A game-theoretic explanation of the administrative lattice in institutions of higher learning

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Abstract

We provide a game-theoretic model of academic organizations, focusing on the strategic interaction of prototypical overseers, administrators, and professors. By identifying key principal-agent games routinely played in colleges and universities, we begin to unpack the black box typically used to conceptualize these institutions. Our approach suggests an explanation for the seemingly inevitable drift of institutions of higher education into such well-documented phenomena as academic ratchet and administrative lattice and builds an understanding of the organizational conditions in which drift would be restrained.

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1. Introduction

Many, if not most, institutions of higher education have fallen on fiscal hard times. Costs continue their dramatic rise which began in the early 1980s and which, interestingly, has been more pronounced for private than public colleges and universities. The sticker price for a four-year college education at selective private liberal arts colleges crossed several years ago already the $100,000 barrier (Honan, 1994) and continues to outpace inflation by a wide margin (Larson, 1997; Bronner, 1998; Mabry, 1999). Costs per student are even higher (Winston and Yen, 1995), with administrative accretion being a major driver of this development (Zemsky and Massy, 1990; Leslie and Rhoades, 1995; National Commission, 1998; Chronister, 1999).

That administrative accretion is a problem is widely acknowledged;[1] it is not well understood, however, *why* administrative costs have grown so dramatically. Massy has identified the increased use of information technology as an important cost driver "at the present time" (National Commission, p. 89), the qualification expressing the hope that higher education will ultimately reap rich rewards for its investment in IT and overcome the "cost disease" that allegedly afflicts labor-intensive industries (Baumol and Bowen, 1966). Several authors have

[1]Using data from the National Center for Education Statistics of the U.S. Department of Education, Chronister finds that the number of faculty and staff in higher education institutions grew as follows: those with executive and faculty status by 46% and 47% respectively, those classified as "other professional" (i.e., administrative staff) by 152% and other staff by 16%. These numbers are likely to underestimate the true growth of administrative accretion since they do not account for outsourcing of auxiliary and other services such as payroll, dining services, bookstores, etc. In any case, there seems to be consensus that administrative costs grew dramatically, i.e., not just in absolute but in relative terms, for much of the 1980s. Since the end of the 1980s the share of administrative costs seems to have leveled off. However, that is not necessarily good news as during the same time other manufacturing and service industries have managed to reduce their bureaucracies (McKinsey, 1992 and 1993; Brynjolfson, Malone, Gurbaxani, and Kambil, 1994; Zenger and Hesterly, 1997). These reductions seem to have been the result of productivity gains from advanced information technologies and of outsourcing.

suggested “what is perhaps the most commonly identified source of administrative cost increases, government regulation” (Leslie and Rhoades, p. 190; see also National Commission, pp. 11/12 and p. 88). Indeed, the 7,000 regulations reportedly governing the award of student grants and loans alone (Ritter, 1996) seem to be a reasonable indication of an important cost driver; and that is not counting more complex accounting rules and increasing regulatory requirements (OSHA, EEOC). Clotfelter (1996) has suggested the perceived need to provide new services and “amenities” as the culprit. Leslie and Rhoades have argued that external demands such as increased regulatory and information requests or “mission creep” increase organizational complexity, which, in turn, fuels administrative accretion.

Massy and collaborators have identified the “academic ratchet” and the “administrative lattice” as important cost drivers. The academic ratchet describes the tendency for faculty to shift effort over time toward research and personal income opportunities and away from teaching, student advising and counseling, governance tasks, etc. (Massy and Wilger, 1992; Zemsky, Massy, and Oedel, 1993; Massy and Zemsky, 1994; see also James, 1990; and Clotfelter, Figures 7.3-7.6). The administrative lattice describes the tendency for college administrative staffs to grow relative to the faculty over time, partially in reaction to the academic ratchet, but also as the result of “consensus management” and the self-perpetuating growth of administration (Massy and Warner, 1991; see also James and Clotfelter).

