The Internal Organization of Colleges and Universities: A Game-theoretic Approach

Andreas Ortmann[*]

Economics Department, Bowdoin College

and

Richard C. Squire

Harvard Business School

May 1998

[*]Correspondence: Andreas Ortmann, Economics Department, Bowdoin College, Brunswick, ME 04011, or, aortmann@polar.bowdoin.edu.

Andreas Ortmann thanks the Program on Non-Profit Organizations (PONPO) at Yale University for its hospitality and the Alfred P. Sloan Foundation for support. Both authors thank Matt Kraatz, Bill Massy, Reinhard Selten, and Raymond Zammuto for constructive suggestions. This paper is a thoroughly revised version of PONPO discussion paper #232 (1996).

Abstract

In this article we propose that "a familiar form of organized anarchy" (Cohen, March, & Olson, 1972), i.e., colleges and universities, can be usefully conceptualized as a cascade of principal-agent games played out between four key players -- Student/Alumnus, Overseer, Administrator, and Professor. By identifying the key principal-agent games routinely played in colleges and universities, we begin to unpack the black box as which these institutions are typically conceptualized. Our approach suggests an explanation for the seemingly inevitable drift of institutions of higher education toward such well-documented phenomena as administrative lattice and academic ratchet and builds an understanding of the organizational conditions in which drift would be restrained.

Many if not most institutions of higher education have fallen on fiscal hard times. Costs, which have risen dramatically since the early eighties, are outstripping revenues -- interestingly, more so for private than public colleges and universities (Clotfelter, 1996). The sticker price for a four-year college education at private liberal arts colleges recently crossed the $100,000 barrier (Honan, 1994); costs per student are even higher (Winston, 1997a, b; Winston and Yen, 1995). Higher education's attempts to reconcile revenues and costs by way of revenue-enhancements have prompted increasingly skeptical questions about the value that colleges and universities add. Parents, students, and politicians increasingly demand to know what marketable skills an education buys; their insistence on such skills has already led to a dramatic re-orientation of curricula toward vocationalism (Breneman, 1994). However, industry and government sources continue to claim that higher education fails to equip its customers with the skills required by postindustrial environments (Applebome, 1994; SCANS, 1992). The dramatic changes in manufacturing and other service industries and the resultant skills requirements (McKinsey, 1992, 1993; Nussbaum, 1991a, b) have contributed to that perception.

Despite such powerful external pressure, most institutions of higher education seem remarkably unresponsive in adjusting their cost structure and their curricula to the demands of the market place (Cameron & Tschirhart, 1992; Gumport & Pusser, 1995; Leslie & Rhoades, 1995; Pew Higher Education Roundtable, 1993a,b, 1994, 1995a,b; Siegfried, Getz & Anderson, 1995). Even the emergence of aggressive competitors of the non-profit and for-profit variety (Hammonds & Jackson 1997; Healy, 1998; Strosnider, 1998), seem not to have invoked a greater sense of urgency in most colleges and universities. Why is this so?

We propose that the conceptual lenses of game theory provide new insights regarding cost structure and educational quality or the lack thereof, in institutions of higher education. Over the past decade, game theory has been used to model competition and cooperation between organizations (Brandenburger & Nalebuff, 1996; Oster, 1995); it has also been used to unpack the black box of the firm by identifying its constituencies, framing their interaction as principal-agent games, and examining the outcomes of these strategic interactions (Aron, 1990; Crawford & Sobel, 1982; Holmstrom & Milgrom, 1991, 1994; Holmstrom & Tirole, 1989; Kreps, 1990a, 1990b; Milgrom & Roberts, 1990). By making explicit the interests of its constituencies, and by suggesting why and under what circumstances they may be in conflict, game-theoretic models help us to understand essential determinants of cost structure such as the misalignment of incentives in principal-agent games not studied hitherto. Recent empirical and experimental work has persuasively demonstrated the ubiquity of strategic interaction in principal-agent situations (Abrahamson & Park, 1994; Dickhaut, McCabe, & Mukherji, 1995).

Until recently, game theory was not used to unpack the internal workings of government units and nonprofits such as educational institutions. A key reason was the assumption that the preferences of constituencies in such organizations were inconsistent, ill-defined, and in any case hopelessly multi-layered, thereby making them resistant to analysis. To wit, "the goals of some members of the university community (faculty and students) are perhaps not too difficult to model, but the motivations of others (in particular, senior administrators, regents, and trustees) resist easy characterization." (Rothschild & White, 1991: 14; see also Cohen, March & Olsen, 1972; Hoeneck, 1990; Hopkins 1990; James, 1990; Massy, 1981).

However, Tirole recently used game theory to break open the public sector and analyze the internal organization of government (Tirole, 1994). In this paper we do the same to institutions of higher eduction. We show that colleges (and by extension universities) can be modeled game-theoretically as cascades of principal-agent games between the "key players" -- the students, alumni, overseers, administrators, and professors. We define the services that colleges and universities provide and explore how the interplay of key player motivations and structural incentives impact the cost structure and quality of the institution as a whole. While we use the paragon of higher eduction in the U.S. -- the (selective) liberal arts college (Brenemann, 1994) -- as our template, we believe our analysis to apply readily to other educational institutions.

The balance of this paper is organized as follows. We first review traditional explanations and then differentiate our approach from those explanations. Next we build a game-theoretic model of a liberal arts college by discussing the goals of the four key constituencies that we identify in this paper -- the students/alumni, overseers, administrators, and professors. We then zoom in on two levels of the principal-agent cascade to analyze the strategic interaction of Administrator and Professor, and Overseer and Administrator, respectively. A conclusion follows.

REVIEW OF LITERATURE AND RATIONALIZATION OF THE APPROACH PROPOSED HERE

Traditional Explanations

Cohen, March & Olsen (1972) based their Garbage Can theory of organized anarchies on three key assumptions: the existence of inconsistent and ill-defined preferences, the unclear understanding of the organization's processes, and fluid participation by the organization's members. The authors diagnosed (and illustrated by way of simulations) a drift into "organized chaos" as inevitable consequence; they also pointed out that these three key characteristics are particularly conspicuous in public and educational organizations, which are less subject to the discipline of market forces.

Weick (1976), using educational organizations as his subject, added the important notion of loosely coupled systems to describe systems in which the repercussions of actions are unclear at the time that they are undertaken. Loose coupling tends to be endemic in educational organizations (Baldridge, 1980; Cohen, March, & Olson, 1972).

