predicted career concern biases from the financial market and social media market.

The plan of the literature review is as follows. theory exposition of career concerns is split into three interpretations about the agent's type discussed above: productivity, taste and preference, and expertise. Each theory exposition is aligned with corresponding or closely related empirical evidence. The last section summarizes the literature review and discusses future directions of research.

---

mimics the effect of competition among the principals.

2 Productivity

2.1 Theories

2.1.1 Employer Learning: Holmström (1999)

Holmström considers a common agency problem with many identical principals and a single agent in an infinite horizon model. Agent's unobservable ability η, which is constant over time, is drawn from a normal distribution $N(m_1, h_1)$, with common prior mean m_1 and precision h_1 (reciprocal of the variance). The realized ability is revealed to the agent but kept unknown to the market. Principals are only able to observe the output y_t at each period, determined by the hidden information η, agent's hidden action a_t and luck $\epsilon_t \sim N(0, h_\epsilon)$:

$$y_t = \eta + a_t + \epsilon_t \tag{1}$$

Incomplete contract is assumed. That is, only period-to-period fixed wage contract is feasible. The competition in the principal market implies the wage is bid up to the marginal product, given the observable history, $w_t = \mathbb{E}(y_t | y_{t-1}, \ldots, y_1)$. A hiring principal has value $y_t - w_t$, while the agent's payoff is $\Sigma_t \beta^t [w_t - g(a_t)]$, with the discount rate β and a well-defined convex effort function $g(\cdot)$.

Consider the non-contingent non-stochastic strategies of the model for simplicity. We then observe a deterministic path of outputs and wages, regardless of any stochastic randomness. The optimal decision rules then involve the principals choosing the wage contract $\{w_t\}_{t=1}^{\infty}$ and the agent choosing the effort levels $\{a_t\}_{t=1}^{\infty}$.

The timing is as follows. After the ability is realized, the principals first offer wage w_1. The agent chooses a_1. Then, the principals observe y_1 and offer wage w_2. The

agent chooses a_2, and so on so forth.

As the wage contract is dependent on the effort level, and vice versa, the optimal strategies are determined simultaneously. One famous implication of the posterior normal distribution from DeGroot (1970) simplifies the problem.[3] The transitions of the sufficient statistics of the normal distribution are

$$\begin{aligned} &\text{posterior mean: } m_{t+1} = \frac{h_t}{h_t + h_\epsilon} m_t + \frac{h_\epsilon}{h_t + h_\epsilon} z_t \\ &\text{posterior precision: } h_{t+1} = h_t + h_\epsilon \end{aligned} \tag{2}$$

where $z_t = y_t - a_t^*$ and a_t^* is the effort level on the equilibrium path. By assuming optimal effort levels and wage contract and applying the one-shot deviation principle, we solve the optimality condition

$$g'(a_t^*) = \Sigma_{s=1}^{\infty} \beta^s \frac{h_\epsilon}{h_t + s h_\epsilon} \tag{3}$$

The comparative statics show the effort level is (i) increasing in h_ϵ: less dependent on luck, (ii) decreasing in h_1: less uncertainty about agent's ability, and (iii) increasing in β: career concerns are stronger. Note that in the infinite future, agent's ability is fullly revealed to the market: $\lim_{t \to \infty} h_t = \infty$. There is no more incentives to build reputation, when there is no hidden information. This explains the descending effort levels in the model.

Before revisiting Fama's conjecture, we modify the basic model and impose a stronger assumption of stationarity. Assume the ability follows the random walk.

$$\eta_{t+1} = \eta_t + \delta_t \tag{4}$$

[3] The learning process is a special case of hidden Markov chains and Kalman filtering.

where $\delta_t \sim N(0, h_\delta)$. Since noise keeps adding to the employer's learning process, there is no full but partial revelation: $\lim_{t\to\infty} h_t = h^* < \infty$. The corresponding stationary optimality condition is

$$g'(a^*) = \beta - \frac{(1-\beta^2)h^*}{h_\epsilon + (1-\beta)h^*} \tag{5}$$

With complete information, the first best effort level is given by $g'(a^{FB}) = 1$. Compared the first best with the employer-learning model, we can conclude that Fama's conjecture is true only under very narrow assumptions; implicit contracts are powerful enough to eliminate moral hazard only when there is no discounting. Otherwise, the stationary efforts are strictly lower than the first best levels; moral hazard is mitigated but still persists.

2.1.2 Optimal Incentive Contract: Gibbons and Murphy (1992)

The lack of elaborate characterization of the explicit contract in Holmström (1999) could not clearly show the types of tradeoff in the career concerns problem. Innovation in Gibbons and Murphy (1992) imposes the structure of the explicit incentive contract to be linear and decomposes the tradeoff between implicit and explicit contracts.

