IS PUBLIC OWNERSHIP BAD FOR PROFESSIONAL SERVICE FIRMS?
AD AGENCY OWNERSHIP, PERFORMANCE, AND CREATIVITY

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ABSTRACT

Does public ownership have negative consequences for professional service firms by reducing employee incentives? I address this question with a panel of advertising agencies. Public ownership was associated with inferior performance for small agencies but not for large agencies; and there was no association between ownership and agency creativity, indicating that public ownership did not preclude agencies from competing with strategies requiring highly-skilled professionals. The results challenge existing theories of the ownership models of professional service firms.

INTRODUCTION

Scholars are increasingly looking to professional service firms (PSFs) for insights into how the growing importance of human capital in the economy will affect the organization of firms (Blair & Kochan, 2000; Rajan & Zingales, 2000; Teece, 2003), and as potential organizational models for knowledge intensive firms more generally (Ghoshal & Bartlett, 1999; Greenwood, Li, & Deephouse, 2002; Lowendahl, 2000; Teece, 2003). One of the key "stylized facts" about PSFs is that they have traditionally been owned exclusively by the professionals inside the firm, with no outside shareholders. This ownership structure is often inferred to be particularly efficient for the PSF environment, primarily by providing high levels of incentives (in the form of either financial rewards or other preferences, such as prestige or collegiality) to the highly mobile, hard-to-monitor professionals who are the primary source of value in such firms (Dow & Putterman, 2000; Fama & Jensen, 1983; Greenwood & Empson, 2003; Greenwood et al., 2002; Jensen & Meckling, 1979; Roberts & Van den Steen, 2000).

And yet public corporations have emerged in several professional service industries (Greenwood & Empson, 2003), highlighted by high-profile IPOs over the last decade: e.g., investment bank Goldman Sachs; consultancies Accenture, KPMG, and LECG; executive search firms Korn/Ferry and Heidrick & Struggles. What then should we make of these publicly-traded PSFs, who have abandoned an ownership model assumed to be optimal?

On the one hand, the aforementioned literature implies that being owned exclusively by professionals inside the firm (hereafter, "exclusive insider ownership") contributes greatly to the ability to retain and motivate professionals, which is a critical task in the PSF environment (Lorsch & Tierney, 2002). Thus, going public, and thereby introducing outside owners, may be a

mistake for the firm. While the existing owners may get rich in cashing out, the firm will under-perform relative to its privately-held rivals. This seems consistent with conventional wisdom in these industries. For example, the re-privatizations of once-public consultancies Booz Allen & Hamilton, Arthur D. Little, and LECG led one manager to suggest: *"I think by and large in the consulting industry you'd have to say that public ownership is a failure"* (personal interview 2003). Similar cautionary anecdotes can be found in other professional services as well (see, for example, Groysberg, Matthews, Nanda, & Salter, 1999; Millman, 1988: 65; Moskowitz, 1989).

On the other hand, if publicly-traded PSFs are not disadvantaged, this suggests that there are flaws in our theories about the efficiency of the traditional PSF ownership model. Addressing this issue is certainly relevant to managers of PSFs, as well as to professional associations in law and public accounting, who are increasingly debating whether to repeal long-standing prohibitions against outside ownership (Makin, 2004). However, it is also very relevant to organizational theory since if public PSFs challenge our conventional understanding of PSFs, they thereby challenge the broader theories of the firm being built upon that understanding.

But our knowledge of PSFs is long on anecdotes and short on rigorous empirical evidence. This is particularly true regarding public ownership, partly because of the historical rarity of public PSFs and partly because of the lack of data on private firms, which has led to a surprising lack of research comparing public vs. private firms in any context (Pagano, Panetta, & Zingales, 1998). One notable exception is recent work by Empson and Chapman (2006), which compares the internal organization and culture of two strategically allied consultancies, one a public corporation, the other a professional partnership. But in addition to detailed qualitative comparisons, we also need quantitative analyses across larger numbers of comparable firms.

This study makes more progress on the question of whether public ownership is detrimental to PSFs by focusing on the advertising industry, where a clutch of firms went public in the mid-1960s and competed against very comparable private firms for several decades. It analyzes whether public ownership negatively affected ad agency performance by comparing the growth rates of public and private agencies from 1960 to 1980, utilizing fixed effects models to help address endogeneity issues. The study also tests the assumptions underlying the theory that exclusive insider ownership provides superior incentives, by analyzing whether public ownership is more prevalent where employee[1] incentives are less important. In particular, I analyze whether public ownership is associated with larger agencies (where individual employees may be less critical and/or capital may be more valuable) or agencies in strategic positions that are less reliant on highly-skilled employees (as measured by agency creativity).

While there are limits to generalizing from the advertising industry to other professional services, the findings raise the possibility that public ownership may not be "bad" for PSFs. By challenging our stylized views of PSFs, the study thereby suggests caution to organizational theorists who use these stylized views to formulate more general theories about ownership structures in a human capital-intensive future. Also, this study highlights the value of and need for more systematic empirical research on the distribution and effects of alternative PSF governance structures to tie our stylized assumptions more closely to empirical reality.

[1] For simplicity, I use the term "employee" to refer to any individual who is paid by the firm for the use of their labor and/or human capital, which therefore includes "partners"—individuals who are both owners of the firm as well as providers of labor and human capital—even though they might not commonly be considered employees.

THEORY AND HYPOTHESES

Definitions and Distinctions

Two literatures are particularly helpful for framing the issue of public ownership of PSFs: a theoretical literature on the professional partnership model and a corporate finance literature on public versus private ownership. The professional partnership literature stems from the assumption that professional service firms[2] have traditionally been organized using a distinctive set of governance arrangements, collectively referred to as the *professional partnership* model. However, there tends to be confusion around what this term means, so it is useful to make some clarifications. The term *partnership* in this literature is used differently than its legal meaning. From a legal standpoint, a partnership is a particular organizational form which, in contrast to the corporation, lacks standing as a separate legal entity and is taxed differently. Partnerships, in this sense, are widely employed in many industries. Historically, many PSFs were partnerships in the legal sense, rather than corporations, which accounts for the use of the term in the organizational literature. However, more and more PSFs, including law and accounting firms, are no longer partnerships, having been converted into various forms of private corporations for tax and liability purposes (Lorsch & Tierney, 2002).

