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ANALYSIS OF INVESTMENT EFFECTIVENESS ON THE PAINTING MARKET – SCIENTIFIC LITERATURE REVIEW

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ANALYSIS OF INVESTMENT EFFECTIVENESS ON THE PAINTING MARKET – SCIENTIFIC LITERATURE REVIEW

ABSTRACT

In response to the growing interest in the effectiveness of investing in alternative assets, the academic community offers numerous publications on investing in works of art. The purpose of this article is to conduct a critical and comparative analysis of the most significant scientific publications on investment effectiveness in the auction market for paintings and to answer the question of the risk and effectiveness of these investments compared to traditional assets, such as stocks, bonds, real estate, commodities, and others. To achieve this stated objective, a literature review was conducted, covering 35 works that form the canon of global literature in the field of art market research. The primary criterion for selecting the publications was their citation frequency in the subject literature, considered in order of their publication. A supplementary criterion was the market being the subject of the study. Consequently, the selected publications include not only major world paintings in large, mature markets but also previously unexamined paintings and emerging art markets.

No circumstances were found that would definitively allow for the formulation of a thesis presenting art as an attractive investment, particularly over a long-term horizon. The results differ depending on the period under study and the characteristics of the paintings in the research sample. Generally, rates of return are low and subject to high risk. Within a specific time and in a specific market, paintings with certain characteristics can yield higher rates of return and exhibit greater effectiveness than other assets. In mature art markets, this effectiveness was found to be lower than in financial markets but higher than in non-financial asset markets. In contrast, in emerging art markets, investment effectiveness was generally higher than that of both global financial and non-financial markets.

Keywords: art market, investments, effectiveness, financial markets.

JEL Class: G11, G12, G14.

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Introduction

The high prices achieved by paintings at art auctions contribute to an increased demand for knowledge about the factors that determine the value of a work of art, as well as the rates of return and risks associated with investing in art. It should be noted that, although the concept of art is much broader, the term "work of art" as used in this article, refers specifically to a work of painting, and "art market" refers to the auction market for paintings.

There are many publications concerning the "art market" and "art investment." The purpose of this article is to conduct a critical and comparative analysis of the most significant scientific publications regarding investments in the art market and to answer the question of how the risk and effectiveness of investing in works of art have performed in comparison to traditional assets: securities, real estate, commodities, hedge funds, Private Equity funds, and others.

The literature review encompassed 35 items most frequently cited in the subject literature and published in scientific journals such as: Applied Economics, Australian Economic Papers, Cambridge Journal of Economics, Canadian Journal of Economics, Eastern Economic Journal, Economic Inquiry, Emerging Markets Review, International Advances in Economic Research, Journal of Business Research, Journal of Cultural Economics, Journal of Finance, Journal of Political Economy, Management Science, Review of Financial Studies, The American Economic Review, The Economist, The Journal of Alternative Investments, Transformations in Business & Economics a.o., which form the canon of world literature in the field of art market research.

The primary criterion for the selection of publications was their citation frequency in the subject literature. A supplementary criterion was the market being the subject of the study. Consequently, the selected publications feature not only great, world-renowned paintings in large, mature markets such as the American, British, or French one, but also previously unexplored paintings and emerging markets: Canadian, Belgian, South American, Venezuelan, German, Swiss, Polish, Russian, Chinese, Indian, Australian, North African, and Middle Eastern. This approach to selecting publications reflects the chronological and geographical dimensions of the present study.

A list of the articles and journals examined in this work, along with their bibliometric data, is presented in Table 1. The table excludes articles, monographs, chapters in monographs, and reports that do not possess bibliometric indicators. The articles not presented in Table 1 were published in working paper series that are not indexed in the Web of Science and Scopus databases, such as: NBER Working Paper Series, LSF Research Working Paper Series, CFS Working Paper Series, Working Paper VU University Amsterdam, John M. Olin Program in Law & Economics Working Paper. However, they are frequently cited in scientific publications concerning the art market

Table 1

Bibliometric indicators of analyzed articles and journals

Bibliography	Article	Journal
Agnello, R. J. (2002). Investment Returns and Risk for Art: Evidence from Auctions of American Paintings 1971-1996. *Eastern Economic Journal*	Scopus cited by 0 / WoS cited by 0	2023: CiteScore 1.3 / IF – no indicator Indexed: Web of Science, Scopus, SJR 2002: CiteScore, IF - no indicator
Agnello, R. J. & Pierce, R. K. (1996). Financial Returns, Price Determinants, and Genre Effects in American Art Investment. *Journal of Cultural Economics*	Scopus cited by 77 / WoS cited by 0	2023: CiteScore 5.2 / IF 1.9 1996: CiteScore, IF - no indicator Indexed: Scopus, Web of Science
Anderson, R. C. (1974). Painting as an Investment. *Economic Inquiry*	Scopus cited by 126 / WoS cited by 89	2023: CiteScore 3.8 / IF 2.32 1974: CiteScore, IF – no indicator Indexed: Scopus, Web of Science
Barbosa, R. L. & Campos, N. F. (2008). Paintings and Numbers: An Econometric Investigation of Sales Rates, Prices and Returns in Latin American Art Auctions. *IZA Discussion Paper Series*	Scopus cited by 34 / WoS cited by 34	2023: CiteScore 2.2 / IF 1.0 2008: CiteScore – no indicator / IF 0.765 Indexed: Scopus, Web of Science, SJR
Baumol, W. (1986). Economic Issues in the Arts. Unnatural Value: or Art Investment as Floating Crap Game. *The American Economic Review*	Scopus cited by 0 / WoS cited by 0	2023: CiteScore 18.6 / IF 10.5 1986: CiteScore, IF – no indicator, Indexed in Scopus, Web of Science
Białowąs, S., Potocki, T. & Rogozińska, A. (2018). Financial returns and cultural price determinants on the Polish art market 1991–2012. *Acta Oeconomica*, Budapeszt	Scopus cited by 2 / WoS cited by 1	2023: CiteScore 1.4 / IF 0.7 2018: CiteScore 1.0 / IF 0.840 Indexed: Scopus, Web of Science
Buelens, N. & Ginsburgh, V. (1993). Revisiting Baumol's'Art as a Floating crap game. *Working Paper,* Universite Libre de Bruxelles – C.E.M.E.	Scopus cited by 101 / WoS cited by 81	2022: IF 2.8 / CiteScore 4.7 1993: CiteScore, IF – no indicator Indexed: Scopus, Web of Science, SJR
Campbell, R. A. J. (2009). Art as a Financial Investment. *The Journal of Alternative Investments*	Scopus cited by 72 / WoS cited by 64	2023: CiteScore 1.2 / IF 0.4 2009: CiteScore, IF – no indicator Indexed: Scopus, Web of Science, SJR
Chanel, O., Gérard-Varet, L. & Ginsburgh, V. (1996). The relevance of hedonic price indices. The case of paintings. *The Journal of Cultural Economics*	Scopus cited by 113 / WoS cited by 0	2023: CiteScore 5.2 / IF 1.9 1996: CiteScore, IF – no indicator Indexed: Web of Science, Scopus
Fase, M. M. G. (1996). Communications – Purchase of Art: consumption and investment. *The Economist*	Scopus cited by 10 / WoS cited by 4	2023: CiteScore 2.9 / IF 2.4 1996: CiteScore, IF - no indicator

