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Artists' labour market and gender: Evidence from German visual artists

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Artists' Labour Market and Gender: Evidence from German visual artists

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Using comprehensive data from German visual artists, we provide strong empirical evidence of a gender gap in revenues. We find that female artists have significantly lower revenues from the art market and are about ten percentage points less likely to remain in the top category over three years. This gap persists in the most prominent art forms and is more pronounced for younger artists. Only 30 to 40 percent of these gaps can be explained by differences in observable characteristics. We also find differences in the networking behaviour of the artists of different genders: females are connecting more, whereas males tend to create tighter links, suggesting the importance of the latter for the art market.

JEL-Code: J4, J16, Z11

Keywords: art market; artists' earnings; gender gaps

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1. Introduction

Linda Nochlin writes in her famous essay, "[t]here are no women equivalents of Michelangelo or Rembrandt, Delacroix or Cezanne, Picasso or Matisse, or even, in very recent times, for de Kooning or Warhol" (Nochlin, 1988, p.150). Indeed, if one looks at the catalogues of the most prominent museums, one will not find many (if any) female artists before the beginning of the 20th century. Such inequality rarely arises due to the lower quality of the female's work, but, as many experts point out, due to the stereotypical historically established image of the artist as a white male: "Male artists are overrepresented in major galleries because still in 2016 the archetypal artist is a white male" (D'Souza (2016) quoting Melbourne artist Elvis Richardson). Historical gender disparities in art also reflect a broader tendency in the society, with total male dominance in politics, economics, and culture. For a long time, females did not have an access to the same education and training as males, including art education. Despite this, there were some quite prominent female artists almost at all times; however, their names got lost in history. "Like those of her male contemporaries, Plautilla Nelli's Biblical paintings were masterful works of beauty, but, in a tale as old as patriarchy itself, she was written out of every Renaissance history book, dismissed as just another nun with a paintbrush." (Ellis-Petersen, 2017). Some museums are trying to restore the historical justice, which resulted in several exhibitions showing forgotten talented females to the public[1].

Nowadays, more and more female artists are present in the galleries, and the differences in the gender representations are not as dramatic as it used to be. Equal rights and feminist movements affected the strength of the gender gaps; however, it has not yet fully disappeared. According to the data gathered by Maura Reilly (Reilly, 2015), even with almost equal numbers of art school graduates of both genders, the gender distribution in the galleries and at the exhibitions are far from equal. For instance, two big modern art galleries in Berlin, the *Berlinische Galerie* and the *Hamburger Bahnhof* had

[1] Among them, for example, are long-awaited and postponed due to COVID-19 exhibition of Artemisia Gentileschi in National Gallery; a very successful 2019 exhibition "City of Women: Female Artists in Vienna from 1900 to 1938" in Viennese Belvedere; 2019-2020 exhibition of two Renaissance artists "A Tale of Two Women Painters: Sofonisba Anguissola and Lavinia Fontana" at the Prado Museum in Madrid.

only around 25% of solo female exhibitions in 2007-2014. This trend is persistent for many developed countries; for example, according to the Australian survey The Countess report[2], in 2014, there were 74% female visual art graduates and only 34% of females in museum exhibitions. One explanation for this is given by Polonsky (2019), suggesting that the galleries and museums are choosing the safe strategies of program selection. Aiming to attract more visitors to their institutions, directors and curators keep selecting artists already known to a broad audience, and these artists are mainly male. Thus, such a 'safe' behaviour of art institutions may support the continuing gender disparities in the art market.

Despite the considerable amount of studies dealing with the specifics of the artists' labour market (see Bille, 2020, for a recent survey), and although the gender wage gap is a well-established field of research in labour economics, only a few discuss potential gender inequalities in revenues from the art market.

There are some papers using data from secondary markets to explore gender differences in auction outcomes. Resale prices do not directly affect artists' income but can be interpreted as the buyer's (sometimes retrospective) valuation of the artistic product (Bocart et al., 2020). Combining primary (gallery) market data with global auction data, Bocart et al. (2020) find that women in their sample of Western artists are, on balance, 2.3 percentage points less likely to transition from primary to secondary art markets for fine art. However, conditioning upon transition to secondary markets, artworks associated with female artists realise a premium of 4.4%. The authors provide further evidence that this result is driven by a small number of now popular and, therefore, high-selling individuals. A similar effect is observed by Cameron et al. (2019), who look at Yale graduates and their performance on the art market. While there are fewer auctions sales for women than for men, prices for female artists' artworks tend to be higher. On the contrary, Adams et al. (2017) find that, depending on the type of controls involved, auction prices for paintings made by women are 12 to 25 % below those of paintings made by men. Finally, Farrell et al. (2020) document that secondary art market prices are around 18%

[2]http://www.thecountessreport.com.au/

higher for women than men in their sample of Indigenous Australian art auctions. Yet, the market for this kind of art is characterised by an extraordinarily high share of women among the top-selling artists (which is probably due to the higher cultural authenticity traditionally ascribed to female painters as the authors point out).

We are aware of only two studies dealing with gender inequalities in artists' direct income. Rengers and Velthuis (2002), who use data on Dutch gallery prices, report that works of visual art made by women are sold at a lower price compared to men. Controlling for artists, galleries, and artwork attributes, they find an unexplained gender gap of around 140 Euros (given a mean price of 2,227 Euros per item). The only study concerned with aggregated income data is Heo and Yoon (2018). Analysing Korean survey data on wages, the authors find a gender wage gap in the industry segment called 'Arts and culture' of around 16%, which is unexplained by characteristics such as age, education, and experience. Furthermore, they show that this unexplained part of the gap increases over wage quantiles.

Our paper analyses the incomes of German artists to test the presence of the pay gap. Previous studies either rely on highly selective samples, chiefly from the top end of the distribution of earnings or, like in Bille and Jensen (2018), do not provide a clear account of revenues. However, as, e.g., Bille et al. (2017) point out, the art market is skewed, and there exists a selective group of highly performing superstar artists and a much bigger group of poorer, often unemployed trained artists. Using a more diverse sample of artists, we provide a more comprehensive picture of the gender differences in the art labour market as a whole. We are able to distinguish between the art income and other sources of income and find suggestive evidence that the art market is indeed discriminating against female artists. Specifically, the empirical analysis indicates that gender itself is a predictor of art market revenues and that women are about ten percentage points less likely to belong to the top category over three years. Only 30 to 40 percent of these gaps can be explained by differences in characteristics. These results are robust for different art forms.

