Does Governance Matter: The Case of Art Museums[1]

Sharon Oster

William N. Goetzmann

Yale School of Management

Abstract: Art museums are economic institutions that facilitate art education and connoisseurship. In this paper we examine the empirical evidence on how museum governance, revenue structure and the collection affect these related goals. We find strong differences in performance among public, not-for-profit and university museums, consistent with expectations about institutional economic incentives. We find that attendance is correlated to an instrument for museum collection value, consistent with the idea that the collection is an asset, in an economic sense. We find evidence that museums in affluent locations rely more upon private donations, consistent with the hypothesis that museums serve a social function. Analysis of time-series data on attendance shows that art prices and museum attendance are uncorrelated, suggesting that the demand for the aesthetic experience by different sectors of the market is disjoint. We also find no evidence that inter-city attendance is correlated, suggesting that variations in the appetite for the visual arts is local.

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I. Introduction

Art museums provide a classic example of organizations operating with multiple objectives. On the one hand, many American museums take as their central function the education of the populace. At the same time, there is a long tradition in museum management of conservation and appeal to the narrower elite. In the past decade, the balance between these objectives seems to have tilted in favor of the broader populace. In writing of this change, one museum activist, Kenneth Hudson, has argued: "The most fundamental change that has affected museums is the now almost universal conviction that they exist in order to serve the public." (in Kotler, 2001). Sociologists have explored this tension at some length. D'Harnoncourt and DiMaggio, for, example, describe the movement of art museums from secluded temples of culture to the present-day more public institutions (D'Harnoncourt, DiMaggio et al, 1991). Grana (1971) similarly contrasts patron-oriented museums, focused on "men of leisure from the upper classes" with public-oriented ones.

This paper uses cross-sectional and times series data on U.S. museum finances and operating characteristics to explore the effect of governance structure on performance. We are particularly interested in whether or not the ownership structure of a museum influences the balance it strikes among competing constituents. Increasingly, economists have come to appreciate the role played by governance structures on decision making in organizations, and the differentiated structure of the industry makes museums an excellent case study.

II. The Role of Museums

We begin our discussion by considering the objective function of the typical museum. In the literature, there are three oft-cited museum goals—art preservation, education of the populace, and providing a social signal for the elite of a community. The first two of these goals

appear frequently in the mission statements of museums. The mission statement of the Portland Art Museum in Oregon is typical: "The mission of the Portland Art Museum is to serve the public by providing access to art of enduring quality, by educating a diverse audience about art and by collecting and presenting a wide range of art for the enrichment of present and future generations." The opening lines of the mission statement of the Boston Museum of Fine Arts strikes a similar theme: "The Museum of Fine Arts houses and preserves preeminent collections and aspires to serve a wide variety of people through direct encounters with works of art."[2] The interest in both art preservation and education for the public are clear.

The role of museums in reinforcing a social elite within a city is less often articulated in mission statements. Yet, until well into the twentieth century, most American museums depended for their support on private philanthropic dollars (Anheier and Toepler, 1998, 235). Indeed, wealthy industrialists whom Dimaggio refers to as "cultural capitalists" founded many of our most well known museums. (Dimaggio, 1985). Dimaggio describes in some detail the way that these industrialists, in cities like Boston, used art institutions to build cultural boundaries, separating themselves from the rest of society. As Temin suggests, displaying one's art validates both a patron's possessions and his or her position in society. (Temin, 1991). As such, one might expect that the more affluent the society, the greater the need to signal taste through support and display of the arts.

Consider now the role of governance structure in determining how museums pursue their varied objectives. Approximately one third of the art museums in the U.S. are public institutions. These public museums were most typically founded with service to the public in mind and are likely to emphasize public attendance as an objective. The remaining two thirds of American museums are overwhelmingly nonprofit, but within this pool there are institutional

[2] See the web mission statement at: http://207.127.106.123/mission)

differences, such as between university-based museums and free-standing nonprofits. University art museums, which emerged largely in the nineteenth century, were principally intended to serve the students and academic staffs of their own institutions. (Boylan, 1999). While many university museums have clearly broadened their reach to serve the general public, one might well expect some residual focus on the less popular end of the art spectrum and on curatorial and educational functions as opposed to exhibitions. Thus, we hypothesize that public museums will service the general public most and university museums the least as they go about their respective businesses.

In pursuing these three objectives, museums have a number of instruments available. To the extent that public museums emphasize public access, one would expect them to maintain low prices, focus collection efforts on broadly accessible art and programs and emphasize more popular exhibitions. University based museums would be expected to focus on more sophisticated art and programs and be less concerned with keeping admission prices low for the general public, though free student access might well be important. Free standing nonprofits, operating without other support, might be expected to charge higher prices and pay more attention to the interests of elite donors.

Unfortunately, it is difficult to gather data directly on most of these strategic variables, though we will explore the special exhibition more shortly. Many museums, for example, characterize admissions fees as "suggestions," where the suggestion carries varying levels of force at different museums. Hence, while the broad-brush data do support our hypotheses, in that low or zero price levels are correlated with public ownership, it is hard to go much further simply looking at these variables.

We have instead chosen to focus on an output measure for the museums in our sample as a way of getting at the issue of the objective function of those museums. In particular, we use the attendance levels at museums with different ownership structures as an index of how vigorously these museums are pursuing public education and entertainment over their alternative goals. High attendance levels provide a measure of public attentiveness.

While governance is expected to influence the aggressiveness with which museums pursue audiences, characteristics of the collection itself likely affect its inherent attractiveness to the public. Finally, since museums deliver their output on site, we expect the city characteristics to help determine demand. Here we ask: Are museums like Walmart, where all that really matters for attracting customers is the organization's location? Or will a museum attract its own audience despite location-specific features?

II.1. Overall attendance

The empirical work on attendance described in this section of the paper is based on data collected by the Association of Art Museum Directors (AAMD). The AAMD is the principal art museum membership organization and consists of just over 200 museums located in the U.S. and Canada. The AAMD conducts annual surveys of its members, covering a wide range of information about finances, operations and museum collections. While the survey data are not generally publicly available, we were given access to the data for 1989 and 1999 and these two years form the basis for the econometric work in this section of the paper. In the full sample, there are 148 U.S. museums in 1989 and 140 in 1999 with substantial museum overlap between the two years, though many of the museums have at least some missing data. The museums surveyed are quite diverse, ranging for example in size from the Metropolitan Museum of New

York, with 1835 full time employees in 1999 to the California State University Art Museum with only 4 full time employees. There is a similarly large range in the attendance figures. The National Gallery in Washington D.C. and the Metropolitan Museum of New York both attract more than 5 million annual visitors, while the Yale University Art Gallery has a more modest 50,000. The summary statistics on the sample used in this paper are given in Table 1.

