



The Careers of Modern Artists

Evidence from Auctions of Contemporary Art

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Abstract. Using transactions from fine art auctions for 42 leading American contemporary artists I estimate the relationship between the value of a painting and the artist's age at the date of its execution. The econometric estimates show that artists born before 1920 were likely to have produced their most valuable work late in their careers, whereas artists born in the 1920s and '30s were more likely to have done their most valuable work at an early age. Comparison of these results to evidence drawn from art history textbooks and retrospective exhibitions furthermore indicates that these artists' most valuable work has also been that most highly regarded by scholars. I argue that the shift across generations in the shape of these artists' age-price profiles was a result of the evolution of modern painting and a growth in the demand for contemporary American art during the 1950s and '60s.

Key words: contemporary art, age-price profiles

1. Introduction

Economists have long been interested in how workers' productivity varies with age, and have devoted considerable effort to measuring this relationship in a variety of settings. Yet few markets generate evidence that allows economists to observe this relationship throughout the careers of specific individuals. One that does produce evidence relevant to this is the market for fine art. This paper will use records of paintings sold at auctions since 1980 to estimate the relationship between artists' ages and the value of their work for a group of successful twentieth-century artists. Although this does not fully capture these artists' productivity, because it does not take into account the volume of their work, the value of an artist's work over his career is nonetheless of interest for its indication of how the quality of the artist's work varies with age.

The painters studied in this paper are among the most prominent American artists whose work is sold in auctions of Contemporary Art. This is a category introduced in the auction market by Sotheby's, and broadly includes artists who have become known since World War II.¹ The 42 artists considered in this study are listed in Table I. All are important contemporary artists. They are not intended to include all important contemporary artists, or all the members of any particular school of art, but they do share some broad common characteristics.² Most were born after 1900, and all were born before 1940. Most were born in the United

States, and all spent much, if not most, of their careers in the US. And all are sufficiently successful that auctions held in recent years have included enough of their work to allow the statistical analysis reported below. The artists considered here form a particularly interesting group, for they include the painters who dominated modern art for two generations after World War II, and who for the first time established the United States as the source of the major developments in western art.

The results of this study are intriguing. Many occupations that involve extensive training and complex technical abilities produce rising skill levels of practitioners, and rising quality of work, over an extended period. The evidence analyzed here suggests that this was generally true for the generation of American artists born in the first two decades of this century, but that it ceased to be true for the following generation, those born in the 1920s and '30s. This shift appears to have important implications for our understanding of the careers of contemporary artists: why were major American artists born before 1920 likely to have done their most valuable work late in their careers, while their successors born after 1920 are more likely to have done their most valuable work early in their careers? The answer appears to highlight a dramatic change in the economic incentives for artists that occurred during the 1950s, as a result of an interaction of the evolution of modern painting with an increase in the demand for American art.

2. Data and Econometric Analysis

The data analyzed in this paper are drawn from auctions held during 1980–96. The source of these data is the annual editions of *Le Guide Mayer*, which compiles the results of fine art auctions held all over the world. Mayer classifies the works sold into five groups: prints, drawings, watercolors, paintings, and sculptures. This study collected the records of all sales for the 42 artists listed in Table I from the 17 annual editions of Mayer for auctions held during 1980–96 in the two categories of watercolors and paintings. This yielded a total of 4,532 sales of individual works. Most of these sales occurred in the United States, and nearly 90 per cent were sold by the two leading auction houses, Sotheby's and Christie's. For each painting in the data set, the coding for this study recorded the support (paper or canvas), size, date of execution, date sold, and sale price.³

For the econometric analysis, each painting sold constituted a single observation. Separate regression equations were specified for each artist. The dependent variable was the natural logarithm of the sale price in dollars.⁴ The principal interest of this study was in the impact on a painting's auction price of the artist's age at the time of its execution. To test for the best form for this relationship, three regressions were estimated for each artist, the first with the artist's age as an independent variable, the second with age and its square, and the third with age, its square, and its cube. A binary independent variable was included to indicate whether the work was done on paper or canvas. The size of the work was controlled,

Table I. Artists included in this study

Artist	Country of birth	Year of birth	Year of death
Albers, Josef	Germany	1888	1976
Baziotes, William	United States	1912	1963
Diebenkorn, Richard	United States	1922	1993
Dine, Jim	United States	1935	
Francis, Sam	United States	1923	1994
Frankenthaler, Helen	United States	1928	
Gorky, Arshile	Armenia	1904	1948
Gottlieb, Adolph	United States	1903	1974
Guston, Philip	Canada	1913	1980
Hockney, David	Great Britain	1937	
Hofmann, Hans	Germany	1880	1966
Jensen, Alfred	Guatemala	1903	1981
Johns, Jasper	United States	1930	
Kelly, Ellsworth	United States	1923	
Kline, Franz	United States	1910	1962
de Kooning, Willem	Holland	1904	1997
LeWitt, Sol	United States	1928	
Lichtenstein, Roy	United States	1923	1997
Louis, Morris	United States	1912	1962
Mangold, Robert	United States	1937	
Marden, Brice	United States	1938	
Mitchell, Joan	United States	1926	1992
Motherwell, Robert	United States	1915	1991
Newman, Barnett	United States	1905	1970
Noland, Kenneth	United States	1924	
Olitski, Jules	Russia	1922	
Pollock, Jackson	United States	1912	1956
Poons, Larry	Japan	1937	
Porter, Fairfield	United States	1907	1975
Rauschenberg, Robert	United States	1925	
Reinhardt, Ad	United States	1913	1967
Rivers, Larry	United States	1923	
Rosenquist, James	United States	1933	
Rothko, Mark	Russia	1903	1970
Ryman Robert	United States	1930	
Stella, Frank	United States	1936	
Still, Clyfford	United States	1904	1980
Thiebaud, Wayne	United States	1920	
Tobey, Mark	United States	1890	1976
Tomlin, Bradley Walker	United States	1899	1953
Twombly, Cy	United States	1928	
Warhol, Andy	United States	1928	1987

Table II. Estimated peaks of age-price profiles, by artist

Artist	Year of birth	Peak age	Artist	Year of birth	Peak age
Hofmann	1880	84	Kelly	1923	42
Tomlin	1899	54	Lichtenstein	1923	41
Rothko	1903	57	Rivers	1923	40
Gorky	1904	43	Noland	1924	33
De Kooning	1904	44	Rauschenberg	1925	30
Porter	1907	68	Frankenthaler	1928	27
Kline	1910	48	LeWitt	1928	32
Baziotes	1912	44	Twombly	1928	24
Louis	1912	50	Warhol	1928	33
Pollock	1912	37	Johns	1930	25
Guston	1913	66	Rosenquist	1933	28
Reinhardt	1913	45	Stella	1936	21
Motherwell	1915	72	Hockney	1937	32
Thiebaud	1920	66	Mangold	1937	52
Olitski	1922	38	Poons	1937	24
Francis	1923	27			

Source: Calculated from regressions reported in Appendix.

using the natural logarithm of the surface area. Substantial fluctuations occurred in the art market during the 1980s and early '90s, so independent variables were included to allow for the effect of the date at which the work was auctioned.

3. Regression Estimates of Age – Price Profiles

The estimated regressions for the 42 artists considered in the study are presented in the appendix. Of the three specifications estimated for each artist, the one reported is that which produced the best fit, as measured by the adjusted R^2 . For each case in which the second or third variant is reported, the table also shows the results of an F test for the joint statistical significance of the age variables. Overall, age had a statistically significant effect on the value of an artist's work for 31 of the 42 artists considered.⁵ For these 31, Table II shows the age at which the value of the artist's work peaked, as calculated from the estimated age coefficients shown in the appendix.