By contrast, in the organizational literature, the *professional* partnership refers to a distinctive set of governance characteristics, independent of any underlying legal form (Empson & Chapman, 2006; Greenwood, Hinings, & Brown, 1990; Lorsch & Tierney, 2002). While there is not a consensus on the precise set of features that define the archetypal professional

[2] The boundaries of the "professional services" are not tightly defined. Frequently included are accounting, law, management consulting and investment banking; and advertising, engineering, and architecture are also often included. The definition does not coincide with the traditional "professions," as medicine is sometimes not included while consultants and investment bankers are. A more accurate label might be "business advisory services" (Lowendahl, 2000).

partnership, most scholars would agree on at least two key characteristics: ownership held exclusively by professionals who work (or once worked) for the firm (i.e., no outside investors); and highly dispersed authority (as reflected, for example, in broad participation by senior professionals in strategic decisions; rotating executive positions; and/or high individual autonomy in the production process) (Eccles & Crane, 1988; Empson & Chapman, 2006; Gilson & Mnookin, 1985; Greenwood et al., 1990; Lorsch & Tierney, 2002; Maister, 1993).

However, only the former characteristic—*exclusive insider ownership*—is *per se* incompatible with public ownership. Thus, any theorizing about the impact of public ownership on PSFs must focus primarily on the ownership dimension, specifically the costs and benefits of having outside owners. This paper, then, compares public PSFs against PSFs *with no outside owners*. Whether other features of the professional partnership model, such as dispersed internal authority, are somehow incompatible with or seldom associated with public ownership is an empirical question beyond the scope of this paper. (Note also that this analysis skips over an intermediate form: a private firm *with* outside owners. However, the private firm with outside owners, like the public corporation, is uncommon among PSFs).

Having made these important distinctions, we can now ask why a public PSF might be disadvantaged relative to a PSF with no outside owners. In the corporate finance literature, the most commonly theorized benefit of public ownership is improved access to capital (Dow & Putterman, 2000; Pagano et al., 1998; Ritter & Welch, 2002). A second frequently posited benefit is an increase in the liquidity of the firm's shares, which increases their value and allows existing owners to diversify or cash out more easily (Pagano et al., 1998; Ritter & Welch, 2002).

The primary cost of public ownership, in theory, is an increase in agency costs. Insiders' effort should decrease because their share of profits decreases as some of the ownership is sold to

investors and because a more dispersed base of outside owners monitors less (Mikkelson, Partch, & Shah, 1997; Pagano et al., 1998; Ritter & Welch, 2002). In addition, public ownership imposes some fixed administrative costs, including one-time costs of arranging the IPO and on-going costs associated with public disclosure requirements (Pagano et al., 1998).

It is interesting to note that there is very limited empirical research comparing public and private firms, primarily because of the difficulty of acquiring data on private firms (Chemmanur & Fulghieri, 1999; Pagano et al., 1998; Ritter & Welch, 2002). However, what little evidence there is lends some support to these assumptions. Pagano et al (1998) and Kwan (2002) compare public and private firms in settings where regulatory requirements produce financial data on private firms and find that public firms have lower profitability. Mikkelson, Partch and Shah (1997) find a decline in profitability after firms go public. These studies generally infer that firms suffer from increased agency costs after going public. Pagano et al (1998) also find evidence that firms experience greater access to capital after going public.

How might these theories apply to the PSF context? In a nutshell, the literature on PSFs suggests that the benefits of public ownership are diluted while the costs are greatly exacerbated, which explains the scarcity of public PSFs. In this literature, the key characteristics of PSFs are an almost exclusive reliance on skilled, non-firm-specific human capital and a limited ability to monitor the efforts of or evaluate the outputs of that human capital (Alchian & Demsetz, 1972; Dow & Putterman, 2000; Fama & Jensen, 1983; Jensen & Meckling, 1979; Levin & Tadelis, 2005b; Roberts & Van den Steen, 2000). Thus, on the one hand, access to capital is assumed to be of distinctly low value for PSFs as their investment needs are minimal. PSFs are typically assumed to exhibit few scale economies, their physical assets (e.g., office space, computers) are generic rather than firm-specific and thus amenable to leasing or debt-financing (rather than

equity financing) (Dow & Putterman, 2000; Hansmann, 1996), and R&D and advertising investments are minimal.

On the other hand, the agency costs are assumed to be very high. First, recall that PSFs involve the special case of a private firm *with exclusive insider ownership*. Going public, by definition, reduces insiders' ownership, thereby reducing insiders' incentives. Second, in the PSF environment, insider incentives are particularly critical, because attracting and motivating skilled professionals is very valuable yet also poses considerable contracting difficulties. In fact, several classic articles on the economic theory of the firm explicitly explain the ownership model of professional partnerships by asserting that professional labor is extremely hard for outsiders to monitor (Alchian & Demsetz, 1972; Fama & Jensen, 1983; Jensen & Meckling, 1979).

Furthermore, agency costs may not be the only source of diluted incentives for public PSFs. Both economic and sociological theorists argue that a strong culture that fosters cooperation and intrinsic motivation is a key source of advantage for PSFs, because professionals' portable skills render formal authority and traditional incentive systems less effective (Eccles & Crane, 1988; Gilson & Mnookin, 1985; Greenwood & Empson, 2003; Lorsch & Tierney, 2002; Maister, 1993; Teece, 2003). But public ownership may weaken a firm's culture in several ways. Public disclosure and other shareholder protections may require the adoption of more formal processes and hierarchical structures (Marchisio & Ravasi, 2001), which could conflict with informal processes and "collegial controls" (Greenwood & Empson, 2003). And making the firm's shares freely available may reduce the prestige of an ownership stake, thereby diminishing the "lure of partnership" (Greenwood & Empson, 2003; Greenwood et al., 2002; Groysberg et al., 1999; Krause, 1963).

Thus the literatures on corporate finance and professional service firms combine to suggest that public ownership will impose high costs on PSFs in the form of reduced incentives while offering few offsetting benefits for the firm (although the owners may well benefit from increased liquidity). This leads to the study's primary empirical hypothesis:

Hypothesis 1. Public PSFs will under-perform PSFs with no outside owners.

We can further test the argument against public PSFs by looking at its underlying assumptions about the PSF environment: (1) that capital is a relatively unimportant input, and (2) that employee incentives are very important but also difficult to provide. These assumptions may not hold equally for all PSFs. To the extent that there is variation across PSFs in these conditions, we can predict two empirical patterns. First, we would expect an inverse correlation between the likelihood of public ownership and the strength of these conditions. This could arise either because PSFs facing the relevant conditions avoid going public or because PSFs that go public migrate away from these conditions (or are selected out). Second, public PSFs for whom the conditions apply more strongly should perform worse than public PSFs for whom they apply less strongly.

