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ORIGINAL ARTICLE

Artworks without names: an insight into the market for anonymous paintings

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Abstract

This paper explores the market for indeterminate works of art. Our data set includes 1578 sales of fifteenth and sixteenth-century anonymous Flemish paintings, mainly collected from the Blouin Art Sales Index over the period 1955–2015. After a brief introductory section to the issue of anonymity in early modern art, and the different situations of information failure generated by anonymous paintings, the empirical part examines the supply and demand for paintings by unrecorded artists, using a hedonic pricing model. We find evidence that the degree of specification of the spatio-temporal designations given to the paintings (e.g. Flemish school, sixteenth century) affect prices differently (H1). The more specific the designation is in time and space, the more it tends to make up for the lack of information, and to positively affect the market value of anonymous paintings. When the artist name is missing, we also argue that purchasers pay greater attention to other quality signals. Four other hypotheses, which are expected to influence the buyer's willingness to pay, are successively tested: H2) the physical condition of the painting; H3) oral or written interventions by an expert; H4) the length of the lot essay; and H5) previous attributions to named artists. The results suggest that most of these variables operate as significant pricing characteristics. We finally compare price indices of named artists, indirect names and spatio-temporal designations.

Keywords Art market · Old masters · Hedonic regression · Anonymous art · Indeterminate goods · Information failure · Branding strategy

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1 Introduction

"For Old Masters, It's All About the Name". It is in these words that the New York Times entitled an article published shortly after the July auctions at Christie's and Sotheby's (Reyburn 2014a). This assertion openly states what is commonly-known in the art world: among the main factors that determine the prices of fine arts, the artist name is of paramount importance. With the rise of modern and contemporary art, the art market has indeed become a place more ruled by the artist name than by the art object itself (Moureau 2000). Already in 1970s, Keen (1971, p. 63) stated that "collectors nowadays infinitely prefer to buy the work of a named artist. Even if he buys an anonymous work, the collector will often seek an authoritative attribution (…)". According to economist William Grampp (1989, pp. 131–132), authorship is the main issue that the art market has to face with, and its certification has significant effects on prices (Ginsburgh et al. 2019). As a matter of fact, buyers want names and signatures although, obviously, they do not seek the artist name itself—since proper names are nothing more than meaningless labels (Mill 1896; Kripke 1972; Molino 1982)—but its semantics and the information it provides about the artist's personality, career, reputation and work.

Several disciplines are concerned with the artist name. The most obvious of them is art history which has been built on the artist's patronym and biography since its early origins in the sixteenth century (Guichard 2010). In this respect, art history literature such as monographs, *catalogues raisonnés* or artist dictionaries are as many as witnesses of a Western scholarly tradition that values the artist name above all, and has decisively determined the way people look at art. In this regard, cognitive sciences have demonstrated the extent to which information related to the artist name conditions the way viewers perceive art (Russel and Milnes 1997; Millis 2001; Russel 2003; Leder et al. 2004; Leder et al. 2006; Belke et al. 2010). When facing two artworks—one that explicitly reveals the artist name (through a signature or any other name tag), and another one that does not provide any indication about the artist's identity—viewers unconsciously feel more attracted by the named piece of art, regardless of the reputation of the artist (Specht 2010; Cleeremans et al. 2016; Hernando and Campo 2017a). Economists have also tried to capture the effect of the artist reputation on sales. The inclusion of artist dummies in econometric models is now a common practice to create accurate price indices and to better understand the process of pricing artworks (Campos and Leite-Barbosa 2009). For instance, 68 old master names are included in Ginsburgh and Schwed (1992), 410 Russian artists in Renneboog and Spaenjers (2011), 10,442 names from all art movements in Renneboog and Spaenjers (2013), 2938 Polish artists in Witkowska (2014), and 1996 names in Oosterlinck (2017). If the coefficients picked up by these dummies are not systematically detailed—because of the size of the samples—most studies confirm that the artist name, in conjunction with its recognition, reputation and popularity, significantly affects prices. More recently, several marketing studies have focused on brand name strategies developed by modern and contemporary artists to build up their careers and achieve financial legitimacy in the art market (Maheswaran

et al. 1992; Schroeder 2005; Schroeder and Salzer-Mörling 2006; O'Reilly and Kerrigan 2010; Kerrigan et al. 2011; Muñiz et al. 2014). Although not all artist names are equivalent—some of them being unknown, known, renowned, popular or unpopular, they can however be regarded as brand names that enable rapid and easy identification of the artist's visual identity. In accordance with brand theory, the artist name is considered a vector of information that reduces information asymmetry in a market characterized by strong demand uncertainty (Akerlof 1970; Nelson 1970; Smallwood and Conlisk 1979; Coffman 1991; Goetzmann 1995; Karpik 2010; Beckert and Rössel 2013). Indeed, information conveyed by brand names—and premium brand names in particular— sends quality signals to buyers who are therefore willing to pay more for those artworks (Miller and Plott 1985). In other words, the brand value of art has become one of the main components of its market value (Hernando and Campo 2017b). It is therefore on brand names that the art trade mostly capitalizes; great names such as Warhol, Picasso, Basquiat, Modigliani, or Rubens are the most sought-after names which generate significant amounts of money every year, with strong media coverage.

In a market mostly driven by the artist name, little attention is paid to another category of goods called "indeterminate works of art", for which the author's identity and/or the origins are unknown (Lupton 2005). Traditionally, anonymity in art is the consequence of four explanatory factors: (1) conjectural factors related to the historical context of the work (i.e. guild regulation system, workshop settings, labour division, social status of craftsmen and artists, etc.) (De Patoule and Van Schoute 2001; Rizzi and Griffiths 2016); (2) cultural factors related to the vision that a given society has of authorship (Lagamma 1998; Mullin Vogel 1999; Bolens and Erne 2011; Henderiks 2016); (3) historical factors when the artist name has failed the test of time because of human or natural vagaries (i.e. destruction of artworks and archives, etc.); and (4) intentional factors when self-effacement is a deliberate choice motivated by artistic and political reasons (McCartney 2017; Milohnić 2017), or to break free from the grip of the art market (Nemser 1970; Bertini 2015).

It is, however, reasonable to say that, in the art world, indeterminate works of art are not particularly appreciated. According to signalling theory (Spence 1973, 1974, 2002), unbranded (or unlabelled) goods usually send negative signals to customers. Because of incomplete or missing information, they create great market uncertainty (Weinberger and Dillon 1980; Dubin 1998; Kotler and Gertner 2002; Sogn-Grundvag and Jens Østli 2007; Dubin 2007). In the absence of any brand name, indeterminate works of art are often assimilated to low-quality and affordable copycat products resulting from low-cost production (Onkvisit and Shaw 1989; Miceli and Pieters 2010; Van Horen and Pieters 2013). In addition, because of their lower market appeal, unbranded goods are rarely promoted in an aggressive commercial way, and thus suffer from limited market visibility (Myers 1967). Their market value is usually lower, and in a trade that is strongly conditioned by conspicuous consumption (Veblen [1899] 1970), low presale estimates and auction results are consequently negatively perceived. Interestingly, this lack of interest in unbranded artworks is also attested in the academic field. Unnamed pictures are not the focus of significant scholarly interest (Keen 1971; Leary 1995). According to great expert Friedländer (1942, p. 161), anonymity is "a symptom of deficient knowledge",

and "the ultimate, the most fruitful question, even if it cannot be answered, is and remains that which concerns personality".

Anonymity in art has inevitable consequences in the art market, especially because the assessment of the work of art as a unique creative act, and the degree of physical contact with the artist, have no longer effect on people's valuation (Newman and Bloom 2012). In their paper dedicated to the trade of tribal art, Candela et al. (2012, p. 291) affirm that "the problem of evaluating quality is complicated by artist anonymity. While in the Western art, the artist name is usually known and is accepted as a guarantee of the artwork quality, in Tribal art the artist name is almost never known. Therefore, in the Tribal art market signs and signals are especially important in helping players recognize the quality of the artwork". For anonymous medieval sculpture, some professionals even consider that those artworks should be put into the realm of decorative arts (Reyburn 2014b). Alongside other market segments (e.g. Non-European art, Ancient art, furniture, etc.), the market for early modern art is one of the most concerned with indeterminate artworks as very few names are proportionally recorded for this period nowadays, because of conjectural and historical factors. In order to partly solve this imperfect market situation, salesrooms refer to several identification strategies originally developed by art historians. Attribution qualifiers are used to label anonymous paintings with indirect names on the basis of stylistic and iconographic comparisons with the work of a named master (e.g. workshop of Sir Peter Paul Rubens; follower of Pieter I Bruegel).[1] Several economic studies include these indicators of authenticity and confirm their negative effects on prices (Onofri 2009; Renneboog and Spaenjers 2013; Oosterlinck 2017; Euwe and Oosterlinck 2017). Provisional names (e.g. the Master of the Parrot, the Master of the Female Half-Lengths) constitute another alternative identification strategy that has been proven to be particularly profitable in the market as it operates as a real name substitute (Oosterlinck and Radermecker 2019). Nonetheless, when no convincing connection can be made with the work of a named artist, the work should preferably be kept anonymous, and labelled with a "spatio-temporal designation" that informs the buyers about its geographic and temporal origins with relative certainty (e.g. "Flemish school", "Antwerp school, sixteenth century").