Before we turn to the econometrics, the raw data suggest something of the governance-attendance relationship. Consider the ratio of attendance to museum exhibition space as one, admittedly crude measure of the "productivity" of a museum. By this measure, university-based museums are heavily over-represented in the list of the twenty least productive museums. Thirty five percent of the museums on this list are university-affiliates, as compared to a population of 23%. Among the twenty most space-productive museums, there is only one university affiliate. Similarly, public museums are over-represented in the productive class and under-represented in the under-performers.

Of course, there are many differences among these museums other than their governance structure. In order to explore those differences more thoroughly, we estimate a simple model of museum attendance. The attendance levels at museums are modeled as a production function, where the inputs include museum and city characteristics. In particular, we estimate a production function for museum attendance as follows:

$$Ait= \alpha+ \beta Xit+ \delta Zit + \phi G \qquad (1)$$

Where Ait is the attendance at museum i at time t, Xit is a vector of characteristics associated with the collection of museum i at time t, Zit is a vector of characteristics at time t of the city in which museum i is located, and G is an indicator for governance structure.

Data on attendance levels and collection characteristics come from the AAMD survey.

The survey data are not without problems, some of which are described by Rossett (1991) for the earlier 1989 data. From our point of view, the collection data are most problematic. Ideally, we would like a measure of the value of the museum collection to use as one element of the X vector. In the more usual industrial production function context, this would be equivalent to a capital stock figure. As is well know, however, museum collections are not valued in the financial statements of museums; indeed, the standard procedure is to list the art assets at $1. In the AAMD survey, there are some data provided on the total value of a museum's collection based on insurance coverage.[3] These data are problematic both because insurance readjustments are likely to be sticky and because many of the museums self-insure and thus drop out of the sample when we measure collection value this way. Moreover, the censored museums are not representative since it is many of the large public museums that self-insure.

An alternative measure of collection value is the current expenditures on the collection. While we may presume that acquisitions are a major component of this category, expenditures on the collection may also include restoration, framing and other expenses. Nevertheless, this measure has the advantage of being "real" data, and is also available for a broader set of museums. Clearly what we are measuring here is a flow (analogous to investment) rather than the preferable asset value, but the flow and stock values do appear to be highly correlated. Using current expenditures on the collection may also create an endogeneity problem. Increased attendance at a museum typically contributes to the earned income of a museum, either through admissions fees or concession revenue, and thus may increase funds available for collections. To deal with this issue, we provide an alternative estimate of the attendance regression, instrumenting for collection expenditures using the market value of the endowment at

[3] Museum directors were asked to provide information both on the pay off of the insurance and the fraction of the collection covered. These two figures were then used to generate a total value figure.

the end of the prior period. Endowment value should be both independent of attendance and correlated with collection expenditures. Since a number of the museums in the sample do not report endowment values, instrumenting in this way reduces the sample size somewhat.

In addition to the variable measuring collection value, we also identify each collection by type. Narrative summaries of each museum provided by the AAMD were used to categorize each museum as either: Survey, Modern, American or Other. We are interested here in whether there is any evidence of a type bias in American museum-goers.

The Z vector contains a set of variables describing the characteristics of the site of the museum. The typical museum attracts both residents and tourists. To capture local demand, we used the size of the local population, and the percent of the population with a college degree. Prior work (Dimaggio,et al, 1987) suggests that educational level is a better predictor of local demand than income. We used two measures of tourist demand: hotel expenditures per capita, and mean January temperature. High January temperatures are intended to capture substitution possibilities for tourists and local residents alike. We expect that, holding tourist levels constant, museums do better in climates with cold winters.

Finally, we use a set of three dummies to capture governance type, distinguishing public, university-based, and other nonprofit museums. The public museums include those run by city, state and federal governments. The set of independent variables used, and the means of the data are given in Table 1. We note that the problem of missing observations reduces to overall sample considerably, essentially halving the population of 300 museums we started with.

Table 2 reports the results of the estimation. In the estimation, all variables were transformed to logs, given the expected nonlinear relationship between attendance and museum and city characteristics. Thus, in this specification, we can think of the coefficient estimates as

elasticities. The results in Table 2 suggest that both museum characteristics and city characteristics matter for a museum's ability to draw an audience. Collection expenditures exert a large positive and highly significant effect on attendance. A 10% increase in the expenditures on collections increases current attendance by 2.5% to 4%, which seems to be a relatively large effect given the durable nature of collection expenditures. There is some evidence that survey collections have more drawing power than other collection types.

In fundamental terms, these results suggest that art matters. Collections function as economic assets, with larger collections drawing more customers. In fact, we can go further and use the coefficient estimates to answer the question of what the economic impact would be on the museum of an increase in collection expenditures. The data in Table 1 suggests that in our sample the mean annual collection expenditures is $1.5 million, while average attendance in the sample is 379,000. If we apply the lower elasticity figure of .25 generated in Table 2, we see that an increased expenditure on the collection of $150,000 (10%) would yield approximately 9,500 more museum attendees each year. For this to "pay off" in strictly one-year economic impact, each new attendee would have to spend $40 in a visit, which is likely high. Of course, one would not expect art investment to pay off this quickly for a museum (or else they would be doing more of it!).

In terms of location, all of the variables are of the right signs in both regressions though only the population variable passes the usual significance tests in both specifications. We note again the truncated sample in the IV regressions. The tourist-related variables suggest that the ideal museum location from an attendance perspective is a tourist-location in a cold area. For Tom Krens' new Guggenheim museum branch in Los Vegas, the regression gives a mixed prediction: based on tourist beds, Las Vegas looks like a good site; based on January

temperature, Krens may have a failure on his hands.

The results further suggest that governance type matters a good deal in terms of audience attraction. Public museums strongly outdraw nonprofit museums of either type, and university based museums clearly deliver the smallest audiences. These results are consistent with the view that public museums stress public education, while college museums in particular may focus more on connoisseurship other aspects of the museum mission. These results further support Hansmann's observations on the differences in the focus on attendance by performance arts organizations. (Hansmann, 1981). We turn now to look directly at the role of special exhibits in museums of varying ownership types.

II.2 The role of traveling exhibitions

Special exhibitions play two important roles for museums. In some cases, these exhibitions are mounted by a museum's own curators and represent the art historic product of that curator, expressing a particular point of view about a body of work. Thus, at one level special exhibitions represent a curatorial research product. On the other hand, some special exhibits, the block busters, serve in large measure as a way to attract large new audiences to a museum. Attracting large audiences has financial benefits as well. Even those museums that charge no admission fees benefit through their concession and museum shops from increases in visitorship. Indeed, for the average museum, revenues from audience-related concessions exceed admissions fees. (AAMD Survey, 1999).