For expositional purpose, consider a two-period employer-learning model similar to the basic model discussed in Holmström (1999). Three additional assumptions are made. First, the agent possesses negative exponential preferences $-e^{-r\cdot PV}$, where PV is the present value of the agent in Holmström (1999). Second, agent's ability is drawn from normal distribution known to the market and kept constant.[4] Last, the following linear contract is assumed to be feasible:

[4] In Holmström (1999), note that the agent has perfect information about her ability, instead of knowing her ability from a distribution; the market has a common prior following a normal distribution. The assumption made in Gibbons and Murphy (1992) is close to that in Harris and Holmström (1982).

$$w_i(y_i) = c_i + b_i y_i, \;\; i = 1, 2. \tag{6}$$

where b_i and c_i are certain constants. With finite number of periods, the problem can be solved backwards. Competition among principals yields zero profit of the hiring firm; the additional condition reduces the linear incentive contract with two unknowns to only one unknown, say b_i. The major concern is to find the determinants of b_1 and b_2, which capture the incentives in the explicit contract. The main theoretical prediction is that

$$b_1^* < b_2^* \tag{7}$$

Three effects co-determine the magnitude of b_i: (i) noise reduction effect, (ii) career concern effect, and (iii) insurance effect. Noise reduction effect means acquiring information reduce uncertainty about the agent's ability, which enhances incentives and creates positive effect on both b_1 and b_2. The career concern effect is only in the presence of the first-period wage contract. Due to the agent's career concern in the first period, the optimal explicit incentives are adjusted to account for reputation. There is no need to incentivize the agent as much as the second period. b_1^* is thus driven down. The insurance effect results from the uncertainty in the realization of agent's ability. The agent wants insurance against the possibly low ability. The first-period wage contract thus tend to be flatter and requires lower b_1^*. Note that in some extreme situations, b_1^* can be driven to be negative when career concern and insurance effect are dominant.

Availability of long-term career data of CEOs allows testing the proposed theory. Gibbons and Murphy (1992) look into *Executive Compensation Survey* data in *Forbes* from 1971 to 1989. Over 1,000 CEOs and over 500 corporations are in the observations. They figure out a plausible way to test their major finding. That is, the slope

term b_t of the incentive contract is increasing in t. Their focus is the pay-performance relationship. The authors explore the trend of b_t (i) when the CEO is near retirement, and (ii) when the tenure as CEO is longer. They find some supportive evidence of the first claim but not for the second.[5]

2.2 Empirical Evidence

2.2.1 Termination and Performance: Chevalier and Ellison (1999)

Evidence of Gibbons and Murphy (1992), in some sense, is indirect, claimed by Chevalier and Ellison (1999). This paper examines the labor market for mutual fund managers. By investigating job termination, one aspect of career concerns, the authors find certain investment patterns of managerial behaviors in their early careers.

Instead of looking at the pay-performance relationship, Chevalier and Ellison (1999) concentrate on the termination-performance relationship. Termination is defined as either (i) disappearing from fund management, or (ii) obtain a position at a smaller fund. The data that the researchers employ is Morningstar *Mutual Funds OnDisc* from 1992 to 1994. The dataset contains information on 453 portfolio managers who had primary responsibility for a growth or growth and income mutual fund.

The paper examines the determinants of termination in details. The probability of termination of the younger managers is found more performance-sensitive than that of

[5] The career concern effect in Gibbons and Murphy (1992) is similar in observation to the multistage tournament effect in Rosen (1986). Both models predict that incentives shall ascend in time or over the stages of promotion. Rosen (1986) argues that large enough first-place prize is necessary to give agents in the middle of the promotion ladder something to shoot for. Although the literature review focuses attention on career concerns, multistage tournament and promotion have intersection with the topic. If we agree with the assumption that CEO is at the top of the promotion ladder, the finding in Gibbons and Murphy (1992) is still robust in the presence of Rosen (1986)'s promotion. It will be an interesting future research topic to investigate whether it is possible to separate two effects, career concern effect and multistage tournament effect. If so, which effect dominates in the contract.

the old ones. Two key observations are found from the data. First, a closer look shows the probability of termination is a convex function of performance. That is, younger managers have more incentives to avoid unsystematic risk in investment, for fear of huge increase in the possibility of termination. Second, by looking at the investment actions of the portfolio managers, the probability of termination of younger managers is increasing in the deviation of fund's sector weightings or unsystematic risk level from the average objective levels, as is suggested by the theoretical literatures. The second observation implies there are incentives to herd; being an outlier when young is too risky.

The authors finally look at how investment flows react to managerial termination. If consumers believe that managerial ability exists, one might imagine that they will reallocate their investments in response to changes in a fund's management, and that this might well provide an additional motivation for funds to fire or retain managers. Weak evidence of the behavior are found on the part of consumers.

2.2.2 Statistical Discrimination: Altonji and Pierret (2001)

It is always hard to interpret the correlation between wage and observables including education and race. Such correlation can result from statistical discrimination, and it can also come from the correlation between the observables and unobservable productivity. In a framework similar to Farber and Gibbons (1996), Altonji and Pierret (2001) attempt to answer the following questions: (i) whether employers statistically discriminate among young workers on the basis of easily observable variables such as education, race, and other clues to a worker's labor force preparation, and (ii) whether employers rely less on such variables when they learn over time.

The key hypothesis of which the paper explores the implications is referred as Employer Learning with Statistical Discriminiation (EL-SD). Firms at first are assumed

to distinguish workers only by observables correlated with productivity, *i.e.* education, race etc. Over time, the worker's performance is informative to the employers. The main contribution of the paper is to solve the identification problem of statistical discrimination. The authors provide a testable way to disentangle statistical discrimination from the wage-observables correlation. AFQT scores that are correlates of productivity are unavailable to the firms but are accessible to the econometricians as a good proxy of the productivity. Apart from AFQT scores, father's education and wage rates of older siblings as the hard-to-observe variables are used to study statistical discrimination.

