

Black notes and white noise: a hedonic approach to auction prices of classical music manuscripts

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Abstract The literature on art auctions has overlooked the market for classical music manuscripts, and this paper explores, for the first time, the determinants of ‘hammer’ prices for about 360 classical music manuscripts auctioned at Sotheby’s (London) during the 1998–2009 period. We use hedonic price regressions in order to explain the price of classical music manuscripts by several characteristics. The paper shows that the ‘trace’ of the composer (e.g. whether the manuscript is fully or partly in the hand of the composer or in a scribal hand), the artistic value of the composition, the number of pages, the period (Baroque, Classical, etc.), and of course the name of the composer and the relative scarcity of his manuscripts, are all characteristics that contribute to explain the hammer price of these manuscripts. However, parameter estimates for characteristics such as the type of music (symphony, opera, etc.) and whether the manuscript is the complete work or some fragment (say, one movement) are not statistically significant. The paper also estimates a hedonic price index that provides a measure of the average returns and (high) risk of collecting and investing in music manuscripts.

Keywords Art auctions · Classical music manuscripts · Hedonic price regression · Economics of classical music

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1 Introduction

It is often argued that artworks are ‘invaluable’, yet news media frequently report the latest sale of high-priced artworks such as paintings or classical music manuscripts. In May 2003, the 575-page manuscript of Ludwig van Beethoven’s *Ninth Symphony* sold for £2.13 million at Sotheby’s in London and was described in media clips as ‘an incomparable manuscript of an incomparable work, one of the highest achievements of man, ranking alongside Shakespeare’s *Hamlet* and *King Lear*, and [Bach’s] *St Matthew Passion*’.¹ The 80-page manuscript of Beethoven’s piano four-hand version of the *Grosse Fuge* (Op. 134) which was missing since 1890 resurfaced at auction in December 2005 and was sold at Sotheby’s for £1.13 million. The story of the manuscript, a gigantic movement of 741 bars, was largely diffused in the press. From the period when he was completely deaf, this manuscript, one among Beethoven’s very last, depicts his thought process at its most introspective, but also gives a sense of his concern for his legacy. The *Grosse Fuge*, originally conceived as the finale movement of the *String Quartet No. 13*, Op. 130, but eventually published separately in 1827 as Op. 133 (under the initial request of his publisher who believed that the finale would frighten purchasers), had been dismissed at its reception by most critics.² ‘However, Beethoven was eager to see it live on in a form [Op. 134] in which music lovers could play it on their pianos at home.’³ To date, the highest price paid for a classical music manuscript was £2.35 million for an auction sale in May 1987, of nine of Wolfgang Amadeus Mozart’s symphonies (No. 22–30, from the 1771–1777 Salzburg-era Symphonies), all written before the composer’s 20th birthday and bound together in a single volume of 508 pages by his father, Leopold Mozart. The inclusion of a title page and a table of contents with a few bars of music from each symphony in the hand of the composer’s father add an extra emotional value to the manuscript. As was reported in the news, the auction took place at Sotheby’s with a musical background—the opening strains of Mozart’s *Symphony No. 29 in A major* regarded as the finest of the works in the manuscript. The bidding began at £500,000; it was fierce and fast among a few parties and went up in £100,000 and £50,000 increments; the sale was over in 3 min.⁴

Auction houses, indeed, routinely price the ‘priceless’, and an extensive literature exists on auction prices of art such as paintings and sculptures, as well as many other collectibles, including rare books, letters, music instruments, wines, coins, photographs and antique furniture.⁵ Surprisingly, no study exists on the valuation of

¹ Maev Kennedy, *The Guardian*, April 8, 2003.

² About two centuries later, this work remains, perhaps, the most ‘modern’ work in music literature and one of the less immediately accessible of Beethoven’s compositions because of its combination of dissonance and contrapuntal complexity so that it is often argued that reading and studying the score might give more pleasure than hearing it.

³ Daniel Wakin, *New York Times*, October 13, 2005.

⁴ Based on press reports (e.g. Rita Reif, *New York Times*, May 23, 1987; and *Los Angeles Times*, May 22, 1987).

⁵ For a review of auctions and the price of art, see Ashenfelter and Graddy (2003), Ginsburgh and Throsby (2006) and references therein. For research related to auctions of paintings, see Campos and

classical music manuscripts through auctions. The objective of this paper is to provide a step towards filling this gap by using hedonic price regressions in order to explain the auction prices of classical music manuscripts sold at Sotheby's during the period 1998–2009. Of course, the manuscript of the *Piano Sonata in C major* Op. 53 from the 'middle-period' of Beethoven is not likely to fetch the same price as the manuscript of the *Symphony in D* by César Franck. But more precisely, what are the characteristics that buyers and collectors would seek in a manuscript which makes it valuable? The paper shows that the 'trace' of the composer (e.g. whether the manuscript is fully or partly in the hand of the composer or in a scribal hand), the artistic value of the composition, the number of pages, the period (Baroque, Classical, etc.) and of course the name of the composer and the relative scarcity of his manuscripts, are all characteristics that contribute to explain the hammer price of these manuscripts. However, parameter estimates for characteristics such as the type of music (symphony, opera, etc.) and whether the manuscript is the complete work or some fragment (say, one movement) are not statistically significant. Furthermore, beyond the aesthetic pleasure and prestige that these characteristics may bring to the buyer, it cannot be ignored that these manuscripts are durable and that some portion of the price can be thought of as representing the discounted present value of the sums that may be paid by potential future owners. To account for this investment purpose, the price of music manuscripts is also regressed on the time periods (years) at which the auction transaction takes place, which permits to estimate a hedonic price index that provides a measure of the average returns and (high) risk of collecting and investing in music manuscripts.⁶

We can only speculate on the reasons why this paper is the very first analysis of auction prices of classical music manuscripts while prices of paintings, sculptures, or wines, violins and many other collectables have been studied extensively. Beyond the 'obvious' (data collection problems, emphasis on extending and refining existing studies, bandwagon effects, etc.), perhaps one explanation to this puzzle lies outside the realm of economics and economists, and stems from a long-standing philosophical debate on the ontology of the musical work (e.g. Goehr 1992; Treitler 1993). We will examine some aspects of this debate in Sect. 2, but it strikes us that developments in musicology such as ethnomusicology (Kunst 1955), and more recently, critical musicology (Kerman 1985), new musicology (Kramer 1995) and gender-oriented musicology (Citron 1993) share some responsibility for a late-twentieth/early-twenty-first century bias in favour of the performer and at the expense of the composer, and which might translate in the realm of economics into a larger research emphasis on the economics of 'music performance' at the expense of 'music composition'. For research related to classical music performances (at large),

Footnote 5 continued

Barbosa (2009), Mei and Moses (2002, 2005), Hodgson and Vorkink (2004), Beggs and Graddy (1997), Chanel et al. (1996), Ginsburgh and Jeanfils (1995), Pesando (1993), among many others. For sculptures, see Locatelli-Biey and Zanola (2002). For other collectibles, see Dickie et al. (1994) on coins, Ross and Zondervan (1989) on violins, Pompe (1996) on photographs, Graeser (1993) on antique furniture and Combris et al. (1997) on wine.

⁶ There are a large number of studies on the financial economics of art markets. See Mei and Moses (2002, 2005) and Ashenfelter and Graddy (2003) for a short review of this literature.

including attendances, public orchestra funding, music recording, see Gapinski (1981), Felton (1989), Schulze and Rose (1998), Harchaoui and Hamdad (2000), among many others. As for the economics of music composition, Scherer (2004, 2006) is probably the major reference. Of tangential interest to our paper on classical music manuscripts, Scherer studies the economics of music publishing in the eighteenth and nineteenth centuries in relation to the evolution of intellectual property rights regimes and copyright laws (e.g. the English Statute of Anne, 1709; the French Copyright Law, 1793; the late 1830s German and Austrian copyright laws) and the incentives it provided to elicit systematic changes in the choice of composing as a vocation.⁷ Scherer also studies the popularization of musical culture in the nineteenth century and the fact that performance at home provided a market for instruments and sheet music.⁸

The rest of the paper is as follows. Section 2 briefly examines some views on the aesthetic value of music manuscripts. Section 3 presents the database and the hedonic regression methodology. Section 4 provides econometric results and Sect. 5 concludes.