The traveling special exhibition is particularly interesting in terms of function. In many cases, exhibitions travel from one museum to another and provide a way to expose a local audience to new work. For moderate sized art museums, some reliance on traveling museums is

common. The St Louis Art Museum, for example, had 35 special exhibits in the decade of the 1990's, 35% of which were organized outside of the museum itself, including most of the very high attendance exhibits. As such, traveling exhibitions are a way of temporarily augmenting a museum collection through, in effect, leasing more valuable works from major museums. Much of the discussion by art historians on the changed role of the museum has focused on these exhibits, and particularly on the use of the special exhibit as a crowd-pleaser. By mounting a recent exhibit of guitars, the Museum of Fine Arts in Boston was described as "turning itself into a gigantic Hard Rock Café." (Leo, 5/14/01). Of NY's Guggenheim which is well known for its unusual exhibits, one critic opined that " the Giorgio Armani show at the Guggenheim reminds us that 'art' in an art museum these days is optional." (MacDonald).

There is a tension, then, between the smaller-scale special exhibit, which principally serves a research or educational function and the audience-generating, revenue producing blockbuster. In line with our earlier discussion, we expect to see different museum types specializing in each of these forms. In particular, university-based museums are likely to be over-represented among museums mounting specialized exhibits, while public and nonprofit museums, lured by both revenues and audience will focus on the blockbuster segment.

Before we can consider the different production of special exhibits by different museums, it is useful to touch briefly on the economics of exhibition production more generally. From the point of view of an industrial organization economist and a finance professor, it is a curious process indeed.

Producing special exhibits requires essentially two inputs: curatorial time and art objects. While museums can and do use visiting curators, the ability to regularly mount a diverse group of special exhibits requires a substantial curatorial staff. In the modern blockbuster age, a staff

of exhibit designers has become increasingly important (Silver,1982), further increasing the fixed costs burden for the smaller museum.

A more important barrier to mounting major exhibits by the small museums is created by the economics of art object lending. The typical special exhibit relies on both a museum's own objects and borrowed objects. It is the custom in the museum business that these loans are made without a fee, though it is usual for the borrowing museum to pay for travel and insurance costs. Even objects from private collections are borrowed rather than rented, though there is, at times, some restoration work serving as a *quid pro quo*. Initially, one might think that the borrowing tradition would make it easier for smaller museums to mount exhibits, by lowering costs. We would argue, however, that. this system may discriminate against the smaller museums. In the barter system used, the smaller museum may find itself with few objects of any appreciable "trade" value, and thus more often find its requests for loans refused. Similarly private exhibitors likely prefer lending to big-name museums. As with many barter systems, this one may create an inefficiency by reducing the ability of the creative curator in the smaller museum from exploiting his or her skill. As we will shortly argue, however, the university museum—even the relatively small one—is in a somewhat advantaged position in the borrowing business.

The evidence suggests that production of traveling exhibitions among art museums is indeed a highly concentrated business. One way to measure concentration is to look at participation fees earned by a museum. Participation fees are earned by museums that mount shows from the museums to which those shows travel. In 1999, for example, the AAMD data indicate that the top four museums providing data on participation fees earned 55% of the total

fees earned. [4] A decade earlier, in 1989, this figure was slightly lower. There are no university museums among this top list.

Another way to estimate concentration is to look at the originating museum for recent large exhibits. This allows us to look at some museums that do not provide AAMD survey data. This information is provided in Table 3. Of the twenty one exhibits we identified in the 1998-99 period with attendance levels over 200,000 in a single museum, the National Gallery has one third and the Metropolitan one-quarter of the exhibits. Again, high concentration is clearly in evidence, public and nonprofit museums are represented in proportion to their place in the pool and no university museums are present. .

The 1999 AAMD list of museums with the highest earned income from participation fees is principally dominated by the very largest museums. Interestingly, the smaller museums earning participation fees are disproportionately university based museums. Here we see the importance of the more specialized traveling exhibition to the research life of the university museum. In 1999, the Harvard University Art Museum was among the top ten reporting museums for participation fees. These fees appear to be the result of a show mounted in 1998, "Inside Out: the New Chinese Art," which traveled throughout the country in 1999 and 2000 and was mounted in cooperation with the San Francisco Museum of Modern Art. Williams College, Smith College, Yale University all earn more from participation fees than you might expect from their operating budgets. The Harvard and Yale Art Galleries routinely mount special exhibitions that travel to other museums. The university museum may well have cost advantages in mounting these exhibits, as well as enhanced mission-driven reasons to support such activity. Here, we see one of the advantages of the university museum, both in terms of ability to use curatorial talents outside the museum budget, in the quality of their history departments and in

[4] This figure is based on the approximately two-thirds of the museums responding to this question.

terms of ability to borrow, particularly from affiliated collectors. Colleges with well-endowed alumni may be able call on those alumni to lend art to their museum exhibitions, and in this way are less hampered by the borrowing culture of the art world than their similarly sized cohorts.

III. Museums as Social Institutions

We have thus far explored the way in which museum ownership and governance structure influence the emphasis it places on audience attraction. We turn now to look more directly at the role of a museum vis a vis the social elite in a city.

Founding a museum, sitting on the board of a local arts institution, contributing conspicuously to a public museum has long been an avenue into society. The role of the single philanthropist in founding museums like the Guggenheim and the Whitney in New York is well known, but the pattern is common in the rest of the country as well. In Minneapolis, T.B. Walker, who made his fortune in lumber, started the Walker Art Center in the mid -nineteenth century. The Center for British Art at Yale University is the gift of philanthropist and collector Paul Mellon. In Chicago, the Terra Museum of American Art was founded, funded and named by its principal donor, Daniel Terra.

What has happened to the museum's role as a validator of social position? As we suggested earlier, in the last several decades the typical museum has attempted to broaden its public appeal in part to attract new audiences for revenue reasons. As museums have become democratized in their exhibitions, there is some question about whether they have lost their roles as promoters of the social elite.

As part of their required Form 990 filings with the IRS, museums are asked a series of questions pertaining to their "public support" basis for tax exemption. As part of this set of questions, museums are required to indicate funds raised from individuals who have contributed over the past four years an amount in excess of 2% of the museum's total funds. We use this information as one measure of the "elite focus" of the museum's funds.

As Table A-1 in the appendix to this paper suggests, there is considerable variation in the reliance of museums on very large contributions. Some museums report having no patron who has in the period 1994-97 contributed more than 2% of museum support, while several museums receive almost half of their private support from this source. Among the museums with substantial reliance on the large gift are included several very large, high profile museums, the Whitney Museum and SF MOMA, for example, as well as a number of smaller, less well known museums, including the Arkansas Art Center and the Akron Art Museum.

In Table 4, we report the results of a simple regression intended to tease out some of the determinants of museum dependence on concentrated donors. The dependent variable is the ratio of donations raised from donors contributing each in excess of 2% of the pool to the total support pool. As independent variables, we consider two city characteristics, percent of the city population in the top income group (>$150K in 1990), and population stability (Percent of the population living in the same county between 1985-90). Our expectation is that a museum's reliance on a high end donors will be positively related to both measures. The social elites supporting museums have historically been high income, and stable in residence. In addition, we look at the museum's age, recognizing that in early stages, museums are often the product of a few wealthy benefactors, and in that museum's life cycle, the donor pool tends to spread. While all variables are of the expected sign, only the income variable is statistically significant. The

significance of the High Income variable is consistent with the conspicuous consumption function of museums. The greater the density of affluent citizens, the greater the need to signal social status through support of the arts.