We are also exploring the possibility that such income differences occur due to the networking behaviour specific for each gender. We indeed find some differences: females tend to connect more and be involved in the broader community, whereas males focus on creating tighter links. This evidence suggests that male behaviour might be more important for success in the art market. However, no causal evidence is possible with the data on hand.

The remainder of the article is structured as follows: Section 2 gives an overview of economic theories about discrimination with application to the art market. Section 3 describes the data set, whereas Section 4 presents the empirical strategy and the results. Finally, Section 5 concludes with a discussion.

2. Theories about discrimination

In their handbook article, Altonji and Blank (1999) refer to two main models of discrimination in labour markets. First, in the most prominent within the series of taste-based models proposed by Becker (1971), the preference for workers from their own group enters the employer's utility function in the form of additional costs besides the wage when hiring a worker outside this group.[3] In equilibrium, the pay gap between the groups exists if the parameter accounting for these additional costs exceeds a critical value. After the critical value has been reached, the gap increases in the distaste parameter and in the number of employers with in-group preferences.

Bertrand (2011) notes that the taste-based model was developed to explain discrimination against non-white employees and is not directly applicable to discrimination against women. Therefore, she advocates using the identity model proposed by Akerlof and Kranton (2000) as a micro-foundation for the taste-based model. In the identity model, deviation from the 'assigned category' decreases utility. In work environments perceived as male, female co-workers may threaten the gender identity of men. Further variants of the taste-based model relate to discriminating co-workers and customers. In the latter case, the assumption is that buyers receive lower utility from purchasing services that involve interaction with individuals outside the in-group.

[3] As noticed by Altonji and Blank (1999), there is a (formal) similarity to the standard hedonic wage model.

Second, statistical discrimination models (starting with the pioneering works by Phelps (1972) and Arrow (1973)) focus on personal characteristics in the hiring and wage-setting process. In the context of information asymmetry, employers may use aggregate group characteristics as a predictor for productivity. As a result, equally skilled individuals are treated differently. In the case of labour market discrimination against women, long-standing stereotypes and prejudices, such as a lower job attachment and a higher number of absences, may cause gender inequalities.

Concerning the art market, there is empirical evidence for disparities in revenues between male and female artists (e.g., Alper and Wassall, 2006). However, income disparities alone cannot be taken as proof for direct discrimination by market players as there might be differences in observable variables within the groups. For instance, arguing upon a series of historical examples rather than systematic data analyses, Tyler Cowen points out that differences in access to resources like arts education, training networks, and expensive material as well as maternal obstacles (discussed as the 'motherhood penalty' in labour economics) are the most convincing reasons for female underachievement in the art market (Cowen, 1996). Being more radical and ignoring these kinds of barriers, German painter Georg Baselitz states that "[t]he market doesn't lie. [...] If women are ambitious enough to succeed, they can do so" (Connolly, 2015).

If we were able to control for differences in observables across the groups, such as education, artistic excellence, and family, and gender was still a predictor for revenues, discriminating behaviour of players in the art market would be an obvious explanation for this result. In a market with high uncertainty about quality and artist ability, statistical discrimination models can explain why players (e.g., dealers, auction houses, curators, experts, and journalists) may take gender as a proxy for quality.[4] In the same manner, Becker's consumer discrimination model could be applied to collectors with a preference for male artists' works.

[4] In their conceptual framework, Bocart et al. (2020) argue that the variant of the statistical discrimination model developed by Phelps (1972) is more applicable to the current state of the art market given that we cannot observe an underinvestment in education by women in anticipation of discrimination as predicted by Arrow (1973) model.

3. The data set

The study is based on cross-sectional data from a self-administered survey conducted by the *Bund Bildender Künstlerinnen und Künstler* (BKK, national association of visual artists), a professional representation of free-lance visual artists in Germany. From March to May 2016, the questionnaire was part of the association's journal given to the more than 10,000 members (claimed by the BKK) and distributed to the fifteen BKK regional associations and other artists' organisations. Additionally, it was posted on the association's website.[5]

In total, there were 1,585 responses, of which 1,361 were coded as 'completed'. 94.87% declared to be a member of an artist association (BKK: 80.63%). According to Bertschek et al. (2017), the number of core workers in the German art market is 18,045 in 2016, with 1,795 individuals categorised as 'own-account visual artists'. With characteristics for gender, age, and income similar to those of official data provided by the German Federal Statistical Office and the German artists' social security fund (*Künstlersozialkasse*), we expect our sample to be representative.[6]

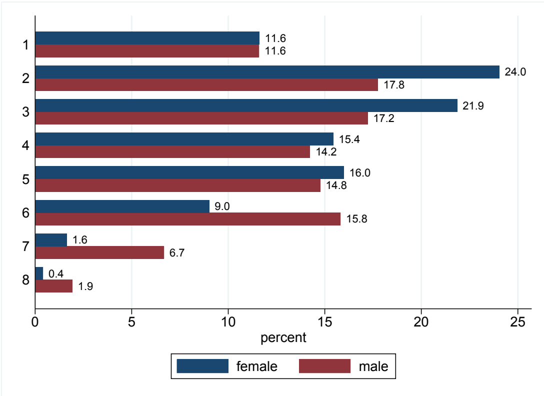
As a special feature, the data includes information on whether the subject is recognised by tax authorities as an artist (which applies to 85.33% of all observations in our sample). Recognition requires proof of free artists' work in terms of education, press releases, exhibitions, and prizes. In case of doubt, an advisory body is involved in the decision-making process. This information is helpful as the analyses based on population-wide panel data typically work with very broad categories such as 'photographer' or 'painter'.

In the survey, artists report their yearly revenues from the art market for three previous years (2013 to 2015). This income is divided into eight categories, see Figure 1. With category 3 (yearly revenues between 3,000 and 5,000 Euros) being the median category, our data reflects previous findings indicating that artists rely on different income sources (see Bille, 2020, for an overview). In fact, 78.82% declare to have income from other sources such as non-art jobs, patrons, partner and family, and unemployment benefits.