With the artists listed in order of their birthdates, Table II shows a striking change over time. Fourteen of the artists included in the table were born from 1880 through 1920. For 13 of these 14, the value of their work peaked above the age of 40; for 8, the value peaked at 50 or above. In contrast, for the 17 artists born after 1920, the value of the work of 13 peaked below the age of 40; for 7, their most valuable work was done during their 20s. The median age at which the peak

value of their work occurred was 52 for the 14 artists born through 1920, while the median age for the 17 born after 1920 was 32. Thus considering those artists for whom age significantly affected the value of their work, more than 90 per cent of those born through 1920 did their most valuable work after the age of 40, while more than three-quarters of those born after 1920 did their most valuable work before they reached 40.⁶

This contrast between the generations appears even greater when considered within the context of the artists' careers. This is because several artists of the first generation died at early ages. So for example Arshile Gorky's most valuable work was done at 43, just one year before his death, while Jackson Pollock's age-price profile peaked just seven years before his death at 44. For those artists, Figures 1 and 2 trace out the hypothetical auction prices of a series of paintings, of identical size, done in each year of the artist's career.⁷ With the exception only of Willem de Kooning, the value of the work of artists born through 1920 rises with age for most or all of their careers.⁸ In this group only one artist, Wayne Thiebaud, remains alive today; for 12 of the other 13, the estimated peak value of their work occurred within ten years of their death. In contrast, the value of the work of most of the artists born after 1920 declines with age during the greater part of their careers. Figures 3 and 4 show this pattern clearly, for example, for Jasper Johns and Frank Stella. For only one artist, Robert Mangold, does the peak value of his work occur within ten years of the oldest age represented in the auction sample. Since all but three of the artists born after 1920 are still alive, it would still be possible for them to produce new work that would cause their peak value to shift to an older age.⁹ Yet even if this occurred, in general it would not make their age-price profiles resemble those of their earlier counterparts, because a late peak alone would not change the fact that the value of their work declines for much of their earlier careers.

4. Market Values and Critical Evaluation

The econometric results thus provide strong evidence of a shift over time in the market valuation of artists' work over the course of their careers: whereas the most valuable work of the contemporary artists born before 1920 was usually that done late in their careers, for artists born in the 1920s and '30s their most valuable work is typically that done early in their careers. These results emerge clearly from analysis of sales at art auctions held since 1980. Yet art auctions – particularly those of contemporary art – have often been dismissed by art critics as having little relevance to art appreciation, with prices determined by wealthy collectors whose purchases are of little scholarly interest. Before attempting to interpret the econometric results, a salient question therefore concerns whether they represent the outcomes of decisions based on sophisticated judgments. One way to answer this question is to compare the age-price profiles estimated above with the evaluations of art experts.

Systematic evidence on scholars' evaluations of the relative quality of artists' work throughout their careers in the form of direct statements is elusive, because for many artists this question has not been addressed explicitly, and even when it has, critics' judgments can be elliptical. Yet unambiguous implicit evidence of these critical evaluations is available in several forms. Two of these will be examined here. The first provides evidence of scholars' judgments of when an artist's most important work was done, while the second reveals critical evaluations of the relative importance of all the stages of an artist's career.

Evidence of critics' judgments of the timing of the most important stage of an artist's career can be drawn from published surveys of contemporary art. Whether monographs or textbooks, these books contain photographs of the work of the leading artists, chosen to illustrate each artist's most important contribution or contributions. Although no single book can be considered definitive, examining several popular books can provide a survey of critical opinion, and indicate whether there is a consensus on the best period of each artist's career.

Table III lists the ages at which the artists considered in this study executed the paintings reproduced in six important surveys of American art.¹⁰ Comparing these to the age at which each artist's work peaked in value is obviously somewhat simplistic, for it does not take into account cases in which an artist did important work at several different stages of his career. In general, however, the ages at which artists' work is illustrated in the texts summarized in Table III correspond quite closely to the ages at which the artists' work peaked in value. In total, the six books analyzed contain 192 photographs of paintings by 26 artists for whom peaks of age-price profiles are shown in Table II. Of these illustrated paintings, 122 (69 per cent) were done within five years of the peak ages shown in Table II, and 159 (88 per cent) were done within ten years of those peak ages.

The correspondence between the two types of evidence is striking for a number of artists. The artist with the most works illustrated in the six books is Jasper Johns. Five of the 17 illustrations of his work show paintings done at the age of 25, the estimated peak of his age-price profile; another eight are of paintings done later in his 20s, and the remaining four are of paintings he did between 30 and 34. None of the 15 illustrations of paintings by Jackson Pollock was done more than six years from the age of 37, at which the value of his work peaked; eight of the 15 are of paintings done within one year of that age. The 10 illustrations for Andy Warhol were all of paintings done between ages 34 and 36, all within three years of his estimated age of peak value at 33. Thirteen of the 14 paintings by Roy Lichtenstein illustrated in the books were done between 38 and 45, none of these more than four years from his estimated age of peak value at 41. Eight of the 9 illustrations of paintings by Morris Louis are of work done within five years of his estimated peak age, as are nine of the 11 illustrations for Robert Rauschenberg, and all eight illustrations for Ellsworth Kelly. For only one artist, Robert Motherwell, does none of the illustrations show paintings done near the age at which his work peaked in value.

Table III. Ages from which artists' work is illustrated in selected books, compared to peak of age-price profile

Artist	(1) Rose	(2) Geldzahler	(3) Russell	(4) Ashton	(5) Seitz	(6) Craven	(7) Peak age
Albers	70	76				63	
Baziotes				38		49	44
Diebenkorn			57	33, 58			
Dine				44	27, 29		
Francis	30			34			27
Frankenthaler	33	33	24, 45	24	24	36	27
Gorky	32, 43	40	25, 37, 40, 43	40, 43		37	43
Gottlieb	56	56		44		48	
Guston		39		45, 52, 63, 65		42	66
Hofmann	79	82, 85	70	66		64	84
Johns	25	30	25, 25, 29	25, 28, 29	25, 26, 27, 28 28, 30, 32, 34	28	25
Kelly	45	42, 43	40	39, 40	41	40	42
Kline	43	48	44	41, 42		46	48
de Kooning	36, 46, 55	42	44, 46, 48	45, 48, 59	48	48	44
LeWitt				39	38	38	32
Lichtenstein	40	38	38, 39, 40, 51	40, 43	38, 38, 42, 43, 45	41	41
Louis	47	42, 49	46, 48	48, 48	47	47	50
Marden				40			
Mitchell				30			
Motherwell	39	29		50, 54		34	72
Newman		44	44, 46, 47	62	44	46	
Noland	43	44	34, 40	40		40	33
Olitski	45	46			45		38
Pollock	31, 38, 39	38	31, 36, 38, 40, 42	31, 38, 41	36, 38	38	37
Poons	29	31			29		24
Rauschenberg	29	30	29, 30, 30, 34	34, 35, 37	30	38	30
Reinhardt	40	39, 51	45	39	51	51	45
Rivers				40	30, 36	40	40
Rosenquist	36	29	32	32		29	28
Rothko	54	57	47	56, 57, 64	54	51	57
Stella	24	32	23, 41	24	23, 29, 32	32	21
Still	47	53	47, 56	47, 49	52	42	
Tobey	53			54		61	
Tomlin	51	50		50		50	54
Warhol	34	35	34, 34	36	34, 35, 36	34, 34	33

Notes: Only color photographs were tabulated from Geldzahler.

Artists omitted from table had no paintings illustrated in the six books.

No entry is given for peak age for artists for whom age did not significantly affect price.

Sources: (1) Rose (1969); (2) Geldzahler (1969); (3) Russell (1981); (4) Ashton (1982); (5) Seitz (1992); (6) Craven (1994); (7) Table II, above.

For most of the artists, the illustrations of the texts therefore suggest that critics' judgments of the timing of their best work coincides quite closely with the evaluation of the market. Of the 31 artists listed in Table II, 26 have work reproduced in the six books considered here. For 18 of these 26, half or more of the illustrations are of work done within five years of the age at which their paintings peaked in value, and for 18 all of the paintings illustrated were done within 10 years of that estimated peak age.

