

# Price formation of autographs of famous persons at stationary and online auctions in Poland before, during and after the Covid19 pandemic - influence of selected factors.

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**Abstract**— Autographs of famous people constitute an interesting, albeit small, branch of the art market. Due to the limited number of works on the subject, the consideration of factors that can affect the price formation of these goods is important. The article analyses the results obtained from the Polish market for the last 7 years. In the study, measures used in finding pairwise correlations were used to identify potential relationships between characteristics. The results indicated relationships between the asking (and final) price and such factors as: the popularity of the person signing the document, the time of the document's creation and the impact of the Covid19 pandemic. The paper also proposed a special popularity ranking of famous people based on the Google Trends tool. In addition to the above-mentioned main factors, a set of other features of the document was analysed to a limited extent, taking into account, among others: the state of preservation, format or content of the document.

**Keywords**— autographs, art market, famous people, price, artwork, auction.

## I. INTRODUCTION

Collecting autographs of famous people is a relatively well-known hobby. In its popular version, available to a wider range of interested people, it is often limited to collecting signatures of currently living athletes or musicians. This relatively inexpensive hobby is often related to young people wanting a memorabilia of their "idol" and passes with age. However, professional collecting of autographs is, in many of its aspects, a completely different form of collecting - often requiring considerable financial investments. Thanks to the Internet, professional collectors of such documents have access to a number of portals with huge turnovers (for example, (RRAuction 2023)). This does not change the fact that

documents written (or just signed) by famous people are most often encountered in the context of broader bibliophilic auctions, so it concerns the rare book market. It is even difficult to draw a clear line between auctions of both types of goods. It should be added that the very concept of rare books is often discussed in the literature (for example, (Berger 1987; Lieberman 1996; Rodrigues and Como 2006; Robinson 2012)). In addition, the issue of investment in the rare book market has been the subject of research for many years, and usually refers to specific categories of books - e.g. economics, medical, comic books, etc., (for example, (Gottlieb 1953; Liebert 1981; Norman 1985; Michaelis 1987; Birmingham 1998; Kells 2003; Deltas and Kosmopoulou 2003; Rudd 2009; Wyburn and Roach 2012; Ursprung 2021)). Rare books, collecting them and treating them as a form of investment, are distinctive and different from those branches of the art market that record the highest turnover, i.e. the painting or sculpture market. Many factors can affect the value of a book. The case is often analogous for manuscript documents. Taking into account the guidelines presented in ACRL (2016), the term associated with the rarity of a specific old document is used to describe a particular item according to one or any combination of the following criteria: market value, rarity and scarcity, date and place of publication, physical and intrinsic features, bibliographic and research value (historical, cultural or intellectual), condition, but obviously - who the author is. Due to the - most often - uniqueness of a particular document, we can often determine its value based on the smallest details, which can often only be observed by eye. This feature of the market also means that there is a dense network of collectors and antiquarians - and traveling to study the characteristics of items is very important. The bibliophile market in Poland also

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has its own characteristics. There are surprises for sellers and buyers. After World War II, numerous private and public books collections were dispersed as a result of regime and border changes. Books and documents claimed by the former owners went into commerce (Belke and Miliszewicz 2011).

The bibliophile market itself was also significantly changed by the Covid19 pandemic. It not only affected social relations issues, but also significantly changed the functioning of the economy. Many indicators related to economics, finance or social interaction have been severely disrupted by the emergence of this disease (Baker et al. 2020b). It has caused a rising tide of uncertainty about the behaviour of markets (Baker et al. 2020a). All this has confirmed that COVID-19, since it appeared, has become the first of the global problems of the 21st century (Altig et al. 2020). Various types of measures implemented by the authorities of many countries were one of the elements to control the negative effects of the pandemic (Barthe-Dejean 2021). These measures were intended to provide positive incentives to stabilize the financial sector, but nevertheless changed the entire paradigm of global economic interactions (Barthe-Dejean 2021). These changes, as well as emerging inflationary pressures, have forced many players to seek new instruments to diversify their investment portfolios. Among these instruments were tools for investing in the art market. The art market, after initial declines in turnover, closed at \$347 billion in 2020 and reached \$405 billion in 2021 (with forecasts of \$553 billion in 2025) (AGMR 2021). The initial declines were influenced by blockades and closures of public spaces (Hale et al. 2020), social distancing measures to limit human interaction (Sikali 2020), and restrictions on cross-border activities (Fry et al. 2020). However, these obstacles have led to attempts to adjust the art market by introducing new mechanisms of operation, such as by moving stationary auctions to online platforms; thus, the market share of new auction mechanisms has increased at least several times (Maciejewska-Bogusz 2021). The currently available literature attempts to describe global changes in this market (Bourron 2021; Wang 2021), as well as local changes (e.g., Australia (Archer and Challis 2022), Belgium (Kalbermatten and Rausch 2021), Poland (Zakonnik and Czerwonka 2022), United Arab Emirates (Grinstead 2021), Spain/Portugal/Brazil (Duarte et al. 2021)). The changes described in the aforementioned literature indicate (as mentioned earlier in the article) the flexibility to transform one form of sales (traditional sales) into another (online sales), as well as the potential for increased turnover, which provides opportunities for investment success. However, there are also articles indicating that the transformation of the sales form has not changed the long-term trend of investment returns in the art market (Tuszko 2021), while others point to – for example - the speculative bubble (Zakonnik et al. 2022). The

most commonly described segment of the art market in the literature is the market for paintings (for example (Anderson 1974; Pénasse et al. 2021)). Of course, it should not be forgotten that the literature also covers other market segments, such as coins (Dickie et al. 1994), stamps (Cardell et al. 1995), and even wine (Ashenfelter 1989).

In the presented article, the authors intend to enhance the knowledge of unique documents signed by famous people in the context of specific factors affecting the price. An important element is also an attempt to include in the consideration of the effects of the Covid19 pandemic as well as the use of online auctions.

## II. MATERIALS AND METHODS

The data collected covers a period of 7 years (from June 2016 to June 2023). The decision to choose such a period was dictated by the desire to collect data before the COVID19 pandemic (about 3.5 years) and during its 3.5-year duration (WHO officially announced the beginning of the pandemic in March 2020 and the end in May 2023 (WHO 2023)). The data on which the work was based concerned the Polish market and came from catalogues as well as official result tables of the vast majority of Polish antiquarian bookstores (which held nationwide, cyclical bibliophilic auctions during the mentioned period). In the period before the pandemic, the offers of 11 entities were taken into account (data on their cyclic auctions from that period was based on information from the portal (Portolan 2023)). During the pandemic period, all auctions that were previously held stationary moved to a nationwide art auction portal (OneBid 2023) (except for one antiquarian bookstore, which already offered online auctions on its own platform before the pandemic (Secretera 2023) - its results are also included in the article). The study, due to the limited availability of data, did not take into account transactions carried out on an ongoing basis at individual antiquarians as well as offers available on, for example, non-specialized auction portals (such as the Polish version of ebay).