In this paper, we focus on the latter identification strategy—i.e. the spatio-temporal designations—in order to shed light on a still underexplored aspect of the art market. More specifically, paintings by (yet) unknown artists active in the Southern Low Countries from the fifteenth to the early seventeenth century are considered, and we examine how spatio-temporal designations affect auction prices depending on the information they provide. To do so, we first identify the main factors that explain why the market for old masters is filled with APs (Sect. 1). Second, we introduce a theoretical framework that exposes the different situations of information failure generated by APs in the art market (Sect. 2), before testing whether spatio-temporal designations are capable of influencing the buyer's willingness to pay (Sect. 3—H1). To do so, we apply a hedonic pricing model to a dataset containing

[1] Note that with prints, the notion of "state" is preferred when considering later reproductions of original prototypes (Lazzaro 2006).

information on 1578 sales of APs. Our analysis shows that the generic expression "anonymous painting" covers a very heterogeneous set of works that can be ranked into a multi-layered taxonomy made up of different types of spatio-temporal designations that affect prices differently, depending on the level of information they provide to buyers. In other words, the more specific the designation is in time and space, the more it reduces the existing lack of information and increases the market value of indeterminate goods. Simultaneously, four hypotheses are addressed to better understand what drives the market value of paintings by unrecorded artists. We find evidence that H2) the physical condition of the work, H3/4) the length of the lot essay (correlated with the expertise of an external specialist), and H5) previous attributions to named artists are significant pricing characteristics in this market segment. Because the quest for the artist name does not longer make sense with APs, buyers tend to pay greater attention to other quality signals. The last part of the paper discusses the relative market performance of APs in putting them into perspective with that of other identification strategies, including named artists and indirect names (Sect. 4). If annual rates of return are expectedly lower for APs compared to named masters active in the same geographical and chronological context, the comparison of the three price indices shows that spatio-temporal designations are no less profitable than indirect names, with similar prices and returns. More broadly, and given that most empirical studies usually exclude APs from their analytical framework,[2] the current research proposes an exploratory model specification that may help researchers to take into account indeterminate art objects in future work.

2 Invisible hands at work: the paradigm of anonymity in early modern art history

A brief review of the historical context early modern art is a necessary step to better understand why the market for old masters is literally overflowed with APs. The Southern Low Countries, including seaside cities such as Bruges and Antwerp, became commercially attractive between the fifteenth and the sixteenth century, given their central location and harbour infrastructures. The economic boom experienced by the region at the time caused the expansion of the free art market, which rapidly constrained the artists to reconsider their way of making art. Since this issue has been extensively studied (Campbell 1976; Vermeylen 2003; De Marchi and Van Miegroet 2006; Lyna et al. 2009), the current section will focus on three key conjectural and historical factors that explain why a large number of Flemish paintings are still concerned with anonymity.

First, the role played by the guilds in the early modern period has to be pointed out. The Flanders art market was for long regulated by locally-based guilds whose mission was to maintain high-quality standards and to avoid unfair competition among artists (De Patoule and Van Schoute 2001). To be officially recorded as an

[2] With the exception of Euwe and Oosterlinck (2017). Note that the authors do not provide any new model specification.

independent master (*vry meester*), the artist had to register at the guild according to very selective modalities and expensive fees. Guild inventories (*liggeren*) are therefore valuable records that disclose many artists' names. However, the foreseeable counterpart of this system is that a significant number of artists never registered and still remain unknown.

Second, it should be remembered that the practice of signing pictures was far from being systematic during the fifteenth and sixteenth centuries (Chastel 1974). The absence of signature makes the authentication process much more complex for experts who have to suggest attributions on the sole basis of stylistic, iconographic and material comparisons. Nonetheless, signature is no guarantee of quality, and unsigned paintings are not automatically less valuable than autograph works bearing a signature (Radermecker 2018).

Third, the increasing demand for affordable pictures in the sixteenth century forced the artists to rethink their *modus operandi* in order to speed up the production process and to increase their outputs. Although artists' studios were already attested in the fourteenth century, the workshop organization considerably evolved over the course of the fifteenth, sixteenth and seventeenth centuries. Increasingly, officially-recorded masters had to deal with larger-scale production that required new methods of mechanical reproduction (i.e. preparatory drawings, pouncing patterns, prefabricated supports) and the help of several pupils, assistants, collaborators, and journeymen of unequal skills (Ainsworth 2002; Peeters 2007; Nash 2008). In other terms, the commodification of art is one of the main factors that explain the proliferation of APs at the time. The intense activity of peripheral structures specialized in the production of "phantom copies" must be mentioned as well (De Marchi and Van Miegroet 1996). Of quick execution and lower quality, these pictures intended to mimic the style of great masters, without offering direct connections with their official works. These paintings, mostly executed in Mechelen, were exported across Europe and beyond to meet the international demand for Flemish pictures. According to Van Miegroet (2017), the substitutability and "attributability" of these pictures were more important than the artist name itself. Antwerp Mannerism—an art movement typical of Antwerp between 1500 and 1530, is, in this perspective, a relevant example of serial production of religious panels and altarpieces. But despite the success of these pictures, only very few names have survived the test of time (Van den Brink et al. 2005).

Concretely, how are Flemish APs different from named paintings? Technically, they are oil paintings executed on wood panels of similar dimensions. In accordance with the practice of the time, the iconography is mainly religious, with a predilection for the *Adoration of the Magi* and scenes of the *Passion of Christ*. Other pictures depict secular scenes in the style of existing models. Put differently, this means that APs exactly share the same Flemish aesthetic idiom as named pictures. Quality could however differ from one to another picture. In the current context, they are put on sale by salesrooms, and included in catalogues with a copy of the work, its technical data sheet, and occasional information about its provenance, related literature and previous exhibitions. In some cases, detailed lot notes are provided to buyers.

In the light of these factual elements, several remarks are in order. As suggested above, the notion of quality should not abusively be assimilated to the artist name; a

painting by an identified—but less-skilled—artist may be of lower quality than one by an unrecorded artist. In addition, anonymity is not a definitive status; reattributions and rediscoveries occur in this market segment. The fact that the artist name is missing at time *t* does not mean that the artist's identity is definitively lost. The current state of knowledge simply prevents current scholars from assigning a name to a work.[3] Eventually, misattributions happen with APs as well. The origins of a painting are not always identified accurately, and a picture previously assigned to school *A* can be reattributed to school *B*.[4] If that kind of errors is financially less damaging than reattributions involving great names, some schools may be more attractive than others, with possible positive or negative effects on prices.

3 Information failure in the market for indeterminate works of art

According to Johnson and Levin (1985, p. 170), "it is not unusual to encounter situations in which information for an important attribute is not available (…) and the negative effect derives from the uncertainty that is associated with missing information". Likewise, Hernandez et al. (2014, p. 874) suggest that "(…) the accuracy of consumers' judgments is likely to be compromised when the amount or the validity of the information provided is insufficient to allow for informed judgment. Uninformed judgment can lead to poor decisions that consumers may come to regret". As mentioned in Sect. 1, a significant part of the market for early modern art is based on imperfect knowledge and information about the artist name and identity. But contrary to brand names, indirect names or provisional names, spatio-temporal designations present the disadvantage of not providing any specific information about the artist's reputation or most representative characteristics, and de facto no direct evidence of the quality of the works. When the artist name is missing, artistic quality and merit can thus hardly be assessed otherwise (Bonus and Ronte 1997), and for this reason, information failure contributes to art market inefficiency (David et al. 2013).

With indeterminate works of art, either the information is available but not known by art market players, or it is utterly unavailable in the current state of knowledge (Harpring and Baca 2010, p. 176). Hence, "the product is 'incomplete' and requires further scientific knowledge in order to be assessed better" (Lupton 2005, p. 402). Theoretically, salesrooms should invest time and money in research to provide minimum information about the product offered for sale (Rose 1999, pp. 4 and 25). In this context, intermediary agents such as experts and art historians play a fundamental certification role to overcome discrepancies between the demand and supply of information (Rose 1999, p. 4). But for APs, research costs are often considered

[3] See for example a painting labelled as "studio of Jacob Grimmer" (Sotheby's London, 9 December 2010, lot 12), which previously sold at Sotheby's as "Flemish school, seventeenth century" (17 April 1991, lot 84).

[4] This is for example the case of an "Antwerp school, sixteenth century" sold at Sotheby's London (14 April 2011, lot 3), which was catalogued as "Anónimo Hispano-Flamenco" in 2003.

non-proportional to the expected incomes, especially when high-quality standards are not met. For this reason, salesrooms rarely expend considerable efforts in documenting and promoting indeterminate paintings, although they have the moral obligation to manage their trading.

Since little can be said on the past of indeterminate works of art (Lupton 2005), the vast majority of them are sold without any information, except for the work's title, material, technique and dimensions. In such circumstances, the greater the amount of missing of information, the less favourable the evaluation (Johnson and Levin 1985). APs are therefore worth considering from an economic point of view as they create particular forms of information failure with potential consequences on prices. Three main cases of information failure are likely to be encountered in the market for indeterminate works of art, as synthetized in Fig. 1.

Case 1 When both the seller and the buyer are uninformed about the identity of the artist, presale estimates and auction prices will theoretically reflect the value given to the spatio-temporal designation suggested by in-house experts or other intermediaries (Lazzaro et al. 2004, p. 94). This situation reflects what Lupton (2005) and Candela et al. (2012) call 'shared uncertainty' and 'symmetric disinformation' as both parties have an equal but incomplete set of information.[5] Because of the artist name is missing, estimates and auction results will be relatively low compared to branded paintings, though some attractive signs and signals (in terms of visible quality particularly) may explain higher market values. Shared uncertainty tends to be detrimental to any market, even if, as pointed out by Lupton (2005), symmetrical ignorance can be viewed as identical to perfect information as none of the agents are able to use the lack of information to their strategic advantage.

Case 2 Information asymmetry occurs when one of the two parties is more informed than the other (Akerlof 1970). In the market for Old masters, asymmetric information mainly has to do with potential attributions. When the seller is less informed than the buyer, mostly because of insufficient research efforts, presale estimates are relatively low and auction results unexpectedly high.[6] In this case, the presence of 'sleepers' should not be excluded. A sleeper is an artwork that "remains a dormant treasure until the discovery of its real attribution and value" (Bandle 2016, p. 5). The belief in an attribution may explain why APs sometimes fetch unexpected prices, especially when buyers know more than auctioneers about the potential identity of the author. The reverse situation can also occur when the salesroom refers to a spatio-temporal designation in which the buyers do not trust. If so, the lot is likely to go unsold.

Case 3 The third case of information failure occurs when the seller suspects a potential attribution but decide to put the lot on sale with a basic spatio-temporal

[5] Note that the notion of two-sided uncertainty has been originally developed in the academic literature dedicated to bargaining context with, for instance, Chatterjee and Samuelson (1983) and Cramton (1992).

