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Art Prices and Race: Paintings by African American Artists and
Their White Contemporaries†

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Their White Contemporaries**

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ABSTRACT

In this paper we compare prices of oil paintings sold at auction from 1972 to 2004 for African American artists and their white contemporaries. It is widely documented by the art community that African American art has been under appreciated in America going back to the time of slavery. Along with the great strides made in the twentieth century towards racial equality in the U.S., African American art has become recognized in the national and international art scene with much focus from galleries, programs and exhibitions. Our interest is to investigate the extent that economic and financial markets have incorporated mainstream acceptance of African American art.

Painting prices for African American artists and their white contemporaries are compared using two statistical regimes. First uncontrolled comparisons are made for the two groups in the aggregate as well as for each African American artist versus their white contemporary. Average real prices are found to be significantly lower for African American artists throughout the time period in the aggregate as well as in almost every individual comparison. The second statistical framework controls for factors characterizing the painting and the auction sale in an hedonic regression model. Significant differences in price persist between the two groups. However structural changes occur within the 1972-2004 period which narrows the gap. A significantly higher rate of growth for prices of paintings by African American artists occurs throughout the time period. The price gap thus appears to be narrowing indicating a convergence of economic reality and artistic appreciation. In addition, the higher investment returns for paintings by African American artists made them a relatively profitable art niche in recent years and possibly for the future since economic values have not yet completely converged for the two groups.

I. INTRODUCTION

In this paper economic analysis is applied to a segment of the art market comprised of paintings by African American artists. African American art has been little appreciated by the art community until the 20th century. This lack of acceptance is likely the result of numerous factors including quality perceptions, style conformity, and racial prejudice. Regardless of the causes, the likely result has been for works by African American artists to be undervalued in the marketplace. This paper focuses on values for paintings of African American artists in comparison to those of contemporary non African American artists 1972 to 2004. Prices and rates of return are compared for the two groups in order to determine if systematic differences in value exist, and if the gap is narrowing or widening. To our knowledge there has been no formal empirical work done on economic values for paintings by African American artists.

African American artists and art historians have documented the enormous difficulties facing African Americans in the art world. For good historical summaries of these difficulties, see Lewis (1990) and Bearden and Henderson (1993). The history of African American artists is intertwined with that of slavery and its manifestations of inferiority and racial prejudice. African Americans were denied the privilege of personal expression under slavery. In addition the creative arts require knowledge of artistic traditions, prolonged study, and disciplined practice in technical skills, all of which were generally unavailable to slaves. Poverty and the isolation of rural living prevented access to implements such as tools, media, and models of the creative arts such as painting and sculpture (Bearden and Henderson, 1993). Both during and immediately after slavery African American art was often a reflection of the values and motifs of the dominant white society, and like many white artists of the time African American artists generally developed styles derived from European traditions. African American art forms were judged inferior and their cultural roots discredited by the white community (Lewis, 1990). After slavery was abolished, the situation did not change immediately since African Americans in general were preoccupied with economic survival and cultural acceptance was slow to form.

It was not until the early 20th century that self-expression and racial heritage began to take hold in the African American art community with both an internal and external change in attitudes (Lewis, 1990). The Harlem Renaissance of the 1920's reflected a movement by African Americans in many fields including artistic expression with African American artists Aenergetic participants in a cultural revolution...in search of cultural identity, self-discovery, and understanding≡ (Lewis, 1990). This has carried forward throughout the end of the 20th century with increased patronage of African American artists by the art community. Historians and art critics have come to appreciate the African American aesthetic as one that not only encompasses the spontaneous arts, music, and dance, but also more deliberate expressive forms such as paintings, sculpture, weaving and pottery (Lewis, 1990). African American artists are now evident on the national and international art scenes with special galleries around the U.S. and international exhibitions. The number of African American students in fine art programs has increased in the last half of the 20th century from practically zero to many thousands. African Americans are rapidly increasing the number of distinguished positions held in the fields of art criticism and art history (Lewis, 1990).

With the social, political, and economic climate likely improving for African Americans in the U.S. in the second half of the 20th century, it is reasonable to inquire to what extent financial art markets have reflected this surge in African American participation. Anecdotal evidence exists for differences in market appreciation between African American and white American artists with some observers claiming that African American art continues to be under represented, under appreciated and under valued in the art community. This paper attempts to document empirically with a large sample whether African American artists have been systematically under valued in the market, and whether this is changing. If in fact African American art is coming into its own economically and appreciating faster than the more general art market, it may be a good niche to be in for a collector also interested in financial success.

II. ECONOMIC PERFORMANCE FOR PAINTINGS

Economists have focused on numerous areas over the years which at first may seem to be outside their realm. One of the latest areas to be invaded by economists is art. Baumol's art economics paper, although not the first, received much attention with its characterization of art investment as a floating crap game (1986). Since his provocative work there has been a flurry of activity categorized in the literature as cultural economics with its own international organizations and academic journals. Economic studies have tried to document the profitability of investment in collectibles of all kinds including high end paintings and sculpture whose beauty endures for centuries to such things as wine whose bottles and labels may endure even though the taste may be fleeting. These examples illustrate the approach of the economist which is usually to focus on monetary values. Intrinsic value, artistic interpretation, acceptance, reputation, taste, etc. are still the realm of indigenous experts such as the art historian or wine connoisseur. Interestingly economists' findings on monetary values associated with art and artists may corroborate the views on intrinsic value and esteem determined by experts in the field such as art historians (Galenson, 2001).

Anecdotal evidence from some spectacular individual examples suggests that collectibles in general and art in particular represent lucrative forms of investment (Frey and Pommerehne, 1988). The more mundane scientific evidence is less enthusiastic with returns from art investment modest and often accompanied by high risk (for a review of the economic literature see Burton and Jacobsen, 1999; Ashenfelter and Graddy, 2003). The rate of return to art investment generally matches or exceeds inflation but lags that of stocks and bonds. In addition the variance of art returns tends to be much greater than stocks and bonds. These somewhat dismal results should not be surprising given the consumption benefit of art to the owner (Frey, 1997). The long-run real returns to holding art appear to be positive even when factoring in high costs of transacting and special risks inherent in fine art

such as fire, theft, maintenance, mutilation, forgeries, mistaken attribution (Frey and Pommerehne, 1988, 1989). Although not an overly attractive investment, art nevertheless may have appeal since few consumption goods retain real value over long periods. If art returns do not strongly positively covary with the returns of other assets, even those whose returns are both higher and less volatile, art can play a role in reducing the overall risk of a portfolio especially for wealthy investors seeking an outlet for excess liquidity (Ashenfelter and Graddy, 2003).