If the Employer Learning Hypothesis is true, the theory predicts the coefficients on easy observables decrease over time, while those on AFQT scores, the proxy of productivity, increase over time. The predicted observation implies less weight on observables such as education and race, and more weight on unobservable productivity due to informative employer learning. Using NLSY79 data, the researchers find supportive evidence for the hypothesis that firms indeed statistically discriminate on the basis of education and learn the workers' productivity over time. However, the research suggests that statistical discrimination on the basis of race plays a relatively minor role in the race gap of wages.

2.2.3 Employer Learning vs Productivity Dynamics: Kahn and Lange (2014)

Kahn and Lange (2014) question the assumption made in Altonji and Pierret (2001) that employers did not have access to the AFQT scores when setting initial wages. As a valuable proxy of the worker's productivity, a firm has the incentive to acquire AFQT scores. Another drawback in the previous research, pointed out by Kahn and Lange (2014), is that Altonji and Pierret (2001) discusses a pure employer learning model, which excludes productivity dynamics as a possible explanation of wage dy-

namics. The researchers attempt to understand why wages of observationally similar workers evolve differently and why these differences increase with age.

Two competing theories, employer learning and productivity dynamics, are tested in a nested model. A 20-year unbalanced panel data set is used, which includes all managerial employees in one firm. The data was previously analyzed in Baker et al. (1994a) and Baker et al. (1994b) (BGH data). The ratings of the employees assessed subjectively by the employers, before and after the current period, are available in the BGH data set. The after-period information used for rating was not available when the employer set the wage rate of the employee in the current period. The dynamics of rating thus describes the ad-hoc employer's learning process over the life cycle, and allows for estimating dynamic specifications of productivity and learning.

Employer learning is distinguished from productivity dynamics by looking at whether past and future are treated symmetrically in terms of the correlation between wage and performance. In the employer learning model, unobserved information matters. The correlation in the past will be greater than that in the future, because firms have incorporated the new noisy signals. But over time, such discrepancy between past and future will be narrowed, due to more precise expectation of the firm. Past and future are thus treated asymmetrically. As to the productivity dynamics, when complete information is assumed, the model predicts no distinction between correlation of wages with past and future performance evaluations. The reason is that both the past and the future encounter uncorrelated shocks of productivity. Past and future are thus treated symmetrically.

The major finding in the paper is that neither of the pure models can fully explain the wage dynamics in the data. However, the nested model has better performance than the pure ones, providing evidence that both employer learning and productivity dynamics matter. Learning a moving target is found common. Overall, the majority

of the observed dispersion in wage residuals is found due to variation in individual productivity. This finding contributes most to the understanding of employer learning in the empirical literature.

3 Taste and Preference

3.1 Theories

3.1.1 Political Correctness: Morris (2001)

The first generation models of career concerns concentrate on the good aspects of reputation, *i.e.* mitigating moral hazard in labor markets. Morris (2001) introduces the political correctness model to explore negative aspects of reputation created by career concerns. Agents are different from each others not by those summary parameters, but instead by distinct forms of preferences. Thus, the agent and the principal could have the same or incongruent taste of actions or the state of the world.

Morris (2001) considers a two-period cheap talk model in the fashion of Crawford and Sobel (1982). There are two equally likely states of the world, $w_t \in \{0, 1\}$. After the state is realized, an agent will receive an informative signal that coincides with the state only probabilistically, $p(s_t = w_t | w_t) = \gamma \in (0.5, 1)$. The agent then decides to announce the message $m_t \in \{0, 1\}$ based on the signal she observes. The principal receives the message and chooses an action a_1. At the end of the second period, the true state is revealed. The principal then updates her prior $\lambda_1 = p(good)$ of the agent being good to

$$\lambda_2 = \Lambda(\lambda_1, m_1, w_1) \tag{8}$$

which is interpreted as agent's reputation. The second period is the same as the first period, except that the agent has no concern about future and reputation.

A good agent is assumed to have preferences identical to the principal's, while a bad agent has incongruent tastes.

$$\begin{aligned} &\text{Principal: } -x_1(w_1-a_1)^2-x_2(w_2-a_2)^2 \\ &\text{Bad agent: } y_1a_1+y_2a_2 \end{aligned} \tag{9}$$

where x_i, y_i are weights on period i, respectively. The equilibrium concept employed in the class of the models is perfect Bayesian equilibrium. As is well known, there are multiple equilibria in the dynamic setting. Morris (2001) focuses only on those "reasonable" equilibria, *i.e.* agents mean what they say.[6]

The authors first find the truth-telling equilibrium fail to exist; biases are inevitable. They then investigate the informative equilibria that are partially truth-telling. First, Strict reputational incentive $\Lambda(\lambda_1, m_1, w_1)$ to announce 0 is observed

$$\Lambda(\lambda_1,0,1) \geq \Lambda(\lambda_1,0,0) > \lambda_1 > \Lambda(\lambda_1,1,1) \geq \Lambda(\lambda_1,1,0) \tag{10}$$

second, the good agent announces 0 when $s_1 = 0$ and announces 1 with positive probability when $s_1 = 1$. Third, the bad agent announces 1 more often than the good one. Bad and good agents are partially self-sorted. The good agent is not willing to announce too much $s_1 = 1$, because the principal will mistake her for the bad agent. Thus, the good agent who have the same preference as the principal fails to act in the the principal's interest, because the principal cannot tell a good agent from a bad one and feedback matters. Last, the existence of an informative equilibrium requires

[6] According to Crawford and Sobel (1982), there always exists babbling equilibria that are fully uninformative. Apart from the reasonable equilibria, there is a class of equilibria called perverse equilibria, *i.e.* agents mean exact the opposite to what they say.

x_2 to be not too large. In other words, reputational concerns should be so dominant as for informative equilibria to exist.