One dimension on which these conditions likely vary is firm size: i.e., capital may be relatively more important to larger PSFs than to smaller PSFs; and employee incentives may be relatively less important to larger PSFs. While PSFs seldom face large-scale investments, they tend to add increasing fixed costs as they grow, such as additional offices (each with fixed overhead), specialized personnel, and more complex IT systems. This may result in higher working capital requirements and a greater valuation of external finance. In addition, the incentive dilution of public ownership may be much less for larger PSFs, both because individual professionals may be less critical to overall firm performance and because the incentive effects

of exclusive insider ownership may already be greatly attenuated in larger firms. The latter could arise because a greater number of inside owners dilutes the incentives for each individual owner (Alchian & Demsetz, 1972) or because firm size may weaken the cohesiveness of the firm's culture, as it adds more formality and bureaucracy (Baron, Burton, & Hannan, 1999). This size/ownership relationship is consistent with the limited empirical evidence. Pagano, et al. (1998) find that larger firms in their sample were more likely to go public. And Mikkelson, et al. (1997) find that for the first five years after going public, smaller firms performed worse than their peers while larger ones did not. Two hypotheses test this size-ownership relationship:

Hypothesis 2a. Public PSFs will be larger than PSFs with no outside owners.

Hypothesis 2b. Performance of public PSFs will increase with firm size.

(Note that public ownership may also be correlated with firm size simply because there are fixed costs associated with going and being public that are more easily borne by larger firms. So a correlation between ownership and firm size *by itself* would not be the most compelling test of the theory that public ownership dilutes incentives, as I note in the Discussion.)

Another dimension along which the boundary conditions might vary is strategic position. In particular, certain PSF strategies rely more heavily than others on highly skilled professionals and thus might face greater penalties from an incentive loss under public ownership. Hitt, Bierman, Shimizu and Kochhar (2001), for example, provide evidence that the value of high levels of individual human capital in law firms depends on the extent of a law firm's diversification (in terms of specialties and geographic locations). Another dimension of skill-differentiated positions is customization versus standardization. Maister (1993) distinguishes between "brains" projects—which address complex problems and require "creativity, innovation … high professional craft [and] highly skilled and highly paid professionals"—from "procedure"

projects, which involve more routine problems and do not demand the same level of professional expertise. This customization versus standardization distinction is also described in Hansen, Nohria and Tierney (1999), where the former is exemplified by McKinsey, Bain, BCG and the latter by Accenture and Ernst & Young (now Cap Gemini). Like Maister, they argue that the former entails selectively hiring highly-trained "inventors" while the latter uses less skilled "implementers." In investment banking, Morrison and Wilhelm (2004) also suggest that the value of skilled individuals varies across segments of the industry, with the lowest value in retail brokerage (e.g., E.F. Hutton) and the highest value in M&A advisory services (e.g., Goldman Sachs).

If public ownership hinders the provision of incentives, then we should expect to see public PSFs associated with strategic positions that are *less* dependent on highly skilled individuals. As explained in the next section, I test these hypotheses with a panel of advertising agencies. How might skill-differentiated strategic positions be manifested in this context? In the advertising industry, *creativity* is a key dimension of professional skill. Creativity refers to the originality of an ad campaign, both in terms of its artistic conception and its approach to positioning the clients' product. Creativity is perhaps the primary dimension on which advertising professionals judge each other (Helgesen, 1994). Furthermore, the common assumption in the industry is that producing high levels of creativity is dependent on highly skilled individuals (aka, "creative stars") (Cook & Nohria, 1991). Creativity is unlikely to be produced with less talented employees even if supplemented with various capital investments (Laird, 1961). Conversely, creative stars do not need complementary physical or organizational assets to produce creative output (e.g., one agency founder claimed in an interview that "great creative people will do great work at [any] agency").

However, high creativity is not essential for agency success, as it is not the only dimension that clients care about. Clients vary in the extent to which they prioritize creativity, with some clients caring more about an agency's expertise in marketing strategy or its responsiveness to client input. Therefore different levels of creativity can be competitive in different client segments, and many successful agencies can have mediocre creative reputations.[3] For the purposes of this analysis, the useful feature of creativity is that producing high levels of creativity requires high levels of professional skill and is a distinct strategic position or choice. Accordingly, we can posit a third set of hypotheses within the advertising context:

Hypothesis 3a. Public ad agencies will compete with lower levels of creativity than ad agencies with no outside owners.

Hypothesis 3b. Performance of public ad agencies will decrease as their level of creativity increases.

RESEARCH DESIGN & SETTING

The primary question—do publicly held PSFs underperform PSFs with no outside owners?—is fairly simple, but there are several challenges to addressing it empirically. Foremost is the small number of publicly-traded PSFs, particularly those with long track records. For example, there are still no publicly-traded law firms or audit firms and most of the publicly-traded consulting firms have emerged only in the last decade. I address this challenge by focusing on the U.S. advertising industry, where at least twenty advertising agencies conducted

[3] Because of this, creativity should not be construed as a proxy for an agency's economic performance. This is illustrated by the sample used in this analysis, in which creativity (as measured by number of awards) is not a significant predictor of agency growth. The raw correlation between growth and awards is only 0.07 (see Table 2) and in the regressions using growth as a dependent variable (Table 3), the coefficient on awards is consistently *negative*.

IPOs between 1962 and 1973. This is a small sample, to be sure, but larger than in many other professional service industries and offers a long period to observe post-IPO outcomes.

The agencies that went public included a number of the industry's large firms. In 1973, 17 public agencies (the maximum number of simultaneously existing public agencies) accounted for 19.5% of industry revenue; and in 1981, while the number of public agencies had dropped to 8, they still accounted for 18.6% of industry revenue. However, the majority of IPOs were conducted by firms smaller than the top 25 (including three that were not even among the top 200)—and many large agencies remained private well into the late 1980s. So this setting offers comparable public and private firms in several size categories.

This industry offers a relevant setting because ad agencies face the conditions posited in the professional partnership literature. First, the production of advertising services rests almost entirely on human capital: marketing expertise, creative talent, relationship management skills. There are few opportunities for investment in non-human assets, such as equipment, advertising, R&D, or even centralized databases and IT systems (Cook & Nohria, 1991). Where producing advertisements involves expensive equipment (e.g., TV production), the work is typically outsourced and charged directly to the client. Advertising is custom-designed for each client, so there are minimal scale or scope economies (as confirmed by a stream of econometric research by Silk and Berndt (Schmalensee, Silk, & Bojanek, 1983; Silk & Berndt, 1993, 1995, 2003). Second, assessing the effectiveness of an ad agency's output even *ex post* has been notoriously difficult and the subject of considerable on-going research (Rothenberg, 1994), so evaluating the likely quality of an agency's output *ex ante* is even harder. Third, the advertising industry offers a relevant ownership model. From the industry's founding in the 1860s until 1962, not only were

all advertising agencies privately held, but they also had no outside investors, so they corresponded to the *exclusive insider ownership* model.

