You can’t export that! Export ban for modern and contemporary Italian art

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Abstract

Since 1939, an artwork in Italy can be subject to an "export veto" if it was created more than 50 years before the date of sale by an artist who is no longer living at the time of the sale. When the Italian bureau decides to exercise its right to veto exportation, these artworks cannot circulate outside the territory of Italy. Using original data from a hand-collected dataset covering all artworks made by non-living modern and contemporary Italian artists, auctioned at Christie's and Sotheby's in London and Milan between 2012 and 2016, we estimate a threshold model to consider the effect of the export veto law on price while controlling for the potential presence of a sample selection bias. We found that, while artwork prices are increasing in the time span between the year of creation and the date of sale, this effect reverses for artworks sold in Italy and created more than 50 years before the sale date. A similar pattern is also found in pre-sale estimates fixed by the auction houses, suggesting they exhibit rational behaviour in anticipating the export veto effect.

Keywords: export ban, art market, modern and contemporary art, threshold model

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1 Introduction

The globalization of the art market generally allows artwork to circulate across borders, all around the world (Schulze, 1999; Velthuis, 2013; Velthuis & Baia Curioni, 2015).[1] Some countries, such as Italy, France, the UK and more recently Germany, have laws to prohibit the export of artwork deemed relevant to the country's historical and cultural heritage.[2] In Italy there are a series of laws, modified and amended over the last 80 years, that regulates how this type of export ban works. Starting in 1939, Law number 1089/1939 established the procedure for an "export veto" allowing the bureau of MIBACT (Ministero dei Beni e delle Attività Culturali) to essentially ban artwork from export if it was created more than 50 years before the date of sale, by an artist who is no longer alive. Subsequent changes came in 1998 which, then, further evolved in 2004 with the Cultural Heritage and Landscape Code (Legislative Decree 42/2004), that introduced three distinct levels to the limitations: a total export ban, an export ban unless a free circulation certificate is issued, and the absence of circulation limitations (Pirri Valentini, 2020a). Additional reforms have been introduced since 2017,[3] but they do not affect our data set which runs through the year 2016.

Whether privately or publicly owned, artwork cannot be exported if a formal declaration of cultural interest has been filed stating the work is important to the historical-cultural heritage of Italy. If this declaration has not yet been formally made because the verification of cultural importance process is ongoing, a temporary ban can also be established, with the same proviso that the author is no longer living and the artwork was created more than 50 years before the sale.

This potential constraint to the circulation of artwork is perceived by Italian collectors as something that reduces the competitiveness of the Italian art market (Monte dei Paschi di Siena, 2012), deterring both foreign and national collectors from buying Italian pieces that could fall under the protection of the export veto law, either because the new owner might not be allowed to bring the artwork into their home country, or due to the risk that the resale value will be affected by the export ban. On the other hand, Italian collectors also believe that artwork subject to this law has been somehow certified by the State as a valuable piece, particularly for pieces that would not be in the top tier of the market. Another positive aspect of the law, from the point of view of Italian art market agents, is that it effectively becomes an instrument for keeping masterpieces inside the borders of the country (Ripa, 2012). While art

[1] In 2015, € 416.6 million worth of artworks were exported from Italy, while € 112.8 million were imported, so the balance of Italian cultural trade was in surplus. Artworks were among the main cultural assets exported from Italy, accounting for the 23.5% of € 1,773 million of total exports (Eurostat, 2022).

[2] See IBA (2020) for a recent discussion on artwork export restrictions in several countries.

[3] See Pirri Valentini (2020a).

collectors consider the application of the law as discretionary, there is an actual risk that exportation will be limited and it is perceived as such by the agents in the market. Two recent examples of the veto law being applied to pieces by modern and contemporary artists can be found in 1973 with the Mattioli Collection, for 26 artworks by artists such as Giacomo Balla, Umberto Boccioni, Carlo Carrà, Fortunato Depero, Amedeo Modigliani, and Giorgio Morandi (Mattioli Rossi & Braun, 1997), and more recently in December 2018 when the Pandolfini auction house saw 57 of its 111 lots being subjected to an export ban only a few days before auction (Maggi, 2018). And these two facts were not isolated cases. In 2015, the Export Offices of the MIBACT received 12,588 requests for certificates of international free circulation in the EU (*Attestato di Libera Circolazione*, ALC, that is, Free Circulation Certificate). Overall, 12,300 export licenses (inside the EU) were issued, 458 definitive export licenses (outside the EU) were authorized, and 50 requests received a denial by the issue of 50 decrees of declaration of public interest.[4] The MIBACT, taking it upon Superintendencies' initiatives, issued additional 65 notifications. So, MIBACT made a total of 115 notifications in 2015, while in 2013 and 2014, they registered 175 and 183 notifications, respectively (Pirrelli, 2017). In addition to the Ministry's activity on the legal export of artworks, we have to consider the cases of illicit exports of artworks discovered by the Carabinieri TPC Command (*Comando Carabinieri Tutela Patrimonio Culturale*, Command for the Protection of Cultural Heritage), which were 108, 117, and 181 respectively in 2013, 2014, and 2015. These records are not only due to smuggling outside the market. There have been cases in Italy where important auction houses helped to illicitly export pieces of art, to elude the veto law, such as the famous case of Sotheby's reported by Watson (1997), which finally led to the suspension of two executives following the illicit export out of Italy of an Italian artwork that fell within the applicability of the veto law (Ibrahim, 1997; Tully, 1997).

The institutional framework we outlined affects the art market (Onofri, 2009), possibly creating formal trade barriers along national borders. Nationality, and country of residence have an impact on the success of the artists in a certain country (and hence the price of a piece) (Quemin & van Hest, 2015), which naturally leads to the questions of whether this effect is the same for all artwork, whether or not they fall under the umbrella of the veto law and how this export ban affects the demand for Italian artwork either when they are sold in Italy or abroad.[5]

To test the effect export ban we use original data from a hand-collected dataset covering all artworks made by modern and contemporary Italian artists who are no longer alive, auctioned at Christie's and Sotheby's in London and Milan, from 2012 to 2016. These data allow us to consider how the export ban affects the price of the artworks by the same artist when his/her artworks

[4]Such a denial is also called *notifica*, notification.

[5]The Italian export veto law can be applied only if the artwork is sold within the territory of Italy and held by sellers who are located in Italy. However, the Italian law allows an application to be filed on artwork purchased abroad by Italian citizens and then brought into Italy after the purchase, allowing the public sector to keep the artwork in Italy if it is considered important for Italian culture.

are traded before and after the threshold year created by the Law concerning the creation to sale date, also considering the artists' price trends in the same period in foreign markets. Furthermore, since we are using auction data and presale estimates are available in the catalogues, we can also investigate whether the auction houses anticipate the possible effects of the export veto law when choosing the range of presale estimates. If so, this would suggest that auction houses behave rationally when fixing the presale estimates.
To answer the first question, we estimate a threshold model with endogenous sample selection that allows us to consider the effect of the Law while controlling for the potential presence of a sample selection bias. Since presale estimates are available for all the observations, a similar threshold model without endogenous sample selection is used to answer the second question.