[6] This is for instance the case of a painting labelled as "French school, nineteenth century" valued at USD 250 and sold for 1.1 million dollars at auction in 2016. The work has since been authenticated as a genuine *Allegory of the five senses* by Rembrandt by the Paris-based gallery Talabardon and Gautier and was resold later in the year at TEFAF Maastricht for about 4 million.

designation anyway. If some bidders share the same intuition, then prices can rise dramatically, and far exceed the presale estimates.[7] This scenario is extremely difficult to consider from an economic point of view, since this kind of information is private by definition. Such a practice—based on implicit misinformation (as salesrooms do not publicly share all the information they have)—creates severe biases in price formation mechanisms. First, researchers need to get this unofficial information, and to determine whether the salesroom has shared it with potential buyers before the sale, or if they have learned about the potential attribution through another channel. To justify this sale strategy, auctioneers argue that they expect more dynamic biddings with spatio-temporal designations, especially in situation of strong information asymmetry. This identification strategy indeed opens the way towards new potential attributions without condemning the picture in rigid and less substitutable categories as indirect names do.[8] Spatio-temporal designations can therefore be attractive to buyers since they are likely to mutate into names over time, thanks to new information supply.

Before further investigating the market for APs, it has to be said that very little is known about the buyers' profiles and incentives to acquire indeterminate paintings. As for any bidder, their identity is kept anonymous by auction houses. Old master buyers are however known to be knowledgeable and well-informed people who give particular importance to brand name and quality (Keen 1971, p. 82). Whether good-quality APs regularly appear at auction after being long kept in private hands, collections exclusively made up of this type of works remain however uncommon.[9] One may suspect that personal interests in the aesthetic, spiritual, and historical value

[7] This is the case of a small and very altered painting offered for sale by Lempertz on 19 November 2016. The works depicted the face of a bearded elderly, and were labelled "Flämischer Meister des 17. Jahrhunderts" (lot 1058), with presale estimates valued at EUR 5000 and 6000. The painting fetched the unexpected price of EUR 390,000 or more than 80 times the low estimate. An informal discussion with the director of the sale (Cologne, 10 November 2016) has revealed that Lempertz suspected some artistic connections with the Flemish Master Jacob Jordaens, but did prefer to opt for a spatio-temporal designation.

[8] If a painting is ascribed to "Follower of Quentin Metsys" from the outset, it is unlikely that the painting to be reattributed to another significant artist. The signal is twofold: the painting was not executed in the lifetime of the artist, but evokes Metsys's art. Conversely, the designation "Flemish art, second half of the sixteenth century" potentially opens to more diversified attribution possibilities. Note that some attributions are sometimes provided in the lot note, although the salesroom still decides to put the artwork for sale with a spatio-temporal designation.

[9] Collections exclusively made up of anonymous paintings are rare. Max J. Friedländer's inventory in his eleventh volume of *Die altniederlandische Malerei* however shows that the proportions between anonymous artworks in public and private collections are relatively equivalent (with 52 and 45 observations, respectively). During the exhibition *Splendeurs du maniérisme anversois* (2013), 67 anonymous artworks of 80 were loaned from private collections (83%). According to auctioneers, experts and art dealers interviewed for this research, there are however several stereotypes that explain why collectors may be reluctant to purchase APs: S1) If the artist name is missing, this would mean that the artist was not considered skillful during his lifetime; S2) without a name, there is no particular stories or anecdotes related to the artist's life which are however valuable in the art market; S3) anonymity in art is automatically associated with lower quality; S4) as academics do not pay much attention to APs, there is no particular reason to consider APs for purchase purposes; S5) the lower market value of APs reflects their lower artistic value; S6) hedonic and monetary benefits usually expected in the art market are not possible with APs; S7) there is no investment opportunity with APs.

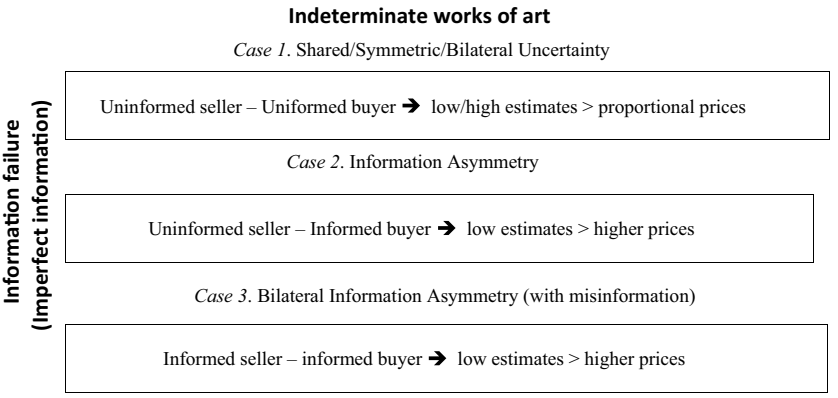

Fig. 1 Information failure in the market for indeterminate works of art

of some APs (Throsby 2003, pp. 279–289) may encourage purchasers to seek for these pictures, while Woodham (2017) suggests that paying attention to anonymous artists is a sign of maturity in art collecting. Hunter (2006) also argues that they constitute affordable substitutes, consistently with the theory of copycat products. Lower purchasing power could therefore be viewed as an incentive to purchase APs. In some cases, the purchase of APs may the fact of specialists collecting in depth and striving for completeness, or transhistoric collectors.[10] We add that restauration and resale purposes also need to be considered. Most art dealers build up their stock through a participative attendance at auction; because of their higher level of specialization, they are sometimes able to detect sleepers and to capitalize on the new name, after making additional research and cleaning. Similarly, museum curators may be potential players in this market segment as high-quality APs can be valuable from an artistic and scientific point of view.

In this paper, we shall mainly focus on the supply side, and we examine how the information provided by spatio-temporal designations allows to mitigate the lack of information about APs, while controlling for other signals of quality such as supply of information in the lot notes. These few considerations on information failure situations created by indeterminate works of art however contribute to set up a first theoretical framework that underlines the complexity of dealing with these goods in the art market. At this stage, these three case scenarios do not pretend to be exhaustive, and should be further studied in future empirical works.

[10] This assumption has been addressed during the fourth annual Ards colloquium "Current research in medieval and renaissance sculpture: Collecting Medieval Sculpture", held in the Musée du Louvre in Paris (FR) on 23–24 November 2017. As APs, medieval sculpture is essentially anonymous. Reyburn (2014b) also suggests that there is a new wave of rich collectors in their 40s and 50s who want originality in their house and therefore buy medieval art to mix it with contemporary art.

4 The market reception of anonymous paintings

The next sections empirically investigate the market for APs. Data and methodology are first introduced, before discussing the main results of the preferred model. Some alternative model specifications are provided to support their robustness.

4.1 Data and methodology

Our database contains 1578 sales of Flemish APs, auctioned by international salesrooms between 1955 and 2015. Data are mainly collected from the Blouin Art Sales Index (BASI) which is one of the most comprehensive online repertory of sales (McAndrew 2010, p. 71). Research in printed auction catalogues has also been carried out to take into account lot essays that are not systematically accessible online but necessary for the purpose of this study. The chronological framework runs from the second half of the twentieth century to the early 2000s. According to Robertson (2005), it is not before the middle of the 1950s that the art market recovered its stability, before experiencing a first significant boom in the 1970s (Wood 1997). Over those years, the auction market experienced considerable shifts, including new marketing strategies developed by international salesrooms. As a consequence of the digital revolution and the development of technical art history (Ainsworth 2005), auction catalogues have become richly documented, with more accurate attributions and scholarly references. As major salesrooms are now able to ask for specialists' expertise, and have access to an extensive scientific literature, we assume that selling a painting as anonymous is a deliberate choice and not the consequence of a lack of knowledge, as it used to be in the past.

As stated by Johnson and Levin (1985, p. 170), "the relative influence of an attribute in the presence or absence of information for other attributes taps important sources of variation in situations where evaluations must be made with missing information". Accordingly, we argue that, when the artist's name is missing, buyers pay attention to other parameters like the alternative identification strategy (i.e. spatio-temporal designation) and quality signals that may reduce uncertainty and affect the market valuation of APs (Wankhade and Dabade 2010). The following assumptions are in line with Hernandez et al. (2014, p. 875) statement: sensitivity to omissions is lower when well-known (vs. lesser-known) brand names are presented, which means that for unbranded art pieces, any other extra information or quality signal is likely to be of paramount importance in the valuation process, especially for novice consumers. Our five assumptions are the following:

H1) Spatio-temporal designations: We first test whether spatio-temporal designations, depending on their formal structure and level of information, influence the buyer's willingness to pay. This assumption has come up after noticing that the generic term "anonymous" actually encompasses a multi-layered taxonomy made up of several designations used to give a minimum identity to indeterminate paintings.

H2) Condition: Paintings in good material condition are highly valuable in the market for old masters (Keen 1971; Hope in Robertson 2005; McAndrew 2010). But

information about the state of conservation of a work is rarely discussed in the lot notes, especially for old pictures that are regularly damaged because of time injuries.[11] As a result, this characteristic is almost never included in empirical studies. The close examination of lot essays of APs however reveals that salesrooms occasionally provide information about the condition of the lot (e.g. "old restorations" (with negative connotation), "relined/cradled", "minor/major loss", "material damages", "retouched", "cracks", etc.). These alterations affect the visual aspect of the work, with possible negative effects on prices.

H3) Expertise: Expert opinions, expressed through written certificates or verbal judgements, are crucial when dealing with goods of uncertain authorship (Spencer 2005; Fincham 2017). The situation differs somewhat with APs since the authentication process does not aim at confirming authorship per se but the geographic and temporal backgrounds of the work as precisely as possible. The role of the expert is also to provide information about the painting itself in order to assist auctioneers in the cataloguing process.

H4) Length of the note: Advertising and information supply are effective means to any firm to signal the superior quality of its products (Nelson 1970). In the market for APs, cataloguers rarely make comments on the works as little information is available. This observation reveals the extent to which the artist name is a key component of salesroom discourse. However, it is not rare to encounter lots subjected to more detailed essays. It is therefore legitimate to believe that buyers pay greater attention to APs for which a minimum amount of information is provided. Indeed, a greater supply of information is likely to reflect the importance of the lot. To control for this quality signal, we have computed the total number of words of each lot note, and included a continuous variable in the model. This assumption is similar to that of Tummers and Jonckheere (2008) who suggest that in eighteenth-century auction catalogues the length of the note and quality labels were used to create product differentiation.

