Public investment in the arts and cultural agglomeration: Evidence from the New Deal

Jakob Brounstein*

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*UC Berkeley Department of Economics, 530 Evans Hall, Berkeley, CA 94705 (e-mail: jakob.brounstein@berkeley.edu). I am very grateful for advising on this work from Alan Auerbach, Barry Eichengreen, Price Fishback, Hilary Hoynes, Patrick Kline, Enrico Moretti, Emmanuel Saez, and Gabriel Zucman. I thank seminar participants at the UC Berkeley Economic History group. I also thank Ashley Lopez Figuera for truly invaluable research assistantship. I acknowledge grant support from the National Endowment for the Arts, the Robert D. Burch Center for Tax Policy and Public Finance, the Center for Equitable Growth, and the All-UC History Group.

Abstract

What is the impact of extending public funding to the arts? I draw evidence from the first major instance of federal funding to the arts via New Deal programming to evaluate the impact of artist employment programs on the per capita number of artistic professionals in US cities over time. I employ a set of New Deal spending instruments in an instrumental variables differences-in-differences design to identify the causal impacts of these programs. I determine that the program induced large increases in local per capita levels of writers, theater and film industry workers, and certain kinds of visual artists that have endured to the present-day. Namely, present-day population-shares of writers and artists in photography and design increased by approximately 100 and 1000 professionals respectively per 1 million people in response to an investment of $1,000 per professional in 1935. I document positive, but less temporally persistent impacts on music and general visual arts. A subsequent variance decomposition demonstrates modest, yet non-negligible explanatory power (5-15%) of Federal Project Number One in determining variation within and across cities in post New Deal decades.

JEL codes: H30, H44, H49, J48, J24, R12

Key words: Agglomeration, arts economics, urban agglomerations, urban sorting, occupational choice, public investment in amenities, urban development

1 Introduction

Public support to the arts is controversial. On one hand, work in urban economics suggests that higher skilled workers tend to endogenously sort into locations with greater amenities, and that these amenities tend to accumulate over time and benefit from agglomeration economies (Diamond (2016); Kline and Moretti (2013)). Furthermore, the seminal work on the relationship between artistic activity and urban development (Florida (2002)) argues that the development of an artistic class represents a central component to urban growth. Extending funding to the arts could induce positive externalities both to arts practitioners themselves and to the locations that host such activities (Leroux and Bernadska (2014)). On the other hand, critics question the role and efficacy of the government in supporting cultural industries that would otherwise face difficulties in sustaining themselves.

However, as a baseline, evidence on the causal impacts of government spending on the arts is scant. Due to the combined lack of natural experiments and largely non-experimental and non-randomized nature of existing arts policy, studies on the effects of arts funding are forced to make use of observational settings that cannot separate treatment and selection effects (Alper and Wassall (2006); Catteral, Dumais, and Hampden-Thompson (2012)). Behavioral research in laboratory settings and significantly smaller scales represent an exception to this characterization (Bowen and Kisida (2019)), but their relatively limited settings mitigate their scope to inform our understanding of the policy-relevant causal impacts of arts funding, such as on outcomes like artistic occupational choice.

This paper is the first work to inform this discussion by estimating empirical, causal impacts of large-scale arts spending programs on the long-run population shares of artistic professionals across US cities. I ask: how much artistic employment does funding to the arts generate? How persistent are these effects over time? Do the localities that receive funding go on to to foster flourishing arts environments well-after the initial instance of funding has dissipated?

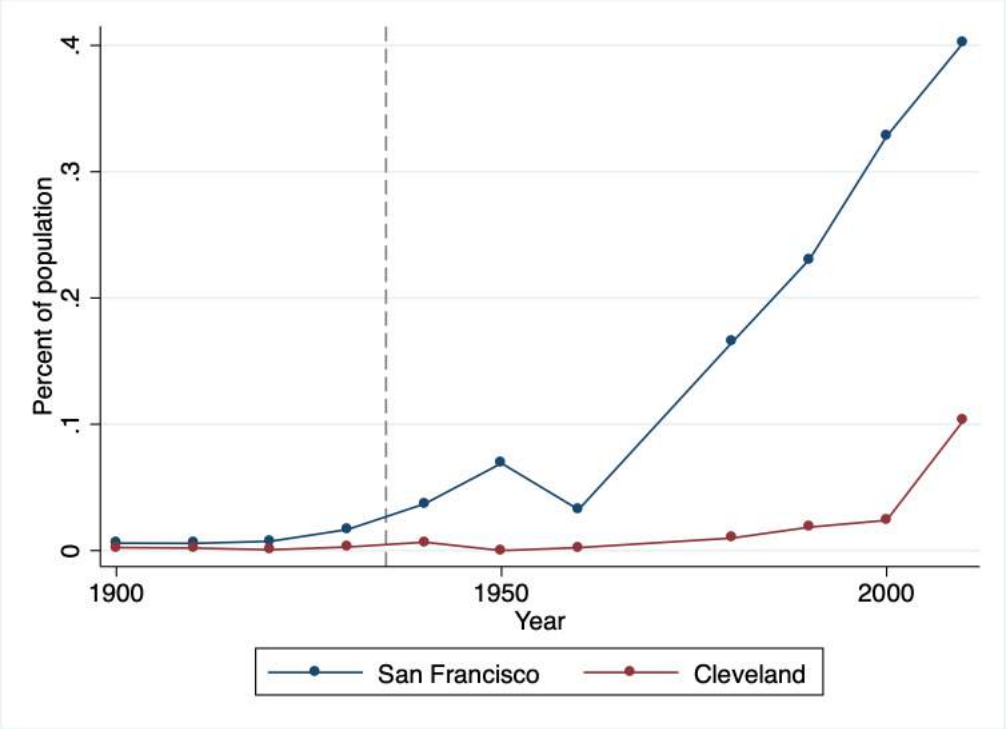
These questions are key for assessing the value of public investment in the arts. Namely, if artistic activity persists heavily across and within spaces (e.g. cities) over time, then extending funding to the arts in the short run will generate considerable additional activity over a longer time horizon. This longer-run impact is particularly important to determine in light of policy discussions that seek to revive New Deal spending programs. Moreover, in a world with highly autocorrelated artistic activity within localities over time (Borowiecki (2019)), the location of current "cultural hotspots" may be the result of historical, path-dependent developments.

Figure 1 illustrates the underlying concept that motivates this work, plotting the evolution of the population share of writer in San Francisco and Cleveland—two cities of comparable activity and demographic characteristics in the beginning of the 20th century, the former of which benefited from substantially more Federal Writer's Project funds than the latter. The figure illustrates a divergence of the share of writers in the two cities following the Federal Writer's Project. For the case of San Francisco, Beat generation poetry emerged from local authors that received support from the Federal Writer's Project. This initial seed of funding may have spurred the growth of a literature scene that spurred the accumulation of high-skilled professionals and further development of the arts in simultaneity that fostered the growth of San Francisco to the present-day.

To study these questions, I employ newly digitized data on the New Deal arts spending encompassed under Federal Project Number One ("FPNo1", "Federal One")—the New Deal's primary artistic employment program, managed within the Works Progress Administration. The program was tasked with the employment of local artists for the dual purpose of promoting cultural production as well as extending New Deal employment efforts to white-collar workers. Importantly, the program represents the first instance of substantial centralized funding to the arts—totalling to approximately 4 billion present-day Dollars, or about half a percent of GDP in 1935.

FPNo1 offers a promising and irreproducible opportunity to study the long-run impacts

Figure 1: Writer's share of population



This figure plots the population share of individuals identifying as an "author" as their primary occupation to the decadal US Census (variable OCC1950) in each respective city. The dashed gray vertical line represents the imposition of the Federal Writer's Project in September 1935, lasting in its primary form until March 1940.

of funding to the arts. Federal funding to the arts had not existed in the US until this point; only Boston and New York to a lesser extent featured publicly available local arts education and programming. At that, throughout the course of the program's run from mid-1935 to the early months of 1940, the federal government granted approximately USD 4 billion (present-day) to the arts, five times today's annual federal funding to the arts allocated to the National Endowment for the Arts. Moreover, the rise of charitable giving to the arts, the variety of funding programs on the state-, local-, and national-levels, and the rise of local arts education in public schools—all in the subsequent decades—potentially render any single arts program less salient for policy-evaluation purposes.[1] Thus, given its size and uniqueness as one of the earliest sources of federal funding to the arts in the US,

[1] In 2018, the sum of philanthropy to arts, culture, and humanities and public spending on part of federal, state, and local governments totaled to 20.9 billion USD in 2018, with philanthropic giving representing about 90% of this amount (Stubbs and Mullaney-Loss (2019); "Giving USA 2019: The Annual Report on Philanthropy for the Year 2018" (2019)).

the program represents a highly unique policy environment to study the long-run impacts of arts funding.