However, as Greenwood, et al (2002) caution, there is a tendency in the literature to generalize results from one professional service to others without qualification (e.g., Hitt et al., 2001) which may be empirically unjustified. Ad agencies may differ from more quintessential PSFs in ways that would limit the relevance of this analysis. For example, advertising may involve more division of labor across distinct functions (e.g., creative personnel vs. account managers) than in other professions, like law and accounting, which are commonly assumed to involve homogeneous professionals working independently (Greenwood et al., 1990). Greater production interdependence might make the theorized incentive problems of public ownership less acute. Also, ad agencies have not traditionally featured the highly decentralized internal authority which characterizes the archetypal professional partnership. Control in private agencies is typically concentrated among a few senior executives (Rubel, 1963). However, this should *not* affect the ability to generalize about the presence or absence of outside ownership, on which this paper focuses. In the end, since I am testing hypotheses regarding the value of public ownership vs. exclusive insider ownership under conditions where production relies on hard-to-monitor human capital and *not* on physical or financial capital, ad agencies offer a very relevant population for the existing theory.

A second important obstacle is the lack of data on private firms in general. This has led to a dearth of research on the relative performance of public vs. private firms in any context, even in the corporate finance literature (Pagano et al., 1998; Ritter & Welch, 2002). This remains a problem with the ad industry sample, with no source for financial information on private

agencies. However, the main trade journal publishes an annual list of ad agencies along with their revenue, thus performance can be measured by growth rates (described in the next section).

A third challenge is the significant potential for endogeneity between the dependent variable and public ownership. Firms are not selected at random to go public, so the set of public agencies may be systematically different from those that stay private, including on performance dimensions. It is plausible to assume that firms with high performance are more likely to go public, so that cross-sectional comparisons between public and private firms would be biased towards finding superior performance of public firms. Endogeneity concerns are partially mitigated through the use of a panel dataset, which allows for the use of firm fixed effects to control for unobserved firm-level heterogeneity.

In addition to collecting a panel dataset of public and private ad agencies, I also extensively researched the contemporary industry trade press and conducted interviews with a range of advertising executives in order to build a qualitative understanding of the industry. These qualitative sources provided context for the measures and interpretations that follow.

SAMPLE, MEASURES AND MODELS

Sample

The analysis that follows is based on a panel of 122 U.S.-based advertising agencies from 1960 to 1980. The basic data source was *Advertising Age's* annual "Agency Report", which lists approximately 500 U.S. advertising agencies, ranked by revenue. The sample was constructed by selecting the largest 200 agencies from the 1962 *Advertising Age* report.

Limiting the sample to the top 200 excludes many thousands of agencies (the 1967 Census reported 5,948 ad agencies in the U.S.). But consistent information about agencies

outside of the top 200—most of whom had fewer than ten employees—is hard to come by. The top 200 agencies accounted for about 40% of industry revenue in 1962. The time period was chosen for conceptual and practical reasons. 1960 is the first year for which data from multiple awards shows is available. Conveniently, the first IPO was not until 1962. The analysis ends at 1980, before the beginning of an industry consolidation that has resulted in a few holding companies controlling half of the industry's global revenue. After 1980, the analysis becomes more problematic as most of the firms leave the sample via acquisition.

I include only independent agencies, so agencies exit the sample as they are acquired. From the initial 200, some agencies are excluded for lack of data regarding their independence or because they were already subsidiaries in 1962, yielding 122 firms. The final panel includes 1,825 agency-year observations.

The panel includes 15 of the 20 agencies that went public during the period. Of the five omitted agencies, one was founded after 1962, three were outside of the top 200 in 1962, and one lacked requisite data. As noted earlier, these 15 agencies accounted for roughly 18%-20% of the industry's revenue during the sample period. Interestingly, four of these agencies re-privatized during the sample period, which means the sample contains a total of 19 ownership changes.

Measures

Performance. As noted earlier, studying the performance effects of public ownership is problematic because of the lack of financial data on the private firms that form the key control group, and this remains a problem for the sample of ad agencies. In this sample, the next best proxy is growth rate. For many firms, growth is a desired outcome, in addition to profitability. Furthermore, faster growth is often an indication of greater efficiency (Ericson & Pakes, 1995; Jovanovic, 1982; Klepper, 1996). Of course, to some degree a firm's rate of growth is also a

choice (rather than just a desirable outcome); and very high growth rates can be hazardous to organizational performance and survival, so growth may not always be tightly correlated with profitability. Fortunately, in the sample of publicly-traded agencies used here, there is a high correlation between growth rate and profitability. Regressing profit margin on growth for the public agencies in the sample yields a positive coefficient on growth and a negative coefficient on the square of growth, both significant at a 99.9% level. This supports the idea that growth has a non-monotonic relationship with profitability, but is a good first-order proxy for firm profitability.

Two alternative proxies are survival and revenue per employee. However, the small number of failures in the sample provide little statistical traction for a survival rate analysis (not surprisingly, hazard rate models show no correlation between ownership type and survival rates). Revenue per employee has been used as a performance proxy in studies in other professional service contexts, where firms are also largely private (Greenwood et al., 2002). However, in the sub-sample of public agencies, there is no correlation between profitability and revenue per employee. Thus, growth rate appears to be the most reasonable measure of overall agency performance (and this is further supported by a strong correlation between growth rate and firm survival in the full sample of agencies).

The primary measure of growth is an agency's annual change in revenue (*growth*). Additionally, I compute the agency's compound annual growth rate over the preceding three years ($year_{(t-3)}$ to $year_t$). This three-year measure (*3yr growth*) smoothes out the idiosyncratic elements in a one-year measure and is used primarily as a control variable where awards (see below) are the dependent variable.

High Skill Strategy: Creativity.

Creativity is measured through the winning of awards for creative excellence. The industry's annual awards shows are an important manifestation of creative reputation. Most shows are organized by non-profit professional associations (e.g., *The Art Director's Club of New York*), with a few organized as for-profit enterprises (e.g., *Clios*). Almost all awards shows are intended to recognize creativity rather than marketing effectiveness (Helgesen, 1994). Awards are determined by panels of judges comprised of many prominent creative personnel from across multiple agencies.

Interviews with industry participants identified four national awards shows as the most prestigious and well-known (during the timeframe of the sample). Archives for two of those awards, the *Clios* and the *Art Director's Club of New York* (*ADCNY*), were available back to 1960 and were used to measure an agency's award rate. An agency's award rate is simply the number of Clio and ADCNY awards it wins in a given year (*awards*). The total number of awards bestowed in a year varies from a low of 223 to a high of 814. (No Clio data are available for 1979, so all 1979 observations are excluded from models using awards measures).