We found that, while artwork prices are increasing in the time span between their creation year and the sale date, this effect reverses for artworks sold in Italy and created more than 50 years before the sale date, our threshold. This could mean that the export veto law not only crowds out the demand for artwork that could be subject to an export ban, but that this law also reduces the price as these artworks age. Thus, the effect of an export ban on price may discourage collectors and artists from respectively selling or buying and creating artworks in the Italian market. A similar pattern (i.e., the negative impact of artwork age after its 50^{th} year) is observed in the presale estimates of artworks to be sold in Italy, for the minimum, the maximum, and the average presale estimates. The same effect is not present on pieces sold abroad, so this could suggest that auction houses in Italy rationally fix the presale estimates when an export ban could potentially be applied to the artworks brought to sale.

Our paper contributes to law and economics literature focusing on the economic effects of the export veto law within the strands of the art market studies, such as copyrights, moral rights, *droit de suite* laws, disputes on authenticity, and ownership of artworks in presence of possibly stolen pieces. Our paper also adds novel results to the empirical literature on economic impacts of regulation and limitation of property rights.

The remainder of the paper is organized as follows. In Section 2 we present the export regulation of the Italian art market and the previous studies on export veto laws, describing its main economic issues. In Section 3, we describe our data and variables. In Section 4 we present the methodology used for each research question and our results. Section 5 discusses the results and concludes.

2 Export veto and the art market

In this Section, we present the institutional framework of the export veto in the Italian art market. We refer to the Appendix A for a discussion of the main links between the export veto law and other art market issues.

2.1 Cultural goods, cultural heritage, and institutional barriers

Cultural goods can be considered parts of the cultural heritage of a nation (national patrimonial approach) or the cultural heritage of humanity (cosmopolitan patrimonial approach). With the first approach, the right of ownership of these goods can be limited by prohibiting their circulation outside national borders.[6] Several countries do have laws along these lines, actually establishing institutional barriers to the trade of cultural goods, aimed at protecting the national cultural heritage (IBA, 2020; Karataş, 2019; Pirri Valentini, 2020a). Following the second approach, the export of these goods cannot be prohibited by limiting their right of ownership.

The Italian export veto law

Italian cultural heritage legislation governs the exploitation, conservation, protection, and use of cultural heritage and has its roots in Law no. 1089/1939 "for the protection of things of artistic and historical interest" and in Law no. 1497/1939 "for the protection of landscape beauty". These laws introduce an export ban on certain goods from Italy, as well as a pre-emption of the State for goods subject to notification by the ministry if they fall within the category of cultural goods.[7]

More recently, Legislative Decree 112/1998 entitled "Cultural goods and activities", introduces a precise definition of cultural goods.[8] Furthermore, article 17 of Italian Law 88/1998 (paragraph 1) states: "If export would damage the national historic and cultural patrimony, then export from the territory of the Italian Republic is forbidden for those goods, which, according to Article 1 of the present Law and according to Presidential Decree of the Italian Republic, number 1409, from 30 September 1963, and subsequent modifications, are of a specific nature; or belong to a specific historical and cultural milieu; and are of particular interest from the artistic, historic, archaeological, ethnographic, bibliographic, documentary or archival point of view". In other words, it is forbidden to export privately or publicly owned cultural goods if it is deemed to damage the cultural and historical patrimony of Italy (Onofri, 2009).[9] What this law does is introduce a possible export ban on cultural goods, which works as a barrier to trade that influences both the sellers, by limiting the potential pool of collectors who can buy the artwork, and the buyers, who can experience a decrease in the economic value of their artworks because future circulation

[6] Notice that this type of law exists also at an international level, as we see in the European Union, with the Council Regulation no. 116/2009 of 18/12/2008, which introduced an export licence for cultural goods crossing the Community's outer borders.

[7] Article 9 of the Italian Constitution also protects the landscape and the historical and artistic heritage of the nation; and article 117 specifies the competencies of the State and the Regions in the matter of protection and legislation of cultural goods.

[8] Article 148 (paragraph 1, letter a) defines cultural goods as those that make up the historical, artistic, monumental, demo-ethno-anthropological, archaeological and archival heritage - including books - and the others that constitute testimony having the value of civilization.

[9] Article 18 of the same Law (no. 88/1998, par. 1) states that export is allowed for objects for which Art. 17 does not apply, but only after the qualified authority has released a free circulation permit.

is possibly limited. In particular, the seller must follow a complicated procedure to understand if he/she can sell cultural goods abroad; if the permit is not released, he/she can only sell it within the Italian territory.[10] On the other hand, if a non-Italian buyer buys an artwork that meets the conditions for a potential export veto, he/she could find himself/herself in the situation of being the owner of an artwork that cannot be brought across the Italian border, if the ban comes into effect (Figini & Onofri, 2005). This potential situation would discourage foreign collectors from making purchase agreements with Italian sellers when the pieces they are interested in meet the conditions for a possible export veto. The conditions for the applicability of the export veto in Italy changed in 2017, with a series of modifications of the regulation that could have impacted the way market agents made their choices. However, our analysis will be limited to the years between 2012 and 2016, and will not consider the possible effects of these modifications.[11]

The "veto risk"

The export veto can be a credible signal of artwork quality since it is issued by a public agency such as the Ministry (Ripa, 2012). Still, this information is only communicated to the owner of the artwork. The certificate (ALC) is the document through which the Ministry declares that an artwork can leave the Italian territory. This certificate is valid for five years and is not renewable. Still, it can also be requested by the owner to know the existence of a possible limitation in advance without establishing its status or destination. After having ascertained the adequacy of the value of the artwork and based on the reports received by the Ministry, the export office issues or denies with a reasoned judgment the certificate of free circulation, notifying the interested party within 40 days from the request. Refusal involves the initiation of the declaration procedure (notification). At the same time as the denial, the declaration of public interest is communicated to the interested party, and the artwork is subject to export veto. Within this term, the export office can propose to the Ministry the compulsory purchase of the artwork for which the certificate of free circulation has been requested (pre-emption). The Ministry has the right to purchase the artwork for the value indicated in the report. The purchase order is notified to the interested party within the peremptory term of 90 days from the complaint. Until the purchase order is notified, the interested party can renounce the exit of the artwork and arrange for the withdrawal of the same. Therefore, the information on the notification process is private if it is not completed. Once the procedure has been completed, the information that the artwork cannot leave the Italian territory becomes public through the decree of the Ministry. However, before the notification, the probability of veto is a latent variable. For this reason, even if the "veto risk" would depend on the value of the artwork, we could not observe this variable.

[10] See Onofri (2009) and Deloitte and ArtTactic (2017) (pp. 248-251) for an explanation of the various steps of this procedure.

[11] We thank an anonymous reviewer for highlighting this point.

Furthermore, after the notification, the information on artworks that cannot leave the Italian territory is not disclosed to non-interested parties.