With the notable exception of Massy and Zemsky’s conceptualization of the academic ratchet, the internal workings of educational institutions were, until recently, regarded as a black box not accessible to analysis. 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. 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 and White, 1991, p 14; see also Cohen, March and Olsen, 1972; Hoeneck, 1990; Hopkins 1990; James; Massy, 1981).

Here we provide such a characterization. Specifically, we first identify what we believe to be the relevant goals and motivations of prototypical professors, administrators, and overseers. We then provide a game-theoretic model of the principal-agent games in which these players routinely engage and identify the conditions under which incentives can become misaligned and, ultimately, become an important determinant of cost structure.

We assume that being a member of a constituency shapes one's incentives. Thus, we identify preferences of constituencies as representative 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.[2] To emphasize the representative-agent aspects of our modeling, we

[2]Birnbaum (1992, p. 17) demonstrated that individual idiosyncracies such as "cognitive complexity" and "concern for people and process" determines whether a college presidency moves toward success or failure. 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

identify these constituencies as Overseer, Administrator, and Professor.

By identifying the degree to which incentives faced by agents are not aligned with the goals of the corresponding principals, 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. By focusing on the strategic interaction among Overseer, Administrator, and Professor, we also build an understanding of the organizational conditions in which administrative accretion, to the extent that it is driven by misaligned incentives, would be restrained.

The balance of the paper is organized as follows. Section 2 describes players and enumerates their respective objectives. Section 3 analyzes the principal-agent game between Administrator and Professor and the drift of professors out of “sharable management duties” such as student advising, counseling, and a variety of governance tasks. Section 4 analyzes the principal-agent game between Overseer and Administrator and the emergence of the administrative lattice. Section 5 concludes.

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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. We therefore readily admit the possibility of multiple equilibria. However, Birnbaum 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." Furthermore, such phenomena as academic ratchet and administrative lattice are, by any account, wide-spread phenomena across various institutional forms.

2. Players and Objectives

Ortmann and Squire (1996) have suggested that institutions of higher learning can be conceptualized as a cascade of principal-agent games. Specifically, we explicated four levels of such a cascade, representing the key college constituencies of the students and alumni, the overseers, the administrators, and the professors. Through this approach, we explored the degree to which the formal modeling of strategic interaction among prototypical players with representative objectives and institutional constraints can explain observations about the conduct and performance of real world institutions of higher learning. In the present article, we demonstrate how academic ratchet and administrative lattice are predictable results of principal-agent interactions among overseers, administrators, and professors. In this section, we lay the groundwork for our model by briefly introducing the relevant players, their goals, and their institutional constraints.

Our prototypical Professor has three related objectives: job security, freedom to spend his time on activities he prefers, and maximization of professional reputation and income. To achieve these goals, the Professor engages in some mixture of the traditional professorial roles of teaching, research and publishing, advising and counseling students, and college governance tasks such as committee work, fund raising, recruiting, and other forms of "public relations" work. For our purposes, we categorize advising, counseling, and the various governance tasks as "sharable management" duties, because they are tasks that to some extent can also be performed by college administrators and their support staff. Finally, our Professor may also be tempted by lucrative opportunities such as consulting or speaking engagements.

The most common means for the Professor to achieve his objective of job security is

through the institution of tenure. At many colleges and universities, tenure is a reward for success in research and publishing, with less emphasis placed on teaching quality and virtually no emphasis on performance of sharable management duties. Massy and Zemsky suggest as one explanation for the de-emphasis of teaching and sharable management duties the relative difficulty in measuring performance in these areas. Although individual professors differ in their proclivity to teach and perform sharable management duties, all experience the strong incentive to disengage from them due to their high opportunity cost relative to the goal of achieving job security through tenure.

