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Art as an Investment and Conspicuous Consumption Good

By Benjamin R. Mandel*

A spate of recent media announcements on record auction sales might lead one to believe that art as an asset class has come of age. However, it is clear that the determinants of an artwork's value are distinct from equities and other investments because, unlike "pure" financial instruments, art is also a consumption good. Art owners take pleasure in its intrinsic value (e.g., for aesthetic pleasure or as a "storehouse" of an artist's deftness), and to the extent that it is a luxury good, they derive additional enjoyment from the signal of wealth that owning a masterpiece transmits. It is the mixture of pecuniary and nonpecuniary payoffs to ownership that makes artworks both compelling to purchase and difficult to value.

I exploit this insight to explain why the measured risk premium of a portfolio of artworks is low compared to other risky assets. In a consumption-based pricing model, an asset's risk premium is a function of the covariance of its returns with agents' marginal utility of consumption; agents need to be compensated if the asset pays off in a period of already high utility. As a luxury good, relative art demand is an increasing function of wealth. Therefore, positive shocks to income increase the demand, price, and returns to art in periods of high consumption utility, implying a high risk premium. This intuition is at odds with empirical studies that quantify the average financial returns of paintings relative to more traditional investment vehicles. These studies find that art[1] often underperforms relative to equities and bonds. While there have been stunning individual success stories in art investment, long-term average returns are lower than for equity and, in several cases, the mean real return of "risk-free" government bonds exceeds that of art, implying a negative risk premium. The savings motive for art purchases is not sufficient to explain this observation.

From a theoretical perspective then, art must be treated differently from equities and other risky assets. Unlike an equity, art offers no claim on an underlying stream of payments. In fact, returns on art are largely independent of any production-side factors: the high-end market is dominated by the masterstrokes of dead artists who are rather unlikely to dilute their existing stocks,[2] and many living artists are relegated to the domain of fad,[3] avocation, or financial

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[1] Examples of art price indexes include: Robert C. Anderson (1974), John P. Stein (1977), William J. Baumol (1986), Bruno S. Frey and Werner W. Pommerehne (1989), Nathalie Buelens and Victor A. Ginsburgh (1993), William N. Goetzmann (1993), James E. Pesando (1993), Madeleine de la Barre, Sophie Docclo and Ginsburgh (1994), Pesando and Pauline M. Shum (1996, 2008), Corinna Czujack (1997), and Jianping Mei and Michael Moses (2002).

[2] Stein (1977) uses this reasoning to argue that auction sales represent a sampling from a fixed stock of artworks, while Robert B. Ekelund Jr., Rand W. Ressler, and John K. Watson (2000) point out that there is an observable rise in the value of artists' work around the time of their death. The latter observation alludes to the value of limiting future production of close substitutes for existing artworks.

[3] In a model of customs and fads in consumer behavior, B. Douglas Bernheim (1994) describes how the desire for status causes agents to conform to social norms despite heterogeneous underlying preferences. Sushil Bikhchandani, David Hirshleifer and Ivo Welch (1992) attribute the dynamics of conformity behavior to incremental changes in information flows. Both status and imperfect information are important factors in the art market, so we expect fad behavior to be particularly pronounced, especially for living artists for whom the status and legacy of their works are uncertain.

ruin (i.e., the supply of works by living artists has little if any bearing on the prices they fetch). Moreover, reasonable people can disagree on exactly "what is art?," which makes its supply essentially arbitrary. Thus it is the dynamic *demand* for art that is the only meaningful driver of investment returns.

Demand factors for art assets include the demand for savings (as in any investment vehicle), and I propose a novel "utility dividend" that is increasing in the value of art. The utility dividend is a special feature of demand for luxury goods. Peter J. Kalman (1968) first outlined the general class of utility functions containing both quantities *and prices*. Utility from goods prices, in turn, has appeared in economic writings at the very least since Thorstein Veblen's *The Theory of the Leisure Class* (1899). It formalizes the satisfaction derived from the conspicuous consumption of, or in this case investment in, high-priced luxuries. While art does not affect consumption decisions for other goods (by construction herein), it yields incremental utility when its price is high; effectively, an increase in the price of art is an upward shift in an agent's contemporaneous marginal utility of consumption.