Exceptions or niches exist however with some styles, subject matter, time periods, and individual artists doing better than others (see Agnello, 2002; Mei and Moses, 2002; Edwards, 2004; Hodgson and Vorkink, 2004). Quality may play a role in profitability with economic returns varying systematically between high end (high quality) and low end items. Findings vary across studies. Some researchers find that high quality art does not generate higher returns (e.g. Mei and Moses, 2002) while others have found that high quality art is superior with higher returns and no more risk (Flores, Ginsburgh, Jeanfils, 1999; Agnello, 2002). In addition high end paintings may mimic a financial asset by conforming to the capital asset pricing model (CAPM) of modern finance somewhat better than low end works (Agnello, 2006).

III. DATA AND COMPARISONS

In order to analyze returns and risk for art purchases, measurement of the time series movement in prices is usually a starting point. Since art is not a homogeneous commodity traded in highly organized markets like stocks and bonds, price indices are not readily available. Individual prices from public auctions typically are used to develop general price indices since auction data are numerous, fairly representative, and readily available. In order to achieve as much homogeneity as possible we focus on prices of oil paintings for African American artists identified from <http://www.artcyclopedia.com>. Artists born between the year 1800 and World War II, and whose auction volume between 1972 and 2004 is at least 5 were used. Sixteen African American artists

comprise the group. The Art Sales Index CD (Hislop, 2004), compiled annually, was used to obtain the auction information. Each African American artist was assigned at least one contemporary white artist by considering similar style, age, and reputation. For some African American artists more than one contemporary was identified. **Table I** shows the artists included. The first contemporary listed is considered primary and the only one used in the regression analysis since the volume of transactions for white contemporaries far exceeds that of African American artists. Amalia Amaki, curator of the Paul R. Jones Collection of African American Art at the University of Delaware and contemporary African-American artist, has reviewed and verified each contemporary white artist. The variables used were extracted from the Art Sales Index, saved in text format, and reformatted into Excel using LabView software. See **Appendix 1** for a sample of the information utilized from the auction records. Since the original auction prices are nominal and cover a time period of over 30 years, it was necessary to convert to real prices before any meaningful analysis is performed. The CPI was used as the price deflator (see **Appendix 4** <http://minneapolisfed.org/Research/data/us/calc/hist1913.cfm>). All prices used in this paper are thus real prices measured with the chained base period (1982-1984) as 100.

Table 2 shows various sample statistics for the African American and contemporary groups. We observe that the mean real price for the oil paintings created by the African American artists is \$13,858. Mean prices for works of all and 1st contemporaries sell on average of \$71,630 and \$64,428 respectively, approximately five times that of African American works. At the individual artist level (shown in **Appendix 2**), we observe with few exceptions that works by African American artists command lower prices. In order to see if these average differences are indeed significant, the t-test is performed using the standard formula below:

$$t = (\text{Mean } X1 - \text{Mean } X2) \sqrt{\frac{\text{Var } X1}{N1} + \frac{\text{Var } X2}{N2}}$$

where X1 and X2 represent prices for African artists and their contemporaries respectively, Var represents variance and N1 and N2 are sample sizes for the two groups respectively. Degrees of freedom equal N1+N2-2 (http://www.socialresearchmethods.net/kb/stat_t.htm). **Table 3** shows these

results in both linear and logarithmic form (logs are used for regressions discussed later in the paper). The results are robust with respect to price transformation, and except for Horace Pippin, Romare Bearden, and Charles White, works by African American artists sold at significantly lower prices than those of their white contemporaries. The exceptions reflect African American artists who are well known relative to their white contemporaries. We note that even in the case of Horace Pippin, the most highly valued African American artist in our group, the mean price of \$62,404 is lower than the mean of \$71,630 for all white contemporary artists in the sample.

IV. REGRESSION METHODOLOGY

Although the mean comparisons reported are significant, factors other than race may be influencing the gross means and thus account for the differences. We account for additional heterogeneities with a regression framework which controls for differences in characteristics for each painting and auction transaction when comparing prices between African American and white artists. Using a general but separable linear model (see Ashenfelter and Graddy, 2003), we can differentiate prices between paintings and over time:

$$(1) \quad P_{it} = P_i + P_t + e_{it}$$

where P_i represents the fixed component of price unique to the object and independent of time, P_t represents the price component fluctuating over time, and e_{it} is a random error term. Two models generally used for P_i are the repeat-sales and hedonic models. Repeat-sale models introduce a dummy variable for each painting as a regression control whereas hedonic models assume that P_i is determined by a small set of characteristics (X_i) of a painting and conditions of the sale. The repeat sales regression methodology developed by Bailey, Muth, and Nourse (1963) has the advantage of controlling for the item when observing temporal price movements. A disadvantage is that only items

subject to multiple sale can be used, and thus a large number of transactions are needed and potentially useful information is ignored. Theoretical details in applying the repeat sale regression model to art can be found in Chanel et. al. (1996). Empirical applications can be found in Baumol (1986) for old masters, Pesando (1993) for modern prints, and Mei and Moses (2002) for American, old masters, and impressionists.

Given the limited number of observations on African American artists, we employ and hedonic framework in this paper. In an hedonic framework transactions of different works are pooled together in a multiple regression equation. In this way a much larger set of objects can be included in the analysis. Developed initially to construct price indices for automobiles and housing with different characteristics, hedonic price models have been used extensively in many other areas including art. When determining value, hedonic models control for the presence of characteristics either intrinsic to the asset or surrounding its sale. When applied to large samples hedonic models provide accurate estimates for the marginal effects (sometimes termed shadow values) of characteristics surrounding each sales transaction. Hedonic models generally yield coefficient estimates that have more reliability (i.e. smaller standard deviation) than those from repeat sales (Chanel et. al., 1996). Applications of the hedonic price model to various art portfolios go back to Anderson (1974) and are summarized in Ashenfelter and Graddy (2003).