During the time period included in the study, data was collected on 606 documents signed by famous persons. Of these offers, 473 were sold (more than 78%). In fact, there were more offers collected, but those that posed a problem in interpretation were excluded. Such problematic offers included documents that were signed by more than one well-known person, or those that constituted some sort of collection (such as a collection of letters from a well-known person). Thus, an effort was made to include individual documents. A more detailed characterization of the collected data is presented in the table below.

TABLE 1. DETAILED CHARACTERIZATION OF THE COLLECTED DATA.

Year of the offer	2016	2017	2018	2019	2020	2021	2022	2023
Quantity	67	79	76	51	100	104	76	53
%	11,1	13	12,5	8,4	16,5	17,2	12,5	8,7

Year of the offer	2016	2017	2018	2019	2020	2021	2022	2023
Category of activities of a well-known person	church	King/Queen	royal spouse	culture	politics	„great person”	monarchs	army
Quantity	38	148	13	126	40	146	32	63
%	6,3	24,4	2,1	20,8	6,6	24,1	5,3	10,4
Document creation period	16th century	17th century	18th century	19th century	20th century (until the end of World War II)	20th century (after the end of World War II) or 21st century	20th or 21st century combined	
Quantity	16	49	142	116	121	162	283	
%	3%	8%	23%	19%	20%	27%	47%	

Source: own elaboration.

Analysing the frequency with which documents were offered in each year, it can be seen that the number of documents usually oscillated between 76 and 104 (2016 and 2023 do not meet this assumption - nevertheless, it should be remembered that the data for these years is partial, and it is possible that for the entire period it would be consistent - especially since the second half of the year is usually richer in the number of available offers (Zakonnik et al. 2022). The only year that was a clear outlier was 2019 (it is difficult to indicate a specific reason for this). It is worth noting that the pandemic's peak years (2020 and 2021) also stand out, where the number of offers was clearly the highest. This observation will be discussed later in the article.

In the process of data collection, the need for a certain classification of people who signed the document was considered a formal problem. Many times a person could be classified into at least 2 groups (categories). The least problem was people associated with the world of culture or science. Only secular people were included among politicians (although, for example, sometimes the political activities of people associated with the church could be indicated). In the case of the military, those were included who were not later politicians (and were not kings, who, after all, occasionally waged wars). The group of kings included persons who ruled in real (at least formally) in Poland. The group of monarchs included people who ruled in countries other than Poland. The biggest problem was the group of "greats" included persons well known from history (if only on the basis of information placed in basic history textbooks in Poland), but not the people who ruled (as qualified for the previously mentioned groups).

In the case of the period of the document's creation, it turned out that the earliest documents offered were from the 16th century. However, the 16th century as well as the 17th, constituted a decided minority among the offerings that were found. In the analyses made, sometimes the two periods were treated together. The 20th century (and 21st) was divided into before and after the Second World War. Such assumptions yielded fairly equal groups (nevertheless, the 16th as well as 17th centuries were clearly in the minority anyway in terms of the number of offerings examined).

The issues discussed above provide a formal description of the data collected. Further analysis concertedly determines the statistical relationships between the various additive variables identified in the study, listed in the table below.

TABLE 2. VARIABLES/FACTORS IDENTIFIED IN THE STUDY.

Name of variable/factor	Description
Person's name	The name of the person whose autograph appears on the document. The study did not refer to this data directly.
Category	There were categories: kings and queens, royal spouses, non-Polish monarchs, military men, politicians, church people, people of culture and science, and "greats."
Popularity	The number of points given to a person based on their popularity (special rating based on google trends tool)*.
Frequency	Frequency of appearance of a person's documents at the analysed auctions.
Date of document creation	Date of document creation. Based on it, additional variables were created, such as those indicating the century the document was created.
Language	The language in which the document was created. Based on it, additional variables were created to indicate whether, for example, the document was created in a language other than Polish or Latin.
Year of the offer	Additional variables (e.g., Covid19** pandemic period) were highlighted based on this variable.
Country	The country indicated in the document as the place of issue.
Starting price	Asking price in Euros (adjusted for inflation).***
Final price	The price achieved in the auction in Euros (adjusted for inflation) - or a value of 0 if the document has not been sold.***
Type of document	Type of document. An effort was made to classify the document into a specific category, e.g.: official document, private correspondence, etc. Based on it, additional variables were created.
Additional document features	In practice, information was marked whether the document had a seal (state or personal).
Document's state of preservation	The general state of preservation of the document (distinguished states: without losses, with minor losses or after visible preservation, with major losses but no loss on the text, with major losses causing loss on the text). Used to create additional variables.
Format of the document	Document format (compared to a sheet of paper roughly A4 size: multi-page document, large over a standard sheet of paper, sheet of paper, part of a sheet of paper, the signature itself).

\* Popularity was determined based on the Google Trends tool (<https://trends.google.pl/trends/>). This tool shows the popularity of a given query (in this case, the name of the analysed person) in a given period (in the study from 06.2016 to 06.2023) in a given area (in the study - for Poland). The tool also allows you to compare the popularity of two (up to five) keywords in the studied time period against each other. Based on the data obtained in this way, it is possible to arrange a kind of ranking of the popularity of people in the context of searching for information about them in google search in Poland. Thus, it was found that the most "popular" person was - considered the greatest Polish poet - Adam Mickiewicz (22500 points). He was ahead of the Polish Pope John Paul II (20000 points) and the great Polish politician and

military man - Jozef Pilsudski (15000 points). The Polish writer, four-time Nobel Prize nominee Stefan Zeromski, was chosen as the base person (he was awarded 1,000 points, which means that queries about Adam Mickiewicz were made 22.5 times more often than about Stefan Zeromski).

\*\*The article mentions the official duration time frame of the Covid19 pandemic. However, formal restrictions (e.g., on human contact) had already been lifted before the time of the official end of the pandemic. Therefore, the 2020-2022 period was considered the pandemic years.

\*\*\* Offers were for the Polish market and the price was expressed in PLN. Accordingly, all prices were converted to Euros at an exchange rate of 4.30. Source: own elaboration.