In this article, I specify and calibrate a consumption-based capital asset pricing model as in Robert E. Lucas, Jr. (1978) to predict the dynamic returns and risk premium of the art asset. Indeed, the model predicts a low and possibly even negative risk premium for art. Since art demand is a function of income, its price and returns rise when the economy is robust. Concurrently, when the price of art is high, the marginal utility of consumption is shifted upward due to the utility dividend. Since the covariance of the art asset's payoff and marginal utility is increased by the utility dividend, the typically positive consumption-based risk premium for a procyclical asset is offset or even reversed (i.e., art can act as a type of insurance that pays off in times of high marginal utility of consumption).

The model thus succinctly bridges the demand for luxury goods with the demand for art as investments, and can be interpreted more broadly as an application of conspicuous consumption[4] in an environment where goods embody this dual nature. The paper proceeds as follows. The next section briefly documents the literature describing the measurement and underperformance of art returns. Section II then outlines the basic assumptions of the model and simulations in Section III. Section IV concludes.

I. Art Portfolio Returns

The empirical literature measuring average art prices is extensive, and the estimated long-run real return on art is quite low. According to a survey by Orley C. Ashenfelter and Kathryn Graddy (2003), real art return estimates range from 0.6 to 5.0 percent for paintings in general, as shown in Table 1. The returns are quite heterogeneous across (and even within) periods and index construction methodologies;[5] in large part, this is due to the difficulty of constructing average price changes for highly distinct and illiquid[6] goods. This illiquidity creates selection issues

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[4] See, among others, Kaushik Basu (1987), Yew-Kwang Ng (1987), Ottmar L. Braun and Robert A. Wicklund (1989), Norman J. Ireland (1994), Wolfgang Pesendorfer (1995) and Betsy M. Wearing and Stephen Wearing (2000) for previous applications in quality uncertainty, taxation, psychology, regulation, design innovation, and smoking behavior, respectively.

[5] There are two predominant methods for calculating price change indexes for paintings: (i) repeat sales regression, which uses painting fixed effects to control for idiosyncratic price variation (but requires at least two price observations per painting), and (ii) hedonic regression, which controls for a vector of painting characteristics (but is subject to bias from systematic changes in these characteristics). For detailed comparisons of index methods as applied to art, see Ginsburgh, Mei, and Moses (2006) and Olivier Chanel, Louis-André Gérard-Varet and Ginsburgh (1996).

[6] Observations of art returns are extremely limited relative to other assets, though the quantity of available data has been increasing in recent empirical work. The most common sources for art pricing data are auction house sale records and collections of historical sales assembled by Enrique Mayer (various years) and Gerald Reitlinger (various years).

Table 1—Survey of Measured Financial Returns for Paintings and Prints

Author(s)	Sample	Period	Method	Nominal return percent	Real return percent
Anderson (1974)	Paintings in general	1780–1960	Hedonic	3.3	2.6
		1780–1970	Repeat sales	3.7	3.0
Stein (1977)	Paintings in general	1946–1968	Assumes random sampling	10.5	
Baumol (1986)	Paintings in general	1652–1961	Repeat sales		0.6
Frey and Pommerehne (1989)	Paintings in general	1635–1949	Repeat sales		1.4
		1950–1987	Repeat sales		1.7
Buelens and Ginsburgh (1993)	Paintings in general	1700–1961	Hedonic		0.9
Pesando (1993)	Modern prints	1977–1991	Repeat sales		1.5
Goetzmann (1993)	Paintings in general	1716–1986	Repeat sales	3.2	2.0
de la Barre et al. (1994)	Great Impressionist	1962–1991	Hedonic	12.0	5.0
	Other Impressionist	1962–1991	Hedonic	8.0	1.0
Chanel et al. (1996)	Paintings in general	1855–1969	Hedonic		4.9
	Paintings in general	1855–1969	Repeat sales		5.0
Goetzmann (1996)	Paintings in general	1907–1977	Repeat sales		5.0
Pesando and Shum (1996)	Picasso prints	1977–1993	Repeat sales	12.0	1.4
Czujack (1997)	Picasso paintings	1966–1994	Hedonic		8.3
Mei and Moses (2001)	American, Impressionist, old masters	1875–2000	Repeat sales		4.9

Notes: Sources for art pricing data are auction house sale records and collections of historical sales assembled by Reitlinger (various years) and Mayer (various years). In the calculation of price indexes, repeat sales regression uses painting fixed effects to control for idiosyncratic price variation (requiring at least two price observations), and hedonic regression controls for a vector of painting characteristics. Returns are annual and the median real return of paintings in general (including Mei and Moses 2002) is 2.6 percent.

