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RETURNS FROM THE ART MARKET. PRICE INDEX EVALUATED FOR THE MOST-TRADED POLISH PAINTERS[1]

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Abstract: Relatively new approach toward investing is to concern pieces of art as investment instrument or collateral. In order to decide whether art is a good investment, it is necessary to evaluate expected returns, which might be obtained from such investment thus an art price index should be developed. The aim of the paper is to discuss artworks as investment assets and evaluate price index of paintings produced by 11 Polish artists whose artworks were traded the most often on auctions that held in Poland in the years 2007-2010. In our research, employing data concerning 750 objects, we apply hedonic index methodology to estimate returns from the paintings market. Our results justify the opinion that art can be treated as safe asset class, especially in comparison to equity market.

Keywords: investment, art market, hedonic price index

INTRODUCTION

Situation at financial markets tends investors to look for alternative investments to diversify their portfolio. Relatively new approach toward investing is to concern pieces of art as investment instrument or collateral. There is growing liter-

[1] Investing in Paintings on the Financial Market**,** research conducted under the National Science Centre Grant No. 2012/05/B/HS4/04188

ature concerning artworks as investment opportunity for investors: Frey, Pommerehne (1988), (1989a), Pesando (1993), Mei, Moses (2002), Worthington, Higgs (2003), (2004), Campbell (2004), (2008), Adamowska (2008), Higgs (2012), Hsieh, et al. (2010), Kraeussl, Wiehenkamp (2012), and Frey, Cueni (2013), to mention some.

In the year 2013, the global art market equaled 47.4 billion of Euro. It means that the global art and antiques market was almost back to the extraordinary heights of the pre-recession boom years powered by buyers in America and by rising prices for major Post-War and Contemporary artists[2]. The Polish art market is very small i.e. about 0.2% of the world sales - its value was estimated for 300-350 million PLN, while auction sales was 60.5 million PLN in 2012[3].

The aim of the paper is to evaluate the returns from the investment in Polish paintings market on the basis of the art price index. Commonly used methods to construct art price indexes are repeat-sales regression and hedonic regression [Ginsburgh, et al., 2006, p. 947]. Limited scale of the art market in Poland does not allow applying the repeated sale approach, therefore the hedonic method is employed. The research is provided on the basis of data concerning the selected sample of paintings sold at auctions held by auction houses and foundations in the years 2007-2010.

ART AS INVESTMENT ASSET

Artworks as investment assets are quite special. The current market value of art piece is difficult to evaluate since there is no "natural value", which could be used as reference or fair value. The price of artwork is limited only by the amount of money that collectors are willing and able to pay for [Goetzmann, et al. 2011]. Investment in art is undivided and illiquid in comparison to "classical" financial assets. Artworks are often expensive, also costs of purchase and sale may be high (from 10 to 25 percent of hammer price while costs on financial markets are about 1% of the price) and they seem to be long-lasting investments.

There are also several risks (regardless the risk of price variability of investment instruments) special for the art market [Frey, Cueni, 2013]. (1) Buyer can never be certain whether the purchased object is original (i.e. not a copy or forgery). And even if the artwork is an original piece, one never knows who was

[2] In the year 2013, USA accounted for 38% of the global market by value, China - 24%, the UK - 20%, France - 6%, Switzerland - 2%, Italy, Germany, Austria and Sweden - for 1% each of them, and the rest of the world – 6%. Taking into account Europe as a whole, United Kingdom created 63% of the market value, France - 19%, Germany - 5%, Italy – 3%, Austria – 2%, Sweden – 2%, Spain -1%, the Netherlands 1% and the rest of European Union 4%. The European Union as a whole kept 32% of the world market [McAndrew 2014].