Previous studies on export veto laws

Despite of the possible direct (such as the effect on collectors' choice) and indirect (such as the reinforcement of home bias and the collision with ARR laws) impact of the export veto law on the art market,[12] cultural and law economics literature only counts a few studies on the role export bans have in artwork trading, likely due to the low number of countries where such a regulation has been in act over a long-enough time span, together with the difficulty of accessing data. In particular, Onofri (2009) studies the effects of the Italian export veto law on the prices of paintings by the Old Masters (from XIII to XIX century) sold between 1992 and 2002. In her study, the author finds that Italian artwork by Old Masters that sold in Italy shows a negative price differential with respect to artworks by the same artists sold in the UK or Germany. At the same time, she finds that pieces by English and German Masters sold in Italy present an even larger negative price differential with respect to artworks by the same artists sold abroad. Karataş (2019) analyses the effects of the introduction of the Cultural Property Protection Act in Germany in 2016, a limitation to the trade of old artwork which is deemed to be important for German culture and history, similar to the one already on the books in Italy and France. The author tests the presence of these effects by using a combination of hedonic regression and the difference-in-differences method, to take into account the characteristics of the artworks when studying the impact of the law. The author finds that the prices are 17% lower for works which could fall under regulation and this effect is even higher (24%) in the years just before the (announced) introduction of the law. Other scholars discuss the existence and the role of export veto regulations, both in general terms (Ginsburgh & Mairesse, 2013; Schulze, 2003) and with a special focus on Europe (Bises, 1997) and on the UK (McAndrew & O'Hagan, 2000; O'Hagan & McAndrew, 2001). However, these previous papers do not empirically investigate the possible impact of the regulations on artwork prices.

In general, what emerges from previous studies is that trade limitations, such as the art export veto we are analyzing have important economic implications on the market. While the origin of this kind of protectionism has to be seen as a sense of national belonging and pride, the new laws that are emerging in countries that did not have any kind of export ban could be motivated by the growing internationalization of the art market due to the globalization of art (McAndrew & O'Hagan, 2000; O'Hagan & McAndrew, 2001). On one hand, these laws aim to counter art globalization by preventing important cultural goods moving towards richer countries; on the other hand, though, they

[12] See Appendix A for more details on the links between the veto Law and home bias and ARR laws.

also forbid the circulation of artworks and this strengthens the already existing home bias effect in the national art markets.
Our contribution to the literature on this topic is two-fold: firstly, by focusing on the same artists sold in Italy and abroad, who were not alive at the time of the sale, we can consider what happens when passing from meeting only one of the conditions (namely the age of the artwork lower than 50) to having met both conditions, something that could not be done with Old Masters since, by definition, their pieces were all made more than 50 years before the sale date. Secondly, we are studying how a legislative threshold can impact prices when this potential effect is widely anticipated by the buyers, given that the law in Italy dates back to the beginning of the XX century. The effect could, indeed, be different with respect to a law that could not be predicted well in advance, such as is the case in Germany.
Law and economics literature focused on other aspects of the art market, such as copyrights, moral rights, *droit de suite* laws, and disputes on authenticity (Landes & Levine, 2006), also studying the disputes on ownership of artworks, in presence of stolen pieces (Landes & Levine, 2006; Posner & Landes, 1996). So, our paper contributes to this literature. Our paper also adds to the wider literature on economic impacts of regulation, ranging from intellectual property laws (e.g., Besen & Raskind, 1991; Handke & Towse, 2007; Merges, 1995; Towse, Handke, & Stepan, 2008) to land use and housing laws (e.g., Grout, Plantinga, & Jaeger, 2014; Kim, Leung, & Wagman, 2017; Needham & Lie, 1994; Severen & Plantinga, 2018), and embracing also the effects of the antitrust laws on the market (e.g., Asch, 1975; Crandall & Winston, 2003; Posner, 1970; Seldeslachts, Clougherty, & Barros, 2009; Stigler, 1966).

3 Data

To answer our research questions we use data from the transactions of modern and contemporary artworks by non-living artists sold at auction with Christie's and Sotheby's in Milan and London between 2012 and 2016.[13] We focus on a sample of cross-listed artists traded in both the Italian and the international art markets to have comparable characteristics between the two markets. At the same time, this allows us to study artists in both a global market and a local market. The data was hand-collected from the official auction house catalogues on the websites (www.christies.com and www.sothebys.com): we first collected the full auction catalogues, before the auction, and then we collected the official hammer price, after the end of each auction. This allows us to take into account also the artworks that were sold after the end of the

[13]Our data cover the period between 25/05/2012 and 24/11/2016. Between 2017 and 2018, further changes were made to increase the time frame from creation to sale date from 50 to 70 years and a minimum value for the artwork included was added. See Law number 124/2017, Ministerial Decree number 537 of 06/12/17, and Ministerial Decree number 246 of 17/05/18. This latter decree, which introduced the price threshold, was suspended by Ministerial Decree "Bonisoli" number 305/2018 (July 2018), which was then suppressed by Ministerial Decree number 367/2020 (July 2020). See also Deloitte and ArtTactic (2017), Mastropietro (2019), Pirri Valentini (2020b), and Cardinale (2021).

auction, as well as buy-ins. We also collected information about the artworks and the artists from various websites (www.artfacts.net, www.artnet.com, and www.arsvalue.com).

The variables we use in our analysis are the following: `Price`, the natural logarithm of the hammer price (only when the artwork is sold); `Age`, the age of the artwork computed as the difference between the year the auction took place and the year of creation, divided by 100;[14] `Veto`, a dummy variable equal to 1 when the artwork was created at least 50 years before the auction (meaning that the export veto is possible, but only if the artwork is at sale in Italy); `Sold`, a dummy variable equal to 1 when the artwork was sold at auction; `Italy`, a dummy equal to 1 when the auction took place in Italy; `Sotheby`, a dummy equal to 1 when the auction was hosted by Sotheby's; `Year`, a variable that represents the year the auction took place, to control for potential year-specific effects, with a range from 1 to 5, where 1 refers to 2012, 2 to 2013, etc. Auction catalogues often report a range of presale estimates to guide the collectors, with a minimum and a maximum estimation by the auction house to signal the possible economic value of the artwork. We collected this information and created the variables `MinPresale` (the natural logarithm of the minimum presale estimate), `MeanPresale` (the natural logarithm of the average between maximum and minimum presale estimates), and `MaxPresale` (the natural logarithm of the maximum presale estimate). Notice that these variables are available for a wider group of artworks than the group where the hammer price is available since unsold pieces also have presale estimates.

Our dataset covers 1,529 artworks in the auction, made by 70 different Italian artists, and no longer living at the time of the sale. 1,144 pieces were sold. We also categorized the "artwork material" into 14 types according to the technique, the support, etc. Table 1 contains descriptive statistics of our main variables, while Table 2 contains descriptive statistics for the variable `Year`. 30% of the items could potentially be subject to an export veto, 75% of the items auctioned were sold, 63% of the auctions took place in Italy, and 59% of the auctions were hosted by Sotheby's. A higher number of auction lots was observed in 2015.

4 Empirical analysis and results

In this section, we present our methodology and results regarding the effect of the Italian veto law on the prices of artwork in Italy and abroad (Sec. 4.1) with the possible anticipation of this effect by the auction houses in the presale estimates (Sec. 4.2).

[14] Notice that the artworks in our dataset are all officially dated by the auction houses, and this is a welcome feature of our data. However, older pieces and/or artworks traded in lower-end markets might be undated or wrongly dated on purpose, making the identification more complex. We thank an anonymous reviewer for highlighting this point.

Table 1 Descriptive statistics. Values are rounded to the second digit.

