Research Article

Evaluation Factors and Pricing Stochastic Model of Contemporary Art

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Contemporary art is the artwork created by currently active artists. As a result, it reflects the many complexities that shape our varied, global, and continuously changing world. Many modern artists use their work to investigate personal or cultural identity, criticize societal and institutional frameworks, or even redefine art itself. The current chaotic phenomena of art market prices has an impact on the development of art, particularly substantial price fluctuations, resulting in a number of problems that are preventing the art market from developing. The aim of this paper is to get a greater understanding of art, as well as a novel approach of evaluating art and a mathematical stochastic model for estimating its price. This paper investigates the pricing method and model by looking at the cultural basis of art, modelling, decoration, market supply and demand, product practicability, and random elements, among other things, in order to help the art market flourish and allow artists to consume. The model test results clearly demonstrate the rationality of the indicator selection, indicating that the pricing model is well designed.

1. Introduction

Art is a broad category of human influence and output that includes creative or inventive talent that expresses technical skill, beauty, emotional strength, or conceptual thoughts [1]. Art is a special commodity with multiple attributes. Today, active artists create contemporary art. As a result, it reflects the various, worldwide, and continuously changing challenges that shape our world [2]. Many modern artists use their work to examine personal or cultural identity, criticize societal and institutional frameworks, or even redefine art itself [3]. They frequently create tough or thought-provoking topics in the process without delivering simple answers. The ideal tools for approaching a work of contemporary art are curiosity, an open mind, and a willingness to discourse and debate [4]. Some scholars have studied the characteristics of art as an asset and a consumer product. Chang considers art to be a unique product with numerous characteristics. They are employed not just as a long-lasting consumer product that provides viewing services but also as a financial asset with monetary value [5]. According to Worthington and Higgs, art is a commodity with low elasticity of supply,

public goods, heterogeneous, and speculative commodities [6]. Bryan pointed out that art is a combination of money and art, and it has the potential to become a profitable hand and investment tool. Art has the traits of both lasting consumer items and investment assets, according to his research [7]. Suqiu also believed that artworks have dual currency properties of assets and consumer goods, which are essentially different from other financial assets [8]. Some scholars discuss the value connotation of art in the economic context. Beckert and Rössel uses neoclassical economics to investigate the relationship between art's value, usage value, and economic value [9]. Based on Marx's "labor theory of value," Songhua et al. observed that the undifferentiated general human determines the value of cultural products labor condensed in the product and divides the value of cultural products into three categories: main value, carrier value, and conversion value [10]. The transformation value, which distinguishes cultural products from general commodities, refers to the transfer value of cultural products gained from producers and production equipment during the production and use process [11]. Tang et al. believed that the value of artworks is primarily determined by scarcity, the

artistic value, use value, historical value, and economic worth of artworks are the sources of its value appreciation, according to traditional supply and demand analysis [12]. Some scholars analyze the value composition of artworks from social, philosophical, cultural, and other contexts [13]. Yang believes that artworks value expression is primarily exhibited in spiritual and material aspects [14].

To summarize, it is clear that the contemporary art market's healthy and mature growth has a long way to go, and art appraisal is mostly dependent on qualitative research. Learn from advanced experience as well as concepts in the development of foreign art markets and constantly establish the pricing model and evaluation factors of art in the market environment [15]. Start with quantitative factors (such as culture, artistry, and other key factors), then turn to quantitative methods for evaluation, and obtain price models to make the evaluation more credible [16].

The remainder of the paper is composed of the following sections: Section 2 is the evaluation factors of the art portion; Section 3 is the construction for the evaluation system of artistic value; example verification and analysis are present in Section 4; finally, the paper is concluded in Section 5.

2. Evaluation Factors of Art

The role of the value factor of artworks is obvious. The greater the influence on the price of artworks, the higher the value content. However, the value of an artwork is a collection of multiple values, each of which has a different effect on the price. It is necessary to decompose the value of the artwork as well as analyze the weight and magnitude of the impact of different value factors on the price of the artwork [17]. There are two aspects to the value of artworks: cultural and aesthetic values are examples of intrinsic and added value.

2.1. Cultural Value. In a broad sense, art is a creative product; its supply and demand scales in the market are shown in Figure 1. Art falls within the category of art in creative and visual products, according to the United Nations Conference on Trade and Development's classification model. They believe that the worth of creative works is primarily because it comes from deep cultural soil and contains specific cultural aspects and particular cultural values [18]. The higher the content of cultural value, the potential of its value appreciation will be greater. The artists think that it is difficult to escape their cultural background when creating art. For example, in the case of painting, the West is recognized for heavy-colored oil paintings, whereas the East is known for landscapes with ink splashes. Therefore, culture is the basis for the generation of artistic value. The specific quality of art that may suit certain cultural demands or the traits that can reflect certain cultural forms is referred to as cultural value [19]. The subject of paintings, the ideas, and the periods reflected in them, all show the cultural value of the works.