[3] Deloitte 2013.

a painter: the master himself, the circle, the school or the painting is made only in style of a grand master[4]. (2) Quality of paintings, which have been repainted, damaged, not properly renovated or stored, may cause the declining of their values. (3) Owners of art pieces can be afraid that the masterpieces (that they poses) might be stolen, destroyed (by fire, revolution, etc.) or seized by government as a part of "national heritage". (4) Possession of valuable art can cause the necessity to pay additional taxes (sale or property taxes) and government may impose new export restrictions. (5) Tastes and fashions changes over a time and art market is characterized by extreme heterogeneity thus one never knows if the certain artist will not be "fallen from fashions" in the future. Renneboog and Spaenjers (2013) report 220 "fallen from fashions" artists who were included in the 1926, 1959 and 1980 edition of Gardner's *Art through the Ages*[5], but not in the 1996 or 2004 edition. (6) Art belongs to the group of luxury goods and it's price is very sensitive on general economic situation and income changes. Goetzmann et al. (2011) present the evidence that personal income of the highest earners determines price of art - one percent fall in income of the earners in the top 0.1 percent income distribution in the UK triggers a decline in art prices of nearly 10 percent. (7) Behavioral anomalies seem to play an important role in the art market since collectors are usually not willing to sell pieces of art from their collections and they tend to buy art produced by domestic artists.

In order to decide whether art is a good investment, it is necessary to evaluate expected returns which might be obtained from such investment thus an art price index should be developed. The are three major goals behind construction of art price indexes is ([Ashenfelter and Graddy 2006], [Ginsburgh et al., 2006]): (1) to measure financial performance of art, relative to other alternative forms of investment, (2) to check whether adding art to a diversified market portfolio can lower the overall risk and/or increase the rate of return, and (3) to outline general trends on the art market.

Construction of the art price index dedicated to the certain market requires several decisions concerning: selection of the index methodology and selection of the sample i.e. its size and the way of the object selection. There are several methods and indexes which can be used to analyze changes of prices or returns from the art market, such as naive price index, repeat-sales, average price (geometric mean), composite price (basket) index, and hedonic index. Pesando (1993), Pesando, Shum (1999), Mei, Moses (2002) employ repeat sales, Mok et al. (1993), Landes (2000) – geometric repeat sales, Ginsburgh, Schwed (1992), Kraussl, van Elsland (2008), Higgs, Warthington (2005) – hedonic index, Candela et al. (2004) – quality adjusted price, Renneboog, van Houtte (2002) –basket index.

[4] See (Frey and Pommerehne, 1989b) describing the story of the painting "Daniel in the Lion's Den".

[5] *Gardner's Art Through the Ages* is an American textbook on art history that was written by Helen Gardner (1878 – 1946) and published for the first time in 1926.

The repeat sales methodology considers only those artworks that were sold at least twice in the investigated period, and their price were registered. Thus it requires transparent and liquid market. Ginsburgh et al. (2006) argue that repeat-sales regression should not be applied to periods shorter than 20 years, since the number of observations may be too small to obtain reliable results. The main advantage of hedonic index approach is that it may consider all traded objects.

According to the Deloitte (2013) report, average annual return from 800 repeat sales, that took place in Poland during last 20 years, was 25.7% while in the same time equity returns measured by Warsaw Stock Exchange Index WIG20 was only 8.7%[6]. Annual return from artworks hold longer than 15 years was 46.6% while investments with the horizon shorter than 5 years gave only 0.2% profit. Thus the time span of investments is crucial in obtained returns.

Naive art price indexes are constructed using average and median auction prices. In this method, a basket of representative paintings is created and tracked over time. This approach avoids the repeated sales restrictions but requires instead aggregation on some a priori criteria in order to construct so-called "average painting" [Candela, Scorcu 1997].

The problem of the sample selection is crucial in construction the fixed basket of representative artworks that must be made by experts. However it appears also in application other methods and it is known from literature since many different criteria of the artwork selection are employed. In the literature the most often selected criteria are: (1) mediums (for example Locatelli-Biey, Zanola (2002) consider sculptures, Pesando (1993) – prints, Candela et al. (2004) – paintings, Ginsburgh, Schwed (1992) – drawings); (2) style of the piece of art or the period when the artwork came into being (for instant Pesando (1993) concerns modern prints and Picasso prints, Candela et al. (2004) – Modern and contemporary, 19-th century, Old Master paintings, Ginsburgh, Schwed (1992) - Flemish-Dutch, French, Italian Old Master drawings); (3) authors selected by the experts (as an example is a paper by Pesando, Shum (1999) who analyze Picasso prints); (4) nationality of artists or place where they created their artworks (for instance: Mok et al. (1993) consider Modern Chinese paintings, a Kraussl, van Elsland (2008) – German paintings in general, Ginsburgh, Schwed (1992) - Flemish-Dutch, French, Italian drawings, Higgs, Warthington (2005) – Australian paintings), and (5) belonging to the certain collection (as it is done by Landes (2000) who takes Ganz collection).

