**Does Nudity Sell?**

An Econometric Analysis
of the Value of Female Nudity
in Modigliani Portraits

Master Cultural Economics and Entrepreneurship
Erasmus School of History, Culture and Communication
Erasmus University Rotterdam
Academic Year 2018-2019

Student Name: Alessia Crotta
Student Number: 500561

Supervisor: Filip Vermeylen
Second Reader: Anna Mignosa

Master's Thesis
June 11th, 2019
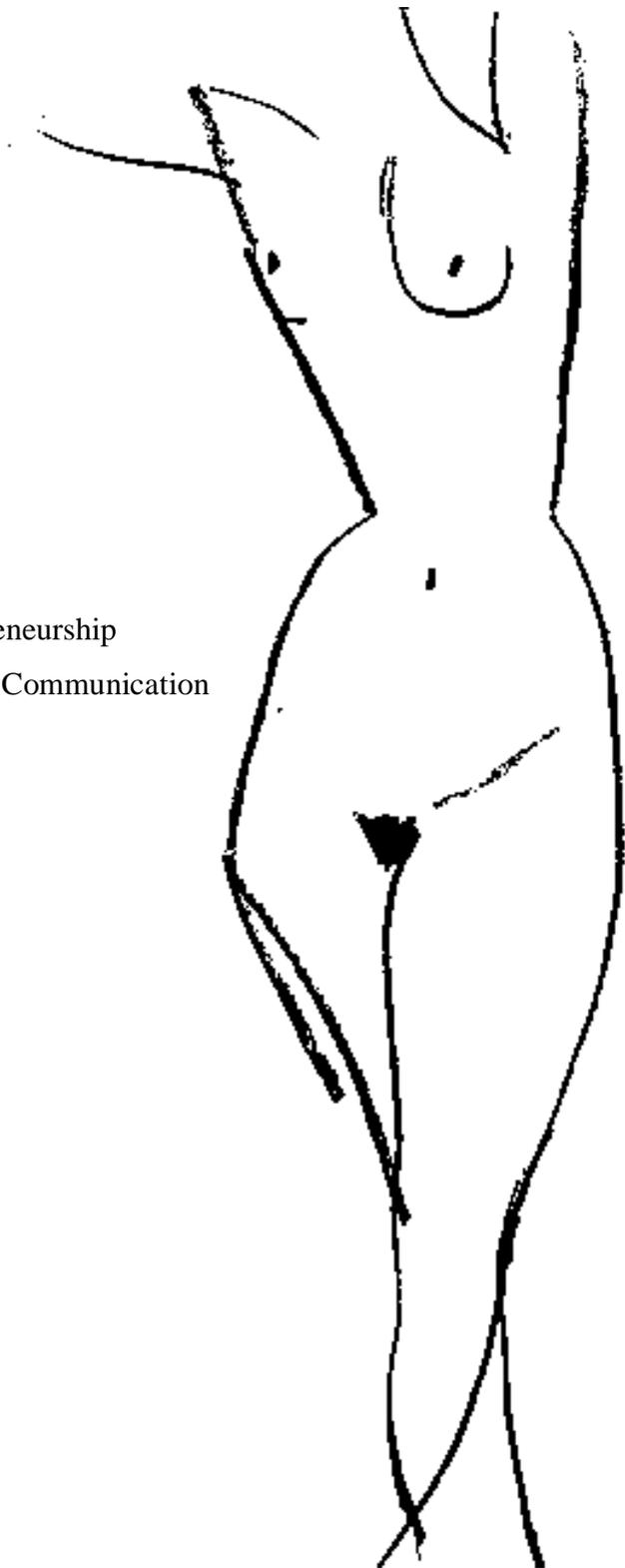
Sotheby's (2019b)

Abstract

The present study examines whether and to what extent the presence of female nudity influences the economic value of Modigliani paintings auctioned in secondary art markets. Female nudity is a constant and recurring subject in the historical developments of the visual arts. Nonetheless, whilst there exists an extensive body of literature addressing its artistic significance, the commercial value of the female nude remains somewhat unexplored. By relying on literature stressing the artistic relevance of female nudity, the present study employs prices achieved at auction sales to investigate whether the artistic significance of this genre has some implications in the assessment of its economic value. Hence, the research offers a quantitative evaluation of the female nude in the art market. Specifically, it focuses on one artist whose repertoire and reputation rely heavily on the production of female nudes: Amedeo Modigliani. By using hedonic regression to measure the economic worth of single characteristics of Modigliani's portraits, this study is able to analyse whether the presence of female nudity has an impact on the price that these paintings achieve at auctions. The sample, collected primarily from ArtPrice, consists in 924 sales of Modigliani paintings and drawings featuring nude, partially nude and dressed subjects. In the analysis, the estimated and hammer prices are examined against the nudity factor through hedonic regression, whilst a series of standard hedonic variables such as size, medium and signature are controlled for. The research confirms the hypotheses that nudity has a positive and relevant influence on the determination of both the hammer and estimated prices. Although limited in terms of generalisability, the study contributes to existing literature connecting historical and artistic values with econometric ones. Overall, the research assess that the aesthetic value of art can be reflected in its economic worth, at least in the case of Modigliani's female nudes.

Keywords: Female Nudity; Amedeo Modigliani; Art History; Artistic Value; Economic Value.

Table of Contents

I. Introduction

Among the four most expensive artworks ever auctioned, three are portraits of women (ArtPrice, 2018). All three date back to the 20th century and were realised by different Modern European artists. All three feature a female subject who, somewhat positioned at the centre of the scene, sensually stares into the eyes of the viewer, capturing the attention immediately. All three are nude, revealing parts of their voluptuous bodies, almost as if they were trying to attract the spectator into the canvas. These three female nudes, auctioned between 2015 and 2018, were sold for prices ranging between 132 and 160 million euros (ArtPrice, 2018). One of the three canvases is entitled *Les Femmes d'Alger, Version "O" (Figure 1)*, and is part of a series of 15 artworks that Pablo Picasso realised in homage to Henri Matisse (Christie's, 2015a). This painting, often described as one of the highlights of Picasso's career, is a cubist revisitation of Eugène Delacroix's 1834 original version (Mastromattei, 2017).

Figure 1: *Les Femmes d'Alger* (1955), Pablo Picasso, Christies (2015a).

Out of the three most expensive nudes in the present history of auctions, the remaining two were painted by Amedeo Modigliani. This artist, whose style developed between Impressionism and Avant Garde, is considered among the painters who most contributed to the conceptualisation of nudity in modern art (Rothwell, 2006). His nude portraits are part of a series commissioned by his dealer Léopold Zborowski, exhibited in Paris in a scandalous show at the beginning of the last century (Christie's, 2015b).

Within the series, the record-breaking nudes were *Nu Couché (Figure 2)* (1917-1918) and *Nu Couché, sur le côté gauche (Figure 3)* (1917), auctioned at Christie's and Sotheby's New York in 2015 and 2018 respectively (ArtPrice, 2018). These paintings are two of the handful of artworks ever sold for over 130 million euros (Platt, 2018). Of these canvases, the most recently auctioned, *Nu Couché*, also broke records for being the painting with the highest ever estimated price – of €135 million - placed on a work of art at auction (Sotheby's, 2018).

Figure 2: *Nu Couchè* (1917-1918), Amedeo Modigliani, Christies (2015b).

Figure 3: *Nu Couché, sur le côté gauche* (1917), Amedeo Modigliani, Sotheby's (2019a).

When three of the four most expensive artworks ever auctioned are portraits of nude women, it becomes inevitable to wonder whether the artistic female nude

exercises some influence on the economic worth of art. From a historical perspective, the nude has been a constant presence in centuries of artistic developments: protagonist of countless amounts of canvases and milestone of artistic education and practices (Rothwell, 2006), the female nude is one of the most relevant yet controversial genres of art history (Berger, Blomberg, Dibb, Fox, & Hollis, 1972; Clark, 1953; Nead, 1990; Pointon, 1990; Sluijter, 2011). When analysing the historical developments of female nudity in figurative arts, the artistic value of the nude becomes clear. At the centre of artistic expression since prehistory, the female nude continues to feature art history books, inspire movements and define new artistic ideals (Clark, 1953; Rothwell, 2006). Its importance for the developments of art history is undeniable, its relevance highly recognised by art critics and its connotations often addressed and criticised by many. However, one question that seems to have remained – at least partially - unanswered is whether it is possible to place a quantitative value on its presence. Econometric studies including the nudity factor in quantitative evaluations of artworks are rare and generic. For instance, in a paper that aims at identifying the price determinants and investment performance of art between 1957 and 2007, Renneboog and Spaenjers (2012) include the nudity variable among many other subjects portrayed in artworks at auction. Nonetheless, with a sample of over one million observations, it does not come to surprise that nudity shows insignificant results. Similarly, in a paper studying the French art market over the course of the first half of the 20th century, David (n.d.) includes, among other subject variables, nudity. Yet, since the scope of her research goes beyond studying nudity in itself, this variable is mostly overlooked and, once again, not significant. Overall, although the artistic and qualitative appreciation of female nudity in visual arts has been clearly and explicitly assessed by art historians and critics, there seems to be a lack of focus on its quantitative evaluation. Thus, given the existing gap between the assessment of the value of female nudity in art history and economics, the aim of this study is to fill this gap.

In general, whether and to what extent the artistic value of artworks is connected to their market value is still an open discussion (Abbing, 2002). Some argue that the aesthetic and commercial values of cultural goods, such as artworks, are completely unrelated: if one responds to intrinsic inputs and motivation, the other follows trends and different extrinsic factors (Abbing, 2002). In contrast, others claim that the

aesthetic, cultural character of works of art constitutes a major influence in the determination of their price in the market (Grampp, 1989). Therefore, within this more general framework, the present study offers a possible approach to assess the relationship between the artistic and economic evaluation of works of art. Accordingly, it can contribute to existing literature by providing new information and a new means to relate art and economics. Hence, this research integrates to the literature combining historical, cultural and economic contexts. In order to touch upon these elements, the research question here investigated is the following:

To what extent does the presence of female nudity affect
the price of Modigliani's portraits at auction?

To what extent does it affect their hammer price?
To what extent does it affect their estimated price?

As previously mentioned, Amedeo Modigliani's legacy is strictly connected to his nude portraits; specifically, to the kind of reaction that his female nudes arose within the social context of his time (Rothwell, 2006). Consequently, his reputation is inherently attached to nude, modern portraiture (Rothwell, 2006). Moreover, the time frame of his artistic career at the earlier stages of the Modern art makes his repertoire a fascinating one to analyse. Formed by the Renaissance, Romantic and Baroque schools and directly influenced by avant-garde artists such as Paul Cézanne and Pablo Picasso, Modigliani provides for a good case study of the shifting definition of the nude in juxtaposition with its perpetual artistic value (Blessing, 2019; Rothwell, 2006). As for the economic value of nudity, the present study considers the price of paintings sold via auction as quantitative units of analysis. Specifically, the prices in the dataset include the hammer and estimated prices, which were collected from reputable price databases such as Artprice.com.

The present study is structured as follows: *Chapter II* will provide for a theoretical framework on the cultural value of female nudity within western society. First, the chapter will present the different perspectives on nudity offered by art historians and critics, and determine a definition of the nude that best suits this research. Second, it will discuss the developments of nudity in western art, and its repercussions on the formation of an artistic value attached to the female nude. Third, it will illustrate

the contribution that Modigliani offered in the definition and formation of the modern nude. Finally, it will address the connection between the artistic value of art with its economic worth, hence construct a theoretical basis to explain and justify the hypotheses and expectations of the study. In order to then test the hypotheses, *Chapter III* will provide for an in-depth description of the research method, the research strategy, the model, and the dependent and independent variables employed for the operationalisation of the research question. *Chapter IV* will illustrate and discuss the main findings in relation to the hypothesis and theoretical framework. Finally, *Chapter V* will conclude the study by discussing its implications, limitations and possibilities for future research.

II. Literature Review

The present chapter aims at building a theoretical framework around the value of nudity in relation with its historical developments, interpretations and implications within western society. Drawing from different perceptions of nudity, the chapter then defines Modigliani's female nudes and constructs the hypotheses linking their artistic relevance to their economic value.

II.I Female Nudity: A Spectrum of Definitions and Perceptions

In order to fully understand how female nudity is valued in western art, it is necessary to provide for a definition that is comprehensive and coherent. Notwithstanding, literature shows that, as for many other genres, nudity is far from being a cohesive concept. Especially because of the transformation experienced with the rise of different movements, figurative art has grown from being a discipline of reproduction to one of authentic creation (Rothwell, 2006). Within this continuous evolution, female nudity often becomes a matter of interpretation. For instance, when considering the painting techniques of Modigliani and Picasso, the nude results in two very different concepts (see *Figures 1*, *2* & *3*). Whilst Modigliani remains attached to a visual description that is closer to traditional portraiture and reality, Picasso experiments with perspective and colour, adopting a more playful attitude towards the image (Rothwell, 2006). As a result, female nudity comes across as a very multifaceted subject, even when analysing two individual artists operating approximately at the same time and in the same social context (Rothwell, 2006). Indeed, especially in modern and contemporary art, female nudity becomes more and more difficult to assess.

According to Pointon (1990) definitions and perceptions of female nudity in art and society in general are subject to significant variations across time. In particular, she argues that, despite what may appear on a canvas, nudity is far from being a category with well-defined boundaries and clear parameters. Instead, it is a 'form of rhetoric' (Pointon, 1990, p.14). As such, the definition and general perception of female nudity depend on the larger context of the image and on the environmental atmosphere in which such image is displayed (Nead, 1992; Pointon, 1990). Within the art gallery space, for instance, the female nude is praised as a form of high art and a symbol of

legitimate, high culture (Nead, 1992, p.101). In contrast, when displayed in venues outside the art world, the nude becomes an expression of vulgarity and cultural disgrace (Nead, 1992). In this sense, artistic female nudity, rather than one of definition, becomes an issue of legitimation.

In order to distinguish legitimate, high forms of artistic nudity from ones of vulgarity, Clark (1953) points out at the separate concepts of the nude and the naked. Whilst the former consists in the subject and form of high art, the latter simply implies a complete or partial depravation of clothes (Clark, 1953, p.3). Between the two, however, there exists a very specific relation. In Clark's words, the naked body consists in the 'point of departure' for the creation of the nude (p.8), which, in turn, is the product of the re-construction of the real human body and its transformation into ideal form. Hence, the artistic nude is a mere recomposition of the body into a figure of ideal proportions and aesthetic perfection (Clark, 1953). In this sense, the female nude stands at the end of the process of idealisation of the naked from vulgar element into form of high art.

Clark's distinction between the nude and the naked has been subjected to various interpretations and criticisms. Scholars mainly reject his conceptualisation of the nude in that they sense in his definition a form of objectification of the female naked body (Berger et. al.,1972; Nead, 1992; Pointon, 1990). In particular, they agree that Clark's nude is a mere camouflage of the natural, real female body, and that it emphasises ideals that eventually become engrained in societal expectations for what women's bodies should resemble (Nead, 1992; Pointon, 1990). According to Berger et. al. (1972), Clark's nude is a veil, a flattering yet fabricated dress that serves the purpose of concealing the 'authentic frames' of femininity (p.17). Whilst the naked represents a humanly natural condition, the nude is a filter, it is the naked remodelled and idealised by others (Berger et. al., 1972; Pointon, 1990). Elaborating on this observation, Nead (1992) follows Berger's footsteps arguing that the nude represents the 'negative other' of the naked (p.325). Finally, with an even greater critical tone and straightforward accusations, Forster (2011) attacks Clark personally for creating a rationale that allows sexual scrutiny and a fundamentally 'pornographic mode of apprehension' (p.118). From her strong words, it emerges that Forster interprets Clark's perspective as a mere camouflage to justify and encourage the propagation of

female sexualisation in modern society. Forster overthrows Clark's attempt to justify and legitimise the sacredness of the nude with a logic that is exceptionally superficial and profane. Probably for this reason, Clark has often been accused of assuming that the passive, observed nude object had to be a female, and the active, observing subject a male (Breazeale, 1986; Nead, 1992; Forster; 2011). In addition, he has been condemned for accepting and encouraging the establishment of specific and rigorous standards of beauty that could be imposed not only in visual art, but also in society (Forster; 2011). In fact, some scholars have interpreted Clark's twofold definition of the nude as an implicitly social separation between working classes (Nead, 1992; Nelson, 1995). According to this interpretation, whilst nudity can be associated with higher and wealthier classes, nakedness is peculiar to the underprivileged working classes (Nead, 1992). With the nude and the naked becoming markers of social status, the concept of nudity can no longer be limited to the artistic and aesthetic spheres, but becomes engrained in actual social environments and everyday life too.

Despite the variety and depth of the criticisms directed against this author, Clark highlights a fundamental semantic distinction that is impossible to neglect. Although highly debated, Clark's differentiation between the two terms "nudity" and "nakedness" is linguistically undeniable. Even when interpreted in literal terms, the expression "nudity" is meant to overcome a sense of embarrassment and pudency and elevate nakedness from mere state of vulnerability to one of high art (Bonfante, 1989). Whether the nude represents a more or less realistic representation of the naked body, its differentiation from the naked persists. Regardless of its aesthetic appearance, the artistic nude inevitably stands at the end of a process of legitimation, approval and idealisation from the expert and critic community and from society (Bonfante, 1989). This process, rather than being managed by the artist and shaped by fixed and consistent criteria, is intrinsic in the role of experts, critics and the intermediary figures in the market (Baia Curioni, Forti & Leone, 2015). In fact, the role of the intermediary is essential not solely for the acknowledgment of the status of works of art as such, but more importantly for the establishment of its artistic – and often economic - value (Baia Curioni, Forti & Leone, 2015; Clark, 1953; Velthuis, 2003). In this sense, art criticism is essential for the production of meanings, such as that of nudity, and values related to the artistic, social and cultural spheres (Nead, 1992, p.55). Given that art is recognised

its status and its aesthetic value by critics, experts and artists (Abbing, 2002; Cameron, 2011; Pointon, 1990), the element of nudity is charged with an aesthetic value in itself.

Provided the diverse interpretations and implications of female nudity, the scope of this research is to examine the economic worth of this genre as an aesthetically valuable characteristic. In particular, the study aims at addressing the economic value of nudity for the art market as broadly as possible. This implies the inclusion of not only collectors, but also those critics and experts who express their economic valuation of works of art. In light of the influence that they exercise in establishing the status of art, experts and intermediaries can provide for a solid connection between artistic and economic values.

Although nudes such as Modigliani's were initially contested for being too bold, too "naked", and rejected by the artistic and critic community of his time, they are now recognised as aesthetically relevant and essential for the transition of art from traditional to modern (Rothwell, 2006). This proves that each definition of nudity needs to be contextualised in the social and cultural environment in which it is produced, and acknowledged as limited to that specific circumstance and timeframe. Rather than a fixed category, female nudity in high art, and the ideal female body in society, is a constantly changing and structurally diverse concept (Hollander, 1993; Pointon, 1990). Nonetheless, given the practical investigation that this study involves, it is necessary to provide a firm definition of what is here considered the "female nude". Fisher and Toulalan (2013) point out that, especially since Modern history, the concept of nudity has developed into a spectrum, a wide and inclusive notion that starts with gradual skin-revealing physical conditions and ends in completely unclothed bodies. Similarly, Ryder (2008) describes the nude as any uncensored circumstance between complete nakedness and partial dress. Finally, Pointon (2011) perceives nudity as an intermediary state between fully clothed and wholly unclothed bodies (p.121). This research follows the definitions provided by the three cited authors. Hence, in the context of this study, nudity is that moment, captured by the artist, suspended in the spectrum somewhere between full, unapologetic nakedness and partial yet skin-revealing clothing. In practice, the portraits in Modigliani's repertoire that outline female subjects revealing private body parts in a state total or partial undress are here identified as female nudes. Relying on this operational definition, the study can proceed

to identify the relationship between the cultural and economic values attributed to female nudity. In order to do so, it is essential to understand how the historical circumstances under which nudity has been displayed have determined its current artistic relevance.

II.II Reflecting on The Artistic Value of The Nude: A Historical Overview of Female Nudity in Western Art

From Ancient Greece to the contemporary era, female nudity has stood at the cornerstone of western high art (Clark,1953). With entire art history chapters overflowed by representations of nude women, the prevalence of female nudity in art is glaring and undeniable (Nead, 1992). Hence, when it comes to addressing its artistic value, art historians, critics and experts have a uniform, sound voice: everyone seems to agree that female nudity has been and continues to be at the centre of artistic expression, as *the* subject and form of high art (Nead, 1990). From a historical perspective, representations of nudity have evolved hand in hand with the developments of figurative art and the emergence of artistic movements. From the 25000-year-old Willendorf Venus[1] to the most recent Jenny Saville portrait[2], the female nude has been depicted in western art in every form, shape, and era.

Although the first representations of nudity date back to prehistoric times, the nude as a form of high art saw its rise in the Archaic and Classical period (VIII century B.C. – I century B.C.), when Greek artists began to represent nude figures - male and female - through vase painting and sculpture (Bonfante, 1989). During this period, artistic nudity revolved around the characters of Greek mythology. Represented in perfect proportions and imponent size, these godlike, heroic figures embodied an archetype of beauty that exceeded the humanly possible, and that became increasingly associated with divinity (Bonfante, 1989). The Greek standards of perfection and divine beauty contributed to set the grounds for the establishment of aesthetic ideals that are still present in the western realm (Bonfante, 1989; Clark, 1953; Nead, 1992). Particularly in sculptures of athletic nudity, Greek society began to recognise the highest form of beauty (Bonfante, 1989). These idealised compositions were obtained

---

[1] Sculptural representation of female nude figure from the upper Paleolithic period (Dixon & Dixon, 2011)
[2] Contemporary British artist eminent for paintings of voluptuous female nudes (ArtNet, 2019).

combining human features with mathematical measurements and scales: comprised of different sections of different bodies, the nude became a 'compilation of meticulous measurements' and calculated balance between the functional and the ideal (Berger et. al., 1972; Clark, 1953, p. 70). Through this assembled and almost methodical approach, the Greeks originated a benchmark for aesthetic perfection that, diffused between 480 and 440 B.C., still inhabits western culture today (Clark, 1953, p.14). Nonetheless, despite divine - male and female - nudity was justified and venerated, nude representations of regular citizens had different symbolic implications. Whilst athletic male nudes competing in the Olympics were indicative of high social classes, hence widely accepted admired, female nudity had diametrically opposite implications. Totally or partially nude female figures – particularly in vase painting - were indicative of women's powerlessness and vulnerability, and mainly associated with prostitution and slavery (Bonfante, 1989). Thus, the artistic nude in general, and the female nude in particular, were already subjected to a spectrum of contrasting interpretations from their very emergence in Ancient Greek art. Oscillating from subject of contemplation to object of sexual humiliation, the female nude sparked controversies and debates that are still very contemporary (Forster, 2011). In fact, contrasting interpretations and perceptions of nude women in Ancient Greek society marked the beginning of an open discussion on the controversial role of the nude in different cultures and historical epochs (Forster, 2011).

An alternative interpretation of nudity sparked in Etruscan art (VIII century B.C. - I century B.C.), where nude figures of women became symbolic of maternity and fertility (Bonfante, 1993). Active in the Italian peninsula, Etruscan artists produced statues of partially nude women in the role of nursing, caring mothers (Bonfante, 1989). This type of nudity located the perception of nude women next to the highly appraised image of the mother-goddess (Bonfante, 1989, p.267). Although, similarly to Greek culture, total nudity – both male and female – remained strictly associated to slavery, Etruscan culture perceived nudity equally for both sexes. This explains why intimate images of couples are a recurrent motif in Etruscan artistic heritage (Bonfante, 1989).

In contrast, in the Roman and Byzantine Empires (I-XII centuries A.C.), artistic nudity became increasingly repudiated (Sorabella, 2008b). In Byzantine art, representations of nude bodies, especially if female, appeared rarely. Particularly when

depicted in pagan culture, these images would create aversion and opprobrium (Sorabella, 2008b). The only accepted representations of nudity, although infrequent, were related to sanctity and martyrdom (Kren, Burke, & Campbell, 2018; Ryder, 2008), hence were mostly representative of the male sex. On the one hand, nudity in pagan art became alienated and began to be surrounded by a sense of shame and disgrace; on the other hand, Christian art elevated the nude representations of saints and martyrs to sacred portraits of purified spirits (Ryder, 2008; Van der Stighelen, Van Cauteren & De Clippel, 2011). Thus, throughout this period, which then perpetuated in Medieval art, depictions of nudity were allegorical of the original sin, marking the separation between the beauty and purity of God's perfect creations and the corrupt and shameful nature of human imperfection (Clark, 1953).