To assess the causal impact of the New Deal arts spending, I exploit the administrative structure of the program to isolate variation in local funding induced through non-arts New Deal funding, exogenous to local potential outcomes in the arts. My main specification employs a local New Deal spending leave-out instrument that is constructed as the difference between total New Deal spending and New Deal arts spending for a given locality. Importantly, the validity of this instrument relies on precluding any impact of non-arts New Deal spending on local artistic outcomes, which I empirically substantiate by demonstrating that New Deal spending had no impact on local population growth and other local economic indicators.

I find positive effects of funding across on local artist shares within their respective disciplines. While the program induced large short-run increases in the shares of artists across nearly all disciplines relative to their respective pre-period baselines (typically greater than 100% increases following the immediate end of the programs), the persistence of these effects over time vary by the specific field of art. Funding to writers generated large effects on the local share of individuals identifying as authors that persist to the present-day. In particular, an investment in 1935 of USD 20,000 per writer (present-day) generated a 20% increase in the population-share of writers relative to non-funded cities in the present-day. However, funding of musicians and visual artists demonstrates large, positive short-run impacts with mixed persistence over time. Namely, the effects of funding musicians on their local shares do not endure beyond a single decade, while the persistence of visual arts funding varies by field (with photographers and designers demonstrating persistent impacts and artists and painters returning to their pre-period shares after a single decade). Finally, the effects of theater funding are somewhat mixed, with null and weakly negative impacts on local shares of actors, but positive and more persistent impacts on the local share of individuals involved in either the theater or television industries.[2]

[2]Historical accounts of Federal One discuss the presence of substantial conflict between Federal One

I proceed as follows: Section 2 discusses the literature on arts and arts/innovation policy, program evaluation, and agglomeration. Section 3 details a historical account of the activities and roll-out of Federal One. Section 4 discusses the data. Section 5 introduces the econometric and reduced form framework and provides ordinary least squares estimates of the relationship between Federal One funding and cities' artistic outcomes over time. Section 6 develops an instrumental variables research design in estimating the causal impacts of the New Deal arts programs. Section 7 develops a theoretical model of dynamic supply, demand, and aggregate production of services with path dependent/agglomerative qualities to illustrate the theoretical foundations of the empirical results. Section 8 contextualizes my findings in the discussion on arts policy and concludes.

2 Related literature

This work relates four seemingly disparate literatures: on urban agglomeration and innovation, the impacts of public amenities investment, the quantitative behavior of artistic and cultural activity, and work in economic history on the effects of New Deal programming during the Great Depression. In brief, this work speaks directly to the role and effectiveness of government funding in promoting artistic and cultural activity by demonstrating the spatial persistence of artistic activity over time and how such activity can be influenced through public investment—namely via historical New Deal funding. These connections have important implications for the role of public investment in fostering the accumulation of local amenities and for policy aimed at influencing the sorting of high-skilled labor and accruing urban growth.

First, work in labor and urban economics aims to quantify the agglomerative tendencies of labor markets and evaluate the scope for public intervention in fostering or inhibiting the development of occupational clusters. Kline and Moretti (2013) represents the most

administrators and local actors and theater unions (McDonald (1968); Flanagan (1940)), where crowd-out and union conflict may have mitigated potentially positive effects of public theater spending or even induced a decrease in actor activity.

closely related work here, studying the short- and long-run impacts of large localized and sustained investments in manufacturing through the Tennessee Valley Authority Program between 1930 and 1960, finding significant agglomeration of manufacturing jobs in the Tennessee Valley area during and after the primary funding period. More recently, Moretti (2019) documents substantial agglomeration economies among inventors within scientific fields and estimates significant productivity premiums to inventors moving to large occupational clusters, as measured by patents. Greenstone, Hornbeck, and Moretti (2010) study the agglomerative spillovers to counties induced by the location of large manufacturing plants, identifying a significant increase in total factor productivity among incumbent plants. Within the creative industries, more recent work finds minimal lasting impact of film-location tax credits on wages, employment, and production in related industries (Button (2019)). In my setting, I similarly seek to quantify the occupational agglomeration to the arts that occurs quasi-experimentally in response to public investment.

There is substantial precedent to frame artistic and cultural activity as phenomena particularly subject to agglomerative forces. A body of work has focused on the spatial clustering of artistic activity as an object of interest in of itself. Borowiecki (2013) uses exogenous variation in the distance from Classical to Post-Romantic composer's birthplaces to major cities to document significant productivity premia to geographic clustering. Kelly and O'Hagan (2007) use a similar approach leveraging variation in visual artists' birthplaces to document the emergence of various cities as artistic clusters between the 13th and 20th centuries. Hellmanzik (2010) demonstrates the geographic shift of location premiums from Paris to New York City between 1850 to 1950 by showing that works produced by artists located in those cities during their respective periods of prominence fetched higher sale prices in auction settings.

In line with the body of work that frames artistic production as a primarily agglomerative activity, this work also engages with research on the agglomeration of amenities as an urban phenomenon and the mutually beneficial relationship between artistic activity and

urban development.[3] Florida (2002) is one of the earlier works to frame artistic production explicitly as central in the process of the spatial concentration of high-technology industries and broader urban growth. Diamond (2016) develops and estimates a structural model that describes the endogenous feedback between endogenous amenity accumulation and agglomeration of high-skilled workers across Metropolitan Statistical Areas. The evidence I draw on the lasting impacts of arts funding in the quasi-experimental setting of New Deal arts funding builds upon other work studying the endogenous accumulation of amenities by estimating the impact of exogenous supply shocks of said amenities. In particular, the estimates produced in this work encompass both the short-run effects of exogenous funding to the arts as well as the longer-run endogenous amenity accumulation process.

Arguing against the prevailing frame of artistic activity as primarily an urban phenomenon, Wojan, Lambert, and McGranahan (2007) demonstrate that in recent decades rural localities in the US have experienced similar growth of artistic professions as have metropolitan localities. However, the majority of related work continues to frame artistic production as an activity that focalizes around urban clustering.

One of the preliminary challenges that artistic activity faces as an object of study is the fundamental issue of how to meaningfully measure artistic activity. Of course, contention surrounding measurement and objections against the use of prices and monetary value as measures of value or willingness-to-pay arise in studying other non-arts-related topics. To this end, McCain (2006) argues that the distinction of arts and cultural goods and services from others serves a largely pragmatic function, due to the tendency for their related markets to behave differently than do more standard markets for goods and services. Examples include more extreme value-mismeasurement issues given the possibility for increased scope of heterogeneous taste, the unclear relationship between human capital, productivity, and labor market outcomes (Towse (2006); Terviö (2009)), and the ambiguous space that artist production occupies as a leisure activity, a primary labor market activity, and a secondary labor market activity (i.e. "moonlighting", Alper and Wassall (2006)). These examples illus-

[3]See overviews of this discussion in Santagata (2006) and Bille and Schulze (2006).

trate the dilemmas that may arise in deciding how precisely to measure artistic and cultural activity.

Yet, money-metric and other value-subjective measurements of artistic value and activity still predominate in studies of arts and culture. Galenson and Weinberg (2000) and Galenson and Weinberg (2001) use this approach by employing data on art auction prices to study the role of the age in style and innovation during artistic transitionary periods of painting, finding generally that younger artists produce their most valuable work and adapt more effectively to new developments in artistic style than do older artists. Hellmanzik (2010) similarly uses auction data in determining the returns of spatial clustering of artists. Instead of monetary value, Kelly and O'Hagan (2007) measures the lasting contributions of artists based on the physical length of their respective entries in the Oxford Dictionary of Art.

Nonetheless, value-subjective approaches may prove less suitable in settings focused less on the valuation of artistic work in of itself. In this respect, I adopt a more value-secular approach in my setting: I opt to focus primarily on occupational choice and labor market outcomes as my primary object of interest, although the impacts of New Deal Arts funding may extend to results that manifest in value-normative measures. The use of occupational choice and labor market for studying artistic/cultural outcomes is common among selected outcome variables after money-metric variables, demonstrated by more visible use in surveys of arts labor markets (Alper and Wassall (2006); Towse (2006)). Moreover, the archival Federal One data distinguish between many different kinds of sub-program activities (e.g. drama theater, comedy theater, choral groups, symphony orchestras, etc.). Aggregating programmatic activity into overall employment counts regardless of specific activity simultaneously represents a decision in favor of pragmatism and a refrain taking a stance on the different value-weighting of different kinds of artistic activities (possibly representing more generally a kind of measurement error). Beyond valuation-oriented concerns, there are also practical benefits to the use of labor market outcomes as measures of artistic outcomes in their wider availability and comparability over time and across different data sources.