It is also interesting to consider the way in which the importance of the big donor to museums may have changed over time. In Exhibits 6a and 6b, we have briefly summarized the founding history of the museums listed in the AAMD survey founded in two historical periods: pre 1920, a period in which many of the premier US museums were founded, and since 1960. We note first that the ownership structure in these newer museums parallel those of the earlier museums: two-thirds of the new museums are nonprofits and one third, public. There is no indication of an evolutionary trend towards one "ideal" museum form, the way we have seen in other areas. A somewhat higher than expected fraction of the new museums do, however, appear to be university based. Most significantly, virtually all of the new museums—including those associated with universities—were founded by large gift of money or art by a major donor. Indeed, the role of the single major donor appears, if anything, to have increased over time. Interestingly, many of the new donors come from the same industry bases as those in the earlier period—manufacturing, oil, transport. Our evidence suggests remarkable stability in the prevalence of founding donors and the profile of those donors in the museum world.

IV. Museums as Aesthetic Institutions

In the analyses thus far, we have emphasized the ways in which serving popular audiences and serving a narrower elite group compete for museum attention. While recent scholarship has underscored the contrasts in these two objectives, it is worth considering the commonalities as well. Art museums are, for the most part, a spatial technology for facilitating the personal experience of art. While connoisseurship might be the elite extreme of the aesthetic

experience, and art education the populist extreme, they can be expected to share some common kernel, or at least to be connected by a continuum of individual, personal experience. Are there cultural commonalties in the "high" and "low" experience of art? Can a single institution serve both extremes? To explore the question of whether common and elite artistic tastes are connected, we used time series analysis of art prices and attendance at museums.

Clearly art serves in some measure as an investment good and thus its price will reflect other forces in investment markets. This has been the direction of most of the prior literature. For example, Goetzmann and Spiegel (1995) take art as a fixed percentage of wealth and show how this may explain the covariation of art with equity markets. More recently, Ait-Sahalia, Parker and Yogo (2001) show how this covariation between luxury goods like art might account for the magnitude of the equity premium. To date, however, there has been little theoretical work that links a social pecking order framework to the prices of the luxury goods and the aesthetic experience directly. On the other hand, such frameworks are common in other parts of the finance literature. For example, keeping up with the Jones' models in the asset pricing literature such as Bakshi and Chen (1996) and Campbell and Cochrane (2001) show how "competitive," socially-determined preferences may affect security prices. A natural question to ask is whether local social competition determines the demand for conspicuous consumption as well, and what role museums might play in this competition.

Economists have long debated the issue of whether art provides a fair rate of return to investors. The natural presumption is that some component of the return to art investment is the "aesthetic dividend" that accrues to the owner – the private benefits enjoyed by viewing the work. Neglecting expectations about future re-sale, the entire value to owning a painting would be the capitalized stream of the aesthetic dividends. Given the evidence on the social role of art

institutions presented above, one could conceivably substitute "social" for aesthetic, however. Museums deliver a flow of these non-monetary dividends to participants – the aesthetic dividends are delivered through viewership, the social dividends are delivered through board association, membership and attendance. To the extent that there are common tastes and common desires for social signaling, we might expect that measures of the dividend flow and its capitalized value to co-vary. Indeed our cross-sectional regressions found a relationship between attendance – i.e. the demand for the flow – and the value of the stock. We also might expect art prices to co-vary with attendance. By the same token, the existence of common aesthetic tastes and demand for social signaling should be associated with correlations in museum attendance. In this section, we test these two propositions with time-series data on museum attendance and the returns to art investment.

IV.1 Data

It is surprisingly difficult to obtain time-series data on museum attendance. The Art Museum Directors Association was unwilling to provide us access to their annual survey for multiple years. As an alternative, we contacted the top 50 art museums in the country and asked for their annual attendance numbers. Many had to reconstruct this information specifically for us. In total, we were able to obtain annual attendance figures for 26 museums for different intervals of time. Table 7 reports this time-series data. In order to test hypotheses about the covariation in art prices and museums attendance, we construct an equal-weighted index of annual percentage changes in museum attendance from this data. As Table 7 suggests, the composition of this changes as museums enter and exit the sample, however it provides the best measure we can get of the annual fluctuations in national art museum attendance. Table 8

reports the statistical characteristics of the index for different sub-periods of the data.

For our measure of returns to investment in art, we use the Mei and Moses (2001) [MM] art price indices. These are estimated from repeated-sales of art works auctioned at major houses over the period from 1875 to the present. The technology is similar to Goetzmann (1992) – it calculates pre-tax and pre-commission investment returns based upon the auction-to-auction price relative, conditional upon re-sale. As such, those works that did not sell after once appearing at auction have no influence on the estimation of the time-series of returns. For our purposes, we are chiefly interested in the inter-temporal variation in art prices. In small-sample, repeat-sales estimators may induce negative serial correlation in the series estimates, however the Mei and Moses dataset is large, and thus we may take their index estimation as a fairly accurate representation of the trends in art prices over the past forty years.

IV.2 Do Art Returns Explain Museum Attendance?

If art prices and museum attendance both reflect fluctuations in the common component of demand for the aesthetic or social dividend, we should expect to find some correlation between attendance and the art index. Figure 1 plots the cumulated growth in art prices and in museum attendance for the equal-weighed index and for a few representative cities. Over the period from 1961 to 2000, art prices appreciated at a considerably higher rate than the growth in attendance at art museums. The plot suggests little relationship between attendance and art prices, however. Art prices spiked in the late 1980's and 1990, while the attendance graph shows no such trend.

To more formally examine the relationship between art prices and attendance trends, we regress the equal-weighted index of annual percent changes in attendance on annual percentage

changes in the MM art index.. We also perform each regression separately by city, and finally we stack all cities together and estimate the coefficient on art under the assumption of equality of coefficients. Table 9 reports the regression results, showing no evidence of a relationship between attendance and art returns. Assuming our tests have power, we can interpret this negative evidence as favoring the hypothesis that the demand at the high end and the demand at the low end for the non-monetary dividends supplied by art are essentially disjoint.

Figure 1 also suggests little relationship among the museums in the sample. This is even more surprising. While the low correlation between attendance and art prices may not be surprising given that auctions reflect demands by a relatively affluent clientele – indeed a group whose wealth may depend upon a different set of factors than the wealth of those who regularly attend art galleries, it is surprising to us to see low inter-city relationships in museum attendance trends. In fact, the average correlation among the cities, reported in Table 10, is close to zero. One way to interpret this is that all art appreciation, like all politics, is local. In some ways, this result reinforces our earlier finding on the importance of both city and museum specific factors in determining attendance patterns. An alternative explanation is that travelling shows are important determinants of attendance, and that the biggest drawing shows are in different cities in different years.