Representations of female nudity in figurative art were restored in the XIII century, with the rise of the Renaissance and, later on, the Neoclassical period (Kren, Burke, & Campbell, 2018). Fascinated by Greek art and inspired by the greatness of antiquity, Renaissance artists aspired to reproduce the heroic and statuesque beauty of Classic artworks (Sorabella, 2008a). The figurative arts of this period re-set the standards of beauty and proportion back to the ancient ideals (Nead, 1992). Indeed, Renaissance artists were essential in replacing female nudity at the centre of creative endeavour and artistic expression (Sorabella, 2008b; Clark, 1953). Nonetheless, the true relevance of the Renaissance female nude needs to be identified in the centrality that this subject had in academic education and artistic formation (Pointon, 1990). In fact, not only did female nudity become a topos of artistic production, but it also became the subject for artistic education and demonstration of mastery (Nead, 1992; Van der Stighelen, Van Cauteren & De Clippel, 2011). Up to the present day, female nudity has remained fundamental for artistic formation, preparation and exercise (Clark, 1953). On top of its academic role, nudity became topic of interest in the growing scientific community, as means of investigating the natural world and studying the human body (Kren, Burke, & Campbell, 2018). With the emphasis on naturalism characteristic of this period, the female nude, on top of being a genre of artistic performance, form of expression and source of inspiration, also became a subject of interest in inspecting nature and exploring the human body (Van der Stighelen, Van Cauteren & De Clippel, 2011). Emblematic of a time in which science

and art were the dominant disciplines of cultural development, the nude perfectly amalgamated these two spheres (Kren, Burke, & Campbell, 2018).

Once the artistic nude reclaimed its relevance in the Renaissance period, it permanently became a reference for inspiration, interpretation and valuation of figurative art (Sorabella, 2008a; Clark, 1953; Nead, 1992; Sluijter, 2011). In particular, the female body became the point of departure and most significant motif of artistic creation (Berger et. al., 1972; Nead, 1992; Nelsom, 1995; Pointon, 1990). From the Renaissance to Romanticism, from Botticelli to Goya, the female nude guided artistic production and dominated the European stage. Especially since Modern art, female nudes have become emblematic of the artistic shifts from one movement to another, challenging the existing aesthetic and academic ideals (Clark, 1953; Sorabella, 2008a). In fact, many identify the beginning of modern art in two cardinal, subversive images standing at the cornerstone of artistic inspiration from twentieth-century to contemporary art. These images are Manet's *Olympia* (1863), and Picasso's *Les Demoiselles d'Avignon* (1907) (Clark, 1953; Nelson, 1995; Pointon, 1990). Coincidentally, the uncontested protagonists of both canvases are nude women. Interestingly, both nudes, in their structure, form, style and straightforwardness, are particularly 'ungreek' (Clark, 1953). Traditional for their poses and revolutionary in every other element, these two paintings concretize the principles of Modern art: in a context of academism and aesthetic perfectionism, the Modern era, and particularly the Modern nude, walked the tightrope between high art and vulgarity (Nelson, 1995, p.100; Eck, 2001). From then on, art has become connected to individuality and content rather than form, whilst the female nude has grown intrinsically related to the stylistic and philosophical statements of each artist and movement (Duncan, 1989; Nead, 1992). Female nudity in Modern art laid the grounds for an increasingly intimate relationship between high art and vulgarity, artistic production and pornography (Nead, 1990; Nelson, 1995). On the other hand, the Modern nude started to bring some elements of truth and closeness to reality that opened the doors to contemporary artistic statements regarding femininity, body diversity and female empowerment, and that merged nudity and nakedness into one, single canvas.

Overall, the artistic importance of female nudity and its status as form of high art can be extrapolated from different elements. First and foremost, the artistic value of

the nude stands in the continuity of its representations throughout history. The historical centrality of female nudity in artistic tradition has elevated the nude from being one among numerous subjects to iconic and paradigmatic element of western high culture (Nead, 1990, p.326; Pointon, 1990). Secondly, the artistic value of the nude is captured by its continuous role in the dictation of aesthetic paradigms of beauty and perfection from the times of Ancient Greece until the present day (Clark, 1953). Thirdly, particularly from the Renaissance onwards, female nudity has emerged as the unit of measurement of artistic capacity and mastery, which are essential for the legitimation and affirmation of any artist (Pointon, 1990). Finally, its social implications and highly contested nature have made it one of the most valuable elements of western art (Clark, 1953). Prominent for its debated morality, adjacency to vulgarity and, from the Modern age, closeness to pornography and female sexualisation, the female nude has generated an inestimably high artistic value that has perpetuated throughout centuries of art history. Crossing the line between high art and indecency, it can be interesting to analyse a female nude that combines definitions of nudity and nakedness at the same time; an artist who portrays notions of permanence and timelessness of traditional ideal beauty, while simultaneously revolutionising the definition and implications of nudity (Pointon, 1990, p.120; Eck, 2001).

This artist is Amedeo Modigliani.

II.III Female Nudity & Modigliani's Contribution

Born in Livorno, Italy, in 1984, Amedeo Clemente Modigliani was the fourth child of a middle class, Jewish family (Braun, Brunner, Frequelli, Silver, & Wayne, 2006). Home schooled by his mother for his entire childhood, Modigliani joined the Ginnasio in 1898; yet, he often had to interrupt his attendance for typhoid fever and other illnesses (Braun et.al., 2006). Due to the gravity of his sickness and his lifestyle in general, Modigliani remained an outsider throughout his entire life (Braun et.al., 2006; Rothwell, 2006). From the origin of his artistic career, he was formed and influenced by emerging figures of the Italian Impressionist movement, such as Giovanni Fattori and Guglielmo Micheli (Braun et.al., 2006). Notwithstanding, his direct contact with these influential artists became constrained by his precarious health conditions that, at the same time, brought him closer to different artistic perspectives, shaping his stylistic

choices immensely. In order to heal from his serious health issues, Modigliani travelled to the south of Italy, where he discovered the beauty and legacy of Ancient and Classical art (Braun et.al., 2006; Rothwell, 2006). These encounters influenced his creations especially in the firm and sculptural traits of his sketches, caryatid paintings and nudes (Rothwell, 2006). As a matter of fact, the fusion of Modern Impressionism and Classical Art in Modigliani is extremely relevant to interpret the message that his creations convey. In 1902 Modigliani was accepted at the Free School of the Nude in Florence (Braun et.al., 2006; Rothwell, 2006). Thereafter, he continued his formation at the Free School of the Nude in Venice, to then move to Paris in 1906 (Braun et.al., 2006; Rothwell, 2006). With an academic background that reflects the artistic centrality of the nude, Modigliani's relationship with nudity was already vivid in the early stages of his artistic formation. As part of the artistic value of female nudity is rooted in its academic and aesthetic relevance in artistic education, Modigliani's biography already starts reflecting his compatibility with the topic of this study.

The period from his relocation in Paris to his death in 1920 was his most prolific. Stimulated by the artistically rich French capital and inspired by fellow artists such as Pablo Picasso, Juan Gris, and writer Max Jacob, Modigliani became part of a circle of innovators that, based in the Parisian neighbourhood of Montparnasse, formed the École de Paris (Rothwell, 2006). In 1907 Modigliani encountered a young doctor names Paul Alexandre, who offered him a studio and became his first – and only – collector (Rothwell, 2006). In this studio, Modigliani met Constantin Brancusi, a great influence on the artist's sculptural works and style in general (Rothwell, 2006). During this time, Modigliani met Beatrice Hastings, a South African poet and journalist with whom he started a romantic relationship that lasted until 1916. Beatrice became Modigliani's model and primary inspiration for the period of their relationship, during which the artist perfected his iconic, unique painting style that is now recognisable in any museum and salesroom (Rothwell, 2006). This style, equally influenced by classic ideals of artistic beauty and modern innovative perspectives, is a crucial factor in Modigliani's legacy and his centrality in this study. From the oval face lines to the almond-shaped eyes, from the extended, swanlike length of the necks to the sinuous S-shape of the bodies, Modigliani's portraits perfectly amalgamate Modern candour and Classic delicacy (Rothwell, 2006). In this same period, by virtue of the creative liberty

that only Paris allowed, Modigliani developed an affinity with female nudity, which then became emblematic of his style and legacy (Rothwell, 2006). While maintaining the harmonious proportions and iconic details of his style, Modigliani's nudes present less structured forms and shapes, which intensify the spectator's engagement with the canvas. Shocking for their straightforwardness and unapologetic bareness, these nude portraits fluctuate between erotic provocation and allegorical, high art (Rothwell, 2006). Without any mythological reference, Modigliani represented nudes that refuse to carry any connotation but that of nudity itself. In this sense, the concept of female nudity, rather than the women portrayed, is the real subject of Modigliani's paintings (Rothwell, 2006). Differently from the nudes of Classic art, the modern nude Modigliani offers lacks any interpretation but that of being 'naked and nothing more' (Rothwell, 2006, p.14). Modigliani's nude portraits delineate naked women sitting comfortably and relaxedly at the centre of the canvas, candidly exposing their breasts, thighs and pubic hair to the viewer's face. They occupy the canvas as if 'they were cut out and pasted onto the background' (Rothwell, 2006, p.14). Although extremely modern in their direct and shameless attitude, these nudes preserve the elegance and harmony typical of Modigliani and associated to more Classic art (MoMA, 1951; Rothwell, 2006). This balance between Classicism and Modernity, between idealisation and eroticism locates Modigliani's nudes exactly on the line dividing nudity and nakedness. Modigliani paints, quite literally, on the border between the nude and naked. His inclusive approach towards different definitions of female nudity makes Modigliani the perfect artist for this study.

In 1917, Modigliani met Jeanne Hébuterne, who soon became his devoted companion for the rest of his life. Although his alcoholism and illness aggravated drastically, he continued to be prolific and artistically active (Braun et.al., 2006; Rothwell, 2006). In 1920, he died at 35 of a tubercular meningitis aggravated by heavy drug and alcohol abuse (Braun et.al., 2006; Rothwell, 2006).

As tragic and turbulent as his life was, his art narrates a completely different story: a story of elegance, sinuosity and modernity (MoMA, 1951; Rothwell, 2006). The greatness of his legacy stems from the balanced mixture of modernism and antiquity that his artworks convey (MoMA, 1951). Especially through his nudes, Modigliani tells the story, representative of the developments and traits of art history,

of the objective pursuit of 'aesthetic ideals and human beauty' (Rothwell, 2006, p.22). Out of his abundant production of female nudes, the most outstanding were the 35 portraits commissioned by Léopold Zborowski and exhibited in the only solo show in Modigliani's lifetime (Rothwell, 2006). Astonishing for their voluptuousness, these nudes had to be covered and the exhibition closed soon after its inauguration (Rothwell, 2006). Drawing attention towards Modigliani, this exhibition laid the grounds for the establishment of his name. From this episode, 'his reputation has been dominated by his nudes, and his name has become synonymous with them' (Rothwell, 2006, p.13). As the two most expensive works of art in Modigliani's repertoire were part of this collection, these nudes provide the key through which the discourse of the cultural - artistic and economic – value of female nudity can begin. Specifically, these two sales can lead to believe that there exists the possibility that the immense artistic and historical value of his female nudes might actually be reflected in their economic value. Nonetheless, drawing conclusions solely on two, however striking observations would be pointless. Therefore, in order to formulate a proper hypothesis on the connection between art and economics through Modigliani's female nude, the next section withdraws on literature assessing the highly debated relationship between the artistic and aesthetic value of art with its quantitative worth in the market.

II.IV Connecting the Artistic & Economic Values of Art

When it comes to explaining the relationship between art and economics, the discussion is widely open. Artists, on one hand, seem unwilling or unable to put a number on the product of their creativity, whereas critics often believe that attaching a price tag to art is enforcing to 'price the priceless' (Grampp, 1989; Klamer, 2016). Economists, on the other hand, mostly argue that the economic value of any good, whether artistic or not, is indicative of its quality (Velthuis, 2003). In general, economic theory relies on prices as signals of quality and products of the forces of demand and supply in the market (Akerlof, 1970; Velthuis, 2003). Nonetheless, economists also recognise that prices sometimes fail to convey truthful information about the goods to which they are attached, generating asymmetries in the market and the possibility for 'markets of lemons' to form (Akerlof, 1970). The assessment of quality varies for different types of goods: goods with experiential characteristics, for instance, can be evaluated only

after their purchase and consumption, whereas credence goods i.e. products whose quality cannot be determined even after their purchase, can never be exhaustively assessed in their value. Artistic goods, such as Modigliani's paintings, present qualities of both experience and credence goods (Cameron, 2011). Then how can their value be determined?

In a book entitled *Why artists are poor* (2002), artist and economist Hans Abbing suggests a conceptual distinction between the economic and aesthetic values of artistic goods. According to his theory, whilst the former refers to the value of artworks in monetary terms, the latter defines the quality of art according to experts, among which he includes artists themselves, critics, mediators and relevant consumers in the art world. (Abbing, 2002). On the one hand, writing from the perspective of an artist, Abbing recognises the difficulties in associating one own's work to a number, stating that 'money should not interfere with art' (Abbing, 2002, p.37). On the other hand, as an economist, he highlights the importance of the presence of a market for the exchange of artistic goods, and acknowledges that markets are necessary for optimal allocations of resources. Overall, he recognises the unavoidable connection between art and commerce, although he admits that the relationship between price and quality in the art market is far from being straightforward and transparent. In fact, he argues, the general perception of high art as sacred obscures its relationship and compatibility with the market. For this reason, Abbing recognises the impossibility of the artistic domain to explicitly open up to a market logic and become profit oriented. In contrast, the sacredness of art forces its artistic value to separate itself from its market value (Abbing, 2002). Even if some sort of connection between the two exists, the arts, in order to maintain their high status, deny any relation with commerce and reject the economic language entirely (Abbing, 2002, p.48). Although largely emarginated by the arts, the question of whether the prices of artworks reflect their artistic quality still remains, and the debate between art and economics continues. In particular, the discussion perpetrates in the assessment of the causal relationship between artistic and economic value, and the legitimating role played by experts and intermediaries.

From a sociological perspective, scholars agree that sentiments of legitimation and acceptance in the art market comprise essential prerequisites for the economic success of a work of art (Spence, 2002; Velthuis, 2003). In different words, the opinion

of experts involved in the art market is essential for artists and their products to become accepted, first in the artistic community, and then in society (Spence, 2002). Art critics and galleries are not only forefront leaders in shaping tastes, but they have a largely influential role in forming prices too (Velthuis, 2003). In order to gain recognition and economic compensation from the market, an artist needs to become legitimized and socially accepted. Once social acceptance has reached and exceeded legitimation, artists' products will conceptually grow into sacred objects of cultural veneration, treasured by society and appreciated by the market (Baia Curioni, Forti, & Leone, 2015; Velthuis, 2003). When accomplished, legitimation and consecration will shape the economic value of works of art (Velthuis, 2003; Velthuis & Baia Curioni, 2015). In demonstration of this point, Radermecker, Ginsburgh and Tommasi (2017), conducted a study addressing the value of experts in the determination of prices for the case of Klaus Ertz and Pieter Brueghel the Younger. In practice, they demonstrated that, once Pieter Brueghel the Younger was recognised by important critics and appraised in catalogues, his market value increased noticeably. Interpreted more broadly, this implies that, once the artist became legitimised, if not consecrated, by the artistic community, his escalation in the market immediately followed. In addition, this study implies that simply relating prices with quality is not always reasonable, especially in the art market. In fact, prices convey, more than quality, information about the cognitive and cultural meaning that an art piece embodies (Preece & Kerrigan, 2015; Velthuis, 2003). Moreover, they carry implicit critical evaluations of the artist, his reputation and even the social status of the dealer (Velthuis, 2003).

From an economic perspective, scholars believe the relationship between artistic status and economic appreciation to be somewhat different. Ashenfelter and Graddy (2003), for instance, stress the importance of auction houses in the establishment of an artist's value. According to them, artistic recognition can be validated exclusively by the success an artist generates in the market. Similarly, Moulin (1967) considers art markets instrumental and essential for the legitimation and consecration of artists. In practice, he suggests the relationship between artistic legitimation, consecration and prices to be reversed: only once art pieces are highly priced in the market, their status becomes confirmed in any other social sphere. Finally, Grampp (1989) more moderately argues that aesthetic and economic values of art move

hand in hand, tied in a symmetrical relationship through which they reciprocally and equally influence each other. Specifically, according to Grampp, the reciprocity and consistency of the connection between art and economics is demonstrated by the correspondence of the artistic and economic values of artworks. When a work of art is considered artistically more exceptional than another, the former will certainly be more valuable in the market, and vice versa (Grampp, 1989).

In light of each different perspective, Grampp's argument seems to reflect the relationship between art and commerce most accurately. In fact, although the two domains do generate different types of values, it remains difficult to maintain a clear separation between the actors establishing the aesthetic, artistic value of art from those playing a relevant role in its economic assessment. In fact, according to Abbing (2002), the very assessment of the aesthetic value of artworks includes collectors and other actors who are also determinant in the establishment of their market value. Similarly, critics and other experts are widely acknowledged to influence not only the artistic, but also the economic evaluation of art. Overall, regardless of the causal relationship between artistic and economic evaluations, it is impossible to deny that a straightforward relationship exists. Hence, in light of the different arguments and opinions pointing at this relationship, the present study can be expected to confirm the existence of a connection between artistic and economic values. In other words, it seems reasonable to believe that the appreciation of female nudity in the artistic community will be reflected by its economic value in the market. Based on this expectation, the hypotheses tested in this study are described as follows:

Hypothesis 1: The characteristic of female nudity in Modigliani portraits positively and significantly affects their hammer price in auction sales.

Hypothesis 2: The characteristic of female nudity in Modigliani portraits positively and significantly affects their estimated price in auction sales.

In order to test these expectations, the present study employs hedonic regression. Thus, the next chapter aims at justifying the use of this method, explains how the hedonic framework is structured, what its limitations are, illustrates the data collection and provides an overview of the variables included in the model.

III. Methodology & Data

The hedonic framework is a method that allows to empirically measure the economic worth of the single constituent parts that collectively form the total price of a good (Sopranzetti, 2015). In this type of analysis, a good is interpreted as an aggregation of various characteristics whose values combined comprise its final price (Rosen, 1974). Assuming the worth of a certain attribute to be implicit within the selling price of the good, the function of hedonic models is to reveal the expected price based on the economic value of single specific characteristics (Rosen, 1974). In synthesis, hedonic regression aims at unveiling the latent prices associated to individual features constituting a good and disclosed by economic agents (Rosen, 1974).

The first application of hedonic regression is attributed to Haas (1922), who employed the model within land economics to measure the impact of distance from urban areas on the market value of a land (Colwell & Dilmore, 1999). Following Haas' input, hedonic regression became commonly employed in real estate (Sopranzetti, 2015). Within art market studies, the first to apply this analytical method was Chanel (1995). His rationale was that artistic creations, rather than being demanded in their totality, can be perceived as agglomerations of specific characteristics that the collector appreciates and values (Chanel, Gérard-Varet & Ginsburgh, 1996). According to him, artworks derive their economic value from material as well as immaterial characteristics, which are generally interpreted as sources of pleasure, hence utility, for the collector. Specifically, the economist interpreted the price of the canvas as the sum of the values of the artist' reputation, the subject and size of the painting, its material, technique of realisation and medium (Chanel, Gérard-Varet & Ginsburgh, 1996).

The characteristics listed by Chanel are essential for this research, in that they provide a general idea of the aspects that need to be considered when evaluating a painting in quantitative, econometric terms. Although the influence that each of these aspects exercises on price will be illustrated in the section *III.III The Model*, explaining and understanding how hedonic regression works is essential to justify its application within this research.

III.I Research Method

When studying returns and price variations in the art market, hedonic regression, however common, is not the only method employed. In fact, another common type of analysis is repeat sales regression. Although both methods rely on the calculation of price indexes to account for quality variations, their approaches differ substantially (Renneboog & Spaenjers, 2012). Whilst hedonic indexes estimate the influence of single characteristics on the final price by regressing the achieved price against such characteristics, repeat sales indexes are determined by regressing the change in the achieved prices against time dummy variables for each date of sale (Chanel & Ginsburgh, 1996). Given the general absence of an established and objective set of attributes determining the price of an artistic good, both methods have been largely employed and validated (Stetco, 2017).

Repeat sales index focuses on the difference in prices of artworks that have been exchanged in the secondary market at least twice (Renneboog & Spaenjers, 2012; Stetco, 2017). Although widely employed[3], this method presents some relevant shortcomings for which it results unsuitable for this research. Firstly, considering the low frequency in which resales of works of art occur, repeat sales regression is necessarily limited to a reduced number of observations, which cannot accurately reflect the art market as a whole (Renneboog & Spaenjers, 2012; Stetco, 2017). Specifically, it has been studied that the proportion of repeat sales with respect to the total sales in a time-period of three decades only accounts for 15% (Ginsburgh, Mei, Moses, 2006). Within the present study, which focuses on a timeframe of 35 years, this limitation is particularly relevant: of the 237 sales of portraits of female nudity in the sample, only 20 nudes were auctioned twice. Secondly, the characteristics of the sample hinder the identification of resales. For instance, Modigliani's sketches are often attributed the same title, or, in some cases, the same painting sold at different times presents different titles. Hence, in this case study, not only do resales occur rarely, but they are also difficult to identify. Finally, repeat sales regression fails to capture the relationship between resales, variations in market trends and artists' reputation (Ginsburgh, Mei & Moses, 2006). In Modigliani's case, it is possible that the variation

---

[3] See Mei and Moses (2002); Goetzmann, Renneboog & Spaenjers (2011) for academic articles employing repeat sales regression.

in prices over the years could reflect changes in demand (*Figure 4*). Whilst the artist was less appreciated by the market in the early 2000's, his value has increased steadily over the last decade and overall maintained a more prestigious position. Repeat sales regression, however, fails to consider these variations within the analysis.

Figure 4: Demand for Amedeo Modigliani's artworks – ArtPrice (2019)
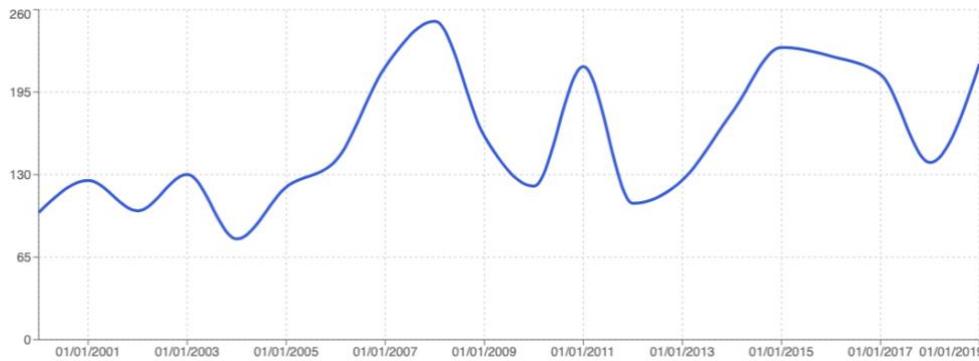
Particularly when combined with the unavoidable structural limitations implicit in repeat sales regression, these issues would aggravate the sample bias and comprise the reliability of the research (Clapp, Giaccotto, & Tirtiroglu, 1991). For these reasons, this method was excluded from the study.

In contrast, in its capacity to include important elements related to each sale while measuring the economic value of a single characteristic, namely the presence of nudity, the hedonic method suits the aim of this study. In fact, hedonic regression presents numerous advantages related to its reliability and sample size. First, by collecting all sales in a multiple regression equation, this method allows for a larger set of objects to be included in the analysis (Agnello, 2010; Ginsburgh, Mei & Moses, 2006). Second, it provides more reliable estimates to measure the effects of specific characteristics on the economic value of each sales transaction (Agnello, 2010; Renneboog & Spaenjers, 2012). Finally, this model generates coefficient estimates with smaller standard deviations than those obtained through repeat sales analyses (Agnello, 2010, p. 66). Altogether, hedonic regression not only overcomes the biased sample issues related to repeat sales, but it also accounts for the potentially relevant factors that repeat sales regression fails to include. Such factors comprise the characteristics listed by Chanel (1995), such as the size of the canvas, the medium and technique, as well as other unobservable elements such as the certainty of attribution of the artwork to the artist (Renneboog and Spaenjers, 2012; Stetco, 2017).

Despite its many advantages, this method presents some drawbacks too. For instance, one criticism often raised against hedonic regression is that it fails to systematically include variables that measure all relevant tangible and intangible characteristics of the artworks in the sample (Renneboog and Spaenjers, 2012; Stetco, 2017). Since the objectively determinant factors influencing the price of artworks are yet to be identified, it can be difficult to establish which variables are important in hedonic analyses. This can lead to a common issue referred to as 'misspecification of variables' (Chin & Chau, 2003, p.148). In different words, the analysis could easily include variables that are irrelevant for the model, while ignoring other variables that could potentially be important (Chin & Chau, 2003). This explains why different studies employing the hedonic framework generally involve multiple variables (Renneboog and Spaenjers, 2012). That said, it is necessary to note that more recent analyses employ a number of common variables that seem relevant in the determination of hedonic prices in general, and that, for this reason, will be referred to as 'standard hedonic control variables' (Oosterlinck and Radermecker, 2019, p.83). For instance, Oosterlinck and Radermecker (2019) employ a number of these variables in a paper that examines the influence that artworks attributed to masters with provisional names exercise on the price reached at auctions. Mostly studied as dummies, these controls are located in different categories ranging from attribution and authenticity qualifiers to technique and material, from subject to dimensions, salesrooms and year of sale. Similarly, in a recent article focused on the price developments of the Dutch market for paintings during the Nazi regime, Euwe and Oosterlinck (2017) include in their model a number of variables that they categorise namely as Period (of creation), Attribution, Authenticity, Quality, Medium, Size and Year of sale (pp.65,66). Finally, Renneboog and Spaenjers's model (2012) comprises attribution, authenticity, medium, topic, period of sale, auction house and size variables. According to literature and recent studies employing them, these variables are listed in *Table 1*.