Frey, B. S. & Pommerehne, W. W. (1988). Is Art such a Good Investment?. *The Public Interest*	Scopus cited by 0 / WoS cited by 8	2023: CiteScore, IF - no indicator 1988: CiteScore, IF - no indicator Indexed in Scopus
Garay, U. (2019). Determinants of Art Prices and Performance by Movements: Long-Run Evidence from an Emerging Market. *Journal of Business Research*	Scopus cited by 12 / WoS cited by 15	2024: CiteScore 20.3 / IF 10.5 2019: CiteScore 8.9 / IF 4.874 Indexed: Scopus, Web of Science
Garay, U., Vielma, G. & Villalobos, E. (2017). Art as an investment alternative: the case of Argentina. *Academia Revista Latinoamericana de Administración*	Scopus cited by 8 / WoS cited by 8	2023: CiteScore (Scopus) 2.6, / IF (Clarivate)1.3 2017: CiteScore 0.8 / IF 0.617
Goetzmann, W. N. (1993). Accounting for taste: an analysis of art returns over three centuries. *The American Economic Review*	Scopus cited by 0	2023: CiteScore 18.6 / IF 10.5 1993: CiteScore, IF - no indicator Indexed in Scopus
Higgs, H. (2010). Australian Art Market Prices during the Global Financial Crisis and two earlier decades, *Australian Economic Papers*	Scopus cited by 18 / WoS cited by 16	2023: CiteScore – no indicator / IF 1.2 2010: CiteScore - no indicator / IF 0.388
Hodgson, D. (2011). An analysis of pricing and returns in the market for French Canadian paintings. *Applied Economics*	Scopus cited by 4 / WoS cited by 4	2023: CiteScore 3.8 / IF 1.8 2011: CiteScore 0.9/ IF 0.459
Hodgson, D. & Vorkink, K. (2004). Asset pricing theory and the valuation of Canadian paintings. *Canadian Journal of Economics*	Scopus cited by 47 / WoS cited by 43	2023: CiteScore 2.2 / IF 1.3 2004: CiteScore - no indicator / IF 0.420
Korteweg, A. G., Kräussl, R. & Verwijmeren, P. (2016). Does It Pay to Invest in Art? A Selection-Corrected Returns Perspective. *Review of Financial Studies*	Scopus cited by 56 / WoS cited by 51	2023: CiteScore 16.0 / IF 6.8 2016: CiteScore 7.0 / IF 3.689
Kräussl, R. & Logher, R. (2010). Emerging Art Markets. *Emerging Markets Review.*	Scopus cited by 59 / WoS cited by 56	2023: CiteScore 7.1 / IF 5.6 2010: CiteScore, IF - no indicator
Lucińska, A. (2015). The Art Market in the European Union. *International Advances in Economic Research*	WoS cited by 5, Scopus SNIP: 2015 = 0.522	2023: IF 1.1
Mei, J. & Moses, M. (2005). Vested interest and biased price estimates. Evidence from an auction market. *Journal of Finance*	Scopus cited by 61 / WoS cited by 58	2023: CiteScore 12.9 / IF 7.6 2005: CiteScore - no indicator/ IF 2.549
Renneboog, L. & Spaenjers, C. (2013). Buying Beauty: On Prices and Returns in the Art Market. *Management Science*	Scopus cited by 196 / WoS cited by 187	2023: CiteScore 8.8 / IF 4.6 2013: CiteScore 4.8 / IF 2.524

Renneboog, L. & Van Houtte, T. (1999). The Monetary Appreciation of Paintings: from Realism to Magritte. *Cambridge Journal of Economics*	Scopus cited by 47 / WoS cited by 38	2023: CiteScore 4.3 / IF 2.0 1999: CiteScore, IF - no indicator,
Stein, J. P. (1977). The Monetary Appreciation of Paintings. *Journal of Political Economy*	Scopus cited by 0 / Wos cited by 81	2023: CiteScore 15.2 / IF 6.9 2977: CiteScore, IF – no indicator Indexed: Web of Science
Witkowska, D. (2016). Evaluation of the Individual Hedonic Art. Price Indexes for the Polish Painters Representing the Auction Market in Poland. *Transformations in Business & Economics*	Scopus cited by 2 / WoS cited by 2	2023: CiteScore 2.4 / IF 1.8 2016: CiteScore 0.9 / IF 0.556 Indexed: Scopus
Worthington, A. & Higgs, H. (2006). A Note on Financial Risk, Return and Asset Pricing in Australian Modern and Contemporary Art. *Journal of Cultural Economics*	Scopus cited by 18	2023: CiteScore 5.2 / IF 1,9 2006: CiteScore, IF – no indicator Indexed: Scopus

Source: own elaboration.

The measures of risk and effectiveness in the analyzed publications include the standard deviation of rates of return, the risk-adjusted return (RAR), the beta coefficient (β), and the Sharpe and Treynor ratios. The effectiveness ratios were treated as techniques that combine the rate of return and risk into a single measure (Tarczyński, 1997, p. 155).

Review of world literature

Measures of risk and effectiveness were determined using market rates of return from global or national stock indices, depending on the characteristics of the research samples and the objectives of the studies. Most frequently, these were the following indices: MSCI World Portfolio, MSCI World Equity Index, MSCI Canadian Equity Index, Global Equity Index MSCI World, DAX30, S&P500, and TSX/S&P Composite Index. The excess return on investment over the risk-free rate was typically determined using the annual rates of return on short-term treasury bills, such as the 3M US T-bill rate, 3M German Treasury Bills, and the Bank of Canada Bank Rate. A comparison of the rates of return and the basic measures of risk and effectiveness for investments in the painting market and other assets is presented in Table 2.

Table 2

A Summary of Comparative Research Findings on Rates of Return, Risk, and Effectiveness in the Global Art and Traditional Asset Markets

Author	Characteristics of the research sample: type of painting, sales period, number of transactions/ additional information	Average annual rate of return,[1] risk and effectiveness measures: standard deviation[2] / Sharpe ratio / Sharpe-Israelsen ratio / Treynor ratio / RAR/ β / minimum and maximum values of the rates of return, the standard deviation, Sharpe ratio, β, *RAR,* Treynor ratio[3]	
		Art market	**Traditional asset markets**
Rush (1961)	global painting markets 1. 1925 2. 1925-1929 3. 1925-1930 4. 1925-1933 5. 1925-1935 6. 1925-1940 7. 1925-1945 8. 1925-1950 9. 1925-1955 10. 1925-1960	single-base price index 1. 100% 2. 165% 3. 100% 4. 50% 5. 71% 6. 81% 7. 102% 8. 150% 9. 290% 10. 981%	-
Anderson (1974)	global painting markets, sales in years: 1. 1800-1970 >13,000 lots 2. 1653-1970 1,730 lots 3. 1780-1970 1,693 lots 4. *Old Masters* 1780-1970, 643 lots 5. British paintings of the 18th and 19th centuries 1825-1970, 707 lots 6. Impressionists 1900-1970, 166 lots 7. 20th-century painting 1950-1970, 49 lots	1. RN = 3.3% 2. RN = 4.9% SD = 56.0% 3. RN = 3.7% 4. RN = 4.1% 5. RN = 3.6% 6. RN = 11.0% 7. RN = 22.9%	1. RN = 6.6% 7. 1949-1955: RN = 21.7% SD = 11.6% 1956-1962: RN = 6.8% SD = 12.6%

[1] Nominal average annual rate of return – RN, real annual rate of return – RR.
[2] Standard deviation of rates of return – SD.
[3] Respectively - $RR_{MIN;MAX}$ or $RN_{MIN;MAX}$, $SD_{MIN;MAX}$, $Sharpe_{MIN;MAX}$, $\beta_{MIN;MAX}$, $RAR_{MIN,MAX}$, $Treynor_{MIN;MAX}$.

Stein (1977)	1. American market: 1946-1968, 8,950 transactions 2. British market: 1946-1968, 35,823 transactions *boom* in the art market	1. RN = 10.5% $\beta = 0.82$ 2. RN = 13.1%	1. RN = 14.3%
Baumol (1986)	global painting markets, 1652-1961, 640 lots	RR = 0.55% $RR_{MIN;MAX}$: [-19.0%; 27.0%]	RR = 2.5%
Frey, Pommerehne (1988)	global painting markets, 1,198 transactions 1. 1635-1987 2. 1635-1949 3. 1950-1987 renowned painters	1. RR = 1.5% 2. RR = 1.5% $RR_{MIN;MAX}$: [-16.0%; 26.0%] 3. RR = 1.6% $RR_{MIN;MAX}$: [-19.0%; 16.0%]	1. RR = 3.0% 2. RR = 3.3% 3. RR = 2.5%
Goetzmann (1993)	British market, 2,809 transactions 1. 1716-1986 2. 1900-1986	1. RN = 3.2% 2. RN = 5.2%	1. $RN_{MIN;MAX}$: [1.5%; 4.3%] 2. $RN_{MIN;MAX}$:[0.8%; 5.7%]
Buelens, Ginsburgh (1993)	global painting markets, 5,900 transactions 1. 1700-1961 including: 2. 1700-1869 3. 1870-1913 4. 1914-1949 5. 1950-1961 6. 1700-1961 except years 1914-1949	1. RR = 0.91% 2. RR = 1.09% 3. RR = 3.49% 4. RR = -4.19% 5. RR = 9.63% 6. RR = 2.5%	1. RR = 2.5%
Chanel, Gérard-Varet, Ginsburgh (1996)	global painting markets, impressionism, postimpressionism 245-1,972 transactions 1. 1855-1969 including: 2. 1855-1914 3. 1915-1949 4. 1950-1960 5. 1961-1969	1. RR = 4.9% 2. RR = 6.0% 3. RR = -3.7% 4. RR = 23.8% 5. RR = 4.3%	-
Fase (1996)	19th-century European painting, 1. 1946-1966 2. 1972-1992 3. 1982-1992	1. RN = 11.0% 2. RN = 10.6% 3. RN = 8.6%	1. $RN_{MIN;MAX}$: [1.8%; 6.7%] CPI[4]: 3.5% *p.a.* 2. $RN_{MIN;MAX}$: [11.2%; 14.8%] CPI: 9.5% *p.a.* 3. $RN_{MIN;MAX}$: [0.5%; 19.2%] CPI: 5.7% *p.a.*

[4] CPI - Consumer Price Index.