2 Ontology of the musical work and aesthetic value of music manuscripts

In the debate on the ontology of the musical work, a well-known question among musicologists, composers and performers is whether the artwork is the composer's manuscript (score) or the sounding result of its interpretation. As argued by Greene (1974), '[t]he two most persistent views of the role of the musical score seem to be: (1) that the score provides instructions for the performer, that it is "potential music", and (2) that the score is an art object that can be contemplated by those who have sufficient literacy, in the same way we view a painting (...)'. According to the first view, if the composer's directions are adequate and the technique and understanding of the performer are sufficient, then the musical work can be presented for contemplating during a performance. This polarity 'object-performance' of the musical work is reminiscent of Stravinsky (1942)'s views in *Poetics of Music* that the score is already music and at the same time, the promise of becoming sound:

⁷ According to Scherer (2004), '[i]n most of Europe before the nineteenth century, composers' ability to maintain control of musical creations as if they were their own property was quite limited. Copyists sold copies of composer's works without the composer's permission, and publishers issued editions that had neither been approved nor proofread by the composer, often in markets far distant from the composer's residence but also in head-to-head competition with authorized publishers'. Because the laws were weak or even non-existent, much of this non-authorized dissemination was perfectly legal even if the term 'piracy' was widely used, as it is now for illegal activities with respect to music download, computer software copying, generic pharmaceutical production and reverse engineering.

⁸ Scherer (2004) also reviews some studies (e.g. Baumol and Baumol 1994, 2002) on the geography of composer supply and demand, that is, on geographical birth versus employment location, the role of magnet cities and the role of patronage and other supports of musical activities by noble courts. See also Borowiecki (2009, 2010) and O'Hagan and Borowiecki (2010).

It is necessary to distinguish two moments, or rather two states of music: potential music and actual music. Having been fixed on paper or retained in the memory, music exists already prior to its actual performance, differing in this respect from all the other arts (...). The musical entity thus presents the remarkable singularity of embodying two aspects, of existing successively and distinctly in two forms separated from each other by the hiatus of silence. (Stravinsky, 1942.)

According to the second view, the score contains the composer's original conception with all that is necessary in a finished work of art. This has been most provocatively expressed by Arnold Schoenberg:

Music need not be performed any more than books need to be read aloud, for its logic is perfectly represented on the printed page; the performer, for all its intolerable arrogance, is totally unnecessary except as his interpretations make the music understandable to an audience unfortunate enough not to be able to read it in print. (Quoted by Newlin, 1980.)

Less provocatively, the musical score has often been prepared in such a way as to be visually interesting and to provide to the score reader a visual element that the listener cannot perceive. A well-known example is in Bach's *St. Matthew Passion*, where the aria, *Give me back my Lord, I pray ye*, sung by a remorseful Judas, is accompanied by a violin motif which consists of diagonally descending and ascending lines forming the letter 'x' which symbolises both Christ and the Cross.⁹ Many other extra-musical references are found in manuscripts, including number symbolism (especially in the scores of the seventeenth and eighteenth centuries). Furthermore, autograph sketches and scores are often beautiful to look at, especially twentieth century manuscripts where, according to music critic Paul Griffiths (1998), 'notation is becoming an end in itself: it is the score that is the artwork, the place where we are most intensively aware of the composer's hand in action, while the sounding result is more or less a shadow play'. In a sense, in repudiation to Lydia Goehr (1992)'s *imaginary museum of musical works*, this second view claims that manuscripts, just like paintings, have a place in a museum.¹⁰

Our paper does not pretend to shed much light on this complex relationship between composer, manuscript, performer and listener. However, an informed econometric analysis of auction prices of classical music manuscripts cannot abstract away from the debate on the ontology of the musical work. Indeed, this debate sheds a light on the functional and aesthetic utility of classical music manuscripts versus autographs and artworks such as paintings. Autographs are documents featuring the handwriting of a celebrity: either a signature or a piece of

⁹ See for example Newman (1995). In German, this aria for bass is known as *Gebt mir meinen Jesum wieder*. See also the crucifix in the manuscript of George Crumb's *Makroskosmos* I, No. 4 for amplified piano.

¹⁰ However, as Greene (1974) explains, we are not expected to complete a painting in a museum by taking up brush and pallet, whereas music composers and performers work from a set of understood performance practices, leaving some room for interpretation or improvisation. According to White (1997), by claiming that 'Bach did not intend to compose musical works', Goehr attempts to liberate the music of Bach from the ideology of a museum culture.

written text of variable length (letters, notes) or both. They have been collected and traded for centuries, and this market is usually considered as a form of cultural heritage market. Autographs generally do not have any functional or aesthetic utility; their value is entirely symbolic or emotional. On the other hand, scholars around the world continue to study original music manuscripts to establish whether the published editions agree with the text (functional utility). In fact, printed music tells us little about the creative process while music manuscripts are full of information. A manuscript showing a composer's self-editing through cross-outs gives invaluable insights into his working method and momentary and second thoughts. Furthermore, the debate on potential music versus artwork per se illustrates that music manuscripts have, arguably, an intrinsic aesthetic value. Thus, on both accounts (functional and aesthetic utility), music manuscripts cannot be considered as any other autograph documents or souvenirs from celebrities. Finally, whether music manuscripts are akin to paintings or sculptures is debatable even if their beauty and aesthetic value are undeniable. Of course, collectors cannot strictly hang music manuscripts on a wall so that they do not necessarily have as much trophy value. However, in February 2006, a collection of music manuscripts was donated to the Juilliard School by financier Bruce Kovner, now Board Chairman of the School—arguably one way to enhance the philanthropic profile of a billionaire collector.¹¹

3 Hedonic regression: data and methodology

The literature on the valuation of art works has focused on the issue of how art asset prices can be measured over time when these works are, by definition, unique. Given that price rises may be exacerbated during booms as better works may come up for sale, there is an ambiguity, emphasized by Ashenfelter and Graddy (2003), that 'average art prices will indicate some variability over time that is better described as movements in the heterogeneity of the quality of the objects offered, rather than as movements in prices for the same objects'. Two approaches have been proposed to address this problem, the hedonic and the repeat-sale regression methods. Applied to the analysis of music manuscripts, both approaches would decompose the price into a fixed component that reflects the unique and fixed character of each manuscript, and a time component that tracks the aggregate movements in the prices of all music manuscripts over time. If accurately determined, the time component will then generate a price index that provides a measure of the returns of collecting and investing in music manuscripts. In the hedonic approach (e.g. Chanel et al. 1994, 1996; Campos and Barbosa 2009), the fixed component is determined by a small number of quantifiable characteristics of a classical manuscript, which do not vary over time. This last assumption is important to ensure unbiased estimate of the time component. In the repeat-sale approach (e.g. Baumol 1986; Goetzmann 1993; Pesando 1993), the fixed component is effectively a dummy variable for each manuscript. See Ginsburgh et al. (2006) for a

¹¹ The digitalized collection can be seen at <http://www.juilliardmanuscriptcollection.org/>.

comparison of both approaches. According to these authors, the repeat-sale method should not be used for time frames that include less than 20 years, unless the number of repeat sales is large. In our data set, we did observe some repeat sales: the manuscript of Wagner's opera *Tannhäuser* has been sold three times (in 1998, 1999, and 2008), and the manuscript of Mahler's *Ninth Symphony* was sold twice. Although there were a few others cases, the number was deemed too small to construct an accurate price index using a repeat-sale approach so that we opted for the hedonic regression methodology.

3.1 Database

There are more than 3,000 auction sale records of about 500 composers' manuscripts, early and first printed editions, letters and other collectables/memorabilia that have been auctioned at Sotheby's (London) between 1998 and 2009. We discarded printed editions, letters and other collectables to focus exclusively on music manuscripts (i.e. 'hand-written') while also discarding lots with multiple manuscripts and unsold items. We also removed composers who had only one manuscript sold during the period. Therefore, this paper focuses exclusively on 357 manuscripts, of 65 composers, auctioned and sold between 1998 and 2009 at Sotheby's.