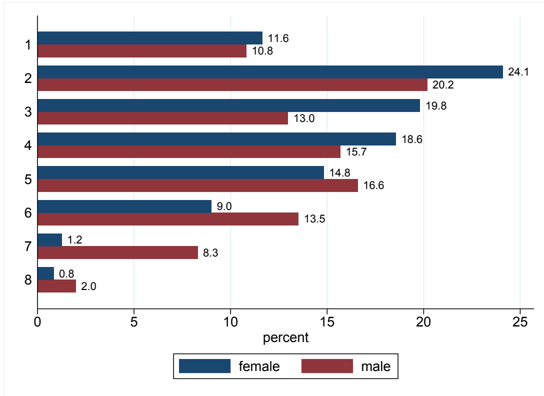
[5] See the official documentation in Priller (2016) for further information on the data set.

[6] A summary of these data can be found in Schulz et al. (2016).

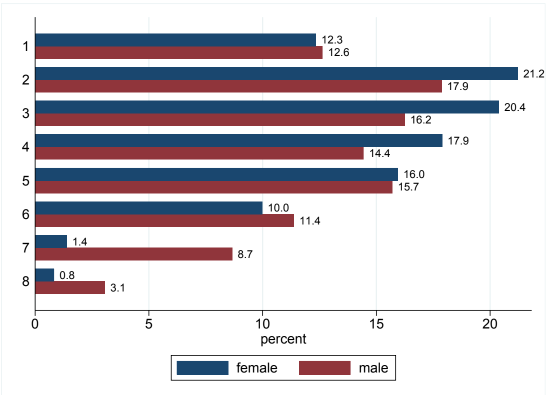
Figure 1: Revenues from the art market by gender



(a) Revenues from the art market in 2013



(b) Revenues from the art market in 2014



(c) Revenues from the art market in 2015

category 1: no revenues
category 2: $x \leq 1000$
category 3: $1,000 < x \leq 3,000$
category 4: $3,000 < x \leq 5,000$
category 5: $5,000 < x \leq 10,000$
category 6: $10,000 < x \leq 20,000$
category 7: $20,000 < x \leq 50,000$
category 8: more than $50,000$ [EUROs]

56.96% state that they are engaged in art-related teaching activities.

Figure 1 also shows that, compared to male artists, the female artists' share is always lower in the three top income categories but higher in the three lowest categories following category 1. Additionally, Pearson's chi-squared test rejects the null hypothesis of independence for each year (p-value = 0.000). Yet, it might be the case that these gender differences result from differences in characteristics that are crucial for art market success. We will consider this in the empirical analysis.

Table 1 reports summary statistics for the main variables used in the analysis. Note that *topcatinc* is a binary variable equal to 1 if the artist is in the top income category for all years 2013 to 2016, and zero otherwise. The Table suggests that female artists appear to be slightly better educated, whereas male artists are, on average, more successful in terms of art prizes. There are also gender differences with respect to partnership and children.

Moreover, the artist's age (not shown in the Table) is divided into six categories, where the median category refers to those artists between fifty and sixty years old. Women in our sample are younger than men ($\chi^2 = 50.3111$, p-value $= 0.000$). In the same way, experience with exhibitions is categorised. Male artists show more experience in single exhibitions, whereas the null is slightly rejected for group exhibitions (two-sample Wilcoxon-Mann-Whitney test, p-values $= 0.0000$ and 0.060).

Table 1: Summary statistics

		N	Mean	Min	Max
demographics					
female	-	1,354	0.561	0	1
children	♂	595	**0.699**	0	1
	♀	758	**0.619**	0	1
partnership	♂	591	**0.786**	0	1
	♀	751	**0.675**	0	1
education					
art academy	♂	595	0.570	0	1
	♀	759	0.563	0	1
art school	♂	595	**0.245**	0	1
	♀	759	**0.300**	0	1
in education	♂	595	0.010	0	1
	♀	759	0.011	0	1
autodidact	♂	595	**0.271**	0	1
	♀	759	**0.221**	0	1
non-art	♂	572	0.468	0	1
education	♀	714	0.482	0	1
art market					
recognised	♂	562	0.849	0	1
(by tax authorities)	♀	712	0.859	0	1
public grants	♂	589	0.348	0	1
	♀	752	0.358	0	1
art prizes	♂	585	**0.487**	0	1
	♀	747	**0.427**	0	1
own studio	♂	590	0.870	0	1
	♀	755	0.845	0	1
topcatinc	♂	595	**0.213**	0	1
	♀	759	**0.092**	0	1

Mean pairs difference: bold $p < 0.05$

4. Empirical analyses and results

Figure 1 in the previous section already hints at significant gender differences related to revenues from the art market. Given these distributions, it may seem tempting to assume discrimination. However, we cannot rule out that these revenue gaps can be explained by group differences in productivity characteristics, such as education, work experience, and artistic excellence. In addition, different preferences regarding the field of art and family status may play a role.

For this reason, and because of the ordinal nature of the dependent variable, we use an ordered logit model defined by the following equation:

$$Y_i^* = \beta_1 female + \beta' X_{ij} + \varepsilon_i, \tag{1}$$

where i refers to the individual, Y_i^* is the (latent) income variable, $female$ denotes the gender dummy, X_i is a set of control variables, and ε_i is a random term. Our control variables include demographics (age, partnership, children), location (federal state, type of area, abroad), education (type of secondary school, type of art school), field of art (14 categories, see Figure B.1 in Appendix B), and artistic excellence (proxied by prizes, exhibitions, having or sharing a studio, and public grants).

Since $Y_i = j$ if $\alpha_{j-1} < Y_1^* \leq \alpha_j$ (for $j = 1, ..., 8$), the probability of observing income category j as an outcome for i equals the probability that the estimated linear function (1) is within the range of the thresholds (denoted by α) estimated for that category:

$$\begin{aligned} \Pr\left(Y_i = j\right) &= \Pr\left(\alpha_{j-1} < Y_1^* \leq \alpha_j\right) \\ &= \Pr\left(\alpha_{j-1} < \beta_1 female + \beta' X_{ij} + \varepsilon_i \leq \alpha_j\right). \end{aligned} \tag{2}$$

Hence, the estimated β_1 being significantly different from zero would indicate a gender gap in art market revenues (Cameron and Trivedi, 2010).