Source: Ashenfelter and Graddy (2003, Table 1). The final row refers to a working paper version of Mei and Moses (2002).

in data collection and it can be argued that art price indexes reflect more of an upper bound to investment returns: nonrepeat sales which henceforth became worthless are not included,[7] nor are transaction costs of sale or those paintings that do not reach their reservation prices at auction (i.e., inclusion in the index is conditional on sale and there may be a relationship between value increases and the occurrence of a transaction).[8] With this in mind, I focus on the long-run return measures of "paintings in general," including Mei and Moses (2002), to gauge the upper bound of the expected unconditional return on art assets.

Mei and Moses (2002) compile price observations for three classes of paintings sold at Sotheby's and Christie's in New York between 1950 and 2000, and search for prior sales of those paintings at auction. Their database, across all classes and including multiple (i.e., at least two) sales of the same painting numbered approximately 5,000. Prior studies using a repeated sales methodology employed 3,329 (Goetzmann 1993), approximately 1,900 (Chanel, Gérard-Varet, and Ginsburgh 1996), 1,198 (Frey and Pommerehne 1993), and 640 (Baumol 1986; Buelens and Ginsburgh 1993) price pairs, respectively. Of note, however, more observations do not necessarily generate higher returns estimates. Pesando (1993) and Pesando and Shum (2008) use substantially larger samples of art print sales (i.e., identical renderings of the same image) of 27,961 and 80,214 price pairs, respectively, and estimate average annual returns of about 1.5 percent.

[7] Goetzmann (1996) documents high (20 percent) "obsolescence" rates for paintings (i.e., the frequency at which they disappear from the auction records over time).

[8] Mei and Moses (2002) point out that these biases are mitigated in part by the survivorship bias of artists (i.e., included data is for artists who are already established and does not capture the initial appreciation of their works), and Goetzmann (1993) notes that high-value donated works to museums are also censored from the index of returns.

Table 2—Comparison of Real Returns for Art and Financial Assets

Period		Art percent	S&P 500 percent	Dow percent	Gov. bond percent	Corp. bond percent	T-Bill percent
1950–1999	Mean	8.2	8.9	9.1	1.9	2.2	1.3
	SD	*21.3*	*16.1*	*16.2*	*9.5*	*9.2*	*2.3*
1900–1999	Mean	5.2	6.7	7.4	1.4	2.0	1.1
	SD	*35.5*	*19.8*	*22.2*	*8.6*	*8.4*	*4.9*
1875–1999	Mean	4.9	6.6	7.4	2.0	2.9	1.8
	SD	*42.8*	*8.7*	*20.8*	*8.0*	*8.0*	*4.8*

Notes: Asset returns are the average annual return calculated over the sample period, with the standard deviation shown in italics below. Real returns are calculated by subtracting inflation (US CPI growth) from nominal returns. Art returns are based on repeat sales regression index methodology for the sample of paintings in Mei and Moses (2002). Financial returns are based on data from the Federal Reserve Board and Global Financial Data (5th edition).

Source: Mei and Moses (2002, Table 1).

Table 2 compares the index of art returns constructed by Mei and Moses (2002) to other investment vehicles. In terms of mean return, in many cases art is outperformed by financial securities: in every instance, art is outperformed by equity though underperformed by bonds. Considering the median real return for paintings in general (from Table 1) of 2.6 percent, art only slightly outperforms long-run bond returns and underperforms corporate bonds. As an upper bound, this implies a small or even negative risk premium.