If we compare the career concerns setting with the setting without feedbacks and belief updating, the tradeoff behind career concerns will be clear. First, without career concerns, there is no discipline effect. The bad agent thus has no incentive to build any reputation and reports $m_1 = 1$ anytime. Second, without career concerns, there is no sorting effect. From the principal's point of view, the feedback provides valuable information about types; the principal tends to trust the good agent and mistrust the bad one. Last, with career concerns, there is the political correctness effect. The good agent is "forced" to build reputation and reputation concerns incur the good agent to lie.

There are wide applications of the political correctness model in the real life. Just to mention a few documented in Morris (2001). As to the public official vs government advisor, the latter may care purely about reputation or represent the public majority, while the former is to maximize social welfare. In financial market, risk-averse investor is to maximize their expected utility. The investment decision is delegated to the financial advisor who may act in the interest of the investor or merely care about reputation or job security. In academic publishing, a journal editor prefers to give positive response to high quality paper. He may deal with either a referee who may reward paper quality, or a referee with ideological bias. In the social media market, readers are to know the truth of the event. The media however may hold biased opinions when covering news. Refer to Gentzkow and Shapiro (2006) for the detailed discussion of social media biases.

The perverse effect of career concerns is related to the failure of truth-telling equilibria. The "good" agents at best are to tell the truth probabilistically and to lie in the other cases, not to say worse behaviors of the "bad" agents. If the phenomenon

in society turns prevalent and becomes the social norm, there seems no way to build mutual trust and expect reciprocity from others. A typical question related to the discussion is why judges are appointed, while politicians are usually elected. Maskin and Tirole (2004) analyzes judges versus politicians in a theoretical model following the spirit of Morris (2001). Elections are found to create more accountability, kicking out very biased agents. Appointments induce less pandering, avoiding judges to take politically correct actions. Institutions thus differ in the means, due to different ends.

3.2 Empirical Evidence

3.2.1 Election vs Appointment: Besley and Coate (2003)

In political economy, accountability structures put in place to select public officials. While the principle that legislators are to be elected is now a defining feature of modern democracies, there are some offices where a plurality of selection methods survive. In a framework similar to Maskin and Tirole (2004), Besley and Coate (2003) casts sight on regulatory sectors in the United States. The paper answers from the theoretical viewpoint the question why direct election should lead to more consumer-oriented policies. A panel data set on electricity rates of 40 US states where regulatory regime didn't change from 1960 to 1997 allows empirical investigation of the validity of the prediction.

The idea of the contrast behind direct election and political appointment regulators guides the authors to examine whether there are pro-consumer biases. If regulators are appointed, regulatory policy is nothing special but becomes bundled with other policy issues that the appointed politicians are responsible for. The reason is that voters have only one vote to cast and regulatory issues are not salient for most voters. The appointed regulator is responsible for the stakeholder. In the other case

where regulators are elected, their stance on regulation is the only salient issue so that the electoral incentive is to run a pro-consumer candidate. It is because the elected regulators are directly responsible to the consumers.

Besley and Coate (2003) does find supportive evidence for the theoretical prediction. The states with elected regulators have lower residential electricity prices. The average saving of a consumer is $60 at 1992 prices. Moreover, when fuel prices increase, elected regulators are less likely to pass the higher cost to the consumers. Both are consistent with the idea that elected regulators are more pro-consumer.

3.2.2 Favoritism: Garicano et al. (2005)

Garicano et al. (2005) studies how social pressure determines corruptive behaviors. The research focuses attention on the possible biased decisions made by professional soccer referees in Spanish Football Association from Spain. In particular, referees are suspected to bias in favor of the home teams in front of up to 100,000 spectators. Such pressure from the crowd may bring about favoritism and turn a referee to be unjust. The linkage to the political correctness model is that the type of a referee, either just or unjust, is not directly observable.

The authors adopts the strategy of looking at the injury time in the soccer games. The additional time set by the referees at the end of each game serves to make up the loss of time due to injury or stoppage. On average, the injury time amounts to 3 minutes. The data from the football association enables the researchers to test systematic bias in favor of home teams in choosing the injury time.

We observe from the data that there is evidence supporting favoritism hypothesis when the game is close in scores. If the home team is behind by 1 goal, the injury time is 35% above the average, whereas if it is ahead by 1 goal, the injury time is 29% below the average. In the case when the game is dominant by one team, the effect

of favoritism didn't emerge. Moreover, the biases in close matches is dependent on the size of the spectators in the presence. 1-standard-deviation increase in crowd size causes the home bias to rise by 20%. The empirical evidence matches the intuition behind the theoretical prediction; a biased referee with favoritism will be disciplined so as to build the reputation of a just referee. If more spectators creates greater reputational concerns of the referees, we should expect to observe a positive correlation of biases and the crowd size, as the theory predicts.