In fact, educational institutions have been a classic example and frequently used subject for theory building and testing efforts in management and organization science (Cameron, 1978, 1981; Cameron & Tschirhart, 1992; Clark, 1972; Cohen, March, & Olsen, 1972; Gioia, Thomas, Clark, & Chittipaldi, 1994; Kreps, 1990b; Ostroff & Schmitt, 1993; Pfeffer & Moore, 1980; Pfeffer & Salancik, 1974; Weick, 1976; Zammuto & Krakower, 1991; Zammuto & O'Connor, 1992). Birnbaum (1988) surveyed the relevant literature up to that point. Using a fictitious generic institution and some selected "players" to construct models of organizational behavior (collegial, bureaucratic, political, anarchial), Birnbaum states early and in the tradition of the

bounded rationality literature that -- given ill-defined, inconsistent, and conflicting preferences, as well as uncertainty and limitations on computational ability --, "rationality is ... not the driving force and major purpose of administration," (Birnbaum, 1988: 65), or for any other constituency for that matter. Taking cues from Weick's insightful conceptualization of organizations as entities that try to make sense of themselves (Weick, 1979), Birnbaum then discusses the process of sensemaking, duly paying attention to the problem of loose coupling. Weick's notion has spawned, directly or indirectly, a number of important concepts and conceptualizations that revolve around the myths, ceremonies, languages, and symbolic actions that constitute organizational culture (Gioia, Thomas, Clark, & Chittipaldi, 1994; Hatch, 1993; Kreps, 1990b; Meindl, Stubbart, & Porac, 1994; Meyer & Rowan, 1977; Pfeffer, 1981; Smircich, 1983; Smircich & Morgan, 1982.)

However, assuming that sensemaking is the only consistent and regular activity that organizations attend to (Weick, 1979: 250) does not explain the origin and evolution of those basic assumptions and beliefs that induce organizational culture, cultural differences, and ultimately performance (Cameron & Tschirhart, 1992; Ostroff & Schmitt, 1993; Zammuto & Krakower, 1991; Zammuto & O'Connor, 1992).

Of particular interest in the current context is the recent work of Gioia, Thomas, Clark, & Chittipaldi (1994) who studied the workings of a task force that was installed by a new university president and whose major task was to define and instigate strategic change. The authors show, from both an outsider and insider perspective, that sensemaking and influence are the two fundamental processes in the instigation of strategic change. They remind us that symbols, metaphors, and (symbolic) actions are important, but not the only means for making sense of

organizational reality; they are communicated and taken in contexts that are almost always defined by power relations. This point, convincingly argued already by Pfeffer & Salancik (1974), Pfeffer & Moore (1980), and Pfeffer (1981), tends to be neglected by theorists in the Garbage Can tradition.

Power relations are typically understood to be structured top-down. However, the nature of many goods and services in modern societies makes it difficult to assess quality and effort upon inspection. Adjustable quality and effort under asymmetric information thus lead to agency problems, and often shift power to those located on lower levels of the formal hierarchy. While influence is a complex phenomenon that can flow both downstream and upstream, the underlying power relations leave their imprint on the sensemaking process. Not surprisingly, Gioia et al. (1994) find that the construction of organizational reality is influence-based, and that influence attempts and sensemaking efforts feed off each other. To the extent that influence can be formalized game-theoretically in principal-agent games, understanding such games constitutes an important step toward an understanding of sensemaking (Meindl, Stubbart, & Porac, 1994); it promises a better understanding of the origin and evolution of those basic assumptions and beliefs that induce organizational culture, cultural differences, and ultimately performance (Kreps, 1990b).

The problem with traditional explanations on both the micro- and the macro level of organizational analysis is their failure to predict the direction of the drift to which institutions of higher education seem prone. However, there is evidence -- old (Smith, 1776; see also Ortmann, forthcoming) and new (Gumport & Pusser 1995; Leslie & Rhoades, 1995; Massy & Warner, 1991; Massy & Wilger, 1992; Massy & Zemsky, 1994; Ortmann, 1997) -- that suggests that the

drift of educational institutions has a clear cut-direction. In particular, two phenomena have been widely observed. One, called the academic ratchet, is the tendency for faculty to shift efforts over time toward research and personal income opportunities and away from teaching, student advising and counseling, and college governance (Massy & Wilger, 1992; see also James, 1990). The other, called the administrative lattice, is the tendency for college administrative staffs to grow relative to the faculty over time (Massy & Warner, 1991; see James, 1990). We thus observe a contrast between the ill-defined and inconsistent preferences that have been postulated, and the well-defined, consistent outcomes that have been documented.

Explanation Proposed Here

Consistent, predictable outcomes imply consistent, predictable inputs. We identify as such inputs the goals and strategic interactions of the key college constituencies. Contrary to the assumptions of traditional explanations, we assume that individuals act rationally and in their self-interest, and pursue goals such as a higher income and other personal rewards. We also assume that being a member of a constituency shapes one's incentives. Thus, we identify preferences of constituencies as abstractions of the goals of the individuals therein. Although individuals surely are heterogeneous, we assume that membership in a constituency prevails over individual idiosyncracies as a predictor of behavior. Obviously, this is not an innocent assumption. Birnbaum (1992), for example, demonstrated that individual idiosyncracies such as "cognitive complexity" and "concern for people and process" determines whether a college presidency moves toward success or failure. However, he also showed that most presidencies are modal in that they follow a typical path (to failure) that is characterized by presidents "maintaining trustee and

administration support even as they become increasingly distant from the faculty." (17) Faculty, in turn, may choose voice (vocal opposition) or exit (retreat from governance). Clearly, a faculty's response is conditioned on the characteristics of the president, the history of the institution and its traditions and organizational culture. In addition, whatever action the faculty takes at any point in time will have to work its way through a loosely coupled system that admits typically several possible outcomes. That said, the drift of many institutions of higher education toward the administrative lattice and academic ratchet are well-documented. Ours is an attempt to take a first stab at an explanation that builds on the often conflicting goals of the key constituencies of colleges and universities.

By identifying the preferences of four key constituencies, we unpack the black box that has traditionally represented institutions of higher learning. We model, by means of rudimentary game theory, the inner workings of the college as a cascade of principal-agent games between Student/Alumnus, Overseer, Administrator, and Professor and propose that the direction of the empirically observable drift into academic ratchet and administrative lattice is driven by the strategic interaction of the key constituencies. Importantly, in our model the drift is driven by self-interested and consistent agendas, although the end product of such a process may be observationally equivalent to the organized chaos well-documented in the literature.

Our approach has several advantages. First, identifying the goals of the key players forces us to be explicit about the nature of the service that the college provides, and allows us to suggest to what extent the goals of players and the mission of the college are aligned. Second, by building a checklist of our assumptions about the motivations of key players, we facilitate the study of the internal consistency of the resultant model, as well as its robustness to changes in assumptions.