Agnello, Pierce (1996)	American market, 15,216 transactions, renowned painters 1971-1992 including monothematic: 1. avant-garde painting 2. landscape multi-topic: 3. a.o. seascape 4. a.o. still life	RN = 9.3% 1. RN = 12.6% 2. RN = 0.2% 3. RN = 6.2% 4. RN = 11.3%	$RN_{MIN;MAX}$: [7.4%; 13.1%]
Landes (1999)	Ganz collection, 86 transactions 1. 1948-1986 2. 1948-1989 3. 1948-1997	1. RR = 20.67% 2. RR = 14.29% 3. RR = 11.74%	1. $RR_{MIN;MAX}$: [3.66%; 7.68%] 2. $RR_{MIN;MAX}$: [5.39%; 10.11%] 3. $RR_{MIN;MAX}$: [7.81%; 10.85%]
Renneboog, Van Houtte (1999)	Belgian market, 10,598 transactions, renowned painters 1. 1970-1997 including: 2. oil technique 3. expressionism 4. surrealism 5. impressionism 6. 1970-1989 including: 7. oil technique 8. luminism 9. surrealism	1. RN = 5.6% SD = 19.4% Sharpe = 0.122 2. RN = 7.6% SD = 30.1% Sharpe = 0.227 3. RN = 6.9% SD = 27.5% Sharpe = 0.185 4. RN = 1.9% SD = 52.8% Sharpe = 0.137 5. RN = 3.5% 6. RN = 8.4% 7. RN = 10.2% 8. RN = 11.3% 9. RN = 3.2%	1. $RN_{MIN;MAX}$: [8.3%; 9.2%] $SD_{MIN;MAX}$:[16.0%; 20.6%] $Sharpe_{MIN;MAX}$: [0.285; 0.302] 6. $RN_{MIN;MAX}$: [7.3%; 9.9%]
Agnello (2002)	American market, 1971-1996, 25,217 transactions 1. Total including a.o.: 2. high-end[5] 3. high-end portraits 4. low-end[6]portraits 5. genre painting high-end 6. landscapes	1. RN = 4.2% SD = 23.1% 2. RN = 9.9% SD = 18.0% 3. RN = 7.3% SD = 25.8% 4. RN = 2.0% SD = 18.4% 5. RN = 8.3% SD = 40.2% 6. RN = 2.0% SD = 28.1%	$RN_{MIN;MAX}$: [7.1%; 11.6%] $SD_{MIN;MAX}$: [2.0%; 12.1%]
Hodgson, Vorkink (2004)	Canadian market, 1968-2001, 12,821 transactions, renowned painters	RR = 8.5% SD = 17.3% β = 0.359	$RR_{MIN;MAX}$: [8.6%; 15.5%] $SD_{MIN;MAX}$: [0.3%; 23.7%]

[5] High-end – high-class painting, the most valuable.
[6] Low-end – mediocre, low-value painting.

Edwards (2004)	South American market, 1981-2001, 12,690 transactions, renowned painters 1. Total including: 2. born before 1900 3. born after 1920 4. women's painting (except Frida Kahlo)	1. RR = 9.00% SD = 12.6% β = 0.108 2. RR = 3.90% SD = 20.71% 3. RR = 5.54% SD = 18.26% 4. RR = 32.05% SD = 140.00%	$RR_{MIN;MAX}$: [3.8%; 7.3%] $SD_{MIN;MAX}$: [41.0%; 57.3%]
Mei, Moses (2005)	American market, 4,896 transactions 1. 1950-2000 2. 1900-2000 3. 1875-2000	1. RR = 8.2% SD = 21.3% 2. RR = 5.2% SD = 35.5% 3. RR = 4.9% SD = 42.8% β = 0.718	1. $RR_{MIN;MAX}$: [1.3%; 9.1%] $SD_{MIN;MAX}$: [2.3%; 16.2%] 2. $RR_{MIN;MAX}$: [1.1%; 7.4%] $SD_{MIN;MAX}$: [4.9%; 22.2%] 3. $RR_{MIN;MAX}$: [1.8%; 7.4%] $SD_{MIN;MAX}$: [4.8%; 20.8%] $\beta_{MIN;MAX}$: [0.114; 1.160]
Worthington, Higgs (2006)	global painting markets, 1976-2001, 211,927 transactions 1. Total including: 2. surrealism 3. contemporary painting 4. *Old Masters* 5. British painting of the 20th century 6. impressionism	1. RN = 2.54% SD = 10.12% RAR = 0.29 2. RN = 1.25% SD = 11.31% RAR = 0.16 3. RN = 3.72% SD = 10.47% RAR = 0.40 4. RN = 2.02% SD = 8.26% RAR = 0.28 5. RN = 2.85% SD = 7.24% RAR = 0.42 6. RN = 2.29% SD = 13.86% RAR = 0.24	$RN_{MIN;MAX}$: [6.49%; 16.82%] $SD_{MIN;MAX}$: [2.62%; 15.29%] $RAR_{MIN;MAX}$: [0.83; 2.49]
Kräussl, Schellart (2007)	German market, 1986 – 2006, "great" painters, 1,950 transactions	RN = 1.6% RR = -0.5% SD = 35.2% RAR = 0.18 Sharpe = 0.031 Treynor = 1.116	$RR_{MIN;MAX}$: [2.0%; 8.7%] $SD_{MIN;MAX}$: [1.5%; 29.0%] $RAR_{MIN;MAX}$: [0.213; 3.8383] $Sharpe_{MIN;MAX}$: [-0.465; 0.946] $Treynor_{MIN;MAX}$: [-9.971; 7.892]
Barbosa, Campos (2008)	South American market, 1995-2002, *dot-com bubble*, Sotheby's, 1,663 transactions	RN = 5.23%	
Kräussl, Elsland (2008)	German market, 1985-2007, 61,135 transactions	RN = 3.8% SD = 17.9% Sharpe = 0.0322 β = 0.248 *downside* β = -0.0924	$RN_{MIN;MAX}$: [7.5%; 10,1%] $Sharpe_{MIN;MAX}$: [0.2071; 1.1970] $\beta_{MIN;MAX}$: [-0.031; 1.558]