4 Expertise

4.1 Theories

4.1.1 Noisy Trading: Dasgupta and Prat (2003)

In the literature of incomplete information, zero trading happens in the well-known Akerlof's lemons problem. The intuition suggests if a buyer (seller) is willing to trade, there must be new arrival of private information, signaling that the asset is worth more (less) than the market price. Adverse selection drives the market to shut down, thus leading to zero trade. Initiated by Grossman and Stiglitz (1980) and Dow and Gorton (1997), one way out of the no-trade puzzle is to introduce noise trading as a consequence of career concerns. Dasgupta and Prat (2003), as well as Dasgupta and Prat (2006) and Dasgupta and Prat (2008), follows this thread of thought to provide a solution to the no-trade puzzle.

In a world with rational traders and no exogenous shock of any form, the authors find career concerns sufficient to generate positive and considerable trading volumes in delegated portfolio management. Young fund managers, who are endowed with lower ability to observe the market fundamentals, may engage in trading randomly

even when there is no private information; the trade thus provides no information about the market fundamentals. Those young fund managers adding noise to the market are called churners in the paper.

Consider a two-period model. There are two equally likely state of the world, denoted by $x_t \in \{-1, 1\}$. The agent (fund manager) receives the signal s_t and sends the message $m_t\{-1, 0, 1\}$, after her type θ, either good (g) or bad (b), is realized. The prior of the agent being good is $p(\theta = g) = \gamma$. The agents differ in terms of their understanding of the state of the world

$$s_t = \begin{cases} -1 & \text{if } \theta = g \text{ and } x_t = -1 \\ 0 & \text{if } \theta = b \\ 1 & \text{if } \theta = g \text{ and } x_t = 1 \end{cases} \tag{11}$$

Note that the good agent has perfect information about the state, while the bad one does not. The principal (investor) cares about whether agent's message matches the state of the world that he couldn't observe.

$$u(m_t, x_t) = \begin{cases} -2 & \text{if } m_t \neq x_t \\ 0 & \text{if } m_t = 0 \\ 1 & \text{if } m_t = x_t \end{cases} \tag{12}$$

The timing is as follows. The principals offer a wage w_1 to the agent. Then the agent observes s_1 and select m_1. After the principals observe m_1 and u_1, w_2 is offered. The agent at last observes s_2 and selects m_2. The paper uses the same equilibrium concept as Morris (2001), focusing on the reasonable equilibria.

As the benchmark case, when there is no career concerns, there is no trading.

That is, if the fund manager doesn't worry about being replaced in the future, or if replacement decision is exogenously specified, then private information is informative about the quality of the asset, leading to the no-trade equilibrium.

With career concerns, however, as the replacement decision turns endogenous, there exists churning equilibrium such that the bad agent (uninformed fund manager) always trades, pretending himself to be the good type (informed) by randomizing among possible trades. If he avoids the churning behaviors, he just signals his lack of information and will be replaced in the future.

The existence of the churners mitigates the adverse selection problems facing those informed. They earn positive profit in equilibrium. From the market point of view, the expected profit of an investor is still zero, because she may delegate the portfolio to a churning manager who has career concerns or probably meet an informed manager who can earn positive profit.

The model with noisy traders solves one solution to the no-trade puzzle. A direct consequence of noisy trading is enlarged trading volumes and trading is no longer a perfect signal of the market fundamentals. Note that in any case the churners and the informed managers will always trade. One may think about how to kill the career concern effect. The authors conclude that as long as the long-term contingent contract on future performance is infeasible, in other words, as long as the contract is *endogenously* determined, there is room for career concerns to survive. The empirical test of fund manager termination mentioned in Chevalier and Ellison (1999) provides direct test of the results.

4.1.2 Media Biases: Gentzkow and Shapiro (2006)

Gentzkow and Shapiro (2006) cast sight on social media markets and explore how media's opinion is biased as the consequence of reputation concerns. Media are dif-

ferentiated in terms of their quality of information source. As general readers value the truth of the events, the social media have incentives to build reputation as a perfectly informed news source. In the benchmark model, readers are principals while social media firms are agents. Agents are either perfectly informed (good type) or partially informed (bad type). Gentzkow and Shapiro (2006) investigates the reasonable equilibria in a dynamic model similar to Dasgupta and Prat (2003). A minor but important modification of the assumption is that feedback at the end of each period is probabilistic, which nests the previous model as a special case. New results spring up when the framework is extended to incorporate competition among agents and agent heterogeneity.

Assume the perfectly informed firm is always truth-telling. The paper focuses attention on the partially informed and reasonable equilibria. Media bias is defined as the probability when the signal received differs from the message reported. In the benchmark model where the media firm is treated as a monopoly, the analysis starts with the finding that social media firms tend to slant their report toward the prior belief of the readers in order to build a reputation for quality. Media biases are proved to be socially inefficient under certain conditions; firms earn less value from the reputation, while the readers receive biased information. When competition among media firms is introduced, *i.e.* the readers can receive *independent* evidence on the true state of the world, the media bias is mitigated.