Third, by identifying the degree to which incentives faced by agents are unaligned with the goals of the corresponding principals, or the ultimate principal, we provide an explanation of the forces underlying the organizational drift toward administrative lattice and academic ratchet. In particular, we suggest how these two phenomena are causally related. Fourth, by modeling the college as a cascade of principal-agent games, we build an understanding of the organizational conditions in which drift would be restrained. Fifth by modeling in such a way, we provide a framework that allows the conceptualization of intangible factors such as organizational culture (Kreps, 1990b) and integrity (Paine, 1994). Sixth, by modeling the college as a cascade of principal-agent games, we elucidate to what extent it is an organization *sui generis*, if at all.

A SIMPLE GAME-THEORETIC MODEL OF A LIBERAL ARTS COLLEGE

Other literature, most notably Gomez-Mejia & Balkin (1992), has suggested that institutions of higher learning can be conceptualized as a cascade of principal-agent games, and has even identified possible principal-agent relationships within the cascade. However, this literature has not proffered a vision of the college as a whole. This section takes on that challenge.

Our principal-agent cascade runs through four levels. Each level takes the form of a player who represents one of the four key college constituencies: the student/alumni body; the overseers; the administrators; and the professors. In our cascade of games, the Student/Alumnus Player serves as the ultimate principal, the Professor serves as the ultimate agent, and the Overseer and Administrator serve as either principals or agents, depending on whether they are studied in relation to the players above or below them.

Players other than the four we identify in our model can be found in the college community. For example, our administrator, who is meant to represent a senior administrator such as the president, has a large support staff. A rivulet in the cascade could be drawn branching from the Administrator and running through a Mid-Level Manager and Typist. We do not bother with the game between Manager and Typist, for example, because it is similar to the private-sector management relationships which have already been modeled extensively in the industrial organization literature (Aron, 1990). The four principal-agent games that we identify are those peculiar to higher education.

We construct our prototypical players by providing a set of descriptive statements. We then suggest a set of goals for each player, based on the player's description and level in the college hierarchy. Next, for each player (except the Professor, who in our model serves only as an agent), we identify the demands that the player as a principal makes upon his corresponding agent, based on the player's goals and the structural nature of the principal- agent relationship.

For reasons we will explain in the next section, we equate the goal of the Student/Alumnus player with the ultimate purpose of the college. In order to assess the effectiveness of the structure of the college, for each player subsequent to the Student/Alumnus, we consider the degree to which the player's goals are aligned or unaligned with the college's ultimate purpose.

The Student/Alumnus Player

Most of a college's revenues come from the students, through tuition, and the alumni, through gifts to endowment or "annual giving," essentially another form of endowment. The students and alumni are tantamount to both the customers and the stockholders in a firm, who invest in their college in hopes of returns on their education. They are the ultimate principals in the college cascade.

The students and alumni understand that the market value of their diploma fluctuates with the perceived quality of education at their college. The quality of an individual's education is a function of many variables, including the overall quality of teaching, opportunities for jobs and graduate school, quality of life, opportunities for personal growth, and so on. Because education is often difficult and costly to valuate directly, the market relies significantly upon the reputation of a college to signal the value of the education that a college provides (Spence, 1974). Since an

---

Winston (1997b) reports that in 1995 on average educational cost per student were about $12,000 of which students paid about one-third. Subsidies (general and individual) accounted for the remaining two-thirds. Most of these subsidies are provided by federal and state sources. Selective liberal arts colleges -- the template for our analysis here -- also get assistance from the state. However, those sums are considerably smaller. For example, in 1995-96, Bowdoin College got 2.9% of its current fund resources from federal and state sources. The median for those 22 schools that Bowdoin uses as comparison group was 3.0%. It ought to be noted though that selective liberal arts colleges benefit in extraordinary ways from numerous tax and other exemptions bestowed on private non-profit schools (Fachina, Showell, Stone 1993; Winston, 1992). These exemptions are subsidies of sorts.

The word "prestige" is often used when one is talking about the common opinion of the quality of a college. We chose to use the word "reputation" instead because it better describes the aspect of college quality we are concerned with, i.e. the "perceived quality of education."

Brewer, Gates, and Goldman (1998) make a distinction between prestige based and reputation based institutions. The latter are being defined as having low prestige in the higher education industry and being mostly concerned with customer needs. The former are being defined as having high prestige in the higher education industry and being mostly concerned with maintaining or improving prestige. We are not convinced that this distinction is useful, as prestige ultimately has to draw on value added for customers. Prestige, in other words, cannot be build without reputation.

education translates into income and other compensating rewards (Rothschild & White, 1991; Tracy & Waldvogel, 1994) the students and alumni, as private actors in the economy, have a continuing interest in their education's perceived quality, and by extension, the reputation of their alma mater.

One indicator that is often identified with reputation is student admission selectivity. In the controversial but undoubtedly influential college rankings by *U.S. News & World Report*, student selectivity is heavily weighted in the scoring. In a competitive market this connection between selectivity and reputation makes intuitive sense. The students are, after all, the customers, representing market demand for the college's product -- education. Because an education can be capitalized in the marketplace, the market gives feedback, through student demand, about the value of its diploma. At a given price, i.e., tuition, the volume of applicants reflects the market's perception of a college's quality. The greater the volume of applicants, the more choosy a college's admissions office can be; thus the connection between reputation and selectivity.

Because they have a stake in their college's reputation, the students benefit from an increase in its selectivity. Importantly, so do the alumni. Although an increase in selectivity this year does not actually change the quality of an education received yesteryear, it affects the perception of that education, which in a competitive market is perhaps the more important asset. Most individuals do not remember the relative performance of colleges in the past. Given this imperfect information, the best estimation of the past educational quality of a college is its present reputation.

The most direct means for increasing a college's selectivity at the disposal of alumni are annual giving or contributions to endowment. Since endowment comes primarily through alumni gifts, we can understand these gifts as a form of investment in the perceived quality of the alumni's education.

An endowment allows a college to subsidize its activities. Colleges with more money can acquire more of the things that students and prospective students value. For example, better endowed colleges can build more luxurious dormitories and athletic facilities. Perhaps more importantly, such colleges can offer high salaries to attract top professors and administrators. Insofar as the professors and administrators are the forces who directly create the college experience, competition for them is probably the strongest link between alumni giving and student selectivity statistics. In simplest terms, alumni give money so that their college can buy and hire the things that boost the college's reputation and diploma value. This point is well understood by most development offices. For example, the alumni membership card of Texas A&M University notes that it is "dedicated to giving greater value to your degree." The point is also recognized by *U.S. News & World Report,* which weighs, in addition to student selectivity, financial resources in its ranking of colleges. Interestingly, under this calculus, money in itself boosts reputation, regardless of how it is spent.