Table 1: Standard Hedonic Control Variables based on Literature:

Standard Hedonic Control Variables	Literature
Technique & Medium Variables	David (2012); Euwe & Oosterlinck (2017); Lazzaro (2006); Oosterlinck & Radermecker (2019); Renneboog & Spaenjers (2012); Onofri (2009); Sagot-Duvauroux (2003)

Dimension Variables	David (2012); De Silva, Pownall & Wolk (2012); Euwe & Oosterlinck (2017); Graddy & Pownall (2016); Lazzaro (2006); Oosterlinck & Radermecker (2019); Renneboog & Spaenjers (2012); Sagot-Duvauroux (2003);
Authenticity Variables	David (2012); Euwe & Oosterlinck (2017); Lazzaro (2006); Oosterlinck & Radermecker (2019); Renneboog & Spaenjers (2012); Onofri (2009); Sagot-Duvauroux (2003);
Salesroom Variables	De Silva et. al. (2012); Graddy & Pownall (2016); Lazzaro (2006); Oosterlinck & Radermecker (2019); Renneboog & Spaenjers (2012); Sagot-Duvauroux (2003);
Period of Creation Variables	Euwe & Oosterlinck (2017); Lazzaro (2006); Oosterlinck & Radermecker (2019); Renneboog & Spaenjers (2012); Onofri (2009); Sagot-Duvauroux (2003);
Year of Sale Variables	David (2012); Euwe & Oosterlinck (2017); Lazzaro (2006); Oosterlinck & Radermecker (2019); Renneboog & Spaenjers (2012); Onofri (2009); Sagot-Duvauroux (2003);

Comparing these recent studies, the issue of variable identification related to hedonic models becomes less relevant. In fact, the hedonic framework is the most efficient analysis to investigate the economic value of single attributes of works of art (Stetco, 2017). As the single aspect analysed in this research is female nudity, the hedonic framework proves to be the most accurate method to employ.

When studying art markets, the actors to consider are various: from galleries to art fairs, from dealers to auction houses, the scenario is extremely diverse. Nonetheless, not all market sectors are easy to tackle. In fact, the lack of transparency of the primary market, largely dominated by galleries and art fairs, causes an important part of the art market to suffer from great lack of data (Candela & Scorcu, 2001; McAndrews, 2019; Onofri, 2009; Stetco, 2017). In contrast, the auction sector shows to be relevant not only in terms of market share – currently of 46% (McAndrews, 2019), but also as a partial solution to the issues of data availability, reliability and transparency (Candela & Scorcu, 1997; McAndrews, 2019; Onofri, 2009; Zorloni, 2005). Moreover, established auction houses have been acknowledged to provide useful information to dealers and influence the shaping and functioning of the primary market itself (Candela

& Scorcu, 2001). For these reasons, the present analysis focuses exclusively on the auction sector of the art market.

Having defined the methodology and market segment targeted, it becomes crucial to explain and justify the focus of this study. Specifically, this research consists in a case study of a single artist for two main reasons. First, considering the historical evolution of the female nude, the contrasting implications of artistic nudity in opposition to nakedness, and the considerable variations in personal artistic styles and movements, it would be difficult to compare nudes of different artists in one single analysis. Second, considering that, especially when sold at auctions, paintings are mainly evaluated based on the reputation of the artist to which they are attributed (Akerlof, 1970; Ginsburgh, Mei & Moses, 2006; Zorloni, 2005), it would be challenging to completely detach the artist's name and style from the sole element of nudity in the subject. Indeed, sociologists, art critics and economists agree that the most controversial and yet critical element determining the price of artworks is the reputation of the artist (Onofri, 2009; Renneboog & Spaenjers, 2012). Nonetheless, past hedonic studies demonstrate how the artist's reputation can overshadow the relevance of other important characteristics, such as nudity (Ginsburgh, Mei & Moses, 2006). Limiting the analysis to one artist then allows to stress the relevance of female nudity in itself, without raising concerns about the artist's reputation and market performance in comparison to others. In fact, investigating the market value of one single established artist whose reputation revolves so remarkably around female nudity remains extensively unexplored. Painter of two record-breaking sales, Amedeo Modigliani is the artist to whom the topic of this research leads, and on whom the present analysis will focus. Not only have his nudes been sold for some of the top prices ever seen in auction sales, but they were also very relevant in the establishment of his reputation. Moreover, Modigliani's Modern yet Classic style makes him the perfect case for this type of study: the centrality of the nude women on the canvas, their closeness to the viewer, and their unapologetic, undeniable nudity facilitate a clear, unequivocal distinction between nude and non-nude figures.

III.II Research Strategy

In order to assess the value of Modigliani's female nude, it is essential to juxtapose it against paintings that lack the element of nudity. As the most straightforward comparison for the state of nudity is the state of dress, this benchmark is represented by portraits of dressed subjects. Hence, the sample collected focuses exclusively on Modigliani's portraits of both nude and non-nude subjects. In Modigliani's case, this was quite unavoidable, as this genre represents the great majority of his artworks.

Manually collected between February and April 2019, the data was retrieved primarily from ArtPrice. Funded in 1987, ArtPrice is a comprehensive price database that specifically gathers and displays current and past financial data on art markets internationally (ArtPrice, 2019). Specifically, it offers information on sales taking place in the secondary market from 1962 to the present day. In case of Modigliani, the ArtPrice database includes sales taking place from 1984 onwards in any European and international locations. Moreover, by displaying actual sales as well as buy-ins, the website offers an extensive perspective on the trends of the art market. The information available for each sale includes details not only on the prices, but also on the context of the auction and the art piece itself. The price information is generally expressed in euros and comprehensive of the achieved hammer price, the buyer's premium and the estimated price - inclusive of a lower and higher estimate. The information on the context of the auction includes the name of the auction house, the location of the sale, the title of the sale and the lot number. Finally, the information on the art piece addresses the title of the artwork, its year of creation, the medium and technique of realisation, its dimensions, some details regarding its attribution, such as the signature, provenance and exhibitions previous to the time of the sale, as well as a photograph of the artwork for sale.

The sales of Modigliani's paintings, and the sales of any art piece in the database in general, are divided in four different categories based on the type of artworks for sale. For Modigliani, these categories are namely Painting, Drawing-Watercolour, Sculpture-Volume and Print-Multiple. Details on the price, auction and art piece are available for most of the sales in any of the categories. Nonetheless, the categories Sculpture-Volume and Prints were excluded from the sample. Whilst three-

dimensional artworks were removed not to undermine the accuracy of the dimension variables in the model, prints were excluded because the 245 sales listed on ArtPrice seemed misrepresentative of the market for this type of artworks. Considering the higher availability and generally higher frequency with which prints are exchanged (Pesando,1993), the sample offered by ArtPrice seems rather reduced. In fact, for this particular category, the dataset includes sales exclusively from 1994 onwards.

The sales collected in the dataset were obtained by browsing the auction sales for the categories Painting and Drawing-Watercolour from the most recent (2019) to most dated (1984). Whilst the Painting category displays 215 sales, the auctions for Drawing-Watercolour have been more frequent, reaching a number of 828 sales as of April 2019 (ArtPrice, 2019). For each sale, the collected information includes the title of the artwork, the year of creation, the size and type of medium, the technique of realisation, the presence of a signature or stamp, the provenance, past exhibitions, the date and place of sale, the hammer and estimated prices, and information about the subject of the painting. In order to assess female nudity, the presence an image of the painting was crucial. The data collected includes all the standard hedonic control variables as well as the particular subject characteristics this study aims to measure (Appendix 1). Although most observations were collected from ArtPrice, the website was systematically compared with ArtNet and ArtValue, in order to provide a reliable and comprehensive corpus of sources. This procedure became especially important when ArtPrice omitted some essential information about the sale, such as the image of the artwork or the estimated and hammer price.

Despite this measure, the amount of data collected – of 924 lots between paintings and drawings - is lower than the total amount presented in the website - of 1043 lots. For the most part, this difference results from some sales missing the image of the artwork auctioned. Although art pieces with specific titles could be easily identified on other databases online, more general titles such as *Portrait de femme*, which in Modigliani's case occurred quite often, were impossible to recognise. If the title failed to describe the sexuality and nudity of the subject of the painting, and if an image of such painting could not be retrieved, the sale had to be excluded from the dataset.

In addition, despite Modigliani's legacy mainly consists of portraits, the ArtPrice database includes the sale of few landscape paintings. These five were excluded from the sample, as they failed to meet the selection criterion of collecting exclusively portraits. Similarly, seven lots portraying male nudes and three sexually ambiguous paintings representing hermaphrodites were removed from the sample. Even if, considering Modigliani's style, it was generally immediate to assess whether the element of nudity in a painting was present, these ambiguous drawings required female nudity to rely on a very specific definition. As specified in the literature review, the concept of nudity employed in this research is inclusive of conditions of both partial and total undress. In more practical terms, all the portraits that represented or outlined female silhouettes that more or less explicitly disclosed their nude figure, whether elements such as pubic hair and nipples were present or not, were categorised as nudes. This implies that those nudes that, although entitled *Hermaphrodite*, only display female body parts were included in the sample.

Another issue that affected the data collection was, in some rare but existing cases, the absence of both the hammer and estimated price. In these cases, the information regarding the specific sale could not be collected. On the other hand, when the lot remained unsold or the hammer price was not listed but the estimated price was present (and vice versa), the data was collected. Specifically, of the 924 lots collected, 69 estimated prices and 33 hammer prices were missing, whilst 209 lots remained unsold (Appendix 1). This results in two databases, one based on the hammer price - of 685 sold lots, and the other on the estimated price - of 855 sold or unsold lots. Dividing the data in two datasets was useful to conduct separate analyses including respectively the hammer and average estimated price as dependent variables, and test whether the element of nudity is evaluated differently by different actors in the market i.e. the auction house and individual collectors.

The data was collected in two separate Excel sheets, coded in Excel and analysed in Stata, a software widely employed for statistical analyses (Stata, 2019), through hedonic regression. To ensure that the hammer price database was free from any bias, the quantity of unsold nudes was juxtaposed against the number of nudes in the total sample. The proportion of unsold nudes with respect to the unsold portraits is of 21% - 43 unsold nudes with respect to 209 unsold paintings. The proportion of nudes

in the total sample is of 26% - 237 nudes with respect to 924 paintings. Thus, in proportion, the amount of nudes in the unsold lots is roughly similar to the number of nudes in the total sample. In fact, this comparison shows that, when nudes are offered in the auction market, they generally seem more likely to get sold than non-nudes. In order to understand how female nudity is valued, however, it is important to create a model that accurately describes its relationship with price. This model, together with the dependent and independent variables, is explained in the next sections.

III.III The Model

To conduct the analysis, this study relies on hedonic regression in its standard form. Specifically, the hedonic model employed can be described as follows:

$$\ln p_i = \alpha + \beta n_i + \sum_{j=1}^{J} \gamma_j m_{ji} + \sum_{k=1}^{K} \delta_k s_{ki} + \sum_{x=1}^{X} \zeta_x d_{xi} + \varepsilon_i$$

Whilst $\ln p_i$ represents the natural logarithm of the price of painting i, α is the constant term, equal to the price of painting i when all the independent variables equal zero. The variable this study aims to measure is n_i: the *Female Nude* variable. Its coefficient β, expresses the direction and magnitude in which female nudity is expected to influence the dependent variable. The term m_{ji} is indicative of the control variables created for this particular sample and expected to influence the market value of the paintings in Modigliani's repertoire. The standard hedonic control variables are expressed through the terms s_{ki} and d_{xi}: the former represents the dummy variables, the latter refers to the dimension variables *Length* and *Width*, which are treated as numeric. Chosen according to the variables used in recent hedonic analyses and based on the information offered by ArtPrice, the control variables have been divided in different categories: Subject, Technique and Medium, Dimensions, Authenticity, Salesroom and Year of sale (Appendix 2). Finally, ε_i represents the error term, with i=1,...,I; j=1,...,J; k=1,...,K; and x=1,...,X. Except for the dimension variables, all the characteristics in the sample were transformed into dummy variables, assuming the value of one when a specific characteristic was present, and zero otherwise.

III.IV Dependent Variables

As shown by the model, the dependent variable is the natural logarithm of the price of the portraits. More precisely, given the presence of two datasets, regression was run with both the hammer price and average estimated price as dependent variables respectively. To take inflation into account, all the prices were adjusted from nominal to real using the Consumer Price Index (CPI) provided by the Organisation for Economic Co-operation and Development (OECD, 2019), with 2015 as base year and euro as currency. Given that all prices on ArtPrice were already in euros can be limiting for two main reasons: first, as the euro was implemented in the 1990's, inflation in the time period between 1984 and 1990 - first year in which an inflation rate for the euro becomes available on the OECD website – could not be taken into account. Second, as the CPI adaptation in the dataset follows changes in the value of the euro, the adjusted price of sales that took place outside of the euro zone could potentially be compromised.

Although these limitations need to be acknowledged, there is something to be said regarding inflation in and outside of the euro zone. In fact, as shown by *Figure 5*, inflation rates are extremely similar for European countries in and outside of the euro area as well as for the United States. Considering that the majority of sales took place either in Europe or in the United States, the limitations caused by currency exchanges and inflation become less relevant. Moreover, using the years of sales as dummy variables contributes to reducing this problem by capturing changes in the monetary values of the lots on a yearly basis.

Figure 5: Inflation (CPI) with 2015 as base year (2015=100) - OECD (2019)
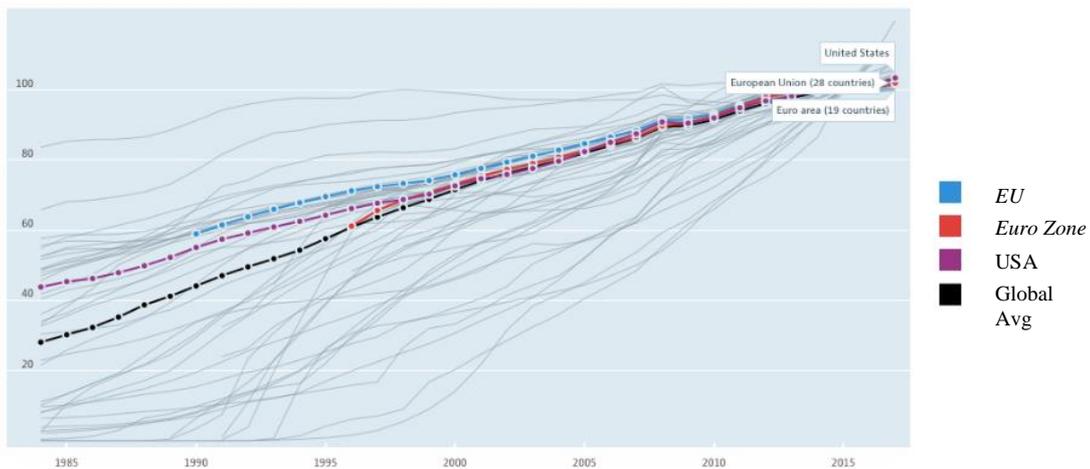
As previously mentioned, the information on price includes the hammer and estimated prices of paintings. Whilst the hammer price is the realised at the end of the sale, the estimated price ranges between two amounts, is established by the team of experts working in the specific auction house, and released before the sale (Butler, 1961). In this research, prices are excluded of buyer's premium and transaction costs. Although this information could be important to calculate the current and future investment performance of the art market, such analysis goes beyond the scope of this research. In fact, as the element of female nudity is purely inherent to the aesthetic presence of a work of art, it seems more adequate to consider a price value that refers exclusively to the economic worth of the artwork in itself. As the price that the collector is willing to pay for the artwork alone, the hammer price is the primary quantitative value on which the present research relies. Nonetheless, as this research aims to tackle the art market as inclusively as possible, it can be interesting to analyse the estimated price and compare how experts and buyers value Modigliani's female nudes[4]. Most importantly, as the stakeholder considered in this research is the art market in general, it is essential not to limit the investigation to collectors, but maintain inclusivity to all the actors in the artistic stage whose evaluation can be conveyed. As the estimated price is indicative of the evaluation of auction house experts, it is important that they are included in the analysis too.

---

[4] See Ekelund, Jackson & Tollison (2013) for more information regarding the relationship between the estimated price and the final price obtained at auctions.

For an exhaustive description of the value of female nudity and a more complete analysis, it can be useful to juxtapose the two price variables before running regression. As the boxplot in *Figure 6* shows, the hammer price (of the 685 lots in the sample that were sold) is characterised by a wider interquartile range than the average estimated price, which refers to the 855 lots – sold or not – in the sample. Although the median prices are similar, the variance is greater for the hammer price range than for the average estimated price (Appendix 3). As matter of fact, the lower and upper whiskers and lower and upper quartiles include a range of values that is much wider for the hammer price than for the estimated one. This implies that, whilst auction house experts maintain more uniform and similar prices in evaluating Modigliani's repertoire, collectors' willingness to pay ranges on a much wider spectrum.

Figure 6: Box Plot Comparing Natural Logs of Hammer & Average Estimated Prices

The two mean values differ too: the mean hammer price of € 1.811.129,00, is over 65% greater than the mean estimated price of €1.094.339,00 (Appendix 3). Thus, on average, collectors' estimations of Modigliani's portraits are higher than experts'.

III.V Independent Variables

On the other side of the equation, the element on which this research mainly focuses is female nudity. Based on the definition previously described, *Female nude* is translated into the dummy variable n_i that assumes the value of 1 if the painting under scrutiny is a female nude and 0 otherwise. As nudity involves a physical characterisation of the protagonist of the canvas, it was placed under the Subject

category. Among the different subjects that Modigliani portrayed, the most commonly auctioned subjects are female portraits. With a number of over 650 lots inclusive of nudes (*Table 2*), portraits of female subjects are sold almost three times more often than male, presumably because they are the most frequent subject in Modigliani's repertoire.

Table 2: Dummy variables by number of observations and percentages

Variable	Observations	Percentage
Subject	-	-
Male	264	28%
Female Dressed	423	46%
Female Nude	237	26%
Technique & Medium	-	-
Oil on canvas	141	15%
Oil on other	45	5%
Pencil on paper	551	60%
Watercolour on paper	46	5%
Ink on paper	60	6%
Other technique on paper	81	9%
Salesroom	-	-
Location	-	-
Paris	207	22%
London	229	25%
New York	258	28%
Other city	230	25%
Auction House	-	-
Sotheby's	315	34%
Christie's	179	19%
Authenticity	-	-
Signature	671	69%
Stamp	62	6%
Provenance	108	11%
Exhibition	139	14%

In addition, in order to provide an overview of the fluctuations in the trend of nudes in the time period considered, *Figure 7* captures the amount of female nudes auctioned each year from 1984 to 2019.

Figure 7: Modigliani's paintings featuring female nude subjects auctioned per year (1984-2019)
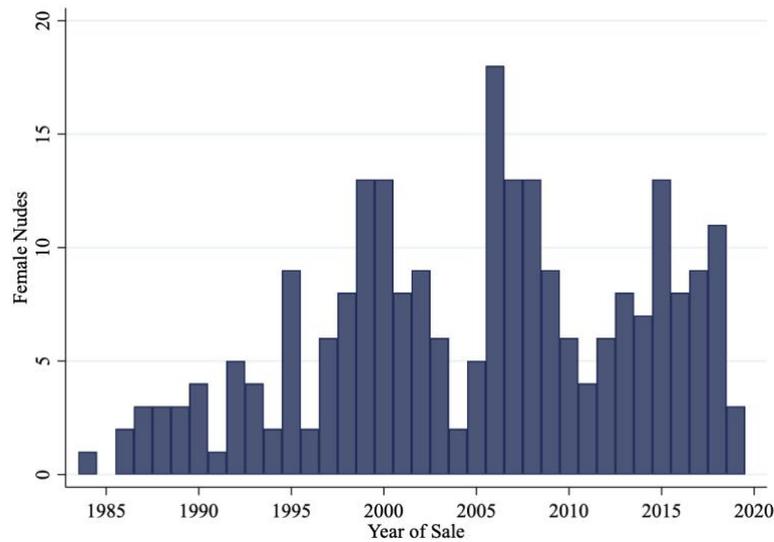
As the graph shows, it appears that the popularity of Modigliani's nudes in the market reached a peak in 2006, with a total of 18 nudes offered at auction, 17 of which were sold. Altogether, the nudes auctioned range approximately between 3 and 14 per year.

Being a dummy variable, *Female Nudity* needs to be analysed in juxtaposition to a variable that, omitted from the analysis, accounts for category of reference against which the female nudity factor is studied. This category, usually complementary to the variable present in the model, is inclusive of paintings that portray non-nude subjects. In different words, the category of reference includes all lots that, within the variable *Female Nude*, assumed the value of zero. In addition to *Female Nude*, the variable *Male* was created to guarantee that the nudity factor could also be distinguished from the sex of the subject in the painting. Without a variable that separates nudity from the sex of the subject portrayed, the coefficient resulting from regression could be attributed not only to female nudity, but also to female subjects in general. As previously explained, the sample only includes male portraits that are dressed. Finally, the last variable in the Subject category is *Notorious Names*. Differently from the other controls, this variable is normally not used in standard hedonic regression. Notwithstanding, it was created to capture the potential influence that the popularity of the subjects portrayed by Modigliani could have on the price of the lot. Since 302 portraits in the sample represent subjects (Appendix 1) - such as Léopold Zborowski, Jeanne Hébuterne or Pablo Picasso - who were close to Modigliani during his life and are well known in the

present day, the presence of these names in the title of the paintings is likely to exercise some influence on their market value (Oosterlinck & Radermecker 2019). Hence, if the title includes names of notorious people, this variable takes the value of 1, whilst if the subject of the painting remains anonymous, the variable takes the value of 0. When juxtaposed against *Nudity*, it is interesting to notice how this variable, although significant in number, covers an entirely different body of portraits. In fact, only four of the 302 portraits are nudes (Appendix 4). As variables that have purposely been added to study this specific sample, both *Male* and *Notorious Names* are captured in the model by the term m_{ji}.

The remaining independent variables, namely s_{ki} and d_{xi}, consist of standard controls generally employed in hedonic analyses and adapted to the specific characteristics of the lots in the sample. For instance, the dummy variables in the category Technique & Medium were grouped based on the amount of portraits in each variable, in order to maintain accuracy in the model and precise predictions in the analysis. The dummy variables in this category are *Oil on canvas*, *Oil on other media, Pencil on paper, Watercolour on paper* and *Ink on paper* (Appendix 1). Notice that, although the sample included other techniques employed on paper - such as charcoal, graphite, gouache, wash and wax crayon – they were purposely not included in the model. When these techniques were considered individually, the lots characterised by each of them failed to reach a number higher than 23. With such a low number of observations, the variables would have not been large enough to become statistically significant. Indeed, when combined into a single variable *Other technique on paper*, the observations grow in number, reaching 81 units in total (Appendix 1). However, including a variable that compensates the other Technique & Medium variables combined would have created redundant information, possibly causing collinearity in the model. Therefore, accounted as the category of reference for the Technique & Medium variables, *Other techniques on paper* was omitted from the model. For this same reason, although useful in describing the dataset, no other complementary variables such as *Other Auction House* or *Other Location* were created for the remaining qualitative variables in the model, as they were considered categories of reference (Appendix 1). Comparably with the Technique and Media variables, the *Auction House* and *Location* dummies in the Salesroom category were chosen based

on the salesrooms in which the majority of sales occurred. Hence, the Salesroom variables generated were *Paris*, *London* and *New York* for the location of the sale and *Sotheby's* and *Christie's* for the auction house, with *Other City* and *Other Auction House* as categories of reference respectively. When paintings were sold at Sotheby's or Christie's or in London, New York or Paris, these variables take the value of 1. In contrast, when different auction houses were involved, or when the sale took place in a different location, the variables assume the value of 0. In addition to the *Salesroom* qualifiers, some *Authenticity* qualifiers were created to include the possibility that general indicators of authorship might affect the market value of a lot. Although disposing of a sample of works attributed with high certainty to the artist could make this factor less significant, the dummy variables *Signature*, *Stamp*, *Provenance* and *Exhibition* could also be useful to include the possibility for fakes to be included in the sample and increase the accuracy of the model. Among these variables, the most frequent is signature (*Table 2*): of the total number of lots included in the database, over two thirds are signed. Of these 671 signed portraits, 134 are nudes (Appendix 4[5]). Another generally important variable is the size of the canvas (Rengers & Velthuis, 2002). In this research, the size of the portraits is included dimension by dimension and transformed into numeric variables, namely *Length* and *Width,* using centimetre as unit of measurement. In general, size variables can be included in the model in various forms: whilst some studies threat it as a linear variable (Oosterlinck and Radermecker, 2019), others include the dimension variables their base as well as squared values, expecting the relationship between size and price to be explained by a parabolic function (Renneboog & Spaenjers, 2012; Euwe & Oosterlinck, 2017). Overall, the parabolic relation between size and price generally applies to studies with larger variation between the sizes of the canvases in the dataset (David & Osterlinck, 2012; Euwe & Oosterlinck; 2017; Renneboog & Spaenjers, 2012). However, to be more precise, this study includes both the base as well as squared values of *Length* and *Width* even with limited size variation (*Table 3*).