Note that we refrain from using the information on the partner's financial support as a predictor for the art market income level. While it might be the case that these kinds of subsidies reduce art market activities, which in turn results in lower revenues, the reverse implication could also hold. That is, artists with lower revenues from the art market rely more heavily on other income sources. The fact that the partner's financial support does not correlate negatively with art market activities proxied by the number of exhibitions suggests that the second line of argument is more likely to be true (correlation coefficients: 0.067 (2013, p-value = 0.030), 0.059 (2014, p-value = 0.059), and 0.040 (2015, p-value = 0.201).

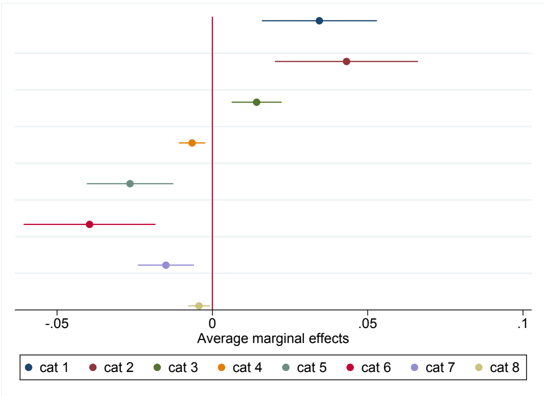
Main results

Figure 2 plots the average marginal effects of the estimating model (1) for male and female artists. There is clear evidence that female artists are less likely to be in higher-income classes and more likely to be in lower-income classes. In addition, Table 2 indicates that, conditional on a comprehensive set of controls, the (latent) income variable is negatively associated with the female dummy variable. For women, we have a decrease in the log odds of being in a higher level of revenues between 0.34 and 0.47, holding all other variables constant. Table A.1 in Appendix A reports predicted probabilities by year and gender. Moreover, since previous literature has identified the motherhood penalty as an important driver of the gender pay gap (e.g., Blau and Kahn, 2017), we additionally estimate model (1) for a restricted sample of artists without children below the age of 14. Table A.2 in Appendix A indicates that the estimates of β_1 are similar to those presented in Table 2.

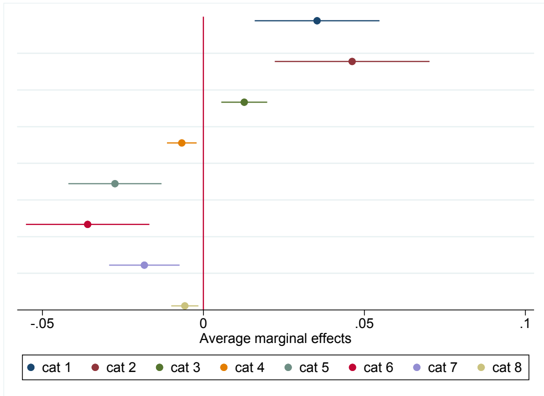
Returning to Table 2, we see that our artistic excellence measures, such as art prizes, exhibitions, and having a studio, positively impact art market income, whereas art education does not seem to play a role. This result is in line with Bille and Jensen (2018) who find that formal artistic education seems not to affect the probability of staying in the artistic labour market for visual artists in their sample of Danish artists.

Does this also imply that men are more likely to stay in the top income category, i.e., to constantly make a living as an artist? To answer this question, we estimate a model quite similar to (1) but with *topinc* as the dependent variable. *topinc* is a binary variable equal to 1 if the artists are in the top income category in years 2013 to 2016, and zero otherwise.

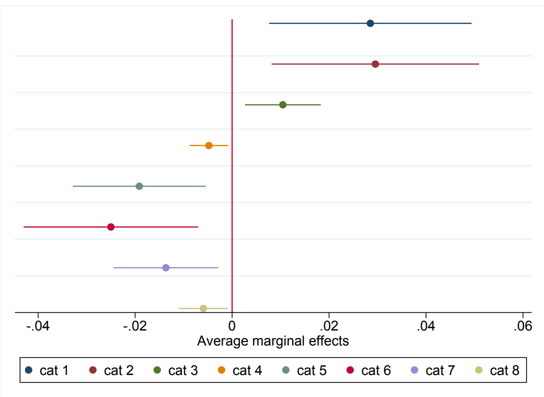
Figure 2: Income categories and gender – average marginal effects



(a) 2013



(b) 2014



(c) 2015

category 1: no income
category 2: less than 1000
category 3: $1,000 < x \leq 3,000$
category 4: $3,000 < x \leq 5,000$
category 5: $5,000 < x \leq 10,000$
category 6: $10,000 < x \leq 20,000$
category 7: $20,000 < x \leq 50,000$
category 8: more than $50,000$ [EURO]

The coefficients are estimated using ordinary least squares (OLS) and Probit regressions. Table 3 indicates that female artists are around ten percentage points (40.47% of the pooled *topcatinc* mean of 0.252) less likely to stay in the top income category for the whole period under study.

Finally, we use the Blinder-Oaxaca decomposition for nonlinear regression models as proposed by Sinning et al. (2008) (Stata command *nldecompose*) to determine the extent to which observable characteristics contribute to the gender gaps in revenues from the art market. It shows that differences in demographics, education, location, artistic excellence, and art forms account for 40.15% (in 2013), 31.44% (in 2014), and 37.36% (in 2015) of the unconditional disparity in income classes. Regarding the probability of staying in the top income category, these group differences explain 35.91% of the gender gap.

As a consequence of the inequalities in art market revenues, we find that female artists are more engaged in teaching the arts (females: 55.51%, males: 44.42%) and have higher earnings from it (Pearson's chi-squared test reject the null hypothesis of independence for each year, *p*-values: 0.000, 0.014, 0.000). Besides, more female than male artists declare to be supported by their partners (females: 68.18%, males: 34.09%).