In the part of the article that discusses the obtained results, the main focus was on the assessment of pairwise correlation of selected factors/variables. To assess the correlation, Pearson's linear correlation coefficient was initially used, followed by the rho-Spearman coefficient, which allowed to verify the nature of the relationship (linear, curvilinear) (Roszkiewicz 2011 pp. 236-237). Due to the similar results obtained for both measures (thus indicating quasilinear relationships), the rho-Spearman coefficient was selected for analysis (as appropriate for variables of an ordered ascending rank nature). To assess the significance of the established correlation relationship, a pair of hypotheses was verified based on the t-Student's test with an assumed significance level of no more than 0.05. However, the paper also reported results where the level did not exceed 0.1, considering them pointing to a certain statistical trend (e.g., (Pritschet et al. 2016)). The rho-Spearman coefficient is in the range <-1;1> and allows estimating the strength and direction

of the relationship between factors. A positive value of the coefficient indicates the stimulant of a factor, a negative one the destimulant. The absolute value of the coefficient for the level up to 0.2 says that there is a very weak relationship between factors. A value in the range of 0.2 to 0.4 indicates a clear but low relationship. A value between 0.4 and 0.7 indicates a moderate dependence. A value between 0.7 and 0.9 indicates a strong dependence and a value above 0.9 indicates a very strong dependence (Ostasiewicz et al., 1997 p. 276). Calculations were performed using IBM SPSS Statistics version 29.

### III. RESULTS AND DISCUSSION PRIMARY ANALYSIS - ALL CATEGORIES

Turning to the analysis related to all groups of documents signed by well-known persons, it should be noted that a more detailed description of the condition as well as the features of the document was usually not available (the corresponding descriptions in catalogues did not describe the full state of preservation - it was determined in more detail for royal documents). This section describes the results of the relationship between the selected factors and the formation of the asking price and the final price of the document. These results are presented by the distinguished factors.

TABLE 3. ASKING PRICE VS. OTHER FACTORS.

Time period of document creation/ category	16th century	17th century	18th century	19th century	20th century (until the end of World War II)	20th century (after the end of World War II) or 21st century	Without periodization
Correlation with the "popularity of the person"							
church	--	--	--	--	--	rho=,463, sig.=0,017	no corr.
Polish King/Queen	--	rho=-0,360, sig.=0,031	rho=,289, sig.=,003	--	--	--	rho=,158, sig.=,055
Polish royal spouse	--	no corr.	--	--	--	--	no corr.
culture	--	--	--	rho=,355, sig.=,03	no corr.	rho=,312, sig.=,023	no corr.
politics	--	--	--	rho=,413, sig.=,079	no corr.	--	rho=,303, sig.=,057
„greats person”	--	--	no corr.	rho=,683, sig.<,001	no corr.	rho=-,202, sig.=,086	rho=-,285, sig.<,001
foreign monarchs	--	--	no corr.	no corr.	no corr.	--	no corr.
military	--	--	rho=,415, sig.=,049	--	no corr.	rho=,792, sig.=,006	no corr.
Without categorization	no corr.	rho=,254, sig.=,078	rho=,580, sig.<,001	rho=,542, sig.<,001	rho=,540, sig.<,001	rho=,351, sig.<,001	rho=,080, sig.=,048
Correlation with "document creation date (in years)"							
church	--	--	--	--	--	no corr.	no corr.
Polish King/Queen	--	rho=-0,522, sig.=0,001	rho=,431, sig.<,001	--	--	--	no corr.
Polish royal spouse	--	b	--	--	--	--	no corr.
culture	--	--	--	no corr.	no corr.	no corr.	rho=-,422, sig.<,001
politics	--	--	--	rho=-,514, sig.=,024	no corr.	--	no corr.
„greats person”	--	--	rho=,791, sig.=,034	no corr.	no corr.	rho=,253, sig.=,031	rho=-,663, sig.<,001
foreign monarchs	--	--	rho=,821, sig.=,023	no corr.	no corr.	--	no corr.
military	--	--	no corr.	--	rho=-,397, sig.=,061	no corr.	rho=-,377, sig.=,002
Without categorization	no corr.	rho=-,551, sig.<,001	rho=,341, sig.<,001	rho=-,370, sig.<,001	rho=-,187, sig.=,040	rho=,289, sig.<,001	rho=-,590, sig.<,001
Correlation with "pandemic period"							

Time period of document creation/ category	16th century	17th century	18th century	19th century	20th century (until the end of World War II)	20th century (after the end of World War II) or 21st century	Without periodization
church	--	--	--	--	--	rho=,427, sig.=,030	rho=,312, sig.=,057
Polish King/Queen	--	no corr.	rho=,327, sig.<,001	--	--	--	rho=,232, sig.=,005
Polish royal spouse	--	no corr.	--	--	--	--	no corr.
culture	--	--	--	no corr.	no corr.	no corr.	no corr.
politics	--	--	--	rho=,517, sig.=,023	rho=,652, sig.=,001	--	rho=,536, sig.<,001
„greats person”	--	--	no corr.	rho=,371, sig.=,033	no corr.	--	rho=,367, sig.<,001
foreign monarchs	--	--	no corr.	no corr.	no corr.	--	no corr.
military	--	--	no corr.	--	no corr.	no corr.	rho=,245, sig.=,053
Without categorization	no corr.	no corr.	rho=,215, sig.=,010	no corr.	no corr.	rho=,149, sig.=,058	no corr.
Correlation with "successful sale"							
church	--	--	--	--	--	no corr.	rho=,391, sig.=,015
Polish King/Queen	--	no corr.	no corr.	--	--	--	rho=,164, sig.=,047
Polish royal spouse	--	no corr.	--	--	--	--	no corr.
culture	--	--	--	rho=,324, sig.=,058	no corr.	no corr.	no corr.
politics	--	--	--	rho=,449, sig.=,054	no corr.	--	no corr.
„greats person”	--	--	rho=,791, sig.=,034	rho=,522, sig.=,002	rho=,438, sig.=,011	--	rho=,435, sig.<,001
foreign monarchs	--	--	no corr.	no corr.	no corr.	--	no corr.
military	--	--	no corr.	--	no corr.	no corr.	rho=,214, sig.=,092
Without categorization	no corr.	no corr.	rho=,204, sig.=,015	rho=,198, sig.=,033	rho=,189, sig.=,038	no corr.	rho=,134, sig.<,001

Source: own elaboration.