Tenure also enables the Professor to achieve his objective of freedom of activity. Although a tenured Professor may choose to allocate greater effort to teaching and sharable management duties, he also faces the heightened allure of consulting and public speaking, which, like research, allow him to earn outside income and enhance his professional reputation.[3] In contrast, teaching and sharable management duties offer, at best, intangible rewards, because most colleges base salaries almost exclusively on seniority and research, and few professors can build a meaningful external reputation based on teaching and performance of sharable management duties. Even if the Professor prefers to teach and spend time advising, counseling, and/or recruiting students, opportunity costs provide disincentive to do so. Thus, the academic ratchet is the predictable outcome of the incentives experienced by most college faculty members (Massy and Zemsky).

The Professor's principal, the Administrator, has objectives that are similar to his agent's.

[3]James 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. Bodenhorn (1997) and Hartley and Robinson (1997) show that a similar trend exists at (selective) liberal arts colleges.

The Administrator seeks to keep his job, build his reputation, and to free his own time for outside income opportunities (Zemsky, 1992). Furthermore, the Administrator also shares the goals that Williamson (1970) identified as common to all managers, such as desire for status and power manifested in a large office and support staff. In fact, such rewards may be especially meaningful for college administrators, who do not have access to the performance-based financial incentives, such as stock options, available to their private-sector counterparts.

To keep his job the Administrator must ultimately please his own principal, the Overseer, on an ongoing basis, because the overseers of a college are not bound to its administration, as they are to its faculty, by tenure. As discussed below, the Overseer is primarily concerned with enhancing the college's reputation for educational quality, and will reward the Administrator accordingly. In addition, the Administrator has personal incentives to enhance his college's reputation, because this bears directly on the prestige of his administrative post and, thus, on his personal marketability.

Because he shares the Professor's goal of freeing his time for external opportunities, the Administrator has incentive to delegate sharable management duties. One option is to try to get the Professor to do them, although, especially when the Professor has tenure, the Administrator may lack the leverage to bring this about. More attractive is delegation to administrative support staff members, who are more controllable as direct reports, and who, as they increase in number, bring the Administrator the intangible rewards described by Williamson. Thus, in order to both avoid conflict with the Professor and achieve intangible managerial rewards, the Administrator has incentive to increase his support staff.

Here we see how the academic ratchet drives the administrative lattice and serves the interests of both Professor and Administrator. The ratchet allows the Professor to devote his time

to activities that are more rewarding financially and professionally; in its wake it creates a series of neglected duties that the Administrator can use to justify the administrative lattice. The lattice, in turn, further relieves the pressure on the Professor to perform sharable management duties.

We ascribe one goal to the Administrator's principal, the Overseer. The Overseer, who can be conceptualized as the agent of the students and alumni, and who is himself probably a diploma-holder of the college he oversees, has the objective of enhancing the college's reputation for educational quality. Like his counterpart in the private sector, i.e., a director, the Overseer seeks to select a senior management team that will spend resources to maximize shareholder (or diploma-holder) value. However, the Overseer does not have access to the equivalent of quarterly earning reports and must rely upon more attenuated and time-delayed measures of college performance, such as student selectivity statistics. Because academic quality is difficult to measure directly, the Overseer is especially dependent upon the Administrator for budget recommendations and hiring and firing decisions, and is disadvantaged in quickly recognizing poor Administrator performance. As we will explore in the next section, this problem of asymmetric information in the Overseer/Administrator interaction clears the structural pathway for the accretive momentum created by the Administrator/Professor interaction.

3. 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 sharable management duties to

pursue consulting opportunities, additional research, or leisure, 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 a standard commitment game (Aron 1990), in that the principal, here the Administrator, may choose either a Monitor or Not Monitor strategy, and the Professor, as agent, may choose either Work or Shirk. 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. Recall that we assume that the Administrator's personal reputation is associated with the reputation of the college where he works.

C_a The cost to the Administrator of his choice to monitor the Professor. Again, this primitive combines several costs, including extra work and diverted resources, political conflict, 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
Professor	Work	(W_p, W_a)	(W_p-C_p, W_a-C_a)
	Shirk	$(W_p+U_p-X_p, W_a-X_a)$	$(W_p+U_p-X_p-C_p-P_p, W_a-X_a-C_a)$

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 choose 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 , 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 spending his efforts on sharable management duties. P_p we will make the smallest primitive, because at many institutions of higher learning 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 be realized instantaneously. The actions must first have a noticeable effect on educational quality, which in turn must cause a reduction in the college's reputation, and then must damage individual reputations and salaries. In addition to delaying the impact of actions, this cause-and-effect chain would also create negative externalities, 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 C_a 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 seldom ruinous; let them be \$250 each. Thus, X_a and C_a have a total value of \$350.