Some readers may protest that we attribute the seemingly altruistic act of alumni giving to selfish motives. There is strong evidence that donations are typically not given out of goodness of a donor's heart (Harbaugh, 1998; se also Glazer & Konrad, 1996). Be that as it may, our model does not depend upon the assumption that alumni donors are self-serving. Our model only requires that alumni who give money do so with the intention of improving the quality of

education at their alma mater. Generous alumni may very well consider the current students, and not themselves, to be the primary beneficiaries of educational improvement. The motive may be selfish or altruistic, but the intended effect is the same, and thus we are able to conflate the interests of alumni and students into a representative Student/Alumni Player who has the principal goal of improving the quality of education at his college.

Of course, despite the formula used by *U.S. News & World Report*, money alone is not (or, at least not yet) sufficient to make a college highly reputable. Not all well-endowed school have top reputations, and some with relatively small endowments are extremely selective. One could well argue that boards of overseers exist precisely for the reason that paying administrators and professors competitive salaries does not in itself ensure that these agents will always act in the best interest of the students and alumni. Thus, the students and alumni's primary demand upon the overseers will be to monitor the effectiveness of the administrators and professors at

---

We looked at 23 of the 25 most selective liberal arts colleges in the United States in 1991, ranked in terms of percent of applicants accepted, as reported in *Barron's complete Profiles of American Colleges*. The two that were not included in the study were public and did not define their endowments in the same way that the private schools did. The colleges we studied had endowments per student in fiscal year 1990 as high as $26,300 at Swarthmore College, and as low as, $14,300 at Sarah Lawrence College.

As simple regression of rank (dependent variable) and endowment per student in fiscal year 1990 (independent variable) yielded an adjusted R-squared value of .5121. This suggests that approximately 51 percent of differences between colleges in terms of their selectivity could be explained by their endowment per student. The correlation is significant, but not complete, indicating that factors other than endowment are also important.

The adjusted R-square of a regression on our body of data could be raised to .6248 by including a non-linear dependent variable -- endowment per student squared. Although for the top five most selective colleges studied (Amherst, Williams, Swarthmore, Bowdoin, and Pomona) the correlation between selectivity and endowment was very tight, after these the correlation loosened and the data points flared out. This observation suggests that while endowment may be an essential component for cracking the top echelon of liberal arts colleges, in the middle ranks (schools, such as, Middlebury, Bates, and Claremont McKenna) there is considerable mobility

enhancing the school's reputation. A decline in a college's reputation would almost certainly be met by demands that the overseers take action or be replaced. In the meantime, giving will probably decline until the alumni can be reassured that their money will not be squandered by ineffective management.

Interestingly, we see that the quality of administrators and professors and the size of the endowment are mutually reinforcing. An increase in endowment allows the college to compete for better employees. Conversely, an increase in the quality of administrators and professors should increase alumni confidence in the leadership of the college, and thus their willingness to give.

As the ultimate principal, we model the Student/Alumnus as follows:

Goal

· To enhance the real and the perceived value of the college's diploma.

Demand upon his agent (the Overseer)

· To increase the college's reputation.

· To hire effective administrators and professors.

We identify just one goal of the Student/Alumnus. Because the Student/Alumnus is the ultimate principal in our model, his goal becomes the ultimate purpose of the college, and the goal by which all others will be measured. By modeling in this way we answer the question: what service does the college provide? The college provides educational quality, both real and perceived.

---

among schools with relatively equal endowments.

One could argue that society as a whole is the ultimate principal of a college. Colleges ostensibly promote the advancement of knowledge, which is a public good that benefits us all. While this may be true, the power that society as a whole wields over colleges is at best indirect. On the other hand, the practical leverage that students and alumni hold over colleges is enormous. In (selective) liberal arts colleges, students and alumni supply almost all college revenues, and they control boards of overseers, which usually have ultimate executive and "legislative" power.

The Overseer

The overseers are the formal principals of the college, tantamount to the board of directors of a profit-seeking firm, who represent and are agents of the student and alumni. Like directors, who are commonly stockholders in their firms, overseers have a stake in the success of the institution they govern.

The majority of overseers are diploma-holders of the college they oversee. Thus the Overseer will have the same goal for the college that the Student/Alumnus has, namely the maintenance and enhancement of the college's reputation. In addition, overseers hold a position of honor in their college community, and often receive their appointment in recognition of personal success in the post-college world. As representatives of the students and alumni, overseers are responsible to them, and their performance is assessed by the degree to which they fulfill their goal for the college. Even if the overseers are not diploma-holders of the college, they have a stake in its success, because their personal reputations as leaders are associated, albeit loosely, with its performance.

Many overseers achieve their position through plentiful financial giving, and are rewarded for the generosity with the privilege of participating in the management of their money. The goals of such overseers can take several forms, including the enhancement of the college's reputation, personal power and accomplishment, and the enhancement of their own prestige, as perhaps manifested in scholarships or buildings bearing their names (Harbaugh, 1998; Glazer & Konrad, 1996).

Overseers are concerned with the performance of both administrators and professors, in that these individuals help to create the reputation of the college. Structurally, though, overseers typically have more direct leverage over the administrators, in that they most often have control over the terms of the administrators' employment. In most matters, the administrators, and most directly the president, are the agents through which the overseers attempt to pursue.

We model the Overseer as follows:

Goals

- To maintain and enhance the college's reputation (A).
- To keep the confidence of the Student/Alumnus through the hiring of effective administrators and professors (A).
- To build a reputation as an effective leader and further other personal interests (U).

Demands upon his agent (the Administrator)

- To maintain the confidence of the students and alumni, primarily by responsibly managing the college's finances.

We have denoted the first two goals of the Overseer with an (A) because they are aligned with the ultimate purpose of the college. The last goal of the Overseer, the enhancement of his personal reputation and interests, can be unaligned, (U), depending on the form it takes.

The Administrator

The administrative body in a college is typically (and, because of administrative lattice, increasingly) a multi-tiered apparatus that includes both managers and support staff. Although the inner workings of this apparatus could be characterized by principal-agent models, we believe that these models would not be significantly different from those that already appear in the industrial organization literature (Aaron, 1990). Our interest here is the principal-agent relationships that are complicated by tenure and the other institutions peculiar to higher eduction in the U.S.A. Thus, only the outer workings of the administration, involving interaction with overseers and professors, are of interest to us. In this section our Administrator represents the senior administrators, i.e., the president and deans who set policy and negotiate with other groups.