In contrast to textbook illustrations, which are usually chosen to represent the author's judgment of an artist's one or two best periods, systematic critical evaluations of the relative quality of artists' work over the course of their entire careers are implicit in the composition of retrospective exhibitions. Curators who organize retrospectives reveal their judgments of the importance of an artist's work at different ages through their decisions on how many paintings to include from each phase of the artist's career. Some exhibitions might not precisely reflect an organizer's wishes, because inability to locate some works, or to persuade owners to lend valuable works, can prevent the inclusion of paintings the organizer would have liked to show. Yet this effect is likely to be minor for retrospectives produced by important museums, for these institutions devote substantial resources to finding and obtaining the works they consider important, and the prestige and value of the imprimatur conferred on paintings included in these shows increases the likelihood that owners will agree to lend their paintings. In addition, although retrospectives are typically organized by a single museum, after they have been shown at that site most tour to other museums. This means that the curators who organize these exhibitions can often draw on the efforts and influence of their counterparts at several other important museums in assembling the shows.

Table IV shows the age distributions of paintings included in retrospective exhibitions of artists included in this study. The distinction of the artists considered makes it possible to find catalogues of retrospectives held by major museums for most; of the 35 exhibitions summarized in Table IV, 16 were presented in New York at either the Museum of Modern Art or the Whitney Museum, the two leading American museums devoted exclusively to modern art, while another 12 were shown at the Metropolitan Museum, the National Gallery, the Guggenheim Museum, or Boston's Museum of Fine Arts.

The agreement between the auction market valuations and the critical evaluations of the retrospectives as to when artists did their best work is generally impressive. Figure 1 shows that the age-price profile for Arshile Gorky, for example, is highest in the final years of his life. The Museum of Modern Art retrospective for Gorky had an average of more than 12 paintings per year from the final five years of his life, a figure more than triple that for any earlier period in his career. Jackson Pollock's age-price profile, shown in Figure 2, peaks at 37, then declines to his death at 44; the Museum of Modern Art retrospective for him had the most paintings per year from his late 30s, considerably more than from any earlier period, and more than from his early 40s. Philip Guston's late work produced the greatest values at auction; the Whitney retrospective of his work included more than twice as many paintings per year from his final decade as from any earlier stage of his career. Willem de Kooning's age-price profile peaks at 44; his National Gallery retrospective, which spanned 48 years, placed its heaviest emphasis on ages 45–49. Hans Hofmann's age-price profile rises through his 70s, and peaks at 84; his Whitney retrospective, which spanned 67 years of his career, had far more paintings

Table IV. Distribution of paintings included in retrospectives, by age of artist (mean number of paintings per year)

Artist	15-9	20-4	25-9	30-4	35-9	40-4	45-9	50-4	55-9	60-4	65-9	70-4	75-9	80-4	85-9
Albers			0.6	0	1.4	3.2	3.0	5.2	2.2	3.2	0.8	1.2	3.2	3.2	0.3
Baziotes				0.6	2.8	2.8	2.0	2.0							
Diebenkorn		0.2	2.4	5.4	4.8	5.6	6.0	6.2	3.3						
Francis		0.4	4.2	5.2	5.6	3.8	1.0	1.4	1.4	4.2	2.7				
Frankenthaler		0.2	0.4	1.6	1.6	0.8	1.6	1.0	0.6	1.0					
Gorky	0.2	1.2	2.2	3.6	3.0	12.4									
Gottlieb		1.0	1.0	1.6	4.0	3.0	3.0	2.6	2.2	1.4	3.8	3.0			
Guston	0.4	0.2	0.6	1.2	1.8	1.6	1.6	1.6	2.2	5.4	7.5				
Hockney	0.4	2.2	6.2	3.0	2.4	3.2	5.6								
Hofmann	1.0	0.6	0	1.0	0.4	0.2	1.2	1.6	2.0	1.8	1.8	1.0	3.0	3.4	7.0
Johns		0.4	6.6	6.2	1.4	1.2	1.4	3.6	2.0	2.4	1.0				
Kelly		0.2	6.4	4.0	3.8	2.4	3.4	2.2	3.4	1.6	1.6	3.0			
Kline			0.8	2.2	4.2	3.8	3.4	10.0							
de Kooning				0.2	0.6	2.2	3.4	2.8	1.2	1.2	1.2	2.0	1.2	0.8	
LeWitt				8.6	7.6	21.6	15.0	8.2	4.4	18.4					
Lichtenstein			0.4	0	6.8	8.4	3.8	3.8	1.8	1.8	4.0				
Louis			0.2	0	0.8	2.6	5.2	10.0							
Mitchell	0.2	0.2	1.6	2.4	1.4	3.2	4.8	4.2	4.2	2.5					
Motherwell			1.2	2.2	1.4	2.0	1.8	1.8	4.2	2.2	2.3				
Newman						4.6	5.0	0.8	3.2	4.0	5.0				
Noland				1.2	5.4	10.8	5.8	1.7							
Olitski					1.0	6.0	2.6	12.0							
Pollock		1.4	5.6	8.4	14.0	3.6									
Porter		0.2	0	0.2	1.0	1.8	4.6	5.4	5.4	11.8					
Reinhardt			1.4	1.2	8.6	4.6	1.8	1.5							
Rivers				2.4	5.0	2.6	1.6	2.6	2.0						
Rothko					0.4	1.4	2.4	3.6	2.6	1.2	1.3				
Ryman			2.6	3.4	2.4	2.4	1.2	1.4	2.2	1.0					
Still					0.6	1.2	3.6	3.4	1.6	0.6	2.4	2.4			
Thiebaud						2.8	3.0	2.2	3.0	6.8					
Tobey							0.2	1.4	2.4	2.0	2.2	2.0	3.0	3.0	
Tomlin			0.2	0.6	0.4	1.2	1.8	4.4							
Twombly		0.6	4.2	5.8	0.6	2.6	0.6	1.0	3.6	1.6	0.8				
Warhol		0.4	9.8	26.0	18.8	1.8	3.6	6.4	11.2						

Notes: Unless indicated otherwise, Table IV includes all works in the retrospectives indicated. Exceptions are as follows: For Albers: architecture, assembly, drawings, furniture, photographs, and prints are excluded. For Francis: lithographs, monotypes, and etchings are excluded. For Gottlieb: graphics and postcards are excluded. For Hockney: lithographs, photographs, etchings, and photo collages are excluded. For Jensen: sketchbooks are excluded. For Johns: drawings, prints, and sculptures are excluded. For Kelly: photographs are excluded. For Lichtenstein: lithographs, screenprints, photographs, sculptures, and murals are excluded. For Newman: sculpture, works on paper, and architecture are excluded. For Pollock: prints are excluded. For Twombly: sculptures are excluded.

Sources: Albers: Waldman (1988); Baziotes: Alloway (1965); Diebenkorn: Buck (1980); Francis: Hulten (1993); Frankenthaler: Carmean (1989); Gorky: Seitz (1962); Gottlieb: Alloway and MacNaughton (1981); Guston: Hopkins (1980); Hockney: Tuchman and Barron (1988); Hofmann: Goodman (1990); Jensen: Messer (1985); Johns: Varnedoe (1996); Kelly: Waldman (1996); Kline: Gordon (1968); de Kooning: Prather (1994); LeWitt: Singer (1992); Lichtenstein: Waldman (1993); Louis: Fried (1967); Mitchell: Bernstock (1988); Motherwell: Buck (1983); Newman: Hess (1971); Noland: Waldman (1977); Olitski: Moffett (1973); Pollock: O'Connor (1967); Porter: Moffett (1982); Reinhardt: Bois (1991); Rivers: Haenli (1980); Rothko: van den Brande (1971); Ryman: Storr (1993); Still: O'Neill (1979); Thiebaud: Tsujimoto (1985); Tobey: Breeskin (1974); Tomlin: Baur (1957); Twombly: Varnedoe (1994); Warhol: McShine (1989).