In this paper a log linear model for price is employed:

$$(2) \quad \text{Ln}P_{it} = a + BX_i + \gamma t + u_i \quad i = 1 \dots n$$

where $\text{Ln}P_{it}$ is log real price of painting i in time period t , $a + BX_i$ represents the systematic portion of price accounted for by the vector of independent variables, X_i characterizing the particular painting or auction environment, γt represents a global growth relationship of price over time, and u_i is an aggregate random error. Given the limited number of observations available for each year, we use a

simple form, β_t , for the systematic portion of P_t . This generates a long run average rate of return (β), instead of annual price indices, and thus short run rates of return (see Agnello and Pierce, 1996). β is simply an estimate for the average (global) rate of return for the entire time frame. B represents a vector of marginal values associated with painting and auction characteristics X_i . Characteristics of paintings available in the auction records are discussed in section V below. The log framework provides a useful normalization for the data since the frequency distributions for paintings are generally found to have long tails due to a few very valuable works.

V. Hedonic Regression Results

Hedonic regressions using alternative data groupings and specifications of independent variables characterizing the painting and auction are tested on the data. The results, presented in **Tables 4** and **5** employ the following definitions: “All” refers to auction records combined for African American artists and their first contemporary artists from **Table 1**; “African” refers to only auction records of African American artists from **Table 1**; “Contemporary” refers to only auction records of first contemporary artists from **Table 1**. The variables Time, Size, Size Square, Illustrated, and Auctioneer are the core set of variables used in all regressions. Time is the auction year, set = 0 for 1972 and increasing by one each year. Size is the product of painting height and width in inches. Size Square is the square of Size. Illustrated and Auctioneer are (0,1) dummy variables. Illustrated = 1 when the painting is illustrated in the auction catalog. Auctioneer = 1 when the auction takes place at either Sotheby’s or Christie’s, the largest and most well known auction houses in the world. For some analyses the data are divided into two periods, early (1972-1989) and late (1990-2004), in order to test for structural changes in the prices. 1990 divides the data equally between the sub periods and was a turning point in US economy and the US art market (see Agnello, 2002).

Below is the core model for the hedonic regressions which includes all of the useable characteristic variables from the auction records for each painting sold. Lot number was not used since the total number of lots in each auction is not reported.

$$(3) \quad \text{LnP} = a + \beta \cdot \text{Time} + b_1 \cdot \text{Size} + b_2 \cdot \text{Size Square} + b_3 \cdot \text{Illustrated} + b_4 \cdot \text{Auctioneer}$$

As indicated earlier the Time coefficient in the equation above represents the average rate of return over the time period of estimation. The Illustrated and Auctioneer coefficients may reflect potential demand enhancing elements in marketing the painting at auction. However, since only the highest quality (price) paintings generally get chosen by major auctioneer houses and in turn illustrated in their catalogs, these variables likely proxy quality (see Agnello, 2002 for more on this point). Painting selection by the major auction houses thus may prevent precise estimation of the marketing impacts of auction house and illustrated. Including these variables as controls in the regression however is deemed useful since it allows for more accuracy in estimating other coefficients. Since size requires more time and effort to accomplish, larger works will likely command higher prices for the same quality. The variable size squared is one way to investigate whether the size effect on price is linear, and has the advantage of a simple test for nonlinearity since the linear size model is nested within the quadratic.

In **Table 4** are presented the results for the hedonic model estimated separately for distinct time periods and artist groupings including All, African and Contemporary records. The regression results show that most coefficients are significant and that the model fits better for late years than for early years with R Square increasing from an average of 26% for early years to 35% for late years. For all time periods, the intercepts for white contemporaries are higher than those for African American artists. Using the whole period (1972-2004), the intercept for African American artists is 6.7157 or \$825 (exp (6.7157)) whereas the intercept for the white contemporaries is 7.3746 or \$1595. Thus without considering other factors such as auction date, size, illustrated and auctioneer, the average price for

works of African American artists is about half that of white contemporaries. This supports the uncontrolled findings shown earlier in **Tables 2 and 3**. The time coefficients reveal several interesting results. Throughout the 1972-2004 period, African American artists experienced a positive and significant real rate of return of 3.98%, while their white contemporaries experienced a slightly negative rate of return -0.7%. Higher returns for African American artists persist for the sub periods as well. In early years, the real return for oil paintings by white contemporaries was -4.27%, while the rate of return for African American artists was slightly positive (0.09%). In late years, both groups have positive annual rate of returns, but the return for African American artists (9.95%) is more than 3 times that for white contemporaries (3.06%).

The cumulative effect of higher African American returns is revealed in the narrowing differences in intercepts (a) between the two artist groups for the two time periods. In the early time period the intercepts (Ln\$) are 6.8462 and 7.9639 for African American and white artists respectively whereas for the late years the intercepts are 5.2302 and 5.9983 respectively. In dollars (exp a) the intercepts are \$940 and \$2875 respectively for African American artists and their white contemporaries in the early period and \$187 and \$403 in the late period respectively. The gap thus narrows although prices are still lower for African American artists.

Size has significant statistical effects but small actual effects on price. Size square coefficients are negative and statistically significant but also small. Size thus has positive effects initially and negative effects eventually. Using the size and size squared coefficients (0.0008 and -4.2E-08 respectively) for all painters and the whole data period, we calculate that the eventual negative impact on Ln Price does not set in until a painting reaches a size of 9526 squared inches. Since the average and maximum sizes for the data are 714 and 22420 squared inches respectively, we conclude the diminishing returns to size set in only for extremely large sized works. Whether a painting was sold at the major auction houses, and whether it was illustrated in their catalogs has a strong association with auction price. For the whole period and all painters, being illustrated in the auction catalog increases

the intercept of LnPrice by 0.6085 and thus price by \$1421. For paintings sold at Sotheby's or Christie's auction houses, the intercept of the LnPrice regression rises by 1.1779 and thus price by \$3812. In late years, these two effects have changed somewhat for the various groups. For African American artists, catalog illustration coefficients weaken from early to late years from 0.7424 to 0.4072, whereas auctioneer effects increase from 0.7895 to 1.1022. For white contemporary artists, both effects have strengthened. As noted earlier, illustration and auctioneer controls in the regression do not necessarily reveal structural effects since the exogeneity of these variables is questionable. Thus we might interpret at least part of the price increases associated with these variables as a ratification of expected higher values by the major auctions house for paintings found in their catalogs.