Finally, this work contributes to discussion on the impacts of historical New Deal spending. Work here typically fits into one of two camps: either on evaluating the role of New Deal spending in alleviating the effects of the Great Depression or the effects of New Deal spending in significantly more closely-focused settings. More aggregate-focused, macroeconomic analyses of the Great Depression tend toward finding a more limited role of fiscal spending in ending the depression (Romer (1992)), documenting low and even negative fiscal multipliers associated with the contemporaneous spending.

However, the more closely-focused works complicate this picture, portraying a landscape of different fiscal policy with widely varying degrees of effectiveness and distributional impacts; many of these works are discussed in detail in P. Fishback (2017). For instance, P. V. Fishback, Haines, and Kantor (2007) document negative impacts of New Deal relief spending on infant mortality and suicides, and Aizer et al. (2020) find positive effects of New Deal youth employment programs on short- and long-run health outcomes and on the long-run earnings of program participants; Kline and Moretti (2013) find large positive effects on manufacturing employment in the Tennessee Valley of Tennessee Valley Authority activity that in-net decreased national manufacturing productivity via mis-allocation. Among many other programs (and respective analyses) for example, agricultural spending demonstrated significantly positive effects on farm activity, but with largely regressive distributional impacts, often displacing poorer tenants and sharecroppers (Sorenson, Fishback, and Kantor (2011, unpublished), Depew, P. Fishback, and Rhode (2013) in P. Fishback (2017)). My work here in turn substantiates these generally mixed effects, finding large persistence effects of writers' and visual arts spending programs, limited temporal persistence of the positive impacts of music spending, and mixed effects on actors versus theater, film and TV industry professionals. Importantly, I do not take a stance on the welfare impacts of the New Deal arts spending programs; I instead entirely on their positivistic impacts.

3 Context: historical account of Federal One

Federal Project Number One offers a promising and irreproducible opportunity to study the long-run impacts of funding to the arts. As the first instance of substantial federal funding to the arts, this WPA program resulted in the gainful employment of tens of thousands of artists across the US from between 1935 and 1940 between its five sub-programs separated by specific field-of-art. In total, before transitioning to significantly smaller-scale WPA sub-programs and state-led programs, the arts programming under FPNo1 comprised nearly 4 billions dollars of present-day funding over approximately five years. Moreover, its magnitude and scope of activities were unprecedented in the US, and remained so in terms of federal outlays until the mid-1970's—after ten years of operations of the National Endowment for the Arts.

In this section, I give a broad overview of Federal Project Number One. I first describe its historical background and its operations, including the division of its sub-programs between fields of art. I then proceed by detailing the program's political context and administrative structure that lend to causal identification later on.[4]

3.1 The background and operations of FPNo1

Federal Project Number One represents the first instance of substantial federal funding to the arts in the US. Prior to 1933, federal (as well as state- and local-level) policy was largely silent in the realm of arts programming. Additionally, due the absence of widespread prescriptive standards in local education curricula, public schools did not universally feature arts programming (Whitford (1923)). In this environment characterized by an absence of popular arts-programming, education, and engagement, historian Howard Zinn describes Federal One as of the first instances where working-class populations benefited from wide access to the performing arts (Zinn (1980)). The emergence of federal arts funding through New Deal programming signified an unprecedented development in American arts policy.

[4]For a historical perspective of the context and operations of New Deal Arts programming, I primarily consult New Deal historian William Francis McDonald's comprehensive account, "Federal Relief Administration and the Arts", though I also reference several other more specifically-focused texts.

Federal One grew out of smaller-scale white-collar employment programs from prior to the passage of the Emergency Appropriation Act of 1935 that gave rise to the Works Progress Administration. The Civil Works Administration (CWA) and the Federal Emergency Relief Act (FERA) featured employment sub-programs from 1933 that featured the limited employment of artists for cultural projects within its white-collar work-relief programming, but the scope of artistic employment prior to Federal One was considerably small in scale. Indeed, WPA historian William McDonald characterizes the extant cultural programming prior to Federal One as "conspicuous...by their rarity" (McDonald, 1969, p.59).

On August 2, 1935, New Deal administrator Jacob Baker announced the beginning of Federal One, and its first appropriations shortly followed one month later on September 12th. Harry Hopkins, one of the central architects of Federal One as well as the broader WPA positioned Federal One with a dual mandate: both as a program of white-collar work relief and as a program to promote cultural production.

On the work-relief role of Federal One, McDonald described the prevailing philosophy that,

> "*...in time of need the artist, no less than the manual worker, is entitled to employment as an artist at the public expense; and that the arts, no less than business, agriculture, and labor, are and should be the immediate concern of the ideal commonwealth.*",

and in a letter to WPA general counsel member Lee Pressman dated August 14, 1935, Hopkins emphasized the importance of cultural production as a key area of focus in New Deal programming:

> "*...it should be recognized that since a very large part of the product of this project is in a cultural service for which there is a tremendous unsatisfied demand in the US, there can be no question of excess production.*"

The dual role of arts programming in the New Deal era as both a form of employment-relief and for the promotion of cultural production is clear.

Federal One was initially installed with four programs (excluding the shortly-defunct Historical Records Survey), divided by artistic discipline: visual arts, music, theater, and writing. Importantly, these four programs were administered separately. I describe their operations in brief, although these accounts are largely partial and capture the primary operations of the programs:

The Federal Art Project (FAP) was the primary visual arts program under Federal One. The program engaged in four primary activities: production of individual art works (which encompassed the majority of FAP activity), providing arts education to children and communities, the completion of community art projects (e.g. murals and other group art works), and the performance of arts research. The FAP employed professional visual artists of a wide variety of media—including easel and mural painting, sculpture, and silk-screen and poster design/printing.[5]

Musicians were employed under the Federal Music Project (FMP). The FMP funded symphony orchestras and other musical ensembles that gave performances for public audiences, administered lessons in instrument performance and music appreciation, and commissioned the composition of new pieces by American composers.

The Federal Theater Project (FTP) was tasked with the employment of drama professionals for the writing, production, and performance of plays for popular consumption, as well as the delivery of acting performance and theater appreciation instruction. The program featured a wide performance mandate that included Black theater troupes and also catered to different language demographics.

[5]Concurrently, the Treasury Relief Art Project (TRAP) also tasked itself with the employment of visual artists for the production of painting and sculpture, but it is important to note that this program is similarly significantly smaller in scope than its homologue under Federal One (respectively, approximately 500,000 USD v. 25,000,000 USD (1935) in federal outlays).

The Federal Writers Project (FWP) employed fiction and nonfiction writers. Most notably, the FWP facilitated the creation of the American Guide Series—a anthology of guide books to states and territories, major cities, and national historical sites. The program produced early oral history collections from formerly enslaved people and also featured a literary wing. Several prominent authors found early support through FWP employment including American novelists John Steinbeck and Ralph Ellison and future playwright and historian Howard Zinn, among many others.

Federal One also featured a fifth sub-program, the Historical Records Survey (HRS), that dealt with the compilation of various historical anthologies and indices, including bibliographies of authors and musicians and lists of newspapers and religious institutions. The HRS was initially installed as a part of the Federal Writer's project, but was re-established as a separate Federal One sub-project in 1936 shortly after its inception. However, the operations of this sub-program were relatively small in comparison to the other sub-programs and was not tasked with artistic production. Moreover, the program was re-organized within the broader WPA for state direction following the reforms and wide dismantling of Federal One in 1939.

The operations of all of the sub-projects continued steadily from September 1935 up until June 1939 with the passage of legislative action that stymied the operation of the Federal One sub-projects and entirely dismantled the Federal Theater Project. Mounting tensions on several margins led to eventual reform to Federal One. In particular, critics of Federal One voiced concern over the projects' purported fiscal unsustainability and inability to "achieve a non-metropolitan character". The House Appropriations Committee focused more closely on the Federal Theater Project in light accusations from the House Un-American Activities Committees that the sub-project promoted "communist ideals" and politically "subversive artists" (Flanagan (1940)); this political focus led to the FTP's complete dismantlement in 1939.