Variable		N	Mean	SD	Min	Max
`Price`		1,144	11.29	1.37	7.39	16.28
`MinPresale`		1,529	10.76	1.33	7.16	16.27
`MeanPresale`		1,529	10.94	1.33	7.57	16.42
`MaxPresale`		1,529	11.10	1.33	7.86	16.55
`Age`		1,529	0.41	0.17	0	0.99
`Veto`		1,529	0.30	0.46	0	1
`Sold`		1,529	0.75	0.43	0	1
`Sotheby`		1,529	0.59	0.49	0	1
`Italy`		1,529	0.63	0.48	0	1
`Price`	if `Italy` = 1	715	11.09	1.20	7.82	14.76
`MinPresale`	if `Italy` = 1	961	10.58	1.15	7.31	14.22
`MeanPresale`	if `Italy` = 1	961	10.77	1.15	7.72	14.38
`MaxPresale`	if `Italy` = 1	961	10.92	1.15	8.00	14.51
`Age`	if `Italy` = 1	961	0.45	0.14	0.02	0.99
`Veto`	if `Italy` = 1	961	0.37	0.48	0	1
`Sold`	if `Italy` = 1	961	0.74	0.44	0	1
`Sotheby`	if `Italy` = 1	961	0.72	0.45	0	1
`Price`	if `Italy` = 0	429	11.63	1.37	7.39	16.28
`MinPresale`	if `Italy` = 0	568	11.05	1.55	7.16	16.27
`MeanPresale`	if `Italy` = 0	568	11.24	1.55	7.57	16.42
`MaxPresale`	if `Italy` = 0	568	11.40	1.55	7.86	16.55
`Age`	if `Italy` = 0	568	0.35	0.18	0	0.87
`Veto`	if `Italy` = 0	568	0.21	0.41	0	1
`Sold`	if `Italy` = 0	568	0.76	0.43	0	1
`Sotheby`	if `Italy` = 0	568	0.35	0.48	0	1

Table 2 Descriptive statistics by `Year`. Values are rounded to the second digit. Percentages are computed with respect to the total pieces sold in each year.

	All	`Italy` = 0		`Italy` = 1	
`Year`	N	N	%	N	%
1 (2012)	284	90	31.69	194	68.31
2 (2013)	277	95	34.30	182	65.70
3 (2014)	298	106	35.57	192	64.43
4 (2015)	339	131	38.64	208	61.36
5 (2016)	331	146	44.11	185	55.89

4.1 The Effect of the Italian Veto Law on artwork prices

Since the `Price` is only observed for items sold, a selection mechanism may cause a sample selection problem. To take this problem into account we estimate an endogenous selection model (Heckman, 1979) that can be formally expressed as a system of two equations where the first equation is the endogenous selection (`Sold`) equation and the second equation is the `Price` equation (Castellani, Pattitoni, & Scorcu, 2018):

$$\texttt{Sold}_i^* = \mathbf{x}_i'\boldsymbol{\beta} + \gamma\texttt{Sotheby}_i + \epsilon_i \tag{1}$$

$$\texttt{Price}_i = \mathbf{x}_i'\boldsymbol{\alpha} + \varepsilon_i \leftrightarrow \texttt{Sold}^*{}_i > 0 \tag{2}$$

where γ is a parameter, $\boldsymbol{\beta}$ and $\boldsymbol{\alpha}$ are the vectors of parameters, $\mathbf{x}$ is the vector of observable variables, and ε_i and ϵ_i are the error terms. We assume the

following joint distribution of the stochastic error terms:

$$\mathbf{E} \sim N(\mathbf{0}, \mathbf{\Omega}) \tag{3}$$

where $\mathbf{E} = [\varepsilon_i, \epsilon_i]$ is the vector of the error terms, $\mathbf{0} = [0, 0]$ is the zero vector, and $\mathbf{\Omega} = \begin{bmatrix} \sigma_\varepsilon^2 & \sigma_{\varepsilon\epsilon} \\ \sigma_{\epsilon\varepsilon} & \sigma_\epsilon^2 \end{bmatrix}$ is the variance-covariance matrix.

In the endogenous selection equation, we model the propensity of artwork i to be sold, $\texttt{Sold}_i^*$, as a linear combination of several observable characteristics included in the vector $\mathbf{x}$. The variable $\texttt{Sold}_i^*$ is latent, but we observe the dummy variable $\texttt{Sold}_i$, which indicates if the artwork is actually sold, $\texttt{Sold}_i = 1 \leftrightarrow \texttt{Sold}_i^* > 0$. Otherwise, we do not observe the $\texttt{Price}_i$ when $\texttt{Sold}_i = 0 \leftrightarrow \texttt{Sold}_i^* \leq 0$. If $\sigma_{\varepsilon\epsilon} \neq 0$, a sample selection bias exists, that is, OLS estimates of the mean $\texttt{Price}_i$ is inconsistent. A consistent estimate of the mean $\texttt{Price}_i$ can be obtained by simultaneously estimating the $\texttt{Sold}_i^*$ and $\texttt{Price}_\texttt{i}$ equations via maximum likelihood.

We estimate this model both for artworks sold in Italy and artworks sold abroad, to check for a difference in the behaviour of the prices with respect to the possible effects from an export veto law. Furthermore, we control for artist name and artwork material fixed effects, and we take into account the effect of time. Formally, we use a threshold model to take into account the effect of artwork age together with the veto effect on the artwork price, where a threshold value of age is used to identify a range of age values for which the price predicted by the model varies in some important ways. In particular, controlling for a possible structural break around the 50^{th} year, we expect a change (from positive to negative) in the effect of the age of the artwork once the conditions are met for the veto law to be applied, because we expect the negative effects linked to the law exceed the positive effects. The estimated models (one for the subsample with $\texttt{Italy} = 1$ and one for the subsample with $\texttt{Italy} = 0$) are the following:

$$\begin{aligned} \texttt{Sold}_{ijm}^* &= \alpha_0 + \alpha_1 \texttt{Veto}_i + \alpha_2 \texttt{Age}_i + \alpha_3 (\texttt{Veto}_i \times \texttt{Age}_i) + \alpha_4 \texttt{Year}_i \\ &\quad + \gamma \texttt{Sotheby}_i + A_j + M_m + \epsilon_i \end{aligned} \tag{4}$$

$$\begin{aligned} \texttt{Price}_{ijm} &= \beta_0 + \beta_1 \texttt{Veto}_i + \beta_2 \texttt{Age}_i + \beta_3 (\texttt{Veto}_i \times \texttt{Age}_i) + \beta_4 \texttt{Year}_i \\ &\quad + A_j + M_m + \varepsilon_i \leftrightarrow \texttt{Sold}_{ijm}^* > 0 \end{aligned} \tag{5}$$

In equation (5), the price of the artwork i, made by artist j, and with material m, is explained by the age of the artwork, the applicability of the export veto, and the interaction between these two variables. We also consider as explanatory variables the year when the auction took place, the artist-fixed effect A_j, and the material/technique-fixed effect M_m. The price is observed only when $\texttt{Sold} = 1$, so in equation (4), we simultaneously estimate this variable by

using the same variables of the second equation with `Sotheby` as an exogenous explanatory variable which affects the probability of sale but not prices.[15]

We use model (4)-(5) as the baseline model, where the effect of the sale year is accounted for through a linear trend. We also carry out two additional specifications: the former model considers a quadratic trend (also adding the variable $\texttt{Year}^2$) to take into account a possible non-linear trend and the latter model where the effect of time is captured by year-specific fixed effects.