In the table presented above (the first part of the table), it can be seen that the asking price is quite clearly related to the popularity of a person (generally in a stimulating way). Out of 34 fields in which it was possible to calculate the correlation coefficient, statistical significance was found in 19 cases (about 56%) (statistical trend was also taken into account - which was also the case in subsequent analyses). In many cases, the strength of the relationship was moderate or strong (rho above 0.4 and 0.7, respectively). Only for data from the first half of the twentieth century were there difficulties in observing a relationship (although this applies not to the whole but to the results obtained in cross-section by individual categories of people).

The situation is different in the case of the dependence of the asking price on the specific date of document creation (the second part of the analysed table). Nearly the same as before, out of 31 fields, statistical significance was found in 16 cases (about 52%). The strength of the relationship itself in many cases was again moderate or even strong (rho above 0.4) but the direction of the relationship was sometimes quite fluctuating (once the factor was a stimulant, once it was a destimulant). It should be noted, however, that this fluctuation appeared in the context of the division into specific time periods. Focusing on the last column, which does not take into account such breakdowns, it can be seen that the characteristic is clearly destimulant - so the asking price tends to increase as the value of the year decreases. Nonetheless, the described problem

prompts the inclusion of time-period divisions in other analyses.

The third part of the table indicates a potential relationship between the asking price and the pandemic period. In this case, statistical significance for the calculated correlation coefficient was already less frequently noted (out of 33 fields, it was found in 12 cases, which is about 36%). Also, the strength of the relationship was sometimes not high, although clearly observable (rho below 0.4 but above 0.2). Again, as in the first part of the table, the factor turned out to be a general stimulant, so the pandemic period was associated with higher asking prices. However, it should be noted (unlike in previous cases) that the 4 categories of people never (by time period) showed statistical significance of the relationship. Taking this fact into account, one should be more cautious in drawing conclusions on this issue.

The last part of the table tested the potential relationship between the asking price and the sale itself (that means, whether the document was purchased by someone at least at the asking price). As in the previous case (nearly), statistical significance was found for 13 cases out of 33 (about 39%). The strength of the relationship fluctuated through low to moderate and even high. However, considering the data without splits (either by period or category, respectively), the strength of the correlation was rather low although noticeable. Since the rho coefficient took negative values, it should be concluded that the higher the asking price, the lower was the possibility of successful sales.

TABLE 4. FINAL PRICE VS. OTHER FACTORS.

Time period of document creation/ category	16th century	17th century	18th century	19th century	20th century (until the end of World War II)	20th century (after the end of World War II) or 21st century	Without periodization
Correlation with the "popularity of the person"							
church	--	--	--	--	--	rho=,533, sig.=,019	no corr.
Polish King/Queen	--	no corr.	rho=,483, sig.<,001	--	--	--	rho=,304, sig.<,001
Polish royal spouse	--	no corr.	--	--	--	--	rho=,744, sig.=,005
culture	--	--	--	rho=,462, sig.=,008	no corr.	no corr.	no corr.
politics	--	--	--	no corr.	no corr.	--	no corr.
„greats person”	--	--	--	rho=,528, sig.=,020	no corr.	no corr.	rho=,189, sig.=,043
foreign monarchs	--	--	no corr.	no corr.	--	--	no corr.
military	--	--	rho=,438, sig.=,061	--	no corr.	rho=,815, sig.=,004	no corr.
Without categorization	no corr.	rho=,429, sig.=,005	rho=,594, sig.<,001	rho=,517, sig.<,001	rho=,470, sig.<,001	rho=,513, sig.<,001	no corr.
Correlation with "document creation date (in years)"							
church	--	--	--	--	--	no corr.	rho=,401, sig.=,052
Polish King/Queen	rho=,589, sig.=,044	no corr.	rho=,490, sig.<,001	--	--	--	no corr.
Polish royal spouse	--	no corr.	--	--	--	--	no corr.
culture	--	--	--	no corr.	no corr.	rho=,521, sig.<,001	rho=,574, sig.<,001
politics	--	--	--	no corr.	no corr.	--	no corr.
„greats person”	--	--	--	no corr.	no corr.	no corr.	rho=,627, sig.<,001
foreign monarchs	--	--	no corr.	no corr.	--	--	no corr.
military	--	--	no corr.	--	no corr.	no corr.	no corr.
Without categorization	rho=,429, sig.=,098	no corr.	rho=,394, sig.<,001	rho=,281, sig.=,015	rho=,232, sig.=,027	rho=,163, sig.=,058	rho=,595, sig.<,001
Correlation with "pandemic period"							
church	--	--	--	--	--	no corr.	no corr.
Polish King/Queen	--	no corr.	rho=,243, sig.=,030	--	--	--	rho=,240, sig.=,007
Polish royal spouse	--	no corr.	--	--	--	--	no corr.
culture	--	--	--	no corr.	no corr.	no corr.	no corr.
politics	--	--	--	no corr.	rho=,490, sig.=,089	--	no corr.
„greats person”	--	--	--	no corr.	no corr.	rho=,258, sig.=,037	rho=,171, sig.=,068
foreign monarchs	--	--	no corr.	no corr.	--	--	no corr.
military	--	--	no corr.	--	no corr.	no corr.	no corr.
Without categorization	no corr.	rho=,401, sig.=,008	rho=,168, sig.=,077	no corr.	no corr.	rho=,243, sig.=,004	no corr.

Source: own elaboration

In the table above - in its first part - shown possible correlations between the selling price and the popularity of the person signing the document. Similar to the earlier table included in this section, such a relationship was found, as out of 32 fields, statistical significance was confirmed in 14 cases (about 44% of cases). Moreover, the strength of the relationship was usually moderate or high (rho above 0.4 or 0.7). Also, the direction of the relationship was consistent, so the final price obtained was higher the higher the popularity of the person. These conclusions indicate a successful application of the popularity ranking proposed in the article. Despite these optimistic conclusions, however, it should be noted that popularity ranking is not a perfect tool. It can be observed that in the context of not dividing by period and only considering the category of people (as well as the entire group), the results were often not statistically significant (in the context of the

selling price).

The second part of the table showed the potential relationship between the sales price and the date the document was created. The conclusions are very similar to those made in the corresponding part of the first table, although out of 33 fields here only 12 fields contained a statistically significant rho coefficient (about 36%). The moderately high rho value changed its sign in the context of the period split, but without the division it can be seen that it is negative. So, again, the high rho depends on the earlier creation date of the document.

The last part of the table is related to the analysis of the link between the selling price and the pandemic period. Again, the conclusions formulated here are generally similar to those for the asking price. The strength of the relationship is noticeable but rather not high. The direction of the relationship between the characteristics is positive, so the pandemic period is

associated with a higher final price obtained. Nevertheless, it should be noted that out of 32 fields only 8 show a statistically significant rho coefficient (about 25% - the smallest value obtained so far). This fact forces one to rely cautiously on the conclusions formulated in this paragraph.