In addition to the raw count measure, I calculate a "residual awards" (*resid. awards*) measure that controls for agency size and year effects. Residual awards are the difference between an agency's actual awards and a *predicted* number of awards, based on a negative binomial model of awards on firm size, year fixed effects, and firm growth rate. I use this construction to avoid having the awards measure interfere with the direct measure of firm size when both are used as control variables, as well as to compare mean award rates of public and private agencies.

This measurement of creativity obviously has limitations. For one, the data do not include an agency's number of awards show *entries*. Award-winning agencies may be those that submit

a disproportionate number of entries, independent of their creative ability. Two, the assessment of creativity is obviously highly subjective and thus having data from only two shows may yield an idiosyncratic measurement of creativity. Fortunately, there is considerable correlation between the two shows used here. In the sample, the correlation between an agency's number of Clio awards and number of ADCNY awards is 0.64. This indicates a high degree of consistency across the shows in the judgment of creativity. In addition, interviews and reviews of the trade press indicated that agencies with renowned creative reputations do, in fact, win many awards, so the measure seems reliable in identifying high levels of creativity. However, it also appears that some large agencies with mediocre creative reputations win more awards than might be expected.

Ownership. Agency ownership status is measured as a dichotomous variable, *public*, equal to 1 if an agency is public in year t. An agency is considered to be public if its stock is traded independently. The value of *public* is changed in the year the firm's public/private status changes. However, the year of the IPO is excluded from the analyses that follow because it is ambiguous which ownership regime applies.

Using a dichotomous measure takes no account of the fact that the percentage of outside ownership may vary across publicly-held firms. Such variation may well have an effect on firm performance, per agency-cost theory (Jensen & Meckling, 1976; Morck, Shleifer, & Vishny, 1988). However, in this analysis, this issue is less problematic for two reasons. First, the hypotheses rest on arguments regarding the mere presence of outside owners, relative to a situation of no outside owners. So even if a small minority of shares is floated, a negative incentive effect should arise (if the theory holds). Second, there is not a wide variation in the percentage of outside ownership across the public agencies in the sample. They initially float

from 25% to 40% of their shares and by the end of the period, outside ownership ranges between 20% and 50%.

Firm Size. Firm size (*size*) is measured with the log of global revenue, adjusted to 1982 dollars.

Controls.

Pre-IPO. To assess whether firms that went public were significantly different from their private peers even before going public, I create a dummy variable (*preIPO*) equal to 1 in the three years prior to the year before an IPO (the year just prior to an IPO is excluded because of anomalous behavior near an IPO, as discussed below).

IPO Years. Prior research on IPOs indicates that firm performance is somewhat volatile just before and after an IPO (Mikkelson et al., 1997; Pagano et al., 1998). To account for the possibility that firm behavior around an IPO may be anomalous, I create a separate dummy variable for each year in the four year window around the IPO year (*IPO-2, IPO-1, IPO+1, IPO+2*). (Note that *IPO-2* overlaps with the *preIPO* variable. *IPO-2* is only used in the fixed effects models in which *preIPO* is not included).

Year Fixed Effects. All models include dummy variables for each year.

Models (Hypothesis Testing Procedures)

I address Hypotheses 1 by comparing the growth rates of public and private agencies. I begin with OLS, using the full panel as a pooled cross-section. I then restrict the sample to 1973-1980, after the IPO activity, so that the private observations do not include the pre-IPO results for agencies that went public (the "adopters")—this provides a more pure cross-sectional comparison. Third, to control for unobserved firm heterogeneity, I use OLS with firm fixed effects.

Fourth, I utilize several techniques to correct for serial correlation in the error terms for a given agency, which can cause mis-estimation of the standard errors and spurious levels of significance (Bertrand, Duflo, & Mullainathan, 2004; Kennedy, 2003). To some extent, using robust standard errors in the aforementioned OLS models addresses such correlation. But I also run a feasible generalized least squares model with an AR(1) correction. Lastly, I employ an alternative solution suggested by Bertrand, et al. (2004), which involves collapsing the panel into only two periods (before and after for the adopters). For this model, *growth* is regressed on all the control variables, excluding *public*. For the adopters only, the residuals from this equation are averaged across all the periods before and all the periods after the IPO, yielding a sample with 30 observations (2 per adopter). These averaged residuals are regressed against *public*.

Hypotheses 2a is assessed by comparing the mean size of the public vs. private observations as well as comparing the adopters vs. the non-adopters. Hypothesis 2b—that the performance of public agencies is conditioned by agency size—is tested by adding an interaction term (the product of *public* and *size*) to the regressions used for Hypothesis 1.

Hypothesis 3a is tested in a manner similar to that used for Hypothesis 1, but using *awards* as the dependent variable and a negative binomial specification, because the dependent variable is a count variable. I use the negative binomial instead of the Poisson specification because there are many observations on zero and the variance of awards is greater than the mean. I begin with a pooled cross-section, then restrict the sample to the 1973-1980 period, and then add conditional fixed effects. To include firm fixed effects in the negative binomial model, each firm must have variance in the dependent variable across time periods. Thus, the sample is reduced because about 30% of the firms never win an award. To account for serial correlation, the final model implements the collapsed sample (of Bertrand, et al, 2004) described above. Lastly, hypothesis

3C—that the performance of public agencies is conditioned by creativity levels—is tested by regressing *growth* on an interaction of *public* and *residual awards*.

RESULTS

Table 1 provides summary statistics for the full sample, along with a comparison of the mean size, growth rate, and number of awards for public and private observations (as well as for the year of an IPO, which is not included in either category). Table 2 presents the correlation matrix among the key variables. It is readily apparent that public agencies were much larger on average ($64m vs. $11m; and a correlation between *size* and *public* of 0.31). Also of note are the very high growth rates and award rates in the year of an IPO, which is consistent with the abnormal performance around an IPO reported in previous studies (Mikkelson et al., 1997; Pagano et al., 1998).

[Insert Tables 1 and 2 about here]

Performance and Ownership

Table 3 presents results from regressions of growth rate on agency ownership. In all specifications, the coefficient on *public* is statistically insignificant. Overall, there is no statistically significant evidence that public ownership was associated with lower growth rates. Thus, there is no support for Hypothesis 1.

[Insert Table 3 about here]

Firm Size and Ownership

Table 4 compares the average size of public vs. private agencies in three selected years: in 1973, once all adopters had gone public; in 1980 at the end of the sample period; and in 1962

(comparing those that would go public vs. those that would not). In all instances, a t-test indicates that the difference in mean size is significant at the 99% level. Thus, hypothesis 2a is supported.

