Journal of Economic Behavior and Organization 191 (2021) 785–797

Contents lists available at ScienceDirect

Journal of Economic Behavior and Organization

journal homepage: www.elsevier.com/locate/jebo

Immigrant artists: Enrichment or displacement? ☆

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ARTICLE INFO

Article history:
Received 30 October 2020
Revised 3 September 2021
Accepted 7 September 2021

JEL classification:
J61
N30
Z11

Keywords:
Migration
Agglomeration economies
Cities
Artists

ABSTRACT

In order to investigate the role of immigrant artists on the development of artistic clusters in U.S. cities, we use the U.S. Census and American Community Survey, collected every 10 years between 1850 and 2010. We identify artists, authors, musicians, actors, architects, and journalists, their geographical location and their status as a native or an immigrant. We look at the relative growth rate of the immigrant population in these occupations over a ten year period and how it affects the relative growth rate of native-born individuals in these artistic occupations. We find that cities that experienced immigrant artist inflows, also see a greater inflow of native artists.

1. Introduction

Immigrants have played an outsized role in the development of art and culture in the United States. As indicated by US Census reports, in 1880, foreign-born musicians comprised approximately 60% of all individuals reporting their occupation as musicians or music teachers in the U.S. During and after World War II, New York took over as the center of the modern art world, largely due to European immigration. At the same time, Boston became a center of architectural design, with well-known immigrant architects such as Walter Gropius on the faculty of the Harvard Graduate School of Design. While stories abound, the impact of immigrant artists on these developments has not been established formally. This paper seeks to measure the effect that immigrant artists have had on the growth of artistic occupations in U.S. cities.

The modern view is that the cultural and creative sectors are among the most dynamic sectors in the world economy and are arguably a substantial source of growth. As noted in the 2014 OECD Forum, “Creativity and innovation are now driving the economy, reshaping entire industries and stimulating inclusive growth.” Furthermore, as the 2010 United Nations Conference on Trade and Development noted, creativity is seen as “the key ingredient for job creation, innovation and trade,” and cultural sectors are believed to constitute opportunities for development. High skilled people generate ideas

☆ The authors wish to thank Philipp Ager, Orley Ashenfelter, Joseph Ferrie, Joel Mokyr, Kevin O’ Rourke, Paul Sharp, Joel Waldfogel, and participants at the Western Economic Association Annual Conference, European Workshop on Applied Cultural Economics, Annual Conference of the Danish Society for Economic and Social History, International Conference of the ACEI, and the Urban, Regional and International Economics Workshop for helpful consultations and insightful comments. The authors also wish to thank anonymous referees for helpful comments. This research has been co-funded by the Danish Research Council under the project“Origins of Creativity”.

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https://doi.org/10.1016/j.jebo.2021.09.007
0167-2681/

(Glaeser, 2003) and their presence is correlated with city growth (e.g., Glaeser, 1994; Gergaud et al., 2016). Urban development comes from being an attractive "consumer city" for high skill people (Glaeser et al., 2001) and the presence of creative people, in particular of artists, may enhance this attractiveness (e.g., Florida, 2002). In this paper, we thus seek to understand the role of immigrants on these very important creative sectors, and potentially, the role of immigrant artists on the settlement and growth of cities in the United States. Our prior hypothesis is that like high technology (Kerr and Lincoln, 2010), immigrant artists "crowd-in" native artists.

In order to study the effect that immigrant artists may have on native artists, we use the 1% sample of the US Census and American Community survey. The Census allows us to identify for every 10 years between 1850 and 2010 individuals in the occupations of artists, authors, musicians, actors, architects, and journalists, as well as their geographical locations. By using such a long time series, we can explore very long term effects. We replicate and extend the methodology described in Card and DiNardo (2000), measuring the effect of the relative growth of immigrant artists in the previous 10 year period, on the relative growth of the native artistic population. This approach diminishes the concern of spatial correlation between the levels of immigrant shares and levels of native shares due to common fixed influences. In addition, we use a Bartik instrument that relies on the interaction between initial migrant stock in a destination city in 1850 (the pull factor) and migration from a given origin country in a given year (push factor). We find that an increase in the relative growth of the immigrant population of artists increases the relative growth of the native population of artists.

This paper proceeds as follows. In Section 2 we briefly summarize the literature in the arts and labor markets. Section 3 describes our data and presents summary statistics. In Section 4 we present our methodology and in Section 5 we present our results. Section 6 interprets our findings and concludes the analysis.

2. Immigration, labor markets, and the arts

In this section we describe studies that have been undertaken regarding immigration, labor markets, and the arts in order to place our study in context. We start with a description of the most well-known and relevant studies on immigration, proceed to the concept of the artist as an innovator, then look at the arts as an occupation. We end this section with a description of papers on migration patterns and clusters of artists.

2.1. Immigration

The role of immigration on native workers has been a topic widely studied by labor economists. While early studies were primarily concerned with the possibility of displacement effects of native low-skilled workers by immigrants (see, for example, Borjas (1987 and 1994), Card (1990 and 2001), and Card and DiNardo (2000)), more recent studies have focused on the effects of immigrants on innovation and high-technology industries, with some mixed results.

In academia, specifically mathematics, Borjas and Doran (2012) documented displacement effects with a post-1992 influx of Soviet mathematicians, with natives less-likely to produce home-run papers and moving to lower-ranked institutions or out of research. However, Kerr and Lincoln (2010) rule out displacement effects in high-technology industries and document small crowding-in effects. Hunt and Gauthier-Loiselle (2010) conclude that invention increases through the contribution of immigrants by measuring patents per capita. Supporting this research, Moser et al. (2014) document that patenting by U.S. inventors in the field of chemistry increased with an influx of Jewish emigres from Nazi Germany. The increase resulted from attracting new researchers to their fields. Kerr et al. (2016) find that high-skilled immigration is linked to knowledge production and clusters of talent. While the balance of papers are showing positive effects in high-technology industries, the question of enrichment or displacement has yet to be definitively answered.