Table 3: Descriptive Statistics of Dimension Variables *Length* & *Width*:

Variable	Obs	Mean	Std. Dev.	Min.	Max.
Length	923	45,55947	18,85579	13	131
Width	924	31,75502	13,68734	8	146,69

---

[5] Check Appendix 4 for frequency tables of the female nudity variable in relation to other dummy variables.

| Surface | 923 | 1664,666 | 1589,985 | 153 | 13128,75 |

Finally, two important variables generally included in this type of analysis are the period of creation of an artwork and its year of sale (*Table 1*). Whilst the latter is included in the model as a dummy variable for every year in the time period 1985-2019 (with 1984 as base year), the former has been excluded. This choice follows multiple reasons: first and foremost, Modigliani's stylistic approach, especially in his most productive years, always remained attached to his iconic portraits with sinuous poses, stretched necks, and almond-shaped, empty eyes, without undergoing any particular change. Second, in parallel with the brevity of his life, Modigliani's repertoire is mostly limited to the short period between 1914 and 1919 in which he was most prolific. Finally, a number of his creations, especially drawings and watercolours, lack certain information on their period of creation.

Employing the variables described in this chapter, the following chapter illustrates the analysis and describes the main findings obtained through hedonic regression.

IV. Empirical Analysis & Results

This section of the study describes the main results of the statistical analyses conducted through Stata. First, the results of regression are observed in juxtaposition with the hypothesis that nudity in Modigliani portraits positively affects their economic value. Second, the robustness of the results is checked through general methods testing heteroscedasticity, as well as through more specific methods testing the limitations of the sample employed. Finally, a reflection is developed based on the final results in relation to literature on the value of nudity.

To analyse the data, regression was run separate times with respectively the natural log of the hammer and estimated price as dependent variables. In both cases, the analysis was conducted multiple times with different combinations of the independent variables to test whether the fitness of the model could be improved and whether nudity was significant throughout. For instance, the dummy variables were combined in different ways to test whether there exists some level of correlation between the variables that affects price more significantly than the variables taken individually. Specifically, the variables *Signature* and *Pencil/paper* were employed to create an interaction term labelled *Signed Drawings*. In addition, the variables in the Salesroom category were combined by generating six interaction terms connecting locations and auction houses. In addition, the relationship of the among the Dimension variables with the dependent variable was tested as both linear and parabolic. The year of sales was always analysed as a dummy, with 1984 as category of reference.

IV.I Hammer Price

In this section of the analysis, the dependent variable always consists in the natural logarithm of the real hammer price. The period considered ranges from 1984 to 2019, and the dataset includes 685 observations. The first regression analysis was run with the variables illustrated in the basic model, with no interaction terms. As shown in *Table A* (Appendix 5), although R-squared is high and nudity is positively and significantly influential on price, many variables seem insignificant. Specifically, all of the location variables, most of the technique and medium variables, and half of the authenticity variables are not significant. Therefore, in order to check whether these

variables could change in relevance when combined, the interaction terms *Paris/Sotheby's, Paris/Christie's, London/Sotheby's, London/Christie's, NewYork/Sotheby's* and *NewYork/Christie's* were created, connecting the location of the sale with the auction house. Furthermore, the interaction terms *Signed Drawings, Signed Oils* and were generated to test whether the significance of the variable *Signature* is subject to any change when combined with other Technique & Medium variables. To test the relationship of *Female Nude* with other variables, the interaction terms *Signed Nudes*, *Nude Drawings* and *Nude Oils* were created too. Finally, in order to examine the relationship between the dimension variables and price, the terms *Length & Width* were squared. *Table 4* shows the results of this regression[6]. With the new variables, this more complete model shows a higher R-squared and β coefficient relating nudity to the hammer price. Specifically, it is able to explain 84,16% of the variation in the hammer price, and the female nudity coefficient of 0,58 is positive and relevant. This implies that, when female nudity is present, the hammer price increases by 0,58%. Therefore, the analysis confirms the *Hypothesis 1*, demonstrating that the characteristic of female nudity in Modigliani portraits positively affects their hammer price in auction sales by 0,58%.

Table 4: Hedonic Regression Results for Hammer & Estimated Price

Variables	Ln Hammer Price	Ln Estimated Price
Female Nude	0,581**	0,464**
Male	-0,179**	-0,115
Notorious Names	0,307**	0,236**
Length	0,025**	0,018**
Length2	-0,0000485	9,40E-06
Width	0,0088122	0,0196**
Width2	0,0000935	-6,40E-06
Provenance	0,2296182	0,0323602
Exhibition	0,528**	0,384**
Signature	0,3324329	0,2363248
Stamp	-0,0379311	0,0688496
Oil/canvas	2,405**	2,179**
Oil/other	1,848**	1,788**
Pencil/paper	-0,2060320	-0,3096**
Watercolour/paper	-0,1010035	-0,1924903
Ink/paper	-0,3193762	-0,342**

---

[6] For the complete regression table, see *Table B* (Appendix 5).

Signed Drawings	-0,553**	-0,401**
Signed Oils	0,1477579	0,2719340
Signed Nudes	0,0482873	0,0576136
Nude Drawings	-0,0146077	-0,1034833
Nude Oils	-0,5525582	-0,666**
Paris/Soth	-0,1335905	-0,1113022
Ldn/Soth	0,626**	0,308**
Ny/Soth	0,380**	0,2697**
Paris/Chris	0,3182507	0,0839928
Ldn/Chris	0,366**	0,221**
NyChris	0,464**	0,287**
Year of Sale	Yes	Yes
R-squared	0,8416	0,8550
Adjusted R-squared	0,8255	0,8436

Results of hedonic regression with the interaction terms. The dependent variables are the natural log of the real hammer price in the second column and the natural log of the real estimated price in the third. Period considered is 1984– April 2019. Annual data are used for each model. In all regressions, coefficients are significant at the 95% confidence interval (**).

Although nudity remains the most relevant element in the analysis, it is also important to discuss the Subject variables to which the nude compares, as well as the standard hedonic variables that comprise the model. At first glance, it is interesting to notice that the coefficient of the *Male* variable is negative and significant. This implies that, when a Modigliani portrait is auctioned, it will sell for a price 0,18% lower when the subject portrayed is male compared to when the subject is female. This shows that the nudity element in Modigliani's paintings of women is not the only factor contributing to increasing the achieved price. Considering that the omitted variable of reference for *Male* is *Female Dressed*, these variables show that both the element of nudity and the female sex positively influence the hammer price of a portrait. When the variable *Female Nude* is observed, it is also important to remember that its influence on price is examined in comparison to the effect that female dressed subjects exercise. Another interesting subject variable is the notoriety of the characters portrayed. When representing a notorious face in Modigliani's life, or some famous artist of his time, the hammer price of the portrait is expected to increase by 0,31%. In this regard, it is interesting to observe how the reputation not only of the artist influences the market value of a painting, but also of his subject, at least in the case of Modigliani.

Among the standard hedonic control variables in *Table 4*, the authenticity category strikes the attention: despite proofs of authorship normally increase the value of artworks, they seem, in this analysis, not particularly significant. For instance, *Signature* is usually a positive and significant variable in hedonic models (Ginsburgh, Mei & Moses, 2006), in that it directly connects the artwork to the name of the artist. However, despite being positive, the signature variable in this dataset includes the value zero in the 95% confidence interval. In other words, this variable is not significant. The singularity of this result can lead to a spectrum of different interpretations: considering the iconic style employed by Modigliani constantly and coherently throughout his career, the most noteworthy would probably be that the recognisability of his artworks facilitates their attribution to him, and might reduce the importance of the presence of his signature. Nevertheless, that would not exclude the possibility for fake artworks in his name to be exchanged in the art market. Thus, the insignificance of this variable remains difficult to interpret. Comparably to *Signature*, the variables *Stamp* and *Provenance* seem not significant too. Although the former, differently from the latter, is characterised by a negative coefficient, they both seem to convey not significant information about the hammer price. Whereas in case of *Stamp*, this could be explained by the lower number of lots – 47 in total – distinguished by this characteristic, the amount of lots with clear provenance – 86 in total – should be enough to withdraw a significant, and usually positive (Oosterlinck & Radermecker, 2019), prediction. Hence, this result is quite surprising too. In contrast, the authenticity variable, *Exhibition* is, as expected in hedonic regression (Oosterlinck & Radermecker, 2019), positive and significant.

Among the Medium & Technique variables, the most relevant are *Oil/canvas* and *Oil/other*, displaying high, positive and significant coefficients of respectively 2,41 and 1,84. This shows that, when the portrait is an oil painting on canvas, its economic value is expected to increase by 2,4%. This is the highest coefficient generated in the model. Nonetheless, the predictions related to the oil technique seem the only ones that matter, as the remaining variables *Pencil/paper*, *Watercolour/paper* and *Ink/paper* all present negative and statistically insignificant coefficients. That said, the combination of the variables *Pencil/paper* and *Signature* shows an unexpectedly negative and significant relationship with price. Once again, this result is unusual in that, although

the medium can be expected to negatively affect price, signature supposedly increases the worth of artworks.

The interaction terms generated for the Salesroom category display, almost in every case, a positive and significant relationship with price. Specifically, when the lot is sold in London or New York at Sotheby's or Christie's, its hammer price can be expected to increase between 0,38 and 0,62%. Nonetheless, even if the sale occurs at one of these two auction houses, when the auction takes place in Paris, the hammer price seems more difficult to predict. This could be because, regardless of where the majority of the sales for Modigliani's artworks occur, the most successful markets in terms of size and sales remain located in London and New York (Renneboog & Spaenjers, 2012).

Regardless of the salesroom, the year in which the lots were sold affects the hammer price positively and significantly for almost every year in the time span examined, with the exception of 1985. In different words, in each year, the hammer price increased (more or less constantly) compared to 1984, as it could be expected. Similarly, the dimension variables also affect the hammer price positively up to a point of inflation, which is represented by the negative coefficient of the squared terms of *Length* and *Width*.

Finally, when combined with the nude, other variables concerning authenticity, such as signature, or technique, such as oils and drawings, seem not to generate any significant prediction. For this reason, regression was run various times with different interaction terms and minor variations to test which combination of variables generates the best and most accurate predictions (*Tables C & D,* Appendix 5). All regression results present an R-squared higher than 80% and a β coefficient consistently positive and statistically significant. The model employed in regression *Table 4*, inclusive of all the interaction terms generated, is the one of reference for in the next steps of this research. As matter of fact, although some interaction terms appear irrelevant in standard regression, disposing of a model that is accurate as well as inclusive of all the potentially relevant variables can be extremely helpful when testing its validity and drawbacks (Chin & Chau, 2003).

IV.II Testing the Hammer Price Model

In order to address whether the model provides for accurate and strong predictions, this section illustrates three tests. First, the model is analysed through quantile regression to determine whether the positive and significant β coefficient of *Female Nude* experiences variations throughout different price ranges. As the hammer price variation of the lots in the sample is quite considerable (Appendix 3), it can be important to check whether the independent variables influence the dependent variable differently in different price ranges (Pesando,1993). Hence, by dividing the sample in different quantiles, it is possible to identify whether nudity remains relevant throughout different price categories. Second, as it has been noticed earlier, the currency conversion and European inflation rate might have caused some inaccuracy in the dataset. Therefore, the strength of the model is tested by running regression with prices adapted to the American CPI. That is, by adjusting the nominal prices obtained from the data collection to real prices through the American dollar CPI (OECD, 2019), and running hedonic regression, it is possible to check whether the model shows any difference in the predictions. Finally, the model is put through more generally employed tests measuring heteroscedasticity, namely Breusch-Pagan and White's tests.

The results of each test are presented in Appendix 6. *Tables E* and *F* display the results of quantile regression for the 25th and 75th quantiles respectively. Running this type of analysis can be important to establish whether the relationship between the dependent and independent variables changes throughout the different values assumed by the dependent variable. By dividing the hammer price in different quantiles, it is possible to assess its relationship with the independent variables as the price increases. Separating the price values in four quantiles, the two – highest and lowest - quantiles considered capture the lowest and highest price ranges of the hammer price. The results of quantile regression show that nudity has a positive and significant influence on the dependent variable in both quantiles considered. This implies that female nudity has a positive and significant coefficient throughout the different price ranges considered in the sample, although the value of β changes. Specifically, whilst β in the 75th quantile regression equals 0,53%, the coefficient in the 25th quantile regression assumes the noticeably higher value of 0,88%. Thus, the nudity element seems more influential for prices in the lower quantile of the dependent variable than for the higher ones. One

explanation of this could be that collectors contemplating highly estimated artworks might be motivated by other factors, such as incentive to invest, more than aesthetic reasons. Hence, the aesthetic content of the canvas, female nudity included, might become less relevant. That said, even when expected to exercise a lower influence on price, nudity remains an unequivocally relevant element.

Table G shows the results of running regression with the prices adapted to inflation based on the US CPI. This test is useful to show that the choice of currency and inflation rates employed to correct the nominal prices causes irrelevant changes in the results of regression. Although the conversion error could not be perfectly corrected, this test provides a clear illustration of the resemblance of the two regression results even with different CPI's. In fact, even when prices are corrected with the American CPI, both R-squared and β remain unchanged until the fourth decimal.

Finally, *Tables H1* and *H2* (Appendix 6) display the results of the Breusch-Pagan and White's tests respectively. In these tests, the null hypothesis H_0 supposes the constant variance of the standard error. In different words, H_0 presumes that there exists no relationship between the squared residuals and the independent variables in the model. In order to test the hypothesis, the Breusch-Pagan dictates the squared residuals to be regressed against all the independent variables in the model. To check whether regression is significant, the P-value indicates the probability that the null hypothesis for the model is truthful. As shown by *Table H1*, the P-value is slightly higher than 5%, which implies that the model cannot be significant at 95% confidence interval, and that the null hypothesis might have to be rejected. In order to confirm the results obtained from Breusch-Pagan test, White's test was also conducted by regressing the squared residuals, the predicted logarithm and the squared of the predicted logarithm of the hammer price. In this case, as shown by *Table H2*, the P-value is far above 5%, which implies that the null hypothesis certainly needs to be rejected, and that the model is likely to be heteroscedastic. In order to correct the model, regression was run again with White heteroscedasticity-consistent standard errors. As shown in *Table H3* (Appendix 6), the variable *Nudity* shows no particular difference in terms of the standard errors before and after the robustness checks. When heteroscedasticity was not taken into account, *Nudity* was characterised by a standard error of 0,20%. On the other hand, once regression was run with White heteroscedasticity-consistent standard

errors, the error term equalled 0,23%. With a difference of 0,03 percentage points, it is safe to argue that the increase in the standard error is not significant. Therefore, it can be confirmed that nudity has a positive influence on the natural logarithm of the hammer price of 0,58%. In more concrete terms, of the €141.572.800,00 that the 2015 record-breaking lot *Nu Couchè* reached in hammer value, the nudity of its female subject is expected be worth €821.122,24.

IV.III Estimated Price

The same models used to explain the hammer price were employed to regress the estimated price. As the previous section with the hammer price, this section employs the natural logarithm of the estimated price as dependent variable. The years of sale in the model range from 1984 to 2019, and the dataset consists of 855 observations.

First, as regression was with the basic model and no interaction terms, *Table I* in Appendix 7 shows its results. Although R-squared is higher than in the model with hammer price, once again, all of the location variables, some of the technique and medium variables and the authenticity variables are not significant. Therefore, regression was run a second time with all the same interaction terms created previously for the hammer price analysis, namely *Paris/Sotheby's, Paris/Christie's, London/Sotheby's, London/Christie's, NewYork/Sotheby's, NewYork/Christie's, Signed Drawings, Signed Oils, Signed Nudes, Nude Drawings* and *Nude Oils*, as well as with the squared dimension variables *Length2* and *Width2*. The results of this regression are displayed in *Table 4*[7]. Once again, R-squared increases, and *Female Nude* remains positively and significantly influential, although lower than in the previous model. With this model, the estimated price equation is able to explain 85,55% of the price variation, and nudity positively affects the price with a significant coefficient of 0,46. This implies that, when the painting portrays a female nude, its estimated price is expected to be 0,46% higher than paintings with a dressed subject. As a consequence, the analysis confirms the validity of *Hypothesis 2*, entailing that the characteristic of female nudity in Modigliani portraits positively affects their estimated price in auction sales by 0,46%.

---

[7] For the complete regression table, see *Table L* (Appendix 7).

As for the remaining variables, some observations are worth of notice. The *Male* variable, for instance, has a negative yet not significant coefficient; whereas the *Notorious Names* variable is still significant and positive, indicating that auction house experts tend to value more a Modigliani whose title contains the name of a notorious person. Within the authenticity variables, *Provenance, Stamp* and *Signature* are still not significant, whilst *Exhibition* has a positive and significant coefficient. Whereas the influence exercised by the first three variables on estimated price is not clear within this sample, the fact that a painting has been previously exhibited is expected to positively influence experts' estimation of its value. Within the Technique & Medium variables, differently from the previous model, the only not significant variable is *Watercolour/paper*. On the one hand the oil technique strongly and positively influences the estimated price of Modigliani's artworks; on the other hand, works with pencil and ink on paper tend to decrease their expected estimated value. In the Salesroom variables, as in the hammer price model, the combination of auction house and city are expected to exercise positive and statistically relevant influence on the estimated price, with the exception of auctions located in Paris. In fact, in this case, regression fails to show any statistically relevant prediction. Similarly, among the interaction terms generated to study the effect of nudity and signature combined with each other as well as with some technique variables, most of the results are not statistically significant. The exceptions occur, once again, in the case of *Signed Drawings*, which seem to exercise a negative and relevant influence on estimated price, and in the case of *Nude Oils*, which is surprisingly negatively significant. Finally, the year of sale and dimension variables generally seem to affect the estimated price of each lot in a positive and mostly significant manner.

IV.IV Testing the Estimated Price Model

As previously for the hammer price model, this section of the research analyses the accuracy of the estimated price model through quantile regression, regular regression with the USA CPI to adjust for inflation, and heteroscedasticity tests.

Auction house experts could behave strategically to direct the collectors' interest towards certain art pieces by estimating higher prices (Mei & Moses, 2001). In other words, they could be incentivised to advance higher estimations in hope to

convince buyers to behave more openly to high prices (Mei & Moses, 2002). In order to test whether the estimated price model in general, and the *Female Nude* variable in particular could be affected by the strategic thinking of auction house experts, the dependent variable was examined through quantile regression. As for the hammer price model, the estimated price was segmented in four different quantiles and regressed against all the independent variables previously employed. The results here shown are the 25th and 75th quantile regressions and are captured respectively by *Table M* and *N* in Appendix 8. As in the previous case, the tables display positive and significant coefficient both in the 25th and 75th quartiles, which implies that the nudity factor is significant in both estimated price ranges. Once again, the coefficient in the first quantile – of 0,76, is higher than for the last quantile, of 0,51. As a consequence, although female nudity seems to exercise a greater influence in lower price ranges, it remains an influential factor throughout the entire sample.

To test whether the chosen CPI has undermined the accuracy of the model, regression was run using the real prices adapted to inflation through the American CPI. The independent variables are maintained to include all the interaction terms generated and the squared values of the dimension variables. The results of this regression are shown in *Table O* of Appendix 8. Similarly to the previous case, even when prices are corrected with the American CPI, R-squared remains unchanged until the third and β until the second decimal compared to the results for the estimated price in *Table 4*. Therefore, the currency and CPI of choice have not compromised the accuracy of the model.

Finally, in order to examine the strength of the model, its robustness was tested through Breusch-Pagan and White's tests measuring heteroscedasticity. *Tables P1* and *P2* in Appendix 8 illustrate the results of Breusch-Pagan and White's tests for the estimated price models respectively. The P-value in both tests is far below 5%, which implies that the model is significant at 95% confidence interval, and that the null hypothesis of constant variance in the error term can be accepted. Therefore, heteroscedasticity in this model is much less likely to occur, and running regression with White heteroscedasticity-consistent standard errors is not necessary.

IV.V Rethinking the Value of the Nude: A Personal Reflection

In light of the results of this research, the connection between the historical, artistic and economic values of Modigliani's nudes has been confirmed. The incentive of collectors to purchase Modigliani's paintings seems stimulated, along with other elements, by female nudity in and of itself. Similarly, the evaluation of experts estimating the market value of this painter seems rather influenced by the female and nudity factors combined. Including art historians and critics oftentimes writing about the historical and pivotal relevance of female nudity for the development of artistic movements and the advancement of figurative art, this research shows that actors in the art market hold the female nude in high regards - at least in Modigliani's case. Considering the general resentment that Modigliani's nudes generated at his time, it is interesting to observe that the contemporary market values and appreciates female nudity. Why could that be?

Whilst some art historians would agree that the market value of female nudity is reflective of a society in which sexism and male privilege still dominate (Nead, 1992; Nelson, 1995; Pointon, 1990), others would sustain that the appreciation of the nude is predictable and related to its continuous presence throughout art history (Clark, 1953). In contrast, economists would argue that the nude is appreciated as a source of aesthetic pleasure and in the utility that it generates (Chanel, 1995; Grampp, 1989). However conflicting, when perceived in a broader perspective, all these arguments can accurately capture different facets of the cultural relevance of artistic nudity. Although, in concrete terms, it simply represents a subject on a canvas, the female nude can never be reduced to a plain image, a genre among many. Instead, it is a subject whose presence inevitably causes contrasting reactions and generates controversies that become essential in the determination of its significance in arts, the market, and culture in general. In fact, I would argue that the real – artistic and monetary - value of female nudity is rooted in its controversial nature. Particularly in Modigliani's case, as his subjects embody a concept of artistic transition from nudity to nakedness, the value of female nudity reflects its capacity to sparkle controversy.

Being controversial in nature, it does not come to surprise that depictions of female nudity often achieve a high status and become symbolic of each and every

artistic era. In addition, it seems that the artistic female nude has the capacity to generate values that become engrained in society and perpetuate throughout time. Whilst the nude in Ancient Greece was indicative of a perception of beauty that contemporary society still idealises (Bonfante, 1989), the female nude in Byzantine art became a symbol of outrage and sin that is still emblematic of religious censorship, devotion and conservativism (Van der Stighelen, Van Cauteren & De Clippel, 2011). From the 15th century, female nudity became determinant in the assessment of artistic mastery and, in the 18th and 19th centuries, emblematic nationalism and patriotic language (Kren, Burke, & Campbell, 2018; Pointon, 1990). Finally, the nude in the 20th century, the nude of Modigliani, conveys a message of individualism, a language of subjectivism that, symbolic of the entire century, dominates not only the artistic, but also the social and cultural scenes (Braun et. al. 2006). These messages are ideologies that Modigliani perfectly captures. Modigliani is not afraid to reveal a "naked truth", to tell a story of the perfect yet real beauty that seduces the spectator for its straightforwardness and fascination (Rothwell, 2006). This same subjectivism that Modigliani paints in different shapes and forms that the female body assumes echoes the developments of the century, from the philosophical to the political and social spheres. The greatness of the nude then, more than in its constant presence within artistic movements, can be found in the symbolic message that, conveyed by a still, bare woman, captures and predicts the social, political and cultural values of the times ahead (Pointon, 1990). In Modigliani, a nude female that continuously crosses the line between nudity and nakedness can be symbolic of an entire century of female conquers and calls for the rise of individuality and the appreciation of the female sex in its true self. In Modigliani's legacy, the naked is nude and the nude is naked; and there exists no beautified version of female nudity other than a nude female woman herself. The truthfulness, honesty and unapologetic nudity in Modigliani captivates an entire century of history centred on individuality and female empowerment. Beyond its aesthetic appearance, the female nude is a symbol that, regardless of its historical roots, conveys a larger message not only directed towards art, but also to society in general. This could be the reason why all kinds of different actors in art and the market seem so appreciative of female nudity. Beyond aestheticism, beyond economics, Modigliani's nudes are the demonstration of the real and constant relevance of nudity in broader

cultural terms. Within this perspective, the nude captures the affiliation that economy has with art through the language of culture.

Regardless of the specific dynamics of the connection between arts and economics, this research has proven that a relationship between the artistic and economic values of Modigliani's artworks indeed exists.

V. Conclusion

Overall, this research confirms the connection between art and economics through the evaluation of the nude. Provided that the artistic value of female nudity is rooted in its continuous and symbolic presence throughout art history, the economic relevance of the female nude was measured by analysing the auction sales of one of its masters, Amedeo Modigliani. As the research stemmed from the question of whether nudity has an influence on the price of paintings, the analysis provides for an exhaustive and clearly positive answer. In other words, the results confirm both hypotheses: female nudity exercises a positive influence on the hammer and estimated prices of Modigliani's portraits. Although, based on the artistic significance of the female nude, this study was expected to reveal a positive relationship between nudity and price, previous research did not obtain any results in relating the two.