[Insert Table 4 about here]

For Hypothesis 2b, Table 5 shows results from regressions of *growth* on *public* that also include the interaction between *public* and *size*. In all five specifications, the coefficients on public are negative and those on the interaction term are positive: relative performance increases with firm size. However, the coefficients are significant only in the simple OLS model (model 1) and the GLS model corrected for autocorrelation (model 4). So there is only weak evidence in support of hypothesis 2b.

The interaction results can be interpreted by assessing the predicted effect of public ownership on growth rates for agencies of different size levels. For the maximum value of *size* in the sample, public ownership is associated with between 0%-10% *higher* growth, depending on the model specification. For the minimum value of *size* for a public agency, public ownership is associated with 7%-13% *lower* growth. And for the average value of *size* in the overall sample, *public* is associated with 3%-4% lower growth. Thus, public ownership is estimated to have a negative effect on growth for small and medium-sized agencies. This is consistent with the pattern of persistence of public ownership: of the eight large agencies that went public—those among the largest 25 firms—all but one remained public through the sample period (one re-privatized); but of the remaining (non-top 25) adopters, four re-privatized and two failed during the same timeframe.

[Insert Table 5 about here]

Creativity and Ownership

Table 6 presents the results from negative binomial models of awards on ownership. The first three models (without controls for firm-level fixed effects) show positive coefficients of consistent magnitude on *public*, significant at the 90% level. This contradicts Hypothesis 3a. If anything, public agencies had *higher* award rates than private agencies. Model 2 also reveals a positive coefficient on *preIPO*, indicating that the agencies that went public had relatively higher award levels to begin with.

In contrast to the cross-sectional results, the longitudinal specifications of models 4 and 5 yield a negative coefficient on *public*, significant at the 90% level. This suggests that agencies that went public experienced lower award rates after going public (and/or higher award rates after re-privatizing).

At a basic level, this analysis of ownership and award rates rejects Hypothesis 3a, as there is no strong relationship between public ownership and award rates: public agencies were not less creative than comparable private firms, and the 90% significance level for the post-IPO decline is rather weak evidence. But the results also suggest an interesting pattern: both before and after going public, the adopters were as or more creative than the agencies that stayed private, but they nonetheless experienced post-IPO declines in their creativity level.

[Insert Tables 6 and 7 about here]

Lastly, Table 7 presents results from regressions of *growth* on the interaction between *public* and *awards*. The coefficient on the *public*awards* interaction is insignificant in three of the four models, and in the fourth model, it is positive, contrary to the prediction of Hypothesis 3b. Performance of public agencies was not conditioned by their creativity.

DISCUSSION

The evidence from the advertising industry indicates that public ownership was not associated with inferior performance on average. However, it also suggests that public ownership was more suited to larger firms. The public firms were clearly larger on average, and there is some evidence that the performance of public agencies was contingent on firm size, with smaller public agencies experiencing lower growth rates than comparably sized agencies with no outside owners. Lastly, public ownership was *not* associated with positions that do not require highly skilled professionals, at least on the dimension of creativity. That said, there is some indication that agencies that went public may have experienced declines in their creativity after going public (while remaining as or more creative than agencies with no outside owners).

It is important to note one of the main empirical limitations of the analysis. While the sample includes 122 firms overall, there are only 15 public firms (and 19 changes between public and private), so the insignificant coefficients in many of the models may stem from a lack of statistical traction rather than the absence of underlying relationships. Accepting this limitation, what can we infer from the results?

The evidence that public ownership was not associated with lower performance for larger agencies challenges the conventional wisdom regarding the ownership of PSFs. But does the competitiveness of public agencies challenge the *organizational* assumption that public ownership weakens incentives inside PSFs or only the *environmental* assumptions that all PSFs derive low value from capital, high value from human capital, and face high costs of contracting for that human capital? The fact that public ownership was associated with larger firms is consistent with the latter interpretation. Incentive dilution from public ownership may have negatively affected smaller agencies but not larger agencies, whose size already attenuated the

benefits of exclusive insider ownership. But there are also administrative costs associated with public ownership, which may simply have been too costly for smaller agencies. So the interpretation of the size/ownership relationship remains ambiguous.

The creativity results provide a second basis for distinguishing between environmental and organizational effects. High creativity requires highly skilled employees. So the fact that public agencies could compete on a dimension requiring highly skilled inputs suggests that public ownership did not hinder incentive provision, even under conditions where the theory suggests that it should. However, we can imagine alternative interpretations in which these results do not contradict the incentive dilution theory. It could be the case, contrary to the qualitative evidence, that creativity *is* amenable to capital substitution and that public agencies made investments that allowed less-skilled employees to be more creative. Alternatively, inducing creative effort may not pose an incentive challenge in the first place. Awards identify not only agencies but also individuals inside the agency, so they are valuable in the industry's labor market. It may be easy to induce creative effort as employees will seek awards to advance their own careers. But even in this interpretation, the agency still needs to attract and retain creative talent in the first place (even if it does not need to motivate effort), so incentives are still important. The creativity findings seem to suggest, then, that public ownership did not dilute incentive provision.

While the evidence of a post-IPO decline in award rate is of marginal significance and hence must be considered only suggestive, it is worth some discussion. It may indicate a change in the firm's priorities (i.e., its objective function). When owned entirely by insiders, a firm may not be purely profit-maximizing, as the owners can balance financial returns against non-financial preferences. For example, there is evidence that highly skilled individuals derive utility

from producing high-quality work (see Stern (2000) for scientists and Caves (2000) for artists) and that firms owned by such individuals tend to produce higher-quality outputs even at the expense of financial returns (see Fee (2002) for movies, Scott Morton and Podolny (2002) for wine makers). Prior to going public, creative agencies may have been pursuing creativity for its own sake. After going public, thus taking on outside investors who only value financial returns, the agencies may have shifted effort, at the margin, from creativity towards profitability. This story would be consistent with the anecdotal lamentations about going public. For example, in regards to the most creative agency in the 1960s, Doyle Dane Bernbach, one historian writes: "Almost everyone who was a star at Doyle Dane Bernbach when it was the greatest advertising agency in New York says its death began when the company went public in 1964….The agency that had been dedicated to the creative product above all else ... became as financially motivated as its counterparts on Madison Avenue" (Millman, 1988: 65). However without additional data on the internal details of the public agencies, this interpretation remains speculative.