2.2. Artists as innovators

Artists have long been considered innovators. In a series of articles, Galenson and Weinberg studied the age at which artists did their best work, as indicated by sale price at subsequent auction. They termed artists who were young when their best work was created as "conceptualists" and artists who were older as "experimentalists." Both innovated, but were different types of innovators. Specifically, in their study of American artists that were born between 1900 and 1940 (Galenson and Weinberg, 2001), they largely termed artists that were born between 1900 and 1920, a large portion of whom are known as abstract expressionists, as experimentalists, and those born between 1920 and 1940 largely as conceptualists—who produced their best work at a younger age. Using an independent dataset, Graddy and Lieberman (2018) replicated the different effects of age on price in two cohorts of artists.

2.3. Art as an occupation

Alper and Wassal (1998) were some of the first economists to use panel data to explore artists and their occupations. They used the National Science Foundation's National Survey of College Graduates (NSCG) to determine whether or not artists were more likely than individuals in other occupations to change jobs; they found that stability in occupation by artists was only slightly less than other occupations for college graduates. Andrew Smith (2000) used the 1970 Census to determine the propensity for individuals to move in and out of artistic occupations and found that slightly more than

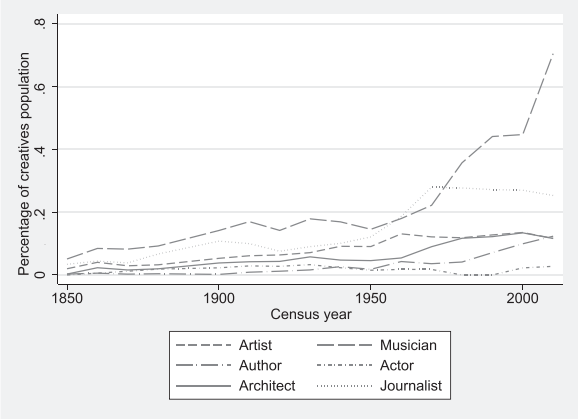

Fig. 1. Share of Creatives by Creative Occupation.

70% of individuals who worked as artists in 1965 persisted as artists in 1970. Alper and Wassal (2006) went on to study employment and earnings of American artists using decennial US Census data from 1940 to 2000. Their findings were that artists are much more likely to be employed and to work fewer hours. They have lower earnings than other occupations, much of the differential results from fewer hours worked.

2.4. Migration and clustering of artists

Previous research has documented the patterns of migration and geographic clustering of music composers (O'Hagan and Borowiecki 2010 and Borowiecki and O'Hagan 2012), and includes studies of the benefits of geographic clustering (Borowiecki 2013, 2015a) as well as work on the long-run path dependency (Borowiecki 2015b). New York is a major work location for composers; the fifth most important city for composers born in the 19th century, and the second most popular destination for 20th century composers, after Paris. They find that composers have remarkable mobility. 27% of the top composers have moved permanently abroad during their life, while 59% migrated internally since the 12th century. O'Hagan and Hellmanzik (2008) found that the predominant location for visual artists born in the first half of the 20th century is New York City, with most prominent American artists clustering there. The historical development and clustering of creative activity in the United States is documented by Borowiecki and Dahl (2021), who also provide a socio-economic portrait of creative people and how it has changed since 1850.

This paper asks about the consequences of this clustering for native-born American artists.

3. The data

The primary dataset we use for our analysis is the 1% sample of the US Census and American Community Survey, provided by the Integrated Public Use Microdata Series – USA (IPUMS-USA). This comprehensive decennial population census provides a large array of variables, collected every 10 years, and since 1850 includes also information on the occupational status of individuals (OCC1950). This variable is used in order to identify the following occupations for household heads: artists and art teachers, authors, musicians and music teachers, actors and actresses, architects, and editors and reporters (labeled as journalists). The selection delivers representatives of visual arts, literary arts, music and performing arts. The Census data also contain information on the geographical locations of the individual artist as well as their place of birth. We use country of birth to identify immigrants versus native-born Americans.

Figure 1 demonstrates the growth and importance of artistic employment during the late nineteenth and twentieth centuries. In terms of total employment, artistic employment is nontrivial, increasing to about 0.1% of all occupations by the end of the 20th century. The share of musicians and music teachers is especially high and takes off during the late 20th century reaching 0.7%, with the other occupations showing stable or more modest growth.

Figure 2 shows the importance of immigrants to these occupations. As is evident, a very high share of individuals in artistic occupations have immigrated from abroad. While the North American population consists in general of a high share of foreign-born individuals, the share of immigrants reached 60% of musicians in 1880. By the 1960s, the share of immigrants in artistic occupations converges to the average for all household-heads, with the exception of actors, where the fraction remains about 7–8 percentage points higher.