Following Congressional action in 1939, the remaining three artistic sub-programs of Federal One continued operation on a significantly smaller scale, benefiting from substantially less funding than previously. The reform ceased congressional funding of the FMP, transferred the program from federal to state control, and changed its name to the WPA Music Program to reflect this shift. Additionally, the reform included the imposition and enforcement of stricter means-testing policies of artists (which were typically absent during the primary period of Federal One activity), the dismissal from local music units of all musicians on FMP employment rolls for longer than eighteen months and new requirements to generate funds from local sponsorship and concert admission fees.

There exist no precise quantitative accounts that illustrate the decrease in activity after 1940, but historians agree on the dramatic decline of arts activity following the reforms. McDonald (1968) writes of the reforms, "As a consequence, performing units were seriously and sometimes fatally injured". After a year of scaling down in activities, by the summer of 1941, all of the state-led music projects were engaged in military and defense support. Following the attack on Pearl Harbor on December 7, 1941 and the US's entrance into World War Two, the programs continued in name only until their *de jure* dismantlement in 1943. The Federal Art and Writer's Projects similarly scaled down in operation following the 1939 reform that limited federal funding until their integration into later war efforts.

Following the full dismantling of Federal Project Number One in 1943, arts programming remained absent from Federal policy until 1963 with the creation of the National Council on the Arts and the National Endowment for the Arts two years later.

3.2 The administrative and financial organization of FPNo1

Federal Project Number One sourced its funding from the Works Progress Administration, whose projects were themselves funded via regular congressional appropriation acts with precise recommended allocations determined by the President.

For Federal One, as for the broader WPA, the US President would make a separate rec-

ommendation/request for funding for each Federal One sub-project every several months based on discussions with national-level Federal One leadership. Upon this making this request, relevant US Congress committees in the House of Representatives deliberated the amounts, generally fulfilling the entire funding request (typically within only a single percent deviation), after which the committees would pass on the funding allocations to the House of Representatives for approval.

From this point, Federal One sub-project leadership on the national level would allocate funding to states, which maintained their internal operations of their respective Federal One sub-projects. Finally, sub-project units within each state would make funding requests via application which for approval by the state sub-project board. As an illustrative example, the San Francisco unit of the California Federal Writer's Project would make a funding request to the California state-level Federal One administrators; the California state-level FWP has its funds apportioned by the federal-level FWP.[6] The use of applications for individual benefit from and participation in WPA and broader New Deal programming was typical, but relatively little is known on the characteristics of individual take-up and application approval (beyond the imposition of certain requirements, such as means testing for select New Deal programs).

Unlike other WPA projects, Federal One did not require local sponsorship: for the most part, funding of Federal One activities across all of the sub-programs originated from federal sources. However, strict local sponsorship requirements were put in place after legislative reform in 1939, and even beforehand Federal One projects in the performing arts (music and drama) were permitted to implement admissions fees as additional sources of funding, although such funding represented an insignificant portion of total funding (generally less than 1%). The majority of Federal One performances were free to the public.

Wages were set by the federal-project level administrators on the state- and administra-

[6]Unfortunately, the current-status of these individual funding applications is unknown; neither records of individual applications at the National Archives and Records Administration nor evidence of their physical existence could be determined.

tive region-level. While these wages did vary between programs and states based on the cost of living and prevailing wages for each respective field of art, they did not differ widely. Federal One workers benefited from relatively higher wages than other non-white-collar workers under other New Deal programs, typically earning about 90 USD 1935 per month (about 1800 present-day USD), about three times as much earned by Civilian Conservation Corps workers, for example.

4 Data

The final dataset consists of a panel of city-year observations that combines newly digitized data on New Deal arts spending under FPNo1 with US Census data on individuals aggregated up to the locality-level. In the main specification, I designate the city-level as the primary unit of analysis, although I also develop results for alternate geographic groupings as well in a series of robustness checks. Namely, I construct my data in order to study how the artistic occupational shares by locality themselves evolve in response to Federal One funding. Importantly, this work studies the artistic characteristics of *locations*, not individuals themselves. For this reason, I structure the data to analyze places, and the main reduced form specifications feature no weighting on population.[7]

I prefer cities as the relevant geographic panel-unit of study for several reasons. First, sub-state project units almost entirely operated on the city-level, even in less-metropolitan locations where projects operations were conducted in towns, which are frequently assigned city-status in geography-level datasets, such as the US Census. The study of cities thus allows me to maintain conformity with the archival Federal One data source. Second, arts activity has canonically been studied as a metropolitan or urban phenomenon in generating agglomeration of skilled labor to cities (Florida (2002); Diamond (2016)). Third, while de jure and de facto city boundaries change over time, their delineation generally adheres to a

[7] An idealized design for this research question would study the occupation activity of individuals based on continuous exposure to Federal One treatment. However, this specification requires an infeasibly detailed person-time panel with frequent observations over individuals throughout time in order infer treatment exposure.

temporally consistent and granular definition of city.[8]

Certainly, there are several limitations of using cities in this setting. In spite of the prevailing practice of research to characterize artistic activity as a primarily urban phenomenon, recent work challenges this depiction, demonstrating substantial accumulation of artistic professionals to non-metro areas as well (Wojan, Lambert, and McGranahan (2007)). Moreover, the changing definitions of cities over time may introduce measurement error in locality-level outcomes. Finally, particularly smaller cities are susceptible to being excluded from US Census samples—either by design or due to sampling variability. To this end, cities come in and out of existence and grow and shrink in de facto scope during the sample time-frame. Failure to properly account for panel-imbalance and imperfect coverage of locations may undermine the internal validity of the research design.

I construct this panel by treating and combining data from two main sources: treatment variables originate from digitized primary data on Federal Project Number One activity and budgeting; outcome and control variables on locality characteristics come from aggregations of full US Census Bureau counts decadally from 1900 to 1940 and from publicly available samples cuts of the subsequent decadal Censuses. I also employ New Deal spending instruments from P. V. Fishback, Haines, and Kantor (2007). I detail the data construction process here.

4.1 Census data

The data on artists per capita by locality originate from dedadal US Censuses.[9]. City geography-units are observed for places with greater than between 50,000 and 100,000 inhabitants and are consistent with the US Census "place" use. From between 1900 and 1940, I make use of full US Census counts, aggregating up from the individual-level to construct

[8]The US Census Bureau follows city definitions for cities as incorporated places, described in Chapter 9 of the US Census Bureau Geographic Areas Reference Manual. States define cities based on typically low population thresholds (between 200 and 2000 people), occasionally incorporating population density requirements.

[9]Ruggles et al. (2020)

city-level population means (per capita artists by discipline and other geography characteristics). Subsequent to 1940, I construct these per capita occupation levels by stacking independent US Census samples from 1950 to 2015 (which typically vary from between .5%- and 5%-sample cuts) and adjusting the sampling weights for each year accordingly.[10] The city-composition of the US Census data varies substantially following the last publicly available US Census. The main specification of the data studies only cities present in the US Census data, but in alternate specifications of the data construction, all non-city inhabitants are aggregated into a by-state "non-city" geographic unit.

Tables 1 and 2 describe the city-panel balance over time. I attribute the observed variability across years to three main sources: Foremost, the full censuses are capable of recording any localities of the jurisdictional denomination "city" regardless of population, whereas the Census samples systematically exclude names of places under specific population (generally from between 50,000 and 200,000 inhabitants); indeed, the number of unique cities observed in a given census year drops off once the full US Censuses become unavailable. Second, localities may in principle move in and out of city-status by population threshold over; lastly, the large variability of smaller Census samples induces greater variability in the presence of less-populous city-places between decades.

The primary sample specification excludes all US Census-recognized city units that were absent from *either* US Census years 1930 or 1940 in order to meet the minimum threshold for the research design at the closest pre- and post-treatment periods. Pedagogically, I will distinguish between short- and long-run impacts as outcomes in 1940 versus starting in 1950. Alternate specifications include varying the threshold for panel continuity—requiring continuous presence from 1920 to 1960, requiring continuous presence from 1900 to 2015 (excluding 1970). The final two specification are based on the 100 most populous cities in 1930 and 2000 respectively. The reduced form specifications will also make use of city fixed effects that leverage changes *within* cities over time.[11]

[10]The city-level analysis excludes results from 1970, which features no city-denominated data in available US Census samples.