V. Conclusions

Art museums in the United States come in a range of ownership forms. In this paper, we have found striking differences in the performance of these museums, consistent with our expectations about differences in institutional economic incentives. We find further, based on our work comparing art prices and museum attendance, that the demand for art by the various

sectors of the market are quite disjoint. In this light, it is interesting to consider the recent Italian proposal to begin moving some of the major museums into the non-governmental sector. Our own work suggests that changing governance in this way may well change operating behavior of those museums, perhaps in ways unanticipated by the government.

Our work also suggests that art collections housed in museums, though often treated as a non-commercial asset, have considerable ability to generate revenues. Moreover, the productivity of a collection varies considerably by the characteristics of the city in which it is located. In our historical work on the social elites of museums, we find remarkable stability: big donors continue to found new museums and support those museums with largesse earned in traditional old economy ways.

Table 1: Summary of Variables

Variables	Mean	Range	Mean	Range
Collection expenditures	$1,487,422	$2,055-$30,800,000	$1,681,048	$2055-$30,800,000
Attendance	379,003	25,000-6,500,000	507,7228	25,000-6,500,000
Percent Survey	72%		76%	
Percent Modern	8%		6%	
Percent American	10%		8%	
Governance: College	19%		16%	
Public	26%		24%	
Other Nonprofit	55%		60%	
Endowment			46,400,000	114885-1,020,000,000
Observations	190		166	

Table 2: Attendance Regressions

Independent Variable	OLS Regression	IV Regression
Log Collection expenditures	.258 (8.92)**	.414 (6.68)**
Type: Survey	.501(2.78)**	.454(2.00*
American	.145(.226)	.080(.27)
Modern	.296(1.4)	.408(1.65)
MSA population (log)	.205(4.53)**	.124(2.00)*
% of pop with a BA (log)	.183(1.22)	.179(1.04)
Hotel exps per capita (log)	.240(3.46)**	.156(1.88)
January mean temp (log)	-.442(2.47)**	-.32(1.53)
Governance: college	Omitted	Omitted
Public	.804(-4.61)**	.863(4.05)**
Other nonprofit	.539(5.52)*	.552(3.03)**
Constant	6.34(5.56)**	4.98(3.59)**
Observations	190	166
R	.60	.56

Table 3: Exhibit Census

Blockbusters in 1998, 99 attendance >400,000 at one museum)

Exhibit	**Originating Museum**
Monet in the Twentieth Century	MFA, Boston
The Private Collection of Degas	Metropolitan Museum
Van Gogh's Van Gogh	National Gallery
Mary Cassatt: Modern Woman	Art Institution Chicago
Pierre Bonnard	MOMA
Cézanne to Van Gogh: Dr. Gachet	Metropolitan Museum
John Singer Sargent	National Gallery
Renoir's Portraits	Art Institute Chicago

Mini-BlockBuster (attendance >200,000 and <400,000)

Monet: Portrait of Giverny	Walters Art Gallery
Alexander Calder	National Gallery
A Collector's Cabinet	National Gallery
Manet, Monet and Gare St. Lazere	National Gallery
Degas at the Races	National Gallery
Collecting Impressionism	High and Seattle
Picasso and the War Years	Guggenheim
From Van Eyck to Brueghel	Metropolitan Museum
Picasso: Painter and Sculptor in Clay	Metropolitan Museum
Hans Hoffman in the Metropolitan	Metropolitan Museum
Jackson Pollock	MOMA
Delacroix: the Late Work	Philadelphia Museum
Portraits by Ingres	National Gallery

Table 4: Determinants of High Donor Funding

Independent Variable	**Coefficient**	**(tstat)**
Constant	-.045	(-.30)
High Income	.961	(2.31)*
Population stability	.002	(.82)
Museum age	-.0002	(-.41)
R^2	.11	
N	63	

Table 5: Reliance on Large Donors

Museum		Fraction of Funds from Large Donors
1.	Akron	.1899962
2.	Albright-Knox	0
3.	Allentown	.0012145
4.	Arkansas	.4329223
5.	Asia Soc	.1664267
6.	Bulter	.056593
7.	Boston M. Fine	0
8.	Chrysler	0
9.	Columbusmoa	.074378
10.	Columbus m	.1177242
11.	Contemporary A	0
12.	Cummer	.0296322
13.	Currier	.0756367
14.	Dallas	.0680886
15.	Dayton	.0931211
16.	Detroit	.0431507
17.	Dia Center	.3419761
18.	Flint	.0997698
19.	Honolulu	.1077176
20.	Huntington L	.1057051
21.	Huntington MoA	.0330222
22.	Huntsville	0
23.	Indianapolis	.1308966
24.	ICP	.0312683
25.	Isabella Gardner	.0789347
26.	JB Speed	0
27.	Jewish	.0891177
28.	Josyln Art	0
29.	Long Beach	.0056818
30.	Marion Koogler	.1067609
31.	Met	.0564407
32.	Milwaukee	.0731025
33.	Mint	.0057806
34.	Mus of Con Art	0
35.	Neuberger	.2936345
36.	New Museum	0
37.	New Orleans	.0376919
38.	Newark	.0036008
39.	Ncarolina	.151555
40.	Palm Springs	.1635293
41.	Paarrish	.0595174
42.	Philadelphia	.0298572
43.	Philbrook	.1342124
44.	Phoenix	.2005516
45.	Pierppont Morgan	.2166278
46.	Portland	.1950636
47.	San Antonio	.0700298
48.	San Diego	.0187342
49.	SF MOMA	.3304738
50.	San Jose	.0114623
51.	Santa Barbara	.1068513
52.	Seattle	.0058311
53.	Southeastern Center	.335601
54.	Studio	0
55.	Tampa	0
56.	Telfair	0
57.	Textile	.1806287
58.	Toledo	.3462301
59.	Wadworth Ath	.0241641
60.	Walker	.0260312
61.	Whitney	.224529
62.	Winterthur	.0056559
63.	Worchester	.0281015