Nudity as a variable in studies employing hedonic regression had already been considered in the past. However, as part of much larger datasets and many other variables in the subject category, nudity failed to show any statistically significant relationship with price. By focusing specifically on this one factor, the present study demonstrates that, when considered by itself, nudity can be significant in the assessment of the economic value of artworks. Instead of being one among many other subject variables, nudity in this research has occupied a central spot. Presumably for this reason, differently from previous researches, female nudity has unequivocally demonstrated to be relevant in the determination of prices of Modigliani's portraits. Specifically, the analysis shows that female nudity increases the hammer price of Modigliani's portraits by 0,58%, and their average estimated price by 0,46%. These results can be of relevance for the auction sector to gain a better understanding of the preferences of collectors and, consequently, the factors that are important to consider when estimating the economic value of works of art. From a market perspective, this research can contribute to the development of auction strategies and the prediction of sales outcomes. Specifically, the research points at importance of including the art historian's and critic's perspective in the economic assessment of works of art. From a broader perspective, the research implies the existence of a connection between art and economics through the value of Modigliani's nude, showing that the artistic importance of the nude is reflected in its economic worth. Although the relationship between art

and economics remains highly contested and an important topic of investigation, this research contributes to the arguments connecting the two disciplines in a positive relationship.

Despite its contribution, this study presents some limitations too. Primarily, being a case study of an individual artist, the results of the research offer a very specific answer to an equally specific question. For this reason, the findings cannot be generalised to include the economic relevance of female nudity in broader terms, but only assess its market value in the case of Modigliani, and in the case of auction sales. Especially when considering the relevance that his female nude portraits implied in the formation of his reputation, Modigliani cannot be considered a pars pro toto for the entire art market. Therefore, this study cannot be generalised to capture the market value of female nudity in absolute terms. In addition, as the research consisted in a case study, the number of observations in the sample were inevitably reduced. This can be limiting in that some variables, for instance, were likely to be statistically not significant because of the limited number of observations. On the other hand, disposing of a larger sample, on top of providing more certain and generalisable results, would allow to distinguish among different degrees and types of nudity, and analyse this important aesthetic element more closely. For instance, although it would have been interesting to examine whether a partially dressed, completely undressed or simply outlined silhouette made any difference in the economic evaluation of female nudity, it would have been unlikely for the dataset employed to generate statistically significant results from such reduced number of observations. Nonetheless, the reduced sample to which a case study of a single artist implies has provided the opportunity to analyse the dataset more in detail, create variables that fit the sample, and generate statistically significant results. Departing from here, the logical next step for future research would be to broaden this type of study to a larger, more inclusive sample.

As a starting point for the conversation between art history and economics, Modigliani provides for a good example to advance the discussion around the nudity element. Equally close to the concepts of nudity and nakedness, he demonstrates that nudity is valuable in all its forms and definitions. Nonetheless, it would be interesting to continue on the footsteps of this research to analyse, for instance, whether there is any different in the appreciation of nudity and nakedness in the market. Although this

distinction can be highly subjective and difficult to assess, the twofold conception of nudity leaves many doors open for further investigations. Similarly, it would be relevant to compare whether the actors within the contemporary art market value female nudes of different artists as positively as Modigliani's nudes. Finally, it would be relevant to investigate whether nude male subject have a different influence on price of artworks. Does male nudity sell? Do nudes from other artistic epochs fetch higher prices? Does the integral nude sell for more than a partial nude?

These are questions that only the future developments of the conversation between art historians and economists will be able to answer.

Appendix 1

Complete Dataset Overview

Category	Item	Value
General Information	Unsold Lots	209
	Missing Ham Price	33
	Missing Est Price	69
Subject	Female Nudes	237
	Female Portraits	423
	Male Portraits	264
	Notorious Names	302
Technique & Medium	Oil/Canvas	141
	Oil/Other medium	45
	Pencil/Paper	551
	Watercolour/Paper	46
	Ink/Paper	60
	Other technique/Paper	81
Autheticity	Provenance	108
	Exhibition	139
	Signature	671
	Stamp	62
Salesroom	Christie's	179
	Sotheby's	315
	Paris	207
	London	229
	New York	258

Appendix 2 – Control Variables

Subject qualifiers:

Female Nude: takes the value of one if the painting portrays a female nude, zero otherwise*;*

Male: takes the value of one if the painting portrays a female nude, zero otherwise;
Reference Category*: Female Dressed*

Notorious Name: takes the value of one if the painting portrays a known subject, zero otherwise;

Technique & Medium qualifiers:

Oil on canvas;

Oil on other media (board, cardboard, panel, mixed media);

Pencil on paper;

Watercolour on paper;

Ink on paper;
Reference Category: *Other technique on paper*

Dimensions:

Height & Width expressed in cm;

Authenticity qualifiers:

Signature: takes the value of one if the painting is signed, zero otherwise;

Stamp: takes the value of one if the painting is stamped, zero otherwise;

Provenance: takes the value of one if provenance information is provided, zero otherwise;

Exhibition: takes the value of one if the painting was exhibited previously than the sale, zero otherwise;

Salesroom qualifiers:

Place of Sale: London; New York; Paris;
Reference Category*: Other city*

Auction House: Christie's; Sotheby's;
Reference Category: *Other auction house*

Year of Sale:

Dummy variables from 1984 to 2019.
Reference Category: 1984

Appendix 3 – Hammer and Estimated Price, Descriptive Statistics

Adj Hammer Price

	Percentiles	Smallest		
1%	5151,11	840,72		
5%	10712,83	1238,729		
10%	16410,00	1638,57	Obs	685
25%	29974,38	2306,718	Sum of Wgt.	685
50%	65892,00		Mean	1811129
		Largest	Std. Dev.	8184995
75%	287638,5	4,41e+07		
90%	4783722,	4,74e+07	Variance	6,70e+13
95%	9464463	1,12e+08	Skewness	11,73628
99%	2,46e+07	1,42e+08	Kurtosis	176,2041

Ln Adj Hammer Price

	Percentiles	Smallest		
1%	8,546967	6,734259		
5%	9,279198	7,121841		
10%	9,705646	7,401579	Obs	685
25%	10,30810	7,743581	Sum of Wgt.	685
50%	11,09577		Mean	11,71334
		Largest	Std. Dev.	2,059662
75%	12,56946	17,60098		
90%	15,38073	17,67354	Variance	4,242209
95%	16,06305	18,53391	Skewness	1,010720
99%	17,08822	18,76832	Kurtosis	3,411646

Adj Estimated Price

	Percentiles	Smallest		
1%	5179,073	823,898		
5%	12590	2118,75		
10%	18424,65	4096,425	Obs	855
25%	31458,81	4485,285	Sum of Wgt.	855
50%	65892,00		Mean	1094339
		Largest	Std. Dev.	3091816
75%	287638,5	2,23e+07		
90%	4783722,	2,24e+07	Variance	9,56e+12
95%	9464463	2,36e+07	Skewness	4,069623
99%	2,46e+07	2,42e+07	Kurtosis	22,10694

Ln Adj Estimated Price

	Percentiles	Smallest		
1%	8,552381	6,714047		
5%	9,440658	7,658582		
10%	9,821445	8,31787	Obs	855
25%	10,35643	8,408557	Sum of Wgt.	855
50%	11,03493		Mean	11,60146
		Largest	Std. Dev.	1,899016
75%	12,15818	16,91793		
90%	15,04154	16,92366	Variance	3,606262
95%	15,86694	16,97489	Skewness	1,1198
99%	16,63618	17,00334	Kurtosis	3,533849

Appendix 4 – Female Nudity & Other Qualitative Variables, Frequency Tables

Frequency table for Nudity & Notorious Name:

	Notorious Name		
Female Nude	0	1	Total
0	389	298	687
Percentage	42,10%	32,25%	74,35%
1	233	4	237
Percentage	25,27%	0,43%	25,65%
Total	622	302	924
Percentage	67,32%	37,68%	100%

Frequency Table for Nudity & Authenticity Variables (*Signature & Stamp*):

	Signature		Stamp	
Female Nude	0	1	1	Total
0	118	537	32	687
Percentage	12,77%	58,12%	3,46%	74,35%
1	73	134	30	237
Percentage	7,90%	14,50%	3,25%	25,65%
Total	191	671	62	924
Percentage	20,67%	72,62%	6,71%	100%

Frequency Table for Nudity & Technique & Medium Variables:

	Oil/canvas		Pencil/paper		Watercolour/paper		Ink/paper		
Female Nude	0	1	0	1	0	1	0	1	Total
0	565	121	261	426	672	15	641	46	687
Percentage	61,26%	13,10%	28,25%	46,10	72,73%	1,62%	69,37%	4,98%	74,35%
1	217	20	112	125	206	31	223	14	237
Percentage	23,48%	2,16%	12,12%	13,53	22,29%	3,35%	24,13%	1,52%	25,65%
Total	783	141	373	551	878	46	864	60	924
Percentage	84,74%	15,26%	40,37%	59,63%	95,02%	4,98%	93,51%	6,49%	100%

Frequency Table for Nudity & Location Variables:

	Paris		London		New York		
Female Nude	0	1	0	1	0	1	Total
0	537	150	523	164	484	203	687
Percentage	58,12%	16,23%	56,60%	17,75	52,38%	21,97%	74,35%
1	180	57	172	65	182	55	237
Percentage	19,48%	6,17%	18,61%	7,03%	19,70%	5,95%	25,65%
Total	717	207	695	229	666	258	924
Percentage	77,60%	22,40%	75,22%	24,78%	72,08%	27,92%	100%

Frequency Table for Nudity & Auction House Variables:

	Sotheby's		Christie's		
Female Nude	0	1	0	1	Total
0	460	227	550	137	687
Percentage	49,78%	24,57%	59,52%	14,83	74,35%
1	149	88	195	42	237
Percentage	16,13%	9,52%	21,10%	4,55%	25,65%
Total	609	315	745	179	924
Percentage	65,91%	34,09%	80,63%	19,37%	100%

Appendix 5 – Regression Tables with Hammer Price as Dependent Variable:
Table A: Basic Model

Source	SS	df	MS		
				Number of obs	= 674
				F(54, 619)	= 57,75
Model	2381,74392	54	44,106369	Prob > F	= 0,0000
Residual	472,767599	619	0,763760258	R-squared	= 0,8344
Total	2854,51152	673	4,24147329	Adj R-squared = 0,8199	
				Root MSE	= 0,87393

LnAdjHamPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	**0,5286358**	**0,0961419**	**5,50**	**0**	**0,3398319**	**0,7174396**
Year of Sale						
1985	0,4846952	0,6228677	0,78	0,437	-0,7384948	1,707885
1986	1,2630090	0,5683494	2,22	0,027	0,1468819	2,379135
1987	1,4905310	0,5518395	2,70	0,007	0,4068267	2,574236
1988	1,4375800	0,5528402	2,60	0,01	0,3519105	2,523250
1989	2,1831880	0,5811641	3,76	0	1,0418960	3,324481
1990	2,0984410	0,5645151	3,72	0	0,9898443	3,207038
1991	1,9052530	0,5885058	3,24	0,001	0,7495434	3,060963
1992	1,2976740	0,5796771	2,24	0,026	0,1593020	2,436046
1993	1,6894080	0,5794219	2,92	0,004	0,5515368	2,827279
1994	1,1807630	0,5683108	2,08	0,038	0,0647119	2,296813
1995	1,2572720	0,5517240	2,28	0,023	0,1737942	2,340749
1996	1,2309320	0,5809207	2,12	0,034	0,0901182	2,371747
1997	1,8613600	0,5554993	3,35	0,001	0,7704678	2,952251
1998	1,7072880	0,5537430	3,08	0,002	0,6198457	2,794731
1999	1,8379500	0,5587595	3,29	0,001	0,7406560	2,935244
2000	1,9556760	0,5481773	3,57	0	0,8791634	3,032189
2001	1,7814430	0,5495046	3,24	0,001	0,7023237	2,860562
2002	1,8847990	0,5558313	3,39	0,001	0,7932554	2,976343
2003	1,5790180	0,5719294	2,76	0,006	0,4558611	2,702175
2004	1,7193630	0,5905174	2,91	0,004	0,5597030	2,879024
2005	1,9292310	0,5584431	3,45	0,001	0,8325581	3,025903
2006	2,2785640	0,5523979	4,12	0	1,1937630	3,363365
2007	2,2001390	0,5648605	3,90	0	1,0908640	3,309414
2008	2,1606510	0,5570654	3,88	0	1,0666840	3,254618
2009	1,8566670	0,5779874	3,21	0,001	0,7216129	2,991721
2010	2,2405940	0,5615353	3,99	0	1,1378490	3,343339
2011	1,9067880	0,5792108	3,29	0,001	0,7693318	3,044244
2012	2,0740200	0,5764771	3,60	0	0,9419325	3,206108

2013	2,2039080	0,5544368	3,98	0	1,1151030	3,292713
2014	1,6601230	0,5719082	2,90	0,004	0,5370075	2,783239
2015	2,0730960	0,5464727	3,79	0	0,9999308	3,146261
2016	2,1753810	0,5575170	3,90	0	1,0805270	3,270235
2017	1,5618340	0,5614759	2,78	0,006	0,4592054	2,664462
2018	1,6894730	0,5514551	3,06	0,002	0,6065231	2,772422
2019	1,8167750	0,6553034	2,77	0,006	0,5298879	3,103662
Male	-0,2294251	0,0916637	-2,50	0,013	-0,4094346	-0,0494156
Notorious Names	0,3184816	0,0888354	3,59	0	0,1440263	0,4929370
Length	0,0162780	0,0036503	4,46	0	0,0091095	0,0234465
Width	0,0216094	0,0048301	4,47	0	0,0121239	0,0310949
Provenance	0,1556073	0,1370632	1,14	0,257	-0,1135579	0,4247724
Exhibition	0,4647492	0,1185443	3,92	0	0,2319514	0,6975470
Signature	0,0174365	0,0922081	0,19	0,85	-0,1636422	0,1985152
Stamp	-0,1234219	0,1740059	-0,71	0,478	-0,4651353	0,2182916
Oil/canvas	2,6621150	0,1980675	13,44	0	2,2731500	3,0510810
Oil/other	2,1475430	0,2012210	10,67	0	1,7523840	2,5427010
Pencil/paper	-0,4302825	0,1335867	-3,22	0,001	-0,6926207	-0,1679444
Watercolour/paper	0,1311376	0,2017358	0,65	0,516	-0,2650320	0,5273071
Ink/paper	-0,1482504	0,1940508	-0,76	0,445	-0,5293282	0,2328273
Paris	0,0481610	0,1103716	0,44	0,663	-0,1685872	0,2649092
London	0,1775980	0,1466251	1,21	0,226	-0,1103449	0,4655408
New York	0,1059328	0,1500006	0,71	0,48	-0,1886390	0,4005046
Sotheby's	0,4301433	0,1314660	3,27	0,001	0,1719699	0,6883167
Christie's	0,3361512	0,1290647	2,60	0,009	0,0826935	0,5896089
_cons	7,5678210	0,5605152	13,5	0	6,4670790	8,6685630

Table B: Basic Model + Salesroom interaction terms + Signed drawings, Signed oils, Signed nudes, Nude drawings, Nude oils + Length & Width squared

Source	SS	df	MS		
				Number of obs	= 674
				F(62, 611)	= 52,35
Model	2402,26245	62	38,7461685	Prob > F	= 0,0000
Residual	452,249073	611	0,740178516	**R-squared**	**= 0,8416**
Total	2854,51152	673	4,24147329	**Adj R-squared = 0,8255**	
				Root MSE	= 0,86034

LnAdjHamPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,5807422	0,1999065	2,91	0,004	0,1881549	0,9733295
Year of Sale						
1985	0,4971927	0,6177876	0,8	0,421	-0,7160521	1,710437
1986	1,199577	0,5640625	2,13	0,034	0,0918405	2,307313
1987	1,510995	0,5460389	2,77	0,006	0,4386544	2,583336
1988	1,388992	0,5475076	2,54	0,011	0,3137666	2,464217
1989	2,263303	0,5752831	3,93	0	1,1335310	3,393075
1990	2,079300	0,5606457	3,71	0	0,9782733	3,180326
1991	1,970552	0,5829938	3,38	0,001	0,8256372	3,115467
1992	1,297156	0,5765315	2,25	0,025	0,1649326	2,429380
1993	1,642262	0,5741315	2,86	0,004	0,5147517	2,769773
1994	1,182737	0,5625119	2,10	0,036	0,0780452	2,287428
1995	1,276564	0,5468749	2,33	0,02	0,2025820	2,350547
1996	1,253175	0,5767419	2,17	0,03	0,1205385	2,385812
1997	1,778777	0,5512081	3,23	0,001	0,6962853	2,861270
1998	1,658609	0,5484073	3,02	0,003	0,5816173	2,735601
1999	1,795752	0,5537428	3,24	0,001	0,7082816	2,883222
2000	1,842128	0,5432954	3,39	0,001	0,7751748	2,909081
2001	1,706270	0,5464024	3,12	0,002	0,6332154	2,779325
2002	1,760065	0,5513479	3,19	0,001	0,6772985	2,842832
2003	1,453939	0,5678786	2,56	0,011	0,3387087	2,569170
2004	1,684203	0,5884109	2,86	0,004	0,5286498	2,839756
2005	1,890441	0,5529778	3,42	0,001	0,8044735	2,976409
2006	2,212226	0,5477860	4,04	0	1,1364550	3,287998
2007	2,115248	0,5605655	3,77	0	1,0143790	3,216117
2008	2,155591	0,5541383	3,89	0	1,0673440	3,243838
2009	1,785420	0,5745262	3,11	0,002	0,6571339	2,913705
2010	2,225715	0,5559227	4,00	0	1,1339640	3,317466
2011	1,858589	0,5734680	3,24	0,001	0,7323812	2,984796
2012	2,037978	0,5730891	3,56	0	0,9125145	3,163441

2013	2,082907	0,5499013	3,79	0	1,0029810	3,162833
2014	1,647942	0,5712191	2,88	0,004	0,5261514	2,769733
2015	2,072591	0,5430241	3,82	0	1,0061710	3,139011
2016	2,073231	0,5532852	3,75	0	0,9866591	3,159802
2017	1,483682	0,5568336	2,66	0,008	0,3901420	2,577222
2018	1,555243	0,5487613	2,83	0,005	0,4775556	2,632930
2019	1,590130	0,6497689	2,45	0,015	0,3140789	2,866182
Male	-0,1791485	0,0907959	-1,97	0,049	-0,3574583	-0,0008387
Notorious Names	0,3066749	0,0882567	3,47	0,001	0,1333517	0,4799981
Length	0,0245415	0,0095310	2,57	0,01	0,0058240	0,0432591
Length2	-0,0000485	0,0000670	-0,72	0,47	-0,0001800	0,0000830
Width	0,0088122	0,0108599	0,81	0,417	-0,0125150	0,0301394
Width2	0,0000935	0,0000749	1,25	0,212	-0,0000536	0,0002405
Provenance	0,2296182	0,1366055	1,68	0,093	-0,0386551	0,4978914
Exhibition	0,5282753	0,1193458	4,43	0	0,2938976	0,7626531
Signature	0,3324329	0,1955736	1,70	0,09	-0,0516452	0,7165109
Stamp	-0,0379311	0,1886103	-0,20	0,841	-0,4083342	0,3324720
Oil/canvas	2,4050090	0,3194861	7,53	0	1,7775850	3,0324330
Oil/other	1,8481880	0,3094145	5,97	0	1,2405430	2,4558330
Pencil/paper	-0,2060320	0,1858562	-1,11	0,268	-0,5710265	0,1589625
Watercolour/paper	-0,1010035	0,2155696	-0,47	0,64	-0,5243507	0,3223436
Ink/paper	-0,3193762	0,2019730	-1,58	0,114	-0,7160218	0,0772694
Signed Drawings	-0,5533346	0,2027847	-2,73	0,007	-0,9515741	-0,1550951
Signed Oils	0,1477579	0,3092344	0,48	0,633	-0,4595334	0,7550492
Signed Nudes	0,0482873	0,1770323	0,27	0,785	-0,2993784	0,3959530
Nude Drawings	-0,0146077	0,2038507	-0,07	0,943	-0,4149408	0,3857254
Nude Oils	-0,5525582	0,3010181	-1,84	0,067	-1,1437140	0,0385974
Paris/Soth	-0,1335905	0,2488671	-0,54	0,592	-0,6223292	0,3551482
Ldn/Soth	0,6263220	0,1225468	5,11	0	0,3856581	0,8669860
Ny/Soth	0,3803473	0,1078174	3,53	0	0,1686097	0,5920850
Paris/Chris	0,3182507	0,2791301	1,14	0,255	-0,2299201	0,8664216
Ldn/Chris	0,3658801	0,1282750	2,85	0,004	0,1139668	0,6177935
NyChris	0,4636638	0,1321157	3,51	0	0,2042078	0,7231197
_cons	7,6150930	0,6102408	12,48	0	6,4166690	8,8135160

Table C: Basic Model + Salesroom interaction terms + Signed drawings

				Number of obs	= 674	
Source	**SS**	**df**	**MS**	F(56, 617)	= 57,89	
Model	2398,07076	56	42,8226921	Prob > F	= 0,0000	
Residual	456,440763	617	0,739774333	**R-squared**	**= 0,8401**	
Total	2854,51152	673	4,24147329	**Adj R-squared = 0,8256**		
				Root MSE	= 0,8601	

LnAdjHamPrice	Coef.	Std. Err.	t	P> |t|	[95% Conf.	Interval]
Female Nude	**0,5342588**	**0,0943333**	**5,66**	**0,000**	**0,3490056**	**0,719512**
Year of Sale						
1985	0,6036505	0,6149121	0,98	0,327	-0,6039239	1,811225
1986	1,303779	0,5597598	2,33	0,02	0,2045137	2,403044
1987	1,589566	0,5432949	2,93	0,004	0,5226345	2,656497
1988	1,485094	0,5445892	2,73	0,007	0,4156210	2,554567
1989	2,353009	0,5718392	4,11	0	1,2300220	3,475996
1990	2,194801	0,5557174	3,95	0	1,1034740	3,286128
1991	2,053911	0,5794583	3,54	0	0,9159609	3,191860
1992	1,395289	0,5708003	2,44	0,015	0,2743421	2,516236
1993	1,754762	0,5706398	3,08	0,002	0,6341303	2,875394
1994	1,239505	0,5600781	2,21	0,027	0,1396141	2,339395
1995	1,342766	0,5435715	2,47	0,014	0,2752916	2,410241
1996	1,340619	0,5721530	2,34	0,019	0,2170157	2,464222
1997	1,883960	0,5476488	3,44	0,001	0,8084784	2,959442
1998	1,716729	0,5453463	3,15	0,002	0,6457687	2,787689
1999	1,855418	0,5510785	3,37	0,001	0,7732009	2,937635
2000	1,945344	0,5397400	3,60	0	0,8853939	3,005294
2001	1,811496	0,5425457	3,34	0,001	0,7460364	2,876956
2002	1,863666	0,5480157	3,40	0,001	0,7874640	2,939868
2003	1,564793	0,5630221	2,78	0,006	0,4591215	2,670465
2004	1,784349	0,5824904	3,06	0,002	0,6404454	2,928253
2005	1,959491	0,5496184	3,57	0	0,8801413	3,038840
2006	2,295416	0,5440039	4,22	0	1,2270920	3,363740
2007	2,218735	0,5564437	3,99	0	1,1259810	3,311488
2008	2,274400	0,5500156	4,14	0	1,1942700	3,354529
2009	1,890635	0,5704618	3,31	0,001	0,7703531	3,010917
2010	2,301264	0,5539267	4,15	0	1,2134530	3,389074
2011	1,952278	0,5714708	3,42	0,001	0,8300145	3,074542
2012	2,135248	0,5684321	3,76	0	1,0189520	3,251544
2013	2,192554	0,5464497	4,01	0	1,1194270	3,265681

2014	1,735718	0,5667475	3,06	0,002	0,6227303	2,848706
2015	2,135281	0,5396770	3,96	0	1,0754550	3,195108
2016	2,181060	0,5490860	3,97	0	1,1027560	3,259364
2017	1,560060	0,5527266	2,82	0,005	0,4746066	2,645514
2018	1,669893	0,5433236	3,07	0,002	0,6029056	2,736881
2019	1,727030	0,6450765	2,68	0,008	0,4602184	2,993842
Male	-0,1889647	0,0903158	-2,09	0,037	-0,3663284	-0,0116011
Notorious Names	0,3101294	0,0877157	3,54	0	0,1378718	0,4823870
Length	0,0165383	0,0035983	4,6	0	0,0094719	0,0236047
Width	0,0195387	0,0047788	4,09	0	0,0101541	0,0289233
Provenance	0,2053338	0,1357537	1,51	0,131	-0,0612616	0,4719293
Exhibition	0,5496840	0,1174450	4,68	0	0,3190436	0,7803245
Signature	0,4148866	0,1449761	2,86	0,004	0,1301802	0,6995929
Stamp	-0,0333345	0,1860624	-0,18	0,858	-0,3987268	0,3320578
Oil/canvas	2,4078310	0,2046494	11,77	0	2,0059370	2,8097250
Oil/other	1,8655560	0,2086729	8,94	0	1,4557610	2,2753520
Pencil/paper	-0,2052364	0,1542196	-1,33	0,184	-0,5080953	0,0976225
Watercolour/paper	-0,1021722	0,2050863	-0,5	0,619	-0,5049240	0,3005797
Ink/paper	-0,3642963	0,1959758	-1,86	0,064	-0,7491568	0,0205641
Signed Drawings	-0,6128451	0,1752354	-3,5	0,001	-0,9569751	-0,2687150
Paris/Soth	-0,1123842	0,2478001	-0,45	0,65	-0,5990181	0,3742496
Ldn/Soth	0,6337642	0,1217252	5,21	0	0,3947183	0,8728101
Ny/Soth	0,3843120	0,1075058	3,57	0	0,1731904	0,5954337
Paris/Chris	0,3290310	0,2785887	1,18	0,238	-0,218066	0,8761280
Ldn/Chris	0,3546931	0,1274179	2,78	0,006	0,1044677	0,6049185
Ny/Chris	0,4731132	0,1301750	3,63	0	0,2174734	0,7287530
_cons	7,5394020	0,5511092	13,68	0	6,4571250	8,6216790