Such arbitrary choice may be criticized because selected artworks may not be representative for the whole market. The size of the sample depends on the investigated period i.e. time span when artworks are sold.

[6] See [Gajewski, Potocki, 2013].

HEDONIC ART PRICE INDEX

Art price index can be evaluated employing hedonic regression, which is a method for estimating an approximate value of a piece of art adjusting the average price of the artist's works for the qualitative characteristics which are incorporated into the hedonic model. Hedonic price functions are used to predict prices of new goods, adjust for quality change in price indexes and to measure consumer and producer valuations of different products. They describe the relationship between characteristic of a product and its price. The analytic function is determined by distributions of buyers and sellers and their preferences as well as the structure of competition in the market [Neiheim 2006].

Artworks are heterogeneous assets, with a variety of physical and non-physical characteristics that make them unique, including artist reputation, materials used, the period of production and subjective traits like quality. Therefore the price of an artwork depends on these characteristics. In hedonic approach[7], the value attached to each one of the attributes, that are deemed to be significant in the determination of the price, is estimated and the price index is evaluated employing so called hedonic quality adjustment (HQA). The basic formula for hedonic index (*HI*) is as following:

$$HI_{t+1} = \frac{NI_{t+1}}{HQA_{t+1}} = \frac{\prod_{i=1}^{n}(P_{i,t+1})^{1/n} \Big/ \prod_{i=1}^{m}(P_{i,t})^{1/m}}{HQA_{t+1}} \tag{1}$$

where at time *t*: NI_t – naive price index, P_{it} - the price of the *i*-th artwork, HQA_t – hedonic quality adjustment.

The naive price index (NI) describes "average painting" from the aggregation of all artworks that create the sample representing the art market or it's segment. The hedonic index allows the tracking of short-term price movements and returns in this market. It let us a better understanding of how this market performed over the investigated period. The performance of this market can then be compared to investments in traditional financial assets.

Changes in quality, style, mode and type of the artworks is described by the hedonic quality adjustment which is defined as following:

$$HQA_{t+1} = \exp\left[\sum_{j=1}^{k}\hat{\alpha}_j\left(\sum_{i=1}^{n}\frac{X_{ij,t+1}}{n} - \sum_{i=1}^{m}\frac{X_{ij,t}}{m}\right)\right] \tag{2}$$

[7] Hedonic price indexes are discussed by Nesheim (2006), Triplett (2006) while their application on the art market by Candela, et al. (2004), Kraeussl, van Elsland (2008), Kraeussl, Wiehenkamp (2012) to mention some research provided for developed art markets. However the first attempt to construct hedonic art price indexes for emerging markets was made by Kraeuss, Logher (2008) who consider art markets in China, Russia and India.

where $X_{ij,t}$ - observations of the *j*-the feature characterizing the *i*-th artwork at time *t*, *m* and *n* are numbers of lots sold in the period *t* and *t*+1 respectively, $\hat{\alpha}_j$ - parameter estimates of hedonic regression (pooled regression) that usually takes the following form:

$$\ln P_{i,t} = \alpha_0 + \sum_{j=1}^{k} \alpha_j X_{ij,t} + \sum_{t=1}^{\tau} \beta_t Z_{i,t} + \varepsilon_{i,t} \tag{3}$$

where α_j, β_t - the coefficient values of the characteristic X_j and Z_t, Z_t - time dummy variable, which takes the value 1 if the painting *i* is sold in the period *t* and takes the value 0 otherwise, and ε_{it} - the disturbance term.

One of the underlying assumptions is that the price of an artwork depends essentially on its quality, which is to a great extent quantifiable. The explanatory variables represent characteristics of the objects, such as the artist, size, format, technique, materials, period, subject of the artwork, signature and artist's living status or related to the sale, including auctioneer, location and date of sale. These attributes are usually qualitative so they are represented by dummy variables in (3). The dependent variable in hedonic models is usually the natural logarithm of the sales price. All auctions relating to an artist are included in the calculation in order to avoid selection bias. The time dummy variables can be annual, semi-annual, quarterly or even monthly depending on the frequency of trading. The hedonic approach essentially entails running an Ordinary Least Squares (OLS) regression.