Like the executives in a corporation, the purpose of the senior administrators is to implement the long-term goals and policies of the board in the daily operations of the institution. As we have stated, the demand that the Overseer places upon the Administrator is to manage the resources of the college in a way that will maximize the value of its diploma. In any major corporation, the board must rely upon its management to provide, in addition to supervisory services, a degree of strategic direction. Administrators in higher education may have more

---

Masten (1998), using AAUP data from 1970, shows that the particular form that governance structure takes (administrator determination, faculty determination, joint action) differs significantly across types of institutions. Casual empiricism suggest that this is still true.

latitude in this area than their counterparts in private corporations. Quarterly earnings reports in private corporations give boards of directors a regular and relatively accurate measure of performance, allowing them to quickly restrain or replace errant executives. In contrast, college boards of overseers do not have similar hard-and-fast indicators of performance and often have to rely on student selectivity statistics or similarly imprecise and time-delayed measures of college performance. Several years may pass before our Overseer realizes that his Administrator has not been acting in the best interest of the college.

Beyond pressure from the overseers, administrators have their own incentives to enhance the reputation of the college. We have claimed that alumni are more likely to give money to a college if they have confidence in the ability and willingness of the employees of the college to enhance its reputation. A wealthier college pays higher salaries to its employees, especially if the employee is someone like our administrator who has the power to affect the allocation of college resources. Also, by enhancing the college's reputation, administrators increase their personal reputations as successful managers, boosting their marketability.

An important distinction between administrators and professors is that colleges are not bound to administrators by the institution of tenure. Our Administrator is therefore more likely to move from college to college during his career, and might be concerned with impressing members of administrations at other institutions as well as his own colleagues. Administrators will hence have large incentives to travel for networking purposes, to acquire reputations as consultants, and in general to be highly visible.

The Administrator is interested in both increasing salary and maintaining job security. Williamson (1970) enumerates several goals typical of managers. Some of these goals, such as

desire for status, power, a larger office, or a larger staff, may be especially pertinent to college administrators who cannot realize the performance-based rewards such as stock options that are typically available to managers in private corporations.

Because a better reputation leads to a happier Overseer and Student/Alumnus, and thus more endowment money to go around, the Administrator wants from the Professor efforts that increase the value of the college's diploma. Specifically, the Administrator will want the Professor to publish, as well as to please the Student/Alumnus by devoting time to teaching.

Besides research, publishing, and teaching, college professors also traditionally participate in student advising, counseling, and college governance. However, in recent years these duties have been increasingly performed by college administrations (Massy & Wilger, 1992). Given the choice, the Administrator would prefer to delegate these tasks, which we call sharable management duties, freeing time for personal projects or for outside income opportunities such as consulting (Zemsky, 1992). One option for the Administrator is to delegate these duties to the Professor. However, a perhaps more attractive option is to hire subordinate administrative staff to perform the sharable management duties. Because of tenure, the Professor is not as controllable as direct reports. Large staffs also bring more status, security, and bargaining leverage in salary negotiations (Williamson, 1970). We believe and will demonstrate that the well-documented phenomenon of self-perpetuated administrative growth, the “administrative lattice,” (Massy & Warner, 1991) is driven by such concerns.

The Administrator is summarized as follows:

Goals

- To enhance the college's reputation (A).

- To increase income, marketability, and power by building up staff, traveling, and networking (U).

- To delegate sharable management duties to either the Professor or support staff, thus freeing time for the pursuit of personal goals and perhaps outside income opportunities. (U).

Demands upon his agent (The Professor)

- To enhance the college's reputation through performance in publishing and teaching.

- To perform sharable management duties.

The Administrator's goal of increasing income and marketability can be unaligned with the primary goal of the college if it involves activities that excessively take the Administrator away from his college duties or require excessive travel costs and the like. The goals of delegating sharable management duties to either the Professor or to support staff can be unaligned if the time gained by the Administrator is used for leisure or for seeking outside income. The costs of delegating duties to support staff are only justified if they result in a commensurate increase in the reputation and quality of education. Of course, what is a "commensurate increase" is hard to measure, and the Overseer will have difficulty evaluating a decision by the Administrator to delegate. This problem of imperfect information at the Administrator level is further explored following the discussion of the goals of the Professor.

The Professor

We identify three traditional sets of tasks that professors perform at a college: teaching; research and publishing; and sharable management duties. As we have described above, sharable

management duties include advising and counseling students, and college governance tasks such as committee work, fund raising, and recruiting.

Teaching is the original and explicit role of professors, especially at the kind of institutions used as template for this analysis (Siow, 1998). Research and publishing ostensibly support teaching by keeping the professors current and innovative. Like teaching, research and publishing has become an expected part of most professors' duties even at the kind of institution we use as template here. On the other hand, the role of professors in sharable management duties is often more implicit than explicit. In fact, most colleges provide disincentives for professors to participate in sharable management duties, and, ironically, teaching itself. Hard work and productivity in publishing are directly rewarded by most colleges, while quality in teaching and participation in sharable management duties are difficult to measure and thus less likely to be rewarded (Massy & Zemsky, 1994). The opportunity cost to professors of participation in sharable management duties is high, because discretionary time could be used for publishing or for collecting consulting and speaking fees. Because both have opportunities elsewhere, the Administrator and the Professor share the incentive to encourage the delegation of sharable management duties to support staff.

On the other hand, advising and counseling and participation in college governance are only implicit duties. They are alike in that they are sharable; professional staffers can be hired to fulfill the student body's advising and counseling needs, and extra administrative staff can be hired to undertake governance duties.

James (1990) reports that "the research/teaching mix of time inputs at universities has grown substantially during the post-World War II period, and is now about 2/1." A similar trend exists

Here we see how the academic ratchet and the administrative lattice feed and justify each other, and how both are in the self-interest of the Professor and the Administrator. The ratchet allows the Professor to devote his time to activities that are more rewarding financially and professionally, while the lattice relieves him of the duties that are less rewarding. To the Administrator, the lattice provides a larger support staff and other compensating rewards including an easy way out of confrontation with the Professor over sharable management duties. The ratchet leaves in its wake a set of neglected duties which, in budget battles, arguably justify the lattice's continuing growth.

Because his reputation is directly related to the reputation of the school at which he teaches, the Professor has incentive to enhance the perceived quality of education at the school. The Professor has a personal goal of getting tenure. Pursuing tenure requires pursuit of research and teaching and participation in sharable management duties -- activities that are in line with the school's mission. Once he has been awarded tenure, however, the professor can pursue income opportunities with little fear that the Administrator will be able to extract a serious penalty for negligence of research teaching, or sharable management duties.

The Professor is modelled as follows:

Goals

· To enhance his professional reputation (A).

---

at (selective) liberal arts colleges (Bodenhorn, 1997; Hartley & Robinson, 1997).

Siow (1998) summaries the available evidence and concludes that "legal scholars did not cite a single case in which a university or college primarily used low research productivity to justify dismissing a tenured professor." (164) Interestingly, tenured professors have been dismissed for not performing their teaching duties (Siow, 1998: 170).

- To get tenure (A).
- To expend his time on college activities he prefers including leisure (U).
- To increase outside income and marketability via publishing, consulting, and speaking (U).