Given the pioneering nature of this paper, a good amount of time was taken to understand which characteristics should be included in the hedonic price regression in order to reflect the unique and fixed character of each manuscript (as suggested above). What are the characteristics that buyers and collectors seek in a manuscript and which should guide our data collection strategy? Ex ante, a few characteristics appear obvious. We simply list these characteristics here and come back shortly to some problems that we encountered. Table 1 provides some statistics on these characteristics. First, that the manuscript is the work of a specific composer is of course a characteristic that a collector might value—he or she wants to collect a 'Rossini', any of Rossini's manuscripts. The name of the artist, here, the composer, is a controversial characteristic of an artwork since this is no explanation for why his works are valued. As argued by Ginsburgh et al. (2006), '[s]ociologists, art philosophers and economists seem however to agree that names do change values'. And according to these authors, because attribution matters in the value of a work, researchers should not be 'afraid of introducing artist dummies as hedonic characteristics'. A second characteristic is the extent to which the manuscript is in the hand of the composer or a copyist. Scherer (2004) mentions that throughout the seventeenth and eighteenth centuries and well into the nineteenth century, a large number of copyists were engaged in the preparation of finished copies from original manuscripts and copies of the copies.¹² In these conditions, uniqueness of a (scribal) manuscript matters less to a collector than the degree of 'closeness' or the 'trace' of the composer in the manuscript. In fact, copyist's manuscripts without documented

¹² See Scherer (2004) for an analysis of the costs of different mechanical printing methods versus the reproduction of musical manuscripts by hand copyists. At low volumes, hand copying was an attractive in-house alternative to mechanical printing. Furthermore, if a composer wanted to see his work performed shortly after composition, it had to be copied by scribes since printing took much more time than copying.

link to the composer generally attain only a few hundred pounds sterling. But the highest price paid to date for any Beethoven manuscript was not for an autograph but for a copyist's manuscript—more precisely, the score of the *Ninth Symphony* bought at £2.13 million in 2003. Though notated by two scribes, the manuscript contains corrections in Beethoven's hand on nearly every page, with cuts to some passages, re-orchestration of others and substantial rewriting that required entire revised pages to be pasted over the original—a true working document.¹³

A third characteristic is the importance or artistic value of the composition as evaluated by musical experts. Beethoven or Mozart did also compose minor works, even in their later days, or works that composers themselves considered as minor, even if popular—talking of his *Septet* Op. 20, Beethoven is said to have proclaimed: 'I wish it were burned'.¹⁴ A manuscript of the *Ninth Symphony* Op. 125 is of greater artistic value than Beethoven's *König Stephan* Op. 117, which remains also one of the least played orchestral work of the composer. Surely, this must affect a collector's willingness to pay. A fourth characteristic that might influence the price of these manuscripts is the relative scarcity of manuscripts by some composers. Of course, some composers were more prolific than others. But more to the point, how many manuscripts remain in private hands, with the possibility to resurface one day on the market? This number is next to impossible to estimate accurately for a single composer, let alone for a study of 65 composers. At best, we can come up with an idea of relative market scarcity by taking into account the market 'share' or 'size' of each composer in our database.¹⁵ For example, our database includes 27 manuscripts by Liszt but only 3 by Dvořák. Based on this admittedly crude measure, the market share of Liszt is therefore assumed to be about 7.5 %, which reflects his 'share' of manuscripts (27/357) in our data set. A priori, we expect that such a high share would contribute to prop up the value of any manuscript by Liszt. Without controlling for this market share, the greater supply of Liszt manuscripts would tend to undervalue the ranking of Liszt (as established in Sect. 4.2, Table 3). A fifth characteristic is the manuscript's period. Over the very long term, some manuscripts are lost and/or destroyed through the passage of time. *Ceteris paribus*, older manuscripts are rarer, and the musical period of a manuscript (Baroque, Classical, early, middle and late Romantic, and twentieth century) is a proxy which might roughly capture this reality. Other factors that might also play some role in the value of a manuscript are its size (e.g. the number of pages), whether the manuscript is a fragment (say, only one movement) or a complete work and the type or form of composition (e.g. opera, symphony, other orchestral (concerto), ballet,

¹³ Beethoven's trusted copyist, Schlemmer, had died the year before, in 1823, and his two replacements were clearly struggling with the composer's occasionally appalling handwriting. The composer's frustration can be discerned in the manuscript as he rebukes the copyist with a 'du verfluchter Kerl' (literally, 'you damned fool').

¹⁴ See Thayer (1967, p. 620).

¹⁵ This is a controversial assumption. As Ginsburgh et al. (2006) claim, it is not clear whether rarity can be introduced as a hedonic characteristic since it is not a characteristic of the work (or the artist), but of the market.

Table 1 Statistics on characteristics—final database for classical music manuscripts

Nationality	%	Type	%	Period	%	Trace	%	Artistic value	%	Fragment/integral	%	Signature	%
Austrian	11.3	Ballet	1.5	Baroque	3.4	Full hand of comp. (1)	74.8	Higher (3)	21.1	Fragmented (1)	43.0	Signed	44.9
British	12.6	Chamber	11.1	Classical	13.1	Extensive revisions (2)	13.0	Middle (2)	70.6	Not fragmented (0)	57.0	Unsigned and N/A	55.1
Czech	2.6	Opera	19.6	Early Romantic	25.3	A few traces (3)	5.5	Lower (1)	8.2				
French	17.0	Orchestral	17.0	Middle Romantic	11.1	Full hand of copyist (4)	6.8						
German	27.3	Religious	2.3	Late Romantic	27.1								
Hungarian	8.0	Solo instr.	2.3	Twentieth century	20.1								
Italian	8.2	Solo piano	14.7										
Polish	2.3	Symphonic	4.6										
Russian	4.9	Vocal	26.8										
Others	5.7												

chamber music, solo instrument, religious and other vocal).¹⁶ The overall condition of the manuscript (wear and tear, stains, quality of the paper and ink) is probably also an important characteristic.

These hypotheses guided us in our strategy of data collection from the Sotheby's website. Other important data needed for the study such as the auction date, auction year, lower and upper price estimates by Sotheby's and the hammer price of sold manuscripts were collected directly. We also collected more precise information on the composers (e.g. the nationality, the date of birth and death of the composer) and on their manuscripts (e.g. the date of composition of the manuscript and the estimated age of the composer when the manuscript was written).¹⁷ In addition to the information provided in Sotheby's website, further data have been collected on composers and their manuscripts and cross-checked from sources such as the *New Grove Dictionary of Music and Musicians* and the Charles H. Smith (2000)'s *Classical Music Navigator*.

Three characteristics were a challenge to collect in a systematic and coherent way. The overall condition of the manuscript (wear and tear, stains) was not included in our study because we could not obtain this information systematically. The other two challenges were first, the 'trace' or extent to which the manuscript was in the hand of the composer and second, the importance or artistic value of the work. With respect to the influence or 'trace' of the composer on the manuscript in question, our database includes a spectrum from complete autograph manuscripts, with every note and bar line in the hand of the composer, to a full scribal manuscript which may have no direct evidence of the composer's personal input. We defined a 'trace' variable going from '1' to '4', '1' being entirely in the composer's hand, '4' being a scribal manuscript, '2' having extensive revisions by the composer and '3' having a few revisions by the composer. Descriptions from Sotheby's website were used to place auctions in their respective category. This process was straightforward for complete autograph manuscripts or scribal manuscripts (ratings of '1' or '4'). However, there was a grey area with the 2's and 3's, and a number of keywords were used to make the distinction between them. To earn a rating of '2', Sotheby's description would have to claim the presence of 'extensive annotations' by the composer, or 'significant corrections throughout' or 'substantially autograph'. To earn a rating of '3', the description from Sotheby's would sometimes merely say that the work is signed on the title page, but written in a different hand or that it contains 'some' corrections in the hand of the composer. This methodology, though

¹⁶ The database includes manuscripts of different sizes, from one page (for songs) to 1,346 pages for a copy of Mozart's opera *Don Giovanni*. Size might reflect, to a certain extent, the scope or ambition of the composition. Of course, this is a *ceteris paribus* statement because in miniature lies also beauty, greatness and ambition. Anton Webern's *Six Bagatelles for String Quartet* Op. 9, a 6-page manuscript that when played lasts about 4 min, is a masterwork of atonal music.

¹⁷ Of course, we ran into some well-known problems. Should we use birthplace versus work location to attribute nationalities/citizenships? What should be done when the definition of national territories changes over time? Date of composition is also far from clear-cut. There is variety in the practice of dating manuscripts; some are dated upon completion of the manuscript, others dated when the work was started, and others still dated when the work was first performed (see Goehr 1992, pp. 198–199). As for associating composers to period, is Schubert a Classical or an early Romantic composer?

imperfect, was implemented consistently and with the greatest attempt to filter out the noise.¹⁸

The other challenge lies with the ‘artistic’ value of a work, that is, its perceived importance within the musical canon. Quantifying the importance of a piece of music is not a simple task, and a number of different methods were considered before an approach was deemed appropriate.¹⁹ The methodology that was finally used to measure the importance of a work is based on the *Classical Music Navigator*, a website conceived by Charles H. Smith.²⁰ The *Classical Music Navigator* has a list of the 444 most important and influential composers and includes their most notable works, as well as musical forms (chamber music, symphonic music, etc.) for which they are best known. When a work auctioned at Sotheby’s was explicitly mentioned on this list, it was given an ‘artistic value’ rating of ‘3’; when a work was implicitly mentioned (for example, the *Classical Music Navigator* notes that Beethoven’s major output includes string quartets, and the auction in question is of a not-mentioned string quartet), it received a rating of ‘2’; and when a work did not belong either explicitly or implicitly, or for that matter, the composer was not on the list, the auction received a rating of ‘1’.