Table D: Basic Model + Salesroom interaction terms + Signed drawings, Signed oils, Signed nudes + Length & Width squared

Source	SS	df	MS		
				Number of obs = 674	
				F(60, 613) = 53,82	
Model	2399,077	60	39,9846167	Prob > F = 0,0000	
Residual	455,43452	613	0,742960065	**R-squared = 0,8405**	
Total	2854,51152	673	4,24147329	**Adj R-squared = 0,8248**	
				Root MSE = 0,86195	

LnAdjHamPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,5416589	0,1405457	3,85	0,000	0,2656493	0,8176684
Year of Sale						
1985	0,606664	0,6166146	0,98	0,326	-0,6042697	1,817597
1986	1,318297	0,5621287	2,35	0,019	0,2143652	2,422228
1987	1,607830	0,5450368	2,95	0,003	0,5374640	2,678196
1988	1,496217	0,5460607	2,74	0,006	0,4238406	2,568594
1989	2,374539	0,5738540	4,14	0	1,2475800	3,501497
1990	2,213446	0,5579418	3,97	0	1,1177370	3,309155
1991	2,074534	0,5819247	3,56	0	0,9317259	3,217342
1992	1,429766	0,5740468	2,49	0,013	0,3024292	2,557103
1993	1,760467	0,5723252	3,08	0,002	0,6365109	2,884423
1994	1,259862	0,5623138	2,24	0,025	0,1555671	2,364157
1995	1,373762	0,5458858	2,52	0,012	0,3017286	2,445795
1996	1,368955	0,5750841	2,38	0,018	0,2395812	2,498329
1997	1,894674	0,5492918	3,45	0,001	0,8159519	2,973396
1998	1,742087	0,5478512	3,18	0,002	0,6661943	2,817980
1999	1,875351	0,5534175	3,39	0,001	0,7885269	2,962175
2000	1,960656	0,5412379	3,62	0	0,8977508	3,023562
2001	1,821434	0,5445514	3,34	0,001	0,7520210	2,890846
2002	1,873462	0,5496312	3,41	0,001	0,7940737	2,952851
2003	1,554449	0,5667698	2,74	0,006	0,4414034	2,667495
2004	1,816411	0,5860149	3,10	0,002	0,6655704	2,967251
2005	1,982976	0,5522104	3,59	0	0,8985220	3,067430
2006	2,317068	0,5460533	4,24	0	1,2447050	3,389430
2007	2,232407	0,5586127	4,00	0	1,1353800	3,329434
2008	2,276473	0,5521006	4,12	0	1,1922350	3,360711
2009	1,907325	0,5725545	3,33	0,001	0,7829190	3,031732
2010	2,311993	0,5554017	4,16	0	1,2212720	3,402713
2011	1,942717	0,5730040	3,39	0,001	0,8174279	3,068006
2012	2,162072	0,5709057	3,79	0	1,0409030	3,283240

2013	2,195809	0,5480549	4,01	0	1,1195160	3,272102
2014	1,768648	0,5692849	3,11	0,002	0,6506626	2,886633
2015	2,159485	0,5420147	3,98	0	1,0950540	3,223916
2016	2,192773	0,5513005	3,98	0	1,1101060	3,275440
2017	1,590696	0,5554217	2,86	0,004	0,4999358	2,681456
2018	1,675954	0,5466873	3,07	0,002	0,6023471	2,749561
2019	1,720385	0,6473150	2,66	0,008	0,4491614	2,991609
Male	-0,1873719	0,0907676	-2,06	0,039	-0,3656251	-0,0091187
Notorious Names	0,3079889	0,0882016	3,49	0,001	0,1347749	0,4812030
Length	0,0250599	0,009490	2,64	0,008	0,0064230	0,0436968
Length2	-0,0000597	0,0000666	-0,90	0,37	-0,0001904	0,0000710
Width	0,0127853	0,0106599	1,20	0,231	-0,0081489	0,0337196
Width2	0,0000510	0,0000720	0,71	0,479	-0,0000904	0,0001924
Provenance	0,2111948	0,1365568	1,55	0,122	-0,0569811	0,4793707
Exhibition	0,5527387	0,1186264	4,66	0	0,3197752	0,7857022
Signature	0,3607326	0,1954539	1,85	0,065	-0,0231078	0,7445730
Stamp	-0,0455360	0,1874699	-0,24	0,808	-0,4136972	0,3226251
Oil/canvas	2,2907310	0,3042762	7,53	0	1,693180	2,8882810
Oil/other	1,7401360	0,2968119	5,86	0	1,157245	2,3230280
Pencil/paper	-0,2184719	0,1593618	-1,37	0,171	-0,5314333	0,0944895
Watercolour/paper	-0,0738754	0,2135249	-0,35	0,729	-0,4932044	0,3454536
Ink/paper	-0,3287822	0,2017287	-1,63	0,104	-0,7249454	0,0673810
Signed Drawings	-0,5660567	0,2023638	-2,80	0,005	-0,9634671	-0,1686462
<u>Signed Oils</u>	0,1841670	0,3092712	0,60	0,552	-0,4231926	0,7915266
<u>Signed Nudes</u>	-0,0148873	0,1742312	-0,09	0,932	-0,3570496	0,3272751
Paris/Soth	-0,1231311	0,2486576	-0,50	0,621	-0,6114551	0,3651929
Ldn/Soth	0,6326415	0,1220170	5,18	0	0,3930194	0,8722636
Ny/Soth	0,3778544	0,1079700	3,50	0	0,1658184	0,5898905
Paris/Chris	0,3253540	0,2795948	1,16	0,245	-0,2237259	0,8744339
Ldn/Chris	0,3619079	0,1281600	2,82	0,005	0,1102220	0,6135939
NyChris	0,4504142	0,1321003	3,41	0,001	0,1909902	0,7098382
_cons	7,4503370	0,6058453	12,3	0	6,2605530	8,6401210

Appendix 6 – Tests for the Hammer Price Model: Quantile Regression, Regression with American CPI, Heteroscedasticity Tests.

Table E - .25 Quantile Regression

Number of obs = 674

Raw sum of deviations 339,6625 (about 10,29)
Min sum of deviations 166,9005

Pseudo R2 = 0,5086

LnAdjHamPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,8845143	0,2800027	3,16	0,002	0,3346298	1,434399
Year of Sale						
1985	0,875890	0,8653155	1,01	0,312	-0,8234635	2,575243
1986	1,314436	0,7900644	1,66	0,097	-0,2371347	2,866008
1987	1,765948	0,7648192	2,31	0,021	0,2639547	3,267942
1988	1,986566	0,7668764	2,59	0,01	0,4805330	3,492600
1989	3,017951	0,8057807	3,75	0	1,4355150	4,600387
1990	2,545476	0,7852786	3,24	0,001	1,0033030	4,087648
1991	2,147568	0,8165808	2,63	0,009	0,5439224	3,751214
1992	1,536884	0,8075293	1,90	0,057	-0,0489853	3,122754
1993	2,030832	0,8041677	2,53	0,012	0,4515640	3,610100
1994	1,744685	0,7878926	2,21	0,027	0,1973786	3,291991
1995	1,208018	0,7659902	1,58	0,115	-0,2962750	2,712311
1996	1,570011	0,8078240	1,94	0,052	-0,0164376	3,156459
1997	2,017582	0,7720596	2,61	0,009	0,5013691	3,533794
1998	1,880876	0,7681367	2,45	0,015	0,3723677	3,389385
1999	2,126159	0,7756099	2,74	0,006	0,6029740	3,649344
2000	2,228973	0,7609766	2,93	0,004	0,7345258	3,723420
2001	2,260529	0,7653285	2,95	0,003	0,7575359	3,763523
2002	2,007389	0,7722555	2,6	0,01	0,4907918	3,523986
2003	1,663438	0,7954095	2,09	0,037	0,1013700	3,225506
2004	1,849963	0,8241685	2,24	0,025	0,2314165	3,468510
2005	1,868744	0,7745384	2,41	0,016	0,3476638	3,389825
2006	2,348773	0,7672664	3,06	0,002	0,8419739	3,855573
2007	2,373214	0,7851663	3,02	0,003	0,8312619	3,915166
2008	2,410326	0,7761639	3,11	0,002	0,8860536	3,934599
2009	1,827043	0,8047206	2,27	0,024	0,2466889	3,407397
2010	2,538820	0,7786632	3,26	0,001	1,0096400	4,068001
2011	2,366828	0,8032383	2,95	0,003	0,7893846	3,944271
2012	2,398500	0,8027076	2,99	0,003	0,8220992	3,974901
2013	2,359584	0,7702293	3,06	0,002	0,8469662	3,872202

2014	1,856397	0,8000884	2,32	0,021	0,2851399	3,427654
2015	2,161811	0,7605965	2,84	0,005	0,6681102	3,655512
2016	2,285760	0,7749690	2,95	0,003	0,7638337	3,807686
2017	1,926624	0,7799391	2,47	0,014	0,3949374	3,458311
2018	2,144685	0,7686325	2,79	0,005	0,6352027	3,654167
2019	1,618131	0,9101106	1,78	0,076	-0,1691932	3,405456
Male	-0,0820575	0,1271749	-0,65	0,519	-0,3318104	0,1676954
Notorious Names	0,2600878	0,1236183	2,10	0,036	0,0173194	0,5028561
Length	0,0098008	0,0133498	0,73	0,463	-0,0164163	0,0360179
Length2	0,0001122	0,0000938	1,20	0,232	-0,0000720	0,0002963
Width	-0,0029294	0,0152111	-0,19	0,847	-0,0328017	0,0269429
Width2	0,0001345	0,0001049	1,28	0,2	-0,0000714	0,0003404
Provenance	0,0134047	0,1913389	0,07	0,944	-0,3623571	0,3891664
Exhibition	0,6369911	0,1671639	3,81	0	0,3087057	0,9652766
Signature	0,3981857	0,2739337	1,45	0,147	-0,1397802	0,9361516
Stamp	-0,0654909	0,2641804	-0,25	0,804	-0,5843027	0,4533209
Oil/canvas	2,5926480	0,4474940	5,79	0	1,7138350	3,4714610
Oil/other	1,6244740	0,4333870	3,75	0	0,7733649	2,4755830
Pencil/paper	-0,4271053	0,2603229	-1,64	0,101	-0,9383415	0,0841309
Watercolour/paper	0,2836784	0,3019414	0,94	0,348	-0,3092905	0,8766473
Ink/paper	-0,4010255	0,2828972	-1,42	0,157	-0,9565944	0,1545434
Signed Drawings	-0,2166202	0,2840340	-0,76	0,446	-0,7744216	0,3411812
Signed Oils	0,1027019	0,4331348	0,24	0,813	-0,7479118	0,9533155
Signed Nudes	-0,3270266	0,2479636	-1,32	0,188	-0,8139909	0,1599376
Nude Drawings	-0,0693097	0,2855272	-0,24	0,808	-0,6300436	0,4914241
Nude Oils	-0,2816642	0,4216265	-0,67	0,504	-1,1096770	0,5463487
Paris/Soth	-0,5940447	0,3485802	-1,70	0,089	-1,2786050	0,0905160
Ldn/Soth	0,6046738	0,1716473	3,52	0	0,2675835	0,9417642
Ny/Soth	0,2700053	0,1510164	1,79	0,074	-0,0265688	0,5665795
Paris/Chris	0,1233156	0,3909686	0,32	0,753	-0,6444898	0,8911210
Ldn/Chris	0,3640556	0,1796707	2,03	0,043	0,0112085	0,7169026
NyChris	0,4123186	0,1850502	2,23	0,026	0,0489070	0,7757303
_cons	7,3843790	0,8547448	8,64	0	5,7057850	9,0629730

Table F - .75 Quantile Regression

Number of obs = 674

Raw sum of deviations 510,9575 (about 12,57)
Min sum of deviations 159,5966

Pseudo R2   =   0,6877

LnAdjHamPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,5300127	0,240389	2,2	0,028	0,0579237	1,002102
Year of Sale						
1985	1,101576	0,7428940	1,48	0,139	-0,3573589	2,560512
1986	1,472024	0,6782891	2,17	0,03	0,1399629	2,804085
1987	1,409385	0,6566156	2,15	0,032	0,1198880	2,698882
1988	1,267360	0,6583817	1,92	0,055	-0,0256058	2,560326
1989	2,319874	0,6917820	3,35	0,001	0,9613147	3,678433
1990	2,169076	0,6741804	3,22	0,001	0,8450840	3,493068
1991	1,967935	0,7010541	2,81	0,005	0,5911667	3,344703
1992	1,153746	0,6932831	1,66	0,097	-0,2077610	2,515253
1993	1,562343	0,6903972	2,26	0,024	0,2065041	2,918183
1994	1,114270	0,6764246	1,65	0,1	-0,2141296	2,442669
1995	1,528375	0,6576209	2,32	0,02	0,2369040	2,819847
1996	0,992611	0,6935362	1,43	0,153	-0,3693932	2,354615
1997	1,756266	0,6628316	2,65	0,008	0,4545616	3,057971
1998	1,730526	0,6594637	2,62	0,009	0,4354355	3,025617
1999	2,057788	0,6658796	3,09	0,002	0,7500979	3,365479
2000	2,042979	0,6533166	3,13	0,002	0,7599605	3,325997
2001	1,725154	0,6570528	2,63	0,009	0,4347979	3,015510
2002	2,087686	0,6629998	3,15	0,002	0,7856507	3,389720
2003	1,685692	0,6828780	2,47	0,014	0,3446191	3,026765
2004	1,648516	0,7075683	2,33	0,02	0,2589549	3,038077
2005	2,002287	0,6649597	3,01	0,003	0,6964031	3,308171
2006	2,423700	0,6587165	3,68	0	1,1300770	3,717324
2007	2,331425	0,6740840	3,46	0,001	1,0076230	3,655228
2008	2,018971	0,6663553	3,03	0,003	0,7103469	3,327596
2009	1,869751	0,6908718	2,71	0,007	0,5129798	3,226523
2010	2,445353	0,6685009	3,66	0	1,1325150	3,758191
2011	1,707862	0,6895993	2,48	0,014	0,3535896	3,062134
2012	2,000610	0,6891436	2,90	0,004	0,6472323	3,353988
2013	2,196913	0,6612602	3,32	0,001	0,8982948	3,495532
2014	1,482698	0,6868950	2,16	0,031	0,1337364	2,831660
2015	2,145053	0,6529903	3,28	0,001	0,8626754	3,427431

2016	1,941483	0,6653294	2,92	0,004	0,6348734	3,248093
2017	1,825220	0,6695963	2,73	0,007	0,5102303	3,140209
2018	1,217743	0,6598893	1,85	0,065	-0,0781833	2,513669
2019	1,683794	0,7813516	2,15	0,032	0,1493334	3,218255
Male	-0,2093626	0,1091827	-1,92	0,056	-0,4237814	0,0050562
Notorious Names	0,1661744	0,1061293	1,57	0,118	-0,042248	0,3745968
Length	0,0341942	0,0114611	2,98	0,003	0,0116863	0,0567022
Length2	-0,0001436	0,0000805	-1,78	0,075	-0,0003017	0,0000145
Width	0,0065501	0,0130591	0,50	0,616	-0,0190960	0,0321962
Width2	0,0000772	0,00009	0,86	0,392	-0,0000996	0,0002540
Provenance	0,3154909	0,164269	1,92	0,055	-0,0071095	0,6380913
Exhibition	0,4824355	0,1435142	3,36	0,001	0,2005947	0,7642764
Signature	0,1237159	0,2351786	0,53	0,599	-0,3381406	0,5855725
Stamp	0,1638278	0,2268052	0,72	0,47	-0,2815845	0,6092402
Oil/canvas	1,846782	0,3841843	4,81	0	1,0923000	2,6012640
Oil/other	1,207653	0,3720731	3,25	0,001	0,4769555	1,9383500
Pencil/paper	-0,3063328	0,2234934	-1,37	0,171	-0,7452412	0,1325757
Watercolour/paper	-0,2784974	0,2592239	-1,07	0,283	-0,7875753	0,2305806
Ink/paper	-0,5508092	0,242874	-2,27	0,024	-1,0277780	-0,0738401
Signed Drawings	-0,555323	0,24385	-2,28	0,023	-1,0342090	-0,0764372
Signed Oils	1,090774	0,3718566	2,93	0,003	0,3605019	1,8210460
Signed Nudes	0,2822259	0,2128826	1,33	0,185	-0,1358445	0,7002963
Nude Drawings	-0,1995602	0,2451319	-0,81	0,416	-0,6809636	0,2818432
Nude Oils	-0,5317869	0,3619764	-1,47	0,142	-1,2426560	0,1790819
Paris/Soth	0,0179843	0,2992644	0,06	0,952	-0,5697274	0,6056959
Ldn/Soth	0,4178564	0,1473633	2,84	0,005	0,1284563	0,7072565
Ny/Soth	0,442098	0,1296512	3,41	0,001	0,1874820	0,6967140
Paris/Chris	0,5290623	0,3356559	1,58	0,115	-0,1301170	1,1882420
Ldn/Chris	0,4071211	0,1542516	2,64	0,009	0,1041935	0,7100486
NyChris	0,2433074	0,15887	1,53	0,126	-0,0686901	0,5553050
_cons	8,223192	0,7338188	11,21	0	6,7820790	9,6643050

Table G – Regression with US CPI

				Number of obs	= 674
Source	**SS**	**df**	**MS**	F(62, 611)	= 52,22
Model	2395,4124	62	38,6356926	Prob > F	= 0,0000
Residual	452,099682	611	0,739934013	**R-squared**	**= 0,8412**
Total	2847,5162	673	4,23107373	**Adj R-squared = 0,8251**	
				Root MSE	= 0,86019

LnAdjHamPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,5809803	0,1998735	2,91	0,004	0,1884579	0,9735027
Year of Sale						
1985	0,459751	0,6176856	0,74	0,457	-0,7532934	1,672795
1986	1,142703	0,5639693	2,03	0,043	0,0351491	2,250256
1987	1,416428	0,5459487	2,59	0,01	0,3442640	2,488591
1988	1,254600	0,5474171	2,29	0,022	0,1795526	2,329647
1989	2,083120	0,5751881	3,62	0	0,9535341	3,212705
1990	1,844301	0,5605531	3,29	0,001	0,7434564	2,945145
1991	1,738428	0,5828975	2,98	0,003	0,5937029	2,883154
1992	1,071006	0,5764362	1,86	0,064	-0,0610306	2,203043
1993	1,420817	0,5740367	2,48	0,014	0,2934923	2,548141
1994	0,962525	0,5624190	1,71	0,088	-0,1419842	2,067034
1995	1,052929	0,5467845	1,93	0,055	-0,0208761	2,126734
1996	1,026855	0,5766466	1,78	0,075	-0,1055944	2,159305
1997	1,544795	0,5511170	2,80	0,005	0,4624819	2,627109
1998	1,419492	0,5483168	2,59	0,01	0,3426782	2,496306
1999	1,549365	0,5536513	2,80	0,005	0,4620745	2,636655
2000	1,583468	0,5432057	2,92	0,004	0,5166910	2,650245
2001	1,443461	0,5463122	2,64	0,008	0,3705830	2,516338
2002	1,505910	0,5512569	2,73	0,006	0,4233216	2,588498
2003	1,197669	0,5677848	2,11	0,035	0,0826228	2,312716
2004	1,420271	0,5883137	2,41	0,016	0,2649089	2,575634
2005	1,616750	0,5528864	2,92	0,004	0,5309615	2,702538
2006	1,928689	0,5476955	3,52	0	0,8530949	3,004283
2007	1,824930	0,5604730	3,26	0,001	0,7242430	2,925617
2008	1,859341	0,5540468	3,36	0,001	0,7712737	2,947408
2009	1,497376	0,5744313	2,61	0,009	0,3692768	2,625476
2010	1,936301	0,5558308	3,48	0,001	0,8447303	3,027872
2011	1,564216	0,5733733	2,73	0,007	0,4381949	2,690238
2012	1,746332	0,5729944	3,05	0,002	0,6210549	2,871610
2013	1,791251	0,5498105	3,26	0,001	0,7115030	2,870998

2014	1,345791	0,5711247	2,36	0,019	0,2241855	2,467397
2015	1,771255	0,5429344	3,26	0,001	0,7050115	2,837499
2016	1,761647	0,5531938	3,18	0,002	0,6752555	2,848039
2017	1,167321	0,5567416	2,10	0,036	0,0739616	2,260680
2018	1,232700	0,5486706	2,25	0,025	0,1551913	2,310209
2019	1,257420	0,6496615	1,94	0,053	-0,0184207	2,533260
Male	-0,1800385	0,0907809	-1,98	0,048	-0,3583189	-0,0017582
Notorious Names	0,3070854	0,0882421	3,48	0,001	0,1337909	0,4803800
Length	0,0244432	0,0095295	2,57	0,011	0,0057287	0,0431577
Length2	-0,0000478	0,0000669	-0,71	0,476	-0,0001792	0,0000837
Width	0,0088813	0,0108581	0,82	0,414	-0,0124424	0,0302049
Width2	0,000093	0,0000749	1,24	0,214	-0,0000540	0,0002400
Provenance	0,2286248	0,1365829	1,67	0,095	-0,0396041	0,4968537
Exhibition	0,5285372	0,1193261	4,43	0	0,2941982	0,7628762
Signature	0,3320663	0,1955413	1,7	0,09	-0,0519483	0,7160809
Stamp	-0,0383352	0,1885791	-0,2	0,839	-0,4086771	0,3320068
Oil/canvas	2,405365	0,3194333	7,53	0	1,7780450	3,0326860
Oil/other	1,849054	0,3093633	5,98	0	1,2415100	2,4565990
Pencil/paper	-0,2054379	0,1858255	-1,11	0,269	-0,5703721	0,1594963
Watercolour/paper	-0,1015717	0,215534	-0,47	0,638	-0,5248490	0,3217056
Ink/paper	-0,3175521	0,2019397	-1,57	0,116	-0,7141322	0,0790280
Signed Drawings	-0,5533514	0,2027512	-2,73	0,007	-0,9515251	-0,1551776
Signed Oils	0,1471445	0,3091834	0,48	0,634	-0,4600465	0,7543355
Signed Nudes	0,048569	0,1770031	0,27	0,784	-0,2990393	0,3961773
Nude Drawings	-0,0160966	0,2038171	-0,08	0,937	-0,4163636	0,3841704
Nude Oils	-0,5531413	0,3009684	-1,84	0,067	-1,1441990	0,0379167
Paris/Soth	-0,1338931	0,248826	-0,54	0,591	-0,6225510	0,3547649
Ldn/Soth	0,6265027	0,1225265	5,11	0	0,3858785	0,8671269
Ny/Soth	0,3803849	0,1077996	3,53	0	0,1686822	0,5920875
Paris/Chris	0,3166762	0,279084	1,13	0,257	-0,2314041	0,8647564
Ldn/Chris	0,3671036	0,1282538	2,86	0,004	0,1152318	0,6189753
NyChris	0,4633061	0,1320939	3,51	0	0,2038930	0,7227192
_cons	7,917834	0,61014	12,98	0	6,7196080	9,1160600

Tables H: Heteroscedasticity Tests

H1: Breusch-Pagan Test

				Number of obs	= 674
Source	SS	df	MS	F(62, 611)	= 1,31
Model	92,389549	62	1,49015402	**Prob > F**	**= 0,0624**
Residual	695,064641	611	1,13758534	R-squared	= 0,1173
Total	787,45419	673	1,17006566	Adj R-squared	= 0,0278
				Root MSE	= 1,0666

H2: White's Test

				Number of obs	= 674
Source	SS	df	MS	F(2, 671)	= 1,42
Model	3,31451595	2	1,65725797	**Prob > F**	**= 0,2429**
Residual	784,139674	671	1,16861352	R-squared	= 0,0042
Total	787,45419	673	1,17006566	Adj R-squared	= 0,0012
				Root MSE	= 1,081

Table H3: Regression with White heteroscedasticity-consistent standard errors

Linear regression

Number of obs	= 674
F(62, 611)	= 80,26
Prob > F	= 0,000
R-squared	= 0,8416
Root MSE	= 0,86034