Analysis of the endogenous feedbacks in Gentzkow and Shapiro (2006), characterized by the probability of knowing the true state at the end of each period, is in the absence of the previous research. The importance of endogenous feedbacks is that exogenous feedbacks may induce readers to acquire additional information *ex post*. In the exogenous setting, it has been proved that for any level of precision of the signal, there exists a minimum level of feedback probability that induces truth-telling

behaviors of the firms. There is a negative relationship between media bias and the number of independent media firms; when the number of firms is large enough, firms report truthfully. If media firms are jointly owned, the media bias is immune to the number of firms and we go back to the benchmark case with monopoly media.

The evidence from media markets sheds light on the empirical test of the theory. The researchers turn to a forecasting environment with rapid feedback in which emotions run high and concrete stakes tend to be low: sports picking by local newspaper columnists. Drawing on data on *New York Times* sports editors' predictions from 1994 to 2000, the authors look for possible evidence that the local columnists favored *the Jets* and *the Giants*, two local teams, to win over non-local teams in their picks. The theory says if the newspaper biases towards readers' desire to hear felicitous report, we should observe statistically biased picks of the two local teams to win. Moreover, since the outcomes are observed soon after reports are made, which could be interpreted as high probability of feedback, we should expect almost no media bias in the story. The evidence turns out not to support the hypothesis that the picks were biased towards local teams.

The authors also look at the data from the 2000 Local News Archive, containing local election news coverage of running for the president. 74 stations in 58 of the top 60 media markets in the US are covered. The paper examines the seconds of speaking time given to George W. Bush and Al Gore, respectively. The squared deviation of the fraction of time from 0.5 is treated as the media bias. The theory predicts a negative correlation between media competition and biases. The number of media in the local market measures the competitiveness. The analysis shows the pattern of the data agrees with the theoretical predictions.

4.1.3 Reputation for Learning: Prendergast and Stole (1996)

If a politician frequently changes his position on some matter, or if a CEO exactly mimics the behavior of her predecessors, then we may infer from the observation that the politician is unsure of himself and the CEO is lacking in ideas of her own. Motivated by the observations, the authors discuss how such inferences affect individual decision making.

The paper frames the principal-agent relationship in the context of investment industry. The investment managers (agents) differ from each others by their ability to learning, either fast or slow, which is labeled as the types of the agents and is characterized by the precision of signals generated by the project with unknown profitability. The agents value the reputation for quickly learning the correct course of action. The model considered is thus a natural extension of Holmström (1999) with agents heterogenous in the ability of learning the state of the world. Instead of just being influenced by past and future self, an agent also cares about how to sort out or pretend to be his counterpart in the current period. The career concern effect is amplified when there is reputational concern about sorting.

The key theoretical prediction is that a fast learner will exaggerate his own information in the early periods. The intuition is that fast learner trusts the inference more than his less able counterpart, implying efficient investment is more variable for the fast learner from an *ex ante* perspective. Since the slow learner knows the reasoning, he will behave as if he is a fast learner. The fast learner tends to exaggerate his information to partially self-sort himself from the less able counterpart.

The other critical prediction is that the fast learner may ultimately become too conservative, unwilling to change his investments on the basis of new information, *i.e.* stubborn. The shift from over-reaction to stubbornness in updating beliefs describes

how a rational Bayesian thinks of his subsequent behaviors as an indication of the quality of both the previous and current information. If a learner chose not to be stubborn, large revision of his investment strategies would be such a bad signal that the manager reveals himself to be a slow learner. It is because in the distant future, a fast learner should have already learnt enough information to make investment close to the efficient level. As to the slow learner, he will also be stubborn, pretending himself as a good one by sticking to his previous actions. These effects in the distant future result in too few variability of investment.

The effects of exaggeration and conservatism are entangled in the principal-agent model. The authors show if the investment tasks are very routine, in which learning takes place very fast, the exaggeration effect dominates. If learning is very slow, although exaggeration still happens, building a reputation for being a fast learner and being stubborn after certain date is worthwhile to do.

4.2 Empirical Evidence

4.2.1 Herding and Exaggeration: Zitzewitz (2001)

Zitzewitz (2001) proposes a novel methodology for measuring opinion biases when firms and individuals sell opinions for either behavioral or strategic reasons. Employing analysts' forecasts, actual earning and market consensus available in Institutional Brokers' Estimate System (I/B/E/S) data set in an econometric model, the author is able to parameterize the herding (exaggeration/anti-herding) effect, defined as under-weighting (over-weighting) one's private information and moving away from (close to) the market consensus. The methodology provides a direct test of the prediction in Prendergast and Stole (1996); it is now possible to identify which effect dominates in the distant future, exaggeration or stubbornness.

Formally, the forecast $F = f(E, \Omega^A, \Omega^P)$ is assumed to be the function of expectation $E = \mathbb{E}(A|\Omega^A, \Omega^P)$, private information Ω^A and public information Ω^P, where A is the actual earning. The term in our interest is the deviation of forecast from the consensus $C = \mathbb{E}(A|\Omega^P)$.

$$F - C = g(E - C, \Omega^A, \Omega^P) \tag{13}$$

Given the data, invert the previous relationship between $F - C$ and $E - C$, yielding

$$A - C = g^{-1}((F - C, \Omega^A, \Omega^P)) + \epsilon, \ \epsilon = A - E \tag{14}$$

The paper imposes an easy model to derive the simple form of $g^{-1}(\cdot)$. The analyst's problem is to tradeoff the actual earning and market consensus by choosing the optimal forcast:

$$\max_{F_t} -\lambda\mathbb{E}(A - F_t)^2 + \mu\mathbb{E}(F_t - A) + \gamma(F_t - C_t)^2 \tag{15}$$

with λ, μ, and γ to be weights. The first order condition yields the expression which could be used for the regression analysis.

$$A_i - C_{it} = -\frac{c}{b} + \frac{1}{b} \cdot (F_{it} - C_{it}) + \epsilon_{it} \tag{16}$$

where $\epsilon_{it} = A_i - E_{it}$, and c measures forecast biases. b captures the idea of exaggeration. If b is less (greater) than 1, there is evidence for herding (anti-herding).