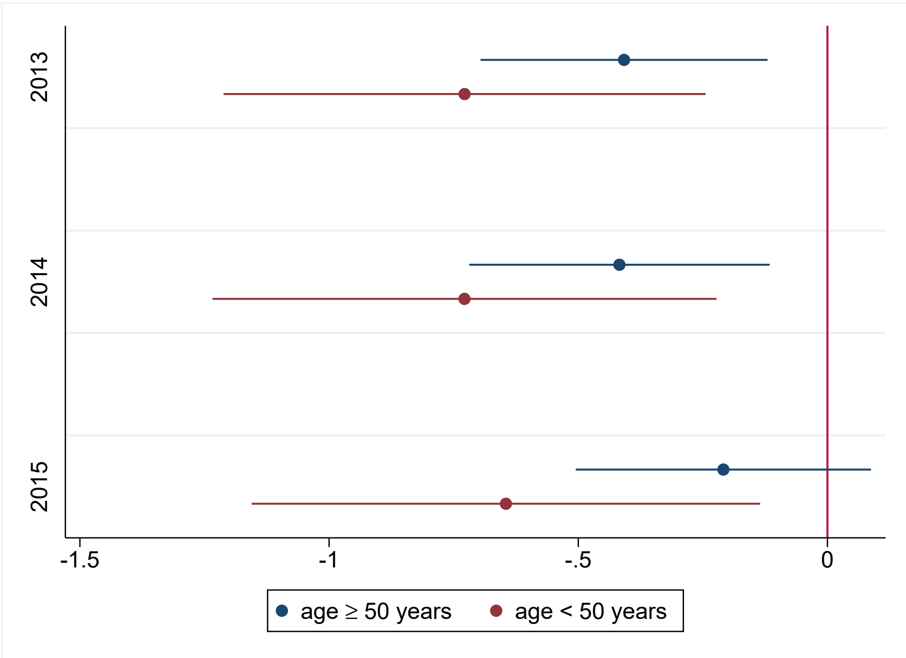
Female artists sell fewer works on the primary market. Differences in revenues could result from different prices and/or different quantities. We do not have information about prices, but subjects were asked about the number of works they sold during the years 2013 to 2015 at exhibitions: (1) none, (2) up to three, (3) up to six, (4) up to ten, (5) up to 15, (6) more than 15. From this, we created the variable *workssold*.

Table A.4 in Appendix A reports results from ordered logistic regressions with the same set of covariates but with *workssold* as the dependent variable. The estimated β_1 is significantly different from zero and negative, indicating that female artists sell less to the art market than male artists. Figure B.2 in Appendix B illustrates that women are 45.64% and 23.80% more likely to be in the two lowest categories of sellings but 12.38%, 15.17%, and 39.63% less likely to be in the three highest categories. We hence cannot rule out that there are discriminating buyers on the primary art market. In other words, these results make a case for the taste-based model of discrimination.

Old versus young artists: the role of experience As discussed in Section 2, the art market is characterised by a high degree of uncertainty about quality and the artist's ability, which opens the door for behaviour described by statistical discrimination models. Artists, therefore, may look for ways to signal quality to the market and to develop a reputation so that players update prior beliefs. Early career artists, however, have fewer opportunities to signal quality.

To examine the effect of reputation and experience on gender disparities in revenues from the art market, we split the sample along the median category of *age* and reestimate model (1) for both groups.[7] Figure 3 presents estimates of β_1 for both groups across the years. It shows that the gender gap is more pronounced for younger than for older artists. Since bootstrap and permutation tests reveal that the difference in coefficients between the groups is not always significant at the 5% level (p-values of 0.096 (2013), 0.112 (2014), and 0.032 (2015)), we refer to these results as suggestive evidence in support of the hypothesis of statistical discrimination against female artists.

Figure 3: Estimator of the gender earnings gap for the years 2013 to 2016 by age



[7]Note that Rengers and Velthuis (2002) also document a mean artist age of 50.03 years in their sample of works created visual artists in the Netherlands. They conclude that "... it takes a long time before an artist starts selling on the private market" (p.6).

Non-discrimination by the public sector. Next, we want to contrast our previous results with areas where we expect little or no discriminating behaviour. We look at the public sector's behaviour regarding the purchases of art and recognition of the artists. Private buyers usually seek artworks that can serve as a profitable investment, whereas the public sector looks at many other factors when deciding to acquire the art piece or choosing the artist to order the specific piece from. For example, the public sector might be aiming to encourage and support underrepresented on the private market artists, including female artists.[8] First, we find no gender difference with regard to recognition by tax authorities (females: 85.96%, males: 84.88%, p-value = 0.631 (Fisher's exact test)). As explained in the foregoing section, the recognition requires proofs of free artists' work and can involve the call for a 'jury'. The fact that we do not observe a gender gap even in the raw data suggests that there are, on average, no systematic differences among men and women in our sample concerning qualifications required to be recognised as an artist.

Second, we examine whether female artists are disadvantaged in terms of public acquisitions. Therefore, we reestimate the model (1) with *public acquisition* as the dependent variable. *public acquisition* equals 1 if the artist affirms the questions "Were there any public acquisitions in 2013/2014/2015" at least for one year, and zero otherwise. Table 4 shows that once we control for observable characteristics, the estimated coefficient of the gender dummy is statistically not different from zero.

In sum, we interpret these results as an indication that we cannot rule out discrimination to be a driver of our main findings presented in Table 2.

Does art form matter? The dataset contains the artists working with different art forms or with several art forms: paintings, sculpture, graphics, etc. We explore the gender pay gap further by looking at the most popular art forms in our sample: paintings, sculptures, and objects.

Figure B.1 in Appendix B shows the gender distribution for different art forms. The

[8] This incentive follows the general anti-discrimination trend and laws on the labour market in many Western countries and in Germany in particular. Regarding cultural sponsorship by the public sector (which remains with the federal states in Germany), the *Kulturfördergesetz* of North Rhine-Westphalia, for example, emphasises the equal treatment for men and women (MKFFI NRW, 2014, p.67)).

distribution of art forms for both genders is quite similar, with some art forms being more prevalent among males and some among females. Printmaking is actually the third most popular art form for males. It has almost as many male artists as object art (173 and 172 correspondingly), but object art is much more prevalent among females. Hence, object art was chosen as the third art form for analysis.

First, Figure B.3 in Appendix B presents estimates of β_1 from model (1) for the five most quoted art forms in our sample. It shows, for instance, that $\hat{\beta}_1$ is the greatest for photography and the smallest for object art.