The goal of getting tenure is aligned with the ultimate purpose of the college if we make the assumption that tenure is granted by academic departments as a reward for the performance of duties that enhance the college's reputation. Of course, if this is not the case, the goal is unaligned. The key issue is the way that the Professor uses personal time once tenure is gained. The incentive to pursue goals such as outside income that are not aligned with the primary purpose of the college is high, and difficult to restrict. Even the goal of research and publishing may be unaligned with the primary purpose of the college. Although some research and publishing may make the Professor a better teacher, the correlation between research productivity and teaching seems spurious (Feldman, 1987). The pursuit of "scholarliness" could benefit the Professor at the expense of neglected students.

Special Note: Untenured Professors

Further modeling of the college principal-agent cascade might involve the splitting of the Professor into two players: the Tenured Professor and the Untenured Professor. In most colleges, the decision to hire junior professors is significantly informed by the opinions of senior professors. We could imagine a principal-agent game occurring within academic departments, with the Tenured Professor leveraging power derived from the hiring, reappointment, and tenure decision to force the Untenured Professor to shoulder a disproportionate burden of teaching responsibilities and sharable management duties. In fact, a sizable literature has emerged that

discusses the internal dynamics of academic departments (e.g., McKenzie, 1979, and Massy & Zemsky, 1994) and related rationales for tenure (e.g., Carmichael, 1988; McKenzie, 1996; Brown, 1997; Siow, 1997) that supplement the traditional explanation of tenure as a means to protect academic freedom. Since we are mainly interested in incentive alignment issues, and since getting tenure seems to work for while having tenure seems to work against the alignment of incentives, we concentrate here on the goals of the Tenured Professor.

GAMES AT WORK, AND AT SCHOOL

In the previous section we constructed a qualitative model of the college as a whole. Now we zoom in on two levels of the principal-agent cascade and model them in formal, game-theoretic terms. The formalized games serve as powerful tools for predicting the outcome of working interactions, given the goals of the individual players and the structure that binds them. It allows us to assess the degree to which unaligned incentives interfere with the achievement of optimal outcomes, and to identify effective remedies.

Sharable Management Duties: Administrator vs. Professor

The Administrator and Professor that meet here are the same in terms of goals and demands as the two so-named players we constructed in the previous section. To formalize the structure within which the players interact, we make the following additional assumptions.

1. The Professor has tenure.
2. Shirking by the Professor on the performance of his sharable management duties has a cost to the quality of education at the college.

3. Monitoring the Professor in his performance of sharable management duties has a cost to the Administrator in terms of diverted time and resources as well as possible backlash from intracollege political conflict.

4. Monitoring the Professor creates a cost to the quality of education at the college as a whole, in that it causes administrative resources to be diverted from other uses.

The Administrator/Professor game is similar to Owner/Security Guard game, in that the principal, here the Administrator, may chose either a Monitor or Not Monitor strategy, and the Professor as agent may chose either Work or Shirk. Again, the game has four possible outcomes.

To assess which outcomes each player will prefer, and how the game will actually turn out, we must construct its payoffs. For this game we define the following primitives:

W_a, W_p The one-period wages of the Administrator and the Professor, respectively

U_p The benefit that the Professor receives when he shirks on his sharable management duties. Another way to understand this primitive is to see -(U_p) as the Professor's opportunity cost of participating in sharable management duties.

X_a The cost to the Administrator caused by the Professor's shirking. This primitive combines two costs: direct hassles because administrative work is left undone, and indirect reputational costs resulting from damaged quality of education at the college. As we stated in Section Three, the Administrator's personal reputation is associated with the reputation of the college where he works.

C_a The cost to the Administrator from his choice to monitor the Professor. Again, this primitive combines several costs, including extra work and diverted resources, political fallout, and reputation costs resulting from a change in educational quality.

P_p The contractual penalty that the Professor incurs if he is monitored while shirking.

X_p The reputational cost to the Professor of his own shirking that results from damaged educational quality.

C_p The reputational cost to the Professor of the Administrator's choice to monitor, again as a result of damaged educational quality.

These primitives allow us to construct our payoff matrix generically without specifying dollar values:

Administrator

		Not Monitor	Monitor
	Work	(W_p, W_a)	(W_p-C_p, W_a-C_a)
Professor			
	Shirk	$(W_p+U_p-X_p, W_a-X_a)$	$(W_p+U_p-X_p-C_p-P_p, W_a-X_a-C_a)$

Although in this form it does not appear to tell us much, this matrix soon will allow us to understand at a detailed level how variance in primitives affects the game's outcome. From this

model, a specific college could be studied by determining the value of its primitives and then plugging them into the matrix to discover which outcome is predicted. For our purposes, we will chose values for primitives that we believe are indicative of colleges in general. Although we aim for realism in our choices, the absolute values of the primitives are not strictly important to the outcome of our model. As will become clear, the important consideration is the relative magnitude of the primitives.

W_p and W_a are present in every payoff, so that, although they are likely to be the largest in magnitude of the primitives, they can be normalized out of the matrix. Of the rest, U_p is probably the largest primitive. The Professor can make a considerable amount of money as a professional consultant, say $5,000, instead of his spending efforts on sharable management duties. P_p we will make the smallest primitive, because at many colleges pay is not based on performance. For now, let P_p equal zero.

This leaves X_a, C_a, X_p, and C_p. Each of these primitives is based, at least in part, on the impact of player actions on the reputation of the college. We would not expect this impact to come instantaneously. The actions must first have a noticeable effect on educational quality, which then must cause a reduction in alumni giving and the college's reputation, which then must damage individual reputations and salaries. In addition to delaying the impact of actions, this cause-and-effect chain would also dilute it, because the damage would be spread relatively evenly across all members of the college community, and not focused exclusively on the perpetrator. From these considerations, we assume that X_p, and C_p are small: $100 each. X_a and X_c would also be only $100, save that they also contain, in addition to reputational costs, immediate

productivity and political costs to the Administrator. These costs are usually irksome but not ruinous; let them be $250 each. Thus, X_a and X_c have a total value of $350.

With these values plugged in for our primitives, our payoff matrix now looks like this:

		Administrator (Principal)	
		Not Monitor	Monitor
Professor (Agent)	Work	($ 0, $ 0)	($ -100, $ -350)
	Shirk	($ 4900, $ -350)	($4800, $ -700)

Given these payoffs, the Administrator has no incentive to monitor; the monitoring cost makes Not Monitor a dominant strategy. What is different here is that the agent also has a dominant strategy. Monitored or not, the Professor is better off playing Shirk and cashing in on the benefits represented by U_p. (Shirk, Not Monitor) will be this game's outcome. Of course, this outcome is not optimal for the Administrator, nor is it aligned with the ultimate purpose of the college. Here we see a game-theoretic explanation of the academic ratchet, and an outcome that will lead to the administrative lattice.