H5) Previous attributions: It is not unusual to encounter APs that had been formerly—but erroneously—attributed to a named artist. Although old attributions could reflect a lack of knowledge, they can also be interpreted as evidence of quality, especially if the prior attribution is related to a great name.[12] One may therefore conjecture that the mention of previous attributions in sale catalogues can raise the buyers' attention to those pictures.

To test these five hypotheses, we apply a hedonic pricing model to our data set. Based on Lancastrian theory (Lancaster 1966), this method is frequently used in art market studies to create price indices and to capture the effects of hedonic characteristics on prices (e.g. Buelens and Ginsburgh 1993; Chanel et al. 1996, Agnello and Pierce 1996; Ashenfelter and Graddy 2003; Renneboog and Spaenjers 2013).

[11] Note that condition reports are now available on demand in major salesrooms.

[12] This is for example the case of a "South Netherlandish School, early sixteenth century", sold at Christie's in 2014, which was formerly attributed to German master Albrecht Dürer ("Galeria Duca Brusche, no. 123, as Albrecht Dürer (according to an old label on the reverse"). *Cf.* Southern Netherlandish School, early sixteenth century, *The Deposition*, Christie's Amsterdam, *Old Masters, nineteenth Century and Impressionist Art,* 13–14 May 2014, lot 70.

Compared to repeat sales regression (RSR), the hedonic pricing model offers several advantages that are discussed in Ginsburgh et al. (2006). The study is based on hammer's prices which are deflated using the US CPI, and expressed in 2015 US dollars. The basic equation can be written as:

$$\log p_i = \alpha + \sum_{j=1}^{m} \beta_j s_{ij} + \sum_{k=1}^{r} \gamma_k x_{ik} + u_i$$

where $\log p_i$ is the log of the price of painting i and s_{ij} includes the five aforementioned variables that are expected to affect the market value of APs. The regression equation also contains some 55 variables x_{ik} hedonic variables that are used to homogenize each lot sold contained in the sample. The last term u_i is a random disturbance, satisfying the usual assumptions, with $i=1,\ldots,n,; j=1,\ldots,m; k=1,\ldots,r$. With the exception of prices, dimensions, lot order, and the length of the note, all other variables are dummies that take the value of one if the characteristic is met, and zero otherwise.

The main limitation of this study is a possible risk of collinearity among the four variables related to quality. Indeed, high-quality paintings, in excellent condition, are more likely to be examined by experts who are then able to come up with useful information to cataloguers. The latter are therefore able to write longer notes. Some robustness tests are provided at the end of the next section to control for these potential biases.

4.2 Main empirical results and discussion

In total, 173 spatio-temporal designations have been detected in the sample, clustered into 41 categories by the Blouin Art Sales Index (see "Appendix 1"). It is first interesting to point out that the art market avoids using terms and adjectives that explicitly mention anonymity (e.g. "Anonymous Flemish Master" or "Unidentified Antwerp Artist"). By contrast, this practice is well attested in older sale catalogues, and in art history in general. This is for example the case of a painting depicting the *Martyrdom of Saint Hippolytus* inventoried as "Unidentified Artist, Flemish fifteenth century" in the Museum of Fine Art (Boston),[13] or a *Portrait of a Woman* by a "Cologne, Unknown artist" preserved in the National Gallery (London).[14] From a marketing perspective, this semantic difference matters since it clearly indicates that the artist's identity is totally unknown, while spatio-temporal designations solely refer to space and time. Phonetically, each identification strategy also sends different signals to buyers (Yorkston and Menon 2004).

Auction results and presale estimates reveal substantial price differences. The average amount of money paid for Flemish APs is USD 37,266, with a median of

[13] Inventory number 63.660. The painting was sold to Rosenberg and Stiebel (Palais Galliera Paris, 11 April 1962, lot 14) before being purchased by the museum on 16 May 1963.

[14] Inventory number NG2670, acquired through Salting bequest in 1910. Note that the painting is not on display.

USD 17,082. Auction prices range from a minimum of USD 938 to a maximum of USD 3,608,563. "Appendix 2" offers some comparative presale estimates that suggest that all APs are not equivalent in terms of market potential. In these circumstances, estimates operate as signals that provide additional information likely to reduce or increase uncertainty according to whether they are high or low (Atakan and Ekmekci 2014).[15] Differences in quality may explain these figures with direct effects on the buyers' perception of the work; if the presale estimate is low, then the buyers may be tempted to believe that the quality of the lot is low as well, and vice versa. But price signaling cannot succeed when the product quality is easily discernible (Alpert et al. 1993). This means that high presale estimates associated with mediocre paintings will not be deemed credible by buyers, except maybe if they suspect a potential attribution.

Tables 1 and 2 provide descriptive statistics about the geographic and temporal characteristics of the paintings.

"Flemish school" is the most encountered generic designation of the sample (55.7%), followed by works from the "Antwerp school" (20.3%), and from the "Netherlandish school" (10.1%). Labelling a painting as "Flemish" or "Netherlandish" is the minimum level of information that can be provided to buyers. Ghent and Leuven are marginally represented since these schools were no major economic centres at the time, contrary to Antwerp, Brussels or Bruges (De Patoule and Van Schoute 2001). As a consequence, few works from these cities are preserved nowadays. Information contained in the sample thus reflects the current state of knowledge in art scholarship. Interestingly, the BASI does not record any AP from Mechelen, whereas the city used to be an important export centre, especially in the early seventeenth century. One possible explanation is that most of the works currently labelled as "Antwerp school" were actually executed in Mechelen, since there is an obvious tendency in art history to systematically gather cultural goods into leading artistic centres. The last category "Mix schools" encompasses other national schools that visibly betray Flemish influences (e.g. "Franco-Flemish school", "Italo-Flemish school", etc.). They only represent 6.5% of the data set.

Table 2 shows that 15.6% of the lots are not specifically located in time, although pertaining to the early modern period. Unsurprisingly, sixteenth-century pictures are the most represented (72.3%), unlike fifteenth-century paintings that only account for 6.2% because of their older origins. This suggests that APs are also concerned with scarcity.

One first step consists in running a hedonic regression on the whole data set, in order to see how standard hedonic variables do react in this market segment. The results are displayed in "Appendix 3". Interestingly most of them are not significantly different from zero. This is notably the case of the "date" and "signature" dummies that are logically considered apocryphal with APs. No particular subject

[15] As demonstrated by Castellani et al. (2018), some painting attributes are also likely to affect seller's reservation price. But although they are major signals on the auction market (Beggs and Graddy 1997), presale estimates are not included in the analysis because of their strong correlation with the five previously defined assumptions.

is more valued than religious paintings, while canvases negatively affect prices (−0.170***) as well as the lot order (−0.000235**). Indeed, high-quality APs are often offered in the first entries of sale catalogues alongside blue-chip masters, while less valuable lots are usually relegated at the end.[16] Unsurprisingly, information about provenance (0.430***) and mentions of the work in the literature (0.510***) significantly affect prices in this segment, as well as some other characteristics related to the context of the sale (salesrooms, months and years). Most coefficients picked up by time and spatio-temporal designation dummies are not significant.

To further explore this market segment, one option is to consider space and time parameters (i.e. schools and centuries) as inherent characteristics of APs. Table 3 presents the main results of this experimental model specification.[17]

Compared to paintings labelled as "Flemish", the average price paid for "Netherlandish" pictures is 22.6% higher (exp(0.204) − 1), against 30.6% (exp(0.267) − 1) and 59.2% (exp(0.465) − 1) for Antwerp and Bruges pictures respectively. Bruges and Antwerp are indeed well-known for being key artistic hubs in the past, wherein many blue-chip artists settled their workshops. These price differences suggest that the name of a city can be viewed as a quality label per se (Larceneux 2001, 2003), some locations being more valuable than others in the market. This finding is also consistent with the "country as brand" theory developed by Kotler and Gertner (2002) who endorse that the vision consumers have of a country can influence their purchasing behaviour. When paintings without any time specification are taken as a control group, results clearly show that prices paid for older APs are significantly higher than for recent ones. The estimates tend to gradually decrease, especially with paintings dating from the sixteenth and early seventeenth centuries.

This model specification, however, is not sufficiently accurate to take into account the variety of spatio-temporal designations exploited by the market to label APs. Indeed, the close examination of the data set reveals the existence of a multi-layered taxonomy, based on a general-to-specific approach which provides different levels of information. In terms of informational content, there is indeed a sharp difference between a painting labelled as "Flemish school" or "Bruges school, circa 1470". The level of information is generic in the first case, and specific in the second. In the latter case, buyers are more informed about where and when the work was presumably executed.

In order to test whether each type of spatio-temporal designation affects the buyers' willingness to pay, a taxonomy made up of eight information levels has been defined and is detailed in Table 4, with descriptive statistics in Table 5. A more comprehensive taxonomy is proposed in "Appendix 4" but will only serve for robustness tests, because of the small number of observations accounted for each designation.

All spatio-temporal designations can be clustered into two main groups: generic schools (referring to a country or a larger territory) and local schools (referring to a

[16] Note that 325 lots, or 20.8% of the sample, were ranged between lots nos 1 and 25, even if lot order is relative by definition.

[17] Complementary tests have been done by including interaction terms between each school and each century but without leading to robust results.