As I noted when describing the research setting, one must be cautious in generalizing results from one specific professional setting to all PSFs (Greenwood et al., 2002), and the nature of production and internal organization of ad agencies may differ in important ways from law firms, accountancies or consultancies. But until future research provides more systematic evidence on the similarities and differences in production and organization both within and across different professional fields (Morris & Pinnington, 1998), it is hard to define the limits on generalizing. Again, ad agencies seem to meet the abstract criteria underlying the theories of professional partnerships, and hence provide a solid stepping stone for continued research into the governance of PSFs.

There is some consistency with findings in other professions. These results complement the qualitative findings of Empson and Chapman (2006), who compare two strategically allied consultancies: one a public corporation, the other a private partnership. They find that managers under both ownership models express a similar commitment to the "interpretive scheme" of the professional partnership model, which entailed limited managerial authority, high individual autonomy, and long-term over short-term performance. However, the principles are manifested through different organizational mechanisms in each firm. Thus, their study suggests that ownership structure—or more specifically, the exclusion of outside owners—is not determinative of a PSF's internal organization, and therefore a public corporation may be able to replicate the internal characteristics of the partnership model. Relatedly, the present study of advertising agencies indicates that public ownership *per se* did not affect firm performance, at least for large agencies. Empson and Chapman's study would suggest that this is because public ownership does not significantly alter the internal incentive system.

If public ownership does not impose an uncompetitive governance structure on PSFs, it begs the question of why PSFs did not go public earlier and why some large PSFs still remain private, given the potential for much higher valuations of their ownership stakes through flotation. A first-order answer is that many have not been allowed to because several professions have or once had regulations against outside ownership. These prohibitions are manifestations of professional codes of ethics that seek to protect clients from conflicts of interest (Nanda, 2002). Outside (i.e., non-professional) owners are seen as potentially compromising the ability to serve clients without bias. Such prohibitions remain in force in law and accounting, explaining the lack of publicly-traded firms in these industries. Interestingly, similar prohibitions also existed in

advertising and investment banking, until these industries had them repealed (in 1963 and 1971 respectively).

The existence of these prohibitions is an even more basic challenge to functionally-based theories of the professional partnership, in that it suggests that the professional partnership has been a dominant form for PSFs not necessarily because it is most efficient but rather because the alternative (the corporation) was not possible. While we can point to these prohibitions to explain the relative historical dearth of public PSFs, that merely shifts the research question to why the prohibitions have been repealed in some industries while not in others (Gilson & Mnookin, 1985).

In addition to understanding the variance in ownership prohibitions across professional services, we should also probe more deeply into why some large PSFs remained private even in industries where they could have gone public. Several scholars have suggested that professionals have normative or emotional attachments to the professional partnership model (Empson & Chapman, 2006; Greenwood & Empson, 2003; Lorsch & Tierney, 2002), which might outweigh the potential riches to be had by going public. Thus, a critical direction for future research on publicly-traded PSFs is to explore the development and erosion of institutional barriers—both regulatory and normative—to outside ownership.

Most directly, the study contributes to the literature on professional partnerships, by challenging the idea that exclusive insider ownership offers optimal incentives (Alchian & Demsetz, 1972; Greenwood & Empson, 2003; Jensen & Meckling, 1979; Levin & Tadelis, 2005a). While the historical prevalence of the professional partnership model of ownership has led theorists to create functional theories of its economic efficiency, perhaps this model is instead an institutional “relic” (Greenwood & Empson, 2003), an artifact of professional norms.

But beyond PSFs, this study has implications for organizational theories more broadly, to the extent that they are built on assumptions about the organization of PSFs. If our understanding of the ownership structures of PSFs is flawed, that should affect theories of ownership that build off that understanding. Economic theories of employee ownership (Dow, 2003; Hansmann, 1996) are one example. These theories typically assume that allocating ownership exclusively to employees offers incentive benefits (but has many offsetting disadvantages) and often support that assumption with the example of professional partnerships. But if outside ownership does not render PSFs less competitive, that challenges this basic assumption—and further supports Dow's (2003) acknowledgement that sustainable forms of employee ownership typically require some type of regulatory support (such as the prohibition on outside ownership in many professions).

A second example are recent attempts to use stylized views of PSFs to speculate about the future characteristics of firms in an increasingly human capital- or knowledge-intensive economy. Rajan & Zingales (2000; 2001), for example, draw on stylized examples of PSFs to predict that future corporations will feature (i) lower levels of outside ownership; (ii) broader internal ownership; and (iii) less diversification. This study certainly seems to challenge the first prediction. More generally, this study suggests caution to those who suggest that corporations will look increasingly like professional partnerships (Blair & Kochan, 2000; Scott, 1998; Teece, 2003), since by going public, and remaining competitive (at least in advertising), PSFs seem to be looking more like traditional corporations. At the very least, this study reiterates the need for more systematic empirical evidence to corroborate or correct our stylized views of PSF governance.

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BIO

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TABLE 1
SUMMARY STATISTICS, 1960-1980

	Full Sample (n = 1825)				Private (n = 1682)	IPO Year (n = 15)	Public (n = 128)
Variable	**Mean**	**Std Dev**	**Min**	**Max**	**Means**		
public	0.071	0.256	0	1			
nominal revenue ($M)	14.8	32.5	0.1	540.8	11.0	28.9	63.8
size (ln(real revenue))	2.52	1.35	-0.99	6.49	2.39	3.68	4.11
growth	0.10	0.17	-0.46	2.39	0.10	0.19	0.10
3-yr growth	0.10	0.10	-0.26	0.74	0.09	0.16	0.10
awards (#)	2.79	9.33	0	119	1.91	10.87	13.41
resid. awards (#)	-0.15	7.96	-32.00	103.57	-0.49	3.30	4.04
public*size	0.29	1.12	0.00	6.49			
public*awards	0.53	7.06	-8.30	77.04			

TABLE 2
CORRELATION MATRIX

Variable	size	growth	awards	resid awards	public	preIPO
size	1.00					
growth	0.02	1.00				
awards	0.41	0.07	1.00			
resid. awards	-0.03	-0.05	0.81	1.00		
public	0.31	0.00	0.33	0.16	1.00	
preIPO	0.09	0.03	0.09	0.06	-0.04	1.00