Campbell (2009)	global painting markets, 1980-2006 1. "giants", 109,000 transactions 2. *Old Masters,* 25,000 transactions 3. impressionism, 22,000 transactions 4. modernism, 63,000 transactions 5. contemporary painting, 21,000 transactions	1. RN = 6.56% SD = 8.08% RAR=0.81 2. RN = 5.52% SD = 7.09% RAR = 0.78 3. RN = 6.30% SD = 13.12% RAR = 0.48 4. RN = 7.55% SD = 7.38% RAR = 1.02 5. RN = 9.00% SD = 9.90% RAR = 0.91	$RN_{MIN;MAX}$: [8.36%; 14.91%] $SD_{MIN;MAX}$: [8.57%; 22.72%] $RAR_{MIN;MAX}$: [0.48; 1.28]
Dürr (2010)	Swiss market, 1993–2009, 5,231 transactions, Christie's, Sotheby's	RN = 3.58% SD = 16.43%	$RN_{MIN;MAX}$: [2.01%; 3.99%] $SD_{MIN;MAX}$: [7.99%; 21.35%]
Kräussl, Logher (2010)	1. Russian market, 1985–2008, 25,524 transactions 2. Chinese market, 1990–2008, 7,172 transactions 3. Indian market, 2002–2008, 2,858 transactions	1. RR =10.00% SD = 26.5% Sharpe = 0.32 β = 0.6526 2. RR = 5.7% SD = 21.1% Sharpe = 0.16 β = -0.2166 3. RR = 42.2% SD = 36.9% Sharpe = 1.14 β = -0.027	1. Russian stock market: RR = 25.77% SD = 69.61% Sharpe =0.62 2. Chinese stock market: RR = 21.73% SD = 117.8% Sharpe = 0.62 3. Indian stock market: RR = 33.08% SD = 27.16% Sharpe = 1.15
Higgs (2010)	Australian market, 1. 1986–2009 2. 2008-2009, Global Financial Crisis 64,203 transactions, renowned painters, quarterly measures	1. RN = 1.17% SD =17.35% 2. RN = -5.85% SD =20.87%	1. $RN_{MIN;MAX}$: [1.54%; 1.86%] $SD_{MIN;MAX}$: [2.19%; 9.78%] 2. $RN_{MIN;MAX}$: [-3.95%; 1.08%] $SD_{MIN;MAX}$: [3.0%; 17.01%]
Hodgson (2011)	Canadian market, 1968-2005, "great" *French Canadian*, 4,135 transactions, oil/acrylic	RR = 4.34% SD = 15.49% β = 0.335	$RR_{MIN;MAX}$: [2.79%; 5.69%] $SD_{MIN;MAX}$: [3.22%; 16.55%]

Renneboog, Spaenjers (2013)	global painting markets, 1,088,709 transactions, oil paintings, renowned painters 1. 1957-2007 2. 1982-2007	1. RR = 4.04% SD =19.05% Sharpe = 0.2000 2. RR = 4.55% SD =18.04% Sharpe = 0.2725	1. $RR_{MIN;MAX}$: [1.06%; 6.63%] $SD_{MIN;MAX}$: [2.11%; 24.19%] $Sharpe_{MIN;MAX}$: [-0.0548; 0.4106] 2. $RR_{MIN;MAX}$: [-0.89%; 9.33%] $SD_{MIN;MAX}$: [7.53%; 16.76%] $Sharpe_{MIN;MAX}$ [-0.1171; 0.7256]
Kräussl (2014)	Turkish, Middle Eastern and North African market, 3,544 transactions, 2000-2012, renowned auction houses	RN = 8.9% SD = 31.5% Sharpe = 2.387 β = 1.103 Treynor = 0.428	$RN_{MIN;MAX}$: [-2.0%; 9.5%] $SD_{MIN;MAX}$: [6.8%; 43.3%] $Sharpe_{MIN;MAX}$: [0.527; 3.934] $\beta_{MIN;MAX}$: [0.815; 1.140] $Treynor_{MIN;MAX}$: [0.257; 0.394]
Dimson, Spaenjers (2014)	British market, world paintings, 1900-2012, renowned painters	RR = 2.4% SD = 12.4%	$RR_{MIN;MAX}$: [0.9%; 5.2%] $SD_{MIN;MAX}$: [6.3%; 19.8%]
Lucińska (2015)	Global Financial Crisis, 2007-2012 1. Polish market, 1,708 transactions 2. British market 3. French market	quarterly rates of return 1. $RN_{MIN;MAX}$: [-56.0%; 121.2%] SD = 83.7% 2. $RN_{MIN;MAX}$: [-6.1%; 3.8%] SD = 6,0% 3. $RN_{MIN;MAX}$: [-4.5%; 2.2%] SD = 3.3%	-
Witkowska (2016)	Polish market, 2008-2013, 17 most liquid painters, 1,710 transactions	RN = -7.62%	$RN_{MIN;MAX}$: [-18.86%; 28.10%]
Korteweg, Kräussl, Verwijmeren (2016)	global painting markets, 1960-2013, 69,103 transactions 1. Total 2. Old Masters 3. American painting 4. Top 100 Artists	1. RN = 6.29% SD = 11.5% Sharpe = 0.11 2. RN = 4.56% SD = 13.8% Sharpe = -0.033 3. RN = 6.83% SD = 10.3% Sharpe = 0.176 4. RN = 9.50% SD = 13.9% Sharpe = 0.323	1. $RN_{MIN;MAX}$: [4.33%; 11.25%] $SD_{MIN;MAX}$: [3.19%; 23.27%] $Sharpe_{MIN;MAX}$: [-0.118; 0.415]
Garay, Vielma, Villalobos (2017)	Argentine market, 1981-2014, 71 liquid painters, 5,069 transactions	RN = 6.81% SD = 29.85%	$RN_{MIN;MAX}$: [8.50%; 29.81%] $SD_{MIN;MAX}$: [10.45%; 88.15%]

Białowąs, Potocki, Rogozińska (2018)	Polish market, 1. 1991-2012 2. 1995-2000 3. 2000-2003 4. 2008-2012	1. RN = 8,7% SD = 15.6% 2. RN = 25.9% 3. RN = -6.2% 4. RN = -3.5%	1. $RN_{MIN;MAX}$: [2.1%; 16.6%] $SD_{MIN;MAX}$: [5.8%; 33.8%] 2. $RN_{MIN;MAX}$: [4.0%; 18.1%]
Garay (2019)	Venezuelan market, 1970-2014, 5,961 transactions, 69 painters	RR = 0.95 SD = 31.6% Sharpe = 0.01	$RR_{MIN;MAX}$: [0.8%; 13.5%] $SD_{MIN;MAX}$: [2.2%; 77.7%] $Sharpe_{MIN;MAX}$: [0.00; 0.40]
Lucińska (2021)	Polish market, 2008-2017, 4,647 transactions, 30 most liquid painters	RN = 1.92% SD = 9.6% Sharpe-Israelsen = -0.0020	$RN_{MIN;MAX}$: [-0.05%; 4.02%] $SD_{MIN;MAX}$: [1.5%; 25.2%] Sharpe-Israelsen $_{MIN;MAX}$: [-0.0102; -0.0010]

Source: own elaboration.

Rush (1961) presented the dynamics of painting price indices for the years 1925–1960. After these indices rose to 165% in 1929, a decline to 50% was observed in 1933, during the Great Depression, and they remained below the 1925 baseline level throughout the years of World War II. The years between 1950–1960 were a period of enormous increases in the indices, which reached a level of 981%.

Anderson (1974) calculated the average annual rates of return for global painting for the periods 1653–1970, 1780–1970, and 1800–1970, finding them to be 4.9%, 3.7%, and 3.3%, respectively. These were significantly lower than the returns on financial assets, for which the average annual rates of return, for example, during the 1800–1970 period, exceeded 6%. Rates of return similar to those for global painting were achieved across different schools and other sales periods; for example, Old Masters[7] paintings sold in the years 1780–1970 and 18th- and 19th-century British paintings sold between 1825 and 1970 were characterized by average annual rates of return of 4.1% and 3.6%, respectively. However, Anderson also noted the existence of periods and schools of painting for which returns were significantly higher than the long-term average. For instance, Impressionist paintings sold between 1900 and 1970 yielded a return of 11.0%, while 20th-century paintings from 1950 to 1970 achieved a return of nearly 23%, surpassing the returns on stocks of American NYSE companies. He concluded that certain movements (e.g., contemporary paintings) could be competitive with financial assets during periods of prosperity in the art market.

Stein (1977) examined the market for American and British paintings for the period 1946–1968. He noted that during the post-war period of prosperity in the art market, the average nominal annual rate of return was approximately 10.5% for American paintings and 13.1% for British paintings, which was not an attractive proposition when compared to the 14.3% return on the British Financial Times Index stocks. He calculated the beta coefficient (β) for the American market to be 0.82, which indicated that an investment in paintings was defensive in nature and less risky than an investment in stocks from the Fisher Index.

[7] Old Masters – European painters active between c. 1300 and 1800.

Baumol (1986) examined the prices of paintings sold in art markets between 1652 and 1961. He published the results of his research with a great sense of timing. In the late 1980s, when the art market was booming, potential investors were informed that over a 300-year period, the average annual real rate of return was 0.55%, lower than the interest rate on British government bonds, which averaged approximately 2.5% per year. Furthermore, the rates of return were highly volatile, ranging from –19% to +27% annually, with 40% of transactions generating an absolute loss and 60% generating a small positive rate of return, lower than the interest rate on government securities. Shortening the investment horizon to 50 years offered a chance for large profits but also posed the threat of large losses. Beyond this period, profitability approached zero.