Throughout the empirical study, we use hammer prices (inclusive of buyer’s premium) as recorded on Sotheby’s website. No effort has been made to adjust or correct the prices to account for costs such as taxes, insurance premia, the Sotheby’s–Christie’s collusion scheme and so on.²¹ All these factors act to reduce the monetary returns of owning musical manuscripts below the levels recorded in Sect. 4. Factors acting to augment the monetary returns to art owners, such as reproduction fees and exhibition lending fees, are also omitted.

3.2 Econometric methodology

As stated above, the hedonic regression methodology is one of the most commonly used methods proposed in the literature to explain the prices of artworks and to

¹⁸ We suspect that the descriptions in Sotheby’s might sometimes mislead (at a glance) the contents of the auction to play up the actual influence of the composer on a manuscript.

¹⁹ One method considered was that of using establishment scholarly sources, such as the *New Grove Dictionary of Music and Musicians* (2001) or the *Bonds Anthology of Scores* (2003), and counting the length of the entry on a given work as a proxy for its importance. However, this approach was ultimately abandoned as there is a great deal of variation between authors/editors because opinions vary in terms of how ‘important’ or deserving a work (or a composer) is of space on the page. Furthermore, musicologists and theorists will not often admit that any one work of art is somehow more important—in objective terms—than another. A second approach, finally abandoned, was to use the volume of recordings, or performances, of a given work as an indicator of its importance within the canon and, potentially, for a collector. However, this method was rejected because there is a considerable gap between what is considered a ‘great’ or ‘important’ work by those initiated into the world of classical music, including collectors, and what is merely a popular work.

²⁰ The academic research of Prof. Smith, a Science Librarian, has involved extensive bibliometrics and collection development. For his work on music, his systematic ranking system indicated to us that his database is a trustworthy source and his ranking system is generally in line with the scholarly consensus.

²¹ The Sotheby’s–Christie’s collusion in the setting of commission rates is largely irrelevant for most of the 1998–2009 period, although it might have pushed up the price paid by the winning bidders in the first 2 years of the study (See Ashenfelter and Graddy 2005).

estimate the returns on art investments. In the context of our analysis, this method decomposes the price of manuscripts into a time component (that tracks the aggregate movements in the prices of all music manuscripts over time) and a fixed component (that reflects the unique and fixed character of each manuscript), and which is written as²²:

$$p_{i,t} = \sum_{t=1}^T \gamma_t z_{i,t} + \sum_{j=1}^J \alpha_j w_{i,j} + u_{i,t}, \quad i = 1, \dots, n, \quad (1)$$

where $p_{i,t}$ is the natural logarithm (to the base-e) of the price of the classical manuscript i sold at period t , $n = 357$ is the number of manuscripts, $z_{i,t}$ is the value of a period- t dummy variable, equal to one if the manuscript was sold in period t and zero otherwise, with the number of time periods T being 12 when the data are grouped annually (from 1998 to 2009); the regressors $\{w_{i,j}\}_{j=1}^J$ represent the J quantifiable characteristics j of a classical music manuscript i as described in Sect. 3.1 and $u_{i,t}$ is assumed to be an identically and independently normally distributed random error term (or ‘white noise’) with mean 0 and variance σ^2 .²³ Given that we control for the specific and fixed characteristics of music manuscripts, the estimates of the vector of associated time period dummy parameters $\{\gamma_t\}_{t=1}^T$ can be thought of as representing a time index of the price of a characteristic-free or ‘average’ classical music manuscript. The change in the time index would be a relatively accurate reflection of the return to be earned by a collector holding a large, well-diversified collection of works by several composers. We can compute investors’ rate of returns (in percentage) in the music manuscript market between periods t and $t + 1$ as²⁴:

$$r_{t+1} = 100 \times (\exp(\hat{\gamma}_{t+1} - \hat{\gamma}_t) - 1) \%. \quad (2)$$

We can proceed similarly for the other characteristic-related dummies. For example, when characteristic j is assumed to be the name of the composer, then the estimate $\hat{\alpha}_j$ can be seen as reflecting the market value of the specific composer vis-à-vis a benchmark composer. In order to avoid the collinearity/dummy-trap problem, the dummy for Darius Milhaud was omitted from the regression (1) and was arbitrarily set equal to zero. Milhaud was chosen as benchmark because the database includes a good amount of his manuscripts (10), and we wanted to select a recognized ‘middle-of-the-pack’ composer who composed for a wide range of genres.²⁵ The percentage difference between the values of a manuscript by a specific composer j and a Milhaud, controlling for all the other factors in our analysis, is then:

²² The presentation of the hedonic regression methodology closely follows Hodgson and Vorkink (2004).

²³ The logarithm of the price is commonly taken in order to reduce the non-normality and non-constant variances of the error term, which result from highly skewed artwork price data.

²⁴ Rewrite (1) for two consecutive time periods, t and $t + 1$, recalling that the time dummy, z , takes a value of 1 for the period considered and 0 otherwise. Subtract the two expressions obtained. Observe that other characteristics w cancel out as they are assumed constant over time. Take the antilog and subtract 1 from both sides to get (2).

²⁵ A member of ‘Les Six’ (with Poulenc and Honegger), Milhaud was also quite influential and some of his students are very well known (e.g. Steve Reich, Philip Glass and Dave Brubeck).

$$100 \times (\exp(\hat{\alpha}_j) - 1) \% . \quad (3)$$

3.3 Estimation

The regression (1) can be, and usually is, estimated by ordinary least squares (OLS). Under the normal assumptions, OLS will be consistent and asymptotically normal and will be asymptotically efficient if the disturbances $\{u_i\}$ are normally distributed. An application of the Jarque–Bera normality test to our residuals yielded a statistic of $JB = 3.1 < \chi^2(0.95; 2) = 5.99$.²⁶ Therefore, there is insufficient evidence from the residuals to reject the null hypothesis of normality of the error terms at the 5 % level of significance. Furthermore, from the White test, we cannot conclude that there is heteroskedasticity, and there is no reason to suppose that a substantial efficiency loss is borne when estimating the model by OLS.²⁷

4 Hedonic regression: results

The results of our estimation of the hedonic regression (1) are discussed here and reported in Tables 2, 3, 4, 5, 6 and 7 and Figs. 1, 2 and 3.

4.1 Manuscript characteristics

In Table 2, we provide results for the characteristics of the 357 music manuscripts. For each variable, we give the estimated parameter and its standard error, the p value, the ‘exact’ per cent change with respect to the relevant benchmark dummy variable and its associated standard error.²⁸ We start with the dummy variables for the form of composition, with that of chamber music being omitted from the regression. Based on Eq. (3), the manuscript of a symphony sells, on average, for 44 % [$\exp(0.362)-1$] more than a chamber music composition, while a ballet is 63 % less valuable. However, only the coefficient for ballet is statistically significant at traditional levels. Relative to the case where the manuscript is fully in the hand of the composer (Trace_1), Table 2 illustrates that a purely scribal manuscript (Trace_4) would in average lose 97 % of value. A scribal manuscript with some minimum connection with the composer (Trace_3) would lose 69 % in value, and a scribal manuscript heavily annotated by the composer would lose 40 %

²⁶ This is for the second specification in Table 2, which is the basis for the rest of the study.

²⁷ For the White test, the sample size multiplied by the R^2 goodness of fit statistic of the variance function has a χ^2 distribution. For the test without cross-product terms, we have $\chi^2 = n \times R^2 = 109.7 < \chi^2(0.95; T + J) = 113.14$ so that at the 5 % level of significance, we cannot conclude that there is heteroskedasticity.

²⁸ The interpretation of dummy variables in regressions where the dependent variable is subject to a logarithmic transformation has been of continuing interest in econometrics. The use of an ‘exact’ calculation for computing a rate of return relative to a benchmark is well known. Tests of inference (including the so-called delta method) on those ‘exact’ returns are still controversial. See Lye and Hirschberg (2002) with an application to hedonic price models.