#### *Analyses related to documents of Polish kings*

Polish royal autographs (nearly  $\frac{1}{4}$  of the total) make up the largest percentage of sold documents signed by famous individuals. This group is quite homogeneous not only in terms of the social position held by the individuals, but also in terms of a specific time frame (the documents were created over a period of 200 years or so - the last one was published more than 225 years ago). Moreover, the analysed documents can often be studied in terms of a number of specific features (the nature of the document, the seal and its type, the language of the document, the place of creation, etc.). Pairwise correlations between the various factors are indicated in the table below: The table shown above indicates many possible relationships between specific factors. Again, the focus is on (but not limited to) analyses related to the asking price as well as the final price.

Stimulants of the final price include: popularity of the person signing the document ( $\rho=0.304$ ,  $\text{sig.}=0.001$ ); offering of a document issued in connection with the declaration of an order or aristocratic title ( $\rho=0.225$ ,  $\text{sig.}=0.012$ ); earlier date of issuance of the document (16th and 17th centuries -  $\rho=0.376$ ,  $\text{sig.}=0.000$ ); creation of the document in Poland ( $\rho=0.289$ ,  $\text{sig.}=0.001$ ). The destimulants, on the other hand, included: visible damage to the document ( $\rho=-0.206$ ,  $\text{sig.}=0.022$ ); the small format of the document ( $\rho=-0.191$ ,  $\text{sig.}=0.034$ ); a document language other than Polish or Latin ( $\rho=-0.217$ ,  $\text{sig.}=0.016$ ). Two factors showed significance above 0.05 but below 0.1, i.e. showed only a statistical trend with the final price - one was stimulative (good condition of the document -  $\rho=0.168$ ,  $\text{sig.}=0.064$ ) the other destimulative (number of documents signed by the person available on the market  $\rho=-0.173$ ,  $\text{sig.}=0.055$ ). Based on the results, it can also be seen that a higher final price was associated with pandemic years ( $\rho=0.240$ ,  $\text{sig.}=0.007$ ).

In the case of asking price, similar relationships were noted, although differences could also be observed. Stimulants of the asking price were: the offering of a document issued in connection with the declaration of an order or aristocratic title ( $\rho=0.213$ ,  $\text{sig.}=0.009$ ); the earlier date of issuance of the document (16th and 17th centuries -  $\rho=0.303$ ,  $\text{sig.}=0.000$ ); the creation of the document in Poland ( $\rho=0.179$ ,  $\text{sig.}=0.029$ ) and - unlike the final price - the fact that the document bears a seal ( $\rho=0.171$ ,  $\text{sig.}=0.037$ ). Classical statistical significance was not observed in connection with the popularity of a person - nevertheless, a statistical trend could be observed for this characteristic ( $\rho=0.158$ ,  $\text{sig.}=0.055$ ). In the case of the destimulant, only the number of documents available on the market and signed by the person could be distinguished ( $\rho=-0.211$ ,  $\text{sig.}=0.010$ ). Pandemic years - as in the case of the final price - influenced the higher asking price ( $\rho=0.232$ ,  $\text{sig.}=0.005$ ). It also appears that setting the starting price too high perceptibly reduced the possibility of any bidding in the

auction ( $\rho=-0.164$ ,  $\text{sig.}=0.047$ ). Was bidding in the auction associated with any more factors? The results indicate that this possibility was positively influenced by the years of pandemonium ( $\rho=0.170$ ,  $\text{sig.}=0.039$ ) and - considering the relationships at the level of static tendency: the official form of the signed document ( $\rho=0.140$ ,  $\text{sig.}=0.090$ ); Latin as the language of the document ( $\rho=0.140$ ,  $\text{sig.}=0.090$ ), and finally the 16th century as the time of the document's creation ( $\rho=0.137$ ,  $\text{sig.}=0.097$ ).

A separate part of the considerations are those concerning the interrelationships between the factors that determine the nature and condition of the document.

As for the types of documents - documents concerning appointments to military or administrative ranks, declaring orders or aristocratic titles, are rather younger (they date from the 18th century -  $\rho=0.298$  ( $\text{sig.}=0.000$ ) and  $\rho=0.154$  ( $\text{sig.}=0.061$ ), respectively). Letters relating to orders or titles are characterized by a large format ( $\rho=0.223$ ,  $\text{sig.}=0.007$ ) - the same cannot be said of nominations. They, on the other hand, are characterized by the presence of corresponding seals ( $\rho=0.188$ ,  $\text{sig.}=0.022$ ) and are not always sold in a good state of preservation ( $\rho=-0.199$ ,  $\text{sig.}=0.015$ ). Moving on to documents related to land grants, they date from earlier centuries (17th century -  $\rho=0.293$ ,  $\text{sig.}=0.000$ ) and are rather written in Latin ( $\rho=0.374$ ,  $\text{sig.}=0.000$ ) and issued in Poland ( $\rho=0.286$ ,  $\text{sig.}=0.000$ ).

As for the physical characteristics of the documents, the seal (in addition to the aforementioned connection with documents relating to land grants) tends to be found on documents issued in standard sizes ( $\rho=0.269$ ,  $\text{sig.}=0.001$ ), concerning formal matters ( $\rho=0.259$ ,  $\text{sig.}=0.001$ ), issued in Poland ( $\rho=0.392$ ,  $\text{sig.}=0.000$ ) in the 17th century ( $\rho=0.167$ ,  $\text{sig.}=0.042$ ) and written in Latin ( $\rho=0.247$ ,  $\text{sig.}=0.002$ ). The document size itself (in addition to the previously mentioned correlations) shows the following correlations: the standard format applies to documents published in Poland ( $\rho=0.161$ ,  $\text{sig.}=0.050$ ), and the small format applies to private correspondence ( $\rho=0.258$ ,  $\text{sig.}=0.020$ ) and those written in a language other than Polish and Latin (e.g. Italian, French -  $\rho=0.252$ ,  $\text{sig.}=0.002$ ).

The last table additionally allows analysis from the point of view of at least two more categories of factors - the language used and the time of creation. Nevertheless, these correlations have already implicitly recurred in the content of the previous paragraphs.