The research by Frey and Pommerehne (1988) focused on paintings by world-renowned artists. Between 1635 and 1987, the average annual return on investment in painting was approximately 1.5% p.a., while for British government bonds, it reached over 3%. Dividing the study period into two parts, 1635–1949 and 1950–1987, yielded similar results. Not only were the rates of return surprisingly low, but their volatility was also considerable; from 1635 to 1949, they ranged from –16% to 26%, and from 1950 to 1987, from –19% to 16%, exceeding the risk of financial markets.

Goetzmann (1993) examined sales transactions in the British market. In the period 1716–1986, the annual rate of return was 3.2%, exceeding the 1.5% return on British LSE stocks but not matching the 4.3% return on British government perpetual bonds. Between 1900 and 1986, this rate averaged 5.2%, approaching the 5.7% return of the S&P 500 index stocks and surpassing the average annual return on US Treasury bonds, which was 0.8% during this period. The final conclusion concerned the relationship between the investment horizon and the rates of return: over the long term, they achieve lower values. He also noted that the art market, similarly to financial markets, is characterized by business cycles.

The research by Buelens and Ginsburgh (1993) concerned the global painting markets in the years 1700–1961 and in specific sub-periods. Confirming the earlier negative conclusions regarding rates of return (e.g., Baumol (1986); Frey and Pommerehne (1988); Goetzmann (1993); Anderson (1974)), they noted strong fluctuations across various subgroups, such as different movements in painting and sub-periods. Thus, for the entire period studied, the average annual rate of return was 0.91%, with the rate for British painting being 0.57% and for the Impressionists (from 1870 onwards) reaching 2.96%. Between 1700 and 1869, the average annual rate of return was 1.09%, ranging from a 1.03% return for 17th-century Dutch painting to a 2.12% return for British painting. The years 1870–1913 were characterized by an average annual rate of return of 3.49%, with fluctuations ranging from 2.24% for British paintings to 6.26% for the Impressionists. The period of crises and wars, 1914–1949, showed a negative average annual rate of return of –4.19%, ranging from –4.59% for British paintings to –1.59% for 15th-century Italian paintings. The final interval studied, i.e., the years 1950–1961, was a period of prosperity in the art market, when the average annual rate of return was very high at 9.63%, ranging from 0.16% for 15th-century Italian paintings to 23.76% for the Impressionists. In this way,

movements in painting (e.g., Impressionism) and certain periods (e.g., 1950–1961) were identified when higher profitability was achieved. Excluding the crisis years of 1914–1949, it was found that over the entire period studied, the average annual rates of return stood at a level of 2.5%, similar to the average annual interest rate on government bonds.

The annual rates of return determined by Chanel et al. (1996) for Impressionist and Post-Impressionist paintings at global auction houses from the years 1855–1969 varied depending on the sub-periods studied and the size of the research samples. Thus, for the entire period studied, the annual rate of return was 4.9%; for the years 1855–1914, the average rate of return was 6.0%; the period 1915–1949 saw the rate of return take on an average value of –3.7%, confirming the results of earlier research by Buelens and Ginsburgh (1993). In the years 1950–1960, i.e., the art market boom, the average annual rate of return reached a high level of 23.8%, while in the years 1961–1969, it was 4.3%.

Fase (1996) determined the rates of return on 19th-century European paintings. He noted that in the years 1946–1966, the return on investment in paintings, at 11%, offered a significant advantage over the return from the stock market (6.7%) and gold (1.8%). The periods 1972–1992 and 1982–1992 were characterized by nominal annual returns on investment in paintings of 10.6% and 8.6%, respectively. These were lower than the returns on British bonds (11.2% and 16%, respectively), stocks (14.8% and 19.2%), gold (12.9% and 0.5%), and real estate (11.8% and 8.2%). This means that during the art market boom, investing in paintings yielded greater returns than the markets for other assets. In other periods, such a relationship did not hold true. In each of the periods studied, the rates of return on the art market were found to have surpassed inflation.

Agnello and Pierce (1996) determined the rates of return in the market for renowned American paintings for transactions in the years 1971–1992, i.e., during a period of economic growth. The nominal average annual rate of return was 9.3%, while inflation during this period was over 6% p.a. The average annual return on the market for large-cap stocks reached 13.1%, the return on US government bonds was 9.7%, and on T-bills, 7.4%. This means that the research sample included works that yielded a negative real rate of return, as well as those whose rate of return was positive but did not match that of the aforementioned securities. It was noted that the subject matter of the paintings strongly influences the achieved rates of return; certain subjects (e.g., avant-garde paintings, still lifes) are conducive to higher returns, while others (e.g., landscapes) are not.

The factors of investor knowledge and the ability to select paintings with high price-growth potential are the reasons behind the success of the Ganz family collection, a point highlighted by Landes (1999). He determined the average annual rates of return for the periods 1948–1986, 1948–1989, and 1948–1997. In the first period, the rate of return on the Ganz's paintings was 20.67%, whereas S&P 500 large-cap stocks had a return of 3.66% and small-cap NYSE stocks a return of 7.68%. In the second period, the return on the paintings was 14.29%, while the returns on the two stock categories were 5.39% and 10.11%, respectively. In the third period, the return on the paintings stood at 11.74%, while the

respective stock returns were 7.81% and 10.85%. This indicates a significant outperformance of the investment in paintings compared to stocks in all the periods studied.

Renneboog and Van Houtte (1999) studied the Belgian painting market for the periods 1970–1997 and 1970–1989. For the first period, they calculated the measures of return, risk, and effectiveness to be 5.6% (nominal), 19.4%, and 0.122, respectively. During the same period in the capital market, returns ranged from 8.3% for S&P 500 stocks to 9.2% for the European Stock Index, and were thus higher. In the stock markets, the standard deviation ranged from 16.0% to 20.6%. During this period, Expressionist, Surrealist, and Impressionist paintings, as well as oil paintings, also yielded rates of return lower than the securities market, i.e., ranging from 1.9% for Surrealism to 7.6% for oil paintings. Similarly, the Sharpe ratio was lower for the painting market at 0.122, whereas for the stock markets it was within the range of 0.285–0.302. In the shorter period, i.e., 1970–1989, the average annual rate of return on the painting market was 8.4%, which fell within the range of returns in the capital market [7.3%; 9.9%]. Particularly high rates of return during this time were yielded by oil paintings (10.2%) and those representing the Luminist movement (11.3%). Ultimately, it was concluded that, with certain exceptions, return and effectiveness are lower than in the stock market, while the risk is higher.

Agnello (2002) determined the rates of return in the American painting market for the years 1971–1996, focusing on paintings by popular artists that achieve high prices at auction. The average nominal rate of return was 4.2% p.a. and was markedly lower than the rates of return on the S&P 500 stock market (11.6%), 10-year US government bonds (8.5%), 6-month T-bills (7.1%), and the CPI inflation rate (5.4%). Disaggregation of the research sample according to various criteria yields more varied results. For instance, high-end works yield a return of 9.9%, outpacing debt securities. The rates of return for high-end portraits and high-end genre painting are 7.3% and 8.3%, respectively, surpassing US T-bills but not matching S&P 500 stocks and US government bonds. The risk in the market for all paintings studied is high, with an average standard deviation of 23.1%, significantly exceeding the risk indicators for S&P 500 stocks (12.1%) and for long-term (2.0%) and short-term (2.6%) government bonds.

Hodgson and Vorkink (2004) examined the rates of return on paintings by recognized Canadian artists for the period 1968–2001. The average annual real rate of return was 8.5%, which was lower than both the return on Canadian MSCI stocks (15.5%) and on Canadian government bonds (8.6%). The risk in the art market, with a standard deviation of 17.3%, was lower than in the stock market (23.7%) and significantly higher than in the government bond market (0.3%). The positive and weak risk relationship between the painting market and the stock market was confirmed by the beta coefficient (β) value of 0.359. The return and risk in the Canadian art market show values similar to the parameters of the American market determined by Mei and Moses (2005) and differ significantly from those of the British art market as determined by Goetzmann (1993).