Second, Table A.3 in Appendix A illustrates the gender differences in probabilities to be in top categories for artists working with the three most popular art forms. Due to the limited data, we are not able to analyse the probability of staying in top income categories in all three years, as we did for the full sample. For example, we only observe 41 sculptors constantly staying in top income categories. Moreover, only nine of them are females. Therefore, we are looking at the probabilities to be in top income categories at least in one of the years. All three most represented art forms show an around 10% lower probability for females to end up in the top income category. So it seems that the gender pay gap persists regardless of the art form in which the artist predominantly works.

Do networks help? As Bille and Jensen (2018) claimed, networks could be playing an important role in performance on the market by increasing visibility and recognition of the artist. In this section, we are testing potential differences in gender behaviour towards network creation. McDowell et al. (2006) suggest the existence of gender differences in scientific co-authorship; however, the difference is diminishing with more people entering the profession. In recent experimental work, Mengel (2020) finds that gender gaps in performance do not appear because of the differences in the network formation but can be partly explained with the network tightness and behaviour, with men more likely spreading the rewards across the network to the peers of the same gender.

The data on hand does not report the exact network; however, we have some indicators of networking and collaborative activities, such as participation in joint exhibitions, memberships in formal artistic organisations, and/or sharing atelier.

First, we look at the difference in group exhibitions. Conditional on the educational, demographics, art form, location controls, as well as on the number of solo exhibitions, females tend to participate in more group exhibitions: the ordered log odd of being in the higher category by the number of group exhibitions is almost 0.5 higher for females than for males (see Table 5 for the results). One worry could be that higher levels of participation in group exhibitions may signal less recognition of female artists, resulting in lower solo exhibition level (as also reported in Reilly, 2015). However, controlling for the number of solo exhibitions allows us to look at the group exhibitions as a proxy of network links, rather than the sign of professional recognition.

Similarly, we find women tend to join more art organisations than men. These two results suggest that the networks' size is not playing an important role in explaining the gender gap in the art labour market. Other things equal, females are engaging more in interactions with colleagues. Moreover, females are putting greater importance on having colleagues nearby (see Table A.5 in Appendix A.). They are ten percentage points more likely to consider colleagues nearby to be essential for their artistic carrier. However, as we showed in the main results, these engagements and beliefs are not resulting in higher performances in the art market.

Sharing the atelier is, however, slightly more common among males, as presented in Table 6. Working in the same atelier represents a different relationship than participation in group exhibitions or formal art organisations. One would expect a much tighter link between the artists working in the same atelier. So, while females tend to connect and engage more, males create more stable and close relationships that are potentially bringing more benefits in the future. Such a conclusion goes in line with Mengel (2020) who shows that males reward their network more.

5. Conclusions

This study sheds new light on gender differences in the art market. While most prior studies used data on auction sales to identify potential gender gaps and thereby focused on the top segment of the earnings hierarchy, our data allows for a more comprehensive analysis. We find that female artists, on average, generate fewer revenues from the art market and are underrepresented in the highest category. As one explanation for lower revenues, we provide evidence that females sell less to the art market. This result goes along with a higher engagement in teaching the art and higher take-up of other income sources like financial support by the partner.

A decomposition of the payment gaps shows that we can explain only around one-third of the gaps by differences in observable characteristics, such as education, art field, demographics, and artistic excellence measures. Therefore, we cannot rule out that (explicit or implicit) discrimination against female artists exists. This could relate to gatekeepers and taste-makers in the private market, like curators, dealers, and critics, for instance. The fact that we do not find gender inequalities when the public sector acts on the art market supports the impression of taste-based discrimination.

Exploring the payment differences in the art market deeper, we observe that the disparity is more prominent for the younger artists. We expect that there might be some statistical discrimination on the market for the younger, less established female artists, whereas with the experience and more established reputation, the art itself should become more crucial than the artists' characteristics. Moreover, we observe similar discrimination trends in the most popular art forms in our sample.

We also provide evidence suggesting that creating a bigger network does not appear to be the driving force behind the pay gap. We show that females tend to connect to more people and engage more in professional interactions. However, men are more likely to share the atelier with other artists. It suggests that males' connections are tighter and potentially more beneficial for performance in the art market.

There are also further factors identified in labour economics (e.g., Bertrand, 2011; Blau and Kahn, 2017; Petrongolo, 2019) that might play in. For instance, gender differences in competitiveness and risk-taking may serve as a further explanation of the pay gap. With fewer regular jobs, a lower share of fixed revenues, and wider income inequalities than in other comparable occupations (Menger, 2006), the decision to work as a full-time artist involves a high level of risk tolerance. Furthermore, the long-standing excess supply of artistic labour results in a highly competitive and uncertain environment. So, if male artists were more able to cope with these risks and competitive pressure, they may succeed more than females.

Table 2: Art market revenues – results from ordered logistic regressions

	2013	*2014*	*2015*
female	-0.452***	-0.468***	-0.337***
	(0.121)	(0.125)	(0.124)
partnership	0.166	0.218	0.216
	(0.128)	(0.137)	(0.132)
children	-0.0265	0.00287	0.00999
	(0.125)	(0.129)	(0.129)
art education	0.0292	-0.0361	-0.0265
	(0.0485)	(0.0502)	(0.0489)
non-art education	-0.316***	-0.367***	-0.292**
	(0.122)	(0.125)	(0.125)
graduation	0.00133	0.0248	0.0656
	(0.0896)	(0.100)	(0.0931)
public grants	0.309**	0.345***	0.339***
	(0.123)	(0.124)	(0.125)
prizes	0.309***	0.237**	0.333***
	(0.120)	(0.120)	(0.121)
experience w. exhibitions	-0.109	-0.0371	-0.0905
	(0.0670)	(0.0666)	(0.0667)
single exhibitions	0.207***	0.211***	0.217***
	(0.0491)	(0.0512)	(0.0484)
group exhibitions	0.0595**	0.0632**	0.0443
	(0.0273)	(0.0290)	(0.0283)
studio	0.785***	0.574***	0.577***
	(0.174)	(0.172)	(0.171)
recognised	1.391***	1.457***	1.410***
(by tax authorities)	(0.173)	(0.183)	(0.179)
art form dummies	*yes*	*yes*	*yes*
location dummies	*yes*	*yes*	*yes*
N	1150	1127	1125
pseudo R^2	0.070	0.071	0.065

- Data: BKK survey 2016
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01
- The number of observations varies according to differences in non-responses across variables.