[11]I also reproduce my specifications on different jurisdictional levels—namely county, that has remained

Table 1: Number of observed cities by Census year

Year	All	Has 1930 + 1940	Has 1920-1960	Has 1900-2000	Top 100 (1930)	Top 100 (2000)
1900	656	618	104	91	97	68
1910	653	613	105	91	99	73
1920	796	737	106	91	100	77
1930	1032	955	106	91	100	81
1940	966	955	106	91	100	81
1950	146	146	106	91	74	55
1960	204	189	106	91	70	45
1970	0	0	0	0	0	0
1980	218	174	100	91	82	87
1990	213	167	96	91	72	83
2000	231	177	98	91	72	100
2010	230	176	97	90	71	99
2015	243	181	99	91	74	100
Unique cities	1177	955	106	91	100	100

This table displays count of the number of unique cities observable for each decadal US Census. Each column refers to a sample balance requirement. The "All" column imposes no restrictions on the sample-presence of cities and thereby reports the number of unique cities identifiable in each US Census year as a baseline. The "Top 100" columns refer to the 100 most populous city in its respective year. Note the absence of city observations in 1970 and the drop-off starting in 1950 in the first two columns.

Table 2: City observation frequency (of 12 census samples)

	(1)	(2)	(3)	(4)	(5)	(6)
Frequency	All	1930 + 1940	1920-1960	1900-2000	Top 100 pop. (1930)	Top 100 pop. (2000)
1	102	0	0	0	0	0
2	172	133	0	0	0	0
3	180	144	0	0	0	3
4	148	127	0	0	0	3
5	313	294	0	0	2	12
6	69	66	0	0	10	2
7	21	20	5	0	8	3
8	18	17	0	0	7	6
9	12	12	3	0	3	4
10	20	20	1	0	9	15
11	32	32	7	1	20	23
12	90	90	90	90	41	29
Total	1177	955	106	91	100	100

This table displays the city-balance for different specifications. With no restrictions on balance, the US Census data features 1177 distinct cities. The main specification that requires cities' presence in both 1930 and 1940 removes 200 cities. Imposing requirements for presence subsequent to the end of publicly available Census data removes a substantial number of cities (more than 90% relative to the unrestricted baseline), resulting in a city-state panel with substantial overlap with the largest US cities based both on 1930 and 2000 population.

relatively constant in border and in continuity since the beginning of the 20th century (albeit minimal exceptions do exist). In the case where counties are not observed in the census data (generally beginning

Table 3: Sample balance

	Main	Unrestricted		Has 1920-1960		Has 1900-2000	
			Diff.		Diff.		Diff.
Unique cities	907	1125	218	58	-849	43	-864
City pop. 1930	62822	59277	-3544.803**	491460	428638.1**	620194	557371.9**
	(282658.6)	(271644.8)	[*0.000*]	(1019226)	[*.0006*]	(1157948)	[*.0008*]
Occ. Score 1930	8.451	8.446	-0.00600	8.849	.398**	8.907	.456**
	(.7597)	(.7505)	[*.3504*]	(.4589)	[*0.000*]	(.4722)	[*0.000*]
Literate 1930	0.966	0.966	0.00	0.965	-0.00100	0.969	0.00300
	(.0434)	(.0423)	[*.6913*]	(.0216)	[*.7809*]	(.0177)	[*.2751*]
Artists (per 10k) 1930	2.638	2.746	.108**	3.943	1.305**	4.243	1.605**
	(3.6103)	(3.6779)	[*.0076*]	(2.5462)	[*.0001*]	(2.6644)	[*.0001*]
Musicians (per 10k) 1930	14.27	14.17	-0.102	17.00	2.733**	17.37	3.095**
	(6.6261)	(6.5749)	[*.0664*]	(5.608)	[*.0001*]	(5.8312)	[*.0003*]
Actors (per 10k) 1930	1.164	1.147	-0.0160	2.274	1.110	2.646	1.483
	(4.8196)	(4.6409)	[*.3313*]	(4.9523)	[*.0748*]	(5.7081)	[*.0756*]
Writers (per 10k) 1930	0.401	0.393	-0.00800	0.494	0.0920	0.558	0.156
	(1.3664)	(1.3214)	[*.1879*]	(.7144)	[*.3458*]	(.7954)	[*.2036*]
FAP binary	0.0260	0.0240	-.002**	0.328	.301**	0.419	.392**
	(.1606)	(.1543)	[*0.000*]	(.4734)	[*0.000*]	(.4992)	[*0.000*]
FMP binary	0.211	0.204	-0.00600	0.810	.6**	0.860	.65**
	(.4079)	(.4034)	[*.0524*]	(.3955)	[*0.000*]	(.3506)	[*0.000*]
FTP binary	0.0800	0.0740	-.006**	0.517	.437**	0.581	.501**
	(.2722)	(.2622)	[*0.000*]	(.5041)	[*0.000*]	(.4992)	[*0.000*]
FWP binary	0.0280	0.0250	-.002**	0.345	.317**	0.442	.414**
	(.1638)	(.1574)	[*0.000*]	(.4795)	[*0.000*]	(.5025)	[*0.000*]

This table displays the balance of observable characteristics of different city-sample specifications relative to the main sample. Distributional statistics of the main sample—the sample requiring the presence of cities in *both* 1930 and 1940 are displayed under the **main** column with standard deviations displayed under each sample mean in parentheses. The differences between different sample specifications and the main specification are displayed under the "Diff." sub-columns with p-values for the chi-squared test of equal distributions displayed below each sample difference in hard brackets and italicized text.
$*p < .05$, $**p < .01$

4.2 Federal One digitization

A central component of this work consists of digitizing the primary source of data on FPNo1 treatment; nearly all detailed records on localized programmatic funding and activity on part of Federal One are held physically at the National Archives and Records Administration branch in College Park, Maryland.[12] This ambitious digitization procedure resulted

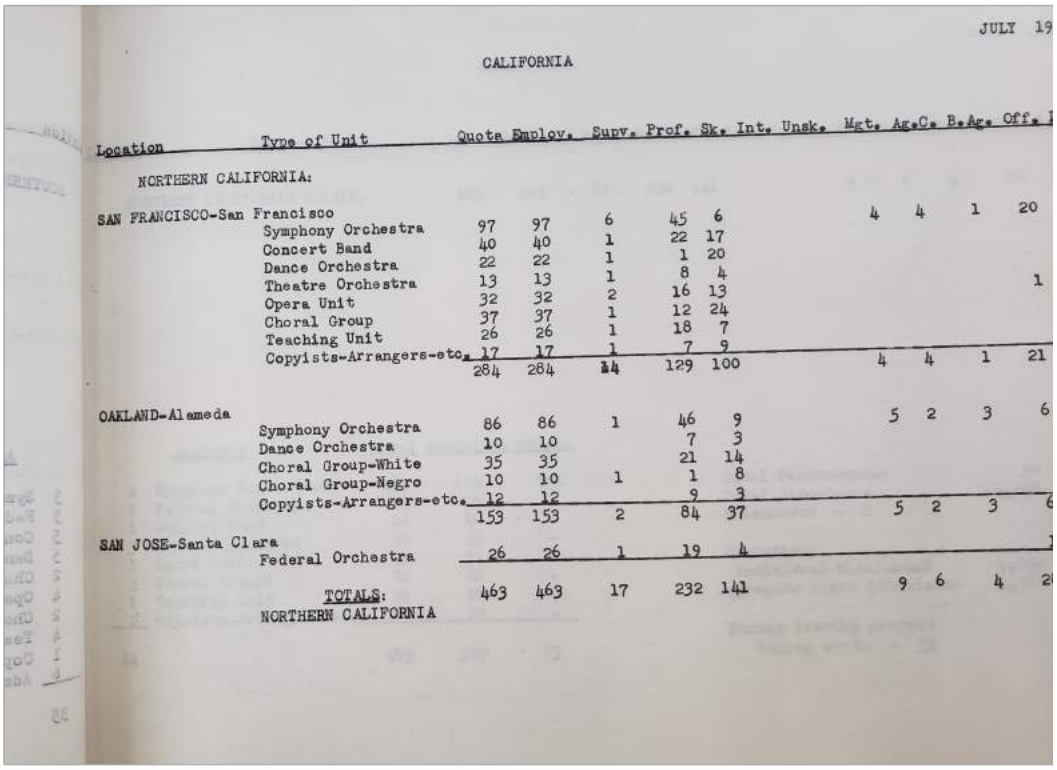
1950), I use of equivalent county-level aggregates by mapping cities to counties. In cases where single cities map to multiple counties, as in New York City, I map the city manually to the most populous county (e.g. mapping all New York City observations to New York county).

[12]In broad, the digitization procedure consisted of four parts: 1) visiting the College Park NARA branch during August 2019 where I identified and photographed relevant FPNo1 documentation (approximately 5,600 photographs); 2) organizing and prioritizing the photographs by jurisdictional level and subject matter; 3) transcribing photographs into tractable *.csv* spreadsheets; and 4) post-processing and cleaning the prepared datasets for attachment to geography-denominated data from the US Census Bureau.

in the construction of several novel datasets on federal- state- and city-level Federal One spending and activity.