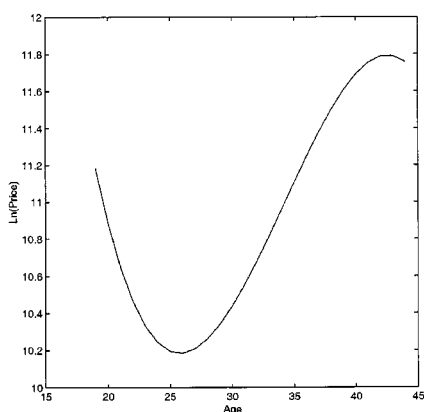


Figure 1. Arshile Gorky (1904–1948).

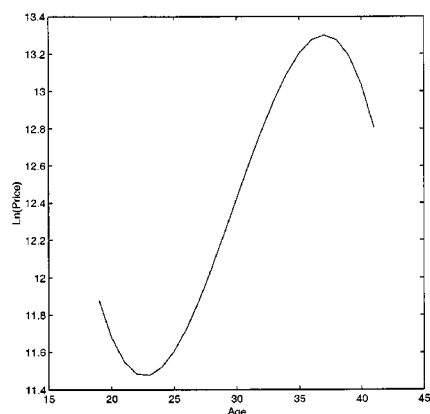


Figure 2. Jackson Pollock (1912–1956).

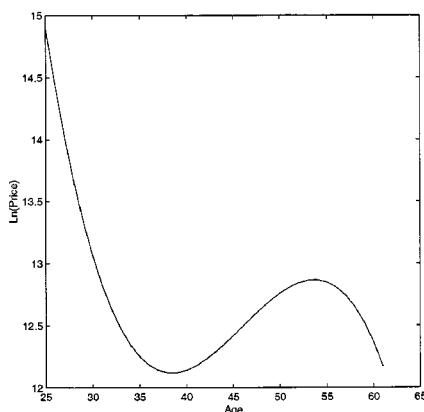


Figure 3. Jasper Johns (1930–).

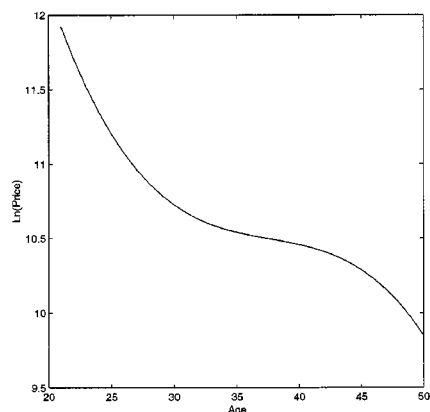


Figure 4. Frank Stella (1936–).

from his late 70s than from any earlier period, followed by an even larger number of paintings per year from his 80s.

The subtlety of the relationship between the auction valuations and the composition of retrospectives is illustrated by the case of Jasper Johns. From the evidence of Table IV, the composition of Johns's recent Museum of Modern Art retrospective seems to conflict somewhat with the value of his work by age shown in Figure 3: the retrospective did have the largest number of paintings per year from his late 20s, as the age-price profile would suggest, but the retrospective also had nearly as many paintings from his early 30s, in spite of sharply lower prices. Yet this apparent disagreement is in large part a result of the age categorization of Table IV. The annual series in Table V show that the retrospective reflected the age-price profile quite closely, tracking both its peaks and its troughs.¹¹ Overall, Johns's retrospective included a total of 127 paintings from 42 years of his career, an average

Table V. Annual estimated prices for Jasper Johns and annual composition of his retrospective

Year	Age	Price	Paintings (n)	Year	Age	Price	Paintings (n)
1954	24	n.a.	2	1975	45	12.42	4
55	25	14.90	8	76	46	12.49	0
56	26	14.44	2	77	47	12.56	0
57	27	14.02	5	78	48	12.64	2
58	28	13.66	9	79	49	12.70	1
59	29	13.34	9	1980	50	12.76	2
1960	30	13.06	5	81	51	12.81	4
61	31	12.83	8	82	52	12.84	2
62	32	12.63	9	83	53	12.86	4
63	33	12.47	3	84	54	12.87	6
64	34	12.35	6	85	55	12.85	2
65	35	12.25	1	86	56	12.81	4
66	36	12.18	2	87	57	12.74	1
67	37	12.14	2	88	58	12.65	2
68	38	12.12	2	89	59	12.52	1
69	39	12.12	0	1990	60	12.36	3
1970	40	12.14	0	91	61	12.17	3
71	41	12.18	3	92	62	n.a.	1
72	42	12.22	1	93	63	n.a.	3
73	43	12.28	0	94	64	n.a.	2
74	44	12.35	2	95	65	n.a.	1

Notes: n.a. – not available.

Price – natural logarithm of price for painting on canvas, 24' × 24', sold in 1990–94, in constant (1983) dollars; calculated from Appendix.

Paintings – number of paintings from each year included in Jasper Johns retrospective. See Varnedoe (1996, pp. 404–05).

of 3 paintings per year. Table V shows that the ten years of Johns's career with the highest estimated prices were those from ages 25–30 and 52–55, and that the retrospective included a total of 52 paintings from these years. In contrast, the ten years with the lowest estimated prices – ages 35–43 and 61 – were represented by a total of only 14 paintings. Whereas the ten years with the highest estimated prices accounted for six of the nine years from which the retrospective displayed 5 or more paintings, the ten years with the lowest prices accounted for none of these nine years; the ten years with the lowest prices did, however, include three of the five years of Johns' career from which there were no paintings in the retrospective.

In short, for nearly all the artists considered here for whom age was found to have a significant effect on the market value of their work and for whom catalogues of retrospectives are available, the evidence from the two sources on when the artists did their best work appears consistent. For some artists – those discussed above, as well as Baziotis, Francis, Kline, Louis, Rivers, Rothko, Thiebaud, Tomlin, Twombly, and Warhol – the agreement between the two sources is strong, with

heavy emphasis by the retrospectives on the period of peak market value. In a few cases, notably those of Frankenthaler, Kelly, LeWitt, and Olitski, the greatest emphasis of the retrospectives is not on the most highly priced period of the artist's career.¹² Yet rarely is there strong disagreement between the two sources: only for Robert Motherwell does the retrospective give its greatest emphasis to a period far from that most highly valued by the auction market.

Overall, the conclusion drawn from the evidence of the retrospectives therefore reinforces that taken from the earlier consideration of the monographs and textbooks, that the auction market produces valuations of work over the course of artists' careers very similar to the evaluations of scholars. This heightens the interest in explaining the patterns produced by the age-price profiles, particularly the striking contrast between the typically rising value of paintings with age for artists born before 1920 and the opposite relationship for artists born after that date.

5. Changes in Artists' Careers: An Explanation

The shift described above in the careers of contemporary artists has not previously been discussed or systematically analyzed. The statistical evidence of the shift is surprising both for its consistency across artists and for its abruptness: a large number of artists born before 1920 exhibit the pattern of rising values to a peak late in their career, while a similarly large number born after 1920 show the opposite pattern of an early peak and subsequently falling values. A detailed explanation of this change would require systematic study of biographies, and lies beyond the scope of this study. Yet some central elements of an explanation, having to do with changes over time in the nature of painting and in the market conditions facing artists, can be provided.