Table 6a: Museums Founded Since 1960

Museum	Year	Donor (Industry)
Amon Carter Museum	1961	Amon Carter (publishing)
Asian Art SF	1966	Avery Brundage (construction)
Brandywine River Museum	1971	Du Pont (chemicals)
Contemporary Arts Center	1976	State
David and Alfred Smart (U of Chicago)	1974	Smarts (publishing)
Dia Center for Arts	1974	DeMenil (oil and banking)
Elvehjem Museum U of Wisconsin	1962	Faculty idea: no money
Georgia O'Keefe House	1997	Anne/John Marion (former Sotheby's head)
Hirshhorn Museum	1966	Hirshhorn (finance, mining)
Huntsville	1970	City
Herbert Johnson Cornell	1973	Johnson (manufacturing)
Jack Blanton Museum U of Texas	1963	Blanton (oil)
Jane Voorhees-Zimmerli (Rutgers)	1966	Voorhees-Zimmerli (finance)
Krannert Art Museum (U of Illinois)	1961	Herman Krannert (box manufacturing)
Museum of Con'y Art	1967	Daniel Brenner
National African Art	1964	Government
National Portrait Gallery	1962	Government
Neuberger State U at Purchase	1974	Roy Neuberger (finance)
New M Contemporary Art	1977	City
Salvador Dali Museum	1971	AR Morse (industry)
Samuel Harn Museum	1981	Samuel Harn (manufacture)
San Antonio Museum	1981	City
San Jose Museum	1969	City
St. Petersburg Museum	1961	M Acheson Stuart (publishing)
Studio Museum of Harlem	1967	Volunteer founders
Tampa Museum	1967	DeMenils (oil and banking)
UCLA-Hammer	1994	Hammer (chemicals)
University of Cal: Berkeley	1970	Hans Hoffmann (artist)
U of Iowa	1967	Owen/Leone Elliot
Wexner Center	1989	Wexner (retail)
Yale British Arts	1977	Andrew Mellon (transport and aluminum)

Table 6b: Museums Founded Before 1920
(Includes all museums listed in the AAMD Directory)

Museum	Year	Founder Name and Industry
Albright Know Art Galley	1826	John Albright (steel)
Art Institute of Chicago	1979	Group of businessmen
Baltimore Museum	1914	M. Carey Thomas (President of Bryn Mawr; RR money inherited)
Boston Museum of Fine Arts	1970	Group of citizens (Henry Kidder: Finance; W. Endicaott (dry goods); Charles Eliot (Harvard President)
Brooklyn Museum of Art	1823	Community group
Butler Art Institute	1919	Joseph Butler (manufacture)
Carnegie Museum of Art	1896	Andrew Carnegie (steel)
Cincinnati Art Museum	1896	Citizen Group
Cleveland Museum	1913	Huntington (oil) Kelley (development) Hurlburt (banks)
Cooper Hewitt	1987	Cooper grandchildren (RR)
Corcoran Gallery	1959	William Corcoran (banks)
Crocker Art Institute	1885	Edwin Crocker (railroads)
Currier Gallery	1929	Moody Currier (banking)
Dallas Museum of Art	1903	Citizen Group
Davis Museum	1889	Wellseley College
Dayton Art Institute	1919	Julia Paterson Carnell (National Cash Register)
Deleware Art Museum	1912	Citizen Group
Denver Art Museum	1983	Municipal
Detroit Art Museum	1885	Brearly (jounalism)
Fine Arts San Francisco	1894	DeYoung (publishing)
Freer Gallery	1916	Charles Freer (RR)
Frick Collection	1920	Henry Frick (steel)
Harvard Art Museum (Fogg)	1895	William Hayes Fogg (China trade)
Henry Art Gallery	1927	Horace Henry (RR)
Huntington Library Collection	1919	Henry Huntington (RR)
Indianapolis Museum of Art	1883	John Herron
Isabella Stewart Gardner	1903	Isabella Gardner (commerce)
Los Angeles County	1910	City
Memorial Art-Rochester	1913	Mrs. JS Watson (telegraph)
The Metropolitan Museum	1870	Group of businessmen
The Michael Carlos Museum	1876	Emory; Carlos (alcohol dist)
Milwaukee Art Museum	1888	
Minneapolis Institute	1915	
Mississippi Museum of Art	1911	Citizen association
Munson Williams-Proctor	1919	Munson (banking) Williams (politics) Proctor (manufacture)
New Orleans Museum	1911	Isaac Delgado (sugar)
Newark Museum	1909	Louis Bamberger (retail)
Parrish Art Museum	1898	Samuel Parrish
Philadelphia Museum of Art	1876	Group: Centennial related
The Phillips Collection	1897	Duncan Phillips (steel)
Portland Art Museum (Me)	1883	Margaret deMedici Sweat (retail)
Portland Art Museum (Ore)	1892	Henry Corbett (bands)
Saint Louis Art Museum	1892	Group: St Louis Fair
Seattle Art Museum	1917	Russell Fuller (medicine)

Table 6b: Museums Founded Before 1920
(Includes all museums listed in the AAMD Directory)

Museum	Year	Founder Name and Industry
Telfair Museum	1875	Alexander Telfair (trade; agriculture)
Toledo Art Museum	1901	Edward Libbey (glass)
Wadsworth Atheneum	1842	D. Wadsworth (insurance)
Walker Art Center	1879	T. Walker (lumber)
Walters Art Gallery	1908	William Walters (RR)
Worcester Art Museum	1896	Stephen Salisbury (trade)
Yale University Art Gallery	1832	John Trumbull (artist)

Table 7: Museum Attendance Data

	year	asia	baltimoreMOA	dallasMOA	decordova	georgiaMOA	Johnson	huntington	illinoisAG	indianapolisMOA	Getty	Kimbell	Lacounty
1	1960	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	1961	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3	1962	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4	1963	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
5	1964	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6	1965	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	1966	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2665388
8	1967	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1887135
9	1968	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1174674
10	1969	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1133870
11	1970	NA	NA	NA	NA	NA	NA	610102	NA	NA	NA	NA	1384448
12	1971	NA	NA	NA	NA	NA	NA	487753	NA	NA	NA	NA	1185741
13	1972	NA	NA	NA	NA	NA	NA	450817	NA	NA	NA	NA	1203999
14	1973	NA	NA	NA	NA	NA	NA	450000	NA	NA	NA	NA	1124870
15	1974	NA	NA	NA	NA	NA	NA	486847	NA	NA	NA	NA	1204857
16	1975	NA	NA	NA	NA	NA	NA	552299	NA	NA	NA	NA	1026918
17	1976	NA	NA	NA	NA	NA	NA	596419	NA	NA	NA	NA	1425704
18	1977	NA	NA	NA	NA	NA	NA	590075	NA	NA	NA	NA	1350302
19	1978	NA	NA	NA	NA	NA	NA	541557	NA	NA	NA	NA	2750039
20	1979	NA	NA	NA	NA	NA	NA	444094	NA	NA	NA	NA	357577
21	1980	NA	NA	NA	NA	NA	NA	379096	NA	545152	NA	NA	506956
22	1981	NA	NA	NA	NA	NA	NA	396695	NA	596223	NA	NA	586587
23	1982	NA	NA	NA	NA	NA	NA	489917	NA	NA	NA	NA	372182
24	1983	NA	NA	NA	NA	NA	NA	502635	NA	NA	NA	NA	415000
25	1984	NA	NA	NA	NA	NA	63591	470692	NA	NA	NA	NA	579569
26	1985	NA	NA	NA	NA	NA	73993	509292	NA	NA	NA	NA	914978
27	1986	NA	NA	NA	NA	NA	71701	456824	NA	NA	NA	NA	421296
28	1987	NA	NA	NA	NA	NA	83762	515058	NA	NA	NA	NA	1099440
29	1988	NA	NA	NA	NA	NA	73665	483964	NA	NA	NA	NA	860689
30	1989	NA	NA	291100	NA	NA	77656	442238	NA	NA	NA	NA	950833
31	1990	NA	315047	442200	NA	NA	67097	497482	NA	NA	NA	NA	663869
32	1991	NA	302196	419600	NA	NA	84212	542813	NA	422464	NA	NA	1003059
33	1992	NA	483347	427000	NA	NA	66535	534676	NA	NA	NA	NA	848099
34	1993	NA	328714	410700	NA	NA	72423	492624	29610	NA	NA	NA	612005
35	1994	NA	322073	422300	NA	NA	67656	553503	28943	NA	NA	NA	551935
36	1995	NA	311577	380000	NA	NA	74698	484849	25469	NA	NA	NA	541308
37	1996	61868	347996	458100	54991	78966	71393	463938	34925	NA	NA	NA	663429
38	1997	62666	317090	415200	84724	65003	71875	487861	45526	NA	NA	NA	602141
39	1998	85117	340677	431500	92954	86802	66284	467064	48689	NA	1750000	NA	554024
40	1999	91369	277589	501661	90432	109000	68081	509377	32331	NA	1500000	481049	1328765
41	2000	73880	290299	NA	100156	120000	72134	534162	25545	380425	1400000	138016	597409