Figures 1 and 2 display example images of digitized files. Figure 1 displays a page from the city-level employment records from the Federal Music Project Figure 2 depicts an example of the monthly Federal Art Project employment figures by state-unit during Fiscal Year 1939. In this state-level document, note in this example both that, 1) not all states received FAP funding, and 2) the "state"-level employment figures adhere to the programmatic administrative divisions that split California into two units, separated New York City from New York State, and allocated funding to Washington D.C. These documents are representative of the archival tables used to compile city- and state-level employment counts for each Federal One sub-program.

Figure 2: Excerpt from FMP employment tabulations: July 1939



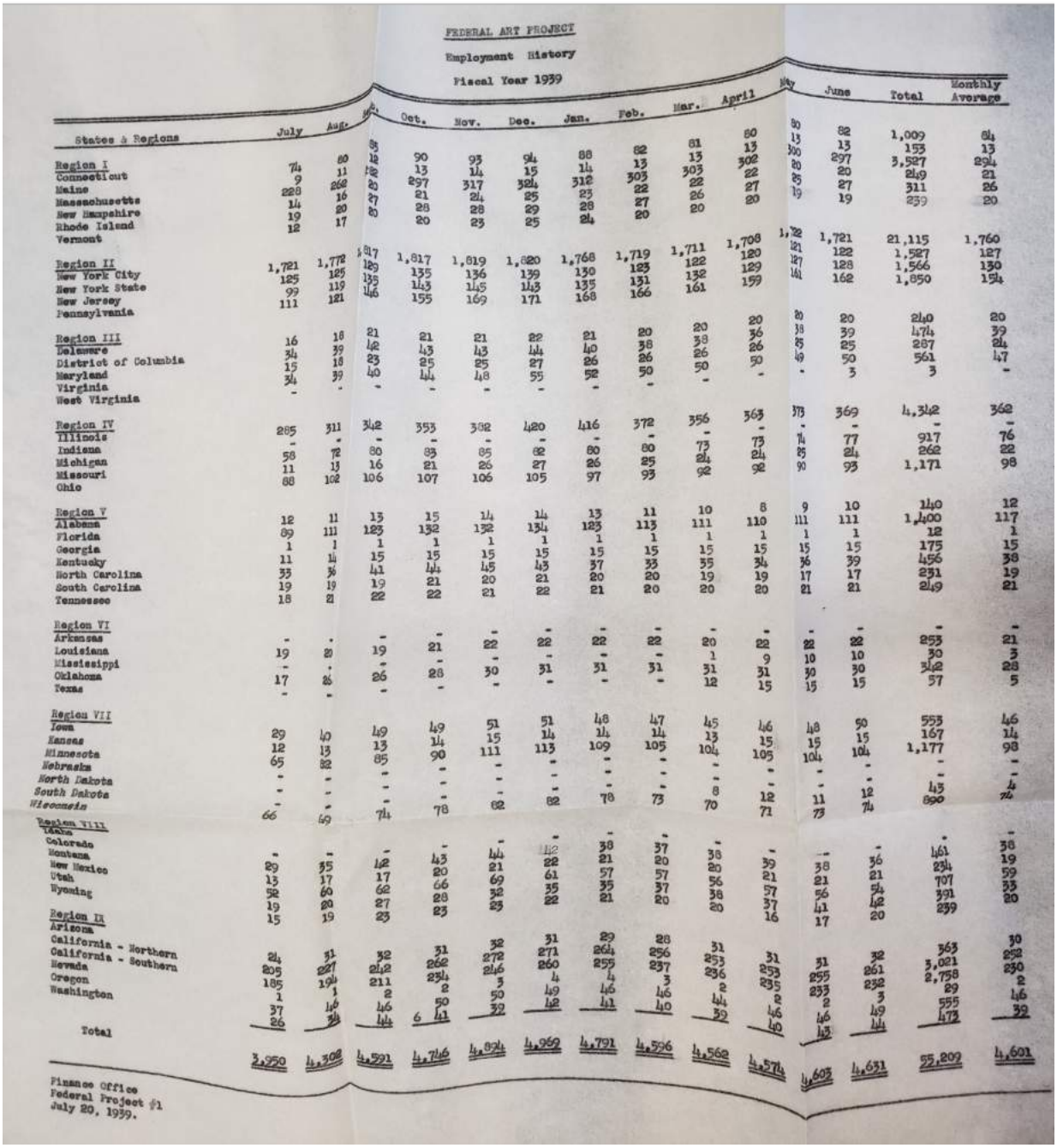
JULY 19

CALIFORNIA

Location	Type of Unit	Quota	Employ.	Supv.	Prof.	Sk.	Int.	Unsk.	Mgt.	Ag.	C.	B.	Ag.	Off.
NORTHERN CALIFORNIA:														
SAN FRANCISCO-San Francisco	Symphony Orchestra	97	97	6	45	6			4	4		1	20	
	Concert Band	40	40	1	22	17								
	Dance Orchestra	22	22	1	1	20								
	Theatre Orchestra	13	13	1	8	4								1
	Opera Unit	32	32	2	16	13								
	Choral Group	37	37	1	12	24								
	Teaching Unit	26	26	1	18	7								
	Copyists-Arrangers-etc.	17	17	1	7	9								
		284	284	14	129	100			4	4		1	21	
OAKLAND-Alameda	Symphony Orchestra	86	86	1	46	9			5	2		3	6	
	Dance Orchestra	10	10		7	3								
	Choral Group-White	35	35		21	14								
	Choral Group-Negro	10	10	1	1	8								
	Copyists-Arrangers-etc.	12	12		9	3								
		153	153	2	84	37			5	2		3	6	
SAN JOSE-Santa Clara	Federal Orchestra	26	26	1	19	4								
	TOTALS: NORTHERN CALIFORNIA	463	463	17	232	141			9	6		4	2	

This image serves as an example of typical city-level employment counts by city. Importantly, the present work does not distinguish between the different types of musical groups (e.g. Concert Band, Choral Group), but rather focuses on the employment totals for each city displayed below each horizontal line.