Edwards (2004) examined auction records from 1981–2001 in South American countries. The average annual real rate of return for the entire research sample was 9%, whereas the rates of return for

the stock markets ranged from 3.8% in Argentina to 7.3% in Chile and Brazil. The high rate of return may have been influenced by paintings by female artists, which had a rate of return of 32.05%. The standard deviation was 12.6%, which was lower than in the stock markets (ranging from 41.0% in Chile to 57.3% in Argentina). An exceptionally high risk, with a standard deviation of 140%, was associated with paintings by female artists. The beta coefficient (β) of 0.108 indicated a weak response to changes in the rates of return in the capital market.

Mei and Moses (2005) constructed repeat-sales indices for paintings by American artists sold at the Sotheby's and Christie's global auction houses for three periods: 1950–2000, 1900–2000, and 1875–2000. In the first period, the average annual real rate of return was 8.2%, compared to 8.9% for the S&P 500 index, 9.1% for the Dow Jones index, 1.9% for US government bonds, 2.2% for American corporate bonds, and 1.3% for US T-bills. In the second period, the 5.2% return on paintings also fell within the range of 1.1% for the debt securities market to 7.4% for Dow Jones stocks. This was similar to the third period, when the return was 4.9% and fell within the range of 1.8% for T-bills to 7.4% for the stock markets. The risk in the art market was significantly higher. The standard deviation for art was 21.3% compared to a range of 2.3% for T-bills to 16.2% for Dow Jones stocks (1950–2000); 35.5% compared to a range of 4.9% for T-bills to 22.2% for Dow Jones stocks (1900–2000); and 42.8% compared to a range of 4.8% for US government bonds to 20.8% for Dow Jones stocks (1875–2000). The β (beta) coefficient was 0.718, indicating a risk lower than that of the market. These relationships were characterized by returns in the painting market that were higher than those in the debt securities market, but lower than those in the stock market, and were associated with higher risk.

Worthington and Higgs (2006) examined global art markets for the period 1976–2001, disaggregated by artistic movement. The average annual rates of return for art ranged from 1.25% for Surrealism to 3.72% for contemporary painting and were lower than in the financial markets, where returns fell within the range of 6.49% for US T-bills to 16.82% for US small-cap stocks. Standard deviation for art ranged from 7.24% for 20th-century English paintings to 13.86% for French Impressionism. This indicated that in general the risk was higher than for T-bills (2.62%), while in other cases, it was lower than for long-term US corporate bonds (10.51%) and US government bonds (11.68%). However, it was always lower than the risk of the US small-cap stock market (15.29%). The risk-adjusted return (RAR) indicators for art ranged from 0.16 for Surrealism to 0.42 for 20th-century English painting, and were lower than in the financial markets, where they assumed values from 0.83 for long-term government bonds to 2.49 for US T-bills. This is another study demonstrating the outperformance of traditional financial markets over the art market, and at the same time, showing varied risk relationships, where painting is characterized by a higher risk than T-bills but a lower risk than equity and long-term debt securities.

Kräussl and Schellart (2007) studied the market for the most important German painters for the period 1986–2006. They determined the average annual geometric rates of return to be 1.6% (nominal) and –0.5% (real), which was a weaker result than in the markets for other assets, where rates of return

ranged from 2.0% for GSCI gold to 8.7% for the S&P 500 stock market. The volatility of rates of return in the art market was 35.2% and was higher than in other markets, which ranged from a standard deviation of 1.5% for 10-year German government bonds to 29.0% for DAX 30 index stocks. The Sharpe ratio was 0.031, whereas in the financial markets, it ranged from -0.465 for CSFB/Tremont Hedge funds to 0.946 for 10-year US government bonds. The Treynor ratio of 1.116 was higher than that for 10-year UK government bonds (–9.971) and lower than that for 10-year US government bonds (7.892). The investment effectiveness of painting places it between hedge funds, US T-bills, and GSCI gold on one hand, and the European Real Estate Price Index, US, UK, and German government bonds, and stocks on the other.

Barbosa and Campos (2008) examined the rates of return on South American painting during the years of the dot-com bubble, 1995–2002. The research sample comprised paintings by the most recognized artists sold at auctions in New York. The average annual rate of return was 5.23%, which for obvious reasons was lower than the returns on the stock market; however, some caution is advised in interpreting these results due to the short time period covered by the study.

Kräussl and Elsland (2008), based on hedonic indices, determined the rates of return for German paintings from 1985 to the first half of 2007. The average annual rate of return was 3.8% and was subject to a high risk (standard deviation) of 17.9%. During this time, financial assets yielded annual returns in the range of [7.5% for Private Equity (LPX50); 10.1% for CC/Tremont Hedge funds]. The Sharpe ratio was less favorable for the painting market, at 0.0322, compared to 0.2071 for Private Equity funds and 1.1970 for US corporate bonds. The lower value of the beta coefficient (β) at 0.248, compared to the β for Private Equity (1.558), indicates a lower systematic risk in the art market than in the financial market. The negative value of the downside beta (β) indicator, i.e., –0.0924, points to the potential for achieving better rates of return in the painting market when financial markets experience a downturn.

Campbell (2009) studied the market for the "giants" of painting (i.e., the 100 most important painters from various countries and artistic movements) for the period 1980–2006. The average annual nominal rates of return for art ranged from 5.52% for Old Masters to 9.00% for contemporary painting, whereas in the financial markets, returns were in the range of 8.36% for 10-year US government bonds to 14.91% for US corporate bonds. The standard deviations of rates of return in the art market were in the range of [7.09% for Old Masters; 13.12% for European Impressionism], while in the financial markets, this range was formed by values from [8.57% for British 10-year government bonds; 22.72% for US corporate bonds]. This research indicates a lower rate of return in the art market than in the financial markets and reveals more varied risk relationships.

Dürr (2010) determined the average annual rate of return on Swiss painting for the period 1993–2009. It amounted to 3.58% and was lower than the return on HFRI FOF hedge funds (3.62%) and JPM GBI global bonds (3.99%), while surpassing the return on the MSCI World stock market (2.01%). The risk of rates of return in the painting market (16.43%) fell within the range of [7.99% for bonds; 21.35%

for stocks]. This indicates lower returns and higher risk in the painting market compared to the hedge fund and bond markets, and higher returns and lower risk compared to the stock market.

Kräussl and Logher (2010) studied the painting markets: the Russian market from 1985 to 2008, the Chinese market from 1990 to 2008, and the Indian market for the period 2002–2008. In the periods studied, the average rate of return in the art market in Russia was 10.00% versus 25.77% in the Russian RTS stock market; in China, it was 5.70% versus 21.73% in the Chinese SSE stock market; and in India, it was 42.20% versus 33.08% in the Indian BBE100 stock market. The returns in the art markets of Russia and India surpassed the returns obtainable during that time on global financial markets, where they ranged from 4.30% for 10-year US government bonds to 11.09% for CS/Tremont hedge funds. The volatility of rates of return in the art market was 26.5%, 21.1%, and 36.9% respectively, while the risk in the respective stock markets was 69.61%, 117.80%, and 27.16%. The Russian art market is characterized by a positive beta (β) coefficient of 0.6526. In the Chinese and Indian markets, the beta (β) coefficients are –0.2166 and –0.027, respectively, which means that the rates of return are inversely correlated with the rates in the capital markets of those countries.

Higgs (2010) determined the average quarterly rates of return in the Australian art market for the period 1986–2009. The average quarterly return for well-known painters was 1.17%, compared to 1.54% in the Australian stock market and 1.86% in the real estate market. The volatility in the art market (17.35%) significantly exceeded the volatility in the stock market (9.78%) and the real estate market (2.19%). During the global financial crisis of 2008–2009, the level of returns was very low: in the art market, it was –5.85%; in the stock market, –3.95%; while only the real estate market recorded a positive quarterly rate of return of 1.08%. During this time, the return in the Australian paintings market decreased by 7.02 percentage points (p.p.) quarterly, compared to a decrease of 5.49 p.p. in the stock market and 0.78 p.p. in the real estate market. Risk increased unequally, rising to a level of 20.87% in the art market, 17.01% in the stock market, and 3% in the real estate market.

Hodgson (2011) studied the rates of return on oil and acrylic paintings by recognized French-Canadian artists from the period 1968–2005. He determined the average annual rate of return to be 4.34%. This was lower than the return on stocks on the Canadian TSX/S&P exchange (5.69%) and higher than the Canadian interest rate during that time (2.79%). The risk in the art market, with a standard deviation of 15.49%, was similar to the risk in the stock market (16.55%). The beta (β) coefficient was 0.335, which signifies a weak relationship between the rates of return on the paintings market and the Canadian stock market.