2.2. Aesthetic Value. In general, aesthetic value is defined primarily by two factors: one is a physical property, and the other is an emotional attribute [20]. The physical beauty and
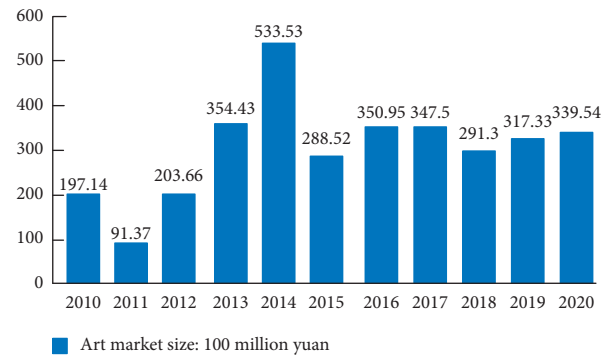

Figure 1: The size of the art market.

texture of the figurative art bring consumers a wonderful sensory experience, and the emotional attributes at the subtle level are the subtle resonance caused by this aesthetic pleasure, which brings a new experience of body and mind. The aesthetic attributes of painting art often include the size of work, degree of completeness for preservation, and fineness of the craftsmanship. The important carrier of artistic value is its aesthetic value. The value of an artwork is closely related to the aesthetic properties it contains. Aesthetic theory has a lengthy history and a significant impact. It is one of the most significant cultural qualities addressed by art researchers, which are directly associated with cultural and creative goods in historical study. The scale of market output value is shown in Figure 2.

2.3. Artistic Value. The concepts of artistic and aesthetic value are quite similar thus; aesthetic value is commonly used when evaluating artistic value, as demonstrated in Figure 3, which shows the percentage of each art category. However, according to Polish aesthetician Ingarden, artistic value relates to the spiritual meaning contained in the work, whereas aesthetic value is displayed in the aesthetic actions of consumers confronting creative objects. Therefore, the core of artistic worth is apparent from the beginning in the development of creative items, while aesthetic value is experienced in appreciation. From this perspective, the artistic value is higher than the aesthetic value, which denotes the artistic accomplishments of the product. For example, a painter's painting abilities, the use of color and ink, and the composition, as well as the layout of the painting, can be used to measure its artistic value. For this reason, people prefer works with strong artistic value.

3. Construction for the Evaluation System of Artistic Value

This section contains different subsections such that indicator design, Hedonic pricing, and model establishment, which are discussed as follows.

3.1. Indicator Design. The indicator design provides a platform that business practitioners and other stakeholders can use to establish objectives and indicators aimed at
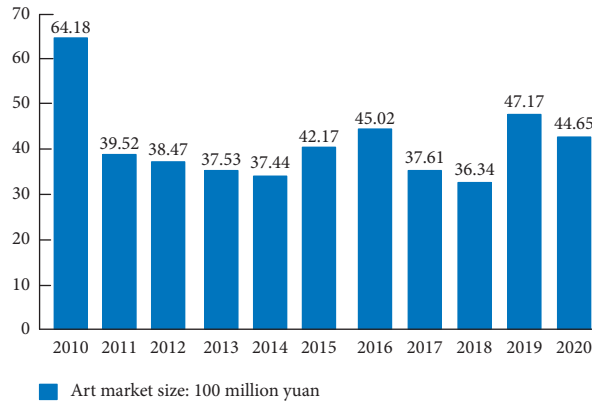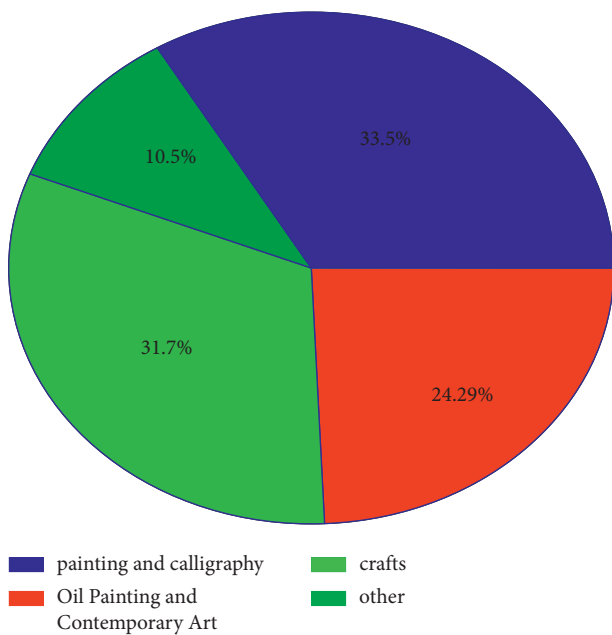
Figure 2: Output value scale.