Since the primary focus of this paper is to compare prices and returns of African American artists with their white contemporaries rather than compare size, illustrated, and auctioneer effects between these groups, we restructure the statistical framework to focus on this narrower task. As an alternative to **Table 4**, where the regressions are performed separately for each racial group and time period, we now investigate racial and temporal changes within a single regression by introducing additional dummy variables to reflect race and time period. The basic hedonic model in equation (3) is structured to reflect changes in only Ln price and rate of return from one regime to another. The regimes of interest are race (African American versus their contemporaries) and time frame (early versus late years). The dummy variables "African" and "Late" are defined as (0,1) for paintings from African American artists and auctions after 1989 respectively. The variable T-17 represents variable Time minus 17. Eqs. 4a through 6b show the various hedonic pooled regressions estimated.

$$(4a) \text{ LnP} = a + ? * \text{Time} + b1 * \text{Size} + b2 * \text{Size Square} + b3 * \text{Illustrated} + b4 * \text{Auctioneer} + b5 * \text{African}$$

$$(4b) \text{ LnP} = a + ? * \text{Time} + b1 * \text{Size} + b2 * \text{Size Square} + b3 * \text{Illustrated} + b4 * \text{Auctioneer} + b5 * \text{African} + b6 * \text{Afr} * \text{Time}$$

$$(5a) \text{ LnP} = a + ? * \text{Time} + b1 * \text{Size} + b2 * \text{Size Square} + b3 * \text{Illustrated} + b4 * \text{Auctioneer} + b5 * \text{Late} + b6 * \text{Late} * \text{Time}$$

$$(5b) \text{ LnP} = a + ? * \text{Time} + b1 * \text{Size} + b2 * \text{Size Square} + b3 * \text{Illustrated} + b4 * \text{Auctioneer} + b5 * \text{Late} * (T-17)$$

$$(6a) \text{ LnP} = a + ? * \text{Time} + b1 * \text{Size} + b2 * \text{Size Square} + b3 * \text{Illustrated} + b4 * \text{Auctioneer} + b5 * \text{African} + b6 * \text{Afr} * \text{Time} + b7 * \text{Late} * (T-17)$$

$$(6b) \text{ LnP} = a + ? * \text{Time} + b1 * \text{Size} + b2 * \text{Size Square} + b3 * \text{Illustrated} + b4 * \text{Auctioneer} + b5 * \text{African} + b6 * \text{Afr} * \text{Time} + b7 * \text{Late} * (T-17) + b8 * (T-17) * \text{Late} * \text{Afr}$$

The Ln Price equation for a particular group can be found by adjusting the intercept and rate of return (i.e. time) coefficient for the appropriate additive and interactive effects respectively. In equation 4a the term (b5*African) allows the intercept to shift from (a) for white contemporary artists to (a + b5) for paintings of African American artists. In equation 4b both the intercept (a) and rate of return (?) are allowed to change from paintings of contemporary white artists to works of African American artists. Equations 5a and 5b allow for subperiod differences in the intercept and rate of return. In equation 5a both the intercept and time slope can change abruptly from early to late years. In equation 5b, which is sometimes referred to as a spline (see Gujarati, 2003), the time slope can change

after 1989, but the equation does not abruptly shift. Since no cataclysmic event occurred between 1989 and 1990, equation 5b may be more appropriate. Equations 6a and 6b introduce both race and sub period effects using the spline model. In equation 6a the spline approach to early and late effects is added to equation 4b, but this effect is not allowed to vary by race of the artist. In equation 6b the effect of race extends to both the early and late time slope, and thus the rate of return can change across race.

In order to facilitate comparison, the base pooled model from **Table 4** is shown again in the first column of **Table 5** (3 all). Here no allowance for differences across race and time periods is allowed. The remaining columns in **Table 5** show the effects of relaxing various restrictions in the base model by allowing the intercept and/or time slope (rate of return) to change by race and time period. These models explain 28% to 30% of the regression variance. Although the less restrictive models add only marginally to overall explanatory power, they do show significant differences across race and time periods. The coefficients of the variables Size, Size Square, Illustrated, and Auctioneer are little affected by model specification and remain significant under all model variants. An exception is the coefficient for the variable Illustrated which increases from around 0.6 to almost 0.8 when late controls are introduced. This increase is unaffected by the spline approach.

We now focus on each restriction removed from the base model (3 all). For model 4a where rates of return are restricted to be the same for both races, we see a significant drop in the intercept (-.3663) for works of African American artists. In model 4b, however, we see a larger intercept decline (-1.308) for works of African American artists when rates of return are allowed to differ by race. In this period African American artists had a significantly higher rate of return (4.69%) than their white contemporaries. In models 3 and 4a we see no growth in prices for paintings of white contemporary artists and African American artists when the two groups are lumped together. But in model 4b where the two groups are separated with respect to price growth, we see that there has been a 4% increase in annual return for African American artists over white contemporaries (-.0069 + .0469) per year.

Model 5a allows for both an intercept shift and change in time slope to occur in 1990 while model 5b allows for only a time slope change in 1990. The results for these models are quite similar. Both models show significant increases in annual price growth of over 7% after 1989 thus changing growth from negative to positive in the two time periods. In models 6a and 6b we allow for both race and sub period to affect price appreciation of paintings. In model 6a we see that African American artists exhibit a higher growth rate in price (4.11%) over their white contemporaries. Both groups again exhibit a higher growth rate (6.92%) after 1989. In model 6b the higher price appreciation for African American artists is disaggregated between the sub periods. We see a 2.45% and 2.88% increase in African American returns over their white contemporaries for the early and late sub periods respectively. Returns to African American artists thus accelerate slightly over their white contemporaries after 1989. However since these late period return disaggregations by race are not significant (P-value of 0.36 and 0.50 for early and late periods respectively), we prefer the more parsimonious specification of model 6a. In **Table 6** the findings from the pooled regression are summarized using the results of model 6a. We focus only on the intercept and time coefficients which are impacted by the race and sub period controls introduced into model 6a.

Paintings by African American artists experience a downward shift in the intercept of the Ln Price regression from 7.822 to 6.6294 or from \$2,495 to \$757 in dollars. The difference of \$1,738 confirms the earlier findings which show that works of white American artists command higher prices than those of African American artists. The bright side for African American artists lies in the growth in prices over time. For white contemporaries the early sub period reveals significantly negative growth (-4.37%) with improvement in the late years to +2.55%. For African American artists the early sub period price growth was 4.11% higher than white contemporaries and close to zero (-0.26%). For the late years African American paintings appreciated by 6.66% per year. Based on Model 6a, African American artists will take about 29 years ($1.19/0.04$) to catch up with their white contemporaries in oil painting prices.