Renneboog and Spaenjers (2013) studied the market for renowned global artists for the periods 1957–2007 and 1982–2007. In the first period, the return in the painting market was 4.04%. This did not match the rates of return from the S&P 500 (6.63%) and Global Stocks (6.34%) markets, but it surpassed the returns on the Shiller U.S. real estate market (1.06%), gold (2.35%), T-bills (1.39%), and others. The Sharpe ratio of 0.2000 proved to be lower than in the S&P 500 and Global Stocks markets, where it was 0.4106 and 0.3953, respectively. It was higher than in the real estate market (–0.0548), the

CRB commodities market (0.1780), and the gold market (0.1285). In the years 1982–2007, a real rate of return of 4.55% was recorded, compared to rates of return from the range of [5.77% for DJ US government bonds; 9.33% for the S&P 500]. It was higher than in the markets for gold (–0.89%), commodities (2.06%), and real estate (2.41%). Similarly to the first study period, the Sharpe ratio of 0.2725 was lower than in the markets for global stocks (0.5039), S&P 500 stocks (0.5707), government bonds (0.4503), and corporate bonds (0.7256), but higher than in the markets for gold (–0.1171), commodities (0.0511), and real estate (0.0902). Both the rates of return and the effectiveness in the art market are lower than in the financial asset markets, but more favorable than in the markets for non-financial assets (commodities, gold, real estate).

Kräussl (2014) studied the paintings markets for the period 2000–2012. The analysis covered paintings sold at major auction houses and painted by renowned artists from Turkey, the Middle East, and North Africa (MENA). An average annual rate of return of 8.9% was determined. This was higher than the returns in the markets for Datastream World real estate (–2.0%), MSCI World stocks (2.7%), PE LPX50 funds (4.8%), GSCI commodities (5%), ML corporate bonds (7.6%), and DJ CS hedge funds (8.4%), but lower than the rate of return on Citigroup World WGBI government bonds (9.5%). The risk in the painting market (31.5%) was significantly greater than the risk in the corporate bond market (6.8%) and lower than the volatility in the PE funds market (43.3%). The value of the beta (β) coefficient (1.103) was higher than in the markets for commodities (0.815) and corporate bonds (1.083), and lower than in the government bond market (1.140). The Treynor ratio was 0.428 and was higher than the values in all compared markets, where it ranged from 0.257 for stocks to 0.394 for the real estate market. The Sharpe ratio was 2.387 and was higher than in the markets for PE (0.527), commodities (0.582), real estate (0.907), and stocks (0.645), but lower than in the markets for hedge funds (2.727) and government bonds (3.934).

Dimson and Spaenjers (2014) compared the return and risk of investing in paintings and other collectible assets, such as stamps. They determined the average annual real rates of return in the British paintings market for the period 1900–2012. It achieved 2.4%, surpassing the returns on T-bills (0.9%), World Gold Council gold (1.1%) and bonds (1.5%), but not matching the rates of return in the philatelic market at 2.8% (Dimson and Spaenjers, 2011) or for global CSR stocks at 5.2%. The standard deviation of returns on paintings was 12.4%, exceeding the risk of the US T-bills market (6.3%) but not matching the risk for gold (16.6%) and stocks (19.8%).

Lucińska (2015) compared the quarterly rates of return in the Polish, British, and French painting markets for the years 2007–2012, i.e., the period preceding the global financial crisis and immediately following it. In the Polish market, they ranged from [–56.0%; 121.2%], compared to the much smaller range of returns in the British market [–6.1%; 3.8%] and the French market [–4.5%; 2.2%]. This is consistent with the high value of the standard deviation in the Polish market (83.7%) compared to the corresponding values in the British (6.0%) and French (3.3%) markets. The stable rates of return in Great Britain and France contrast with the highly volatile Polish market. The returns in the British

and French art markets move in parallel with the course of the global financial crisis. Returns in the Polish art market remain unstable and highly volatile, reacting to the crisis with a one-year delay.

Witkowska (2016) determined the average annual rate of return for the years 2008–2013 for the most liquid painters in the Polish auction market. For the artists selected for the research sample, the result was negative; during this period, investing in paintings yielded losses at a level of –7.62%. This was a better result than the WIG stock market (–18.86%) but worse than the market for Polish treasury bonds (28.10%).

Korteweg et al. (2016) determined the rates of return in the global auction market, i.e., across 350 auction houses, for the period 1960–2013. The average annual rate of return for the entire sample was 6.29%, the standard deviation was 11.5%, and the Sharpe ratio was 0.11. When disaggregated by category, the rates of return ranged from 4.56% for Old Masters to 9.50% for the Top 100 Artists. During this time, Global Equities yielded a return of 11.25%, DJ corporate bonds 8.72%, WBG Commodities 8.63%, Shiller U.S. real estate 4.33%, and T-bills 5.02%. The risk for art was in the range of [10.3% for American paintings; 13.9% for the Top 100 Artists], compared to a wider variation in the financial markets: [3.19% for the T-bills market; 23.27% for the commodities market]. The Sharpe ratio for art ranged from –0.033 for Old Masters to 0.323 for the Top 100 Artists, compared to values from –0.118 in the real estate market to 0.415 in the corporate bond market. The group of the most expensive painters, the Top 100 Artists, stands out with a higher return than financial markets (with the exception of the global stock market) and greater effectiveness than the real estate and commodities markets.

Garay et al. (2017) studied the market for paintings by recognized Argentine artists for the period 1981–2014. They determined an average annual rate of return of 6.81% and a standard deviation of rates of return at 29.85%, a high level typical for emerging markets. While Total S&P 500 Argentina stocks were much more profitable (29.81%) than both the Argentine art market and the American stock market, their risk stood at an astronomically high level of 88.15%. During this period, the US financial markets were characterized by a different relationship between rates of return and risk, i.e., lower returns and lower risk. The return on 10Y US Treasury Bonds was 8.50% with a volatility of 10.45%, and the rates of return in the Total S&P 500 US stock market stood at 12.66% with a volatility of 16.86%.

Białowąs et al. (2018) studied the Polish art market. They determined the aggregate rates of return for sales transactions of paintings (74.3% of transactions), drawings (25.5%), and collages (0.3%) for the years 1991–2012. The average annual arithmetic rate of return in the art market was 8.7%, surpassing the return on Forex PLN/USD (2.1%) and the interest rate on annual deposits (7.9%), but not matching the returns on Polish WIG stocks (16.6%), Mennica Polska gold (11.3%), and 52-week treasury bills (9.8%). In the category of risk, the art market (with a standard deviation of returns of 15.6%) shows similarity to gold (14.2%), exceeds the risk of the Forex market (13.1%), treasury bills (6.5%), and deposit interest rates (5.8%), but does not match the risk of WIG stocks (33.8%). The Sharpe effectiveness ratio has a negative value in the art market. The analysis of returns by sub-periods indicates that only the years 1995–2000 brought the art market an advantage over other assets, with a rate of return

of 25.9% compared to the other rates, which were in the range of [4.0%; 18.1%]. In the other's ub-periods, the rates of return are at the lowest level among all assets: –6.2% in 2000–2003 and –3.5% in 2008–2012.

The Venezuelan painting market for the period 1970–2014 was studied by Garay (2019). The return achieved an average level of 0.95%, surpassing the rates of return on US T-bills (0.8%) but not matching the returns on US government bonds (3.4%), crude oil (6.3%), American S&P 500 stocks (7.6%), and Venezuelan stocks from the Caracas Stock Exchange (13.5%). The high risk (31.6%) exceeded the volatility of rates of return for T-bills (2.2%), US bonds (9.9%), US stocks (17.1%), and crude oil (25.4%), while not matching the risk of Venezuelan stocks (77.7%). The Sharpe ratio placed the effectiveness of the Venezuelan art market (0.01) behind Venezuelan stocks (0.16), crude oil (0.22), US government bonds (0.27), and US stocks (0.40), but ahead of T-bills (0.00).