The treatment of herding in Zitzewitz (2001) is quite different from that in the previous literatures. The former studies use the dispersion of forecasts as a relative measure of herding. The methodology in Zitzewitz (2001) has benefits in two folds. First, the model allows absolute measure of herding/exaggeration relative to unbi-

ased forecasting, instead of just saying the herding effect is relatively strong or weak. Second, the methodology controls for the amount of independent private information embodied in forecasts. Without the control, we cannot tell herding in the forecasts from limited amounts of independent private information. In previous research, inferring herding from forecast dispersion requires the assumption to make comparison that forecast information should be held constant.

The researcher surprisingly finds that analysts do not herd, but instead they exaggerate the differences with the consensus by an average factor of 2.4. That is, forecasters overweight their private information and issue forecasts that are 2.4 times further away from the prior consensus than unbiased forecasts would be.

The other key finding is relevant to heterogeneity and performance variance. The difference between an analyst's forecasts and the prior consensus, adjusted by exaggeration, yields a measure of informativeness in the analyst's forecasts on average. The measure is proportional to what a mean-variance investor should be willing to pay for early access to the information. The author also shows how the willingness-to-pay measure of informativeness has an advantage over the traditional measure of forecast accuracy, when the analyst's performance is evaluated.[7] The data explains that the analysts ranked in the top 10% make future forecasts that are roughly six times as valuable as those made by analysts ranked in the bottom 40%.

[7] Zitzewitz (2001) provides two reasons why the informativeness measure is advantageous. The reasons are similar to those, when we discuss why forecast dispersion is not preferred. First, the measure of the forecast accuracy can not be translated readily into a measure of the value of the forecast to its consumer, thus they cannot measure analyst ability in absolute terms that are economically meaningful. Second, assuming that more accurate forecasters are higher ability involves assuming that the accuracy of the public information available to the analyst is constant, which will almost never be true, particularly when forecasts are made sequentially.

5 Summary and Future Rsearch

Career concerns were initially proposed by Fama (1980) as a conjecture of policing moral hazard in the dynamic employer-worker context. This class of the principal-agent problems is at the crossroads of adverse selection and moral hazard. The principal can only infer the true state of the world from the messages sent by the agent; the agent has reputational concerns since the principal rewards the agent period-by-period based on the quality of messages. Due to the richness in the informational context, there is no universal way to model career concerns.

The models presented in the literature review are classified into three main categories, based on different interpretation of the agent's type. First, the type is understood as the ability to exert effort. In the employer-learning setting, the agent has strong incentives to exert early efforts and to build a reputation of a highly productive worker. The generation of the models basically says moral hazard could be mitigated to some extent, when the reputational concern is strong.

The second exposition of the type goes beyond the employer-worker setting; the type represents incongruent tastes between the principal and the agent. The class of the models discovers the perverse effect of career concerns; in the presence of the bad agent, the good agent may be forced to misbehave by taking politically correct actions to build good reputation, even if she has the same preferences as the principal. Models in this fashion are widely applicable to diverse cases in reality. from the appointment of judges to the election of politicians, from the interaction of journal editors and referees to the delegation of investment decisions to the financial advisors.

The ability to learn the state of the world summarizes the last interpretation of the type in career concerns. That is, agents are different in expertise. The expertise models are similar to the taste and preferences models, but are usually not cheap-talk.

More than detecting the biased behaviors of agents, what are the sources of the bias and how to kill it are at the center of the discussion; the consequences of endogenous feedbacks in career concerns are thus investigated more deeply.

Future research on career concerns could move on in both theoretical and empirical directions. Theories of career concerns are now well-developed in interpreting the agent's type in different ways. We know career concerns can create both positive and negative effects. However, detecting biases, especially those related to the negative effects, is only the first step. What's the role and what's the source of the biases are the crucial questions that remain to be answered. For example, in Dasgupta and Prat (2003), agent biases introduce noisy trading, enhance trading volumes, and solve the no-trade puzzle. The endogenous feedbacks are responsible for creating biases.

Moreover, the policy implications guided by the theories of career concerns are weak and indirect. One good attempt is made by Maskin and Tirole (2004). The theory lays institutional foundation for the observation that the appointment of judges is preferred to the election. When career concerns are taken into account, how to design general institutions that differ in the means according to distinct ends is still unclear, even at the qualitative level.