Figure 3: Proportion of art auctions.

improving people's achievements. The design can assist users in learning about what works and why, allowing them to make evidence-based decisions about how to spend resources, change programs, and ultimately provide better results for employees, customers, and communities. The indicator design of the model is divided into three categories. These categories are cultural value, aesthetic value, and artistic value.

3.1.1. Cultural Value. The evaluation of cultural value can be divided into four secondary indicators as follows:

(1) The typical degree of subject matter: this indicator reflects the typical degree of the subject matter of the artwork. The higher the score, the more the chosen subject matter resembles the artist's usual style.

(2) Rarity of subject matter: this indicator reflects the rarity of the subject matter for the selected artwork.

The greater the score for rarer subject matter, the lower the score for the common subject matter.

(3) Ideological: this indicator reflects the weight of the artist's personal emotions contained in the artwork. The higher the score, the more profound the artist's own thoughts in the work.

(4) Theme popularity: if the artwork topic is currently popular or prominent during the time, it was created. The greater the score, the higher the specificity.

3.1.2. Aesthetic Value. The evaluation of the aesthetic value of the artwork is to observe the artwork's visual and tactile intuitive sensation in terms of appearance. Aesthetic value is divided into three secondary indicators as follows:

(1) Specification and size: this indicator measures the score of size for the painting. The Chinese painting business has a long history of pricing paintings according to their size. People generally prefer large-scale paintings. Therefore, the larger the size, the higher the score for this indicator.

(2) Preservation integrity: preserving intact and flawless artworks can give people a feeling of beauty in appearance, so the greater the aesthetic value.

(3) Grade of works: this indicator measures the quality of artworks. Fine art is reflected in factors such as well-packaged artworks and the choice of paper, pen, and ink. The fine artwork is made by artists who invested a lot of time, energy, and wisdom, and it will certainly provide visitors with a wonderful beauty experience.

3.1.3. Artistic Value. Artistic value is the foundation for artwork value. The evaluation of the artistic value for traditional Chinese paintings can start from the following four aspects:

(1) Artistic language innovation: the higher the score of replicating ancient methods without originality, the lower the score of the artist's creative techniques, unique expressions, and obvious personal style.

(2) Creative skills: it reflects the depth of the artist's creative skills. The greater the score, the deeper and more stable the skills.

(3) Composition/layout: originality, regularity, and highly adorned paintings receive higher scores, whereas conventional, sloppy, and badly ornamented works receive lower scores.

(4) Use of color/inking: the use of ink in Chinese art is given special consideration. Brush and ink provide a distinct layering effect, which can draw attention to the work's aesthetic vision. Work with small layers and poor color management, on the other hand, has less aesthetic value and receives lower scores.

3.2. Hedonic Pricing. The consumption theory presented by Lancaster and the market equilibrium model proposed by American economist Rosen in 1974 is based on this strategy. It is used in abroad to deal with the characteristics of different products and its prices. Among different models, this pricing method has increasingly been adopted by statistical agencies in recent years, and therefore, it can be cited in the ceramic art industry and the assumption that there are numerous differences in the characteristics or quality for a range of commodities. When the characteristics of a commodity change, the price of the commodity will also change. The effect range of each characteristic change on the commodity price is found by computing the partial derivative from each characteristic variable of the function, and the relationship of this influence is considered to be fixed across several times. Nonhomogeneous ceramic works of art can be utilised to compare the base period and the reporting period in the absence of homogeneous commodities. The impacts of characteristic changes are subtracted from the overall price change item by item, leaving just the final price change. The price has changed only as a result of supply and demand, as well as the price index derived in this manner is the hedonic pricing method index of ceramic art. For linear models, the hedonic pricing approach gives equations for the following functions:

$$M_2 = b_0 + b_1 x_1^2 b_2 x_2 + \cdots n b_n x_n. \quad (1)$$

The log-linear models are

$$LnP_2 = eb_0 * b_1 x_1. \quad (2)$$

Among them, M_2 represents the price of the ceramic artwork, b_0 represents the constant term, $x_1, x_2, \ldots, x_n$ represents the feature of the art, b_n represents the price of the corresponding feature, and e represents the random error.