Table 3: Survival in the top income category – results from OLS and Probit regressions

	OLS		*Probit*	
female	-0.121***	-0.102***	-0.118***	-0.099***
	(0.0198)	(0.0212)	(0.0187)	(0.020)
demographics controls	*no*	*yes*	*no*	*yes*
education controls	*no*	*yes*	*no*	*yes*
artistic excellence controls	*no*	*yes*	*no*	*yes*
art form dummies	*no*	*yes*	*no*	*yes*
location dummies	*no*	*yes*	*no*	*yes*
N	1354	1125	1354	1125
R^2	0.029	0.085		
pseudo R^2			0.035	0.106

- Data: BKK survey 2016.
- The dependent variable *topinc* is equal to 1 if the artists is in the top income category for all the years 2013 to 2016, 0 otherwise.
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- For Probit estimates, the Table presents marginal effect.
- The number of observations varies according to differences in non-responses across variables.

Table 4: Public acquisition – results from OLS and Probit regressions

	OLS		*Probit*	
female	-0.048**	-0.004	-0.048**	-0.009
	(0.024)	(0.028)	(0.024)	(0.027)
demographics controls	*no*	*yes*	*no*	*yes*
education controls	*no*	*yes*	*no*	*yes*
artistic excellence controls	*no*	*yes*	*no*	*yes*
art form dummies	*no*	*yes*	*no*	*yes*
location dummies	*no*	*yes*	*no*	*yes*
N	1,224	1,033	1,224	1,033
R^2	0.003	0.111		
pseudo R^2			0.003	0.105

- Data: BKK survey 2016.
- The dependent variable *public acquisition* is equal to 1 if the artists has sold their art to public authorities at least once during the years 2013 to 2016, 0 otherwise.
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- For Probit estimates, the Table presents marginal effect.
- The number of observations varies according to differences in non-responses across variables.

Table 5: Group exhibitions and memberships – results from ordered logit and OLS regressions

	Group Exhibitions (Ordered logit)		*Memberships (OLS)*	
female	0.184*	0.499***	0.142***	0.171***
	(0.099)	(0.122)	(0.032)	(0.035)
demographics controls	*no*	*yes*	*no*	*yes*
education controls	*no*	*yes*	*no*	*yes*
artistic excellence controls	*no*	*yes*	*no*	*yes*
art form dummies	*no*	*yes*	*no*	*yes*
location dummies	*no*	*yes*	*no*	*yes*
N	1,329	1,233	1,289	1,183
R^2	0.001	0.201	0.014	0.109

- Data: BKK survey 2016.
- The dependent variable *group exhibitions* is a categorical variable and is equal to 1 if the artists did not participate in any group exhibitions, 2 if participated in up to 10 exhibitions, 3 - in up to 20, and so on, with the maximum value of 10 for more than 100 exhibitions. The dependent variable *membership* is a sum of dummies for being a member in each art organisation.
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- The number of observations varies according to differences in non-responses across variables.

Table 6: Shared atelier – results from OLS and Probit regressions

	OLS		*Probit*	
female	-0.007	-0.041**	-0.007	-0.046**
	(0.018)	(0.021)	(0.018)	(0.023)
demographics controls	*no*	*yes*	*no*	*yes*
education controls	*no*	*yes*	*no*	*yes*
artistic excellence controls	*no*	*yes*	*no*	*yes*
art form dummies	*no*	*yes*	*no*	*yes*
location dummies	*no*	*yes*	*no*	*yes*
N	1,354	1,247	1,354	1,075
R^2	0.001	0.087		
pseudo R^2			0.001	0.083

- Data: BKK survey 2016.
- The dependent variable *shared atelier* is equal to 1 if the artist is sharing the atelier with a colleague, 0 otherwise.
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- For Probit estimates, the Table presents marginal effect.
- The number of observations varies according to differences in non-responses across variables.

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A. Additional Tables

Table A.1: Predicted probabilities (%) of art market revenues by year and gender

	Pr[Y=1]	Pr[Y=2]	Pr[Y=3]	Pr[Y=4]	Pr[Y=5]	Pr[Y=6]	Pr[Y=7]	Pr[Y=8]
Revenue category	0	below 1,000	1,000 to 3,000	3,000 to 5,000	5,000 to 10,000	10,000 to 20,000	20,000 to 50,000	more than 50,000
2013								
Men	5.0	16.7	21.5	19.4	20.0	13.5	3.1	0.8
Women	7.7	22.6	24.1	18.0	15.7	9.3	2.0	0.5
2014								
Men	4.9	17.9	18.1	22.3	19.7	12.2	3.9	1.0
Women	7.6	24.5	20.5	20.8	15.3	8.3	2.5	0.6
2015								
Men	6.3	16.8	20.8	20.5	18.8	11.5	3.9	1.4
Women	8.5	21.1	22.7	19.4	15.7	8.8	2.9	1.0

- Calculations based on regressions presented in Table 2.
- Probabilities changed into percentages. Every probability row adds up to 100.
- Revenue categories: All values are expressed in Euros.

Table A.2: Art market revenues – Sample restricted to artists without children below the age of 14.

	2013	*2014*	*2015*
female	-0.464***	-0.386***	-0.261*
	(0.142)	(0.150)	(0.149)
demographics controls	*yes*	*yes*	*yes*
education controls	*yes*	*yes*	*yes*
artistic excellence controls	*yes*	*yes*	*yes*
art form dummies	*yes*	*yes*	*yes*
location dummies	*yes*	*yes*	*yes*
N	790	774	770
pseudo R^2	0.080	0.081	0.080

- Data: BKK survey 2016
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01
- The number of observations varies according to differences in non-responses across variables.

Table A.3: Survival in the top income category – different art forms (OLS regressions only)

	Paintings and Graphics		*Sculpture and Plastic*		*Objects*	
female	-0.132***	-0.109***	-0.138***	-0.095**	-0.129***	-0.109***
	(0.024)	(0.026)	(0.036)	(0.044)	(0.035)	(0.038)
demographics controls	*no*	*yes*	*no*	*yes*	*no*	*yes*
education controls	*no*	*yes*	*no*	*yes*	*no*	*yes*
artistic excellence controls	*no*	*yes*	*no*	*yes*	*no*	*yes*
art form dummies	*no*	*yes*	*no*	*yes*	*no*	*yes*
location dummies	*no*	*yes*	*no*	*yes*	*no*	*yes*
N	960	794	417	349	415	344
R^2	0.035	0.098	0.032	0.130	0.036	0.179

- Data: BKK survey 2016.
- The dependent variable *topinc* is equal to 1 if the artists is in the top income category for one of the years 2013 to 2016, 0 otherwise.
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- The number of observations varies according to differences in non-responses across variables.