Figure 3: Federal Art Project state employment aggregates, Fiscal Year 1939



FEDERAL ART PROJECT

Employment History

Fiscal Year 1939

States & Regions	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	Total	Monthly Average
Region I														
Connecticut	74	80	85	90	93	94	88	82	81	80	80	82	1,009	84
Maine	9	11	12	13	14	15	14	13	13	13	13	13	153	13
Massachusetts	228	262	292	297	317	324	312	303	303	302	300	297	3,527	294
New Hampshire	14	16	20	21	24	25	25	22	22	22	20	20	249	21
Rhode Island	19	20	27	28	28	29	28	27	26	27	25	27	311	26
Vermont	12	17	20	20	23	25	24	20	20	20	19	19	239	20
Region II														
New York City	1,721	1,772	1,817	1,817	1,819	1,820	1,768	1,719	1,711	1,708	1,782	1,721	21,115	1,760
New York State	125	125	129	135	136	139	130	123	122	120	121	122	1,527	127
New Jersey	99	119	135	143	145	143	135	131	132	129	127	128	1,566	130
Pennsylvania	111	121	146	155	169	171	168	166	161	159	161	162	1,850	154
Region III														
Delaware	16	18	21	21	21	22	21	20	20	20	20	20	240	20
District of Columbia	34	39	42	43	43	44	40	38	38	36	38	39	474	39
Maryland	15	18	23	25	25	27	26	26	26	26	25	25	287	24
Virginia	34	39	40	44	48	55	52	50	50	50	49	50	561	47
West Virginia	-	-	-	-	-	-	-	-	-	-	-	3	3	-
Region IV														
Illinois	285	311	342	353	382	420	416	372	356	363	373	369	4,342	362
Indiana	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Michigan	58	72	80	83	85	82	80	80	73	73	74	77	917	76
Missouri	11	13	16	21	26	27	26	25	24	24	25	24	262	22
Ohio	88	102	106	107	106	105	97	93	92	92	90	93	1,171	98
Region V														
Alabama	12	11	13	15	14	14	13	11	10	8	9	10	140	12
Florida	89	111	123	132	132	134	123	113	111	110	111	111	1,400	117
Georgia	1	1	1	1	1	1	1	1	1	1	1	1	12	1
Kentucky	11	14	15	15	15	15	15	15	15	15	15	15	175	15
North Carolina	33	36	41	44	45	43	37	33	35	34	36	39	456	38
South Carolina	19	19	19	21	20	21	20	20	19	19	17	17	231	19
Tennessee	18	21	22	22	21	22	21	20	20	20	21	21	249	21
Region VI														
Arkansas	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Louisiana	19	21	19	21	22	22	22	22	20	22	22	22	253	21
Mississippi	-	-	-	-	-	-	-	-	1	9	10	10	30	3
Oklahoma	17	24	26	28	30	31	31	31	31	31	30	30	342	28
Texas	-	-	-	-	-	-	-	-	12	15	15	15	57	5
Region VII														
Iowa	29	40	49	49	51	51	48	47	45	46	48	50	553	46
Kansas	12	13	13	14	15	14	14	14	13	15	15	15	167	14
Minnesota	65	82	85	90	111	113	109	105	104	105	104	104	1,177	98
Nebraska	-	-	-	-	-	-	-	-	-	-	-	-	-	-
North Dakota	-	-	-	-	-	-	-	-	-	-	-	-	-	-
South Dakota	-	-	-	-	-	-	-	-	8	12	11	12	43	4
Wisconsin	66	69	74	78	82	82	78	73	70	71	73	74	890	74
Region VIII														
Idaho	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colorado	-	-	-	-	-	42	38	37	38	-	-	-	461	38
Montana	29	35	42	43	44	22	21	20	20	39	38	36	234	19
New Mexico	13	17	17	20	21	61	57	57	56	21	21	21	707	59
Utah	52	60	62	66	69	35	35	37	38	57	56	54	391	33
Wyoming	19	20	27	28	32	22	21	20	20	37	41	42	239	20
Region IX	15	19	23	23	23					16	17	20		
Arizona						31	29	28						30
California - Northern	24	31	32	31	32	271	264	256	31	31	31	32	363	252
California - Southern	205	227	242	262	272	260	255	237	253	253	255	261	3,021	230
Nevada	185	194	211	234	246	4	4	3	236	235	233	232	2,758	2
Oregon	1	1	2	2	3	49	46	46	2	2	2	3	29	46
Washington	37	46	46	50	50	42	41	40	44	46	46	49	555	39
Total	26	34	44	6 41	32				39	40	43	44	473	
	3,950	4,308	4,591	4,746	4,824	4,969	4,791	4,596	4,562	4,574	4,603	4,631	55,209	4,601

Finance Office
Federal Project #1
July 20, 1939.

This figure serves as a representative image of state-level employment counts. In this case, the archival table displays employment counts by each state-month for the 1939 fiscal year. Dashed entries refer to zero-employment (program inactivity), rather than missing data.

I construct program-city-level employment per month variables as simple averages of all available point-in-time employment counts; the accuracy of these counts are cross-validated by aggregating up to the state-level and comparing with independently-produced state- and federal-level employment counts. The Federal Music Project makes use of three employment count compilations in 1937, 1939, and 1940 (shortly before transitioning into the significantly smaller-scale and state-led WPA Music Program). The Federal Theater Project makes use of five sets of counts from 1936 to 1937. The Federal Art Project and Federal Writer's Project featured less of the systematized record-keeping practiced by the Federal Music Project and FTP leadership. These programs feature only a single primary-source of city-level employment counts for three points-in-time that includes only the most prominent recipients of Federal One funding[13]; the Historical Records Survey records featured no sub-state employment or activity counts.

However, the archival records do not include city-level expense or wage variables. Instead, I impute city-program-level monthly expenses by projecting constructed state-level average monthly wages onto city-level employment counts. Specifically, I construct the total expense for sub-program l in city i and state $s(i)$ as

$$Exp._{i,l} := \frac{Total\ Expense_{s(i),l}}{Total\ Person\ Month\ Employment_{s(i),l}} \times Avg.\ Person\ Month\ Emp._{i,l} \times Months\ Active_{l}.$$

This imputation method aligns with the administrative accounts of Federal One that indicate that wages were indeed set on the state-level (or sub-state- or district- level for Northern and Southern California, Washington D.C., and New York State and New York City). However, this imputation may generate measurement error in city-program-level expenses by imposing equal duration of local sub-program activity as for the entirety of federal sub-program activity. Additional measurement error may also arise due to systematic covariation in local employment and state-level wages.

[13]To alleviate the internal and external validity treatment censoring concerns of possibly analyzing only the largest Federal Writer's and Artist Project outlays, subsequent robustness checks study the impact of Music and Theater spending based on only the top-25 beneficiary cities for each program.

The city-level employment per month counts aggregated to the state- and federal-level resemble the separate state-level counts for each of the four arts sub-programs. The Federal Art Project, Federal Music Project, and Federal Theater Project city employment records all reproduce state-level program employment with relative reliability, with only the Federal Writer's Project employment count estimates diverging somewhat between state- and city-level. However, even for both visual artists and authors, the imputed expenditure amounts for cities only differ from state records slightly. Importantly, these employment counts illustrate average employment counts over time, not the count of unique individuals employed by each program. Table 4 displays these aggregations.

Different methods also tend to converge on similar estimates of total expense by program. Table 5 displays estimates of total programmatic expense, comparing imputed expenses aggregated up from cities, state-level tabulations directly from federal documentation, and figures cited in the limited historical literature on New Deal arts spending.

Table 4: FPNo1 data consistency: city-level versus state-level employment aggregations

	FAP		FMP		FTP		FWP		HRS
	City	State	City	State	City	State	City	State	State
Employment	3360	4330	10917	11626	11702	9779	1647	3709	4228
Discrepancy	1.29		1.06		0.84		2.25		N/A
Expense (M. USD 1935)	18.74	18.90	51.06	46.80	78.15	59.30	9.25	12.7	12.75
Discrepancy	1.01		0.92		0.76		1.37		N/A

This table compares employment and imputed expense aggregations to the federal level for each sub-program. Aggregations for the city- and state-levels are constructed from independent archival budget and activity tables.

Table 5: Comparisons of FPNo1 total expense by source (M. USD 1935)

	FAP	FMP	FTP	FWP	Total
City aggregations	18.74	51.06	78.15	9.247	157.2
State tabulations	18.90	46.80	59.30	12.70	137.7
Literature restrospectives	35[14]	.	46.20[15]	25.70[16]	.

This table combines expenditure estimates of the four main arts programs under Federal One from the different methods. The first row uses expenditure imputations from the city-level. The second row aggregates expenditures from the primary source tables of state-level programmatic outlays. The third row displays expenditure estimates from prominent historical retrospectives of the New Deal arts programs.

The archival FPNo1 tables also include geographically-delineated data on more detailed program activity: for instance, concerts performed by type (e.g. opera, choral group, etc.) and number in attendance for the concert, plays performed and written, activity by genre and type of performing unit (e.g. drama, comedy; French-language, Yiddish-language; Black-theater, etc.), and number in attendance for the performance. I currently do not make use of these more detailed records of programmatic activity, primarily due to relative lack of systematization and comprehensiveness between archival tables.

4.3 Additional data

I also make use of New Deal spending data by county compiled in P. V. Fishback, Haines, and Kantor (2007). These data include spending-levels associated with different New Deal programs as well as political characteristics and congressional representation for each county. I map these data to my main cities-level specification via each city's respective contemporaneous county.

5 Reduced form framework: ordinary least squares

In this section, I present the reduced form framework employed for drawing inference on the short-run and lasting and impacts of Federal One on local artistic professional shares of the population. Building toward these correlational results, I discuss the magnitude of Federal One treatment on cities, the most prevalent threats to internal validity to the ordinary least squares regression design, and the econometric assumptions and that inform this framework.

5.1 Federal One treatment

Federal One treatment induced large increases in artistic employment. Table 6 displays tabulations of various parameterizations of Federal One treatment. The Music and Theater Projects reached a wide number of unique cities, whereas Arts and Writer's Projects reached

[14]O'Connor (1973), p. 305
[15]Flanagan (1940), p. 435
[16]Mangione (1972), p. 369

fewer cities as recorded in the sub-state archival data. Conditional on program activity, the median city saw employment of around 30 artists. However, programmatic activity saw high skew in its concentration in relatively few cities as evidence by the divergence between mean and median conditional employment.

Nonetheless, programmatic activity represented a significant increases to artistic employment in cities relative to their pre-period baseline levels in 1930. To place Federal One activity into context, I construct field-city employment shares by normalizing program employment counts by the number of artists of each respective field and city in 1930.[17] To this end, I pair the Federal Art Project with visual artists, the Music Project with musicians, the Theater Project with actors, and the Writer's Project with authors.[18] Table 6 demonstrates that the amount of Federal One activity represented a large share of pre-existing artistic activity, with the program hiring between 15- and 30% of visual artists and musicians and between 100- and 300% of pre-existing actors and writers in treated cities.