For our analysis, we break down populations by Metropolitan Statistical Area—the smallest geographic unit that can be easily made consistent across Censuses—and refer to this geographic unit of analysis as city. During this period, the relative population, and even existence of cities, changed tremendously. To demonstrate this change and to present the variables that we will be using in the paper, Table 1 provides summary statistics on the variables by breaking up the period into

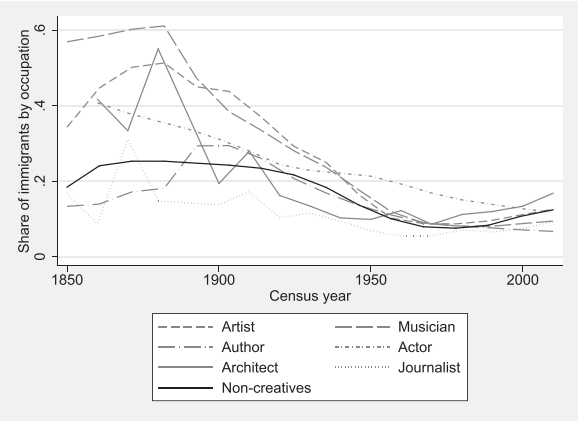

Fig. 2. Share of Immigrants by Creative Occupation.

Table 1
Summary Statistics.

	(1) pre-1920	(2) post-1920	(3) Overall
	Percentage growth		
A. Total population growth over a decade			
Immigrants	11.01	2.68	3.51
	(17.12)	(5.95)	(8.21)
Natives	19.88	14.13	14.71
	(15.22)	(22.79)	(22.21)
Total	30.89	16.81	18.22
	(24.41)	(25.20)	(25.47)
B. Relative growth of artistic population			
Immigrants	14.08	1.20	0.33
	(48.41)	(33.32)	(35.41)
Natives	29.08	2.55	5.21
	(60.86)	(123.76)	(119.24)
Total	43.15	1.35	5.53
	(54.31)	(129.83)	(124.99)
C. Control and instrumental variables			
Proportion of immigrants	0.336	0.098	0.123
	(0.432)	(0.225)	(0.265)
City population growth	0.499	0.388	0.423
	(0.672)	(0.670)	(0.672)
log(Immigrant population)	0.149	0.498	0.374
	(0.856)	(1.542)	(1.350)
Clergymen (in thousands)	0.057	0.368	0.258
	(0.164)	(0.795)	(0.663)
Teachers (in thousands)	0.048	2.797	1.821
	(0.179)	(8.742)	(7.144)
Proportion of teachers	0.0040	0.0151	0.0112
in overall population	(0.0102)	(0.0136)	(0.0135)

Notes: Standard deviations in parentheses. Column 1 "pre-1920" covers the years from 1850 to 1920. Column 2 "post-1920" covers the years from 1920 to 2010. Column 3 "Overall" covers the years from 1850 to 2010.

pre- and post-1920. Panel A decomposes the population growth rate over a decade into components attributable to natives and immigrants. Panel B does the same for the relative growth rate of the artistic population (i.e., the growth rate of the population of artists minus the growth rate for the total population). As would be expected, population growth of both immigrants and natives was greater pre-1920 than post-1920. Furthermore, the relative growth of the artistic population was greater earlier than later. Panel C presents control and instrumental variables.

4. Methodology

A common challenge in estimating the effects of local labor market variation in immigrant populations on the native population is the problem of spatial correlation. This would not be the case if immigrants were randomly allocated across local labor markets. However, it is likely that levels of immigrant shares and levels of native shares may be spatially corre-

lated because of common fixed influences, leading to a positive or negative statistical correlation between immigrant and native concentrations, even in the absence of any genuine effects of immigration. Elimination of common fixed influences could be achieved by using changes in native concentrations and relating them to changes in immigrant concentrations. This is the approach we pursue below.

The primary variable that we focus on is proportion of artists in a city, P_{ac}, relative to the total population in a city P_c.[1] We decompose changes in this proportion into changes that are driven by the immigrant population (M) and changes that are driven by the native population (N), so that $P_c = M_c + N_c$. As is standard in the labor literature (e.g. Card and DiNardo 2000), the natural log of the change in the proportion of artists to the total population is then approximately

$$\Delta \ln P_{ac}/P_c = (\Delta M_{ac}/P_{ac} - \Delta M_c/P_c) + (\Delta N_{ac}/P_{ac} - \Delta N_c/P_c) \quad (1)$$

The first term is the relative growth rate of immigrants in the artist population and the second is the relative growth rate of natives in the artist population. So, the total growth rate of artists relative to the entire population is that sum of these two parts.

As is usual, we then propose that natives react as follows to immigrant inflow:

$$(\Delta N_{ac}/P_{ac} - \Delta N_c/P_c) = a + b(\Delta M_{ac}/P_{ac} - \Delta M_c/P_c) + \eta_{ac} \quad (2)$$

where η_{ac} is an error term.

By substitution, the overall change in the log population share of artists can be written as:

$$\Delta \ln P_{ac}/P_c = a + (1+b)(\Delta M_{ac}/P_{ac} - \Delta M_c/P_c) + \eta_{ac} \quad (3)$$

If $b < 0$ then native outflows occur if there are immigrant inflows, and if $b = -1$, then native outflows exactly offset immigrant inflows. If b = 0, then population changes of natives are not affected by the relative inflow rate of immigrants. If b > 0, then native inflows increase with immigrant inflows. Hence, we can test for the effect of immigrant inflows on the native artist occupation.

As a first specification test, we extend the simple model of Eq. (2) with a set of plausibly exogenous covariates to account for the possibility that a simple first-differenced specification may not sufficiently capture the dynamics of population change. (As noted before, using relative growth rates may partially mitigate other possible influences.) Specifically, we include the relative growth of the native artistic population over a preceding period (i.e., the lagged dependent variable) and the lagged proportion of immigrants. In further tests we also include measures of city population growth and lagged city population growth.