In terms of volatility, art unambiguously has the highest variance of all assets, up to twice or three times that of the Dow Jones industrial index or corporate bonds. Thus, given low average real returns, art is often a dominated asset in a portfolio that seeks to maximize returns and minimize variance. Estimating mean-variance-efficient portfolios using Harry M. Markowitz's (1959) framework of diversification, Pesando (1993) argues that, despite their high variance, art prints should be included in a low risk portfolio with 180-day Treasury Bills since T-Bill and art returns are negatively correlated.[9] In contrast, both Baumol (1986) and Goetzmann (1993) find an index of art to be a strictly dominated asset. Several of the studies in Table 1 also find a significant, positive correlation between art and equity returns, e.g., Stein (1977) and Goetzmann (1993). On the other hand, Mei and Moses (2002) estimate lower correlations between painting returns and equities (see Table 3) and relatively less systematic risk for a portfolio of paintings, which suggests that the timing of art payoffs makes it attractive as an investment.

As the empirical literature on the desirability of art as an asset disagrees largely due to differences in data and empirical methodology, I turn to the theory of consumption-based asset pricing to predict which view should prevail.

II. Modeling Luxuries as Assets

I proceed by assuming that demand factors fully determine equilibrium art prices and bear special features unique to luxury goods; specifically, the value of art factors into utility directly. Veblen (1899) coined the term "conspicuous consumption" to refer to consumption that is unrelated to the intrinsic value of a good. A casual observer of prices for the wears on Madison Avenue in New York or the mobile phone market in China would conclude that certain classes of goods are intended primarily to signal wealth. Models of consumer behavior employing this insight have sought to formalize the idea that utility is derived not only from the quantity of

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[9] However, Pesando (1993) also concludes that art prints should not be included in optimal mean-variance efficient portfolios with expected returns of greater than 3 percent.

Table 3—Correlation of Real Art Returns with Financial Asset Returns

Art index	1.00					
S&P 500 index	0.04	1.00				
Dow industrial	0.03	0.99	1.00			
Government bonds	−0.15	0.33	0.28	1.00		
Corporate bonds	−0.10	0.38	0.33	0.95	1.00	
Treasury Bills	−0.03	0.27	0.25	0.61	0.63	1.00

Notes: Shown are pair-wise correlation coefficients for real asset returns over the period 1950–1999. Art returns are based on repeat sales regression index methodology for the sample of paintings in Mei and Moses (2002). Financial returns are based on data from the Federal Reserve Board and Global Financial Data (5th edition).

Source: Mei and Moses (2002, Table 1).

consumables, but by their value. Kalman (1968) investigates the properties of utility functions containing prices and their corresponding demand functions; Laurie S. Bagwell and Bernheim (1996) model luxury goods purchases as a signal to society with subsequent externalities; Ng (1987) argues that luxuries whose value enters into utility are a good candidate for taxes since they do not affect the consumption decisions vis-à-vis other consumption goods; and Michele Piccione and Ariel Rubinstein (2008) model luxuries as goods that satisfy both the "psychological need of owning a precious commodity" and redistribute wealth.

The conventional wisdom of art investing is to buy the most noted works in order to obtain the highest returns, though according to more rigorous empirical testing, masterpieces often *underperform* the (already low) art index. The datasets of both the Mei and Moses (2002) and Pesando (1993) suggest that buying highly prized and valuable paintings or prints is a poor investment strategy.[10] This observation is particularly poignant in light of the fact that it is precisely these rare masterpieces that ought to yield the highest conspicuous consumption boon to utility.[11]

The model below merges the literature on consumer behavior for luxuries with that of the consumption-based theory of asset pricing. I model utility as increasing and concave in the value of art collectibles while allowing for art to persist (without depreciation) into the next period with the opportunity for resale. Art is thus a hybrid of consumption and investment since utility is derived both from the value of contemporaneous art possession and the expected capital appreciation of art holdings in the future. Each period, every agent in the economy makes the calculation of how much real income to invest in savings instruments (i.e., bonds, equities, and art) and how much to consume. The Lucas asset pricing model then solves for the value of each instrument implied by market clearing in the financial and goods markets. Each agent faces the following trade-off: at the margin, the utility of giving up consumption to buy a piece of art exactly equals its expected conspicuous consumption benefit plus capital return next period.[12]

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[10] De la Barre, Docclo, and Ginsburgh (1994) find that great Impressionists return 4 percent higher than other Impressionists, though Ashenfelter and Graddy (2003) find no "masterpiece" effect for Impressionist art and a return of 50 percent less for contemporary masterpieces.