Table 3 Estimated coefficients of (4) and (5) (column 1), of the model with a quadratic trend (column 2), and of the model with year fixed effects (column 3). Values are rounded to the second digit. Standard errors are adjusted for the artist-specific clusters.

	(1)		(2)		(3)	
	`Italy` = 1	`Italy` = 0	`Italy` = 1	`Italy` = 0	`Italy` = 1	`Italy` = 0
`Price` **Equation**						
`Age`	1.85***	4.26***	1.85***	4.29***	1.81***	4.31***
`Veto`	1.68***	-1.52	1.68***	-1.57	1.72***	-1.55
`Age` × `Veto`	-2.91***	1.98	-2.91***	2.14	-2.98***	2.07
constant	9.94***	10.88***	9.96***	10.25***	10.23***	10.70***
`Sold` **Equation**						
`Sotheby`	-0.89***	-0.40**	-0.92***	-0.40**	-0.94***	-0.41**
`Age`	0.52	-0.71	0.57	-0.71	0.58	-0.78
`Veto`	2.56***	1.85	2.57***	1.81	2.63***	1.81
`Age` × `Veto`	-4.48***	-1.66	-4.54***	-1.61	-4.64***	-1.55
constant	0.44	0.68	-0.15	0.74	0.44	1.00**
Artist fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Material fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
`Year`	Yes	Yes	Yes	Yes	No	No
Squared `Year`	No	No	Yes	Yes	No	No
Year fixed effects	No	No	No	No	Yes	Yes
N	961	568	961	568	961	568
$\sigma_{\varepsilon\epsilon}$	-0.14	0.03	-0.14	0.02	-0.20	-0.01

[15] This empirical problem could have been tackled using the sharp Regression Discontinuity Design methods since we have a defined cutoff on a running variable, `Age`. However, in our case, this model cannot be used given the high likelihood of having treatment manipulation, which is also suggested by the example of Watson (1997). Consequently, we do not claim to make a causal inference here but only to study the differences in the two markets, considering the law's applicability. Available upon request, we have a "qualitative" quasi-RDD, where we divided our sample into subsamples based on `Age` and observed if differences in the characteristics of the goods exist, finding none between the observation up to 5 years before and up to 5 years after the threshold. Further, looking at the relationship of price with `Age` in the two subsamples, we find none, but this may be due to the endogeneity problem emerging from the use of this same variable to build the subsamples and from the following use in the regression within the subsamples. However, comparing these two subsamples, we still observe a drop in the average level, passing from before to after the threshold.

From Table 3 we can see that, in general, the age of the artwork has a positive effect on the price. In other words, an age effect exists and it is stronger abroad than in Italy. At the same time, a threshold effect exists when the export veto becomes applicable, and it changes the age effect from positive to negative; this change is observed only for those artworks that are sold in Italy, so we can say it captures the effect of the Italian law on the Italian market. Turning to the selection equation, we can see that the dummy for the auction house Sotheby's has a negative impact on the probability an artwork will be sold. In the `Sold` equation there is no effect of the age of the artwork for the international market, but the Italian market subsample presents a positive and significant coefficient for `Veto` and a negative coefficient for `Age` after reaching the threshold. Notice however that the covariance between the errors of the main and the selection models ($\sigma_{\varepsilon\epsilon}$) are not statistically significant in either subsample, suggesting that selection is not an issue in our case. All these results are robust throughout the 3 specifications of the model we consider. Figure 1 represents the dynamic of the price with respect to the age of the artwork for both the Italian and non-Italian markets, using the coefficients from the estimation in column (2), who is more parsimonious of the non-parametric estimation in column (3) and at the same time possibly accounts for non-linearity in contrast to what the model in column (1) does.

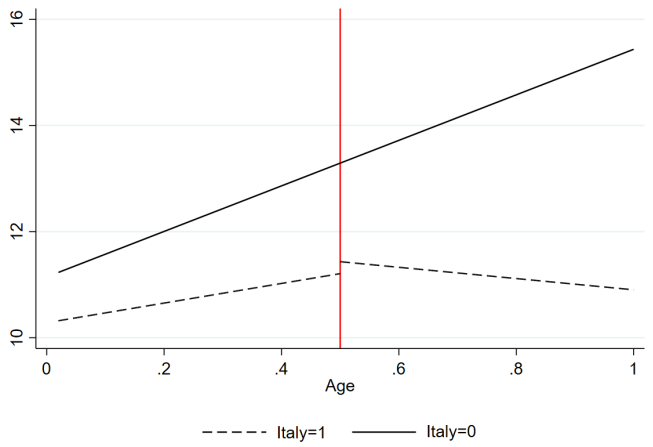

Fig. 1 Predicted `Price` values following the model with a quadratic trend, with respect to `Age`, using averages for all variables but `Age` and `Veto`, in the two subsamples identified by `Italy`. Dashed black line is for artworks sold in Italy, solid black line is for artworks sold abroad. Vertical red line is at `Age` = 0.5.

These results are in line with the intuition that introducing an export veto law distorts the effect of time on the value of an artwork. This is because the owner of the artwork bears the costs of the protection and trade barriers, decreasing the growth of the value with respect to the increasing age of the

artwork. A paradox is thus observed since the law aims at protecting the value of the artwork but the empirical result is that the economic value is reduced by the effect of the law itself. At the same time, if the main purpose of the law is to prevent art considered important to Italian culture from leaving Italy, reaching this aim generates a cost of intervention that is borne by sellers and private owners and the benefit is indirectly enjoyed by buyers and public owners.[16]

4.2 Do auction houses anticipate the effects of the Veto law?

In this section, we study whether presale estimates reported in the auction catalogues are set with in anticipation of the export veto effect we found in Section 4.1. Finding that this is the case would suggest that auction houses behave in a rational way when deciding these estimates, being aware that an export veto law effect exists. In what follows, we will check if the (minimum, average, and maximum) presale estimates present the same patterns we observed for the hammer prices. The main difference with respect to the estimation of `Price` is that presale estimates are available also for unsold pieces, so we can use the whole sample of 1,529 observations without the need to consider a selection equation model as in (4)–(5).

To check for the presence of an impact of a possible ban on presale estimates, we estimate the following equation in the two subsamples defined by `Italy`:

$$\begin{aligned} Y_{ijm} = \beta_0 + \beta_1 \texttt{Veto}_i + \beta_2 \texttt{Age}_i + \beta_3 (\texttt{Veto}_i \times \texttt{Age}_i) + \beta_4 \texttt{Year}_i \\ + \beta_5 \texttt{Year}_i^2 + A_j + M_m + \varepsilon_i \end{aligned} \tag{6}$$

where Y_{ijm} can be either `MinPresale`, `MaxPresale`, or `MeanPresale`. The model is specified on the same variables of the model in (5) (with the addition of $\texttt{Year}^2$),[17] but in this case there is no selection equation. The results for `MinPresale` are reported in the first two columns of Table 4, those for `MeanPresale` in the third and fourth columns, while those for `MaxPresale` in the last two columns.