	MemorialAG	Met	MFA	National	Norton	Philadelphia	Princeton	StLouis	Dali	Guggenheim	Walker	Walters	Whitney	Yale
1960	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	99196
1961	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92989
1962	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	94372
1963	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	83440

1964	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	79302
1965	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	92019
1966	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	101424
1967	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	114211
1968	NA	NA	NA	NA	NA	NA	41811	NA	NA	NA	NA	NA	NA	131811
1969	NA	NA	NA	NA	NA	NA	43641	NA	NA	NA	NA	NA	NA	126253
1970	NA	NA	NA	NA	NA	NA	43850	NA	NA	NA	NA	NA	NA	119004
1971	NA	NA	NA	NA	NA	NA	47575	NA	NA	NA	NA	NA	NA	101482
1972	NA	2225530	NA	NA	NA	NA	59770	NA	NA	NA	NA	NA	NA	120946
1973	NA	2272212	NA	NA	NA	NA	99706	NA	NA	NA	NA	NA	NA	118366
1974	NA	2590851	NA	NA	NA	NA	123722	NA	NA	NA	NA	NA	261342	87496
1975	NA	3326012	NA	NA	NA	NA	84338	NA	NA	NA	NA	NA	231829	96293
1976	NA	2871417	NA	NA	NA	NA	89519	NA	NA	NA	NA	NA	278981	144290
1977	NA	3337040	NA	NA	NA	NA	86779	NA	NA	NA	417380	NA	401489	75392
1978	NA	3235684	NA	NA	NA	NA	77228	NA	NA	NA	436040	NA	458547	98546
1979	NA	4687277	490888	NA	NA	NA	76031	NA	NA	NA	423362	NA	369791	96423
1980	NA	3369934	390604	NA	NA	NA	59551	NA	NA	NA	645799	NA	441405	106677
1981	NA	3574138	327431	NA	NA	NA	NA	NA	NA	NA	360793	NA	637578	110223
1982	NA	3232876	341901	NA	NA	NA	NA	NA	NA	NA	415340	NA	420150	99346
1983	NA	4333918	335142	NA	NA	NA	61817	NA	NA	NA	401305	NA	426547	110914
1984	NA	3945708	437685	NA	NA	NA	61145	NA	NA	NA	396554	NA	387743	97130
1985	NA	3889471	491603	NA	NA	NA	68281	NA	NA	NA	352099	NA	310595	117746
1986	NA	3290133	507507	NA	NA	NA	NA	NA	NA	NA	473259	NA	340781	185951
1987	NA	4871698	511838	NA	NA	NA	NA	NA	NA	NA	473074	NA	457471	118467
1988	85333	3767018	665887	NA	NA	NA	NA	NA	NA	NA	334033	NA	399564	137867
1989	80349	4585554	560187	NA	NA	NA	48118	NA	NA	NA	350044	220000	313143	135981
1990	73978	4329474	510992	NA	NA	NA	75713	NA	NA	NA	335996	200000	338090	155085
1991	98458	4479344	760868	NA	NA	NA	81345	NA	NA	NA	371672	247000	260800	119834
1992	79499	4453441	544804	NA	52494	NA	103589	NA	NA	671303	356801	275000	273986	120630
1993	84952	4399543	579466	5397973	54174	NA	119211	542656	NA	919191	406910	306000	273426	121436
1994	88294	4308881	1247768	4042044	55092	NA	78836	447436	NA	745526	456825	255000	231100	103786
1995	83733	4657430	1259642	4684095	40268	873515	72188	479738	NA	788717	499693	267000	293040	96873
1996	87372	4566579	NA	4731418	87689	841683	85385	645738	NA	789182	509123	200000	421867	100968
1997	102682	5309076	1801924	5637841	98309	1148816	84797	553853	209312	875118	516568	275000	291800	98848
1998	85678	4950136	1323380	6198523	123212	734149	68144	653016	225685	1048302	518398	344000	385836	111547
1999	75398	4850913	1251094	5969528	150436	748966	76722	494848	216340	1029638	430252	143676	464244	NA
2000	110910	5152884	1784332	5126954	69487	645999	69980	499944	212057	1129366	581590	110952	570255	116400

Table 8: Summary statistics about annual percentage changes in an index of attendance at American Art Museums over the period 1961-2000