The fact that (Shirk, Not Monitor) is not the optimal outcome for the college may not be obvious from the matrix alone. After all, it has the greatest combined value of any outcome, and thus appears to contribute the most to overall wealth. What this matrix fails to capture is the impact of this outcome on the rest of the college community. The Professor and Administrator are not the only ones hurt when the college's reputation is damaged. X_a and X_p, at $100 each, may be small to any single individual, but would be much larger if we add up the similar costs experienced by every student, employee, and diploma-holder of the college. Probably this total is

exaggerated; the individual cost might be only $50 to a particular alumnus, or a few pennies to a professor about to retire. The point is that the total cost is certainly more than U_p. If we consider everyone involved, shirking creates a net cost to the college community.

While the model predicts that a sub-optimal outcome will result, it also indicates how someone (such as the Overseer) might try to engineer a preferable result. (Work, Not Monitor) is the optimal outcome from the college's perspective. For it to come about, the Professor must be penalized for getting caught shirking, and the Administrator must not mind trying to catch him. Because the sub-optimal strategies for both players are dominant, both players' incentives would need to be changed. P_p would need to be made greater than $4800. In addition, a reward that would make monitoring worthwhile to the Administrator, call it R_a, would need to be inserted in his contract. In this model, that reward would only need to be around $700. This would be a bargain to the Overseer, surely less than the wages of administrative staff hired to perform the duties that the Professor is neglecting. Here we see how our game theoretic model provides us with an understanding of the circumstances under which drift would be restrained.

Here we see that the relative magnitudes of the primitives is the important consideration. The greater the value of U_p relative to P_p, the greater the tendency for the Professor to neglect sharable management duties. Meanwhile, the greater the value of C_a relative to R_a, the greater the tendency for the Administrator to seek other ways to get the work done. We know that at most colleges neither R_a nor P_p exist. The Administrator/Professor model shows the consequences of this fact for the performance of sharable management duties. Our next model shows the consequences for the size of the college's budget.

Sharable Management Duties: Overseer vs. Administrator

As we have seen, shirking by the Professor places pressure upon the Administrator to take care of sharable management duties by other means. One option is to grow the administrative support staff. As we stated earlier, this option has benefits for the Administrator. An increase in the number of subordinates brings about an increase in prestige, power, and salary negotiation leverage. Typically, college administrators cannot increase budgets autonomously; such measures need the approval of the board of overseers.

The Administrator and Overseer who meet in this game are the same in terms of goals and incentives as the two so-named players we constructed. To formalize the structure within which the players interact, we make the following additional assumptions:

1. Once per year, the Overseer requests a recommendation from the Administrator about the optimal size of the following year's administrative budget. Here, an optimal budget is one that, from the perspective of the Student-Alumnus, would achieve the ideal trade-off between expenditures and educational quality.

2. The Administrator can make one of two recommendations. One, he can recommend that the administrative budget remain the same size (the small budget), signifying that he believes that the level of administrative expenditures is near the ideal point. Two, he can recommend that the budget grow (the Big Budget), signifying that he believes that more staff must be added in order for the ideal point to be achieved.

3. The Overseer does not know with certainty which budget is actually optimal. However, he does know the *probability*, represented by the variable r, that the Big Budget is optimal.

4. Like the Overseer, the Administrator knows the value of r. However, unlike the Overseer, he also knows with certainty which budget is actually optimal. To put it another way, he knows the college's true position on the graph in Figure 1, and the distance (if any) to the ideal point.

5. After the Administrator makes his recommendation, the Overseer chooses which budget to actually implement.

In our previous games, the agent had a choice about how much effort to expend. Now, the agent's choice is about honesty. The Administrator knows which budget is optimal, but he is not compelled to recommend it. The principal's options are also different from before. Short of employing a lie-detector machine, the "monitor" choice is no longer available. The Overseer's only choice is to either accept or reject the Administrator's recommendation.

We can identify four primitives for each player. Instead of specifying dollar values for these primitives, we will simply assign them the value of their ordinal rank. In other words, the primitive with the greatest value to a player will have the value 4, the next-best the value 3, and so on. Again, our contention is that, in terms of primitives, relative magnitudes are more important than absolute values. First, we provide the Administrator's primitives:

Figure 1

The Costs and Benefits of Transferring Sharable
Management Duties from Professors to
Administrative Support Staff

The graph above shows how educational quality changes as the burden of sharable management duties is shifted from professors to administrative support staff. At point A, the administration is very small, and professors essentially run the college and perform almost all administrative duties. This was the status of many U.S. liberal arts colleges before 1960, when even the president was a professor. Scholarship, as measured by research and publishing, was minimal, and one could make a strong case that educational quality suffered. From this point, increased administrative expenditures likely would improve educational quality, here maximized at point B. At point C, all sharable management duties are performed by the administration, and professors teach and do research only. The shape of the curve between B and C is arguable. It might be flat, or it might even fall, as the administrative bureaucracy becomes so cumbersome and the faculty from the students so distanced that educational quality suffers. Of course, a particular college's exact position on the curve is difficult to pinpoint, opening the door for budget battles. We show in this paper that both administrators and professors have incentive to claim that their college is to the left of point B, (say at point D), and to advocate the further shifting of sharable management duties to administrative staff.

The Administrator's Primitives

Primitive	*Definition*	*Rank*	*Reason for Rank*
B_aS_a	**The Administrator's payoff from implementation of the Big Budget, given that the small budget is optimal.**	**4**	**The administration has more money than it needs to carry out its normal duties. The Administrator can expand his staff, and shift to them a greater share of the sharable management duties, thus reducing conflict with the Professor.**
B_aB_a	**The payoff from the Big Budget, given that the Big Budget is optimal.**	**3**	**On the positive side, the staff is bigger. On the negative side, the budget has no "fat," and sharable management duty conflict may still pose a problem.**
S_aS_a	**The payoff from the small budget, given that the small budget is optimal.**	**2**	**The administration does not expand, but at least it has enough resources to accomplish its normal set of tasks.**
S_aB_a	**The payoff from the small budget, given that the Big Budget is optimal.**	**1**	**Worst case scenario for the Administrator. The staff is insufficient to get all of its normal duties done.**

From these primitives, we can derive the strategies that the Administrator might play. One available strategy we will call Always Truth. Under this strategy, the Administrator always recommends the optimal budget. Alternately, the Administrator can play Always Big, in which, regardless of what is actually optimal, he always recommends the Big Budget. Always Truth and Always Big are the strategies we will include in our model. Conceivably, the strategies Always False and Always Small also exist. But the ranking of the Administrator's payoffs tells us that he has no reason to ever recommend the small budget when the Big Budget is optimal. Thus, the Administrator will never play Always False or Always Small, and we can exclude these strategies from our model. Here we see how the

phenomenon of the academic ratchet helps the Administrator's cause, in that it gives him a potential defense if the Overseer questions his recommendation of the Big Budget.