The variable `Veto` presents a similar pattern to the one we found in Section 4.1, namely a positive coefficient for the variable in the subsample of pieces sold in Italy and negative interaction with `Age` in the same subsample. A difference with respect to the analysis of hammer prices is the effect of the variable `Age`, which is positive only for pieces sold abroad. The observed differences between the results of this analysis and the one in Section 4.1 may be due to the auction houses behaving differently when setting the presale estimates, but possibly also to the fact that here we are also considering unsold pieces since presale estimates are available for these artworks as well. Moreover, the

[16] Appendix B contains a robustness check of this analysis, based on a performance index we construct. The dynamics we found here are confirmed.

[17] Notice that we use the specification with both `Year` and $\texttt{Year}^2$, which is more informative than the baseline model but at the same time more parsimonious than the model with year fixed effects.

Table 4 Estimated coefficients of (6) for `MinPresale`, `MeanPresale`, and `MaxPresale` in the two subsamples defined by `Italy`. The values are rounded to the second digit.

	`MinPresale` `Italy` = 1	`MinPresale` `Italy` = 0	`MeanPresale` `Italy` = 1	`MeanPresale` `Italy` = 0	`MaxPresale` `Italy` = 1	`MaxPresale` `Italy` = 0
`Age`	0.63	3.46**	0.65	3.49**	0.64	3.50**
	[0.54]	[1.40]	[0.55]	[1.42]	[0.54]	[1.41]
`Veto`	1.35***	-0.45	1.36***	-0.33	1.36***	-0.35
	[0.41]	[2.42]	[0.41]	[2.44]	[0.41]	[2.43]
`Age` × `Veto`	-2.06**	0.18	-2.06***	-0.11	-2.06**	-0.03
	[0.79]	[4.64]	[0.78]	[4.70]	[0.78]	[4.66]
constant	10.97***	10.41***	11.29***	10.78***	11.14***	10.60***
	[0.42]	[0.78]	[0.42]	[0.80]	[0.42]	[0.79]
Artist fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Material fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
`Year` and squared `Year`	Yes	Yes	Yes	Yes	Yes	Yes
N	961	568	961	568	961	568

estimated coefficients are stable for all the three presale estimate variables, suggesting a possible fixed relationship between the minimum and maximum presale estimates (that is reflected on the average of the two).
In general, these results are coherent with the hypothesis that auction houses are indeed behaving in an economically rational way when fixing the presale estimates. We should however recall that we are considering only top-tier auction houses in our analysis, so this behaviour might not be found in the auction houses operating in other segments of the market.

5 Discussion and conclusions

The institutional framework of the Italian art market is marked by a series of laws, dating back to 1939, aimed at protecting the national heritage. These laws allow the Italian government to forbid important artworks from being exports outside of Italy, though the conditions for the application of this veto have evolved over time. In this paper, we focus on the economic effects of the export veto law, considering the conditions set by the law between 2012 and 2016, namely before the subsequent series of rapid changes to the regulation that might have created confusion in the market agents' trade choices. We aim to study if the (possible) limitation to trade introduced by the law is taken into account by sellers and buyers when making their sale and purchase decisions and how this is reflected on prices and presale estimates, considering that this law can potentially reduce the size of the market for Italian pieces (Monte dei Paschi di Siena, 2012).

The art export veto law effects have been studied by a few scholars in the economics literature, such as Onofri (2009), who focused on the Italian export veto for pieces by Old Masters and its effects on prices, and Karataş (2019), who studied how the German art market reacted to the introduction of an export veto. Our contribution to this literature is to consider the Italian contemporary and modern art market and how the long-lasting Italian export veto law affects the prices of artwork, considering a continuous effect of the artworks' age on their prices that allows us to study the dynamics of price overtime with respect to the age threshold related to the applicability of the veto. To do so, we implement an endogenous selection model with a threshold,

using data from the auction held in Italy and abroad of both sold and unsold artwork by Italian artists who were not alive at the time of the sale. We find that an age of the artwork effect exists and positively affects the price independently of where the auction took place, but the veto effect exists only in Italy, and it reverts the age effect, making it negative. In other words, artworks sold in Italy that meet the conditions for the export veto law to be applied, have a lower auction value as their age increases if compared with the price growth of pieces sold abroad.

In critically considering the results we found, one should take into account the different art market agents that are potentially hit by the effects of the export veto law: national collectors inspired by aesthetics would find such a limitation to be a positive consequence of the law, since artwork can be bought at a lower price; on the other hand, investors and international collectors would find this effect detrimental, limiting the re-sale possibilities of the pieces subject to an export ban in the future, since their market is reduced. If we focus on national museums and other institutions organizing exhibitions, reducing the circulation of pieces by national artists would make them easier to be bought or obtained for temporary exhibitions, even though some collectors find it risky to borrow pieces from museums if these artworks have not yet been evaluated as possible subjects of an export ban (Monte dei Paschi di Siena, 2012), so the law does not have a clear-cut effect for this category of agents. Concerning art dealers, on the other hand, we saw that the veto law has a negative impact on the selling price for auction houses, so the whole category of agents is likely to be negatively impacted by the export veto effect. In general, we can say that reaching the goal of limiting artwork from flying out of Italy generates a cost that is borne mostly by sellers and private owners, while the benefit is indirectly enjoyed by some buyers and public owners.[18] Furthermore, another cost is linked to how easy it is to export a particular piece, namely to the transaction costs related to its export or its smuggling, as we highlighted in Section 2 and Appendix A. The potential seller might find himself comparing the costs (and the related risk) in case he wants to use official and licit markets and the costs he would face in case he passes on illicit markets.[19]

In our paper, we also study if the effect found in hammer prices is present in the presale estimates chosen by the auction houses, a fact that would hint at an economically rational price-fixing strategy. What we find is that the veto law has a similar effect on the artworks' (minimum, maximum, and average) presale estimates concerning lots on sale in Italy, while the effect is not present for pieces sold abroad, as found with the hammer price. What is different from the pieces sold is that lots on sale in Italy do not show increasing presale estimates as their age increases, but still present a negative relationship between age on presale estimates after the conditions are met for the export veto to be applied. This may also hint at different presale estimate setting strategies between

[18] To consider exactly the redistributive effects, however, we should perform a welfare analysis on the general economic equilibrium.

[19] This comparison is of high interest and particularly important for policing art crime, but our data do not allow us to study it empirically.

Italian and foreign auction houses, even though the market then reacts by attaching an economic value to the artwork, which is on average higher as they increase in age, both in the Italian and foreign art markets.

Concerning the link with the ARR (as discussed in Appendix A), one might claim that the downward pressure on prices as artworks age will reduces the heirs' potential income from the resale rights, since pieces sold in Italy that are older than 50 could also be subject to ARR laws as well, and if the sale price shrinks, the absolute value of ARR decreases as well. Recall, however, that this is an issue only affecting artists' heirs since the export veto law is only applied to pieces by non-living artists. Our data do not allow us to determine if there is a link between the export veto law and the home bias.[20] We also have no information on the nationality of the collectors, so we cannot say if the decline in price observed in the Italian market after the 50 year threshold is due to lower competition among the Italian bidders, or lower competition between the Italian bidders and the international ones, or to a generally lower interest in pieces that are part of this group since the more interesting ones could have been exported to be sold abroad before the threshold was met. The Italian law on exports of cultural goods may also create a "protection paradox": while it aims at protecting the Italian heritage by preventing it from exiting the country, on the other hand, it creates an incentive to export the artwork before it meets the conditions for the law to come into effect since the positive effect of artwork age remains positive outside the territory of Italy. This latter issue would need further data to study and disentangle the different (possibly multiple) dynamics at work that yield this result.