As to the empirical research, the fact that career concerns deal with the implicit contracts makes empirical tests very difficult to implement. Proper proxies and panel data sets of high quality are necessary to detect the career concern effect. The common practice is to directly test or transform the main testable predictions of the theoretical models. The method however suffers the shortcoming that those tests are not backed by strong alternative hypotheses. That is, if we fail to statistically observe the career concern effect, it is not clear what alternative explanations we shall make. The claim that there is no career concern effect is implausible and uninformative. One thread of research led by Kahn and Lange (2014) attempts to solve the problem. The trick

is to use a nested model to test the competing theories, employer learning versus productivity dynamics. The empirical finding supports the idea of the importance of the alternative hypothesis in testing the theories; although employer learning is crucial, it is however relatively trivial compared to the productivity dynamics. The finding in turn guides the direction of future theories of career concerns.

References

Akerlof, George, "The Economics of Caste and of the Fat Face and Other Woeful Tales," *The Quarterly Journal of Economics*, 1976, pp. 599–617.

Altonji, Joseph G and Charles R Pierret, "Employer Learning and Statistical Discrimination," *The Quarterly Journal of Economics*, 2001, *116* (1), 313–350.

Baker, George, Michael Gibbs, and Bengt Holmström, "The Internal Economics of the Firm: Evidence from Personnel Data," *The Quarterly Journal of Economics*, 1994, pp. 881–919.

___ , ___ , and ___ , "The Wage Policy of a Firm," *The Quarterly Journal of Economics*, 1994, pp. 921–955.

Besley, Timothy and Stephen Coate, "Elected Versus Appointed Regulators: Theory and Evidence," *Journal of the European Economic Association*, 2003, *1* (5), 1176–1206.

Chevalier, Judith and Glenn Ellison, "Career Concerns of Mutual Fund Managers," *The Quarterly Journal of Economics*, 1999, *114* (2), 389–432.

Crawford, Vincent P and Joel Sobel, "Strategic Information Transmission," *Econometrica: Journal of the Econometric Society*, 1982, pp. 1431–1451.

Dasgupta, Amil and Andrea Prat, "Trading Volume with Career Concerns," 2003. CEPR Discussion Paper.

___ **and** ___ , "Financial Equilibrium with Career Concerns," *Theoretical Economics*, 2006, *1* (1), 67–93.

___ **and** ___ , "Information Aggregation in Financial Markets with Career Concerns," *Journal of Economic Theory*, 2008, *143* (1), 83–113.

DeGroot, Morris H, *Optimal Statistical Decisions*, Vol. 82, John Wiley & Sons, 1970.

Dow, James and Gary Gorton, "Noise Trading, Delegated Portfolio Management, and Economic Welfare," *Journal of Political Economy*, 1997, pp. 1024–1050.

Fama, Eugene F, "Agency Problems and the Theory of the Firm," *The journal of Political Economy*, 1980, pp. 288–307.

Farber, Henry S and Robert Gibbons, "Learning and Wage Dynamics," *The Quarterly Journal of Economics*, 1996, *111* (4), 1007–1047.

Garicano, Luis, Ignacio Palacios-Huerta, and Canice Prendergast, "Favoritism under Social Pressure," *Review of Economics and Statistics*, 2005, *87* (2), 208–216.

Gentzkow, Matthew and Jesse M Shapiro, "Media Bias and Reputation," *Journal of Political Economy*, 2006, *114* (2).

Gibbons, Robert and Kevin J Murphy, "Optimal Incentive Contracts in the Presence of Career Concerns: Theory and Evidence," *The Journal of Political Economy*, 1992, *100* (3), 468–505.

___ **and Michael Waldman**, "Careers in Organizations: Theory and Evidence," *Handbook of Labor Economics*, 1999, *3*, 2373–2437.

Grossman, Sanford J and Joseph E Stiglitz, "On the Impossibility of Informationally Efficient Markets," *The American Economic Review*, 1980, pp. 393–408.

Harris, Milton and Bengt Holmström, "A Theory of Wage Dynamics," *The Review of Economic Studies*, 1982, *49* (3), 315–333.

Holmström, Bengt, "Managerial Incentive Problems: A Dynamic Perspective," *The Review of Economic Studies*, 1999, *66* (1), 169–182.

Kahn, Lisa B and Fabian Lange, "Employer Learning, Productivity, and the Earnings Distribution: Evidence from Performance Measures," *The Review of Economic Studies*, 2014, *81* (4), 1575–1613.

Landers, Renee M, James B Rebitzer, and Lowell J Taylor, "Rat Race Redux: Adverse Selection in the Determination of Work Hours in Law Firms," *The American Economic Review*, 1996, pp. 329–348.

Lazear, Edward P and Paul Oyer, "Personnel Economics," Technical Report, National Bureau of Economic Research 2007.

Maskin, Eric and Jean Tirole, "The Politician and the Judge: Accountability in Government," *American Economic Review*, 2004, pp. 1034–1054.

Morris, Stephen, "Political Correctness," *Journal of Political Economy*, 2001, *109* (2), 231–265.

Oyer, Paul and Scott Schaefer, "Personnel Economics: Hiring and Incentives," *Handbook of Labor Economics*, 2011, *4*, 1769–1823.

Prendergast, Canice and Lars Stole, "Impetuous Youngsters and Jaded Old-timers: Acquiring a Reputation for Learning," *Journal of Political Economy*, 1996, pp. 1105–1134.

Rosen, Sherwin, "Prizes and Incentives in Elimination Tournaments," *The American Economic Review*, 1986, pp. 701–715.

Zitzewitz, Eric, "Measuring Herding and Exaggeration by Equity Analysts and Other Opinion Sellers," 2001. Stanford GSB Working Paper.