One concern with the above specification is that demand shocks that are specific to cities and artists can deter or attract both native and immigrant artists from a particular city. This selective settlement would lead to an upward biased estimate. An additional problem in the calculation of immigrant concentrations at the city level is subject to measurement error. This is likely to be the case in a study that is based on a survey of relatively small sample size, or when using differenced and within groups estimation.

A possible solution to the problems above is to use a Bartik instrument that relies on the interaction between initial local employment shares with national sector employment growth rates (Goldsmith-Pinkham et al. 2019). More specifically, in Eq. (2) we substitute the actual migrant population of artists (M_{ac}) in the relative growth rate of migrants with the predicted migrant population of artists ($\widehat{M_{ac}}$). The prediction comes from the first-stage estimation, which regresses migrant artists in city c and from origin country o (M_{aco}) on the interaction between initial migrant stock in destination city c in 1850 (the pull factor) and migration from a given origin country o in a given year (push factor); we include here destination city fixed effects and origin country fixed effects. The predicted migrant artists in city c and from country of origin o ($\widehat{M_{aco}}$) are then summed up by city year in order to obtain the predicted migrant population of artists in city c ($\widehat{M_{ac}}$). This enables us to include it into the relative growth rate of the migrant artist population and use in Eq. (2).

5. Estimation

We estimate Eq. (2) in several ways. In the first part of this section we present OLS estimates using a pooled sample and controlling for occupation, and then estimating each artistic occupation separately. In the second part of the section, we present our instrumental variable regressions, including various specifications and robustness tests.

5.1. Ordinary least squares estimation

Using a pooled sample of all artist occupations and then controlling for occupation, we present the results in Table 2. Our variable of interest is the relative growth of the immigrant population in each of the artistic occupations and how that effects the relative growth of the native population in each of the artistic occupations. We construct this variable by census Metropolitan Statistical Area (MSA), taking the relative change (relative to the total MSA population) in each of the artistic populations over a 10 year period. When we difference for growth rates, we are left with 4298 observations for 617 MSA's.

[1] Agglomeration research typically identifies cities as the relevant spatial unit to study labor market effects, for example, Rosenthal and Strange (2001) and Ellison et al. (2010).

Table 2
Relative Growth of the Native and Immigrant Artistic Population.

	(1)	(2)	(3)
	Relative growth of native artistic population		
	OLS		
Relative growth of immigrant artistic population	0.0513	0.681***	0.789***
	(0.0513)	(0.0985)	(0.103)
Lagged relative growth of native artistic population		−0.184***	−0.198***
		(0.0287)	(0.0293)
Lagged proportion of immigrants		1.309***	1.431***
		(0.176)	(0.193)
City population growth		0.101	0.101
		(0.0806)	(0.0867)
Lagged city population growth		−0.147***	−0.154**
		(0.0563)	(0.0616)
Observations	4298	1975	1975
R-squared	0.007	0.099	0.161
Occupation fixed effects	✓	✓	✓
Year fixed effects		✓	✓
State fixed effects		✓	
City fixed effects			✓

Notes: Relative growth of native artistic population is regressed on relative growth of native artistic population and controls, as presented in Section 4. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3
Relative Growth of the Native Artistic Population by Occupation .

	(1)	(2)	(3)	(4)	(5)	(6)
	Artist	Author	Musician	Actor	Architect	Journalist
Relative growth of immigrant artistic population	0.880***	0.702**	0.583***	0.780	0.995***	0.772**
	(0.310)	(0.341)	(0.151)	(0.654)	(0.251)	(0.324)
Lagged relative growth of native artistic population	−0.328***	−0.517***	−0.283***	−0.176	−0.345***	−0.424***
	(0.0754)	(0.101)	(0.0485)	(0.292)	(0.0867)	(0.0766)
Lagged proportion of immigrants	1.429**	0.216	1.164***	1.586	1.487***	0.854
	(0.695)	(0.568)	(0.255)	(0.982)	(0.403)	(0.579)
City population growth	0.290	−0.00173	−0.0562	0.193	0.200	0.236
	(0.294)	(0.206)	(0.114)	(0.447)	(0.151)	(0.171)
Lagged city population growth	−0.215	−0.130	−0.234***	−1.899***	−0.0154	−0.102
	(0.240)	(0.184)	(0.0741)	(0.553)	(0.111)	(0.0936)
Observations	370	204	553	53	363	437
R-squared	0.364	0.711	0.365	0.622	0.551	0.356
Year fixed effects	✓	✓	✓	✓	✓	✓
City fixed effects	✓	✓	✓	✓	✓	✓

Notes: Relative growth of native artistic population is regressed on relative growth of native artistic population for each type of artistic occupation and controls, as described in Section 4. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

In column 1, without using any controls we find that on average, the relative growth of the immigrant population in artistic occupations does not affect the relative growth of the native population in the artistic occupations.

In column 2, we add lagged relative growth rate of the native artistic population in the previous 10 year period, the lagged proportion of immigrants in the previous 10 year period, change in the total city population, the lagged change in the total city population, year fixed effects and state fixed effects. With these controls the relative growth of immigrant artists positively effects the relative growth of native artists. The magnitude of the OLS results indicate that for each 10% increase in the immigrant population we would have about a 6.8% increase in the native population. This effect persists and increases to 7.9% when we add city fixed effects (column 3).

When broken out by artist occupation, our regression results from the estimation of Eq. (2) are presented in Table 3.[2] None of the individual coefficients on the relative growth of the immigrant artistic population for each occupation differ substantially from the average estimates. Furthermore, the coefficients for the artists, musicians and architect samples are positive and significant at the 99% level, and on author and journalist, the coefficients are positive and significant at the 95% level. The only insignificant coefficient is found in the actors regression, albeit the magnitude remains comparable with the average. Immigration by people in artistic occupations does not crowd out, but rather crowds in, native artists.