[11] An alternative explanation for the underperformance of masterpieces is posited by Mei and Moses (2005): auction houses tend to upwardly bias price estimates for high-priced works which correlates with subsequently poor investment returns. That credulous investors systematically overpay due to the influence of auction house price estimates seems consistent with a story in which (rational) investors receive nonpecuniary benefits from high-priced art purchases.

[12] For ease of exposition, I specify art as entering into utility in an additively separable manner. As a result, the marginal utility of consumption (i.e., non-art consumption) and the pricing of all other assets is unchanged from the standard framework. This is consistent with the result in Ng (1987) that "diamond" good prices do not affect the consumption quantities of regular consumption goods (hence, they are good candidates for taxation).

III. Model and Simulations

Consider a representative agent setting with a stochastically growing endowment of some homogeneous consumption good, y, growing at rate γ, where the latter follows a three-state Markov process:

$$y_{t+1} = \gamma_{t+1} y_t. \tag{1}$$

As an approximation, art production will be ignored: each agent is endowed with one unit of art. That is, whereas an equity represents a claim to the stochastic stream of a consumption good, artworks, a_t, are supplied inelastically and bear no association to the endowment process of the consumption good.

The art investor seeks to maximize the net present value of her utility flows, which depends on: (i) expected capital gains, and (ii) expected utility "dividends" from art purchases. Both of these motivations gauge the price of art, p_t^a: the former is simply the percentage change in the art price and the latter is a function of the value of art which enters directly into utility as follows:

$$u(c_t, a_t p_t^a) = \frac{c_t^{1-\alpha}}{1-\alpha} + \frac{(a_t p_t^a)^{1-\alpha}}{1-\alpha}, \tag{2}$$

where c_t is the agent's choice of the consumption good, $a_t p_t^a$ is the value of her art collection, and α is her coefficient of relative risk aversion.

The agent chooses consumption levels, c_t, risk-free bonds, b_{t+1}, equities, s_{t+1}, and art, a_{t+1}, given current price realizations, p_t^i ($i \in \{b, s, a\}$), to solve the following utility maximization problem:

$$\max_{c_t, b_{t+1}, s_{t+1}, a_{t+1}} E_0\left[\sum_{t=0}^{\infty} \beta^t u(c_t, a_t p_t^a)\right] \tag{3}$$

s.t.:

$$b_t + s_t(p_t^s + y_t) + a_t p_t^a \geq c_t + b_{t+1} p_t^b + s_{t+1} p_t^s + a_{t+1} p_t^a. \tag{4}$$

The first-order conditions of this problem are:

$$\textit{Bond} \quad : \quad p_t^b u'(c_t) = \beta E_t[u'(c_{t+1})], \tag{5}$$

$$\textit{Equity} \quad : \quad p_t^s u'(c_t) = \beta E_t[u'(c_{t+1})(y_{t+1} + p_{t+1}^s)], \tag{6}$$

$$\textit{Art} \quad : \quad p_t^a u'(c_t) = \beta E_t[a_{t+1}^{-\alpha} p_{t+1}^{a^{1-\alpha}} + u'(c_{t+1}) p_{t+1}^a]. \tag{7}$$

Equations (5) and (6) are standard intertemporal Euler equations, while equation (7) illustrates the trade-off faced by the representative agent between contemporaneous marginal utility of consumption and the future conspicuous consumption dividend and capital gain from art.

Market clearing implies: $\{c_t = y_t; b_t = 0; s_t = 1; a_t = 1\}, \forall t$. With the further assumption that both equity and art prices are homogeneous of degree one in the endowment (i.e., $p_t^s = \varphi(\gamma_t) y_t$; $p_t^a = \omega(\gamma_t) y_t$) and using (1), (6) and (7) can be rewritten:

$$\varphi(\gamma_t) = \beta E_t[\gamma_{t+1}^{1-\alpha}(1 + \varphi(\gamma_{t+1}))], \tag{8}$$

$$\omega(\gamma_t) = \beta E_t\left[\gamma_{t+1}^{1-\alpha}\ \omega(\gamma_{t+1})\ (1+\omega(\gamma_{t+1})^{-\alpha})\right]. \tag{9}$$

In equilibrium, prices adjust to clear the goods and financial markets subject to the necessary conditions (5), (8), and (9).