According to the characteristic factors of art, the pricing expression of art is

$$M_2 = G(x_1, x_2, x_3). \quad (3)$$

3.3. Model Establishment. This paper uses Statistical Package for the Social Sciences version 20.0 (SPSS20.0) for the stepwise regression analysis method to estimate the three

classical forms of the hedonic price model for all research samples. It has been discovered that the semilogarithmic Hedonic model has the best fitting degree and strong explanatory power. Therefore, the semilogarithmic Hedonic model is selected. The logarithmic form is used for empirical research, and the model is set as follows:

$$\text{In price}_t = \alpha_0 + \sum_{j=1}^{n} \alpha_i X_{it} + \sum_{j=1}^{m} \beta_j I_{jt} + \varepsilon_t. \quad (4)$$

Among them, price_t represents the auction price of a certain artwork in period t, X_{it} is the determining element in the market pricing of artworks and is the evaluation score of value factor i for artworks in period t, $i = \{1, 6\}$, and I_{jt} represents the influence on the auction of artworks in period t. The market factor of price, $j = \{1, 6\}$, demonstrates the constant term, α_i is the calculated value for the matching value factor of the artwork's regression coefficient, it can be regarded as the price that consumers are willing to pay for a certain attribute value, and β_j is the estimated value of the market index coefficient.

4. Example Verification and Analysis

The relationship between each influencing component and the art market price is preliminarily explored using the obtained data to estimate the parameters according to the semilogarithmic hedonic pricing model, and the main factors are found using the multivariate linear regression approach. After considering related factors, the results are shown in Table 1.

The results of art pricing model test and variance analysis are shown in Tables 2 and 3.

It can be seen from Tables 2 and 3 that the regression part of the model value is $R^2 = 0.876$, indicating that the model is well-fitting. The F value is 26.321, $P < 0.02$, indicating that characteristic variables have a considerable impact on the price of ceramic artworks. D-W value = 1.363, which is nearer to 2, indicating that the residual follows a normal distribution.

The degree of correlation between a single independent variable and a dependent variable may be determined using partial correlation analysis, which excludes the impact of additional independent variables. The results show that only the partial correlation coefficients between the three independent variables of x_2 aesthetic value, x_3 artistic value, and x_5 historical value, and artwork prices passed the significance test, as shown in Table 4. It can be seen that under the condition of controlling other variables, the correlation between historical value and art market price is the strongest. There is a moderate correlation between exchange rate and art price. The relationship between aesthetic value and art price is moderate while the correlation is weak.

From the analysis of regression and partial correlation for the above price influencing factors, it is shown that value factors have a considerable influence on the price of artworks, the most obvious of which are historical, aesthetic, and artistic values.

TABLE 1: Regression of art price characteristic model.

Model	Unstandardized coefficients		Standardized coefficient	T	Sig
	B	Standard error	Beta		
x_1	0.088	0.061	0.132	1.324	0.154
x_2	0.151	0.098	0.156	1.534	0.112
x_3	0.087	0.068	0.128	1.256	0.078
x_4	−0.106	0.068	−0.117	−1.325	0.169
x_5	−0.112	0.028	−0.346	−3.547	0.001
x_6	0.076	0.042	0.189	1.78	0.231

TABLE 2: Summary of artwork pricing model inspection.

Model	R	R^2	Adjusted R^2	Error in standard estimation	Changes in R^2
1	0.941	0.876	0.832	0.876458	0.883

TABLE 3: ANOVA analysis of variance results of art pricing model.

Model	Statistics	Sum of square	Degrees of freedom	F
	Return	158.7	18.12	
1	Residual	24.87	0.721	26.321
	Sum	183.57	18.841	

TABLE 4: Results of partial correlation analysis.

Independent variable	Partial correlation coefficient	Sig
x_1	0.151	0.174
x_2	0.168	0.046
x_3	0.127	0.086
x_4	−0.142	0.176
x_5	−0.328	0.001
x_6	0.191	0.121

5. Conclusion

Art is an area of human impact that encompasses imaginative or creative ability that exhibits the technical skill, beauty, emotional power, or philosophical ideas. Contemporary art is the work of modern artists. It represents various complexities that define our diverse, global, and ever-changing world. The modern unstable reality of art market pricing has an influence on the development of art due to significant price variations resulting in a variety of challenges that are barriers in the growth of the art market. This study obtains the influencing variables of numerous indicators on art prices and verifies the final model findings by building a pricing model based on the hedonic price approach. The model test results demonstrate the rationality of the selection for numerous indicators, showing that the pricing model is adequately built. The research on the pricing structure of the ceramic art market is not comprehensive and in-depth because data are only collected from a portion of the market, and there are still many inadequacies in data collecting, data sorting, model analysis, and so on; therefore, furthermore, in-depth analyses are required.

Data Availability

All the data used in the paper and research study can be obtained from the principal author through an e-mail request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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