[2] The specification presented includes city fixed effects in order to resemble most closely the approach introduced by Card and DiNardo (2000). However, the results would remain very similar if city fixed effects were dropped or substituted by state fixed effects.

Table 4
Relative Growth of the Native and Predicted Immigrant Artistic Population.

	(1)	(2)	(3)
	Relative growth of native artistic population		
	IV	IV	IV
Predicted relative growth of immigrant artistic population	2.683*** (0.334)	0.787** (0.382)	3.113*** (0.501)
Lagged relative growth of native artistic population			−0.168*** (0.0215)
Lagged proportion of immigrants			61.47 (62.10)
City population growth			−60.38** (25.26)
Lagged city population growth			53.23*** (16.66)
Observations	4283	4266	1975
R-squared	0.016	0.367	0.467
Occupation fixed effects	✓	✓	✓
Year fixed effects		✓	✓
City fixed effects		✓	✓

Notes: Predicted relative growth of immigrant artistic population estimated from the interaction between initial migrant stock in a destination city in 1850 and migration from a given origin country in a given year. The prediction is described in Section 4 and shown in Table 5. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 5
Predicting migrant population of artists.

	(1)
	Migrant population of artists
	OLS
Migrant stock in destination city in 1850 * * migration from a given origin country in a given year	1.184*** (0.112)
Observations	2777
R-squared	0.170
Cragg-Donald Wald F statistic	26.2
Origin country fixed effects	✓
Destination city fixed effects	✓

Notes: This is the first-stage predicting the migrant population of artists in a given destination city, from a given origin country and in a given year. The predicted migrant population of artists from a given country of origin are then summed up by city year and used to calculate the predicted relative growth of immigrant artistic population as summarized in Eq. (2) and described in Section 4. For legibility, coefficients and standard errors are multiplied by 100,000. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.2. Instrumental variables estimation

Table 4 presents our instrumental variable results, using a Bartik instrument to predict the relative growth rate of the immigrant artistic population. The prediction depends on the interaction between initial migrant stock in a given destination city in 1850 (the pull factor) and migration from a given origin country in a given year (the push factor).[3] All specifications—whether control variables and fixed effects are included or not—indicate that immigration in artistic occupations is positively and significantly related to overall immigration. It is encouraging to observe that the magnitude of the IV-coefficient in the specification with all fixed effects, but without the lagged or city growth controls (column 2, Table 4) is very similar to the baseline OLS-estimations. The most restrictive specification in column 3 delivers a coefficient of 3.1. This supports the view that immigration of artists substantially crowds in native artists.

The validity of our instrument depends upon the assumption that the initial number of migrants in 1850 in a given city and the migration from a given origin country are only correlated with the relative growth rate of the native artistic population through the growth rate of the immigrant population of artists. It is plausible that the exclusion restriction holds in the underlying paper. Following Goldsmith-Pinkham et al. (2020), one could argue for the identifying assumption in terms of the shares, that is the initial migrant stock in a given destination city in 1850. In any period since then, there are immigrants

[3] See Table 5.

Table 6
Relative Growth of the Immigrant Artistic Population: Alternative instrument.

	(1)	(2)	(3)	(4)	(5)
	Relative growth of immigrant artistic population				
	OLS (first-stage)				
Logged(dist. to New York City)	−4.311**				
	(2.015)				
Logged(dist. to Baltimore)		1.413			
		(1.403)			
Logged(dist. to Boston)			1.933		
			(2.020)		
Logged(dist. to New Orleans)				0.825	
				(1.840)	
Logged(dist. to Philadelphia)					1.857
					(1.952)
Lagged relative growth of native artistic population	−0.00623***	−0.00623***	−0.00623***	−0.00623***	−0.00623***
	(0.00109)	(0.00109)	(0.00109)	(0.00109)	(0.00109)
Lagged proportion of immigrants	−3.550	−3.550	−3.550	−3.550	−3.550
	(2.924)	(2.924)	(2.924)	(2.924)	(2.924)
City population growth	−32.30***	−32.30***	−32.30***	−32.30***	−32.30***
	(0.928)	(0.928)	(0.928)	(0.928)	(0.928)
Lagged city population growth	−3.603***	−3.603***	−3.603***	−3.603***	−3.603***
	(0.810)	(0.810)	(0.810)	(0.810)	(0.810)
Observations	1912	1912	1912	1912	1912
R-squared	0.705	0.705	0.705	0.705	0.705
Occupation controls	✓	✓	✓	✓	✓
Year controls	✓	✓	✓	✓	✓
City controls	✓	✓	✓	✓	✓

Notes: Relative growth of immigrant artistic population is estimated as a function of the logged distance between a destination and selected ports of the 19th century. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

arriving from different countries and this then naturally affects places differently.[4] One reason for this is related to the persistency and immobility of cultural capital (see Throsby, 1999), an asset embodying cultural value, which is approximated by the quality of the arts in a given place. In other words, once a location enters the cultural path and obtains a sufficiently large group of migrant artists, it will likely attract further migrant artists over a longer period. Jaeger et al. (2018), however, argue that these "shift-share" instruments conflate short-run and long-run effects. Because our estimates are reliant on the above assumption, we also present alternative identification methods below.