A. *Calibration*

The empirical starting point for pricing the art asset relative to other financial instruments is a model of the equity risk premium. Thomas A. Rietz (1988) posits a solution to Rajnish Mehra and Edward C. Prescott's (1985) equity premium puzzle (and the related risk-free rate puzzle) by modeling a low probability "crash" state in an Arrow-Debreu asset pricing model. For reasonable degrees of time preference and risk aversion, the model predicts a high equity risk premium and low risk-free rate, as observed in postwar US data. In the simulation below, Rietz's three-state model is augmented to include the art asset.[13]

The economy has three discrete states: (i) a high-growth state ($\gamma_t = 1 + m + v$), (ii) a low-growth state ($\gamma_t = 1 + m - v$), and (iii) a crash state ($\gamma_t = k\,(1 + m)$). These states evolve according to the following transition probability matrix:

$$\begin{matrix} \pi & 1-\pi-\delta & \delta \\ 1-\pi-\delta & \pi & \delta \\ \tfrac{1}{2} & \tfrac{1}{2} & 0 \end{matrix}$$

where δ is the probability of entering the crash state.[14] Deriving expressions for the mean, standard deviation, and covariance of endowment growth, equating these expressions to reasonable values for US data (i.e., $E[\gamma_t] = 1.018$; $\mathrm{sd}[\gamma_t] = 0.036$; $\mathrm{cov}[\gamma_t, \gamma_{t-1}] = -0.16$), and assuming crash state parameters (δ and k), I solve for values of m, v, and π. Then, using these calibrated parameters, I solve for the unconditional expected financial returns of bonds, equity, and art.

B. *Simulation*

Table 4 presents the resulting risk premia given assumptions about the underlying parameters of the model. The first row assumes a time discount of 0.99 and the probability of a crash occurring to be 0.001 (with $k = 0.5$). As a first approximation, I simulate the model with an art risk premium restricted to be zero (row I): the corresponding coefficient of relative risk aversion is 6.56 with an equity return of 7.85 percent and a risk-free rate of 2.02 percent. These returns for stocks and bonds are almost equal to the long-term actual returns shown in Table 2 and are hence consistent with the observed equity risk premium. Moreover, as in Rietz (1988) the crash state allows for a coefficient of relative risk aversion that is not "too high" to match this empirical fact. The simulated standard deviations for equity and art are low relative to the data but are ordinally roughly correct: equity returns are more volatile than the risk-free return, and art is as volatile as equity. Finally, the covariance of art with the risk-free rate is negative, and that of art and equity is positive, which is consistent with Mei and Moses (Table 3) and other empirical studies.

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[13] The Rietz framework is an elegant way to model an empirically plausible equity risk premium and risk-free rate without encumbering the model with too much complexity. As I will illustrate, the results of this paper are not dependent on the crash state.

[14] Note both the symmetry of the high and low states in the first two rows, as well as the ephemeral nature of the crash state in the third row.

Table 4—Predicted Returns and Risk Premia for Art and Equity

	Probability of crash (δ)	Risk aversion (α)	Risk-free return percent	Equity return percent	Equity risk premium percent	Art return percent	Art risk premium percent	Cov (art, risk-free)	Cov (art, equity)
(I)	0.001	6.56	2.02 *3.83*	7.85 *7.74*	5.83	2.02 *7.66*	0.00	−0.0027	0.0059
(II)	0.001	6.1	3.83 *3.71*	8.35 *7.45*	4.52	2.00 *7.34*	−1.83	−0.0025	0.0055
(III)	0.001	6.9	0.20 *3.87*	7.23 *7.92*	7.03	2.04 *7.86*	1.84	−0.0028	0.0062
(IV)	0.0001	10	2.62 *5.15*	10.09 *10.01*	7.49	2.23 *10.04*	−0.39	−0.0046	0.0100
(V)	0.001	6.56	3.36 *3.87*	9.25 *7.80*	5.89	2.23 *7.70*	−1.13	−0.0027	0.0060
(VI)	0.001	6.56	1.38 *4.12*	7.46 *8.49*	6.08	2.07 *8.40*	0.69	−0.0032	0.0071
(VII)	0.001	6.56	2.23 *5.99*	8.25 *10.05*	6.02	2.24 *10.17*	0.01	−0.0055	0.0102