With these values plugged in 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. In addition, the Professor is always 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 does it maximize value to the College due to the negative externalities created by the Professor's shirking. 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. Here we see a game-theoretic explanation of the academic ratchet, and an outcome that will lead to the administrative lattice.

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 this outcome 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 into 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.

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.

4. 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 increase 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 in Section 2. 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 would maximize diploma-holder value and achieve the ideal trade-off between expenditures and educational quality. See Figure 1.

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.[4]

[4]Figure 1 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

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

-- Figure 1 about here --

In our previous game, the agent had a choice about how much effort to expend. Now, the agent's choice is about honesty (e.g., Pitchik and Schotter, 1987). 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

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administrative expenditures enabling productivity gains from specialization 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.

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:

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.**
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 accomplish all of its normal duties.**

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 serves the Administrator's interest 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 implement 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 given that the Administrator would only recommend the small budget if it were optimal.

The payoff matrix for this game is as follows. In this matrix, the payoffs of the Overseer are listed above 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 Overseer 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, we see that 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 dependent on 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 structural incentives to keep the budget small, in order to counterbalance his personal 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 suggested explanations for the emergence of 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.

5. Conclusion

We have provided a simple game-theoretic model of academic organizations. By identifying key principal-agent games routinely played between overseers, administrators, and professors, we have suggested an explanation of the well-documented administrative accretion in institutions of higher learning. To the extent that we focus on sharable management duties, such as advising and counseling students, and college governance tasks such as committee work, fund raising, recruiting and other forms of "public relations" work, the scope of our model is bounded. Professors, for example, can shirk also on teaching and/or scholarship margins, especially if they are tenured. Or, less

opportunistically, they may trade better teaching and/or scholarship for less participation in governance tasks. Casual empiricism suggests indeed that faculty members have different propensities and abilities to shirk on each margin, and that administrators have different incentives and abilities to monitor each component of production. Further research that introduces such heterogeneity would provide a useful description of resource allocation in academic departments and could investigate the degree to which apparent shirking by individuals may be complementary and enable efficient specialization. In addition, research that explores the potentially different conceptions of what constitutes the components of educational quality, with the students and alumni perhaps focusing on teaching and the overseers focusing on faculty publishing, may provide further explanation of the accretive tendencies of higher education institutions.

A referee for this journal pointed out that increased division of labor is another explanation for administrative accretion: "Non-faculty academic advisors and career counselors may prove to be better than faculty members at providing these services. Staffs of professional fund raisers and admission counselors may be more effective achieving these goals. Modern computing and database skills may have made the philosopher/registrar obsolete. The growth of state and federal government financial aid programs, more complex accounting rules, and increasing regulatory requirements (OSHA, EEOC) have no doubt led to the need for individuals with specialized skills to handle many of the tasks previously completed by faculty members." While we agree that some division of labor may be beneficial for the reasons the referee suggests, we believe that misaligned incentives ensure that it will go too far. Unfortunately, direct measures of the relative merits of our and other explanations must await wider availability of relevant empirical data (Leslie and

Rhoades; see also Massy in National Commission, p. 88).

This said, we are convinced that understanding the relative merits of our and other explanations of administrative accretion empirically is an important question. One interesting strategy could be a comparison of types of traditional, and often ossified, non-profit educational institutions with exemplars of the new breed of for-profit institutions of higher learning whose incentives are not saddled with institutional and curricular inertia (Siegfried, Getz, and Anderson, 1995; see also Ortmann 1999) and that seemingly inevitable "way of life in colleges and universities": cross-subsidization (Massy in National Commission, p. 87).

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