Table 2 Classical music manuscript characteristics

Variable	Coefficient	SE	<i>p</i> value	%Δ to Benchmark	SE (on %Δ)
<i>First specification</i>					
SYMPHONY	0.362	0.293	0.218	43.6	42.1
ORCHESTRAL	0.030	0.214	0.889	3.0	22.1
CHAMBER	–	–	–	–	–
SOLO	–0.048	0.217	0.824	–4.7	20.7
VOCAL	–0.128	0.201	0.523	–12.1	17.7
OPERA	–0.217	0.237	0.362	–19.5	19.1
RELIGIOUS	–0.461	0.377	0.222	–37.0	23.8
BALLET	–1.000	0.506	0.049	–63.2	18.6
TRACE_1	–	–	–	–	–
TRACE_2	–0.513	0.162	0.002	–40.1	9.7
TRACE_3	–1.181	0.239	0.000	–69.3	7.3
TRACE_4	–3.427	0.281	0.000	–96.8	0.9
ARTISTIC_VALUE_1	–	–	–	–	–
ARTISTIC_VALUE_2	0.116	0.125	0.356	12.2	14.0
ARTISTIC_VALUE_3	0.282	0.091	0.002	32.5	12.1
SIGNED_N	–	–	–	–	–
SIGNED_Y	0.108	0.126	0.396	11.3	14.1
FRAGMENTED_N	–	–	–	–	–
FRAGMENTED_Y	–0.123	0.137	0.372	–11.5	12.1
LN(PAGES)	0.450	0.044	0.000	–	–
MKTSHARE (%)	–0.223	0.154	0.149	–	–
<i>R</i> -squared	0.797				
<i>Second specification</i>					
TRACE_1	–	–	–	–	–
TRACE_2	–0.541	0.160	0.001	–42	9.3
TRACE_3	–1.323	0.234	0.000	–73	6.2
TRACE_4	–3.556	0.269	0.000	–97	0.8
ARTISTIC_VALUE_1	–	–	–	–	–
ARTISTIC_VALUE_2	0.132	0.124	0.291	14	14.2
ARTISTIC_VALUE_3	0.288	0.088	0.001	33	11.8
LN(PAGES)	0.468	0.037	0.000	–	–
MKTSHARE(%)	–0.270	0.150	0.073	–	–
<i>R</i> -squared	0.788				

Composer dummies and year dummies are introduced in both specifications. Composer dummies are discussed in Table 3 and time dummies in Table 4

of value with respect to Trace_1 manuscripts. All parameters are in this case highly statistically significant.

The dummy variable ‘artistic value’ reflects classical expert opinions and can take values of ‘1’ to ‘3’ (‘3’ is the highest artistic value). Table 2 shows that a

Table 3 A market-based ranking for 65 classical music composers

Composer	Number of manuscripts	Coefficient	SE	<i>p</i> value	% Δ to Milhaud	SE (on % Δ)
BEETHOVEN	15	3.811	0.549	0.000	4421.1	2480.8
CHOPIN	7	3.650	0.410	0.000	3747.8	1578.6
BACH_JS	3	3.409	0.564	0.000	2925.0	1707.0
MOZART	13	3.282	0.494	0.000	2564.0	1315.4
HANDEL	4	3.264	0.505	0.000	2515.8	1320.2
SCHUBERT	10	2.774	0.406	0.000	1503.0	651.5
HAYDN	7	2.752	0.412	0.000	1467.5	646.4
RAVEL	5	2.656	0.443	0.000	1324.2	630.5
SCHUMANN	8	2.416	0.400	0.000	1020.3	447.6
LISZT	27	2.042	0.934	0.030	670.3	719.8
MAHLER	6	2.011	0.421	0.000	647.0	314.5
BRAHMS	10	1.999	0.421	0.000	638.3	310.8
WAGNER	6	1.902	0.426	0.000	569.7	285.1
MENDELSSOHN	10	1.762	0.422	0.000	482.6	245.9
STRAUSS_R	8	1.753	0.390	0.000	477.2	225.2
BIZET	2	1.541	0.687	0.026	366.9	320.9
SIBELIUS	2	1.469	0.666	0.028	334.7	289.4
BACH_JC	3	1.437	0.569	0.012	320.8	239.5
VERDI	6	1.420	0.417	0.001	313.8	172.7
DVORAK	3	1.353	0.553	0.015	287.0	214.1
WEBER_VON	5	1.233	0.438	0.005	243.1	150.2
SATIE	3	1.184	0.542	0.030	226.9	177.2
STRAVINSKY	12	1.122	0.454	0.014	207.1	139.3
BELLINI	6	1.119	0.423	0.009	206.1	129.6
STRAUSS_J	4	1.091	0.486	0.026	197.7	144.7
FAURE	5	1.055	0.480	0.029	187.1	137.9
ELGAR	8	1.047	0.403	0.010	184.9	114.7
RACHMANINOV	3	1.040	0.560	0.064	183.0	158.6
BERNSTEIN	2	0.856	0.658	0.195	135.3	154.9
SCHOENBERG	2	0.850	0.667	0.204	134.0	156.1
POULENC	2	0.846	0.670	0.208	133.1	156.3
PURCELL	2	0.754	0.699	0.282	112.6	148.6
DELIUS	5	0.715	0.441	0.106	104.4	90.2
REGER	2	0.649	0.667	0.331	91.3	127.6
DEBUSSY	4	0.560	0.483	0.247	75.1	84.5
WOLF	4	0.512	0.483	0.290	66.9	80.7
PAGANINI	2	0.392	0.672	0.560	48.0	99.4
WALTON	2	0.233	0.669	0.728	26.2	84.4
SULLIVAN	12	0.191	0.453	0.673	21.1	54.8
OFFENBACH	11	0.173	0.424	0.683	18.9	50.4
PROKOFIEV	2	0.147	0.664	0.825	15.8	76.9

Table 3 continued

Composer	Number of manuscripts	Coefficient	SE	<i>p</i> value	%Δ to Milhaud	SE (on %Δ)
MILHAUD	10	–	–	–	–	–
FRANCK	5	–0.001	0.432	0.997	–0.1	43.2
DONIZETTI	4	–0.050	0.485	0.917	–4.9	46.1
ROSSINI	7	–0.144	0.408	0.725	–13.4	35.3
JANACEK	2	–0.156	0.659	0.813	–14.4	56.4
HONEGGER	4	–0.210	0.479	0.662	–18.9	38.8
MEYERBEER	6	–0.249	0.465	0.593	–22.0	36.2
SAINT_SAENS	3	–0.385	0.553	0.487	–32.0	37.7
VAUGHAN_WILLIAMS	4	–0.594	0.479	0.216	–44.8	26.5
HINDEMITH	2	–0.636	0.658	0.335	–47.1	34.8
RESPIGHI	2	–0.646	0.663	0.331	–47.6	34.8
MASSENET	10	–0.795	0.411	0.054	–54.8	18.6
GOUNOD	12	–0.802	0.452	0.077	–55.1	20.3
CHAUSSON	3	–0.878	0.557	0.116	–58.4	23.2
MARTINU	3	–0.885	0.551	0.110	–58.7	22.8
CRUMB	2	–0.897	0.670	0.182	–59.2	27.3
ROUSSEL	2	–0.924	0.706	0.192	–60.3	28.0
ENESCU	4	–0.966	0.481	0.046	–61.9	18.3
TIPPETT	2	–0.975	0.660	0.140	–62.3	24.9
HUMMEL	2	–1.231	0.683	0.073	–70.8	19.9
HOWELLS	6	–1.265	0.407	0.002	–71.8	11.5
CIMAROSA	3	–1.458	0.542	0.008	–76.7	12.6
BRIDGE	4	–1.598	0.527	0.003	–79.8	10.7
ORFF	2	–1.752	0.696	0.002	–82.7	12.1

The spelling of composer names was simplified to accommodate statistical softwares. Of course, Dvorak stands for Dvořák, Saint_Saens for Saint-Saëns, and Weber has no real legitimate claims to the ‘von’ in his name

higher artistic value props up the hammer price of a manuscript—A work of high artistic value attracts a market price premium of 33 % relative to a work of ‘low’ artistic value, and the parameter is highly significant. The parameter estimate for the (natural logarithm) of the number of pages suggests that size matters in determining the hammer price of a music manuscript—an arguably controversial result for artists and musicologists. A 100 % increase in the number of pages will increase the price of a manuscript by 45 % and this result is highly significant. Of course, some collinearity between the number of pages and the type or style of music must be expected because music written for one or a few instruments (vocal, solo and chamber music) requires less pages than full-orchestral compositions (e.g. orchestral, symphonic, religious, ballet or opera), with partitions for strings,