The explanation begins with the observation that during the 1950s and '60s the importance of an artist's work increasingly came to be judged by that artist's ability to solve formal problems within art. This was in large part due to the great influence of a single critic, Clement Greenberg, who played a key role in establishing the importance of the Abstract Expressionists during the late 1940s and early '50s. Greenberg's analysis of modern art emphasized the formal properties of paintings above all, line, color, and form took precedence over subject matter or content.¹³ A disciple of Greenberg's, Michael Fried, declared that "the history of painting from Manet through Synthetic Cubism and Matisse may be characterized in terms of the gradual withdrawal of painting from the task of representing reality ... in favor of an increasing preoccupation with problems intrinsic to painting itself". A key consequence of this was that it now became possible "to conceive of stylistic change in terms of the decisions of individual artists to engage with particular formal problems thrown up by the art of the recent past".¹⁴ A critic who regretted the tendency to use this criterion in evaluating the work of artists remarked in 1968 on its pervasiveness, "how often recent Abstract American painting is defined and

described almost exclusively in terms of internal problem-solving. As though the strength of a particular artist expressed itself only in his choice to conform with a set of existent professional needs and his inventiveness in producing the answers". The critic, Leo Steinberg, used technological change as a metaphor: "The dominant formalist critics today tend to treat modern painting as an evolving technology wherein at any one moment specific tasks require solution ... The artist as engineer and research technician becomes important insofar as he comes up with solutions to the right problem".¹⁵

Devising solutions to formal problems, and having those solutions adopted by other artists, increasingly became the hallmark of success for contemporary artists during the 1950s and '60s. A number of observers remarked on the acceleration of this process in the recent past. Fried refers to this as a "quickening that has taken place in the rate of self-transformation within modernism itself".¹⁶ In 1968 Clement Greenberg surveyed the history of modern art, and concluded that "Until the middle of the last century innovation in Western art had not had to be startling or upsetting; since then ... it has had to be that. And now in the 60s it is as though everybody had finally ... caught on not only to the necessity of innovation, but also to the necessity – or seeming necessity – of advertising innovation by making it startling and spectacular". Greenberg noted that producing conspicuous innovations had become a preoccupation of artists: "Today everybody innovates. Deliberately, methodically. And the innovations are deliberately and methodically made startling".¹⁷ Another who remarked on this trend was Henry Geldzahler, the first curator of Contemporary Art at the Metropolitan Museum. He recalled "in the late 1950s being shocked to hear painters, who believed in the primacy of de Kooning's position and who admired him, wondering aloud whether next year's show would repeat his success, whether he could consolidate his lead not by painting a beautiful show but by changing in an unexpected and unpredictable way". Geldzahler attributed this demand for novelty in part to the growing interest in art of the mass media, "with their concern for immediacy and emphasis on the current moment", and in part to the workings of the gallery system. Galleries that catered "to an audience overeager to spot trends, rising reputations, and falls from favor" conceived new shows "more in response to the demands of fashion than art". The "biennial exhibitions of each artist's work" from which the galleries profited created "cruel and destructive" pressure for artists to change their work, leading to the application of "the false urgency of Hollywood to the fine arts".¹⁸

In his description of the gallery system and the growing interest of the mass media, Geldzahler identified a basic way in which the environment facing young American artists changed during the period spanned by the careers of the artists analyzed in this study. The older artists considered here – those born before 1920 – entered a profession in which there was little immediate demand for their work. There were relatively few outlets for the work of American artists during the 1920s, and this situation did not change greatly during the Depression or World War II.¹⁹ Yet after World War II it did begin to change. The art of the Abstract Expressionists

developed rapidly in the late 1940s, in part because of the influence of European Surrealist painters who had come to New York during the war.²⁰ The very success of the older artists, led by Jackson Pollock and Willem de Kooning, in establishing the legitimacy of a distinctively American art led to improving market conditions. During the late 1940s and early '50s, galleries sympathetic to the new American art were opened in New York at an increasing rate. Peggy Guggenheim had opened her pioneering gallery, Art of this Century, in 1942, and within the next few years showed the work of Pollock, Hofmann, Motherwell, Rothko, Baziotes, Still, and others. When she left New York after the war her place was taken by Charles Egan, Betty Parsons, Samuel Kootz, and Sidney Janis, all of whom opened galleries later in the '40s.²¹ Looking back on this period, Barnett Newman later recalled that "we had no general public ... There were just a few galleries: Peggy Guggenheim up until 1947 ... and between '47 and '52, you might say Betty Parsons, Charlie Egan, and to some extent Sam Kootz were the only places where any of us had an opportunity of presenting ourselves, of showing the work. It was not, in that sense, a true marketplace".²² Initially established to show the work of the older artists, commercial success led these galleries also to seek out new, younger painters. The success of these dealers in turn attracted Eleanor Ward, Martha Jackson, Leo Castelli, Andre Emmerich, and other new dealers during the 1950s, and these newer entrants increasingly focused their efforts on the rising generation of young artists, including Robert Rauschenberg and Jasper Johns. Instead of facing the prospect of having to find academic or other jobs to support themselves, as had many of the older painters, the younger artists increasingly entered a profession in which the strength of the market allowed them the possibility of devoting themselves exclusively to painting. The key to doing this was to attract the attention of gallery owners, critics, and other painters. The prevailing formalist doctrines in art criticism furthermore made it clear how they might do this, pointing to problems to which they might provide solutions.

The expanding market for contemporary art during the 1950s, and beyond into the '60s, thus raised the rewards to successful innovation, and young artists could easily perceive these rewards.²³ In 1954, Adolph Gottlieb recalled that he had been aware of "the difficulties of the modern artist" from the beginning of his career: "By the age of 18 [in 1921] I clearly understood that the artist in our society cannot expect to make a living from art; must live in the midst of a hostile environment; cannot communicate through his art with more than a few people; and if his work is significant cannot achieve recognition until the end of his life (if he is lucky), and more likely posthumously".²⁴ In contrast, once they had had their first solo shows, Jasper Johns, Frank Stella, and a number of their contemporaries who came of age in the 1950s would no longer have to concern themselves with the problem of supporting themselves in jobs that might allow them to paint in their spare time. As William Rubin, Director of the Museum of Modern Art, later observed: "By 1958, when Stella came to New York, the art-buying public had become convinced that Americans could produce major painting, worthy of comparison with the best

of earlier European modern art. And it was now clear that this work could be sold at prices that made an artist's profession economically feasible".²⁵

The career of Helen Frankenthaler provides a striking example of how quickly an innovation by a young artist in the new environment of the 1950s could diffuse and establish the artist's place in the critical canon. Frankenthaler arrived in New York as a college senior in 1949 and became a friend of the influential critic Clement Greenberg, who introduced her to many of the Abstract Expressionists. She was particularly struck by the recent work of Jackson Pollock, and under his influence began to experiment with pouring oil washes on unprimed canvas. In 1952 she painted a large canvas that she titled *Mountains and Sea*. Greenberg soon arranged for two painters from Washington, D.C., to see the painting in Frankenthaler's studio. One of them, Kenneth Noland, later described their reaction: "We were interested in Pollock but could gain no lead from him. He was too personal. But Frankenthaler showed us a way – a way to think about, and use color". Even more succinctly, the other visitor, Morris Louis, declared that Frankenthaler was "a bridge between Pollock and what was possible".²⁶

In an essay written in 1960, Greenberg identified Louis and Noland as two of the best young American artists. Greenberg wrote that Louis "found himself only some seven or eight years ago ... His first sight of the middle-period Pollock and of a large and extraordinary painting done in 1952 by Helen Frankenthaler, called *Mountains and Sea*, led Louis to change his direction abruptly". Greenberg argued that the "crucial revelation" from Pollock and Frankenthaler "liberated Louis' originality along with his hitherto dormant gift for color". In Greenberg's opinion this achievement was substantial, as he concluded that "Louis, Noland, and Sam Francis are the only painters to have come up in American art since that 'first wave' [Pollock's generation] who approach its level".²⁷ In the introduction to a 1965 exhibition, Michael Fried provided a similar analysis of causation for Kenneth Noland, observing that "Noland's first wholly individual paintings date from 1958–59. They are executed in a stain technique deriving ultimately from Pollock's black stain paintings of 1951 by way of Helen Frankenthaler". Fried shared Greenberg's opinion of the importance of the development: "the formal issues with which Pollock and subsequent modernists such as Louis, Noland, Olitski, and ... Stella have chosen to engage are of a phenomenological subtlety, complexity, and richness without equal since Manet".²⁸

Today *Mountains and Sea* hangs in the National Gallery of Art; critic Carter Ratcliff has called it "an icon of postwar American art".²⁹ Thus a single painting done by a 24-year-old artist embodied an innovation that established that artist's place in the progression of American art before even a decade had passed. Although Frankenthaler has been successful throughout a long career that continues today, her most valuable, and most highly critically acclaimed, work remains that done during her twenties.