Notes: The standard deviation of asset returns is shown below average returns in italics, and is based on 1 million periods of model simulation. The model is calibrated to postwar US data, and endowment growth follows a three-state Markov process with probability δ of entering a transient crash state with growth rate 0.5 (see Section IIIA). Row I restricts the art risk premium to be zero. Rows II and III decrease and increase the coefficient of relative risk aversion, respectively. Row IV simultaneously decreases the probability of crash and increases agents' risk aversion and time discount. In rows V–VII, the calibration assumptions are changed: row V assumes a higher average endowment growth rate of 2 percent; row VI assumes a higher endowment standard deviation of 0.4; row VII assumes a greater negative lag covariance of -0.25.

The results are also suggestive that art is dominated by equity as a "pure" financial asset. Given lower returns, equal variance, and positive covariance, equity is strictly preferred to art in a mean-variance-efficient portfolio.[15] Moreover, since art and equity are nearly perfectly correlated in the model (i.e., art has a beta of one),[16] expected returns should be equalized. The return on art is markedly lower. Agents are willing to accept this low financial return, however, since there is an augmenting utility benefit to holding art when prices are high.

Figure 1 illustrates the simulated returns of equity, art, and bonds in relation to the three states of endowment growth (the thick solid line). The thin solid line depicts the risk-free rate which is strongly countercyclical due to consumption-smoothing behavior. The equity and art returns, on the other hand, move procyclically and in tandem with one another, and since the art return is a pure capital gain (i.e., an ex-dividend return) their difference bounds the nonpecuniary benefits to holding art. In period 13, there is an unlucky draw from the endowment growth distribution and consumption growth crashes. That the ordering of returns is preserved, and that equity and art returns are similar in the crash state, suggests that it is not the crash per se that generates the low art risk premium, but rather more systematic behavior.

The remaining rows in Table 4 present comparative statics for the model. Row II shows the resulting asset returns and covariances when risk aversion is lowered (i.e., their intertemporal elasticity of substitution increases). As expected, both equity and bond returns increase as agents are

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[15] Using $\mathrm{var}(x + y) = \mathrm{var}(x) + \mathrm{var}(y) + \mathrm{cov}(x, y)$, the combined variance of an art/equity portfolio is larger than for either alone.

[16] Very high correlation between art and equity, while in line with Goetzmann (1993) and Stein (1977), is in sharp contrast to the low (positive) correlation measured by Mei and Moses (2002). One potential way to reconcile that finding with the model is if the relationship between equity income and art returns is not contemporaneous. It is likely that the low measured correlation is not capturing market behavior that actually occurs over several periods.

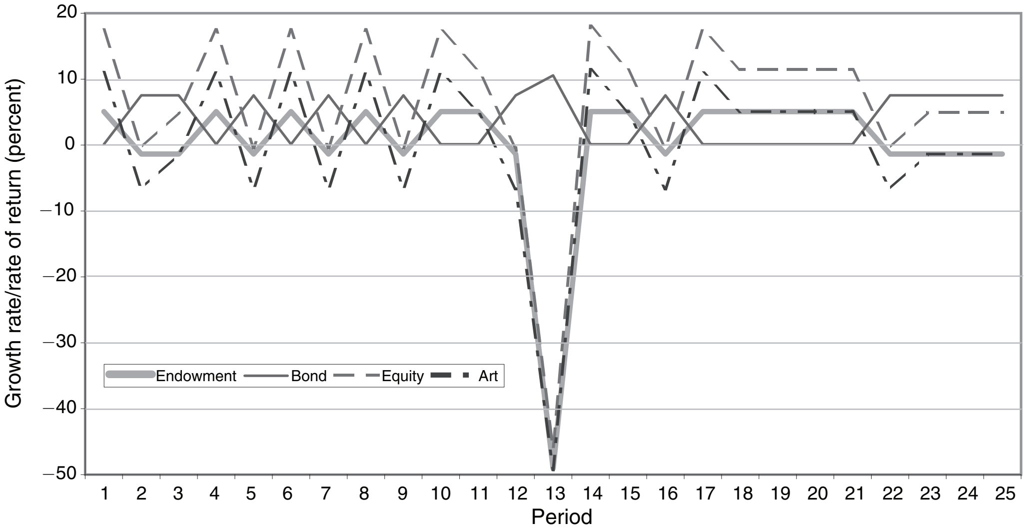

Figure 1. Simulation of Endowment Process and Asset Returns

Notes: The figure illustrates 25 of 1 million simulated periods, chosen to bracket a crash state (period 13). The specification of the model and average asset returns can be found in Table 4, row I. The model is calibrated to postwar US data, and endowment growth (the thick solid line) follows a three-state Markov process with probability 0.001 of entering a transient crash state with growth rate 0.5 (see Section IIIA).