African American painting returns compare well with traditional financial markets after 1989. For the period of 1990-2004, the annual nominal rate of return for S&P500 Index was 10.94%, the annual nominal rate of return for Lehman Aggregate Bond Index (a blend of long and short term bonds) was 7.70% (<http://cisdm.som.umass.edu/research/pdffiles/benefitsofprivateinvestment.pdf>), and the average compounded CPI inflation rate was 2.8% (see **Appendix4**). In the late period the 6.66% annual real return makes African American paintings a fairly attractive investment when compared to stocks and bonds which averaged 8.14% and 4.9% respectively.

VI. Conclusions

In this paper, the price performance for oil paintings by a well known group of African American artists is compared to that of their white contemporaries using various statistical frameworks. All analyses reveal the same general observation. For oil paintings sold at auction between 1972 and 2004, average prices for African American artists were lower than their white contemporaries. Rates of return in early years (1972-1989) were low for both groups, but increased significantly in late years (1990-2004). However, rates of return were higher for African American artists in both periods. Therefore, we can say that although prices are lower for African American artists, the gap is narrowing. Determining whether this shift is the result of declining racial prejudice, evolving artistic appreciation, fads or changing demographic and income factors are interesting questions to investigate for future research.

Table 1 Artist Summary

Artist Name	Lifespan	Sample Size	Contemporary White Artist	Lifespan	Sample Size
Robert Scott Duncanson	1821-1872	39	George Inness	1825-1894	345
			Thomas Cole	1801-1848	45
Edward M. Bannister	1828-1901	33	Frederic E. Church	1826-1900	70
Charles Porter	1847 -1923	15	John F. Francis	1808-1886	122
Henry Ossawa Tanner	1859-1937	33	Thomas Eakins	1844-1916	38
William Edouard Scott	1884-1964	15	Everett Shinn	1876-1953	98
			Robert Henri	1865-1929	255
			Winslow Homer	1836-1910	44
Horace Pippen	1888-1946	14	Earl Cunningham	1893-1977	8
Alma W. Thomas	1891 -1978	15	Barnett Newman	1905-1970	18
			James Rosenquist	1933-	106
Beauford Delaney	1901-1979	12	Philip Guston	1913-1980	88
			John Marin	1870-1953	29
Allan Rohan Crite	1910-	7	Charles Woodbury	1864-1940	175
Romare Bearden	1914-1988	15	George Grosz	1893-1959	156
			Stuart Davis	1894-1964	52
Hughie Lee-Smith	1915-2000	34	Joseph Hirsch	1910-1981	56
			Edward Hopper	1882-1967	21
Jacob Lawrence	1917-2000	24	Stuart Davis	1894-1964	52
			Arthur Dove	1880-1946	41
Charles White	1918-1979	5	Moses Soyer	1899-1974	239
			Joe Jones	1909-1963	37
Benny Andrews	1930-	6	Ben Shahn	1899-1969	64
Sam Gilliam	1933-	12	Robert Rauschenberg	1925-	54
Bob Thompson	1937-1966	36	Lyonel Feininger	1871-1956	124
			Jan Muller	1922-1958	6

Table 2 Statistical Summary for Prices

	Descriptive Statistics	African and All Contemporary	African	All Contemporary	1st Contemporary
Real Price	Mean	64,647	13,858	71,630	64,428
	Median	10,426	4,984	11,507	9,447
	Standard Deviation	239,113	31,998	253,960	264,146
	Minimum	205	462	205	222
	Maximum	6,048,387	308,099	6,048,387	6,048,387
	Count	2,606	315	2,291	1,707

Table 3 t-test for Mean Differences

Comparison		T-value for Real Price	Significance Level	T-value for Ln Real Price	Significance Level
African	All Contemporary	-10.31	99.00%	-10.05	99.00%
African	1st Contemporary	-7.61	99.00%	-7.46	99.00%
Robert Duncanson	George Inness	-0.83	Below 80%	-2.16	95.00%
Robert Duncanson	Thomas Cole	-3.09	99.00%	-3.81	99.00%
Edward M. Bannister	Frederic E. Church	-2.60	98.00%	-10.02	99.00%
Charles Porter	John F. Francis	-5.70	99.00%	-4.47	99.00%
Henry Ossawa Tanner	Thomas Eakins	-1.92	90.00%	-5.50	99.00%
William Edouard Scott	Everett Shinn	-1.67	90.00%	-2.91	99.00%
William Edouard Scott	Robert Henri	-7.41	99.00%	-4.06	99.00%
William Edouard Scott	Winslow Homer	-7.12	99.00%	-11.03	99.00%
Horace Phippen	Earl Cunningham	2.25	95.00%	2.15	95.00%
Alma W. Thomas	Barnett Newman	-3.82	99.00%	-7.58	99.00%
Alma W. Thomas	James Rosenquist	-5.29	99.00%	-3.01	99.00%
Beauford Delaney	Philip Guston	-5.47	99.00%	-8.62	99.00%
Beauford Delaney	John Marin	-3.20	99.00%	-4.85	99.00%
Allan Rohan Crite	Charles Woodbury	-0.87	Below 80%	-0.37	Below 80%
Romare Bearden	George Grosz	-0.49	Below 80%	3.13	99.00%
Romare Bearden	Stuart Davis	-3.22	99.00%	-4.60	99.00%
Hughie Lee-Smith	Joseph Hirsch	-0.40	Below 80%	-1.17	Below 80%
Hughie Lee-Smith	Edward Hopper	-3.50	99.00%	-7.75	99.00%
Jacob Lawrence	Stuart Davis	-3.00	99.00%	-4.28	99.00%
Jacob Lawrence	Arthur Dove	-3.75	99.00%	-4.72	99.00%
Charles White	Moses Soyer	0.42	Below 80%	0.09	Below 80%
Charles White	Joe Jones	-0.27	Below 80%	0.31	Below 80%
Benny Andrews	Ben Shahn	-4.65	99.00%	-4.57	99.00%
Sam Gilliam	Robert Rauschenberg	-4.29	99.00%	-10.85	99.00%
Bob Thompson	Lyonel Feininger	-7.11	99.00%	-17.91	99.00%
Bob Thompson	Jan Muller	-1.36	80.00%	-0.78	Below 80%

Table 4 Hedonic Regression Results for Data Stratified by Race and Time Period
(P-values for coefficients in parenthesis)