While Frankenthaler's case is somewhat unusual because of the extraordinary importance of a single painting, her early rapid attainment of the status of an im-

portant figure in American art is not unusual among the younger generation of artists considered in this study. Jasper Johns, perhaps the most successful of this group, first became known even more abruptly and dramatically. In 1958, Johns had his first one-man show at Leo Castelli's gallery. Thomas Hess, the editor of *Artnews*, saw Johns' work at Castelli's before the show, and put one of the paintings, *Target with Four Faces*, on the front of his magazine. Johns' first show was thus announced on the cover of the most respected American art journal. When the show opened Alfred Barr, then Director of Collections at the Museum of Modern Art, bought *Target with Four Faces* and two other paintings for the museum, and persuaded the architect Philip Johnson to buy Johns' five-foot long painting of the American flag as a future gift to the museum.³⁰ When the show closed, at age 27 Johns had become a new star in contemporary art.

The young Johns had furthermore already become a source of new ideas for even younger artists. One of these, Frank Stella, was struck by "the idea of repetition" in Johns' flags, and appropriated it for the paintings of black stripes that produced his own initial success – at his first one-man show, at Castelli's gallery two years later in 1960, when Stella was 24. Just five years after the Castelli show, Michael Fried gave Stella a central place in the critical canon. Describing the black paintings as done "partly in direct response to the work of Barnett Newman", Fried argued that they "amounted to the most extreme statement yet made advocating the importance of the literal character of the picture-support for the determination of pictorial structures", and consequently represented "the culmination of a tendency visible in the work of Manet if not earlier".³¹

A systematic indication of how greatly the economic environment facing young artists changed during the 1950s is given by Table VI, which lists the ages at which the artists considered in this study had their first one-person gallery shows in New York. For most of these artists their first New York exhibit was an important event in their careers, analogous to the debut of an actor or musician. There is a clear decline over time in the typical age of an artist's debut: the median age at the time of the first New York show falls from 43 for artists born before 1910 to 32 and 33 for those born in the 1910s and '20s, respectively, and further to 27 for those born in the 1930s. Whereas only 4 of 20 artists born through 1920 had their first New York shows while in their 20s, this became normal for the next generation, as 14 of 22 born after 1920 debuted while still in their 20s. This dramatic decline in the age at which many artists gained their first opportunity to become economically successful provides concrete evidence of the impact of the growing demand for contemporary art on artists' careers.

6. Conclusion

Econometric analysis of auction sales of paintings reveals that successful American artists born in the 1920s and '30s are much more likely to have done their most valuable work at an early age than were their counterparts born between 1900 and

Table VI. Age at time of first one-person show in New York, in order of birthdate

Artist	Year of birth	Year of show	Gallery	Age
Hofmann	1880	1944	Art of this Century	64
Albers	1888	1936	Neumann	48
Tobey	1890	1917	Knoedler	27
Tomlin	1899	1923	Anderson	24
Gottlieb	1903	1930	Dudensing	27
Jensen	1903	1955	Tanager	52
Rothko	1903	1933	Contemporary Arts	30
Gorky	1904	1938	Boyer	34
de Kooning	1904	1948	Egan	44
Still	1904	1946	Art of this Century	42
Newman	1905	1950	Parsons	45
Porter	1907	1952	Tibor de Nagy	45
Kline	1910	1950	Egan	40
Baziotes	1912	1944	Art of this Century	32
Louis	1912	1957	Jackson	45
Pollock	1912	1943	Art of this Century	31
Guston	1913	1945	Midtown	32
Reinhardt	1913	1944	Artists	31
Motherwell	1915	1944	Art of this Century	29
Thiebaud	1920	1962	Allan Stone	42
Diebenkorn	1922	1956	Poindexter	34
Olitski	1922	1958	Iolas	36
Francis	1923	1956	Jackson	33
Kelly	1923	1956	Parsons	33
Lichtenstein	1923	1951	Carlebach	28
Rivers	1923	1951	Tibor de Nagy	28
Noland	1924	1957	Tibor de Nagy	33
Rauschenberg	1925	1951	Parsons	26
Mitchell	1926	1952	New	26
Frankenthaler	1928	1951	Tibor de Nagy	23
LeWitt	1928	1965	Daniels	37
Twombly	1928	1955	Stable	27
Johns	1930	1958	Castelli	28
Ryman	1930	1967	Paul Bianchini	37
Warhol	1928	1962	Stable	34
Rosenquist	1933	1962	Green	29
Dine	1935	1960	Reuben	25
Stella	1936	1960	Castelli	24
Hockney	1937	1964	Alan	27
Mangold	1937	1964	Thibaut	27
Poons	1937	1963	Green	26
Marden	1938	1966	Bykert	28

Sources: Geldzahler (1969, pp. 429–50); Sandler (1970, pp. 277–80); Sandler (1962, p. 90); Tsujimoto (1985, p. 171); Weitman (1996); Jensen (1978, p. 92); Bastian (1992, p. 280); Kertess (1992); Clothier (1995, p. 119); de Wilde (1982); Storr (1993, p. 216).

1920. Comparing these results to art textbooks and the composition of retrospective exhibitions furthermore demonstrates that these artists' most valuable work has also been that most highly regarded by art historians and critics.

The implied shift in career patterns across generations appears to have been a result of changes in both the nature of modern painting and in the market for contemporary art. With a growing emphasis on the importance of solving formal problems in painting, youth may not only have become less of a barrier to doing significant work, but may actually have become an advantage: painting may have become one of the many disciplines in which "startling and spectacular" improvements in the existing technology are routinely made by the young.³² The growth of the demand for contemporary American art in the 1950s and '60s heightened the demand for such innovations: the growth of the market made young artists more aware of the rewards for innovation at the same time that it increased the probability that innovative work would be seen and recognized.

The growing tendency for the most valuable and important work of successful artists born after 1920 to be done early in their careers was therefore a product of changes in both the practice of art and the market for it: the evolution of modern painting made success early in a career possible, while the expansion of the market for contemporary art allowed a new generation of American artists to take advantage of this and become established much more quickly than those who had preceded them.

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Appendix: Regression Analysis of Auction Prices, by Artist