The hedonic regression method therefore controls for quality changes by attributing implicit prices to a set of value-adding characteristics. In other words, hedonic regressions strip the observable characteristics from the artworks to obtain an index reflecting the price of a "standard artwork" [Renneboog, Van Houtte 2002].

Hedonic models require knowledge of the artworks' characteristics and mechanisms driving art prices. The main weakness of this methodology is limitation of attributes used as explanatory variables and arbitrariness of their selection. Therefore application of hedonic index methodology requires decision about:

a) the form of the price index[8], for example Kraeussl, van Elsland (2008) use formula (1) while Higgs (2012) defines hedonic price index in different way;
b) the selection of explanatory variables in the regression model (3) that is connected with the information describing artworks being subject of transaction,
c) the selection of the artwork sample that will be used for art price index evaluation in formulas (1)-(2).

EMPIRICAL RESULTS

The art market in Poland practically did not exist under the communist regime. Although in that time several art galleries and artist associations were operat-

[8] See [Widłak 2010] who presents different forms of the price index.

ing buying and selling art pieces, mostly currently produced by domestic artists or the one from other soviet bloc countries. Art market in Poland started to normalize and develop at the beginning of political and economic transformation in 1989 when new art galleries and foundations together with auction market have been created. In years 1989-2012, number of art auctions increased from 8 to 122. It is worth mentioning that last two decades were characterized by changes in the income distribution and the structure of consumption that caused the increasing of the interest on art market in the Polish society.

Table 1. Structure of Polish art market in the first half of 2012 by mediums and segments

Mediums	Lots [%]	Value [%]	Segments	Lots [%]	Value [%]
Sculpture	2	1	Post-war and contemporary	30	31
Photography	1	0	Ultra-contemporary	44	8
Arts & Crafts	10	5	Art before 1945	26	61
Graphic	14	2			
Drawing	17	20			
Painting	56	72			

Source: own elaboration on the basis of data from [Gajewski, Potocki, 2013, pp. 18-19].

Structure of the art market in Poland in 2012 is presented in Table 1. Paintings are the most popular medium of the Polish art market both in number of lots (56%) and value of transaction (72%). Therefore paintings may be used as representative segment of the Polish art market. "Ultra-contemporary art", which describes young artists (under 40 years old) is distinguished since it creates the majority (44%) of artworks sold but they characterize by low prices, and creates only 8% of total value.

Table 2. Structure of the database: paintings sold on auctions in years 2007-2010

Structure of transactions in years	2007	2008	2009	2010
Number of lots sold	2493 (24%)	2548 (25%)	2427 (23%)	2932 (28%)
Value of transactions [mln PLN]	39.22 (24%)	58.71 (37%)	36.71 (23%)	25.68 (16%)

Source: own elaboration

Hedonic models are estimated employing data[9] from auctions of paintings that took place in Poland in the years 2007-2010. The whole sample contains 10,400 objects produced by nearly 3,000 artists who represent different periods and styles, as well as a great variety of techniques. Taking into account number of lots sold, one should notice that situation is stable i.e. every year these numbers are similar (Table 2). However the highest value of transaction was observed in 2008, and in 2010 it equaled less than 50% of the sales in 2007.

[9] The basic data base from auctions of paintings was constructed by Lucińska (2012).

The range of prices is huge: from 20 PLN for a piece created by J. Jakóbowska (born in 1984) to 1.1 million PLN for an artwork by W. Czachórski (1850 - 1911), with average price for a single lot 8,691 PLN and standard deviation 33,698 PLN. Therefore here a question arises which traded objects should be taken into account and what is the minimal price for a work to treat is as a piece of art.

Description of data and variables

We decided to consider only artworks, painted by the Polish artists who are selected according to the biggest number of lots sold in the investigated period[10], and we assume that minimal average price for an artist should be 2,000 PLN. Employing these criteria the sample of paintings is constructed. It consists of 750 paintings created by 11 artists (see Table 3).