Data Pool	a	Time	Size	Size Square	Illus- trated	Aucti- oneer	R Square	F
<u>Whole Period (1972-2004)</u>								
All (n=2022)	7.436 (0)	-0.0028 (-0.51)	0.0008 (0)	-4.2E-08 (0)	0.6085 (0)	1.1779 (0)	0.28	158.3
African (n=315)	6.7157 (0)	0.0398 (0)	0.0003 (-0)	-1.8E-08 (0.0002)	0.4755 (0.01)	1.0314 (0)	0.27	22.6
Contemporary (n=1707)	7.3746 (0)	-0.007 (0.14)	0.0011 (0)	-9.1E-08 (0)	0.6621 (0)	1.1623 (0)	0.30	145.7
<u>Early Years (1972-1989)</u>								
All (n=1006)	7.931 (0)	-0.041 (0.)	0.0011 (0)	-9.8E-08 (0)	0.7043 (0)	0.748 (0)	0.24	63.4
African (n=100)	6.8462 (0)	0.0009 (0.98)	0.0014 (0)	-3.5E-07 (0.0004)	0.7424 (0.02)	0.7895 (0)	0.28	7.3
Contemporary (n=906)	7.9639 (0)	-0.0427 (0)	0.0012 (0)	-1.1E-07 (0)	0.711 (0)	0.7519 (0)	0.25	61.4
<u>Late Years (1990-2004)</u>								
All (n=1016)	6.034 (0)	0.0428 (0)	0.0007 (0)	-3.6E-08 (0)	0.802 (0)	1.4605 (0)	0.35	106.6
African (n=215)	5.2302 (0)	0.0995 (0)	0.0003 (0.01)	-1.5E-08 (0.0024)	0.4072 (0.04)	1.1022 (0)	0.35	22.8
Contemporary (n=801)	5.9983 (0)	0.0306 (0.02)	0.001 (0)	-8E-08 (0)	1.0166 (0)	1.463 (0)	0.36	90.5

**Table 5 Hedonic Regression Results from Pooled Data
(P-value for coefficients in parenthesis)**

Variables	Models						
	3 (all)	4a	4b	5a	5b	6a	6b
Intercept	7.436 (0.00)	7.4905 (0.00)	7.5721 (0.00)	7.6971 (0.00)	7.7198 (0.00)	7.822 (0.00)	7.8056 (0.00)
Time	-0.0028 (0.51)	-0.0006 (0.89)	-0.0069 (0.13)	-0.0396 (0.00)	-0.0438 (0.00)	-0.0437 (0.00)	-0.0418 (0.00)
Size	0.0008 (0.00)	0.0008 (0.00)	0.0008 (0.00)	0.0008 (0.00)	0.0008 (0.00)	0.0008 (0.00)	0.0008 (0.00)
Size Square	-4.2E-08 (0.00)	-4.2E-08 (0.00)	-4.3E-08 (0.00)	-4.2E-08 (0.00)	-4.2E-08 (0.00)	-4.3E-08 (0.00)	-4.3E-08 (0.00)
Illustrated	0.6085 (0.00)	0.5862 (0.00)	0.606 (0.00)	0.7809 (0.00)	0.794 (0.00)	0.7733 (0.00)	0.7697 (0.00)
Auctioneer	1.1779 (0.00)	1.1479 (0.00)	1.166 (0.00)	1.1622 (0.00)	1.1607 (0.00)	1.1479 (0.00)	1.148 (0.00)
African		-0.3663 (0.00)	-1.308 (0.00)			-1.1926 (0.00)	-1.0131 (0.00)
Afr * Time			0.0469 (0.00)			0.0411 (0.00)	0.0245 (0.36)
Late				-1.41 (0.00)			
Late * Time				0.0772 (0.00)			
(T-17) * Late					0.0756 (0.00)	0.0692 (0.00)	0.0653 (0.00)
(T-17) * Late * Afr							0.0288 (0.50)
R Square	0.28	0.29	0.29	0.29	0.29	0.30	0.30
F	158.30	135.61	119.75	117.89	137.47	108.33	96.32
N	2022	2022	2022	2022	2022	2022	2022

Table 6 Summary for Model 6a

	Intercept	Time Slope (Rate of Growth)
African American Artists		
Early Period	6.6294 (=7.822 – 1.1926)	-0.0026 (= - 0.0437 + 0.0411)
Late Period	6.6294 (=7.822 – 1.1926)	0.0666 (= - 0.0437 + 0.0411 + 0.0692)
White Contemporaries		
Early Period	7.822	- 0.0437
Late Period	7.822	0.0255 (= - 0.0437 + 0.0692)

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Appendix 1 Sample Records for One Artist from the Art Sales Index

Artist	Title	Type	Create Date	Auction Date	Dollar Price	Low Estimate	High Estimate	Picture Detail	Height Inch	Width Inch	Illustrated	Auctioneer	Lot Number
ANDREWS, Benny (1930-)	Adam and Eve	Works on paper	N/A	24-June-2002	4750	N/A	N/A	signed. mixed media oil on panel	24	18	No	Winter Associates	124
ANDREWS, Benny (1930-)	Bird	Works on paper	1964	30-March-1996	2000	N/A	N/A	signed.dated.1964 collage	25	18	No	Mystic Fine Arts	80
ANDREWS, Benny (1930-)	Covetousness	Oil Painting	1964	12-September-2003	6500	N/A	N/A	signed. signed.dated.64 verso oil masonite	24	18	illustrated	Skinner	545
ANDREWS, Benny (1930-)	Crow	Oil Painting	1864	22-February-1990	1100	N/A	N/A	signed.dated.1864	24	18	No	Mystic Fine Arts	188
ANDREWS, Benny (1930-)	Early bird	Works on paper	1989	7-May-1990	850	N/A	N/A	signed.dated.1989 signed.inscribed.dated.verso collage	30	22	illustrated	Christie's, East	193
ANDREWS, Benny (1930-)	Emil Arnold, study	Oil Painting	1966	9-March-2000	1700	US.D 1000	US.D 1500	signed.dated.1966 signed.inscribed.dated.verso	17	15	illustrated	Swann Galleries	668
ANDREWS, Benny (1930-)	Eva	Works on paper	1977	6-October-1987	900	N/A	N/A	signed.dated.77 signed.dated.verso oil fabric collage	32	44	illustrated	Sotheby's	327
ANDREWS, Benny (1930-)	He Man	Oil Painting	1968	17-November-1998	2400	US.D 800	US.D 1200	signed.dated.68 signed.inscribed.dated.verso oil fabric	16	13	illustrated	Doyle	43
ANDREWS, Benny (1930-)	Portrait of a man wearing glasses	Works on paper	1961	24-June-2002	6000	N/A	N/A	signed.dated.1961 verso mixed media collage	16	13	No	Winter Associates	123
ANDREWS, Benny (1930-)	Portrait of a Puerto Rican	Works on paper	N/A	24-September-1992	750	N/A	N/A	collage board	12	8	No	Mystic Fine Arts	119
ANDREWS, Benny (1930-)	Portraits of men	Works on paper	1961	24-June-2002	1150	N/A	N/A	signed.dated.1961 pen drawing. two	19	12	No	Winter Associates	119
ANDREWS, Benny (1930-)	Spirit. Landscape Isle	Works on paper	1970	28-September-1994	1000	N/A	N/A	signed.inscribed.dated	12	9	No	Sotheby's	458