Table A.4: Number of works sold at exhibitions during the years 2013 to 2015 – results from ordered logistic regression

female	-0.222**	-0.325***
	(0.099)	(0.124)
demographics controls	*no*	*yes*
education controls	*no*	*yes*
artistic excellence controls	*no*	*yes*
art form dummies	*no*	*yes*
location dummies	*no*	*yes*
N	1,319	1,106
pseudo R^2	0.001	0.055

- Data: BKK survey 2016.
- The dependent variable *workssold* is classified into six categories according to the number of works sold during the years 2013 to 2016: zero, up to three, up to six, up to ten, up to 15, more than 15.
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- The number of observations varies according to differences in non-responses across variables.

Table A.5: Importance of colleagues nearby – results from OLS and Probit regressions

	OLS		*Probit*	
female	0.166***	0.100***	0.162***	0.095***
	(0.027)	(0.031)	(0.025)	(0.029)
demographics controls	*no*	*yes*	*no*	*yes*
education controls	*no*	*yes*	*no*	*yes*
artistic excellence controls	*no*	*yes*	*no*	*yes*
art form dummies	*no*	*yes*	*no*	*yes*
location dummies	*no*	*yes*	*no*	*yes*
N	1,354	1,125	1,354	1,125
R^2	0.029	0.111		
pseudo R^2			0.021	0.087

- Data: BKK survey 2016.
- The dependent variable *importance of colleagues nearby* is equal to 1 if the artist says that having colleagues nearby is very important or important, 0 otherwise.
- Robust standard errors in parentheses, * p<0.10, ** p<0.05, *** p<0.01.
- For Probit estimates, the Table presents marginal effect.
- The number of observations varies according to differences in non-responses across variables.

B. Additional Figures

Figure B.1: Frequencies of art forms by gender (multiple answers allowed).

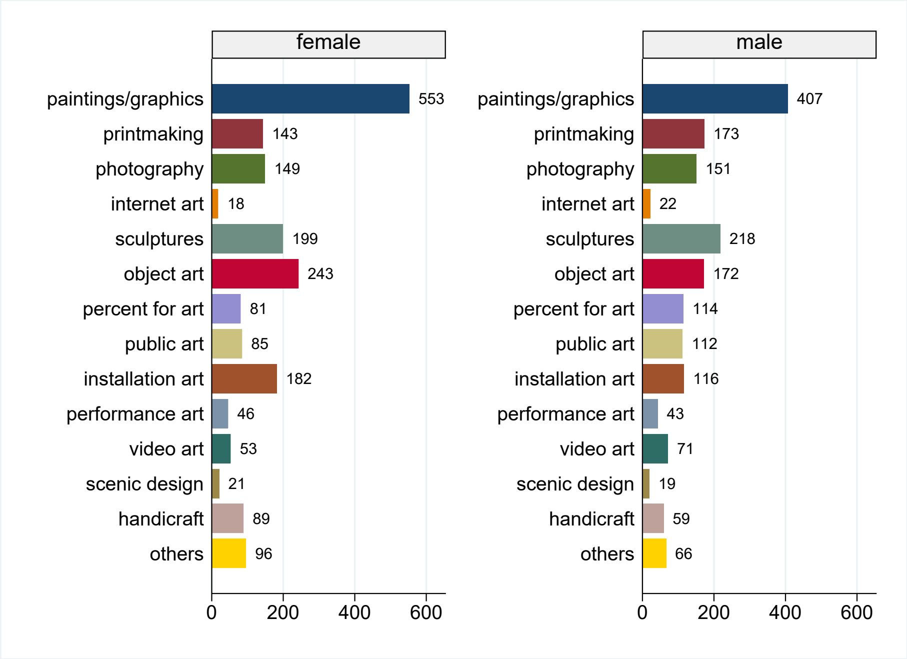

Figure B.2: Predictive margins for each category of *workssold* for female artists.

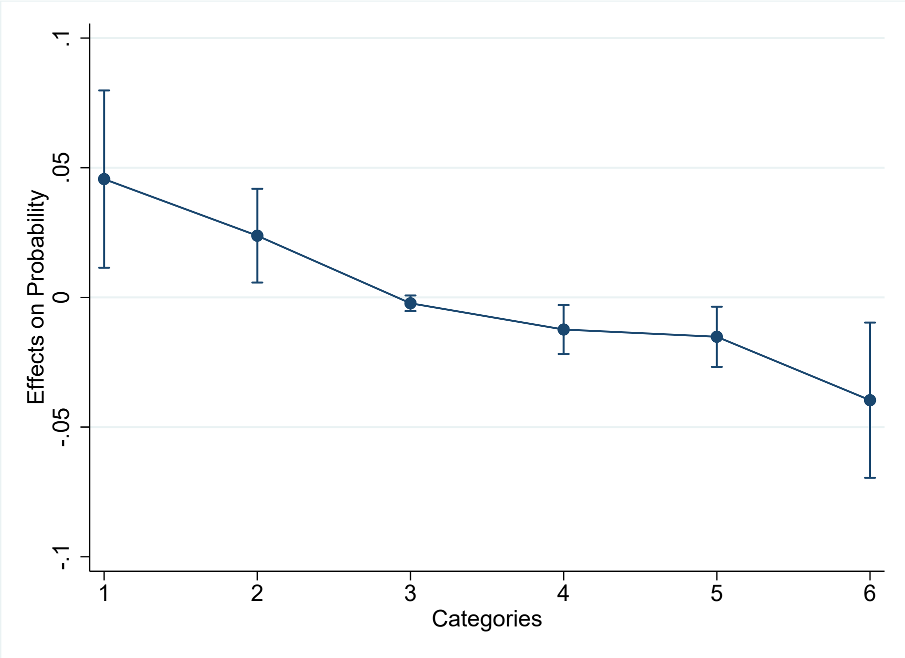

Figure B.3: Estimator of the gender earnings gap for the years 2013 to 2016 by art form.