Table 3. List of Polish painters whose artworks created the sample

No.	Author	Count	Value [PLN]	Average value [PLN]	Year of	
		of artworks sold in 2007 - 2010			birth	death
1	Chmieliński Stachowicz Wł.	55	648 200	11 786	1911	1979
2	Dominik Tadeusz	46	608 000	13 217	1928	-
3	Dwurnik Edward	63	431 300	6 846	1943	-
4	Erb Erno	58	816 500	14 078	1890	1943
5	Kossak Wojciech	60	2 027 500	33 792	1856	1942
6	Wyczółkowski Leon	61	3 848 300	63 086	1852	1936
7	Hofman Wlastimil	85	1 817 050	21 377	1881	1970
8	Kossak Jerzy	91	1 261 000	13 857	1886	1955
9	Malczewski Jacek	71	9 401 300	132 413	1854	1929
10	Nikifor Krynicki	79	196 400	2 486	1895	1968
11	Nowosielski Jerzy	81	5 706 700	70 453	1923	2011
	Sum	750	26 762 250			

Source: own elaboration

The biggest number of lots sold in analyzed period were produced by Jerzy Kossak (91) while the highest value of transactions concerns artworks by Malczewski (more than 1 million PLN). In our sample, the lowest average value for the single artwork obtained paintings by Nikifor (2486 PLN). The selected sample covers 7.2% of all lots and 16.2% of the turnover registered in the database. Table 3 contains basic information about "the most liquid" painters whose artworks are used in our research.

In our investigation we select several explanatory variables which are usually applied in hedonic models constructed for the art price. They describe artist's

[10] In the paper [Kompa, Witkowska 2013] sample selection provided due to different criteria is discussed.

and exhibitor's reputation, type and quality of the artwork as well as conditions of the transaction. *Auction house* describes the reputation of auctioneer and this variable is specified as a number of dummies defined name of auctioneer. In our models there are 9 variants of this variable, and the reference variant is: "other auctioneers". Artist reputation is defined by the name of a painter that is represented by the variable *artist* (see Table 3), and "Wyczółkowski" is the reference painter, among 11 artists. Artist's living status is often incorporated to hedonic models since when an artist dies the production stops and prices may rise. We assume that variable *living status* equals 0 if artist is still living when and auction takes place.

Type and quality of the art piece is described by several variables such as: *signature*, *technique* and *surface* of the painting. Technique and materials characterize type of work and this variable is specified as a number of dummies that indicate whether the art piece represents certain type of work. We distinguished 9 variants of the variable and the reference variant is: "other techniques". *Signature* is one of the artworks attributes, it equals 1 if signature is visible. *Surface* [cm^2] of the artwork is the most commonly used variable that describes the physical characteristics of painting. In general the parameters estimates for this variable should be positive however larger works may be difficult to display thus in some models squared surface is applied. In the model we use natural logarithms of surface area or of squared surface.

Conditions of the transaction is represented by two variables: *year* and *price relation*. Year of sale is a set of binary variables defined the year of transaction. In our research we consider 4 years, and the reference variant of this variable is "Year_2010". *Price relation* between reserve and hammer price, this variable equals 1 if the former is bigger than the letter since in such a case sale might not take place (so-called conditional sale).

Hedonic regression

In this paper we present four selected models that are estimated employing OLS method on the basis of described above sample. The models' specification is presented in Table 4, where symbol ● denotes variables present in the certain model, numbers in parenthesis informs about number of variants that are statistically significant for the significance level $\alpha=0.05$, + informs that qualitative or binary variables are significant with positive sign of the parameter estimates.

Models M3 and M4 are characterized by the highest adjusted R^2 and negative value of Akaike's information criterion, which make them the best models from the point of view their statistical characteristics. The specification of the models M1 and M2 is nearly the same, except presence of the variable: *price relation* thus their characteristics are similar. One may notice that the models M2 and M3 differs one from another only by representation of the painting's size (logarithm *surface area* or logarithm *surface area*^{2}) but their statistical properties are completely different that is especially visible comparing Akaike's criterion. While

the models M3 and M4 differ by two variables and the constant term but their characteristics are nearly the same.