LnAdjHamPrice	Coef.	Robust Std.Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,5807422	0,2261823	2,57	0,01	0,1365531	1,024931
Year of Sale						
1985	0,4971927	0,6487941	0,77	0,444	-0,7769444	1,771330
1986	1,199577	0,4870882	2,46	0,014	0,2430068	2,156147
1987	1,510995	0,4688237	3,22	0,001	0,5902937	2,431696
1988	1,388992	0,4569807	3,04	0,002	0,4915482	2,286435
1989	2,263303	0,4848778	4,67	0	1,3110740	3,215532
1990	2,079300	0,4950484	4,20	0	1,1070970	3,051503
1991	1,970552	0,4587153	4,30	0	1,0697020	2,871402
1992	1,297156	0,4632078	2,80	0,005	0,3874838	2,206829
1993	1,642262	0,5144953	3,19	0,001	0,6318684	2,652656
1994	1,182737	0,4587353	2,58	0,01	0,2818473	2,083626
1995	1,276564	0,4683870	2,73	0,007	0,3567207	2,196408
1996	1,253175	0,4538224	2,76	0,006	0,3619344	2,144416

1997	1,778777	0,4482927	3,97	0	0,8983960	2,659159
1998	1,658609	0,4553873	3,64	0	0,7642950	2,552924
1999	1,795752	0,4880327	3,68	0	0,8373267	2,754177
2000	1,842128	0,4595725	4,01	0	0,9395945	2,744661
2001	1,706270	0,4623338	3,69	0	0,7983140	2,614226
2002	1,760065	0,4654592	3,78	0	0,8459714	2,674159
2003	1,453939	0,4757473	3,06	0,002	0,5196410	2,388238
2004	1,684203	0,4646824	3,62	0	0,7716346	2,596772
2005	1,890441	0,4698458	4,02	0	0,9677326	2,813150
2006	2,212226	0,4733926	4,67	0	1,2825520	3,141901
2007	2,115248	0,4618601	4,58	0	1,2082220	3,022274
2008	2,155591	0,4767902	4,52	0	1,2192440	3,091937
2009	1,785420	0,4854200	3,68	0	0,8321255	2,738714
2010	2,225715	0,4603289	4,84	0	1,3216960	3,129733
2011	1,858589	0,4708513	3,95	0	0,9339054	2,783272
2012	2,037978	0,4641660	4,39	0	1,1264230	2,949532
2013	2,082907	0,4662223	4,47	0	1,1673140	2,998499
2014	1,647942	0,4909020	3,36	0,001	0,6838825	2,612002
2015	2,072591	0,4610464	4,50	0	1,1671630	2,978019
2016	2,073231	0,4701884	4,41	0	1,1498490	2,996612
2017	1,483682	0,4685423	3,17	0,002	0,5635332	2,403831
2018	1,555243	0,4707975	3,30	0,001	0,6306652	2,479820
2019	1,590130	0,5501985	2,89	0,004	0,5096207	2,670640
Male	-0,1791485	0,0840479	-2,13	0,033	-0,3442063	-0,0140907
Notorious Names	0,3066749	0,0796152	3,85	0	0,1503223	0,4630275
Length	0,0245415	0,0096199	2,55	0,011	0,0056494	0,0434337
Length2	-0,0000485	0,0000757	-0,64	0,522	-0,0001971	0,0001002
Width	0,0088122	0,0101693	0,87	0,387	-0,0111587	0,0287832
Width2	0,0000935	0,0000597	1,57	0,118	-0,0000238	0,0002107
Provenance	0,2296182	0,1757882	1,31	0,192	-0,1156042	0,5748405
Exhibition	0,5282753	0,1331109	3,97	0	0,2668649	0,7896857
Signature	0,3324329	0,2126465	1,56	0,118	-0,0851738	0,7500396
Stamp	-0,0379311	0,2245427	-0,17	0,866	-0,4789002	0,4030380
Oil/canvas	2,4050090	0,3025406	7,95	0	1,8108640	2,9991550
Oil/other	1,8481880	0,3161066	5,85	0	1,2274010	2,4689750
Pencil/paper	-0,2060320	0,2136943	-0,96	0,335	-0,6256964	0,2136324
Watercolour/paper	-0,1010035	0,2290302	-0,44	0,659	-0,5507855	0,3487784
Ink/paper	-0,3193762	0,2147881	-1,49	0,138	-0,7411886	0,1024363
Signed Drawings	-0,5533346	0,2184351	-2,53	0,012	-0,9823092	-0,124360
Signed Oils	0,1477579	0,2992965	0,49	0,622	-0,4400169	0,7355327
Signed Nudes	0,0482873	0,1817525	0,27	0,791	-0,3086482	0,4052228

Nude Drawings	-0,0146077	0,2156142	-0,07	0,946	-0,4380424	0,4088271
Nude Oils	-0,5525582	0,3361879	-1,64	0,101	-1,2127820	0,1076658
Paris/Soth	-0,1335905	0,3030317	-0,44	0,659	-0,7287006	0,4615196
Ldn/Soth	0,6263220	0,1114046	5,62	0	0,4075396	0,8451044
Ny/Soth	0,3803473	0,1081575	3,52	0	0,1679418	0,5927529
Paris/Chris	0,3182507	0,3220789	0,99	0,323	-0,3142653	0,9507668
Ldn/Chris	0,3658801	0,1364850	2,68	0,008	0,0978434	0,6339168
NyChris	0,4636638	0,1367799	3,39	0,001	0,1950479	0,7322796
__cons_	7,6150930	0,5162573	14,75	0	6,6012380	8,6289470

Appendix 7: Regression Tables with Estimated Price as Dependent Variable

Table I: Basic Model

				Number of obs	=	847
Source	**SS**	**df**	**MS**	F(54, 792)	=	83,11
Model	2583,25053	54	47,8379727	Prob > F	=	0,0000
Residual	455,870177	792	0,575593658	**R-squared**	=	**0,8500**
Total	3039,12071	846	3.59234126	**Adj R-squared**	=	**0,8398**
				Root MSE	=	0,75868

LnAdjEstPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,3775728	0,0761338	4,96	0	0,228125	0,5270207
Year of Sale						
1985	0,243560	0,5944419	0,41	0,682	-0,9233079	1,410428
1986	0,914178	0,5824925	1,57	0,117	-0,2292340	2,057589
1987	0,925412	0,5702669	1,62	0,105	-0,1940016	2,044825
1988	1,032255	0,5690090	1,81	0,07	-0,0846890	2,149199
1989	1,463833	0,6040809	2,42	0,016	0,2780443	2,649622
1990	1,852081	0,6011556	3,08	0,002	0,6720341	3,032127
1991	1,592500	0,7728299	2,06	0,04	0,0754627	3,109537
1992	1,011458	0,6332906	1,6	0,111	-0,2316680	2,254585
1993	1,207619	0,5858256	2,06	0,04	0,0576649	2,357574
1994	0,941421	0,5774776	1,63	0,103	-0,1921465	2,074989
1995	0,929630	0,5713388	1,63	0,104	-0,1918876	2,051147
1996	0,711064	0,5836791	1,22	0,223	-0,4346767	1,856805
1997	1,370982	0,5691053	2,41	0,016	0,2538484	2,488115
1998	1,285777	0,5654675	2,27	0,023	0,1757850	2,395769
1999	1,543566	0,5628720	2,74	0,006	0,4386683	2,648463
2000	1,553869	0,5629439	2,76	0,006	0,4488309	2,658908
2001	1,406631	0,5610988	2,51	0,012	0,3052145	2,508048
2002	1,616632	0,5661847	2,86	0,004	0,5052317	2,728032
2003	1,532532	0,5775874	2,65	0,008	0,3987485	2,666315
2004	1,559742	0,5739193	2,72	0,007	0,4331594	2,686325
2005	1,359575	0,5708686	2,38	0,017	0,2389810	2,480170
2006	1,714583	0,5660470	3,03	0,003	0,6034534	2,825713
2007	1,818815	0,5659463	3,21	0,001	0,7078827	2,929747
2008	1,738513	0,5621564	3,09	0,002	0,6350201	2,842005
2009	1,744461	0,5690374	3,07	0,002	0,6274610	2,861461
2010	1,723183	0,5672474	3,04	0,002	0,6096969	2,836669
2011	1,543946	0,5805696	2,66	0,008	0,4043085	2,683583

2012	1,741974	0,5733274	3,04	0,002	0,6165528	2,867395
2013	1,643589	0,5658864	2,9	0,004	0,5327749	2,754404
2014	1,602184	0,5713182	2,8	0,005	0,4807070	2,723661
2015	1,601075	0,5659603	2,83	0,005	0,4901157	2,712035
2016	1,699177	0,5706079	2,98	0,003	0,5790947	2,819260
2017	1,181557	0,5722868	2,06	0,039	0,0581784	2,304935
2018	1,435524	0,5665360	2,53	0,011	0,3234345	2,547614
2019	1,530330	0,6473786	2,36	0,018	0,2595492	2,801111
Male	-0,1476264	0,0671754	-2,2	0,028	-0,2794893	-0,0157635
Notorious Names	0,2634200	0,0665792	3,96	0	0,1327274	0,3941125
Length	0,0184819	0,0030653	6,03	0	0,0124648	0,024499
Width	0,0206007	0,0043841	4,7	0	0,0119949	0,0292064
Provenance	-0,0231788	0,1118238	-0,21	0,836	-0,2426848	0,1963273
Exhibition	0,3686820	0,0934890	3,94	0	0,1851665	0,5521975
Signature	0,0499189	0,0707888	0,71	0,481	-0,0890370	0,1888748
Stamp	0,0589343	0,1326965	0,44	0,657	-0,2015441	0,3194127
Oil/canvas	2,4305820	0,1492427	16,29	0	2,1376240	2,7235400
Oil/other	2,0191450	0,2073761	9,74	0	1,6120740	2,4262170
Pencil/paper	-0,5686296	0,1060361	-5,36	0	-0,7767747	-0,3604845
Watercolour/paper	-0,0747880	0,1546763	-0,48	0,629	-0,3784119	0,2288359
Ink/paper	-0,2937637	0,1431752	-2,05	0,041	-0,5748115	-0,0127160
Paris	-0,1259131	0,0820694	-1,53	0,125	-0,2870125	0,0351862
London	-0,0233619	0,1175485	-0,2	0,843	-0,2541054	0,2073816
New York	-0,0162181	0,1192054	-0,14	0,892	-0,2502139	0,2177777
Sotheby's	0,2826413	0,1051454	2,69	0,007	0,0762447	0,4890379
Christie's	0,2357014	0,1066612	2,21	0,027	0,0263294	0,4450735
_cons	8,2149960	0,5719474	14,36	0	7,0922840	9,3377080

Table L: Basic Model + Salesroom interaction terms + Signed drawings, Signed oils, Signed nudes, Nude drawings, Nude oils + Length & Width squared

				Number of obs	= 847	
Source	**SS**	**df**	**MS**	F(62, 784)	= 74,57	
Model	2598,50381	62	41,9113518	Prob > F	= 0,0000	
Residual	440,616893	784	0,562011343	**R-squared**	**= 0,8550**	
Total	3039,12071	846	3,59234126	**Adj R-squared = 0,8436**		
				Root MSE	= 0,74967	

LnAdjEstPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,463849	0,1541612	3,01	0,003	0,1612310	0,7664663
Year of Sale						
1985	0,060037	0,5957331	0,1	0,92	-1,1093830	1,229458
1986	0,717239	0,5839797	1,23	0,22	-0,4291099	1,863588
1987	0,780958	0,5701336	1,37	0,171	-0,3382108	1,900127
1988	0,840347	0,5692213	1,48	0,14	-0,2770309	1,957725
1989	1,360028	0,6052869	2,25	0,025	0,1718533	2,548203
1990	1,648588	0,6031100	2,73	0,006	0,4646860	2,832489
1991	1,571167	0,7678574	2,05	0,041	0,0638669	3,078466
1992	0,814685	0,6346375	1,28	0,2	-0,4311045	2,060475
1993	1,005417	0,5868823	1,71	0,087	-0,1466302	2,157463
1994	0,755700	0,5781637	1,31	0,192	-0,3792325	1,890632
1995	0,793383	0,5719327	1,39	0,166	-0,3293180	1,916083
1996	0,589504	0,5832824	1,01	0,312	-0,5554759	1,734485
1997	1,169507	0,5702086	2,05	0,041	0,0501902	2,288823
1998	1,165489	0,5641450	2,07	0,039	0,0580752	2,272902
1999	1,348134	0,5628933	2,4	0,017	0,2431780	2,453091
2000	1,334242	0,5640134	2,37	0,018	0,2270872	2,441398
2001	1,222560	0,5630346	2,17	0,03	0,1173259	2,327793
2002	1,425338	0,5673617	2,51	0,012	0,3116102	2,539066
2003	1,336603	0,5783595	2,31	0,021	0,2012865	2,471919
2004	1,347906	0,5764868	2,34	0,02	0,2162656	2,479546
2005	1,195955	0,5708750	2,09	0,036	0,0753303	2,316579
2006	1,562519	0,5670920	2,76	0,006	0,4493207	2,675717
2007	1,608392	0,5679120	2,83	0,005	0,4935840	2,723200
2008	1,622958	0,5652100	2,87	0,004	0,5134536	2,732462
2009	1,622933	0,5697461	2,85	0,005	0,5045248	2,741342
2010	1,553501	0,5680257	2,73	0,006	0,4384698	2,668532
2011	1,380876	0,5806487	2,38	0,018	0,2410661	2,520687

2012	1,570736	0,5748172	2,73	0,006	0,4423727	2,699099
2013	1,450856	0,5670163	2,56	0,011	0,3378061	2,563906
2014	1,421304	0,5733081	2,48	0,013	0,2959039	2,546705
2015	1,460907	0,5674534	2,57	0,01	0,3469991	2,574815
2016	1,483042	0,5715345	2,59	0,01	0,3611233	2,604961
2017	1,002629	0,5727248	1,75	0,08	-0,1216262	2,126885
2018	1,216563	0,5684617	2,14	0,033	0,1006761	2,332450
2019	1,191487	0,6480401	1,84	0,066	-0,0806118	2,463586
Male	-0,115105	0,0668331	-1,72	0,085	-0,2462980	0,016088
Notorious Names	0,2361955	0,0666205	3,55	0	0,1054197	0,3669712
Length	0,0182056	0,0072621	2,51	0,012	0,0039503	0,0324610
Length2	9,40E-06	0,0000524	0,18	0,858	-0,0000935	0,0001123
Width	0,0196435	0,0088749	2,21	0,027	0,0022222	0,0370648
Width2	-6,40E-06	0,0000738	-0,09	0,931	-0,0001513	0,0001385
Provenance	0,0323602	0,1131391	0,29	0,775	-0,1897313	0,2544516
Exhibition	0,3835857	0,0938403	4,09	0	0,1993776	0,5677937
Signature	0,2363248	0,1422082	1,66	0,097	-0,0428290	0,5154787
Stamp	0,0688496	0,1420429	0,48	0,628	-0,2099797	0,3476790
Oil/canvas	2,1787170	0,2561434	8,51	0	1,6759090	2,6815250
Oil/other	1,7884760	0,2883723	6,20	0	1,2224030	2,3545490
Pencil/paper	-0,3096837	0,1466468	-2,11	0,035	-0,5975506	-0,0218168
Watercolour/paper	-0,1924903	0,1606737	-1,20	0,231	-0,5078919	0,1229112
Ink/paper	-0,3415975	0,1493756	-2,29	0,022	-0,6348209	-0,0483741
Signed Drawings	-0,4012902	0,1507136	-2,66	0,008	-0,6971402	-0,1054402
Signed Oils	0,2719340	0,2486490	1,09	0,274	-0,2161627	0,7600306
Signed Nudes	0,0576136	0,1359697	0,42	0,672	-0,2092942	0,3245214
Nude Drawings	-0,1034833	0,1566984	-0,66	0,509	-0,4110815	0,2041148
Nude Oils	-0,6655836	0,2506452	-2,66	0,008	-1,1575990	-0,1735685
Paris/Soth	-0,1113022	0,1913024	-0,58	0,561	-0,4868277	0,2642233
Ldn/Soth	0,3075510	0,0942728	3,26	0,001	0,1224940	0,4926080
Ny/Soth	0,2697684	0,0873907	3,09	0,002	0,0982210	0,4413159
Paris/Chris	0,0839928	0,2172047	0,39	0,699	-0,3423788	0,5103643
Ldn/Chris	0,2209933	0,1045538	2,11	0,035	0,0157548	0,4262318
NyChris	0,2867251	0,1097851	2,61	0,009	0,0712176	0,5022327
_cons	8,2719450	0,6019196	13,74	0	7,0903800	9,4535100

Appendix 8: Tests for the Estimated Price Model: Quantile Regression, Regression with American CPI, Heteroscedasticity Tests.

Table M - .25 Quantile Regression

Number of obs = 847

Raw sum of deviations 382,5826 (about 10,355777)
Min sum of deviations 190,6491

Pseudo R2 = 0,5017

LnAdjEstPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,7584545	0,2433296	3,12	0,002	0,2807999	1,236109
Year of Sale						
1985	0,354777	0,9403107	0,38	0,706	-1,4910480	2,200601
1986	1,248482	0,9217590	1,35	0,176	-0,5609260	3,057890
1987	0,957197	0,8999042	1,06	0,288	-0,8093102	2,723704
1988	0,985253	0,8984642	1,10	0,273	-0,7784273	2,748933
1989	1,946201	0,9553906	2,04	0,042	0,0707748	3,821628
1990	1,749099	0,9519545	1,84	0,067	-0,1195827	3,617780
1991	1,985641	1,2119930	1,64	0,102	-0,3934953	4,364777
1992	1,079443	1,0017180	1,08	0,282	-0,8869236	3,045810
1993	1,176088	0,9263405	1,27	0,205	-0,6423137	2,994489
1994	0,791641	0,9125790	0,87	0,386	-0,9997463	2,583029
1995	1,055884	0,9027439	1,17	0,243	-0,7161972	2,827965
1996	0,903594	0,9206585	0,98	0,327	-0,9036535	2,710841
1997	1,458571	0,9000227	1,62	0,106	-0,3081685	3,225311
1998	1,392139	0,8904518	1,56	0,118	-0,3558133	3,140091
1999	1,557016	0,8884760	1,75	0,080	-0,1870573	3,301090
2000	1,553994	0,8902441	1,75	0,081	-0,1935504	3,301538
2001	1,503550	0,8886991	1,69	0,091	-0,2409611	3,248062
2002	1,571520	0,8955290	1,75	0,080	-0,1863983	3,329439
2003	1,110681	0,912888	1,22	0,224	-0,6813134	2,902675
2004	1,750575	0,9099321	1,92	0,055	-0,0356168	3,536767
2005	1,158177	0,9010745	1,29	0,199	-0,6106270	2,926982
2006	1,586146	0,8951033	1,77	0,077	-0,1709364	3,343229
2007	1,942086	0,8963976	2,17	0,031	0,1824630	3,701710
2008	1,760389	0,8921329	1,97	0,049	0,0091373	3,511641
2009	1,625166	0,8992926	1,81	0,071	-0,1401405	3,390472
2010	1,790869	0,8965771	2,00	0,046	0,0308932	3,550845
2011	1,622952	0,9165015	1,77	0,077	-0,1761349	3,422040
2012	1,872293	0,9072969	2,06	0,039	0,0912741	3,653312
2013	1,783936	0,8949838	1,99	0,047	0,0270877	3,540784

2014	1,310491	0,9049148	1,45	0,148	-0,4658514	3,086834
2015	1,836785	0,8956738	2,05	0,041	0,0785820	3,594987
2016	1,982520	0,9021154	2,20	0,028	0,2116729	3,753368
2017	1,288900	0,9039943	1,43	0,154	-0,4856359	3,063435
2018	1,559116	0,8972653	1,74	0,083	-0,2022108	3,320443
2019	1,460749	1,0228730	1,43	0,154	-0,5471442	3,468642
Male	-0,0526401	0,105490	-0,50	0,618	-0,2597164	0,1544362
Notorious Names	0,1088107	0,1051545	1,03	0,301	-0,0976070	0,3152283
Length	0,0162414	0,0114625	1,42	0,157	-0,0062594	0,0387423
Length2	6,31E-06	0,0000827	0,08	0,939	-0,0001561	0,0001687
Width	0,0152359	0,0140082	1,09	0,277	-0,0122620	0,0427339
Width2	0,0000810	0,0001165	0,70	0,487	-0,0001477	0,0003097
Provenance	0,0368855	0,1785798	0,21	0,836	-0,3136657	0,3874367
Exhibition	0,4596523	0,1481185	3,10	0,002	0,1688965	0,7504080
Signature	0,4025254	0,2244627	1,79	0,073	-0,0380937	0,8431445
Stamp	0,0008750	0,2242018	0,00	0,997	-0,4392318	0,4409818
Oil/canvas	2,3736560	0,4042992	5,87	0	1,5800190	3,1672930
Oil/other	1,8756130	0,4551696	4,12	0	0,9821177	2,7691080
Pencil/paper	-0,2610716	0,2314687	-1,13	0,26	-0,7154434	0,1933003
Watercolour/paper	-0,2651374	0,2536089	-1,05	0,296	-0,7629702	0,2326954
Ink/paper	-0,4576429	0,2357758	-1,94	0,053	-0,9204695	0,0051837
Signed Drawings	-0,4207868	0,2378878	-1,77	0,077	-0,8877593	0,0461856
Signed Oils	0,0178419	0,3924699	0,05	0,964	-0,7525745	0,7882582
Signed Nudes	-0,3601082	0,2146159	-1,68	0,094	-0,7813980	0,0611817
Nude Drawings	-0,2781864	0,2473343	-1,12	0,261	-0,7637023	0,2073294
Nude Oils	-0,8382415	0,3956208	-2,12	0,034	-1,6148430	-0,0616401
Paris/Soth	-0,2026842	0,3019535	-0,67	0,502	-0,7954171	0,3900488
Ldn/Soth	0,4145000	0,1488011	2,79	0,005	0,1224042	0,7065957
Ny/Soth	0,2906549	0,1379383	2,11	0,035	0,0198827	0,5614270
Paris/Chris	0,2421379	0,3428379	0,71	0,480	-0,4308509	0,9151268
Ldn/Chris	0,2831513	0,1650287	1,72	0,087	-0,0407991	0,6071016
NyChris	0,462106	0,1732859	2,67	0,008	0,1219468	0,8022652
_cons	7,593846	0,9500756	7,99	0	5,7288530	9,4588390

Table N - .75 Quantile Regression

Number of obs = 847

Raw sum of deviations 591,8282 (about 12,158178)
Min sum of deviations 178,1303

Pseudo R2   =   0,6990

LnAdjEstPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,5074432	0,1869155	2,71	0,007	0,1405291	0,8743572
Year of Sale						
1985	1,038152	0,7223069	1,44	0,151	-0,3797329	2,456036
1986	1,371596	0,7080563	1,94	0,053	-0,0183145	2,761507
1987	1,624060	0,6912684	2,35	0,019	0,2671045	2,981016
1988	1,716826	0,6901622	2,49	0,013	0,3620418	3,071611
1989	1,795501	0,7338907	2,45	0,015	0,3548780	3,236125
1990	2,429195	0,7312512	3,32	0,001	0,9937527	3,864637
1991	1,998869	0,9310021	2,15	0,032	0,1713174	3,826421
1992	2,030654	0,7694773	2,64	0,008	0,5201738	3,541133
1993	1,910267	0,7115757	2,68	0,007	0,5134475	3,307086
1994	1,465239	0,7010046	2,09	0,037	0,0891709	2,841307
1995	1,533742	0,6934497	2,21	0,027	0,1725042	2,894980
1996	1,121229	0,7072110	1,59	0,113	-0,2670225	2,509480
1997	1,992665	0,6913594	2,88	0,004	0,6355308	3,349800
1998	1,805321	0,6840074	2,64	0,008	0,4626184	3,148024
1999	2,137669	0,6824897	3,13	0,002	0,7979455	3,477393
2000	2,078365	0,6838479	3,04	0,002	0,7359755	3,420755
2001	1,924933	0,6826611	2,82	0,005	0,5848733	3,264993
2002	2,206018	0,6879076	3,21	0,001	0,8556590	3,556376
2003	2,368510	0,7012420	3,38	0,001	0,9919760	3,745044
2004	1,850294	0,6989714	2,65	0,008	0,4782165	3,222371
2005	1,975394	0,6921674	2,85	0,004	0,6166731	3,334115
2006	2,411006	0,6875805	3,51	0	1,0612890	3,760722
2007	2,444265	0,6885748	3,55	0	1,0925970	3,795934
2008	2,241644	0,6852988	3,27	0,001	0,8964062	3,586882
2009	2,395316	0,6907986	3,47	0,001	1,0392820	3,751350
2010	2,436655	0,6887126	3,54	0	1,0847160	3,788594
2011	1,864501	0,7040177	2,65	0,008	0,4825183	3,246484
2012	2,176063	0,6969472	3,12	0,002	0,8079601	3,544167
2013	1,917401	0,6874888	2,79	0,005	0,5678648	3,266938
2014	2,530286	0,6951174	3,64	0	1,1657740	3,894797
2015	2,098981	0,6880188	3,05	0,002	0,7484041	3,449558
2016	2,145801	0,6929669	3,1	0,002	0,7855112	3,506092