Table 1 Descriptive statistics by school

School	Obs.	Percentage	Mean	Median	SD	Min	Max
Antwerp	321	20.34	47,527	23,445	87,626	2133	756,068
Bruges	94	5.96	89,104	28,021	372,024	5356	3.61E+06
Brussels	17	1.08	69,154	41,906	93,149	7656	357,911
Ghent	3	0.19	183,505	20,383	284,831	17,737	512,396
Leuven	1	0.06	88,364	88,364	–	88,364	88,364
Flemish	879	55.7	23,836	13,675	38,503	938	653,793
Netherlandish	160	10.14	60,954	22,246	134,430	1606	1.34E+06
Mix schools	103	6.53	25,778	15,190	29,298	3297	160,918
Total	1578	100	37,266	17,082	114,082	938	3.61E+06

Table 2 Descriptive statistics by period

Period	Obs.	Percent	Mean	Median	SD	Min	Max
Fifteenth century	98	6.21	93,915	28,023	368,705	3829	3.61E+06
Fifteenth/sixteenth century	26	1.65	47,246	27,776	66,677	7324	295,050
Sixteenth century	1142	72.37	37,146	17,847	74,992	938	1.34E+06
Sixteenth/seventeenth century	65	4.12	21,516	12,062	30,186	3219	174,491
No specification	247	15.65	18,440	10,309	36,655	1156	491,969
Total	1578	100	27,266	17,081	114,082	938	3.61E+06

specific city), with different levels of time-based information. The designation can either specify the century (e.g. "sixteenth century"), or an approximate date (e.g. "circa 1520"). Sometimes, the century or the school is also specified (e.g. "First half of the sixteenth century"; "Northern Flemish school") [see "Appendix 4" (Table 10)]. In other cases, cataloguers suggest an attribution right after the spatio-temporal designation or in the content of the lot note (e.g. "Flemish school, sixteenth century, in the style of Hieronymus Bosch"). The supply of information thus considerably differs from one lot to another. The natural assumption is that the more specific the designation is in time and space, the more it reduces the lack of information and increases the market value of APs. Accurate spatio-temporal designations are indeed expected to better inform the buyers about the origins of the work, and then to reduce uncertainty surrounding its material and historical authenticity, which is particularly valued by buyers after authorship.

To avoid selection biases, it is first necessary to ensure that these identification strategies have continuously been exploited by the market over the past 60 years. Figure 2 supports this prerequisite. No major evolution is noticed over time, except for "generic school + century" that has become the most encountered identification strategy since the 1980s.

The next section presents and describes the preferred model which includes the taxonomy of spatio-temporal designations and the four extra variables related to quality [i.e. condition (54 obs.), expertise (25 obs.), length of the note (mean = 15

Table 3 Results of the hedonic regression by school and century

Dependent variable (log USD 2015)	Coefficient
School	
Flemish (control group)	0
Netherlandish	0.204***
Antwerp	0.267***
Bruges	0.465***
Brussels	0.0853
Ghent	0.713
Leuven	0.475
Mix school	0.0709
Century	
No specification (control group)	0
Fifteenth century	0.872***
Fifteenth/sixteenth century	0.599***
Sixteenth century	0.330***
Sixteenth/seventeenth century	0.220*
Other standard hedonic controls	Incl.
Time dummies	Incl.
Obs.	1578
R^2	0.443
Adj R^2	0.393

All models are estimated using OLS with White heteroscedasticity-consistent standard errors and covariance. The dependent variable is the natural log of the real price. Period considered is 1955–2015. Single spatio-temporal designations are no longer included to avoid collinearity issues

In all regressions coefficients are significant at the following levels of confidence: *significant at 10%; **significant at 5%; ***significant at 1%

words), and previous attributions (66 obs.)]. These are expected to create product differentiation in the market for APs, with significant price differences.

Table 6 provides the main coefficients resulting from the hedonic regression. Single spatio-temporal designations are no longer included in the model to avoid collinearity issues. In "Appendix 5" (Table 12), we gradually introduce every explanatory variable into the model in order to verify the stability of the estimates.

H1 When the "Generic school" variable is taken as a reference group, all other designation dummies are positive and significantly different from zero at probability level smaller than 1%, which suggests that each identification strategy functions as a pricing determinant. The most interesting finding is that the price effect gradually rises as the supply of information increases. The mention of the century generates a price effect of + 48.2% (exp(0.394) − 1), and + 50% for "Mix school + period" (exp(0.413) − 1). The most significant price increase occurs when an approximate date is provided, with + 101.7% (exp(0.702) − 1). Similar price trends are noticeable

Table 4 Taxonomy of spatio-temporal designations

Taxonomy	Spatio-temporal designations
Generic school	Flemish school; Netherlandish school
Generic school + century	Flemish school (fifteenth century); Flemish school (fifteenth/sixteenth century); Flemish school (sixteenth century); Flemish school (sixteenth/seventeenth century); Netherlandish school (fifteenth century); Netherlandish school (fifteenth/sixteenth century); Netherlandish school (sixteenth century); Netherlandish school (sixteenth/seventeenth century); North Netherlandish school (sixteenth century); South Netherlandish school (sixteenth century)
Generic school + approximate date	Flemish or Netherlandish school + dates (comprises between l470 and 1600)
Mix school + period	Anglo-Flemish school (sixteenth century); Germano-Flemish school; Germano-Flemish school (sixteenth century); Franco-Flemish school (fifteenth century); Franco-Flemish school (sixteenth century); Franco-Flemish school (sixteenth/seventeenth century); Hispano-Flemish school; Hispano-Flemish school (fifteenth century); Hispano-Flemish school (sixteenth century); Hispano-Flemish school (sixteenth/seventeenth century); Italo-Flemish school; Italo-Flemish school (fifteenth century); Italo-Flemish school (sixteenth century); Italo-Flemish school (sixteenth/seventeenth century)
Local school	Antwerp school; Bruges school; Brussels school
Local school + century	Antwerp school (fifteenth century); Antwerp school (fifteenth/sixteenth century); Antwerp school (sixteenth century); Antwerp school (sixteenth/seventeenth century); Bruges school (fifteenth century); Bruges school (sixteenth century); Brussels school (fifteenth century); Brussels school (fifteenth/sixteenth century); Brussels school (sixteenth century); Ghent school (fifteenth century); Ghent school (sixteenth century); Leuven school (fifteenth century)
Local school + approximate date	Local school + approximate date (comprises between 1470 and 1586)
School + period + attribution attempt	Various cases

Table 5 Descriptive statistics by type of spatio-temporal designations

Taxonomy	Obs.	Percentage	Mean	Median	SD	Min	Max
Generic school	203	12.86	15,306	9143	20,808	1156	166,924
Generic school + century	675	42.78	27,727	15,469	62,596	938	1,344,382
Generic school + approximate date	122	7.73	58,180	22,964	103,423	2775	697,964
Mix generic school + century	106	6.72	26,341	14,875	30,412	3298	160,918
Local school	24	1.52	42,846	20,431	97,194	2133	491,969
Local school + century	266	16.86	52,840	23,341	225,842	4106	3,608,563
Local school + approximate date	134	8.49	63,744	32,666	106,357	5514	756,068
School + period + attribution attempt	48	3.04	72,242	23,040	124,043	3667	568,412
Total	1578	100	37,266	17,082			

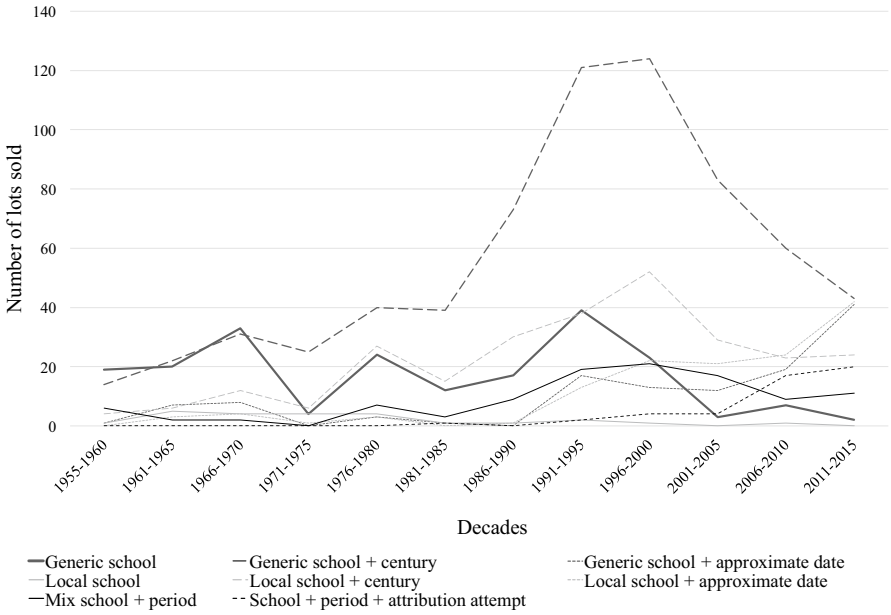

Fig. 2 Number of lots sold for each identification strategy (1955–2015)

when local schools are considered. The ability of cataloguers to specify the geographic origins of the works tend to affect prices differently. In average, designations that explicitly mention a city fetch higher prices than generic ones, and the value of the coefficients tends to increase when the information is getting more accurate. The greatest impact on price is generated by local schools with an approximate date, closely followed by spatio-temporal designations with an attribution. These results are consistent with branding theories according to which meaningful brands allowing easy identification of the artist—or his origins in this case—significantly influence the purchasing behaviour of consumers (Kotler 1991; Aaker 1992, 1997; Keller 1993; Hoeffler and Keller 2002; Preece et al. 2016).

H2 Most "quality dummies" also appear significantly different from zero. As expected, altered APs are in average 20% cheaper than those in good state of conservation. Given that traditional hedonic variables are rarely met with APs, the buyers seem to pay attention to the material condition of the work.[18]

H3 The "expertise variable" does not come out as significant in the preferred model. "Appendix 5" (Table 11) however shows that this coefficient is significantly positive when it is processed individually. It therefore seems that the inclusion of the "length of the note variable" generates strong correlation between the two variables, since experts not only determine the spatio-temporal origins of the work, but also provide additional information that is overtaken by cataloguers

[18] This result has been confirmed during private interviews with experts at Lempertz (November 2016), Bernaerts Antwerp (January 2018), Christie's and Sotheby's (New York, March 2018).

Table 6 Preferred model—results of the hedonic regression

Dependent variable (log 2015 USD)	Coefficient
Taxonomy	
Generic school	
Generic school (control group)	0
Generic school + century	0.394***
Generic school + approximate date	0.702***
Mix school + period	0.413***
Local school	
Local school	0.407**
Local school + century	0.649***
Local school + approximate date	0.731***
School + period + attribution attempt	0.673***
Quality signals	
Expertise	0.0172
Condition (altered)	−0.219*
Length of the note	0.00226***
Previous attribution(s)	0.133*
Other standard hedonic variables	Incl.
Time dummies	Incl.
Observations	1578
R^2	0.453
Adj R^2	0.405

All models are estimated using OLS with White heteroscedasticity-consistent standard errors and covariance. The dependent variable is the natural log of the real price. Period considered is 1955–2015

In all regressions coefficients are significant at the following levels of confidence: *significant at 10%; **significant at 5%; ***significant at 1%

to document the lot notes. This finding is consistent with other empirical studies that include the "expertise" dummy to control for expert opinions on prices. Most of them find that the effect is positive, though it considerably varies from one sample to another (Onofri 2009; Campos and Leite-Barbosa 2009; Euwe and Oosterlinck 2017; Ginsburgh et al. 2019). There are however reasons to believe that the effect of art experts is greater in the market for APs since these works are rarely the object of publications and exhibitions.