Table 4. Comparison of models' specification

Models	M1	M2	M3	M4
const	● +	● +	● +	
year	● (1)	● (1)	●	●
auction house	● (4)	● (4)	● (8)	● (7)
artist	● (9)	● (9)	● (9)	● (9)
signature	●	●	●	●
technique	● (5)	● (5)	● (2)	● (2)
price relation	●	●		
surface area	● +	● +		
surface area^2		● +	● +	
living status		● +		
R^2 adjusted	0.8114	0.8115	0.9953	0.9953
F	101.68	105.07	5071.98	4910.11
Akaike	1269.10	1267.30	-1494.40	-1492.90

Source: own elaboration

Table 5 contains parameter estimates of selected models, stars denote significance level: * α=0.10, ** α=0.05 and *** α=0.01. Artist's *living status* is significant variable with positive sign in model M4. In all models variable *signature* is not significant, as well as nearly all variants of the variable: *year*. Parameter estimates standing by names of all painters, except Malczewski, are negative that is correct since only Malczewski's artworks obtained higher prices than Wyczółkowski. Positive parameters standing by names of auctioneers is also proper because selected auction houses are well-known and seem to be trustworthy thus they organize auction which are selected more often when valuable artworks are subjects of transactions. Taking into consideration sign and significance of selected techniques we notice that oil paintings are usually more expensive than the ones prepared using other techniques.

Table 5. Parameter estimates

Name of variable	Variable variants	Model M1	Model M2	Model M3	Model M4
		Parameter estimates			
const.		**2,788 *****	**2,793 *****	**5,040 *****	
year	YEAR_2007	0,093	0,097	0,008	0,007
	YEAR_2008	0,076 **	0,077 **	0,001	0,001
	YEAR_2009	0,015	0,015	0,002	0,002
auction	AGRAART	0,295 **	0,299 **	0,084 ***	0,083 **

cont. on the next page

Table 5. (cont.) Parameter estimates

house	Desa	0,199	0,201	0,085 ***	0,084
	Desa Unicum	0,408 ***	0,403 ***	0,054 **	0,055 ***
	Okna Sztuki	0,480 ***	0,482 ***	0,071 **	0,070 **
	Ostoya	0,100	0,103	0,065 ***	0,064 ***
	Polswiss Art	0,805 ***	0,797 ***	0,070 ***	0,072 ***
	Rempex	0,090	0,081	0,058 ***	0,061 ***
	Rynek Sztuki	0,017	0,008	0,048 **	0,050 **
signature		-0,044	-0,046	-0,004	-0,004
price relation		-0,027			**-0,007**
surface area		0,565 ***	0,564 ***	**0,048 *****	**0,048 *****
surface area^2				0,564 ***	
artist's living status					**5,041 *****
artist	Kossak_J	**-1,591 *****	**-1,418 *****	**-0,057 *****	**-0,057 *****
	Kossak_W	-0,877 ***	-0,686 ***	-0,032 *	-0,032
	Chmieliski	-1,227 ***	-1,020 ***	-0,060 ***	-0,060 ***
	Dwurnik	-2,282 ***	-2,174 ***	-0,141 ***	-0,141 ***
	Erb	-1,091 ***	-0,812 ***	-0,041 **	-0,042 **
	Hofman	-1,088 ***	-0,848 ***	-0,048 **	-0,048 **
	Malczewski	0,312 ***	0,535 ***	-0,100 ***	-0,101 ***
	Nikifor	-1,333 ***	-0,874 ***	-0,255 ***	-0,256 ***
	Nowosielski	-0,119	0,072	-0,047 ***	-0,047 ***
	Dominik	-1,905 ***	-1,854 ***	-0,060 ***	-0,059 ***
Technique	watercolour	0,197	0,553	-0,015	-0,016
	acrylic	0,698 ***	0,891 ***	0,045	0,045
	gouache	0,285	0,641	-0,002	-0,004
	oil	0,886 ***	1,043 ***	0,056 **	0,056 **
	pencil	-0,246	0,235	-0,070 **	-0,070 **
	pastel	0,450 **	0,746 **	0,034	0,034
	tempera	0,635 ***	0,997 ***	0,030	0,030
	drawing ink	-0,598 **	-0,275 **	-0,017	-0,017

Source: own elaboration

Hedonic art price indexes

In our research we evaluate naive and hedonic price indexes. Parameter estimates of the models (3), presented in Table 5, are used to evaluate hedonic quality adjustment (2), and, finally, price index (1). In Table 6 we present obtained results. Naïve price index is a nominator in relation (1), and describes "average" changes of prices regarding selected artworks in every investigated year. Hedonic quality adjustments (HQA) is evaluated separately for the estimated models therefore also hedonic price indexes depends on the parameter estimates.