more willing to shift consumption over time. Since art returns combine capital gains with utility dividends, the comparative static exposes which factor dominates; in this case, the conspicuous consumption utility dividend increases for lower α, which drives down the financial return by two basis points. Thus the art risk premium is small and negative. For higher risk aversion (row III), the converse holds and the art risk premium is small and positive. In both cases, and for a wide range of specifications of the model, the art return is about 2 percent. This stability reflects the fact that the price enters directly into utility, which agents prefer to keep on an even keel over time. It also increases one's confidence that the low theoretical art return is a robust finding.

In row IV of Table 4, an alternative way of generating a 7 percent equity risk premium is to lower the probability of the crash while increasing the agent's risk aversion. As above, the result is an art return of 2 percent and a slightly negative art risk premium. Interestingly, this new formulation increases the covariance of the art asset with both equities and bonds.[17]

Finally, the calibration assumptions are revisited to examine their impact on the model's predictions. Row V presents the model simulation results under the assumption that the average endowment growth rate is higher (i.e., 2.0 versus 1.8 in the baseline case). For bonds and equity, asset returns are significantly higher, as the stochastic variation in the endowment is a smaller proportion of average total consumption. The same applies for art, though this effect is mitigated by the utility dividend; the return increases, but by a small amount, and the art risk premium becomes negative. Rows VI and VII increase the standard deviation and lag covariance of the endowment, respectively. In times of high endowment variation, asset returns decrease (again, with art returns not changing by much) and the art risk premium becomes positive. The model fails in replicating the high standard deviation of art returns and their higher variability than

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[17] However, since the variance of equity also increases, the near-perfect correlation of art and equity returns is unaffected.

equity returns. High art return variability could be obtained by significantly increasing the lag covariance of the endowment, though this would likely result in a risk-free rate far above that observed, as well as an unrealistically high variance of equity returns. The biases inherent in empirical measurement of art returns may also be skewing the variance statistic upward.

IV. Conclusions

This paper reconciles the observations of a burgeoning, volatile art market and (on average) low long-term returns with the consumption-based motive for savings. Financial returns are low since they tell only part of the story: the price of art reflects not only the desire to smooth consumption over time as for any investment vehicle, but also the utility derived from its conspicuous consumption. The utility dividend, in turn, endogenously moderates the level of art returns. While the cyclicality and variance of artwork returns are similar to those of equity—they are both driven by the stochastic endowment process—art investors need to be compensated by less in financial terms for the risks they are incurring.

One could relate this model to the empirical analysis of the causal linkages between equity markets and art markets as in Andrew C. Worthington and Helen Higgs (2003) and Chanel (1995). Here, equity markets are related to art markets, though not for the same reasons. Whereas those authors reason that equity returns provide a boon to income which, in turn, increases art consumption, here the savings motive for holding art is sufficient to create a positive covariance between art and equity. Further, since the model also presupposes a constant endowment of artwork, it is not well equipped to predict the demand and portfolio share of art in a setting with fewer restrictions on production. The labor market implications of that type of model are beyond the scope of this pricing exercise, but remain important areas of potential advance.

Though applied to the low or negative risk premium observed for indexes of art, the logic of the model is by no means limited to paintings. The same could be said of any good with a low rate of depreciation that is conspicuously consumed, any good with sentimental value, or, more broadly, any good or investment with nonpecuniary benefits. What is important is the potential to blur the bright theoretical distinction between consumption and investment behavior.

Finally, this paper provides food for thought for the myriad dilettante art aficionados. In a boast, a friend once told me that his art was a better investment than all other assets, including financial securities and real estate. Accounting for his utility in telling me so, that is indeed likely.

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