5.3. Alternative instrumental variables estimations

5.3.1. The distance from the main immigration ports

An alternative instrument that could be used is the distance from the main immigration ports to the immigrant artist shares in the sample. We obtained the GIS coordinates for every destination in the US and calculated the airline distance to New York City (mean 1240.8 km, std. dev. 1141.5), as well as to the other early ports (Boston, Baltimore, Philadelphia, New Orleans). In addition, since the selection of the ports is somewhat subjective, we have calculated a proxy for the distance to early entry points as the minimum distance from a given destination to the easternmost point (West Quoddy Head, Maine). In doing this we avoid any subjective selection of 19th century ports, which have been also heterogeneous in size and importance. The distance terms are logged to take account of outliers, but the results would remain comparable if the terms were kept at level or if they were measured as a second-degree polynomial.

The OLS first-stage results are summarized in Table 6, which shows that only the distance to New York City is a meaningful determinant of the relative growth of the immigrant artistic population. This is perhaps not a surprise considering that more than 70% of all immigrants entered through New York City, which came to be known as the "Golden Door" (Library of Congress, 2021).

In Table 7 we present the second-stage specification that uses the logged distance between a given destination and New York City. The results are shown in Table 7 and suggest a very comparable effect to the baseline specification using the Bartik instrument. This is encouraging, especially considering the fundamentally different approach pursued in this estimation, which builds on pre-determined geographic variables.[5]

[4] Consider Card (1990) as an example, who shows in a comparable context of immigration to the US, that the shock experienced by a destination city is due to the pull factor of the immigrant population in the past.

[5] Note, for example, that the location of New York City has been pre-determined geographically. The conveniently located bay and estuary have been discovered by Giovanni da Verrazzano in 1524 who anchored in what is now called the Narrows, the strait that connects the Upper and Lower New York Bay.

Table 7
Relative Growth of the Native and Predicted Immigrant Artistic Population: Alternative instrument.

	(1) Relative growth of immigrant artistic population OLS (first-stage)	(2) Relative growth of native artistic population IV (Second-stage)
Relative growth of immigrant artistic population		2.937***
		(0.509)
Logged(dist. to New York City)	−4.311**	
	(2.015)	
Lagged relative growth of native artistic population	−0.00623***	−0.163***
	(0.00109)	(0.0233)
Lagged proportion of immigrants	−3.550	50.14
	(2.924)	(61.78)
City population growth	−32.30***	−60.64**
	(0.928)	(25.60)
Lagged city population growth	−3.603***	53.39***
	(0.810)	(17.20)
Observations	1912	1912
R-squared	0.705	0.465
Occupation controls	✓	✓
Year controls	✓	✓
City controls	✓	✓

Notes: Relative growth of immigrant artistic population is estimated as a function of the logged distance between a destination and New York City. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.3.2. Religious liberty as a pull factor

We explore also an additional, novel instrumental variable, inspired by "The Brain of the Nation", written by Gustave Michaud in 1904. In his article, Michaud sets the aim to depict geographic spread of intellectual and artistic talent for American States in 1900 and provides efforts to identify "the laws which obtain in the distribution of intellectuality". Based on samples of contemporaneous famous people of literary, artistic, or scientific backgrounds, Michaud arrives at the conclusion that immigrants may be roughly divided into two categories: those who "wished to improve their position through the acquisition of property, and those who wished above all to enjoy religious freedom." While the first category of immigrants—those motivated by economic factors—are the populations typically modeled in labor economics, the second category—those pulled by *religious liberty*—are often ignored.

Migration theory suggests that migrants in their decision to move consider the conditions at the origin (the push factors) and at the destination (the pull factors), before making a decision based on the difference between these conditions/factors and in consideration of the cost of migration. Since the US is a country that in general emphasizes and supports religious liberties, it is likely that the difference in the degree of (religious) freedoms between the destination and the origin abroad (for immigrants) is greater than the difference between the destination and the US origin location (for native migrants). It is thus possible that the incentives (the pull factors) for internal migrants are not large enough to encourage them to move, despite the potentially lower cost of migration. This is why the instrument may be correlated with the relative growth rate of immigrant artists, but directly with the relative growth rate of native artists, and hence our assumption is plausible in some state of the world.

While we acknowledge the limitations of this approach, there are potentially two advantages of this identification. The first one is the contribution in the form a test of the hypothesis on whether religious liberties attract migrants. It is a plausible hypothesis and, more interestingly, one suggested already at the turn of the 1900s, as described above, by Michaud (1904). However, to the best of our knowledge, the hypothesis has not been tested yet. We contribute by providing this test, which is essentially the first-stage result (column 1 in Table 8). The insights that religious liberties and migration are positively related is of some value for economic history, given the context, and naturally for labor economics, where the push and pull factors of migration are often considered.

The second advantage is less evident, and the interpretation depends upon whether the instrument is valid. The result presented in Table 8 is consistent with the baseline identification: The alternative instrumental variable approach provides positive, significant and comparable in size coefficients. This could be interpreted as an encouraging sign of consistency of the claims presented in the paper or it could be interpreted as the result of correlation between the number of clergy and domestic migration.

5.3.3. The political and economic situation of immigrants' country of origin

A final alternative approach builds on the idea of exploiting the political and economic situation of immigrants' country of origin. Given the time period studied here and the wide geographic scope, it is fairly out of scope to measure systematically and directly the political or economic situation in the immigrants' country of origin. However, it is plausible to assume that those seeking artistic freedom or some degree of financial independence, have been more likely to emigrate from Ger-

Table 8
Alternative Instrumental Variable: Religious Freedom.