Table 6. Hedonic art price indexes

Type of index	Model	Year	HQA	Art price Index	Equity market index*	
					WIG	WIG20
Naïve		2007		1.0000	55 648.54	3 456.05
		2008		1.4984	27 228.64	1 789.73
		2009		0.6163	39 985.99	2 388.72
		2010		0.9441	47 489.91	2 744.17
Hedonic	M1	2008	1.4137	1.0599		
		2009	0.6867	0.8975		
		2010	0.9860	0.9575		
	M2	2008	1.4160	1.0582		
		2009	0.6862	0.8981		
		2010	0.9887	0.9549		
	M4	2008	1.3256	1.1303		
		2009	0.8552	0.7206		
		2010	0.9088	1.0389		

Source: own elaboration and *http://www.gpw.pl/indeksy_gieldowe

Table 7. Percentage returns from different investment assets

Investment in art			Returns			Returns		
Index type	Model	Year	comparison to the		Average annual	comparison to the		Average annual
			(t-1)	2007		(t-1)	2007	
Naïve		2008	49.8	49.8	-4.5	Warsaw Stock Exchange Index WIG		
		2009	-38.4	-7.7				
		2010	-5.6	**-12.8**				
Hedonic	M1	2008	6.0	6.0	-3.1	-51.1	-51.1	-5.1
		2009	-10.3	-4.9		46.9	-28.1	
		2010	-4.3	**-8.9**		18.8	**-14.7**	
	M2	2008	5.8	5.8	-3.2	Warsaw Stock Exchange Blue Chip Index WIG20		
		2009	-10.2	-5				
		2010	-4.5	**-9.2**				
	M4	2008	13.0	13.0	-5.4	-48.2	-48.2	-7.4
		2009	-27.9	-18.6		33.5	-30.9	
		2010	3.9	**-15.4**		14.9	**-20.6**	

Source: own elaboration

Last two columns in Table 6 contain quotations of the market indexes from the Warsaw Stock Exchange (WIG is total return index while WIG20 is blue chip index). Having quotations of stock indexes we may calculate returns that could be

obtained investing on equity market and compare it to the investment on art market.

Therefore we calculate percentage returns for each year (Table 7) as: (1) annual return i.e. in comparison to the previous year (t-1), (20 total return i.e. in comparison to the year 2007, and (3) average annual return as geometric mean from the total return obtained in the year 2010.

It is visible that both equity indexes generated losses in every year of investigation while negative returns on the art market appear in 2009 and 2010. It worth mentioning that naïve price index and hedonic indexes evaluated on the basis of the models M1 and M2 show smaller average annual losses than stock index WIG. While all of them have generate smaller losses than index WIG20.

CONCLUSIONS

Analysis provided in the paper shows that the art market in Poland has been developing since 1989. This market is still immature however it may be attractive for the investors. Presented results justify the opinion that artworks, created by the well-known Polish painters, can be treated as safe asset class, although in the investigated period the returns from treasury bonds were higher (- annually from 4% to 5.75% which depends on mature of the bonds that is from 2 to 10 years). Comparing the returns from the investment in art, represented by hedonic or naive indexes, to returns from WIG and WIG20 we notice that losses from investment in artworks are smaller. We also notice that financial crisis is visible in the Polish equity market in 2008 while in the art market a year later.

Taking into consideration the construction of hedonic regression models, it is visible that the model specification essentially influences hedonic quality adjustment hence it affects evaluation of the art price index which is the artworks' prices proxy. Thus it might be convenient to employ aggregated indexes as it is proposed by Witkowska 2014.

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