								d. one signed.dated.1970 oil fabric					
ANDREWS, Benny (1930-)	Thinker	Oil Painting	1968	17-November- 1998	2200	US.D 800	US.D 1200	signed.dated.68 signed.inscribed.date d.verso oil fabric	16	12	illustr ated	Doyle	44
ANDREWS, Benny (1930-)	Watchers	Oil Painting	1969	7-October- 1986	4000	N/A	N/A	signed.dated.1969 signed.dated.verso	48	96	illustr ated	Sotheby's	213
ANDREWS, Benny (1930-)	Woman with a hat	Works on paper	N/A	6-October- 1987	1200	N/A	N/A	oil cut canvas collage	21	17	illustr ated	Sotheby's	329

Appendix 2 Summary Statistics for Prices by Artist

	Statistics	Robert Duncanson	George Inness	Thomas Cole
Real Price	Mean	21377	27247	122671
	Median	7530	12560	29369
	Standard Deviation	40405	53430	215233
	Minimum	692	660	555
	Maximum	174577	685484	866218
	Count	39	345	45
	Ln Real Price	Mean	9	9
Median		9	9	10
Standard Deviation		1	1	2
Minimum		7	6	6
Maximum		12	13	14
Count		39	345	45
			Edward M. Bannister	Frederic E. Church
Real Price	Mean	6531	285462	
	Median	4361	45816	
	Standard Deviation	6495	897286	
	Minimum	561	1687	
	Maximum	25014	6048387	
	Count	33	70	
	Ln Real Price	Mean	8	11
Median		8	11	
Standard Deviation		1	2	
Minimum		6	7	
Maximum		10	16	
Count		33	70	

		Charles Porter	John F. Francis
Real Price	Mean	3804	17441
	Median	3001	10940
	Standard Deviation	2956	25038
	Minimum	784	222
	Maximum	9820	193548
	Count	15	122
Ln Real Price	Mean	8	9
	Median	8	9
	Standard Deviation	1	1
	Minimum	7	5
	Maximum	9	12
	Count	15	122
		Henry Ossawa Tanner	Thomas Eakins
Real Price	Mean	20380	180969
	Median	5282	49871
	Standard Deviation	50514	512181
	Minimum	1100	1186
	Maximum	275028	2611534
	Count	33	38
Ln Real Price	Mean	9	11
	Median	9	11
	Standard Deviation	1	2
	Minimum	7	7
	Maximum	13	15
	Count	33	38

		William Edouard Scott	Everett Shinn	Robert Henri	Winslow Homer
Real Price	Mean	6055	37412	28360	479837
	Median	4910	10198	14681	386630
	Standard Deviation	5473	185231	42438	441454
	Minimum	552	734	311	205
	Maximum	23053	1834352	369718	2063107
	Count	15	98	255	44
Ln Real Price	Mean	8	9	9	12
	Median	8	9	10	13
	Standard Deviation	1	1	1	2
	Minimum	6	7	6	5
	Maximum	10	14	13	15
	Count	15	98	255	44
		Horace Pippen	Earl Cunningham		
Real Price	Mean	62404	11364		
	Median	29803	12273		
	Standard Deviation	84060	7897		
	Minimum	1166	1597		
	Maximum	308099	21325		
	Count	14	8		
Ln Real Price	Mean	10	9		
	Median	10	9		
	Standard Deviation	2	1		
	Minimum	7	7		
	Maximum	13	10		
	Count	14	8		

		Alma W. Thomas	Barnett Newman	James Rosenquist
Real Price	Mean	17895	639384	51561
	Median	15003	309357	31504
	Standard Deviation	13366	689470	55073
	Minimum	954	28053	986
	Maximum	51828	1945525	338123
	Count	15	18	106
Ln Real Price	Mean	9	13	10
	Median	10	13	10
	Standard Deviation	1	1	1
	Minimum	7	10	7
	Maximum	11	14	13
	Count	15	18	106
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		Beauford Delaney	Philip Guston	John Marin
Real Price	Mean	6382	114573	57516
	Median	5789	40887	26769
	Standard Deviation	4227	185247	85849
	Minimum	1123	3961	1104
	Maximum	13780	987890	361312
	Count	12	88	29
Ln Real Price	Mean	9	11	10
	Median	9	11	10
	Standard Deviation	1	1	1
	Minimum	7	8	7
	Maximum	10	14	13
	Count	12	88	29

		Allan Rohan Crite	Charles Woodbury			
Real Price	Mean	1925	2659			
	Median	1687	1433			
	Standard Deviation	1856	6097			
	Minimum	613	381			
	Maximum	5874	60484			
	Count	7	175			
Ln Real Price	Mean	7	7			
	Median	7	7			
	Standard Deviation	1	1			
	Minimum	6	6			
	Maximum	9	11			
	Count	7	175			
<hr/>						
		Romare Bearden	George Grosz	Stuart Davis		
Real Price	Mean	17591	22328	119172		
	Median	11614	8410	43028		
	Standard Deviation	13382	113555	226266		
	Minimum	4984	818	1673		
	Maximum	45018	1300829	1370717		
	Count	15	156	52		
Ln Real Price	Mean	10	9	11		
	Median	9	9	11		
	Standard Deviation	1	1	1		
	Minimum	9	7	7		
	Maximum	11	14	14		
	Count	15	156	52		