Artist	Intercept	Age	Age ²	Age ³	Size	Support	1980–4	1985–9	1995–6	R ²	n	Age sig.
Albers	19.91 (2.74)	-.630 (1.74)	.010 (1.70)	-5.1×10^{-5} (1.66)	.516 (9.62)	-1.03 (3.26)	-1.14 (8.90)	-.342 (3.22)	-.316 (2.29)	.491	188	.36
Baziotes	21.41 (0.80)	-1.63 (0.78)	.052 (0.96)	-5.1×10^{-4} (1.11)	.567 (5.21)	-.155 (0.60)	-1.00 (3.57)	.593 (2.22)	-.275 (0.68)	.751	57	.002
Diebenkorn	1.60 (0.31)	.418 (1.22)	-.009 (1.10)	5.8×10^{-5} (1.00)	.514 (4.93)	-.707 (2.19)	-1.00 (3.48)	.258 (1.19)	.010 (0.03)	.583	85	.36
Dine	5.19 (2.47)	.159 (1.44)	-.002 (1.27)	– –	.332 (3.87)	-.846 (4.35)	-1.11 (4.35)	.093 (0.44)	-.668 (2.29)	.504	109	.14
Francis	13.59 (17.4)	-.232 (6.97)	.002 (5.91)	– –	.539 (16.9)	-.558 (6.23)	-1.38 (12.5)	-.081 (0.83)	-.529 (4.87)	.652	401	.0001
Frankenthaler	3.47 (0.40)	.454 (0.74)	-.013 (0.95)	1.2×10^{-4} (1.11)	.383 (8.49)	-.929 (5.80)	-.413 (2.72)	.162 (1.12)	-.365 (2.04)	.684	111	.0001
Gorky	29.24 (1.46)	-2.23 (1.13)	.070 (1.10)	-6.8×10^{-4} (1.03)	.618 (3.84)	.394 (0.71)	-1.12 (1.79)	.285 (0.54)	.545 (0.81)	.520	45	.02
Gottlieb	5.19 (1.79)	.092 (0.87)	-7.5×10^{-4} (0.78)	– –	.420 (6.78)	-.913 (5.39)	-.708 (3.91)	-.039 (0.24)	-.107 (0.47)	.659	125	.30
Guston	5.47 (5.90)	.025 (1.88)	– –	– –	.617 (6.98)	-.370 (1.57)	-1.20 (4.48)	-.061 (0.23)	.046 (0.12)	.597	63	–
Hockney	-19.36 (3.37)	2.10 (4.05)	-.053 (3.68)	4.3×10^{-4} (3.29)	.627 (6.14)	-.637 (1.88)	-1.12 (3.55)	.369 (1.32)	-.477 (1.19)	.700	75	.0001
Hofmann	41.58 (1.72)	-1.56 (1.45)	.022 (1.43)	-1.0×10^{-4} (1.37)	.663 (13.3)	-.817 (6.46)	-1.22 (7.75)	.074 (0.56)	-.248 (1.44)	.704	221	.0001
Jensen	-212.4 (1.19)	10.08 (1.18)	-.154 (1.13)	7.8×10^{-4} (1.08)	.472 (5.99)	-.232 (0.59)	-.387 (1.73)	.278 (1.41)	-.518 (1.92)	.566	64	.14

Appendix (continued)

Artist	Intercept	Age	Age ²	Age ³	Size	Support	1980-4	1985-9	1995-6	R ²	n	Age sig.
Johns	46.55 (2.96)	-2.63 (2.19)	.059 (1.99)	-4.3 × 10 ⁻⁴ (1.81)	.640 (4.92)	-.672 (1.59)	-.765 (1.13)	.384 (0.97)	-.102 (0.14)	.677	38	.02
Kelly	4.44 (1.55)	.190 (1.44)	-2.3 × 10 ⁻³ (1.65)	- (-)	.436 (4.00)	-1.34 (1.92)	-1.31 (4.04)	.086 (0.34)	-.018 (0.04)	.635	48	.06
Kline	31.07 (1.10)	-2.29 (1.07)	.066 (1.24)	5.8 × 10 ⁻⁴ (1.34)	.599 (9.13)	-.574 (2.66)	-1.23 (5.01)	.188 (0.73)	-.285 (0.79)	.744	118	.0001
de Kooning	-25.55 (2.08)	2.07 (3.10)	-.038 (3.25)	2.3 × 10 ⁻⁴ (3.29)	.517 (5.65)	-.881 (3.99)	-1.66 (6.22)	-.030 (0.13)	-.405 (1.26)	.513	182	.0001
LeWitt	7.68 (11.19)	-.049 (3.98)	- (-)	- (-)	.553 (7.53)	- (-)	-1.99 (7.11)	-.008 (0.04)	-.147 (0.66)	.561	93	-
Lichtenstein	-21.28 (2.05)	1.80 (2.65)	-.037 (2.52)	2.4 × 10 ⁻⁴ (2.36)	.643 (6.70)	-.995 (1.79)	-1.61 (5.29)	.191 (0.79)	-.255 (0.84)	.481	126	.009
Louis	-655.7 (2.97)	43.70 (2.92)	-.955 (2.83)	.007 (2.75)	.289 (2.97)	- (-)	-.384 (1.75)	.331 (1.62)	-.486 (1.96)	.512	79	.0001
Mangold	-25.13 (1.44)	2.44 (1.74)	-.059 (1.61)	4.8 × 10 ⁻⁴ (1.51)	.319 (3.68)	-1.41 (5.17)	-1.39 (4.15)	-.272 (0.97)	-.591 (2.02)	.597	59	.05
Marden	7.07 (1.73)	.065 (0.31)	-8.2 × 10 ⁻⁴ (0.28)	- (-)	.507 (2.42)	.158 (0.25)	-3.19 (5.15)	-.003 (0.01)	-.870 (0.84)	.718	25	.94
Mitchell	5.76 (4.23)	.020 (0.31)	-3.2 × 10 ⁻⁴ (0.44)	- (-)	.660 (11.38)	-.600 (2.12)	-1.98 (10.28)	-.360 (2.30)	-.040 (0.19)	.734	104	.41
Motherwell	-17.89 (3.53)	1.68 (5.15)	-.035 (5.13)	2.3 × 10 ⁻⁴ (5.06)	.425 (9.30)	-.497 (3.24)	-.570 (3.54)	.218 (1.38)	-.432 (1.75)	.518	158	.0001
Newman	21.98 (2.61)	-.429 (1.31)	.004 (1.19)	- (-)	.564 (5.84)	-1.16 (2.53)	-2.56 (3.93)	-1.06 (1.62)	-.444 (0.54)	.939	15	.22
Noland	11.50 (0.96)	.222 (0.29)	-.014 (0.82)	1.5 × 10 ⁻⁴ (1.23)	.327 (6.18)	-.485 (0.92)	-.337 (2.25)	.410 (3.03)	-.582 (3.19)	.596	176	.0001
Olitski	17.09 (3.57)	-.361 (1.90)	.003 (1.50)	- (-)	.434 (4.74)	-.768 (1.66)	-1.12 (4.84)	-.274 (1.20)	-.815 (2.78)	.485	100	.0001

Appendix (continued)

Artist	Intercept	Age	Age ²	Age ³	Size	Support	1980-4	1985-9	1995-6	R ²	n	Age sig.
Pollock	33.61 (1.58)	-3.07 (1.40)	.109 (1.50)	-.001 (1.54)	.868 (5.64)	.097 (0.31)	-1.38 (3.37)	-.198 (0.58)	-.351 (0.52)	.655	53	.02
Poons	14.92 (4.27)	-.372 (1.95)	.004 (1.48)	-	.339 (2.40)	-	-1.13 (3.49)	.074 (0.27)	-1.01 (2.30)	.488	65	.0001
Porter	-2.40 (0.45)	.625 (1.52)	-.014 (1.49)	1.0×10^{-4} (1.51)	.521 (5.15)	-1.13 (3.93)	.520 (1.69)	.591 (2.86)	-.360 (1.10)	.757	46	.03
Rauschenberg	-7.65 (1.13)	1.41 (3.02)	-.036 (3.50)	2.81×10^{-4} (3.73)	.438 (6.46)	-.553 (2.90)	-.946 (3.49)	.166 (0.89)	-.539 (2.42)	.727	111	.0001
Reinhardt	10.63 (1.61)	-.445 (0.78)	.017 (1.06)	-1.9×10^{-4} (1.20)	.383 (3.02)	-.793 (1.93)	-1.24 (3.71)	-.530 (1.85)	-.436 (1.13)	.631	54	.006
Rivers	-27.79 (3.00)	2.34 (3.87)	-.049 (3.77)	3.3×10^{-4} (3.59)	.368 (6.16)	-.570 (2.84)	-1.26 (5.62)	-.050 (0.24)	-.005 (0.02)	.530	92	.0001
Rosenquist	55.95 (3.99)	-3.40 (3.30)	.078 (3.15)	-5.9×10^{-4} (3.01)	.348 (3.78)	-.952 (4.02)	-1.29 (4.70)	.082 (0.33)	-.697 (2.29)	.614	88	.002
Rothko	23.99 (4.33)	-1.40 (3.84)	.036 (4.60)	-2.7×10^{-4} (5.10)	.474 (7.18)	-.479 (2.69)	-1.20 (6.71)	.133 (0.74)	-.282 (1.32)	.855	98	.0001
Ryman	16.23 (2.62)	-.386 (1.32)	.004 (1.28)	-	.562 (4.20)	-1.37 (1.74)	-2.03 (2.80)	.344 (0.82)	-.449 (0.95)	.553	32	.38
Stella	21.68 (3.18)	-1.09 (1.72)	.028 (1.51)	-2.5×10^{-4} (1.37)	.449 (9.59)	-1.21 (6.79)	-1.31 (7.77)	-.049 (0.31)	-.323 (1.47)	.656	157	.0001
Still	367.5 (1.11)	-25.5 (1.09)	.609 (1.10)	-.005 (1.10)	-1.18 (0.69)	-.820 (0.34)	-3.11 (1.27)	-.257 (0.17)	-.512 (0.31)	.777	12	.62
Thiebaud	-1.54 (0.26)	.692 (1.49)	-.014 (1.20)	9.1×10^{-5} (1.02)	.128 (1.19)	-1.14 (3.17)	-.623 (1.51)	.559 (1.64)	.206 (0.48)	.487	46	.02
Tobey	-49.49 (1.46)	2.43 (1.59)	-.035 (1.53)	1.7×10^{-4} (1.48)	.572 (11.5)	-.218 (1.32)	-.997 (5.06)	.261 (1.67)	-.464 (2.47)	.501	194	.31
Tomlin	5.33 (0.95)	-.214 (0.69)	.004 (1.10)	-	.607 (3.83)	-.696 (1.29)	.338 (0.54)	1.35 (2.25)	1.09 (1.31)	.914	19	.0001