Lucińska (2021) studied the Polish market for the most liquid painters for the period 2008–2017. The average annual rate of return was 1.92%, placing it in second place, behind 5-year State Treasury bonds (4.02%) but ahead of the NBP (National Bank of Poland) returns on the real estate market (0.5%) and WIG20 stocks (–0.05%). The risk in the art market was 9.6% and was second only to WIG20 stocks (25.2%), surpassing the real estate market (2.9%) and treasury bonds (1.45%). The Sharpe-Israelsen ratio was negative with the value of –0.0020, behind real estate (0.0010) but ahead of WIG20 stocks (–0.0102).

Summary of Research on the Global Art Market

Factors conducive to higher returns in the art market than in financial markets have been identified. These pertained to the period covered by the study, selected characteristics of the purchased paintings, the assets used as a benchmark, and the specific nature of the art market.

The results of art market research indicate that long-term investment in paintings is less profitable than short-term investment, although better results can be obtained by investing in works of art representing a specific country or movement in painting (Sawicki and Borowski, 2018, p. 99–100). This conclusion is very general and requires further specification. Generally, long-term investments in the paintings market are characterized by average annual rates of return that are lower than those in securities markets, and especially in stock markets. Investment effectiveness is also unfavorable for the art market, as demonstrated by the majority of the discussed studies (e.g., Anderson (1974), Stein (1977), Baumol (1986), Frey and Pommerehne (1988), Renneboog and Spaenjers (2013), Worthington and Higgs (2006), Kräussl and Elsland (2008), Kräussl and Logher (2010), Renneboog and Spaenjers (2013), Korteweg et. al. (2016)).

Within a specific timeframe, paintings possessing certain characteristics can yield a rate of return higher than that of other assets. The most common period covered by the samples is several decades, though studies have also been described that concern a few years (Witkowska (2016)), over

a decade (e.g., Buelens and Ginsburg (1993), Chanel et al. (1996), Fase (1996), Kräussl (2014)), or several hundred years (e.g., Anderson (1974), Baumol (1986), Frey and Pommerehne (1988), Goetzmann (1993)). Over the long term, upward and downward trends occur cyclically in the art market (Goetzmann (1993)). Studies covering a period of several hundred years (Baumol (1986)) indicated that the investment effectiveness of paintings was close to zero. This is not surprising when considering the history of the world, and of Europe in particular, which is full of wars, economic crises, and other tragedies that inevitably disrupted the art world and the art market (Chanel et al. (1996)).

In shorter periods (e.g., several decades), both strongly positive and negative rates of return were possible (Baumol (1986), Frey and Pommerehne (1988)). During periods of growth in the art market (e.g., in the years 1950–1961), the return in the painting market was higher than or equal to that of securities markets and other assets (e.g., Rush (1961), Anderson (1974), Goetzmann (1993), Buelens and Ginsburgh (1993), Chanel et al. (1996), Fase (1996)). The rate of return in the paintings market reached a level similar to that achieved in securities markets (primarily in the government bond or T-bills markets) when years such as 1914–1949 were excluded from the research sample (Buelens and Ginsburg (1993), Chanel et al. (1996)). Crises in financial markets caused a greater decline in effectiveness in the art market than in the stock (Rush (1961)) and real estate markets (Higgs (2010)).

It was noted that selected thematic groups, movements, and periods in painting, as well as the quality of the paintings, can positively influence the profitability of an investment. For example, the rates of return on avant-garde painting and still life were, in a specific period, higher than the returns on debt securities (Agnello and Pierce (1996)). Investments in Belgian oil and Luminist paintings had higher rates of return than stocks (Renneboog and van Houtte (1999)). The high-end portraits and genre painting yielded higher rates of return than US T-bills (Agnello (2002)). The investments in contemporary painting by the 'giants' of world painting were more profitable than US government debt securities (Campbell (2009)) and the stocks of American companies (Anderson (1974)). In cases of exceptionally high-quality painting, the rates of return were extraordinarily high, as exemplified by the history of the Ganz collection (Landes (1999)).

Stocks are more profitable than paintings, especially during periods of rapid asset price growth in the capital markets, such as the dot-com bubble of 1995–2001 (Barbosa and Campos (2008)). In selected periods and for selected research samples (e.g., particular movements in painting, the Top 100 Artists, MENA painters), the outperformance of painting's returns was noted over investments in T-bills (Mei and Moses (2005)); bonds and hedge funds (Dürr (2010)); gold (Fase (1996), Kräussl and Schellart (2007), Renneboog and Spaenjers (2013), Dimson and Spaenjers (2014)); commodities (Renneboog and Spaenjers (2014)); and real estate (Fase (1996), Higgs (2010), Rennebog and Spaenjers (2013), Korteweg et al. (2016)). An inverse relationship between the returns on painting and bonds was also observed (Baumol (1986)). The outperformance of art market returns over the inflation rate and interest rates (e.g., Fase (1996)) was stated, which allows for the use of artworks as a hedge against inflation.

The specific nature of emerging art markets is that extraordinarily high rates of return can be achieved on them, higher than those obtainable in global financial markets. This has been the case, for example, in the art markets of South America (Edwards (2004)); Russia, China, and India (Kräussl and Logher (2010)); Poland (Lucińska (2015)); and the MENA countries, where even during the years of the global financial crisis, only price increases were observed (Kräussl (2014)). This conclusion does not apply to the Polish market before 2017 (Witkowska (2016), Lucińska (2021)).

Risk in the art markets is varied. Generally, the standard deviations of rates of return in the painting markets are greater than the standard deviations in the securities markets (Frey and Pommerehne (1988), Mei and Moses (2005), Agnello (2002), Worthington and Higgs (2006), Kräussl and Schellart (2007), Campbell (2009), Higgs (2010), Renneboog and Spaenjers (2013)). This observation pertains to mature global painting markets and renowned auction houses (e.g., Sotheby's or Christie's). However, this relationship depends on the type of security used as a benchmark. Thus, the volatility of rates of return in the Canadian painting market was lower than the volatility in the Canadian stock markets (e.g., Hodgson and Vorkink (2004), Hodgson (2011)), but higher than in the S&P 500 stock market (Renneboog and Van Houtte (1999)), interest rates (Hodgson (2011)), bonds (e.g., Hodgson and Vorkink (2004), Dürr (2010)), T-bills (e.g., Dimson and Spaenjers (2014), Korteweg et al. (2016)), gold (Dimson and Spaenjers (2014)), and commodities (Korteweg et al. (2016)). These relationships were shaped differently in emerging markets, e.g., in Poland (Lucińska (2015)), in Russia and China (Kräussl and Logher (2010)), and in the countries of the Middle East and North Africa (Kräussl (2014)), where the risk in the art markets was lower than the risk of securities. Periods of financial crises involve a greater increase in risk in the art market than in financial markets (Higgs (2010)).

The relationships of the Sharpe ratio in the art market and other asset markets were varied. The values of this indicator in mature art markets were lower than in the markets for stocks (Renneboog and Van Houtte (1999), Kräussl and Elsland (2008), Renneboog and Spaenjers (2013)), US government bonds (Kräussl and Schellart (2007), Kräussl (2014)), and hedge funds (Kräussl (2014)), but higher than in the markets for non-financial assets, e.g., commodities (Renneboog and Spaenjers (2013)), gold, real estate (Kräussl and Schellart (2007)), and others. In the emerging art markets of MENA, investment effectiveness was more favorable than in the global markets for stocks, PE funds, commodities, and real estate (Kräussl (2014)).

Most often, the beta (β) coefficient fell within the range of (0, 1), indicating a lower risk in the art market than in financial markets and the defensive nature of art as an investment. Exceptions apply to the emerging MENA markets, with a beta (β) coefficient > 1, indicating the potential for a strong reaction to changes occurring in financial markets and the aggressive nature of investment in painting (Kräussl (2014)).

Conclusions

Based on the research presented, final and exhaustive answers to the questions about painting as an investment asset have not been formulated. No strong evidence has been found to support the thesis of art as an attractive investment, particularly over a long-term horizon. The results differ from one another depending on the methodology adopted for determining rates of return, the period, and the paintings included in the research sample. Generally, the rates of return are modest and are subject to high risk.

However, a detailed analysis of the discussed studies has made it possible to identify factors that are conducive to higher returns in the art market than in financial markets. Within a specific time and in a specific market, paintings possessing certain characteristics have yielded a rate of return higher than that of other assets. The effectiveness of investing in paintings was varied; in mature art markets, it was lower than in financial markets but higher than in the markets for non-financial assets. In emerging art markets, investment effectiveness was more favorable than in the global financial, commodity, and real estate markets.

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