#### IV. SUMMARY

The article analysed a couple of hundred documents signed by well-known persons representing different social groups, different professions and living in different times. Due to limitations in the descriptions available in the source materials, the analyses carried out could not always focus on a wide range of factors. Nevertheless, for this wide range of documents, a number of important conclusions were presented, especially regarding certain aspects of price formation (both asking and final prices). The paper shows some correlations that intuitively

seemed true even before the study. These issues include the fact that the price is impacted by the age of creation of the document - for both the starting price and the resulting price, the rho coefficient was almost identical and indicated a moderately strong relationship (rho within 0.6). However, while this link between factors could be observed, for example, in relation to the individual centuries in which the document was created, within a specific century such conclusions were not always valid (e.g., documents from the late 18th century could be more valuable than those from its beginning - a similar relationship was observed for contemporary documents created after World War II). It was also intuitive that the higher the asking price, the more difficult it would be to sell a given document (although the strength of this relationship was often weak - rho within 0.2). Practically the only exception to this statement was the group of people associated with the church - perhaps influenced by the very high popularity in Poland of Pope John Paul II and the regular sale of his autographs, even at high prices. There was an interesting relationship between the popularity of the persons in question with the prices (asking and final). While it again seemed intuitive that the autographs of more famous people would be more valuable, there was no clear criterion of popularity that could be used in such a study. The method proposed in the paper (popularity ranking) worked quite well, with the strength of the relationship ranging from moderate to strong (rho within 0.5, but sometimes exceeding 0.7). However, it should be noted that this occurred within the analysis done in specific groups (division by category of people and time of creation of documents) - when analysing all documents together, such a relationship was practically absent. This fact is difficult to interpret and counterintuitive. The paper also tried to examine the effect of Covid19 on prices - the results indicated that pandemic years influenced higher prices for both asking and final prices. However, the nature of the relationship was not very strong (rho rather within a value of 0.2). Interestingly, the only group showing a different behaviour was the "greats" - here even a subtle inverse relationship was observed. A possible explanation for this could be that these autographs were offered at overestimated prices and ended the auction without selling - however, no such relationship was found.

The article succeeded in analysing the documents of Polish rulers in more detail. While the conclusions on the basic factors affecting the price are consistent (presented in the previous paragraph), other factors that can affect the price were examined. A detailed description has already been presented in paragraph 3.2. Nevertheless, it is worth mentioning here that the higher price was influenced by a good state of preservation (which is obvious), a sufficiently large format and an attractive graphic form (documents decelerating, for example, orders or aristocratic titles were decoratively finished). This is probably due to the fact that documents of this type are framed and treated similarly to paintings. Interestingly, no decisive influence of the language in which the royal document was created (whether it was Latin or Polish, for example) was noted. This further supports the assumption that these documents are unlikely to be read but treated in terms of aesthetics and

prestige.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are also available on the auction houses' websites.

Conflicts of Interest: Author declare no conflict of interest.



TABLE 5. PAIRWISE CORRELATION FOR VARIABLES IDENTIFIED FOR DOCUMENTS OF POLISH KINGS.

		popularity	order declaration	nomination	land grant	pandemic year	good condition	large losses	how many times at	seal	standard size	large size	small size	formal document	private corres.	whether sold	from Poland	in Latin	in another lang.	in Polish	16th c.	17th c.	16th or 17th c.	18th c.	asking price	Final price
popularity	R	1,000	,224**	,213**	0,000	0,051	-0,035	0,017	,573**	-0,022	-0,045	0,075	-0,088	,188*	-0,182*	0,068	,378**	0,139#	-0,330**	0,116	0,031	-0,074	-0,050	0,050	0,158#	,304**
	s		0,006	0,009	0,995	0,540	0,676	0,839	0,000	0,793	0,584	0,362	0,288	0,022	0,027	0,413	0,000	0,091	0,000	0,162	0,709	0,370	0,547	0,547	0,055	0,001
order	R	,224**	1,000	-0,108	-0,187*	0,053	0,091	-0,069	,252**	-0,101	-0,190*	,223**	0,037	0,108	-0,100	0,019	0,112	0,133	-0,103	-0,054	-0,066	0,126	0,154#	0,154#	,213**	,225*
	s	0,006		0,193	0,023	0,521	0,273	0,404	0,002	0,223	0,021	0,007	0,654	0,193	0,224	0,817	0,174	0,106	0,213	0,512	0,424	0,126	0,061	0,061	0,009	0,012
nomination	R	,213**	-0,108	1,000	-0,404**	0,046	-0,199*	0,033	,285**	,188*	-0,078	0,133	-0,081	,233**	-0,218**	-0,004	0,072	-0,026	-0,008	0,093	-0,143#	-0,234**	-0,298**	,298**	0,082	-0,077
	s	0,009	0,193		0,000	0,580	0,015	0,691	0,000	0,022	0,345	0,106	0,331	0,004	0,008	0,965	0,385	0,758	0,293	0,261	0,082	0,004	0,000	0,000	0,319	0,398
land grant	R	0,000	-0,187*	-0,404**	1,000	-0,045	0,065	0,031	-0,107	0,111	-0,048	0,078	-0,140#	-0,404**	-0,378**	0,062	,286**	,374**	-0,314**	-0,132	-0,098	-0,293**	,212**	-0,212**	0,006	0,050
	s	0,995	0,023	0,000		0,591	0,432	0,707	0,195	0,181	0,562	0,348	0,091	0,000	0,000	0,455	0,000	0,000	0,000	0,109	0,237	0,000	0,010	0,010	0,941	0,582
pandemic	R	0,051	0,053	0,046	-0,045	1,000	0,020	0,006	-0,019	0,027	,241**	-0,217**	0,016	0,023	-0,048	,170*	-0,014	0,026	0,008	-0,002	-0,180*	0,124	-0,124	-0,232**	,240**	
	s	0,540	0,521	0,580	0,591		0,812	0,947	0,818	0,745	0,003	0,008	0,848	0,778	0,565	0,039	0,865	0,757	0,921	0,698	0,390	0,028	0,134	0,134	0,005	0,007
good	R	-0,035	0,091	-0,199*	0,065	0,020	1,000	-0,763**	0,046	-0,044	0,097	-0,101	-0,052	0,048	0,132	0,166	-0,061	0,110	0,086	-0,177*	0,050	-0,040	-0,008	0,008	0,103	0,168#
	s	0,676	0,273	0,015	0,432	0,812		0,000	0,577	0,595	0,241	0,220	0,533	0,562	0,111	0,849	0,465	0,184	0,299	0,031	0,547	0,627	0,925	0,925	0,211	0,064
large	R	0,017	-0,069	0,033	0,031	0,006	-0,763**	1,000	-0,047	-0,052	-0,045	0,026	0,095	-0,033	-0,076	0,045	0,022	0,022	0,018	0,035	0,005	0,102	0,091	-0,091	-0,122	,206*
	s	0,839	0,404	0,691	0,707	0,947	0,000		0,571	0,530	0,590	0,752	0,248	0,691	0,357	0,588	0,794	0,795	0,830	0,669	0,955	0,216	0,272	0,272	0,139	0,022
how many	R	,573**	,252**	,285**	-0,107	0,019	0,046	0,047	1,000	0,047	-0,060	0,054	0,064	0,118	-0,081	-0,098	,305**	0,101	-0,348**	,169*	-0,467**	,502**	,732**	,732**	-0,211**	0,173#
	s	0,000	0,002	0,000	0,195	0,818	0,577	0,571		0,572	0,471	0,513	0,439	0,153	0,329	0,237	0,000	0,224	0,000	0,040	0,000	0,000	0,000	0,000	0,010	0,055
seal	R	-0,022	-0,101	,188*	0,111	0,027	-0,044	-0,052	0,047	1,000	,269**	-0,163*	-0,103	,259**	-0,216**	-0,048	,392**	,247**	-0,328**	0,006	-0,242**	,167*	0,012	-0,012	,171*	0,126
	s																									