	(1) Relative growth of immigrant artistic population	(2) Relative growth of native artistic population
	OLS (First-stage)	IV (Second-stage)
Relative growth of immigrant artistic population		4.649** (1.952)
Lagged Clergymen (in thousands)	0.0166*** (0.00564)	
Lagged relative growth of native artistic population	−0.0155** (0.00666)	−0.126*** (0.0478)
Lagged proportion of immigrants	−0.936*** (0.0349)	4.993*** (1.823)
City population growth	0.0172 (0.0187)	0.0475 (0.111)
Lagged city population growth	0.00414 (0.0131)	−0.171** (0.0762)
Observations	1975	1975
R-squared	0.316	0.068
Cragg-Donald Wald F statistic	13.1	
Occupation fixed effects	✓	✓
Year fixed effects	✓	✓
State fixed effects	✓	✓

Notes: This is an alternative instrumental variable approach building on a novel identification, as described in Section 5.3.2. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

many or Ireland in the late 19th and the first half of the 20th centuries. This motivates a robustness test which narrows down the analysis to German or Irish immigrants. In particular, we conduct the robustness test by instrumenting for the migrant population of artists with the German and Irish immigrant stock in the destination city in 1850 interacted with migration flows from Germany and Ireland in a given year since. The results are available upon request and are qualitatively similar to the baseline identification.

All in all, we explore a number of fundamentally different instruments: the preferred shift-share instrument (Section 5.2), including a variant with restriction to Irish/German immigrants (not reported), logged distance to New York City, and the exploratory clergymen instrument. Throughout all these estimations, we observe that the instruments are related to the location and behaviors of migrants, pre-determined geographic variables, or the occupational background of parts of the society. The results coming from utilizing any of these distinct instruments are remarkably similar; the point estimates are always positive, statistically significant, and comparable in magnitude.

5.4. The channel: Internal migrants or new artists?

The main results of the paper show that the relative growth of the immigrant artistic population is conducive to the relative growth of the native artistic population (see, for example, Table 4). The change in the native artistic population could be due to one of the two reasons: due to internal migration (potentially only a relocation of native artists) or due to the uptake of artistic jobs by locals (an increase in the population of artists). Currently, it is not known which effect it is, and yet this an important issue.

If only the former effect was present (internal migration), then the observed uptake of artistic occupation by natives could be largely due to the relocation of native artists: native artists in the origin move to the destination and remain artists; this could be a zero-sum-game. However, if the latter effect was observed (native's uptake of artistic occupations), then the results of the paper would become even more interesting from the point of view of art markets. In other words, with the latter effect we observe an increase in the total population of artists, as opposed to just a relocation.

Therefore, in Table 9 we separate out the effects of immigrant artists on inducing internal migration or inducing the uptake of artistic jobs. The value of Table 9 lies particularly in the effect shown on native artistic stayers (column 3), which is positive and statistically significant. The point estimates with stayers suggests that a 10% higher relative growth rate of the immigrant population increases the relative growth rate of locals in arts by up to 11.9%. This is an important result that signifies the complementarity between foreign migrants and native stayers, and supports the hypothesized role that immigrants have played on the development of local arts clusters.

The interpretation of the coefficient on native artistic migrants is more difficult and there are two reasons for this. First, since the Census data does not provide information on when the internal migration or immigration has occurred, we are not able to disentangle whether the move has been the migrant's deliberate choice or perhaps a choice of her parent's. However, even if it was due to the parents, it is possible that in some cases the parents choice was in consideration of the child's (artistic) talents and prospects; in other cases, the parents may have been artists themselves.

Table 9
Natives: Internal Artistic Migrants or Local-Born Artistic Stayers.

	(1) Relative growth of native artistic population Baseline, IV	(2) Relative growth of native artistic migrants IV	(3) Relative growth of native artistic stayers IV
Relative growth of immigrant artistic population	3.113***	1.923***	1.190***
	(0.501)	(0.249)	(0.326)
Lagged relative growth of native artistic population	−0.168***	−0.103***	−0.0650***
	(0.0215)	(0.0107)	(0.0140)
Lagged proportion of immigrants	61.47	42.36	19.11
	(62.10)	(30.93)	(40.42)
City population growth	−60.38**	−42.47***	−17.90
	(25.26)	(12.58)	(16.44)
Lagged city population growth	53.23***	0.386	52.85***
	(16.66)	(8.300)	(10.84)
Observations	1975	1975	1975
R-squared	0.467	0.449	0.430
Occupation fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓
City fixed effects	✓	✓	✓

Notes: Predicted relative growth of immigrant artistic population estimated from the interaction between initial migrant stock in destination city in 1850 and migration from a given origin country in a given year. The prediction is described in Section 4 and shown in Table 5. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The second reason why the interpretation of the coefficient on the native artistic migrants is difficult is the following: we do not know whether the native migrant has moved and became an artist after the move, or whether she has been already an artist at the origin and only relocated. In the former case, the immigrant artistic population would influence the occupational uptake of the natives (who happen to be also internal migrants), whereas in the latter case, the immigrant artistic population only affects the location choice of native artists. Since we do not observe the uptake of artistic occupations among internal migrants, the overall increase in the population of native artists—as shown in the uptake by native stayers (column 3 in Table 4)—has to be understood as a lower bound. In other words, the effect of immigrant artists is greater on the occupational uptake by natives than observed here.