Appendix (continued)

Artist	Intercept	Age	Age ²	Age ³	Size	Support	1980–4	1985–9	1995–6	R ²	n	Age sig.
Twombly	11.85 (6.76)	-.208 (2.29)	.002 (2.11)	– –	.662 (8.19)	-.636 (3.31)	-2.18 (8.65)	-.075 (0.38)	-.324 (1.38)	.571	125	.04
Warhol	-11.49 (2.21)	1.41 (3.87)	-.034 (4.03)	2.6×10^{-4} (4.03)	.625 (20.0)	-1.28 (5.67)	-2.47 (16.29)	-.045 (0.41)	-.210 (1.66)	.622	475	.0001

Notes: Regressions were estimated by ordinary least squares; absolute values of t-statistics are given in parentheses. The dependent variable is the natural logarithm of the price of each painting, in constant 1983 dollars.

The age variables measure the age of the artist at the date the painting was executed.

The size variable is the natural logarithm of the surface area of the painting in square inches.

The support variable equals one for works on paper, and 0 for works on canvas.

The date variables are binary; in each case they equal one if the painting was sold during the dates indicated, and 0 otherwise. The reference category is 1990–94.

“Age significance” reports the significance levels associated with F-tests of the null hypothesis that all estimated age coefficients in a given equation are simultaneously equal to zero. (For each artist, the equation reported – with age, or age and age², or age, age², and age³ – is that which yielded the highest adjusted R².)

Source: See text.

Notes

1. Watson (1992, pp. 416–18), Haden-Guest (1996, pp. 1–17). Sotheby's first established a separate Contemporary Art department in 1970.
2. For biographical information for most of these painters, see Sandler (1970) and Sandler (1978).
3. The sale price given by Mayer is the hammer price, i.e. it includes the commission charged by the auction house to the seller, but not the premium charged to the buyer. The standard rate for the latter is 10% of the hammer price. Mayer does not report prices for works that were bought in, i.e. that failed to reach their reserve prices.
4. The prices were converted to constant 1983 dollars using the CPI.
5. The .10 level is used as the criterion for statistical significance.
6. This conclusion omits the 11 artists for whom age did not have a statistically significant effect on price. Five of the six of these artists born before 1920 had estimated peak value ages at 40 and above, whereas three of the five born after 1920 had estimated peaks below 40. Notwithstanding the weakness of the impact of the measured effect of age on price for these artists, the age effects estimated for them are consistent with those of their contemporaries listed in Table II.
7. All values in the figures were calculated for paintings on canvas, 2' x 2', sold in 1990–94, in constant (1983) dollars. Each profile is bounded by the minimum and maximum ages from which works by the artist appear in the sample analyzed here.
8. Although this conclusion is drawn from an analysis that holds constant the size of paintings, for many of the artists listed in Table II the size of their works changed systematically with their age. There was a statistically significant correlation between painting size and the artist's age in the auction sample for nine of the artists born before 1920, and in each case this correlation was positive. Thus for Hofmann, Rothko, Gorky, de Kooning, Kline, Baziotis, Pollock, Guston, and Motherwell the average value of their paintings increased more with age than is implied by the age-price profiles calculated from the regressions reported in the Appendix. For a discussion of the increasing size of the Abstract Expressionists' paintings over time, see Seitz (1955, pp. 231–43). There was a statistically significant and positive correlation for five of the artists in Table II who were born after 1920 – Kelly, Lichtenstein, Rivers, Noland, and Rauschenberg – while for two – Olitski and Poons – the correlation was significant and negative.
9. Although theoretically possible, this is unlikely, for reasons – explained below – having to do with the nature of the work that made these artists successful in the first place.
10. One of these books – Geldzahler (1969) – is not a text or a monograph, but rather an exhibition catalogue. It is included because the show was a particularly important one, the first major exhibit organized by the Metropolitan Museum's new Department of Contemporary Art, planned to celebrate the museum's centennial. On its significance, see Ratcliff (1996, p. 229).
11. The correlation between the two series in Table V is .51, significant at the .001 level.
12. For living artists, disagreement between auction valuations and retrospectives can result from the time lag between the execution of paintings and their appearance at auction. So for example the LeWitt retrospective summarized in Table IV gives considerable emphasis to works done at ages 60–64, i.e. executed during 1988–92. Of the 93 works by LeWitt in the auction, only 6 date from 1988 or later. The underrepresentation of recent work in auctions can therefore potentially result in a failure of the auction prices to reflect the latest developments in a living artist's career. When a living artist cooperates in arranging a retrospective, the opportunity to present new work that has not yet appeared on the market and is consequently not familiar to the public might also lead curators to give a greater emphasis to the artist's latest work.
13. E.g. see Greenberg (1986, pp. 221–25); Greenberg (1993a, pp. 113–19).
14. Fried (1965, pp. 5, 8).
15. Steinberg (1972, pp. 77–78). Henry Geldzahler used similar terms in a discussion of the evolution of New York art in the 1950s: "I think one of the ways to look at modernism is as a group research project, the way pure mathematics might be, so that the advances that are made in the

- field are advances that become available to everybody who's working in it"; de Antonio and Tuchman (1984, p. 79).
16. Fried (1965, p. 9).
 17. Greenberg (1993b, p. 300).
 18. Geldzahler (1969, pp. 28–29).
 19. Interestingly, the effects of the Depression on the artists considered here were not entirely negative. Gorky, Pollock, de Kooning, Baziotes, Rothko, Gottlieb, Guston, and others were among the thousands of artists employed by government programs. See Ashton (1972, pp. 44–51); Sandler (1970, pp. 5–7); McKinzie (1973).
 20. E.g. see Sawin (1995).
 21. E.g. see Geldzahler (1970, pp. 30–31); Ashton (1972, pp. 132, 168).
 22. O'Neill (1990, p. 305).
 23. On the growth of the market for contemporary art, and the effect on artists, see Crane (1987, pp. 1–11).
 24. Gottlieb (1954, p. 267).
 25. Rubin (1970, p. 41).
 26. Sandler (1978, pp. 59–62, 231); Ratcliff (1996, p. 200); Waldman (1977, p. 17).
 27. Greenberg (1993b, pp. 96–100).
 28. Fried (1965, pp. 13, 26).
 29. Ratcliff (1996, p. 220).
 30. Ratcliff (1996, pp. 131–32, 140); Greenberg (1993b, pp. 126–27).
 31. Rubin (1970, p. 12); Ratcliff (1996, pp. 235–36); Fried (1965, pp. 40–41).
 32. For a survey of these disciplines, see Simonton (1988, pp. 66–74).

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