		popularity	order declaration	nomination	land grant	pandemic year	good condition	large losses	how many times at	seal	standard size	large size	small size	formal document	private corres.	whether sold	from Poland	in Latin	in another lang.	in Polish	16th c.	17th c.	16th or 17th c.	18th c.	asking price	Final price
	s	0,79 3	0,22 3	0,02 2	0,18 1	0,74 5	0,59 5	0,53 0	0,57 2		0,00 1	0,04 8	0,21 1	0,00 1	0,00 8	0,5 62	0,00 0	0,00 2	0,00 0	0,94 1	0,00 3	0,04 2	0,88 6	0,88 6	0,03 7	0,16 6
	R	- 0,04 5	- ,190 *	- 0,07 8	- 0,04 8	,241 **	0,09 7	- 0,04 5	- 0,06 0	,269 **	1,00 0	- ,892 **	- ,244 **	- 0,10 7	0,11 4	- 0,1 24	,161 *	- 0,00 9	- 0,10 5	0,09 0	0,04 3	0,11 6	0,13 2	- 0,13 2	0,00 6	0,09 5
	s	0,58 4	0,02 1	0,34 5	0,56 2	0,00 3	0,24 1	0,59 0	0,47 1	0,00 1		0,00 0	0,00 3	0,19 5	0,16 8	0,1 33	0,05 0	0,91 2	0,20 6	0,27 5	0,60 3	0,16 0	0,11 1	0,11 1	0,94 0	0,29 4
	R	0,07 5	,223 **	0,13 3	0,07 8	- ,217 **	- 0,10 1	0,02 6	0,05 4	- ,163 *	- ,892 **	1,00 0	- 0,10 1	,255 **	- ,234 **	0,1 21	- 0,07 2	0,06 9	0,03 9	- 0,10 0	- 0,01 4	- 0,09 7	- 0,09 7	0,09 7	0,09 1	0,03 0
	s	0,36 2	0,00 7	0,10 6	0,34 8	0,00 8	0,22 0	0,75 2	0,51 3	0,04 8	0,00 0		0,22 0	0,00 2	0,00 4	0,1 43	0,38 7	0,40 3	0,63 9	0,22 8	0,87 0	0,24 2	0,24 3	0,24 3	0,27 1	0,74 4
	R	- 0,08 8	- 0,03 7	- 0,08 1	- 0,14 0#	0,01 6	- 0,05 2	0,09 5	- 0,06 4	- 0,10 3	- ,244 **	- 0,10 1	1,00 0	- ,345 **	,258 **	- 0,0 33	- ,227 **	- 0,14 2#	,252 **	- 0,05 3	- 0,05 0	0,00 3	- 0,02 6	0,02 6	- 0,08 4	- ,191 *
	s	0,28 8	0,65 4	0,33 1	0,09 1	0,84 8	0,53 3	0,24 8	0,43 9	0,21 1	0,00 3	0,22 0		0,00 0	0,00 2	0,6 94	0,00 6	0,08 6	0,00 2	0,52 4	0,55 0	0,97 5	0,75 0	0,75 0	0,31 1	0,03 4
	R	,188 *	0,10 8	,233 **	,404 **	0,02 3	- 0,04 8	- 0,03 3	0,11 8	,259 **	- 0,10 7	,255 **	- ,345 **	1,00 0	- ,933 **	0,1 40#	,357 **	,235 **	- ,457 **	0,11 8	- 0,04 6	0,07 3	0,04 0	- 0,04 0	0,07 0	0,05 2
	s	0,02 2	0,19 3	0,00 4	0,00 0	0,77 8	0,56 2	0,69 1	0,15 3	0,00 1	0,19 5	0,00 2	0,00 0		0,00 0	0,0 90	0,00 0	0,00 4	0,00 0	0,15 4	0,57 8	0,37 9	0,63 1	0,63 1	0,39 9	0,56 5
	R	- ,182 *	- 0,10 0	- ,218 **	- ,378 **	- 0,04 8	0,13 2	- 0,07 6	- 0,08 1	- ,216 **	0,11 4	- ,234 **	0,00 2	- ,933 **	1,00 0	- ,17 1*	- ,311 **	- ,237 **	,455 **	- 0,11 5	- 0,00 2	- 0,08 7	- 0,08 1	0,08 1	- 0,04 3	- 0,02 2
	s	0,02 7	0,22 4	0,00 8	0,00 0	0,56 5	0,11 1	0,35 7	0,32 9	0,00 8	0,16 8	0,00 4	0,00 2	0,00 0		0,0 38	0,00 0	0,00 4	0,00 0	0,16 3	0,98 3	0,29 0	0,32 6	0,32 6	0,60 7	0,80 9
	R	0,06 8	0,01 9	- 0,00 4	0,06 2	,170 *	0,01 6	- 0,04 5	- 0,09 8	- 0,04 8	- 0,12 4	0,12 1	- 0,03 3	0,14 0#	- ,171 *	1,0 00	- 0,01 2	0,14 0#	- 0,06 7	- 0,08 9	0,13 7#	0,05 5	0,13 0	- 0,13 0	- ,164 *	0,14 3
	s	0,41 3	0,81 7	0,96 5	0,45 5	0,03 9	0,84 9	0,58 8	0,23 7	0,56 2	0,13 3	0,14 3	0,69 4	0,09 0	0,03 8		0,88 6	0,09 0	0,42 0	0,28 2	0,09 7	0,50 8	0,11 5	0,11 5	0,04 7	0,11 5
	R	,378 **	0,11 2	0,07 2	,286 **	- 0,01 4	- 0,06 1	- 0,02 2	,305 **	,392 **	,161 *	- 0,07 2	- ,227 **	,357 **	- ,311 **	- 0,0 12	1,00 0	,326 **	- ,695 **	,211 *	- ,220 **	,168 *	0,02 6	- 0,02 6	,179 *	,289 **
	s	0,00 0	0,17 4	0,38 5	0,00 0	0,86 5	0,46 5	0,79 4	0,00 0	0,00 0	0,05 0	0,38 7	0,00 6	0,00 0	0,00 0	0,8 86		0,00 0	0,00 0	0,01 0	0,00 7	0,04 1	0,75 2	0,75 2	0,02 9	0,00 1
	R	0,13 9#	0,13 3	- 0,02 6	,374 **	0,02 6	0,11 0	- 0,02 2	0,10 1	,247 **	- 0,00 9	0,06 9	- 0,14 2#	,235 **	- ,237 **	0,1 40#	,326 **	1,00 0	- ,392 **	- ,701 **	- 0,10 2	0,06 1	- 0,00 3	0,00 3	0,04 3	0,12 5
	s	0,09 1	0,10 6	0,75 8	0,00 0	0,75 7	0,18 4	0,79 5	0,22 4	0,00 2	0,91 2	0,40 3	0,08 6	0,00 4	0,00 4	0,0 90	0,00 0		0,00 0	0,00 0	0,21 9	0,46 0	0,97 0	0,97 0	0,60 5	0,16 7
	R	- ,330 **	- 0,10 3	- 0,08 7	,314 **	0,00 8	0,08 6	- 0,01 8	,348 **	,328 **	0,10 5	0,03 9	,252 **	- ,457 **	,455 **	- 0,0 67	- ,695 **	- ,392 **	- 1,00 0	- ,381 **	,318 **	- 0,13 8#	0,05 9	- 0,05 9	- 0,09 1	- ,217 *
	s	0,00 0	0,21 3	0,29 3	0,00 0	0,92 1	0,29 9	0,83 0	0,00 0	0,00 0	0,20 6	0,63 9	0,00 2	0,00 0	0,00 0	0,4 20	0,00 0	0,00 0		0,00 0	0,00 0	0,09 5	0,47 3	0,47 3	0,27 3	0,01 6