Table 4 Time period parameters

(1) Variable	(2) Coefficient	(3) SE	(4) Nom. returns (%)	(5) SE (nom. returns)	(6) Real returns (%)	(7) Nom. price index	(8) Real price index	(9) Sotheyby's mean price estimate	(10) Hammer price index	(11) S&P 500 re-based
Y1998	7.60	0.29	–	–	–	100	100	100	100	100
Y1999	7.72	0.30	12.6	24.7	11.5	112.6	111.5	95.8	83.6	119.5
Y2000	7.91	0.31	20.4	27.7	18.3	133.0	129.7	191.4	195.4	107.4
Y2001	8.06	0.30	16.4	27.7	14.1	149.4	143.8	413.2	338.6	93.4
Y2002	8.36	0.31	34.8	32.1	32.5	184.2	176.4	488.3	563.5	71.6
Y2003	8.27	0.36	–8.5	25.9	–10.6	175.7	165.8	1,350.9	846.6	90.5
Y2004	7.89	0.31	–31.6	19.7	–33.8	144.0	132.0	349.4	260.6	98.6
Y2005	7.47	0.35	–34.1	17.9	–36.3	109.9	95.7	709.4	462.4	101.6
Y2006	7.76	0.31	33.0	37.8	30.8	142.9	126.5	233.9	166.0	115.4
Y2007	7.58	0.32	–16.2	21.3	–18.4	126.7	108.1	203.0	167.1	119.5
Y2008	7.83	0.29	29.0	33.2	25.8	155.7	133.9	175.7	191.9	73.5
Y2009	7.73	0.38	–9.5	29.9	–9.7	146.2	124.2	181	167	90.7

Table 5 Returns and standard deviations on manuscripts versus art and stocks

	Average yearly real return (%)	SD of annual returns (%)
<i>1999–2009</i>		
Music manuscripts	2.2	25.1
S&P 500 (Damodaran online)	1.0	21.4
<i>1950–1999</i>		
Art (Mei and Moses 2002)	8.2	21.0
S&P 500 (Mei and Moses 2002)	8.9	16.1

Table 6 Correlation matrix (1999–2009)

	Manuscripts	S&P 500	FTSE 100	UK growth	Libor
Manuscripts	1	−0.48	−0.60	0.09	0.16
S&P 500		1	0.95	−0.18	0.21
FTSE 100			1	−0.18	0.30
UK growth				1	0.19
Libor					1

Table 7 Market ranking for nationalities and musical periods

Variable	Coefficient	SE	<i>p</i> value	%Δ to Benchmark	SE (on %Δ)
POLISH	2.194	0.475	0.000	796.9	426.1
AUSTRIAN	1.373	0.281	0.000	294.6	110.9
GERMAN	1.033	0.223	0.000	180.9	62.5
RUSSIAN	0.539	0.345	0.119	71.4	59.1
OTHER_CITIZ	0.500	0.300	0.097	64.8	49.5
CZECH	0.197	0.408	0.629	21.8	49.7
FRENCH	–	–	–	–	–
BRITISH	−0.282	0.235	0.232	−24.5	17.8
ITALIAN	−0.347	0.333	0.299	−29.3	23.6
HUNGARIAN	−0.593	0.391	0.130	−44.7	21.6
BAROQUE	–	–	–	–	–
CLASSICAL	−0.901	0.444	0.043	−59.4	18.0
EROMANTIC	−1.164	0.446	0.010	−68.8	13.9
LROMANTIC	−1.561	0.411	0.000	−79.0	8.6
TWENTIETHCENT	−2.055	0.438	0.000	−87.2	5.6
MROMANTIC	−2.478	0.452	0.000	−91.6	3.8

Although not reported, year dummies, trace of composer, artistic value, number of pages and market share are also included in this specification

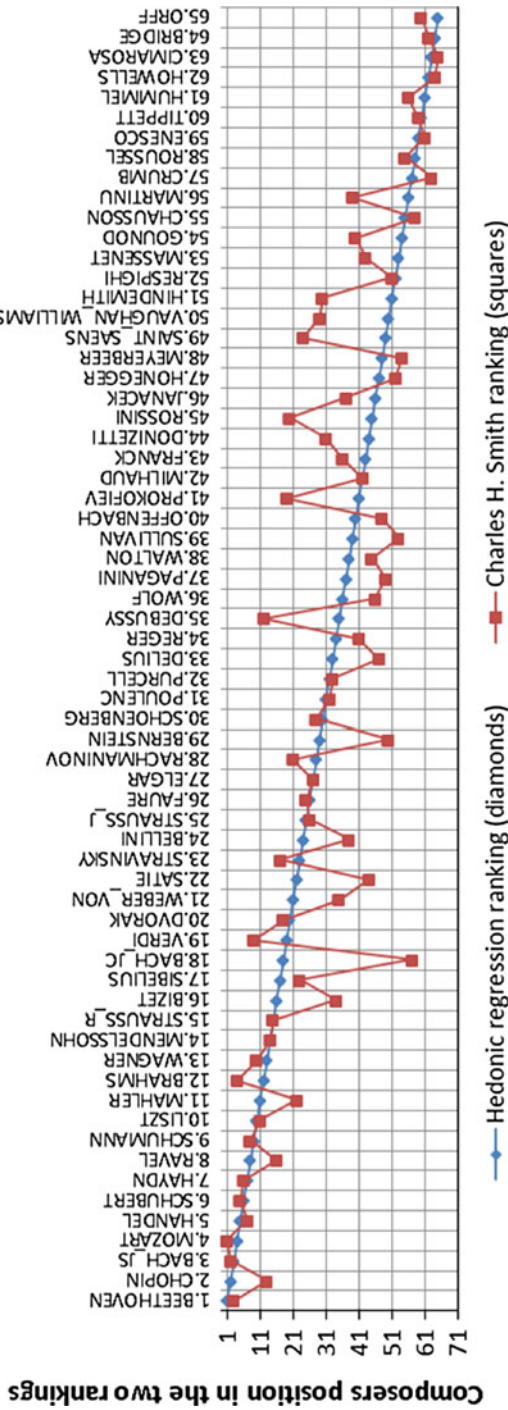


Fig. 1 Comparing the market-based ranking with Charles H. Smith's ranking. Note: Figure must be interpreted with caution as our study does not include several important composers

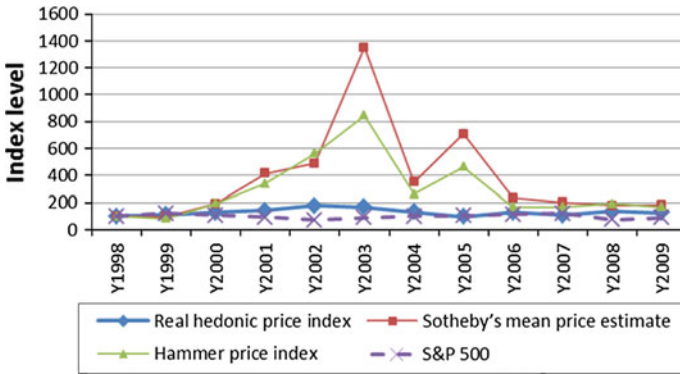


Fig. 2 Hedonic price index versus S&P 500 versus Sotheby's mean price estimates and hammer prices

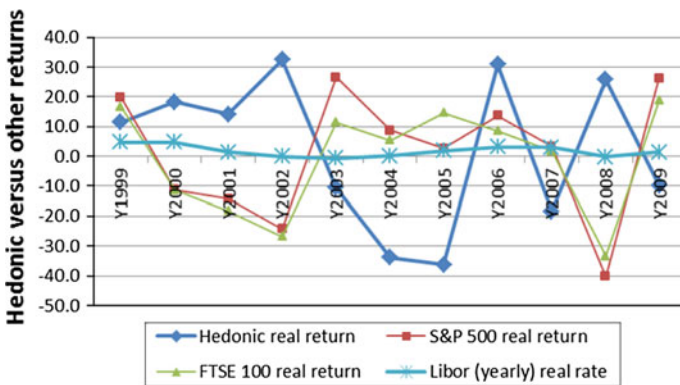


Fig. 3 Yearly real returns (%)—hedonic versus other returns

woodwinds, brass, percussion and keyboard instruments and vocal parts.²⁹ This may in part explain the low significance of the style of music in the regression.