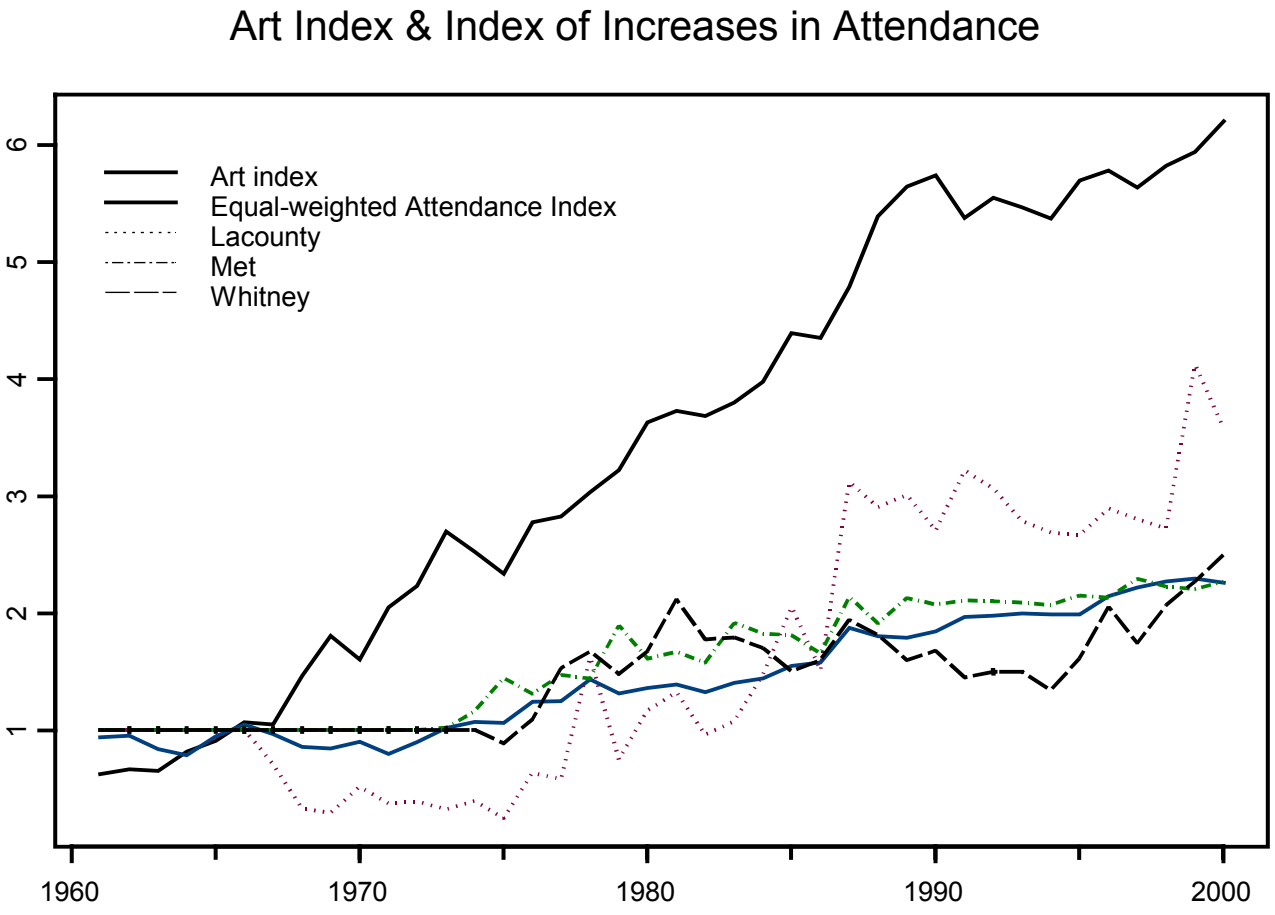
Geographical Growth		Average Growth	Standard Deviation
1961-1970	-0.0105	-0.0100	0.0930
1971-1980	0.0422	0.0461	0.1064
1981-1990	0.0307	0.0414	0.1046
1991-2000	0.0205	0.0414	0.0599

Table 9: Regressions of equal-weighted percent changes in attendance on art returns. City by city regression, index regression and stacked regression.

	Coef	t-stat	N	Rsq
Asia	-0.033	-0.037	4	0.001
BaltimoreMOA	0.381	1.006	10	0.112
DallasMOA	0.210	0.651	10	0.050
Decordova	-1.179	-2.203	4	0.708
GeorgiaMOA	0.962	1.629	4	0.570
Johnson	-0.064	-0.480	16	0.016
Huntington	-0.175	-2.181	30	0.145
IllinoisAG	-0.747	-1.298	7	0.252
IndianapolisMOA	0.000	NA	1	NA
Getty	0.528	NA	2	1.000
Kimbell	0.000	NA	1	NA
Lacounty	0.286	0.742	34	0.017
MemorialAG	-0.394	-1.362	12	0.156
Met	-0.131	-0.851	28	0.027
MFA	-0.451	-1.315	19	0.092
National	0.123	0.302	7	0.018
Norton	-0.749	-0.665	8	0.069
Philadelphia	-1.502	-3.109	5	0.763
Princeton	0.178	0.863	25	0.031
St. Louis	0.506	1.035	7	0.177
Dali	0.127	0.145	3	0.021
Guggenheim	0.001	0.002	8	0.000
Walker	-0.143	-0.709	23	0.023
Walters	-0.490	-1.43	11	0.127
Whitney	0.320	1.517	26	0.088
Yale	0.152	1.087	38	0.032
Equal-weighted index	-0.008	-0.122	40	0.004
Stacked regression	-0.014	-0.215	343	0.001

Table 10: Correlations in attendance for museums with at least ten years of data.

	V1	baltimoreMOA	dallasMOA	Johnson	huntington	Lacounty	MemorialAG	Met	MFA	Princeton	Walker	Walters	Whitney	Yale
V1	1.00	0.05	0.06	0.06	-0.11	-0.10	-0.07	0.09	-0.11	0.12	-0.03	0.09	-0.03	0.01
baltimoreMOA	0.05	1.00	0.09	-0.67	-0.06	-0.26	-0.32	-0.05	-0.43	0.20	-0.09	0.13	0.19	0.09
dallasMOA	0.06	0.09	1.00	-0.51	0.37	0.03	-0.28	-0.22	-0.31	0.73	-0.24	-0.52	0.35	0.38
Johnson	0.06	-0.67	-0.51	1.00	0.15	0.59	0.60	0.45	0.21	-0.23	0.19	0.11	-0.12	-0.48
huntington	-0.11	-0.06	0.37	0.15	1.00	0.24	0.24	0.10	0.30	0.08	-0.20	-0.23	-0.18	-0.20
Lacounty	-0.10	-0.26	0.03	0.59	0.24	1.00	-0.22	0.06	-0.12	-0.04	-0.23	-0.47	0.31	-0.16
MemorialAG	-0.07	-0.32	-0.28	0.60	0.24	-0.22	1.00	0.14	0.81	-0.25	0.48	0.08	-0.25	-0.27
Met	0.09	-0.05	-0.22	0.45	0.10	0.06	0.14	1.00	-0.06	-0.07	-0.22	0.13	-0.04	-0.55
MFA	-0.11	-0.43	-0.31	0.21	0.30	-0.12	0.81	-0.06	1.00	-0.54	0.14	-0.25	-0.39	-0.31
Princeton	0.12	0.20	0.73	-0.23	0.08	-0.04	-0.25	-0.07	-0.54	1.00	-0.39	-0.11	0.04	0.03
Walker	-0.03	-0.09	-0.24	0.19	-0.20	-0.23	0.48	-0.22	0.14	-0.39	1.00	0.10	-0.05	0.11
Walters	0.09	0.13	-0.52	0.11	-0.23	-0.47	0.08	0.13	-0.25	-0.11	0.10	1.00	-0.47	-0.11
Whitney	-0.03	0.19	0.35	-0.12	-0.18	0.31	-0.25	-0.04	-0.39	0.04	-0.05	-0.47	1.00	-0.02
Yale	0.01	0.09	0.38	-0.48	-0.20	-0.16	-0.27	-0.55	-0.31	0.03	0.11	-0.11	-0.02	1.00



Equal-weighted average of available museums,and three large institutions

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