As we illustrated above, a series of laws and decrees modified the setting for the export veto to come into play, starting from 2017. This reform started with Law 124/2017, followed by Ministerial Decree 537 of 06/12/17, and Ministerial Decree 246 of 17/05/18, to introduce a minimum value for export (along the lines of what happens in other countries) and increase the age condition from 50 years from creation to the sale date or 70 years, reducing the severity of the problem in distributing the ARR to the heirs of the artist. However, Ministerial Decree "Bonisoli" 305/2018 (July 2018) suspended the reform concerning the minimum price of the artwork, but this decree was then suppressed by Ministerial Decree 367/2020 (July 2020). Further studies could investigate how this series of changes could have impacted artwork prices, using a framework similar to the one we implemented, but considering the different thresholds.

A further extension of our work could investigate how the applicability of the art export veto influences the ARR collected at the Italian level, considering the different conditions for the two laws to be applied. This can also be analysed considering the extension of the export veto law moving from 50 to 70 years between creation and sale date, a fact that should reduce the chance of artwork being subject to an export ban while the ARR is still collectable, even though some cases could still arise. For example, if an artwork was created 72 years before being sold and then the artist dies 4 years later: in this case, the

[20] See Appendix A for a discussion of this link.

age condition for the veto law is met, and at the same time the ARR can still be collected by the artist's heirs up until the 70th anniversary of the artist's death. Another point worth raising refers to the auction houses' reputation.[21] In fact, less important auction houses could be more eager to risk since they have less of a reputation to lose, while bigger auction houses are likely to be less prone to lose reputation. Unfortunately, we cannot consider this fact in our analysis since our data only cover big auction houses that operate in both the Italian and the international art market but having data on small and local auction houses could shed light on the existence of a discontinuity also in market segments different from the high end. Such an analysis could also add to the emerging literature on the analysis of reputation role and regulation role in the art market (Oosterlinck & Radermecker, 2021; Radermecker, Angelini, & Marchenko, 2021). Finally, one can also study how the law applies to dated and undated (or possibly voluntarily miss-dated) artworks, as we suggest in footnote 14, to see if having an official date of creation might impact the way agents process the age information. In further research, if data were available, we can also perform a quantile regression to test the hypothesis that the veto law applies mostly to the most valuable artworks and famous artists since the export veto signals the quality of the artworks. We could expect the veto risk to be higher for more valuable artworks and famous artists.

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Declarations

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Appendix A Export veto law and its links with art market issues

Export veto law has not only a potential direct impact on the art market through the veto risk as we explained above, but also a possible indirect link with other art market issues, that we are exploring in this section. While we could investigate the possible direct impact of the veto law on art market prices, our data do not allow us to check for these additional possible links. However, we think that presenting these issues can highlight the importance of our study, and possibly suggest future research on export limitations in the art market.

[21] We thank an anonymous reviewer for suggesting this point.

The (potential) link between export veto and home bias

Export veto laws could in principle couple with (or be motivated by) a home bias effect, namely the fact that collectors of a given nationality will value relatively more the artworks by artists with the same nationality than would collectors of other nationalities. However, while the export veto law effect can be expected to be observed only when all the conditions defined by the law are met, home bias simply needs the nationality of the artist to be the same as the collector. The presence of home bias in the art market has been studied within the economics literature, starting with the study by Renneboog and Spaenjers (2011) on modern Russian art, where the authors investigate the relationship between the local and global stock market and the prices of the Russian artworks, explaining the dynamics they observe as a combination between a home bias effect and an investment choice made by the availability of greater wealth Russia after the mid-1990s. Castellani, Pattitoni, and Scorcu (2012) study the heterogeneity of artist price using data from the Italian art market and find that an Italian artist traded in Italy presents a lower price heterogeneity than a non-Italian one, suggesting that this result can be due to a home bias effect. Later, Steiner, Frey, and Resch (2013) analyse how barriers to art trade in a certain country influence the composition of the collections of that country's collectors, that is, they examine if home bias exists in art collections. They hypothesize that the tougher the trade restrictions in a country, the higher the home bias of its collectors, namely that these collectors hold a higher proportion of pieces by artists from their own country. However, since openness is not computed explicitly considering laws that restrict trade, but as a ratio between the sum of exports and imports divided by the GDP of the country, which is a measure that could be also influenced by the demand itself, a caveat should be made when considering that their hypothesis is supported by the data.[22] A further analysis has been developed by Renneboog and Spaenjers (2015), who test whether prices and returns in the international art auction market are influenced by geographical segmentation, considering both law-related barriers to trade (as the Italian case) and demand-related effects (that may be due to cultural preferences towards artists with the same nationality of the buyer). They find a lower effect by local factors for high-tier art, where an artist's quality is proxied by the length of his/her biography in the online encyclopedia Oxford Art Online. Local factors are however important for other segments of the market. For example, the Italian deviation from the global trend could be explained by the presence of trade barriers, while the Australian deviation could be related to high transport costs (Karataş, 2019). This result is confirmed by Vosilov (2015) for the sculpture market finding that the average price is higher for sculpture sold in the home country of the artist compared to outside it, and this effect is stronger for the low-tier segment of the sculpture market than for the high-tier segment. The author

[22]Home bias is not necessarily linked to the presence of national barriers, since it also exists within a country, where an artist's piece that trades in his/her hometown fetches a higher price, as found by Shi, Xu, Wang, and Conroy (2017).

attributes this home bias effect to familiarity and patriotism, with the latter as a more persistent source of home bias than the former.

Export veto and its possible reflections on Artist Resale Right

Besides its (potential) relationship with home bias, the export barrier introduced by law could, in principle, collide with other national laws, such as the Artist Resale Right (ARR) law. In the countries where this law exists, an artist has to be paid a royalty for each trade (after the first) of his/her artworks within the national territory if certain conditions are met. Historically, this type of legislation has existed in Italy, France, Belgium, and Czechoslovakia since the first half of the XX century. In 2001, a Directive on the resale rights of artworks was implemented by the European Union (2001/84/EC), suggesting how to develop national laws on the topic for the EU Member States. Other countries, such as the USA, Canada, and China, do not have an ARR law at the national level (for example, California has an ARR law), but some galleries autonomously pay resale rights to their artists (Boicova-Wynants, 2019).[23] For example, in Italy the ARR is paid to a living artist if one of his/her artworks is sold for at least 3,000 EUR by a professional, or to the artist's heirs if he/she has been dead less than 70 years on the date of sale and the piece is sold for at least 3,000 EUR by a professional (Candela & Scorcu, 2010). It is easy to see that some artwork could meet the conditions for both the ARR and the export veto law, specifically those made more than 50 years before the sale date by an artist who died less than 70 years before the sale date, and were sold for at least 3,000 EUR. If the market shrinks due to the export veto effect, the heirs who would collect ARR could see their ARR decrease because a smaller market is likely to yield lower prices, and hence lower ARRs. Hence, knowing if the export veto law could have an impact on prices is important to understanding whether it would be necessary to emend the export veto law or the ARR law, so that they are more in line with each other.