H4 The longer the lot note, the higher the price (Tummers and Jonckheere 2008). The coefficient picked up by the continuous variable totaling the number of words by catalogue note is significantly positive at the 99% confidence level, with a marginal impact on prices (+0.20% per extra word). Obviously, considering a piece of art as a sum of words is reductive, but this result suggests that detailed lot essays tend to raise the purchasers' attention to APs. Conversely, undocumented notes do not encourage buyers to consider these works for purchase.

H5 The mention of previous attributions is proved to be valuable in the market for APs. Although they are obsolete, they contribute to the narrative of the picture (Preece and Kerrigan 2015). They tell buyer that someone has once given credit to the picture, and thought he was able to identify a distinctive hand. The likelihood that a painting is reassigned to a named artist is not equal to zero, and this specificity of APs can be appealing for buyers. Interestingly, this result seems to be specific to AP as the "previous attributions" variable is not statistically different when applied to a larger sample made up of named old masters.

In order to prove the robustness of the results, several additional tests are provided in "Appendix 5" (Table 12). They show that most estimates remain reasonably stable when different model specifications and sample selections are tested.

Firstly, we run a regression that includes extra variables to make the current taxonomy of spatio-temporal designations more accurate, with: "Generic school + approximate period" (e.g. Flemish school, second half of the sixteenth century), "Local school + approximate period" (e.g. Bruges school, last quarter of the fifteenth century), and "Specified school + period" (e.g. Southern Flemish school, sixteenth century).[19] All the three variables appear positive and significantly different from zero, but more important, they are consistent with the gradual logic of the preferred model, with values that tend to increase as the level of information is getting more accurate. The coefficients of the "length of the note" and "previous attributions" variables are relatively robust, while the "condition" variable is no longer significant, probably because of the limited number of data or collinearity issues with the new variables.

As mentioned before, a large number of APs are left undocumented in sale catalogues because this category of works is not the priority of auction houses. Logically, when no information is provided, no particular quality signal can help the buyer in his or her purchasing decision. Hence, the main bias generated by APs is the results to be driven by the most expensive pictures, for which the four assumptions are often met. A first basic test consists in removing two obvious outliers from the sample ($N = 1576$) to ensure that the results are not skewed by these exceptional sales exceeding six-figure prices.[20] As demonstrated in "Appendix 5" (Table 12), most coefficients are stable at a lower level. In order to work on a more homogenous category of value, we run a second regression on a reduced sample that only contains paintings with auction prices ranging from 0 to USD 100 000 ($N = 1486$). The coefficients picked up by the variables of the taxonomy do not change significantly, with the same gradual effect on prices. These results contrast with those obtained for the "quality variables". Only one coefficient ("previous attributions") remains significantly different from zero, suggesting that detailed lot essays are less frequently

[19] Note that the taxonomy could even be further detailed but the current total number of observations prevents us from doing so.

[20] *Cf.* Bruges school, fifteenth century, *Portrait of Jacob Obrecht and a Female Saint*, Sotheby's New York, *Important Old Master Paintings*, 15 January 1993, lot 139, sold for USD 3,608,568; South Netherlandish School, circa 1500, *Portrait of young lady, probably Mary of Burgundy*, Sotheby's London, *Old Master Paintings Evening (Sale L07031)*, 04 July 2007, lot 15, estimated GBP 50,000–70,000 and sold for 1,344,382.

encountered in this category of value. The robustness of the estimate is due to the fact that previous attributions are sometimes mentioned in the provenance of the lot, and not systematically in the core text of the essay. As expected, similar results are obtained when the 0–USD 50,000 range of value is considered ($N = 1333$), which better reflects the average price paid for Flemish APs (USD 37,000). The four quality criteria are no longer significant but the taxonomy of spatio-temporal designations remains robust.[21] In the light of these results, we can reasonably argue that the market for APs suffers from an underproduction of information (Rose 1999, p. 34), while confirming that each type of spatio-temporal designation used to label APs operates as a pricing characteristic in its own right.

5 How anonymous paintings perform in the art market compared to (directly or indirectly) branded artworks?

Before concluding the study, we put the market for APs in perspective into the general market for old masters, in order to potentially detect similar trends. Figure 3 shows the comparison of three prices indices: the first reflects the market evolution of paintings by identified Flemish masters while the second and the third focus on the market for indeterminate paintings labelled with indirect names (attribution qualifiers) and spatio-temporal designations respectively. All artists used to be active in the Southern Netherlands between the fifteenth and the early seventeenth century. Annual rates of return are detailed in "Appendix 6" (Table 13).

Obvious different market trends are noticeable since the early 1980s. Interestingly, this period of time corresponds to the development of new connoisseurship, and is characterized by greater concerns about authorship (Guichard 2010). The values obtained for named artists[22] are significantly higher than for APs labelled either with indirect names or spatio-temporal designations, which is not surprising as the artist name is one of the most significant pricing characteristics in the market for old masters. The three curves however follow relatively similar patterns in the overall, even though some of them are more sensitive to market variations. This may suggest that the market for indeterminate paintings from a specific historical context is globally influenced by the market for artists active in the same context, but whose names have passed the test of time.

Greater attention has to be paid to the market performance of anonymous paintings. The two curves reveal unpredicted similar values and comparable market evolutions which means that, regardless of the identification strategy (attribution qualifiers or spatio-temporal designations), the whole market for early Flemish APs has experienced moderate growth over the past decades. The graph also reflects the relative steadiness of both segments, less subjected to market variations and time effects. The

[21] Note that consistent results are obtained when the sample is split up by quartile, with higher values that concentrate in the last quartile.

[22] Note that we try to avoid talking about "well-known" masters when considering named artists. Indeed, having a name does not necessarily mean that the artist used to be renowned, or is regarded as blue-chip artist nowadays. Such a dissociation is practically impossible to make in the graph as autograph works by big names are rare in this market segment (e.g. Jan van Eyck, Rogier van der Weyden, Pieter I Bruegel, etc.).

low values of indirect names can be explained by the fact that the scale of authentication used by salesrooms comprises heterogeneous degrees of quality, especially between "workshop of" and "copy after" or "manner of" pictures that are much lower priced in the market (Onofri 2009; Renneboog and Spaenjers 2013; Oosterlinck 2017).

In the light of these findings, one question inevitably arises: What identification strategy is the most profitable to sell APs? Is it preferable to explicitly mention anonymity, by opting for a spatio-temporal designation, or to feign identities by creating indirect names with the help of attribution qualifiers? Intuitively, the second option appears to be a more efficient identification strategy since it allows to indirectly label an indeterminate painting with the name of an identified artist. Subsequently, the designation itself includes a name, which is a quality signal that is supposed to increase the buyer's confidence (Aaker 1992, 1997; Keller 1993; Hoeffler and Keller 2002; Hernando and Campo 2017a, b). But technically, both designations have the same meaning; the historical context is identical but the true identity of the artist remains totally unknown. In other terms, it is chiefly a question of branding strategy.[23] In this respect, Fig. 3 reveals two important points: first, buyers are aware that indirect names are no evidence of authorship, and second, they are roughly willing to pay similar amount of money for both identification strategies. This finding is supported by "Appendix 6" (Table 14) which provides some price comparisons between attribution qualifiers and spatio-temporal designations, with average prices sorted in descending order. Results are plotted in "Appendix 6" (Fig. 4). "School + period + attribution attempt" has the highest mean, while "Generic school" the lowest. The figure also clearly shows that most spatio-temporal designations concentrate at the top of the figure with higher value, while the remaining designations tend to gather in the middle and at the bottom of the graph.

It is therefore legitimate to wonder whether the creation of indirect names is a truly relevant strategy in the market for APs, especially when no argument is provided by cataloguers to support the attribution. In several respects, using spatio-temporal designations is a more transparent identification strategy that excludes indirect—and sometimes unconvincing—connections with the work of a named master. They are also less risky than direct and indirect names because less subjected to negative reattributions which is one of the greatest causes of uncertainty in the market for old masters, with critical consequences on prices (Bandle 2016). At best, APs can be upgraded and reattributed to a named artist, and as mentioned in Sect. 2, this is mainly due to their relative degree of substitutability. When an indeterminate painting is indirectly associated with a name (e.g. Follower of Quinten Massys), there is low probability that the painting to be reattributed to another great name. The market potential of the work will even be lower if the indirect name is the one a minor artist, with an unappealing attribution qualifier ("follower of", "style of", "manner of"). On the contrary, spatio-temporal designations offer multiple opportunities of attributions while limiting the risk of negative reattributions.

[23] Recently, a remarkable unfinished panel depicting the *Virgin and Child with saints* sold at Christie's as "attributed to Hugo van der Goes", a major Flemish primitive born in Ghent. The lot went for USD 8,985,000. Interestingly, this high-quality work was formerly labelled as "Unidentified Ghent (?) Master" (Ainsworth 2002, p. 75). It would have been highly instructive to compare prices if the spatio-temporal designation had been maintained by Christie's.