TABLE 3
OLS AND GLS REGRESSIONS OF GROWTH RATE ON OWNERSHIP TYPE

	1	2	3	4	5	6	7	8
Dep Var:	Growth	Growth	Growth	Growth	Growth	Growth	Growth	Growth
Specification:	OLS	OLS	OLS	Fixed Eff	Fixed Eff	GLS, AR(1)	GLS, AR(1)	OLS
Period:			73-'80				incl FE	
public	0.01	0.01	-0.03	-0.04	-0.02	0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.03)	(0.03)
preIPO		0.06 +				0.06 *	0.07 *	
		(0.03)				(0.03)	(0.03)	
IPOyear-2					0.10 *			
					(0.04)			
IPOyear-1		0.05			0.04	0.04	0.05	
		(0.04)			(0.04)	(0.04)	(0.04)	
IPOyear+1		0.04	0.07 **		0.05	0.04	0.05	
		(0.04)	(0.03)		(0.04)	(0.05)	(0.04)	
IPOyear+2		-0.04	-0.08 +		-0.02	-0.03	-0.02	
		(0.03)	(0.04)		(0.04)	(0.05)	(0.04)	
size (x10)	0.03	0.01	0.24 **	0.94 **	0.94 **	0.04	1.13 **	
	(0.05)	(0.05)	(0.06)	(0.13)	(0.13)	(0.04)	(0.14)	
resid. awards (x100)	-0.05	-0.06	-0.01	-0.36 **	-0.38 **	-0.10 +	-0.38 **	
	(0.12)	(0.12)	(0.08)	(0.09)	(0.09)	(0.06)	(0.09)	
							firm fixed effects	
year fixed effects	X	X	X	X	X	X	X	X
robust errors	X	X	X					
n	1,810	1,810	514	1,810	1,810	1,809	1,809	30
clusters	122	122	86	122	122	121	121	15
adj. R2	0.04	0.05	0.13	0.09	0.10			-0.03

Notes: Figures in parentheses are estimated standard errors.
+ p<0.10; * p<0.05; ** p<0.01

TABLE 4
PUBLIC VS. PRIVATE MEAN SIZE SIGNIFICANCE TESTS

Year	Public	Private	t statistic	Significance
1973	3.58	2.40	-3.11	0.003
1980	5.57	2.51	-5.43	0.000
	Adopters	**Non-Adopt.**		
1962	3.07	2.00	-3.11	0.002

TABLE 5
OLS: GROWTH ON OWNERSHIP WITH PUBLIC*SIZE INTERACTION

	1	2	3	4
Dep Var:	Growth	Growth	Growth	Growth
Specification:	OLS	OLS	Fixed Eff	GLS, AR(1)
Period:		'73-'80		
public	-0.15 **	-0.07	-0.07	-0.14 *
	(0.04)	(0.08)	(0.06)	(0.06)
size (x10)	-0.02	0.22 **	0.92 **	0.01
	(0.05)	(0.06)	(0.13)	(0.04)
public X size (x10)	0.39 **	0.11	0.12	0.36 **
	(0.10)	(0.16)	(0.14)	(0.13)
preIPO	0.07 +			0.07 *
	(0.03)			(0.03)
IPOyear-2			0.10 *	
			(0.04)	
IPOyear-1	0.05		0.04	0.04
	(0.04)		(0.04)	(0.04)
IPOyear+1	0.05	0.07 **	0.05	0.05
	(0.04)	(0.02)	(0.04)	(0.05)
IPOyear+2	-0.02	-0.08 +	-0.02	-0.02
	(0.03)	(0.04)	(0.04)	(0.05)
resid. awards (x100)	-0.07	-0.01	-0.37 **	-0.11 +
	(0.11)	(0.07)	(0.09)	(0.06)
year fixed effects	X	X	X	X
robust errors	X	X		
n	1,810	514	1,810	1,809
clusters	122	86	122	121
adj. R2	0.06	0.13	0.10	

Notes: Figures in parentheses are estimated standard errors.
+ p<0.10; * p<0.05; ** p<0.01

TABLE 6
NEGATIVE BINOMIAL MODELS OF AWARDS ON OWNERSHIP TYPE

	1	2	3	4	5
Dep Var:	Awards	Awards	Awards	Awards	Resid Awards
Specification:	Neg Bin	Neg Bin	Neg Bin	Neg Bin, FE	OLS
Period:			'73-'80		2-period
public	0.83 +	0.84 +	0.85 *	-0.21 +	-3.56 +
	(0.43)	(0.51)	(0.41)	(0.13)	(1.81)
preIPO		0.92 *			
		(0.46)			
IPOyear-2				-0.10	
				(0.20)	
IPOyear-1		1.02 +		-0.13	
		(0.58)		(0.21)	
IPOyear+1		0.23	0.25	0.12	
		(0.26)	(0.64)	(0.21)	
IPOyear+2		-0.41	-0.12	-0.08	
		(0.50)	(0.53)	(0.22)	
size	1.05 **	1.02 **	0.84 **	0.71 **	
	(0.10)	(0.10)	(0.12)	(0.07)	
3-yr growth	1.87 +	1.14	-0.85	-0.10	
	(1.13)	(0.97)	(1.88)	(0.40)	
year fixed effects	X	X	X	X	X
robust errors	X	X	X		
n	1,793	1,793	519	1,371	30
clusters (firms)	122	122	86	87	15
ln(L)	-2,529	-2,518	-821	-1,763	
adj. R2					0.09

Notes: Figures in parentheses are estimated standard errors.
+ p<0.10; * p<0.05; ** p<0.01

TABLE 7
OLS: GROWTH ON OWNERSHIP WITH PUBLIC*AWARDS INTERACTION

	2	3	4	6
Dep Var:	Growth	Growth	Growth	Growth
Specification:	OLS	OLS	Fixed Eff	GLS, AR(1)
Period:		'73-'80		
public	0.01	-0.03	-0.02	0.01
	(0.02)	(0.02)	(0.03)	(0.02)
resid. awards (x100)	-0.20	-0.01	-0.41 **	-0.27 **
	(0.18)	(0.20)	(0.11)	(0.09)
public X awards (x100)	0.22	-0.02	0.07	0.28 *
	(1.00)	(0.21)	(0.11)	(0.12)
preIPO	0.07 +			0.07 *
	(0.04)			(0.03)
IPOyear-2			0.11 *	
			(0.04)	
IPOyear-1	0.05		0.04	0.04
	(0.04)		(0.04)	(0.04)
IPOyear+1	0.04	0.07 **	0.05	0.04
	(0.04)	(0.03)	(0.04)	(0.05)
IPOyear+2	-0.04	-0.08 +	-0.02	-0.03
	(0.03)	(0.04)	(0.04)	(0.05)
size (x10)	-0.01	0.24 **	0.93 **	0.04
	(0.05)	(0.06)	(0.13)	(0.04)
year fixed effects	X	X	X	X
robust errors	X	X		
n	1,810	514	1,810	1,809
clusters	122	86	122	121
adj. R2	0.05	0.13	0.10	

Notes: Figures in parentheses are estimated standard errors.
+ p<0.10; * p<0.05; ** p<0.01