		popularity	order declaration	nomination	land grant	pandemic year	good condition	large losses	how many times at	seal	standard size	large size	small size	formal document	private corres.	whether sold	from Poland	in Latin	in another lang.	in Polish	16th c.	17th c.	16th or 17th c.	18th c.	asking price	Final price
in Polish	R	0,116	-0,054	0,093	-0,132	-0,032	-0,177*	0,035	,169*	0,006	0,090	-0,100	-0,053	0,118	-0,115	0,089	,211*	-0,701**	-0,381**	1,000	-0,144#	0,045	-0,043	0,043	0,027	0,040
	s	0,162	0,512	0,261	0,109	0,698	0,031	0,669	0,040	0,941	0,275	0,228	0,524	0,154	0,163	0,282	0,010	0,000	0,000		0,080	0,586	0,605	0,605	0,743	0,664
16th c.	R	0,031	-0,066	-0,143#	-0,098	-0,071	0,050	0,005	,467**	,242**	0,043	-0,014	-0,050	0,046	-0,002	0,137#	-0,220**	-0,102	,318**	-0,144#	1,000	-0,168*	,429**	-0,429**	0,132	0,115
	s	0,709	0,424	0,082	0,237	0,390	0,547	0,955	0,000	0,003	0,603	0,870	0,550	0,578	0,983	0,097	0,007	0,219	0,000	0,080		0,041	0,000	0,000	0,109	0,204
17th c.	R	-0,074	-0,126	,234**	,293**	,180*	-0,040	0,102	,502**	,167*	0,116	-0,097	0,003	0,073	-0,087	0,168*	0,061	0,138#	-0,013	0,045	-0,168*	1,000	,818**	,818**	-0,246**	,334**
	s	0,370	0,126	0,004	0,000	0,028	0,627	0,216	0,000	0,042	0,160	0,242	0,975	0,379	0,290	0,508	0,041	0,460	0,095	0,586	0,041		0,000	0,000	0,003	0,000
16th or	R	-0,050	-0,154#	,298**	,212**	0,124	0,008	0,091	,732**	0,012	0,132	-0,097	-0,026	0,040	-0,081	0,102	0,026	0,003	0,059	0,043	,429**	,818**	1,000	-1,000**	,303**	,376**
	s	0,547	0,061	0,000	0,010	0,134	0,925	0,272	0,000	0,886	0,111	0,243	0,750	0,631	0,326	0,115	0,752	0,970	0,473	0,605	0,000	0,000			0,000	0,000
18th c.	R	0,050	0,154#	,298**	-0,212**	-0,124	0,008	0,091	,732**	-0,012	0,132	0,097	0,026	-0,040	0,081	-0,102	0,026	0,003	0,059	0,043	-0,429**	,818**	1,000**	-1,000**	,303**	,376**
	s	0,547	0,061	0,000	0,010	0,134	0,925	0,272	0,000	0,886	0,111	0,243	0,750	0,631	0,326	0,115	0,752	0,970	0,473	0,605	0,000	0,000			0,000	0,000
asking	R	0,158#	,213**	0,082	0,006	,232**	0,103	-0,122	-0,211**	,171*	0,006	0,091	-0,084	0,070	-0,043	-0,164*	,179*	0,043	-0,091	0,027	0,132	,246**	,303**	-0,303**	1,000	,681**
	s	0,055	0,009	0,319	0,941	0,005	0,211	0,139	0,010	0,037	0,940	0,271	0,311	0,399	0,607	0,047	0,029	0,605	0,273	0,743	0,109	0,003	0,000	0,000		0,000
final price	R	,304**	,225*	-0,077	0,050	,240**	0,168#	-0,206*	-0,173#	0,126	0,095	0,030	-0,191*	0,052	-0,022	0,143	,289**	0,125	-0,217*	0,040	0,115	,334**	,376**	-0,376**	,681**	1,000
	s	0,001	0,012	0,398	0,582	0,007	0,064	0,022	0,055	0,166	0,294	0,744	0,034	0,565	0,809	0,115	0,001	0,167	0,016	0,664	0,204	0,000	0,000	0,000	0,000	

R – rho Spearman coefficient s – significance; # - sig. <0.1; \* - sig. <0.05; \*\* - sig. <0.01

Source: own elaboration.

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