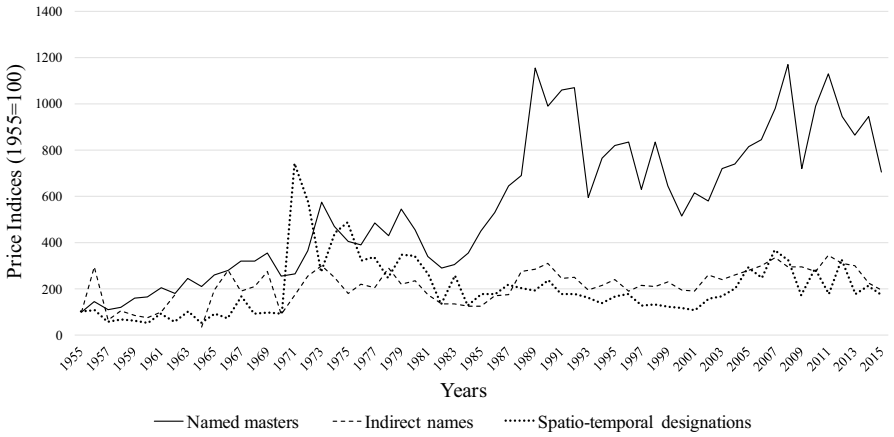

Fig. 3 Comparative price indices (1955 = 100). All models are estimated using OLS with White heteroscedasticity-consistent standard errors and covariance. The dependent variable is the natural log of the real price. Period considered is 1955–2015. Price index (1) only includes names masters with $N = 4866$, model (2) paintings labelled with indirect names with $N = 5914$, and model (3) spatio-temporal designations with $N = 1578$. Estimates are corrected according to Triplett (2004). Ratios are obtained in computing the antilog of the coefficients of each year (i.e. exp(coeff.) − 1)

It is eventually worth noting that salesrooms rarely provide convincing arguments to support the given spatio-temporal designation, whereas our results prove that some of them make real price differences. This situation may be problematic especially because APs are very substitutable for each other. This is for example the case of "Antwerp school, circa 1520", which is a very convenient designation used to sort heterogeneous Antwerp mannerist paintings (Van den Brink et al. 2005). But because our taxonomy is based on a scalable specification system, other spatio-temporal designations such as "Antwerp school", "Antwerp School sixteenth century" or even "Flemish School, sixteenth century" would be as just as relevant to label those pictures. Also, there is no irrefutable evidence that "Antwerp pictures" were indeed executed in Antwerp. As mentioned earlier, other peripheral cities such as Mechelen were active in the production of affordable pictures, thanks to the development of the free art market. Put differently, this means that each spatio-temporal designation has a certain degree of interchangeability and uncertainty. But according to our results, all spatio-temporal designations are not equally valued, and "Local school + approximate date" has been proven to be the most profitable designation. It would therefore be tempting to misuse certain types of spatio-temporal designations to label APs, without providing any concrete evidence to support the given attribution.[24]

[24] From an art historical point of view, it is extremely difficult to prove that an APs was specifically executed in 1520, 1525 or 1530 or any other date.

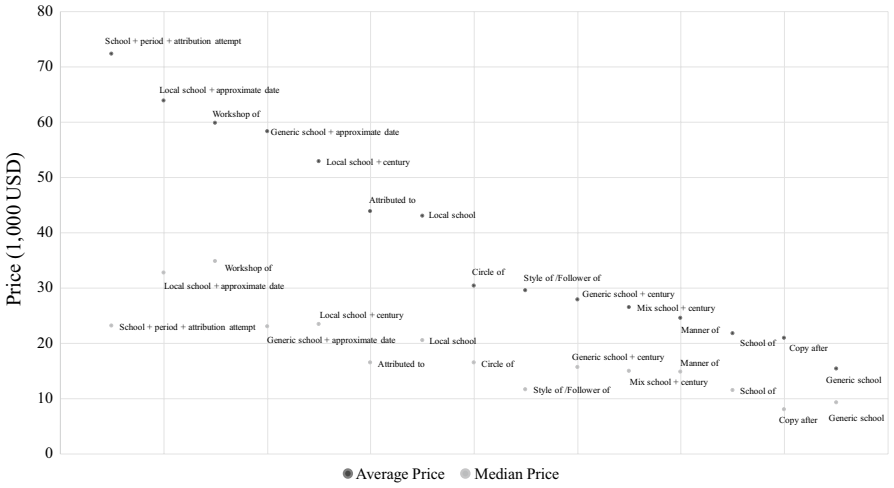

Fig. 4 Means and medians for spatio-temporal designations and attribution qualifiers

6 Conclusions

This paper has offered a first insight into the market for anonymous works of art by highlighting the imperfect market situation generated by these goods, and with a special focus on the effects of spatio-temporal designations in price formation mechanisms. To better understand what drives the market value of APs, we have applied a hedonic pricing model to a sample of 1578 Flemish APs sold between 1955 and 2015. We find that APs can be ranked into a complex taxonomy made up of spatio-temporal designations that provides different levels of information with different impacts on prices. Because they reduce uncertainty about the origins of the works, designations that precisely locate a painting in time and space generate higher prices than less specific ones. These results support the assumption that meaningful identification strategies influence the buyer's willingness to pay (Nelson 1970; Robertson 1989; Kohli and LaBahn 1997; Klink 2001). Each spatio-temporal designation is differently perceived by buyers depending on the supply of information, some of them being more attractive than others, exactly as real names do (Schroeder 2005; Schroeder and Salzer-Mörling 2006; Preece and Kerrigan 2015). Four other assumptions have been tested in order to capture the effects of quality signals on prices. In a market segment characterized by very heterogeneous goods, three variables in particular are statistically significant: the condition of the work, the length of the note, and previous attributions. When the artist name is missing, direct or indirect evidence of quality sends positive signals to buyers and reduces demand uncertainty (Miller and Plott 1985; Spence 1973, 2002). The market for APs has also been compared to those of directly and indirectly identified artists, similarly active in the fifteenth-and early seventeenth century Southern Low Countries. If APs' price index and rates of return are expectedly lower than those of named masters, we have shown that spatio-temporal designations are not less efficient than indirect names, with very similar results. This finding invite us to think about the

way art historians and art market players label APs, and if some identification strategies are more profitable than others.

Further research is however needed to properly understand the inner workings of this market segment. Firstly, our analyses need to be reiterated and extended to other samples for generalization purposes. The taxonomy defined in this paper is likely to apply to other schools (i.e. Italian, Spanish, Dutch APs, etc.), but also to other categories of indeterminate works of art that are labelled with spatio-temporal designations. As suggested in Sect. 2, the demand side should seriously be considered as buyers' profiles and incentives to purchase unbranded works of art are still undocumented. Qualitative research through semi-structured interviews with old master collectors, dealers and auctioneers is particularly needed. The different situations of information failure caused by indeterminate pictures should also be supported by more empirical studies. A new direction in research is to examine price gaps between presale estimates and hammer prices of both indirect names and spatio-temporal designations. In doing so, we might confirm the suspicion that spatio-temporal designations induce greater information asymmetry (with more informed buyers), and thus are worth considering for low-risk investments (all proportions guarded). In the same vein, reattributions and resales should be considered in future work to better understand the degree of substitutability of APs in the art market.

From a broader perspective, this study has demonstrated that the trade of indeterminate artworks is a full-fledged market with its own mechanisms. In a globalized art market ruled by the artist name, this category of works potentially offers other forms of artistic experiences (Bertini 2015; Vassiliou 2017). With anonymous art, passive consumers become active participants (Nemser 1970) since the way they look at it is no longer biased by the quest for the artist name. Purchasers are therefore more willing to focus on the material object, and its intrinsic quality. It is therefore safe to say that the market for indeterminate goods offers a relevant framework to study other models of art consumption.

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Compliance with ethical standards

Conflict of interest The author declares that she has no conflict of interest.

Appendix 1

See Table 7.

Table 7 Data description—main characteristics

	Obs.	Percent
Spatio-temporal designation		
Anglo-Flemish school (sixteenth century)	5	0.32
Antwerp school	22	1.39
Antwerp school (fifteenth century)	3	0.19
Antwerp school (fifteenth/sixteenth century)	3	0.19
Antwerp school (sixteenth century)	288	18.25
Antwerp school (sixteenth/seventeenth century)	6	0.38
Bruges school	6	0.38
Bruges school (fifteenth century)	16	1.01
Bruges school (sixteenth century)	72	4.56
Brussels school	1	0.06
Brussels school (fifteenth century)	8	0.51
Brussels school (fifteenth/sixteenth century)	3	0.19
Brussels school (sixteenth century)	7	0.44
Flemish school	196	12.42
Flemish school (fifteenth century)	52	3.3
Flemish school (fifteenth/sixteenth century)	12	0.76
Flemish school (sixteenth century)	565	35.8
Flemish school (sixteenth/seventeenth century)	48	3.04
Germano-Flemish school	1	0.06
Germano-Flemish school (sixteenth century)	4	0.25
Franco-Flemish school (fifteenth century)	5	0.32
Franco-Flemish school (sixteenth century)	21	1.33
Franco-Flemish school (sixteenth/seventeenth century)	4	0.25
Ghent school (fifteenth century)	1	0.06
Ghent school (sixteenth century)	2	0.13
Hispano-Flemish school	9	0.57
Hispano-Flemish school (fifteenth century)	1	0.06
Hispano-Flemish school (sixteenth century)	36	2.28
Hispano-Flemish school (sixteenth/seventeenth century)	2	0.13
Italo-Flemish school	3	0.19
Italo-Flemish school (fifteenth century)	1	0.06
Italo-Flemish school (sixteenth century)	12	0.76
Italo-Flemish school (sixteenth/seventeenth century)	2	0.13
Leuven school (fifteenth century)	1	0.06
Netherlandish school	9	0.57
Netherlandish school (fifteenth century)	8	0.51
Netherlandish school (fifteenth/sixteenth century)	1	0.06
Netherlandish school (sixteenth century)	92	5.83
Netherlandish school (sixteenth/seventeenth century)	3	0.19
North Netherlandish school (sixteenth century)	13	0.82
South Netherlandish school (sixteenth century)	34	2.15

Table 7 (continued)

	Obs.	Percent
Aesthetic		
Subject		
Biblical	1148	72.75
Allegory	41	2.60
Genre scene	50	3.17
Landscape	81	5.13
Mythology	40	2.53
Portrait	149	9.44
Still life	30	1.90
Others subjects	39	2.47
Material		
Panel	1312	83.14
Canvas	194	12.29
Copper	56	3.55
Other materials	16	1.01
Technique		
Oil	1558	98.73
Tempera	8	0.51
Other techniques	12	0.76
Authenticity—quality		
Signature	43	2.72
Date	56	3.55
Provenance	189	11.98
Previous exhibition(s)	41	2.60
Literature	61	3.87
Context of the sale		
Salesroom		
Sotheby's London	307	19.46
Sotheby's New York	81	5.13
Sotheby's (other locations)	54	3.42
Christie's London	211	13.37
Christie's New York	52	3.3
Christie's (other locations)	56	3.55
Artcurial	7	0.44
Bonhams	18	1.14
Dorotheum	42	2.66
Drouot	127	8.05
Koller	35	2.22
Lempertz	84	5.32
Piasa	13	0.82
Phillips	19	1.20
Tajan	52	3.30

Table 7 (continued)

	Obs.	Percent
Germany-based salesrooms	61	3.87
Belgium-based salesrooms	89	5.64
Spain-based salesrooms	48	3.04
Italy-based salesrooms	54	3.42
Netherlands-based salesrooms	32	2.03
Sweden-based salesrooms	32	2.03
Switzerland-based salesrooms	30	1.90
Other salesrooms	74	4.69

Including year dummies from 1955 to 2015, and months from January to December

Appendix 2

See Table 8.