The Overseer's primitives are as follows:

The Overseer's Primitives

Primitive	*Definition*	*Rank*	*Reason for Rank*
$s_o s_o$	The Overseer's payoff from implementation of the small budget, given that the small budget is optimal.	4	The Overseer can keep the Student/Alumni Player happy by implementing the optimal budget without raising expenditures by increasing tuition, dipping into the endowment, or running a budget deficit.
$B_o B_o$	The payoff from the Big Budget, given that the Big Budget is optimal.	3	Although expenditures must increase, the money is well spent. The level of educational quality is optimized.
$B_o s_o$	The payoff from the Big Budget, given that the small budget is optimal.	2	Although money is spent unnecessarily, at least all required administrative duties can be carried out.
$s_a B_a$	The payoff from the small budget, given that the Big Budget is optimal.	1	Worst case scenario for the Overseer. A slip in educational quality is likely because the administration will have insufficient resources.

From these primitives, we can derive the strategies that the Overseer might play. Again, we find that there are four possible strategies, but only two that would be rational to play. The Overseer might play Always Approve, in which he always implements the budget that the Administrator recommends. Alternately, he might play Always Small, in which, regardless of the Administrator's recommendation, he always implements the small budget.

The strategies Always Reject and Always Big are available but irrational, because the Overseer has no reason to ever reject a recommendation for the small budget.

The payoff matrix for this game is as follows. In this matrix, the payoffs of the Overseer are listed above and to the right of the payoffs to the Administrator.

		Overseer (Principal)	
		Always Accept	**Always Small**
Administrator (Agent)	**Always Truth**	$r(B_oB_o) + (1-r)(s_os_o)$	$r(s_oB_o) + (1-r)(s_os_o)$
		$r(B_aB_a) + (1-r)(s_as_a)$	$r(s_aB_a) + (1-r)(s_as_a)$
	Always Big	$r(B_oB_o) + (1-r)(B_os_o)$	$r(s_oB_o) + (1-r)(s_os_o)$
		$r(B_aB_a) + (1-r)(B_as_a)$	$r(s_aB_a) + (1-r)(s_as_a)$

When the Overseer plays Always Small, the outcome is the same regardless of the Administrator's strategy. If the Overseer has already decided upon the small budget, the Administrator's recommendation is irrelevant.

With the values plugged in for the primitives, the payoff matrix looks like this:

		Overseer (Principal)	
		Always Accept	**Always Small**
Administrator (Agent)	**Always Truth**	4-r [from 3r+4(1-r), etc.]	4-3r
		2+r	2-r
	Always Big	2+r	4-3r
		4-r	2-r

Against Always Small, the Administrator's payoffs are identical. Against Always Accept, the Administrator is better off playing Always Big, as shown by the equation:

$$4 - r \geq 2 + r$$

We know that this equation is always true because r, as a probability variable, is always less than or equal to 1. Thus, Always Big is the Administrator's dominant strategy.

Knowing that the Administrator will surely play Always Big, the Administrator can choose between his two strategies. He will choose Always Accept when the following equation is true:

$$2 + r > 4 - 3r$$

This equation will be true whenever r is greater than 0.5. If the probability that the Big Budget is actually optimal is greater than 50%, the Overseer will choose Always Accept. If r is less than 50%, he will choose Always Small. Interestingly, given these particular values for our primitives, the Administrator's choice is irrelevant. The Overseer simply gauges the more probable outcome and picks the corresponding strategy. The opinion of the player who actually knows which budget is better for the college has no bearing on the outcome of the game.

Of course, this exact 50/50 split is incidental to the values we chose. The game's outcome, however, is not arbitrary. As long as the relative rank of the primitives remains, variances in their values will not change the prediction that the optimal outcome cannot be achieved. (Always Truth, Always Accept), the outcome that would optimize educational value, is not a possibility given our player's goals and the structure in which they interact.

In order to change the outcome, either player goals or the structure would need to change. If we inspect the payoff matrix, we see that the Overseer's highest payoff is at the outcome (Always Truth, Always Accept). To make the Administrator prefer this outcome, we would need to make $s_a s_a$ more valuable than $B_a s_a$. In other words, we would need to provide the Administrator with incentives to keep the budget small, in order to counterbalance his incentives to make it bigger. Possible remedies are numerous. For example, we could base a component of the Administrator's salary on the leanness of his administrative budget relative to those at comparable colleges. The advantage of the model is that it provides a framework for testing which remedies would be most effective at restraining this form of drift.

In both the Administrator/Professor and Overseer/Administrator games, we have seen clear explanations for the phenomena of the academic ratchet and administrative lattice. We accomplished this using the minimal assumptions of game theory: that our players act in their self-interest, and that they respond rationally to the incentives presented to them by the organizations in which they work. In addition, we have shown how game theory, by elucidating the forces that underlie sub-optimal outcomes, indicates how better outcomes might be achieved.

Further research in this area might be to develop the other games implied by the model. The Alumnus/Overseer game might provide insights into the accountability in general of organizations in which profit is not a primary indicator of performance. And the

Tenured Professor/Untenured Professor game might provide further insight into the origins of the academic ratchet.

CONCLUSION

As higher education is touted increasingly as "the best investment opportunity since health care" (*New York Times*, May 29, 1996), understanding its very nature and the conflicting agendas of its key players seems particularly timely.

We have demonstrated that colleges (and by extension universities) can be modelled game-theoretically as cascades of principal-agent games between the key players -- students, alumni, overseers, administrators, and professors. By doing so, we have unpacked the black box that has traditionally represented institutions of higher education. Our simple game-theoretic conceptualization of these institutions enables us to explain their drift toward two empirically well-documented phenomena: the administrative lattice and the academic ratchet. Our approach builds an understanding of the organizational conditions in which drift would be restrained. It suggests also why institutions of higher education seem surprisingly unresponsive in adjusting their cost structure to the demand of the market- place.

Last but not least, by modelling institutions of higher education as cascades of principal-agent games we stress that in many important aspects they are not organizations

***sui generis*. This cannot surprise anyone who has followed recent developments in higher education such as the dramatic increase in for-profits (now 10 percent market share), the adoptation of various forms of outsourcing (close to 50 percent of courses in higher education are now taught by "temps"), and the reorientation of many colleges and universities toward vocationalism (Ortmann, 1997). To the extent that these developments seem to induce other developments -- like the emerging abandoning of the salad-bar pricing approach to higher education --, understanding the nature of the nonprofit higher education enterprise and the causes for its well-documented incentive misalignments and inefficiencies seems overdue.**