The last three characteristics (signature, fragmentation and market share) all have the expected sign (e.g. fragmentation leads to a 12 % reduction of value with respect to a complete manuscript), but parameter estimates are not statistically significant. That the fragmentation of a work does not significantly reduce its value (*ceteris paribus*) is troubling. This could rationalize a dubious practice of fragmenting complete music manuscripts and selling them in parts—a strategy that musicologists resent as a crime akin to chopping the Mona Lisa into quarters

²⁹ Of the 8 styles of music, 'opera manuscripts' have, on average, the largest number of pages (a sample mean of 122 pages), while 'other vocal' has the smallest (10.7 pages). Therefore, their difference in means is 111.3. A 95 % confidence interval for the difference in sample means is given by (75.4, 147.1). Since this interval does not include 0, we can rule out that the difference in sample means is due to random variability and infer that there is correlation between styles of composition and the number of pages.

and which demands deeper investigation.³⁰ The parameter for MKTSHARE indicates that scarcity, measured as a composer smaller market share, tends to increase the price of manuscripts. Although not statistically significant in the first specification, we examine a second specification in Table 2 that includes MKTSHARE but removes other insignificant dummy variables (the type of music—symphony, etc., the fragmentation and the signature). This turns MKTSHARE into a marginally significant (at 7 %) variable. The second specification has been selected as the basis for constructing the composers' ranking and the hedonic price index, but both specifications generate quite similar rankings and price indices.³¹

4.2 Composers

The 65 composers included in the study are identified in Table 3, along with information on the number of auctioned manuscripts for each composer (for a total of 357 manuscripts). Table 3 also reports the estimated composer's name parameter, standard error and *p* value. As mentioned above, each composer's dummy estimate can be interpreted as representing his implicit market value vis-à-vis that of Milhaud. For example, the market value of a typical work by Beethoven is 4,421 % [$\exp(3.811) - 1$] higher than the market value of a typical work by Milhaud. We also provide the standard error of this per cent rate.

In analysing Table 3, a few considerations should be borne in mind. First, the reported standard errors allow us to infer the significance of the parameter estimate relative to the one for Darius Milhaud (0), but not relative to any of the other composers on the list. Secondly, as should be expected, the closer to Milhaud a composer is (in terms of ranking) and the less significant is the parameter estimate relative to Milhaud. These statistical difficulties have led some economists to avoid reporting this type of ranking in the literature on paintings. Furthermore, there is perhaps a fear that people will make a judgment on the artistic value of a composer based on such rankings.³² However, this is just a ranking of prices paid for manuscripts, all other characteristics being controlled for. That the market is willing to pay more for a 'Beethoven' than for a 'Milhaud' is a market reality, not necessarily an ultimate judgment on the artistic value of both composers. Furthermore, we believe, as some other economists with respect to paintings (e.g. Hodgson and Vorkink 2004), that a ranking of composers according to their

³⁰ A Mozart manuscript bought at a well-known auction house in the 1970s was split up page by page. Of course, this type of vandalism should not (necessarily) be attributed to auction houses. Allegedly, Mozart's widow, Constanze, tore some of Mozart's works in two to boost their values.

³¹ The first and second specifications can be viewed as unrestricted and restricted models, and we can do an *F* test on the joint null hypothesis ($H_0: \alpha_j = 0$) for the nine parameters associated with style, signature and fragmentation variables. We have that: $F = 1.37 < F_c(0.95; 9; n-T-J) = 1.9$. Thus, we cannot reject the joint null hypothesis, and we conclude that these nine variables have no joint significant effect on the price of manuscripts. Therefore, we prefer the second specification, which also provides slightly lower values for the Akaike, Schwarz and Hannan–Quinn criteria.

³² Musicologists also traditionally tend to stay away from rankings. One exception is Farnsworth (1966) who polled across several years (1938, 1944, 1951 and 1964) the members of the American Musicological Society in an effort to learn which composers they held in highest regard.

individual market valuations may be of intrinsic interest to anyone fond of classical music. Also, several rankings of composers exist, and it might be of interest to see how the hedonic regression market ranking performs, relatively. All composers in this study contributed significantly to the history of music, although, undeniably, some are great and some are less great. At a glance, the Top 10 names in Table 3 are ‘household names’ while the last 10 are likely to be unknown to most people with little exposure to classical music. Arguably, there are a few important composers missing from this list. Some of them are not in the ranking simply because none of their manuscripts were sold during the period of the study (e.g. Palestrina, Monteverdi, Corelli, Vivaldi, Smetana, Borodin, Mussorgsky, Tchaikovsky, Grieg, Rimsky-Korsakov, Puccini, Berg, Copland, Messiaen and Britten) or they were removed from the sample because only one of their manuscripts was sold during the period (e.g., Telemann, Rameau, Gluck, Berlioz, Bartok and Shostakovich).

Any ranking (beyond the statistical problems evoked above) is always controversial, and Table 3 is also likely to raise a few eyebrows.³³ More precisely, Fig. 1 compares our market-based ranking analysis with the ranking of Smith (2000), a ranking that is generally in line with the scholarly consensus, as much as one exists.³⁴ The line with the ‘diamond’ marker corresponds to the hedonic regression ranking while the one with the ‘square’ marker gives the Smith ranking. At a glance, the hedonic regression methodology performs relatively well in ranking composers included in the study. We see, however, that the market-based index ranks Bizet, Johann Christian Bach, Satie and Bernstein higher (and in the case of J. C. Bach, much higher) than the ranking these composers have received in Smith (2000). This could be due to the few manuscripts—2 or 3—that we have for these composers. Sometimes, a less great composer produces a work that is great and that is extremely popular.³⁵ In this case, the manuscript might be highly prized. Bizet composed *Carmen*, one of the best-loved operas; Bernstein composed *West Side Story*, a piece that stands out against the whole of that composer’s output. The ranking of J.C. Bach, arguably one of the less great composers in the database (despite Mozart’s lifelong admiration), is difficult to rationalize beside a collector’s desire of connecting with an illustrious family of musicians. We also see that the market ranking grossly undervalues Debussy and Prokofiev, whose major contributions to the development of music composition put them clearly in a league above

³³ See also the numerous comments in the *New York Times* (January 9, 2011) generated by the ‘Top 10’ list proposed by music critic and columnist Anthony Tommasini.

³⁴ Smith (2000) has produced two rankings: (1) A ‘primary’ ranking for 444 composers based on objective criteria (number of available recordings of their music as listed in standard music recordings catalogues (*Schwann*, *Gramophone*, etc.), numbers of items on and by the composers held by participating institutions in the OCLC ‘WorldCat’ database (over 20,000 libraries) and the overall size/length of entries on the composers in about a dozen standard reference works; (2) A ‘derived’ or ‘secondary’ ranking of the 111 most influential composers based on a list of composers that they influenced. See the *Classical Music Navigator* for an explanation of the methodology. We compare our hedonic ranking to Smith’s primary ranking re-ordered to take into account missing composers in our sample.

³⁵ Domenico Cimarosa’s opera *Il Matrimonio Segreto* (1792) enjoyed a bigger success than any opera Mozart had in Vienna.

Hugo Wolf, Paganini and Max Reger.³⁶ Further down the ranking, ‘well-loved’ composers such as Rossini, Saint-Saëns, Vaughan Williams and Hindemith are surprisingly ranked below the ‘middle-of-the-pack’ Milhaud.

4.3 Hedonic price index and returns

This section investigates some of the financial aspects of the market for music manuscripts. The estimates for the time series dummy parameters along with standard errors and the estimates of nominal annual returns (based on Eq. 2) along with their associated standard errors are reported in Table 4. We obtained real returns from nominal returns by subtracting yearly inflation in the UK.³⁷ From these returns we can also generate the hedonic (nominal and real) price indices. Columns 9 and 10 give, for all manuscripts auctioned in a given year, an index of the unweighted mean of Sotheby’s minimum and maximum price estimates, and the unweighted average hammer price. Column 11 gives the S&P 500 index (re-based so that its value is 100 in 1998). The real hedonic price index for music manuscripts is plotted in Fig. 2 together with Sotheby’s mean price estimates and actual (average) hammer prices, and the S&P 500 index. In line with other results in the literature (e.g. Campos and Barbosa, 2009), the hedonic price index exhibits lower variability than the Sotheby’s estimates and actual hammer prices, which is consistent with the objective of the hedonic methodology to control for movements over time in the heterogeneity of the quality of the music manuscripts offered, which the other two indices do not attempt to do. The real hedonic price index shows that there was a rapid increase in the price of music manuscripts during the period 1998–2002, followed by a drop of equivalent magnitude up to 2005. A second boom that started in 2005 came to an end in 2009. Although the hedonic price index appears (superficially) ‘close’ to the S&P 500 index in Fig. 2, it is also clear that both indices seem to diverge for several periods, and comparing implicit returns from these two series is likely to be informative.