Table 8 Examples of presale estimate differences

Year	Low presale estimate	High presale estimate	Sale
1995	6000 GBP	8000 GBP	Sotheby's Londres (6 December 1995, lot 129)
	25,000 GBP	35,000 GBP	Sotheby's Londres (6 December 1995, lot 85)
2000	4000 USD	6000 USD	Christie's East (9 October 2000, lot 76)
	200,000 USD	300,000 USD	Sotheby's New York (28 January 2000, lot 22)
2005	6000 USD	8000 USD	Sotheby's New York (29 January 2005, lot 18)
	60,000 USD	80,000 USD	Christie's New York (26 January 2005, lot 53)
2013	10,000 USD	15,000 USD	Leslie Hindman Auctioneers (24 September 2013, lot 295)
	100,000 USD	150,000 USD	Sotheby's New York (6 June 2013, lot 5)
2015	4000 USD	6000 USD	Christie's New York (3 June 2015, lot 7)
	200,000 USD	300,000 USD	Christie's New York (28 January 2015, lot 140)

Appendix 3

See Table 9.

Table 9 Results of the general hedonic regression (APs only)

Dependent variable (log 2015 USD)	Coefficient
Signed	0.0969
Dated	0.0357
Provenance	0.430***
Previously exhibited	0.0322
Mentioned in the literature	0.510***
Lot order	−0.000235**
(Lot order)2	3.42E−08
Subject	
Biblical (control group)	0
Allegory	0.0969
Genre scene	0.0887
Landscape	−0.0434
Mythology	0.0580
Portrait	0.0314
Still life	0.153
Other subjects	0.115
Material	
Panel (control group)	0
Canvas	−0.170**
Copper	0.0475
Other materials	−0.0809
Technique	
Oil (control group)	0
Tempera	0.201
Other techniques	0.0533
Dimensions	
Height (cm)	0.00145
Width (cm)	0.00185
Surface	6.02E−06
Salesroom dummies	Incl.
Time dummies	Incl.
Spatio-temporal designation dummies	Incl.
Obs.	1578
R^2	0.451
Adj R^2	0.390

All models are estimated using OLS with White heteroscedasticity-consistent standard errors and covariance. The dependent variable is the natural log of the real price. Period considered is 1955–2015

In all regressions coefficients are significant at the following levels of confidence: *significant at 10%; **significant at 5%; *** significant at 1%

Appendix 4

See Table 10.

Table 10 Specified taxonomy

Specified taxonomy	Obs.	Percentage	Mean	Median	SD	Min	Max
Generic school	203	12.86	15,306	9143	20,808	1156	166,924
Generic school + century	626	39.67	23,476	14,598	30,421	938	397,561
Generic school + approximate period	24	1.52	51,899	27,012	73,996	3459	354,587
Generic school + approximate date	103	6.53	55,142	22,079	106,008	2775	697,964
Mix school + period	106	6.72	26,341	14,875	30,412	3298	160,918
Specified generic school + period	44	2.79	95,295	36,793	209,877	10,178	1,344,383
Local school	24	1.52	42,846	20,431	97,194	2133	491,969
Local school + century	244	15.46	52,136	23,024	234,683	4106	3,608,563
Local school + approximate period	26	1.65	80,647	33,600	120,594	7089	522,283
Local school + approximate date	130	8.24	59,840	32,666	98,944	5514	756,068
School + period + attribution attempt	48	3.04	72,242	23,040	124,043	3667	568,412
Total	1578	100	37,266	17,082			

Appendix 5

See Tables 11 and 12.

Table 11 Alternative model specifications—part 1

Dependent variable (log 2015 USD)	Regression A. Spatio-temporal designations	Regression B. Spatio-temporal designations + length of the note	Regression C. Spatio-temporal designations + previous attributions	Preferred model
Taxonomy				
Generic school (control group)	0	0	0	0
Generic school + century	0.394***	0.394***	0.393***	0.394***
Generic school + approximate date	0.702***	0.709***	0.688***	0.702***
Mix school + period	0.419***	0.409***	0.425***	0.413***
Local school	0.417**	0.405**	0.419**	0.407**
Local school + century	0.655***	0.647***	0.659***	0.649***
Local school + approximate date	0.758***	0.736***	0.746***	0.731***
School + period + attribution attempt	0.792***	0.674***	0.778***	0.673***
Quality criteria				
Expertise	0.482***	0.0177	0.434**	0.0172
Condition (altered)	−0.320**	−0.222*	−0.304**	−0.219*
Length of the note	–	0.00239***	–	0.00226***
Previous attribution(s)	–	–	0.253***	0.133*
Other standard hedonic variables	Incl.	Incl.	Incl.	Incl.
Time dummies	Incl.	Incl.	Incl.	Incl.
Observations	1578	1578	1578	1578
R^2	0.428	0.45	0.433	0.453
Adj R^2	0.379	0.402	0.383	0.405

In all regressions coefficients are significant at the following levels of confidence: *significant at 10%; **significant at 5%; ***significant at 1%

Table 12 Alternative model specifications—part 2

Dependent variable (2015 USD)	Robustness test A. Detailed typology	Robustness test B. Outliers excluded	Robustness test C. Price range 0–USD 100 000	Robustness test D. Price range 0–USD 50 000
Taxonomy				
Generic school (control group)	0	0	0	0
Generic school + century	0.386***	0.390***	0.384***	0.273***
Generic school + approximate period	0.497***	–	–	–
Generic school + approximate date	0.732***	0.707***	0.596***	0.494***
Specified generic school + period	0.645***	–	–	–
Mix generic school + century	0.420***	0.414***	0.420***	0.346***
Local school	0.411**	0.401**	0.382**	0.267*
Local school + century	0.663***	0.626***	0.618***	0.495***
Local school + approximate period	0.666***	–	–	–
Local school + approximate date	0.747***	0.728***	0.648***	0.563***
School + period + attribution attempt	0.669***	0.680***	0.517***	0.435***
Quality criteria				
Expertise	0.0204	0.0492	0.146	0.251
Condition (altered)	−0.205	−0.217*	−0.134	−0.131
Length of the note	0.00227***	0.00210***	0.000298	−0.000375
Previous attribution(s)	0.134*	0.144*	0.153*	0.0857
Other standard hedonic variables	Incl.	Incl.	Incl.	Incl.
Time dummies	Incl.	Incl.	Incl.	Incl.
Observations	1578	1576	1486	1333
R^2	0.452	0.453	0.402	0.41
Adj R^2	0.403	0.405	0.346	0.347

In all regressions coefficients are significant at the following levels of confidence: *significant at 10%; **significant at 5%; ***significant at 1%

Appendix 6

See Tables 13 and 14.

Table 13 Rates of return by sub-segment (1955 = 100)

Year	Named masters	Indirect names (attribution qualifiers)	Spatio-temporal designations (APs)	Year	Named masters	Indirect names (attribution qualifiers)	Spatio-temporal designations (APs)
1955	100	100	100	1986	530	170	176
1956	146	292	106	1987	646	175	216
1957	109	67	58	1988	687	273	201
1958	118	107	66	1989	1152	282	193
1959	160	87	60	1990	988	307	236
1960	166	77	53	1991	1056	243	179
1961	206	99	90	1992	1066	249	178
1962	178	175	57	1993	595	194	160
1963	246	–	102	1994	764	214	135
1964	208	35	54	1995	820	238	167
1965	261	197	94	1996	833	192	178
1966	281	279	74	1997	627	213	128
1967	321	191	167	1998	835	210	132
1968	317	211	90	1999	642	228	123
1969	356	273	99	2000	513	193	116
1970	254	88	90	2001	614	189	108
1971	264	174	740	2002	578	258	158
1972	364	253	572	2003	720	240	165
1973	574	301	274	2004	738	261	202

Table 13 (continued)

Year	Named masters	Indirect names (attribution qualifiers)	Spatio-temporal designations (APs)	Year	Named masters	Indirect names (attribution qualifiers)	Spatio-temporal designations (APs)
1974	468	249	444	2005	812	280	291
1975	406	182	488	2006	843	298	245
1976	389	219	322	2007	980	336	366
1977	486	203	338	2008	1169	292	320
1978	428	289	248	2009	721	295	171
1979	543	219	348	2010	986	277	286
1980	454	233	344	2011	1130	344	177
1981	338	174	260	2012	942	308	325
1982	291	137	134	2013	862	300	179
1983	306	133	257	2014	945	225	210
1984	354	123	126	2015	705	197	173
1985	451	126	176				

Table 14 Price comparisons between spatio-temporal designations and attribution qualifiers

Identification strategy	Mean	Median
School + attribution attempt	72,242	23,040
Local school + approximate date	63,744	32,666
Workshop of	59,760	34,665
Generic school + approximate date	58,180	22,964
Local school + century	52,840	23,341
Attributed to	43,774	16,312
Local school	42,846	20,431
Circle of	30,212	16,330
Style of/follower of	29,377	11,544
Generic school + century	27,727	15,469
Mix school + century	26,341	14,875
Manner of	24,379	14,681
School of	21,662	11,376
Copy after	20,862	7834
Generic school	15,306	9143

Spatio-temporal designations: $N = 1578$; indirect names (attribution qualifiers): $N = 5914$

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