5.5. Robustness tests

A number of concerns can be raised in relation to the previous estimates. First, the number of teachers in artistic occupations increased rapidly after 1920, and an important question is whether it is the number of teachers or the proportion of teachers in the overall population that is driving the estimates. As column 1 in Table 10 shows, while either of the teacher variables has an effect on the relative growth of the native artistic population, our results are not significantly different when controlling for teachers.[6]

Further concerns are that artists may be attracted to areas that are more racially and ethnically diverse, or simply large cities. The significance of racial or ethnic diversity could have an impact on the proportionate change in the immigrant population. Perhaps artists are attracted to areas directly because of the number of immigrants, which also results in racial or ethnic diversity. Therefore, we introduce an additional control for ethnic diversity, which is calculated as the probability that two individuals taken at random from our sample represent a different race. We also introduce an analogous measure for country of birth diversity.

More formally, our diversity measure constitutes the standard Gini-Simpson index, which is equal to

$$1 - \sum_{n=i} p_i^2, \tag{4}$$

where p_i represents the proportion of each race i. The country of birth diversity index is calculated in analogy to Eq. (4), but considers country of birth instead of race.

The measure equals the probability that two entities taken at random from the dataset of interest represent the different type. The interpretation of the diversity index as the probability that two entities taken at random from the dataset of interest represent the different type assumes that the first entity is replaced to the dataset before taking the second entity. If the dataset is very large, which is the case in the underlying paper, sampling without replacement gives approximately the same result.

For example, if 90% of a city's population were born in the US, and 10% were born in Ireland, the country of birth diversity index works out to 0.18. But, if the proportions were 50/50 the diversity index is 0.5.

[6] Including the two teacher control variables separately or introducing instead the relative growth rate of teachers would not yield qualitatively different results.

Table 10
Robustness Tests: Teachers, Racial Diversity, Country of Birth Diversity, and City Size.

	(1)	(2)	(3)	(4)	(5)
	Relative growth of native artistic population, IV				
	Whole sample				Dropped: New York, Los Angeles & Chicago
Predicted relative growth of immigrant artistic population	3.134*** (0.449)	3.670*** (0.507)	3.053*** (0.494)	3.290*** (0.504)	3.209*** (0.519)
Teachers (in thousands)	−7.392*** (0.887)				
Proportion of teachers in overall population	−12.84*** (0.630)				
Racial diversity		−1140*** (208.1)			
Country of birth diversity			1201*** (172.8)		
City size (in millions)				−4202*** (1552)	
Observations	1975	1975	1975	1975	1851
R-squared	0.573	0.476	0.482	0.470	0.471
Controls	✓	✓	✓	✓	✓
Occupation fixed effects	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓
City fixed effects	✓	✓	✓	✓	✓

Notes: Predicted relative growth of immigrant artistic population estimated from the interaction between initial migrant stock in a destination city in 1850 and migration from a given origin country in a given year. The prediction is described in Section 4 and shown in Table 5. Not reported controls: Lagged relative growth of native artistic population, lagged proportion of immigrants, city population growth, and lagged city population growth. Racial diversity and country of birth diversity are measured with the Gini-Simpson index, based on Eq. (4), and denotes the probability that two individuals taken at random from our sample represent a different race or have a different country of birth. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Consider the city of New Orleans, LA, which has been an extremely diverse place in 1850. The country of birth diversity is the highest among all locations (0.77), followed by the nearby Lafayette, LA (0.74) and Chicago, IL (0.71), and markedly above the mean country of birth diversity of 0.47. New Orleans is also the 11th most racially diverse place with an index of 0.15, which is almost twice higher than the average of 0.08. This corresponds with observations presented by Nystrom (2010) who shows that New Orleans's port is the third largest in the US at that time (in terms of tonnage), and the city is also characterized by the second largest per capita income.

By 2010 New Orleans remained racially diverse with an index of 0.54, which remained above the national average of 0.35. On the other hand, New Orleans has become a significantly more homogeneous place in terms of country of birth: The index has fallen to 0.12 and is now only about half of the US average of 0.24. The calculation delivers a mean racial diversity index of 0.154 (st. dev. 0.171). The mean country of birth diversity is equal to 0.321 (st. dev. 0.224).

In order to account for the role of large cities, we introduce a control variable measuring the city size or drop the largest cities. As Table 10 shows, the additional control variables introduced correlate with the relative growth of native artistic population (columns 2–4). However, these additional controls have very little effect on our baseline estimates, which are also robust to the dropping of particularly large cities (column 5).

6. Discussion and conclusion

This paper seeks to measure the effect that immigrant artists have had on the growth of artistic occupations in U.S. cities. The historical data allows us to look for very long term effects. We find that immigrants have played an outsized role in the development of art and culture in the United States, by crowding in, rather than crowding out, native artists. The results indicate that cities which experienced an inflow of migrant artists, see also an inflow of native artists.

These results could be due to several factors. First, with more migrant artists a city may become more vibrant and diverse, increasing its attractiveness and stimulating knowledge spillovers (Glaeser et al., 1992). Second, the findings could be related to economies of scale: with a greater supply of artistic output, the average price per unit of output decreases. For example, with more musicians there can be staged more concerts in the local concert hall, which leads to a drop in price of an average concert. These effects are nonnegligible due to the typically very high fixed costs of cultural infrastructure. Third, at play could be also economies of scope, leading to lower production costs if a higher variety of goods are produced. Staying with the example of the concert hall: the venue can be used for other artistic ventures, such as performing arts (involving actors) or to stage opera (musicians).

All in all, the results provide new insights on the complementary role of migrants, who have likely stimulated the development of local arts and cultural scenes, which have with time developed to international, important art clusters. The

findings in the paper suggest thus that immigrants may have contributed towards the economic and cultural development of the United States or—in the words of John F. Kennedy—"have enriched and strengthened the fabric of American life."

Declaration of Competing Interest

We declare that there exists no conflict of interest.

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