2017	2,002901	0,6944102	2,88	0,004	0,6397772	3,366024
2018	1,658553	0,6892413	2,41	0,016	0,3055765	3,011530
2019	2,079904	0,7857275	2,65	0,008	0,5375250	3,622282
Male	-0,1862894	0,0810330	-2,3	0,022	-0,3453566	-0,0272221
Notorious Names	0,1552235	0,0807752	1,92	0,055	-0,0033378	0,3137848
Length	0,0211574	0,0088050	2,4	0,016	0,0038732	0,0384416
Length2	-0,0000209	0,0000636	-0,33	0,742	-0,0001457	0,0001038
Width	0,0161650	0,0107605	1,5	0,133	-0,0049578	0,0372877
Width2	-0,0000630	0,0000895	-0,7	0,481	-0,0002387	0,0001126
Provenance	0,1154433	0,1371775	0,84	0,4	-0,1538353	0,3847219
Exhibition	0,1955786	0,1137784	1,72	0,086	-0,0277677	0,4189249
Signature	0,1754189	0,1724228	1,02	0,309	-0,1630461	0,5138838
Stamp	0,2585662	0,1722223	1,5	0,134	-0,0795053	0,5966377
Oil/canvas	2,0396710	0,3105656	6,57	0	1,4300330	2,6493100
Oil/other	1,6782410	0,3496420	4,8	0	0,9918956	2,3645860
Pencil/paper	-0,3815854	0,1778045	-2,15	0,032	-0,7306146	-0,0325561
Watercolour/paper	-0,3344682	0,1948116	-1,72	0,086	-0,7168823	0,0479459
Ink/paper	-0,3713719	0,1811130	-2,05	0,041	-0,7268957	-0,0158480
Signed Drawings	-0,3685739	0,1827354	-2,02	0,044	-0,7272824	-0,0098654
Signed Oils	0,8468014	0,3014788	2,81	0,005	0,2550002	1,4386030
Signed Nudes	0,1658899	0,1648589	1,01	0,315	-0,1577272	0,4895069
Nude Drawings	-0,2297927	0,1899918	-1,21	0,227	-0,6027455	0,1431600
Nude Oils	-0,1625352	0,3038992	-0,53	0,593	-0,7590876	0,4340171
Paris/Soth	0,0571901	0,2319479	0,25	0,805	-0,3981224	0,5125025
Ldn/Soth	0,3378936	0,1143027	2,96	0,003	0,1135180	0,5622692
Ny/Soth	0,2384878	0,1059584	2,25	0,025	0,0304921	0,4464836
Paris/Chris	0,1338088	0,2633536	0,51	0,612	-0,3831528	0,6507704
Ldn/Chris	0,1596557	0,1267680	1,26	0,208	-0,0891893	0,4085007
NyChris	0,1355246	0,1331109	1,02	0,309	-0,1257713	0,3968205
_cons	8,1857260	0,7298079	11,22	0	6,7531170	9,6183350

Table O: Regression with US CPI

Source	SS	df	MS			
				Number of obs	=	847
				F(54, 619)	=	73,41
Model	2620,48241	62	42,2658454	Prob > F	=	0,0000
Residual	451,365107	784	0,575720799	**R-squared**	**=**	**0,8531**
Total	3071,84752	846	3,63102544	**Adj R-squared**	**=**	**0,8414**
				Root MSE	=	0,75876

LnAdjEstPrice	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
Female Nude	0,4322847	0,1560302	2,77	0,006	0,1259983	0,738571
Year of Sale						
1985	0,087872	0,6029553	0,15	0,884	-1,095726	1,271470
1986	0,724112	0,5910594	1,23	0,221	-0,4361342	1,884358
1987	0,734275	0,5770455	1,27	0,204	-0,3984619	1,867012
1988	0,756592	0,5761221	1,31	0,189	-0,3743326	1,887516
1989	1,223553	0,6126250	2	0,046	0,0209733	2,426132
1990	1,474504	0,6104217	2,42	0,016	0,2762498	2,672759
1991	1,413399	0,7771663	1,82	0,069	-0,1121746	2,938972
1992	0,659996	0,6423314	1,03	0,305	-0,6008968	1,920889
1993	0,846441	0,5939972	1,42	0,155	-0,3195727	2,012454
1994	0,593614	0,5851729	1,01	0,311	-0,5550771	1,742305
1995	0,628691	0,5788664	1,09	0,278	-0,5076206	1,765002
1996	0,419868	0,5903537	0,71	0,477	-0,7389935	1,578729
1997	0,991382	0,5771215	1,72	0,086	-0,1415039	2,124269
1998	0,979208	0,5709843	1,71	0,087	-0,1416313	2,100047
1999	1,162188	0,5697174	2,04	0,042	0,0438362	2,280540
2000	1,129475	0,5708511	1,98	0,048	0,0088977	2,250053
2001	1,019095	0,5698604	1,79	0,074	-0,0995377	2,137728
2002	1,222886	0,5742400	2,13	0,034	0,0956559	2,350116
2003	1,136553	0,5853711	1,94	0,053	-0,0125272	2,285633
2004	1,146979	0,5834757	1,97	0,05	0,0016197	2,292339
2005	0,981633	0,5777959	1,7	0,09	-0,1525772	2,115843
2006	1,335324	0,5739670	2,33	0,02	0,2086301	2,462018
2007	1,377107	0,5747969	2,4	0,017	0,2487841	2,505430
2008	1,388762	0,5720622	2,43	0,015	0,2658074	2,511717
2009	1,394560	0,5766533	2,42	0,016	0,2625932	2,526528
2010	1,325970	0,5749120	2,31	0,021	0,1974209	2,454519
2011	1,148005	0,5876881	1,95	0,051	-0,0056232	2,301634
2012	1,348555	0,5817859	2,32	0,021	0,2065124	2,490597
2013	1,210456	0,5738904	2,11	0,035	0,0839123	2,337000

2014	1,187792	0,5802584	2,05	0,041	0,0487477	2,326836
2015	1,178586	0,5743328	2,05	0,040	0,0511742	2,305998
2016	1,237112	0,5784633	2,14	0,033	0,1015914	2,372632
2017	0,723150	0,5796681	1,25	0,213	-0,4147354	1,861035
2018	0,931447	0,5753533	1,62	0,106	-0,1979688	2,060862
2019	0,875247	0,6558964	1,33	0,182	-0,4122741	2,162768
Male	-0,1129843	0,0676433	-1,67	0,095	-0,2457678	0,0197992
Notorious Names	0,2430268	0,0674282	3,6	0	0,1106656	0,3753880
Length	0,0208741	0,0073501	2,84	0,005	0,0064459	0,0353023
Length2	-0,0000101	0,0000531	-0,19	0,85	-0,0001142	0,0000941
Width	0,02073	0,0089825	2,31	0,021	0,0030974	0,0383625
Width2	-0,0000125	0,0000747	-0,17	0,867	-0,0001592	0,0001341
Provenance	0,0705276	0,1145107	0,62	0,538	-0,1542563	0,2953116
Exhibition	0,3931291	0,094978	4,14	0	0,2066879	0,5795704
Signature	0,2330888	0,1439322	1,62	0,106	-0,0494494	0,5156269
Stamp	0,084072	0,1437649	0,58	0,559	-0,1981377	0,3662816
Oil/canvas	2,157022	0,2592487	8,32	0	1,6481180	2,6659260
Oil/other	1,758548	0,2918683	6,03	0	1,1856120	2,3314840
Pencil/paper	-0,3448156	0,1484247	-2,32	0,02	-0,6361724	-0,0534588
Watercolour/paper	-0,186601	0,1626216	-1,15	0,252	-0,5058262	0,1326243
Ink/paper	-0,3601489	0,1511865	-2,38	0,017	-0,6569272	-0,0633707
Signed Drawings	-0,3945153	0,1525408	-2,59	0,01	-0,6939520	-0,0950786
Signed Oils	0,2413805	0,2516635	0,96	0,338	-0,2526335	0,7353944
Signed Nudes	0,0433376	0,1376181	0,31	0,753	-0,2268060	0,3134812
Nude Drawings	-0,0554033	0,1585981	-0,35	0,727	-0,3667306	0,2559240
Nude Oils	-0,5997345	0,2536839	-2,36	0,018	-1,0977150	-0,1017545
Paris/Soth	-0,1518458	0,1936216	-0,78	0,433	-0,5319239	0,2282323
Ldn/Soth	0,3158261	0,0954157	3,31	0,001	0,1285256	0,5031266
Ny/Soth	0,2807624	0,0884502	3,17	0,002	0,1071352	0,4543896
Paris/Chris	0,0863339	0,2198379	0,39	0,695	-0,3452067	0,5178744
Ldn/Chris	0,2370333	0,1058213	2,24	0,025	0,0293067	0,4447600
NyChris	0,3050976	0,1111161	2,75	0,006	0,0869774	0,5232179
_cons	8,433633	0,6092169	13,84	0	7,2377440	9,6295220

Tables P: Heteroscedasticity Tests

P1: Breusch-Pagan Test

				Number of obs	=	848
Source	**SS**	**df**	**MS**	$F_{(62, 611)}$	=	1,72
Model	67,5933415	62	1,49015402	**Prob > F**	**=**	**0,0007**
Residual	497,812736	784	1,13758534	R-squared	=	0,1195
Total	565,406077	846	1,17006566	Adj R-squared	=	0,0499
				Root MSE	=	0,79685

P2: White's Test

				Number of obs	=	847
Source	**SS**	**df**	**MS**	$F_{(2, 671)}$	=	4,98
Model	6,59832527	2	3,29916264	**Prob > F**	**=**	**0,0071**
Residual	558,807752	844	0,662094493	R-squared	=	0,0117
Total	565,406077	846	0,668328696	Adj R-squared	=	0,0093
				Root MSE	=	0,81369

Bibliography

Abbing, H. (2002), *Why Are Artists Poor? The Exceptional Economy of the Arts*, Amsterdam: Amsterdam University Press.

Akerlof, G. A. (1970), The Market for "Lemons": Quality Uncertainty and the Market Mechanism, *Quarterly Journal of Economics*, Vol. 84, No.3, pp.488–500.

Agnello, R. (2010), Race and Art: Prices for African American Painters and Their Contemporaries, *Journal of Black Studies*, Vol.41, No.1, pp.56-70.

ArtPrice (2018), H1 2018 Global Art Market Report, ArtPrice (online). Available from: https://it.artprice.com/artprice-reports/global-art-market-in-h1-2018-by-artprice-com/h1-2018-global-art-market-report-by-artprice-com [Accessed February 21, 2019].

ArtPrice (2019), The World Leader in Art Market Information, ArtPrice (online). Available from: https://imgpublic.artprice.com/img/wp/sites/11/2018/03/FactSheet_EN.pdf [Accessed March 19, 2019]

ArtNet (2019), Jenny Saville, ArtNet (online). Available from: http://www.artnet.com/artists/jenny-saville/ [Accessed June 1, 2019]

Ashenfelter, O. & Graddy, K. (2003), Auctions and the Price of Art, *Journal of Economic Literature*, Vol.41, No.3, pp.763-787.

Baia Curioni, S., Forti, L., & Leone, L. (2015), Making Visible: Artists and Galleries in the Global Art System, *Cosmopolitan Canvases: The Globalization of Markets for Contemporary Art*, pp.55-77.

Berger, J., Blomberg, S., Dibb, M., Fox, C. & Hollis, R. (1972), *Ways of Seeing*, Penguin Group, London.

Blessing, J. (2019), Amedeo Modigliani, Nude (Nu), Collection Online, Guggenheim (online). Available from: https://www.guggenheim.org/artwork/2970 [Accessed March 15, 2019].

Bonfante, L. (1989), Nudity as a Costume in Classical Art, *American Journal of Archaeology*, Vol.93, pp.543–570.

Bonfante, L. (1993), Etruscan Nudity, Essays on Nudity in Antiquity in Memory od Otto Brendel, *Notes in the History of Art*, The University of Chicago Press, Vol.12, No.2, pp.47-55.

Braun, E., Brunner, K, Frequelli, S., Silver, K.E., & Wayne, K. (2006), *Mogiliani & His Models*, Royal Academy Publications, 1st Edition.

Breazeale, M.K. (1986), The Female Nude in Public Art: Constructing Women's Sexual Identity in the Visual Arts, *A Journal of Women Studies*, Vol.9, No.1, pp.56-65.

Butler, E.B. (1961), Auction Prices: Estimated and Realised, *The Economic Journal*, Vol.71, No.281, pp.114-120.

Cameron S. (2011), Criticism in the Arts in Towse, R: *A Handbook of Cultural Economics*, pp.138-141.

Candela, G. & Scorcu, A.E. (1997), A Price Index for Art Market Auctions: An Application to the Italian Market of Modern and Contemporary Oil Paintings, *Journal of Cultural Economics*, Vol.21, pp.175-196.

Candela, G. Scorcu, A.E. (2001), In search of stylized facts on art market prices: Evidence from the secondary market for prints and drawings in Italy, *Journal of Cultural Economics*, Vol.25, pp.219-231.

Chanel O. (1995), Is art market behaviour predictable?, *European Economic Review*, No.39, pp. 529-537.

Chanel O., Gérard-Varet A. L. & Ginsburgh V. (1996), The relevance of Hedonic Price Indices. *Journal of Cultural Economics*, Vol.20, pp.1-24.

Chanel, O., & Ginsburgh, A. V. (1996), The relevance of hedonic price indices the case of paintings, *Journal of Cultural Economics*, Vol.20, pp.1-24.

Chin, T.L. and Chau, K.W. (2003), A critical review of literature on the hedonic price model, *International Journal for Housing and Its Applications,* Vol.27, No.2, pp.145-165.

Christie's (2015a), Picasso's Les femmes d'Alger (Version "O") set to star in New York, Christie's (online). Available from: https://www.christies.com/features/Picasso-5829-1.aspx [Accessed March 15, 2019].

Christie's (2015b), Modigliani's Nu Couché (Reclining Nude) leads a night of records in New York, Christie's (online). Available from: https://www.christies.com/features/Modigliani-Nu-couche-Reclining-Nude-leads-a-night-of-records-in-New-York-6782-3.aspx [Accessed February 15, 2019].

Clapp, J. M., Giaccotto, C., & Tirtiroglu, D. (1991), Housing Price Indices based on All Transactions Compared to Repeat Subsamples, *Real Estate Economics*, Vol.19, No.3, pp.270-28.

Clark, K. (1953), *The Nude: A Study in Ideal Form*, Princeton, Princeton University Press.

Colwell, P.F. & Dilmore, G. (1999), Who Was First? An Examination of an Early Hedonic Study, *Land Economics*, University of Wisconsin Press, Vol.75, No.4, pp. 620-626.

David, G. (n.d.) Art as an investment in times of turmoil, The case of the French art market during the first half of the 20th century, Université Libre de Bruxelles (ULB), pp.1-52.

David, G. & Oosterlinck, K (2012), War, Inflation, Monetary Reforms and the Art Market, EHES Working Papers in Economic History, No.12, pp.1-32.

De Silva, D.G., Pownall, R.A.J., Wolk, L. (2012), Does the sun 'shine' on art prices?, *Journal of Economic Behavior and Organization*, Vol.82, pp.167-178.

Dixon, A.F. & Dixson B.J. (2011), Venus Figurines of the European Paleolithic: Symbols of Fertility or Attractiveness?, Research Article, School of Biological Sciences, Victoria University of Wellington, Wellington 6140, New Zealand, pp.1-11.

Duncan, C. (1989), The MoMA's Hot Mamas, Images of Rule: Issues of Interpretation, *Art Journal*, Vol.48, No.2, pp.171-178.

Eck, B.A. (2001), Nudity and Framing: Classifying Art, Pornography, Information, and Ambiguity, *Sociological Forum*, Vol.16, No.4, pp.603-632.

Ekelund R.B.Jr., Jackson, J.D. & Tollison, R.D. (2013), Are Art Auction Estimates Biased?, *Southern Economic Journal*, Vol.80, No.2, pp. 454-465.

Euwe, J. & Oosterlinck, K. (2017), Art Price Economics in the Netherlands during World War II, *Journal for Art Market Studies*, Vol.1, No.1, pp. 47-67.

Fisher, K. & Toulalan, S. (2013), *The Routledge History of Sex and the Body 1500 to the Present*, Routledge, London.

Forster, C. (2011), The Pornometric Gospel: Wyndham Lewis, Walter Sickert & the History of the Nude, *Journal of Modern Literature*, Vol.34, No.4, pp.114-136.

Ginsburgh, V., Mei, J. & Moses, M. (2006), The Computation of Prices Indices, *Handbook of the Economics of Art and Culture,* Vol.1, Pages 947-979.

Goetzmann, W., Renneboog, L., Spaenjers, C. (2011), Art and money, *American Economic Review*, Vol.101, pp.222-226.

Graddy, K. & Pownall, R. A. J. (2016), Pricing Color Intensity and Lightness in Contemporary Art Auctions, *Research in Economics*, Vol.70, pp.412-420.

Grampp, W. D. (1989). *Pricing the Priceless. Art, Artists and Economics*. New York, Basic Books.

Haas, G.C. (1922), A Statistical Analysis of Farm Sales in Blue Earth County, Minnesota, as a Basis for Farm Land Appraisal, Masters thesis, University of Minnesota.

Hollander, A. (1993) *Seeing through clothes*, 4th ed., Berkeley.

Klamer, A. (2016), *Doing The Right Thing, A value based economy*, SEC, London: Ubiquity Press.

Kren, T., Burke, J. & Campbell, S.J. (2018), *The Renaissance Nude*, Royal Academy of Arts, London.

Lazzaro, E. (2006), Assessing Quality in Cultural Goods: The Hedonic Value of Originality in Rembrandt's Prints, *Journal of Cultural Economics*, Vol.30, pp.15–40.

Mastromattei, D. (2017), Les Femmes d'Alger di Pablo Picasso: analisi completa della serie di opere, Arteworld (online). Available from: https://www.arteworld.it/les-femmes-dalger-picasso-analisi/ [Accessed March 15 2019].

McAndrews (2019), The Art Market 2019: An Art Basel & UBS Report, Art Basel (online). Available from: https://d2u3kfwd92fzu7.cloudfront.net/The_Art_Market_Report_2019.pdf [Accessed May 10, 2019]

Mei, J. & Moses, M. (2001). Art as an investment and the origin of the 'masterpiece effect', Evidence from 1875–2000, Stern School of Business, Mimeo, New York.

Mei, J. & Moses, M. (2002), Art as an Investment and the Underperformance of Masterpieces, *The American Economic Review*, Vol.92, No.5, pp.1656-1668.

MoMA (1951), Modigliani paintings, drawings, sculpture, with an introd. by James Thrall Soby. The Museum of Modern Art, New York, in collaboration with the Cleveland Museum of Art, Museum of Modern Art (online). Available from: https://www.moma.org/documents/moma_catalogue_2916_300191634.pdf [Accessed March 19, 2019]

Moulin, R. (1987, ed princ in French 1967). *The French Art Market: A Sociological View*. New Brunswick, Rutger University Press.

Nead, L. (1990), *The Female Nude: Pornography, Art, and Sexuality, Signs*, Vol.15, No.2, pp.323-335.

Nead, L. (1992), *The Female Nude: Art, Obscenity and Sexuality*, Routledge, London & New York.

Nelson, C. (1995) Nude: Fetishization, Disguise, Dichotomy, *Revue d'Art Canadienne*, Vol. 22, No. 1/2, pp. 97-107.

OECD (2019), CPI, OECD (online). Available from: http://www.oecd.org [Accessed April 19, 2019].

Onofri, L. (2009), Old Master Paintings, Export Veto and Price Formation: An Empirical Study, *European Journal of Law and Economics*, Vol.28, pp.149-161.

Oosterlinck , K. & Radermecker, A.-S. (2019), "The Master of…": creating names for art history and the art market, *Journal of Cultural Economics*, Vol.43, pp.57-95.

Pesando, J.E. (1993), Art as an Investment: The Market for Modern Prints, *The American Economic Review*, Vol.83, No.5, pp. 1075-1089.

Platt, E. (2018), Modigliani masterpiece Nu Couché sells for $157m, Financial Times (online). Available from: https://www.ft.com/content/1569d872-57d6-11e8-bdb7-f6677d2e1ce8 [Accessed March 15, 2019].

Pointon, M. (1990), *Naked Authority: The Body in Western Painting 1830-1908*, Cambridge University Press, Cambridge.

Preece, C., & Kerrigan, F. (2015). Multi-stakeholder brand narratives: An analysis of the construction of artistic brands, *Journal of Marketing Management*, Vol.31, No.11/12, pp.1207–1230.

Radermecker, A. S., Ginsburgh, V., & Tommasi, D. (2017). The Implicit Value of Arts Experts: the Case of Klaus Ertz and Pieter Brueghel the Younger, *ECARES Working Papers*, pp.1-33.

Rengers, M. & Velthuis, O. (2002). Determinants of Prices for Contemporary Art in Dutch Galleries, *Journal of Cultural Economics*, Vol.26, pp.1–28.

Renneboog, L. & Spaenjers, C. (2012), Buying Beauty: On Prices and Returns in the Art Market, *Management Science*, pp.1-33.

Rosen S. (1974), Hedonic prices and implicit markets: product differentiation in pure competition. *The Journal of Political Economy*, Vol.28 No.1, pp. 34-55.

Rothwell, L. (2006), *Modigliani and His Models*, Royal Academy of Arts, London, pp.1-24.

Ryder, E.C. (2008), Nudity and Classical Themes in Byzantine Art, The Metropolitan Museum of Art's Heilbrunn Timeline of Art History (online). Available from: https://www.metmuseum.org/toah/hd/nuby/hd_nuby.htm [Accessed February 21, 2019].

Sagot-Duvauroux, D. (2003), Art Prices, In: Towse, R. (Ed.), *A Handbook of Cultural Economics*, Edward Elgar, Cheltenham.

Sluijter, E.J. (2011), *The Nude, the Artist and the Model: The Case of Rembrandt, The Nude and the Norm in the Early Modern Low Countries,* Brepols Publishers, pp.11-34.

Sopranzetti, B.J. (2015), Hedonic Regression Models, *Handbook of Financial Econometrics and Statistics*, Springer, Chapter 78.

Sorabella, J.(2008a), The Nude in Baroque and Later Art, The Metropolitan Museum of Art's Heilbrunn Timeline of Art History (online). Available from: https://www.metmuseum.org/toah/hd/nuba/hd_nuba.htm?fbclid=IwAR2uBIiaxAoaSp -NKJtqwD9HrnMK8XtTvf0cfmy2EKQmVcsBf4tdMhNlrSk[Accessed February 21, 2019].

Sorabella, J. (2008b), The Nude in the Middle Ages and the Renaissance, The Metropolitan Museum of Art's Heilbrunn Timeline of Art History (online). Available from: https://www.metmuseum.org/toah/hd/numr/hd_numr.htm[Accessed February 21, 2019].

Sotheby's (2018), Modigliani Reinvents the Nude, Sotheby's Impressionist & Modern Art (online). Available from: https://www.sothebys.com/en/videos/modigliani-reinvents-the-nude [Accessed February 15, 2019].

Sotheby's (2019a), Impressionist & Modern Art Evening Sale, Amedeo Modigliani, Nu Couché, sur le côté gauche, Sotheby's (online). Available from: http://www.sothebys.com/en/auctions/ecatalogue/2018/impressionist-modern-art-evening-sale-n09860/lot.18.html?locale=en [Accessed April 19, 2019].

Sotheby's (2019b), Amedeo Modigliani, Femme Nue De Trois Quarts vers la Droite, vue jusqu'à mijambes, la gambe gauche croisée devant la jambe droite (recto), Sotheby's (online). Available from: https://www.sothebys.com/en/auctions/ecatalogue/2015/art-impressionniste-moderne-pf1506/lot.12.html?locale=en [Accessed May 15, 2019]

Spence, M. (2002). Signaling in retrospect and the informational structure of markets, *American Economic Review*, Vol.92, No.3, pp.434–459.

Stata (2019), Stata Software, Stata (online). Available from: https://www.stata.com [Accessed June 1, 2019]

Stetco, I. (2017), Value of art: Analysis of the factors influencing the prices of paintings, Erasmus School of Economics, Erasmus University Thesis Repository (online). Available from: https://thesis.eur.nl/pub/38457/ [Accessed April 2, 2019]

Van der Stighelen, K., Van Cauteren K. & De Clippel K. (2011), *The Nude and the Norm in the Early Modern Low Countries*, Brepols.

Velthuis, O. & Baia Curioni, S. (2015), Making Markets Global, Cosmopolitan Canvases, *The Globalization of Markets for Contemporary Art*, Oxford University Press, pp.1-28.

Velthuis, O. (2003), Symbolic Meaning of Prices: Constructing the Value of Contemporary Art in Amsterdam and New York Galleries, *Theory and Society*, Vol.32, No.2, pp.181-215.

Zorloni, A. (2005), Structure of the Contemporary Art Market and the Profile of Italian Artists, *International Journal of Arts Management*, Vol.8, No.1, pp. 61-71.