Transactions costs and art trade

By the traditional trade theory, transaction costs are the main cause of market imperfection. In the art market, the transaction costs such as insurance, transport, and storage costs are not negligible. At the auction, for instance, buyers and sellers must pay a fee on the sales price to the auction house. Collectors, galleries, and museums must bear costs to protect and preserve their artworks. Often, these costs are related to the size and material of the artworks, and they positively affect their price. On the other hand, transaction costs such as the distance between the trading partners hurt bilateral trade for cultural goods. At the same time, the GNP of the exporting country has

[23] ARR has been widely studied in the cultural economics and law and economics literature, see for example Solow (1998), Hansmann and Santilli (2001), Rushton (2001), and Banternghansa and Graddy (2011). See also Appendix A in van Haaften-Schick and Whitaker (2022) for the description of how ARR laws work in a series of country. A comprehensive list of countries where ARR laws are applied is listed by ADAGP (2022).

a positive impact on cultural trade.[24] Also, cultural proximity, linked to language, ethnic background, religion, belief, trust, and opinions, positively affect bilateral trade. The main explanation for this positive effect is the reduction of trade costs induced by cultural proximity.[25] Not all these transaction costs must be supported when an agent wants to smuggle or illicitly export an artwork, avoiding the limitations of laws such as the Italian export veto. In this case, specific characteristics are more likely to be important than others, among which the provenance record (the more precise the record, the harder it would be to bring the piece out of the country, as also reported in Watson (1997)), the size of the artwork (the smaller the artwork, the easier would be to export it without notice, like what Oosterlinck (2017) showed for artworks movement during the WWII), the corruption of exporting country (Fisman & Wei, 2009), and the importance of the artist name, which is likely to attract the attention of public bodies that control the export.

Appendix B Is an artwork's performance influenced by the applicability of the Veto law?

In this appendix, we propose a measure of performance of the auction in terms of sale (un)success and study if it is related to the application of the veto law. To build our index, we follow the approach used by the Monitor Aste research group of the Arteconomy - Il Sole 24 Ore to measure the auction performance. The Arteconomy research group uses an indicator with multiple levels: the lower level pools together unsold pieces and artworks with a hammer price below the minimum presale estimates, a second level has only pieces that sold at a price equal to the minimum presale estimate, a third level has only pieces that sold at a price equal to the maximum presale estimate, while the highest level is made of artworks with a hammer price higher than the maximum presale estimates. The indicator is used to signal an unsatisfactory result (lower level), a satisfactory result (third level), and very good performance (highest level). Notice that the index of auction performance can be calculated for an artwork or a group of artworks, for an artist by aggregation of her/his artworks or to assess the overall outcome of an auction or auction session. In our case, we will focus on the performance of each artwork.

Our auction performance measure is based on the difference between the hammer price and presale estimates. In particular, we have underperformance when the hammer price is under the minimum presale estimate (or the artwork is unsold), while we have overperformance when the hammer price is over the

[24] For example, Schulze (1999), using a gravity model and exploiting the idea that both demand and supply of traded goods depend positively on the size of the countries and negatively on transaction costs, tests these stylized facts.

[25] Disdier and Mayer (2007) and Guiso, Sapienza, and Zingales (2009) focused on cultural proximity between countries and found it to have a positive influence on bilateral trade. More recently, Disdier, Tai, Fontagné, and Mayer (2010), using trade in cultural goods as a proxy for cultural preferences and most recent advances in gravity equation estimation, suggest that trade in cultural goods is an appropriate measure of countries' cultural proximity.

maximum presale estimate. This approach is useful to analyse whether the veto issue affects auction performance through the model (4) and (5) since it allows us to check if the bidders behave differently when they have different expectations about the veto law application, knowing there is a possibility that export of an artwork could be banned by law. The performance measure we use is an ordered categorical variable that we call `Performance`, equal to 0 when the piece is unsold or when the hammer price is below the minimum presale estimate, equal to 2 when the hammer price is over the maximum presale estimate, and equal to 1 otherwise. Table B1 reports the descriptive statistics for the variable `Performance`.[26]

Table B1 Descriptive statistics of `Performance`. Values are rounded to the second digit.

	N	Percentage
`Performance` = 0	453	29.63
`Performance` = 1	431	28.19
`Performance` = 2	645	42.18
`Performance` = 0 & `Italy` = 1	289	30.07
`Performance` = 1 & `Italy` = 1	270	28.10
`Performance` = 2 & `Italy` = 1	402	41.83
`Performance` = 0 & `Italy` = 0	164	28.87
`Performance` = 1 & `Italy` = 0	161	28.35
`Performance` = 2 & `Italy` = 0	243	42.78

To check for the relationship between the performance and the applicability of veto, we propose a linear model for the probability of an artwork to be traded at an auction price under the minimum estimate, over the maximum estimate or between the minimum and the maximum estimate:[27]

$$\begin{aligned}\texttt{Performance}^*_{ijm} = {} & \gamma_1 \texttt{Veto}_i + \gamma_2 \texttt{Age}_i + \gamma_3(\texttt{Veto}_i \times \texttt{Age}_i) + \gamma_4 \texttt{Year}_i \\ & + \gamma_5 \texttt{Year}_i^2 + A_j + M_m + \epsilon_i\end{aligned} \tag{B1}$$

where the covariates are the same in (5) with the addition of $\texttt{Year}^2$, ϵ_i is an error component and the γ_k are the usual parameters to be estimated. Since $\texttt{Performance}^*$ is an unobservable latent variable, what we can observe is:

$$\begin{aligned}&\texttt{Performance} = 0 \quad \textit{if} \quad \texttt{Performance}^* \leq \mu_0 \\ &\texttt{Performance} = 1 \quad \textit{if} \quad \mu_0 < \texttt{Performance}^* \leq \mu_1 \\ &\texttt{Performance} = 2 \quad \textit{if} \quad \mu_1 < \texttt{Performance}^*\end{aligned} \tag{B2}$$

where μ_0 and μ_1 are the cut-points. In particular, we perform an ordered logit model where the $\texttt{Performance}^*$ is estimated as a linear function of our

[26] Notice that, in Table B1, the percentages in rows 3–6 are computed over the subsample for which `Italy` = 1, percentages in rows 7–9 over the subsample for which `Italy` = 0.

[27] Here, we are assuming the reason artworks go unsold is due to the bidders' prices not reaching the sellers' reserve prices, which are generally lower than the minimum estimates (Castellani et al., 2018).

independent variables and our cut-points. The probability of observing our response variable corresponds to the probability that the estimated linear function, with a random error, is within the range of the cut-points estimated for the response variable.
To check for potential differences between the model for the pieces traded in Italy and those traded abroad, we estimated (B1) in the two subsamples defined by `Italy`. The results of the estimation are reported in Table B2.

Table B2 Estimated odd ratios of the model in (B1). Values are rounded to the second digit.

	`Italy` = 1	`Italy` = 0
`Age`	0.81	0.12
	[1.02]	[0.95]
`Veto`	2.69***	0.64
	[1.04]	[3.38]
`Age` × `Veto`	-5.23***	-0.74
	[1.96]	[6.23]
Artist fixed effects	Yes	Yes
Material fixed effects	Yes	Yes
`Year` and squared `Year`	Yes	Yes
N	961	568

The results reported in Table B2 are in line with what we found in Section 4.1, suggesting that the veto applicability is taken into account by collectors when they bid on pieces by Italian artists sold in Italy.

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