Yearly real returns on music manuscripts calculated in Table 4 are plotted in Fig. 3 together with real returns obtained from investing in either the S&P 500 or the FTSE 100 stock indices and the series for the yearly real Labor rates. Figure 3 clearly indicates that returns on music manuscripts have been very volatile and it might be of interest to compute some statistical properties of these return series (Tables 5 and 6). Table 5 reports that the yearly real return on classical music manuscripts over the 1999–2009 period was 2.2 % while the standard deviation of these annual returns was 25.1 %. We can put these figures in perspective by noting that the average annual real return of investing in the S&P 500 over the same period was 1.0 % with a standard deviation of 21.4 %. Therefore, the average yearly return on classical music manuscripts was higher but this investment turned out to be more risky. We can also provide a longer-term comparison by reporting some results from

³⁶ Paganini, 37th in our ranking, was one of the very first ‘performing stars’ (with Liszt), famous for his technical mastery and virtuosity on the violin but (allegedly) much less for his gift as a composer.

³⁷ Recall that these manuscripts are sold in English pounds. Yearly inflation is computed from the CPI index obtained from the UK office for National Statistics.

the study of Mei and Moses (2002). They find that during the 1950–1999 period, the annual real return to art based on New York auctions was 8.2 % with a standard deviation of 21 %, while the mean return of investing in the S&P 500 over the same period was 8.9 % with a standard deviation of 16.1 %.

More generally, some studies find that the financial returns on art are low, on average, relative to stocks in part because art objects also yield an intrinsic psychic return from owning and viewing them (Baumol 1986; Frey and Pommerehne 1989), while others find returns on art to be relatively high (Chanel et al. 1994; Goetzmann 1993) depending on the time period and the artworks under consideration, as it also appears to be the case for classical music manuscripts in the 1999–2009 period. According to Hodgson and Vorkink (2004), however, one feature that seems robust is that art returns are at least as variable as stocks returns, so that art tends to be a risky investment. A point which is then often made is that despite its high variance, art portfolio can serve as a useful function in a diversified portfolio to counter, or at least be neutral to, general market risk (see also, among others, Ginsburgh and Jeanfils 1995; Mei and Moses 2002). The correlation matrix between different returns series given in Table 6 suggests that returns on manuscripts and stock markets tend to be negatively correlated. Low, let alone negative, covariance (or ‘beta’ values in the language of the capital asset pricing model—CAPM) suggests that music manuscripts could reduce the riskiness of a portfolio comprised of stocks only.³⁸ An unconditional CAPM estimation of the (excess) hedonic returns on the (excess) S&P 500 returns does indeed generate a negative value for beta.³⁹ Of course, a diversification strategy based on this characteristic would tend to prop up the price of music manuscripts and reduce their returns over the holding period.⁴⁰ The time period of the study is, however, much too short for any conclusive statements relative to the investment performance of music manuscripts, and the problem of temporal instability of key parameters (such as the beta) remains an issue to be explored further.

³⁸ The ‘beta’ of a financial asset is defined as the ratio between the covariance of the asset’s return, with that of a general market portfolio, and the market variance. In a CAPM model applied to music manuscripts, beta measures the sensitivity of the music manuscript’s excess returns to the excess returns of a market portfolio (e.g. the S&P 500 or the FTSE 100). Excess returns are calculated relative to a risk-free asset, for example, the one-year Libor rate.

³⁹ Our econometric estimate for beta is -0.61 (statistically different from 0). A negative beta means that the returns on music manuscripts generally move opposite the returns on the market portfolio: one will tend to be above its average when the other is below its average (as Fig. 3 also illustrates).

⁴⁰ That the average real return on music manuscripts is above the real return of the S&P 500 during the 1999–2009 period indicates an undervaluation of the price of manuscripts (although this reasoning abstracts away from insurance premia, transaction costs, liquidity issues and other factors that may lead to a positive premium).

4.4 Nationalities and periods

In another specification, we omit the name of the composers and group them instead by nationalities and periods of music.⁴¹ All other variables remain unchanged (with respect to specification 2). Birthplace was the main criterion for attributing nationality (see footnote 17 for well-known problems of attributing nationality). Table 7 shows that the price of an Austrian composer manuscript might be, on average, 294 % higher than a French composer manuscript. The parameter estimates for Polish, Austrian and German nationalities are statistically significant. Note that Table 1 provides the distribution of manuscripts by nationality. Chopin is the only Polish composer in our data base and this, of course, drives our results. Table 7 also shows the market-based ranking for musical periods, traditionally divided into Baroque (1600–1750), Classical (1750–1825), Early Romantic (1825–1850), Middle Romantic (1850–1890), Late Romantic (1890–1915) and twentieth century. No manuscript from the Renaissance period (1450–1600) was auctioned at Sotheby's during the period of this study. All periods are ranked relative to the Baroque period, and the market-based ranking is nearly an historical one—ancient manuscripts fetch, on average, a higher price (all else equal), and the parameters are highly statistically significant. As in other art markets, collectors are willing to pay a premium for older manuscripts. Late Romantic or twentieth century manuscripts have a markedly lower price than those from the Baroque period. Manuscripts of the Middle Romantic period constitute a surprising exception to this historical ranking as the market seems to attribute them the lowest value.

5 Conclusion and further research

This paper provides, for the first time, an analysis of the auction prices of classical music manuscripts. We use the hedonic price methodology instead of the repeat-sale approach given the short auction period considered (1998–2009) and given that music manuscripts (unlike printed editions) are sold and re-sold infrequently. We estimate the contribution of different characteristics of manuscripts on their auction prices. The hedonic approach also generates a price index that provides a measure of the average returns and high risk of collecting and investing in music manuscripts, and a ranking of composers based on their individual market valuations and which is 'roughly' consistent with existing rankings based on other methods.

Beyond the immediate objectives of the paper, there are broader ramifications that may lead to further research in this area. First, as argued by Ashenfelter and Graddy (2003), the value of most important works of art is established by public auction, either directly, by an actual sale, or indirectly, by reference to other sales, and '[a]lthough the market is surely not all that is important in the judgment of art and artists, it is certainly one of the key components of our understanding of what is

⁴¹ The name of the composer 'picks up' the musical period and this creates multicollinearity between the two variables. Hence, we generate a new specification which re-groups composers by nationality. This is a priori an interesting manuscript's characteristic given that classical music often includes a nationalistic dimension to which some collectors may strongly identify.

good and bad'. How the auction system works and how well it performs is thus a critical determinant of how the public's preferences are translated into the evaluation of artistic work. New studies are largely undertaken to refine understanding of the workings of the auction system in general. Examining classical music manuscript auctions may help us to advance our comprehension of several auction puzzles such as the declining price anomaly, the masterpiece effect and the sales rates.⁴² Beyond the typical strategies of auction houses (e.g. ordering of the lots, the role of secret reserve price and the role of expert estimates), the practice of fragmenting complete music manuscripts and selling them in parts demands deeper study and investigation.

Second, an analysis based on a much longer time period could allow the introduction of interactions between time and characteristic dummies to reflect changes in the publicly perceived artistic value of a composition, a composer or a family of composers. As aptly put by Hodgson and Vorkink (2004), two elements of uncertainty enter into consideration for the potential buyer: 'uncertainty over the future evolution of one's own taste and uncertainty over the future evolution of tastes of society in general'. In November 1827, Beethoven's estate of 252 music autographs, sketches and notebooks was sold at auction. According to Stroh (2007), the lots that excited greatest demand might surprise today's auctioneers: the *Fifth Symphony* sold for just six florins while the *Septet* Op. 20 sold for 18 florins. Other complex issues could be explored. Did the values of the Russian Nationalist School (e.g. Balakirev, Borodin, Mussorgsky and Rimsky-Korsakov) versus the French Impressionists (e.g., Debussy, Ravel and Roussel) versus the Second Viennese School (e.g. Schoenberg, Berg and Webern) fluctuate throughout the twentieth century? This sort of study may eventually reveal that changes in market values of classical music manuscripts are indicative of larger cultural or ideology shifts. This is left for future work.

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⁴² On declining price anomaly, see McAfee and Vincent (1993). On the masterpiece effect, see Pesando (1993), Mei and Moses (2002), Goetzmann (1996) and Ginsburgh and Jeanfils (1995). On sales rates, see Ashenfelter and Graddy (2003), Campos and Barbosa (2009), Ekelund et al. (1998) and Chanel et al. (1996). On the role of expert estimates, see Ashenfelter (1989), Bauwens and Ginsburgh (2000), Mei and Moses (2005) and Marinelli and Palomba (2008).

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