		Hughie Lee-Smith	Joseph Hirsch	Edward Hopper
Real Price	Mean	4549	5055	416457
	Median	2394	3245	316804
	Standard Deviation	6350	4837	538712
	Minimum	570	334	3043
	Maximum	28511	19802	1848592
	Count	34	56	21
Ln Real Price	Mean	8	8	12
	Median	8	8	13
	Standard Deviation	1	1	2
	Minimum	6	6	8
	Maximum	10	10	14
	Count	34	56	21
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		Jacob Lawrence	Stuart Davis	Arthur Dove
Real Price	Mean	22966	119172	102115
	Median	14193	43028	45045
	Standard Deviation	32053	226266	128647
	Minimum	1036	1673	4723
	Maximum	158211	1370717	598477
	Count	24	52	41
Ln Real Price	Mean	9	11	11
	Median	10	11	11
	Standard Deviation	1	1	1
	Minimum	7	7	8
	Maximum	12	14	13
	Count	24	52	41

		Charles White	Moses Soyer	Joe Jones
Real Price	Mean	2701	2242	3146
	Median	2159	1699	1161
	Standard Deviation	2422	1956	7471
	Minimum	462	306	381
	Maximum	6410	15845	45907
	Count	5	239	37
Ln Real Price	Mean	7	7	7
	Median	8	7	7
	Standard Deviation	1	1	1
	Minimum	6	6	6
	Maximum	9	10	11
	Count	5	239	37
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		Benny Andrews	Ben Shahn	
Real Price	Mean	1974	20503	
	Median	1411	8281	
	Standard Deviation	1279	31603	
	Minimum	842	528	
	Maximum	3650	202703	
	Count	6	64	
Ln Real Price	Mean	7	9	
	Median	7	9	
	Standard Deviation	1	2	
	Minimum	7	6	
	Maximum	8	12	
	Count	6	64	

		Sam Gilliam	Robert Rauschenberg			
Real Price	Mean	2309	93094			
	Median	1921	27572			
	Standard Deviation	1540	155404			
	Minimum	667	1353			
	Maximum	6068	651408			
	Count	12	54			
Ln Real Price	Mean	8	10			
	Median	8	10			
	Standard Deviation	1	1			
	Minimum	7	7			
	Maximum	9	13			
	Count	12	54			
<hr/>						
		Bob Thompson	Lyonel Feininger	Jan Muller		
Real Price	Mean	6690	233382	13069		
	Median	4096	100349	11149		
	Standard Deviation	5425	354777	11242		
	Minimum	1640	1676	982		
	Maximum	21123	2126783	27414		
	Count	36	124	6		
Ln Real Price	Mean	9	12	9		
	Median	8	12	9		
	Standard Deviation	1	1	1		
	Minimum	7	7	7		
	Maximum	10	15	10		
	Count	36	124	6		

Appendix 3 Summary Statistics for Variables

Variables	Statistics	African and All Cont.	African and First Cont.	African	All Cont.	First Cont.
Real Price (Pr)	Mean	64647	56550	13858	71630	64428
	Median	10426	8343	4984	11507	9447
	Standard Deviation	239113	243708	31998	253960	264146
	Minimum	205	222	462	205	222
	Maximum	6048387	6048387	308099	6048387	6048387
	Count	2606	2022	315	2291	1707
Ln(Pr)	Mean	9	9	9	9	9
	Median	9	9	9	9	9
	Standard Deviation	2	2	1	2	2
	Minimum	5	5	6	5	5
	Maximum	16	16	13	16	16
	Count	2606	2022	315	2291	1707
Time (T0=1972)	Mean	17	18	21	17	17
	Median	17	18	22	17	17
	Standard Deviation	9	9	8	9	9
	Minimum	0	0	0	0	0
	Maximum	32	32	31	32	32
	Count	2606	2022	315	2291	1707
Size	Mean	771	714	823	763	694
	Median	432	391	432	432	390
	Standard Deviation	1362	1285	1887	1273	1139
	Minimum	16	20	24	16	20
	Maximum	22420	22420	22420	15444	11520
	Count	2599	2022	315	2284	1707
Size Square	Mean	2447696	2160488	4225940	2202447	1779342
	Median	186624	152491	186624	186624	152100
	Standard Deviation	15419737	15748235	34757955	10193922	8396738
	Minimum	256	400	576	256	400
	Maximum	502656400	502656400	502656400	238517136	132710400
	Count	2599	2022	315	2284	1707
Illustrated	Mean	0.84	0.83	0.82	0.84	0.84

	Median	1.00	1.00	1.00	1.00	1.00
	Standard Deviation	0.37	0.37	0.39	0.37	0.37
	Minimum	0.00	0.00	0.00	0.00	0.00
	Maximum	1.00	1.00	1.00	1.00	1.00
	Count	2606	2022	315	2291	1707
Auctioneer	Mean	0.70	0.65	0.47	0.73	0.68
	Median	1.00	1.00	0.00	1.00	1.00
	Standard Deviation	0.46	0.48	0.50	0.45	0.47
	Minimum	0.00	0.00	0.00	0.00	0.00
	Maximum	1.00	1.00	1.00	1.00	1.00
	Count	2606	2022	315	2291	1707
African	Mean	0.12	0.16	1.00	0.00	0.00
	Median	0.00	0.00	1.00	0.00	0.00
	Standard Deviation	0.33	0.36	0.00	0.00	0.00
	Minimum	0.00	0.00	1.00	0.00	0.00
	Maximum	1.00	1.00	1.00	0.00	0.00
	Count	2606	2022	315	2291	1707

Appendix 4 Consumer Price Index

(Source: <http://minneapolisfed.org/Research/data/us/calc/hist1913.cfm>)

Year	Annual Average	Annual Percent Change (Rate of Inflation)
1972	41.8	3.2
1973	44.4	6.2
1974	49.3	11.0
1975	53.8	9.1
1976	56.9	5.8
1977	60.6	6.5
1978	65.2	7.6
1979	72.6	11.3
1980	82.4	13.5
1981	90.9	10.3
1982	96.5	6.2
1983	99.6	3.2
1984	103.9	4.3
1985	107.6	3.6
1986	109.6	1.9
1987	113.6	3.6
1988	118.3	4.1
1989	124.0	4.8
1990	130.7	5.4
1991	136.2	4.2
1992	140.3	3.0
1993	144.5	3.0
1994	148.2	2.6
1995	152.4	2.8
1996	156.9	2.9
1997	160.5	2.3
1998	163.0	1.6

1999	166.6	2.2
2000	172.2	3.4
2001	177.0	2.8
2002	179.9	1.6
2003	184.0	2.3
2004	188.9	2.7