I also compute summary statistics of program expense levels and expense-per artist, providing another illustration of the magnitude of Federal One activity: In present-day terms, programs induced funding to cities of between 3- and 30 million USD (present-day) conditional on positive activity. For those hired, expenses per artist amounted to around 20,000 USD present-day to artists and musicians—and around 4-5 times more for theater practitioners and writers.[19][20] Figures A1-A4 in Appendix A illustrate the spatial variation of various parameterizations of Federal One spending across the US.

[17] $Share_{i,l} = \frac{FPNo1\ Employment_{i,l}}{Employment_{i,l,1930}}$.

[18] I continue this alignment of treatments and outcomes for the reduced form framework, discussed further below.

[19] Although archival and historical sources suggest the outsized magnitude of theater and writer's programming, an additional explanation of the large magnitudes of their Federal One activity parameterizations normalized by pre-existing artist numbers may lie in a systematic under-counting of respective artists as Census-identified professionals (e.g. writers or actors disproportionately responding as having non-arts profession for their primary occupational activity (i.e. moonlighting, Alper and Wassall (2006)).

[20] Measures of expense per artist do not represent wages received by Federal One employment beneficiaries, but rather total programmatic outlays per pre-existing artist: $Per\ artist\ exp_{i,l} = \frac{Expense\ FPNo1_{i,l}}{Emp_{i,l,1930}} = \frac{FPNo1\ Wage_{s(i),l} \cdot FPNo1_{i,l}}{Emp_{i,l,1930}}$. Federal One artists themselves earned approximately 90 USD (1935) per month.

Table 6: FPno1 treatment comparison

	FAP	FMP	FTP	FWP
No. cities	24	191	73	25
Avg. employment	140.0	53.96	158.9	65.89
Med. employment	39	25	37	36
Avg. emp. share	0.152	0.321	3.228	1.898
Med. emp. share	0.138	0.194	1.176	1.324
Avg. expense (1000s USD 1935)	780.9	267.0	1070	369.9
Med. expense (1000s USD 1935)	194.0	109.6	171.2	211.9
Avg. exp. per artist (USD 1935)	780.0	1454	4147	9885
Med. exp. per artist (USD 1935)	697.2	876.9	5196	6979
Total expense (M. USD 1935)	18.74	50.99	78.12	9.247

This table displays tabulations of program activity by city conditional on non-zero program activity. The "employment share" for a city-program is calculated as the number of artist professionals in field l in city i employed on part of Federal One divided by the number of individuals of artistic profession l in city i in 1930.

5.2 Reduced form framework

I employ a simple reduced form framework for drawing inference on the impacts of arts spending on artist outcomes. Throughout the reduced form work, I pair up Federal One treatments with per capita artist level outcomes by specific field of art. Each of the Federal One sub-programs $l \in \{FAP,\ FMP,\ FTP,\ FWP\} := \mathcal{L}$ corresponds with at least two occupation/industries (standardized OCC1950/IND1950 variables in the US Census) in a set of labor market activities denoted $\mathcal{A}_l$. In particular, I **separately** align the 1) Federal Art Project with visual arts labor market activites: artists and art teachers, painters, designers, and photographers; 2) Federal Music Project with musicians/music teachers and piano tuners; 3) Federal Theater Project with actors, theater/motion picture industry workers, and radio/tv industry workers; 4) Federal Writer's Project with authors and publishing industry workers.

I estimate equations of the following form:

$$y_{i,l,t} = \beta_0 + \beta_1 \cdot FPNo1_{i,l} + \sum_{k=1900}^{2010} \delta_k \cdot 1\{Year_t = k\} + \sum_{k=1900}^{2010} \beta_{dd,k} \cdot FPNo1_{i,l} \cdot 1\{Year_t = k\} + \varepsilon_{i,l,t},$$ [21]

[21] I estimate the time-varying coefficients $\beta_{dd,k}$ and δ_k relative to 1930 baselines.

for city i in decade t and arts program l and artistic professional share outcome $y_l \in \mathcal{A}_l$. My preferred specification features city-level fixed effects α_i that leverage changes in fixed cities over time in response to Federal One activity; this fixed effects specification also features the benefit of flexibility to the city panel imbalance inherent to using US Census samples. I also estimate random effect models that make include of pre-period city-level covariates, such as pre-existing artist shares and city-level socioeconomic demographic characteristics.

In this setting, coefficients $\beta_{dd,k}$ capture the correlation between Federal One activity and changes in artistic professional shares relative to cities' 1930 baselines. I implement standard errors clustered at the city-level.

5.3 Endogenous selection into treatment, econometric framework

As is typical in program evaluation, causal interpretation of an ordinary least squares framework is undermined by potential endogenous selection into treatment based on potential outcomes. Correlation between potential outcomes (growth in artistic shares) and Federal One program treatment represents the primary threat to causal identification in my setting:

$$\begin{aligned}&\text{Cov}\Big((y_{i,l,t^+}(D_{i,l}=1) - y_{i,l,1930}(D_{i,l}=1)) - (y_{i,l,t^+}(D_{i,l}=0) - y_{i,l,1930}(D_{i,l}=0)), FPNo1_{i,l}\Big)\\ &= \text{Cov}\Big(\Delta y_{i,l}(D_{i,l}=1) - \Delta y_{i,l}(D_{i,l}=0), D_{i,l}\Big) \neq 0,\end{aligned}$$

and

$$\text{Cov}\Big(\Delta y_{i,l}(D_{i,l}=0), D_{i,l}\Big) \neq 0,$$

for post-period years $t^+ >= 1940$ and potential outcomes for Federal One treatment status $D_{i,l} \in \{0,1\}$[22], which would produce positive correlation between model errors and outcomes. These two threats correspond with counterfactual scenarios respectively where, 1) Federal One treatment would accrue only to those localities whose artistic populations would benefit from government arts investment, and 2) the OLS results will simply illustrate the growth

[22]This specification also generalizes to the case of continuous Federal One treatment.

trajectory of artistic professional shares in large cities—i.e. those that received substantial Federal One funding.

In these cases, the $\beta_{dd,k}$ treatment-on-the-treated coefficients retrieved through an ordinary least squares estimation strategy will reflect the sum of the average treatment effects and the correlations associated with endogenous selection into treatment. It is difficult to anticipate from an ex-ante perspective the direction of the bias. To the extent that Federal One treatment demonstrated significant correlation with large-city status, treatment-on-the-treated impacts as estimated from an ordinary least squares procedure will simply reflect the trajectory of artist shares in big cities—without prescription as to the direction of the bias.

On the other hand, if it is the case that the initial presence of artist begets the future growth of artistic scenes (i.e. that $\mathbb{E}[\Delta y_{i,l} \cdot y_{i,l,t=0}] \neq 0$), the correlation between Federal One activity and subsequent artistic growth would reflect a story of positive Roy Selection (or a Matthew effect).

However, we can empirically investigate these possibilities to an extent. In the absence of observing the true counterfactual scenarios for FPNo1-treated and -untreated cities, I study to what extent Federal One funding simply did in fact accrue to cities with large pre-existing artist shares (among other demographics differences).

Table 7 illustrates the differences in observable characteristics of Federal One beneficiary and non-beneficiary cities. Indeed, Federal One activity demonstrates strong, positive correlation with pre-existing population shares of artistic professionals, with recipient cities hosting 40% more visual artists per capita, 20% more musicians per capita, and 50% more writers per capita than non-recipient cities. The difference for actors per capita is insignificant. Federal One activity also demonstrated strong, positive correlation with city size in terms of population and income demographic as measured by OccScore.[23]

[23]Income and wages per individual are not directly observable in US Census data prior to 1940. Instead, to infer income demographic characteristics of localities in 1930 and before, I make use of various occupation-score indices. These variables assign geography- and time-invariant scores to occupations based on earnings,

Table 8 displays these same characteristics and differences more granularly, instead distinguishing among cities by binary Federal One sub-program treatment status for each separate sub-program. The table illustrates simultaneously similar and stronger results for respective pairings of Federal One activity and artistic professional share outcomes. Finally, Table 9 displays the difference in pre-period outcomes between Federal One-treated and -untreated cities for all artistic disciplines studied here aligned with their respective Federal One sub-program.

While these cross-sectional results correlations signify a strong positive relationship between Federal One treatment and pre-existing artistic professional share, they would only represent an outright violation to causal identification in the case where future growth in artistic professionals share $\Delta y_{i,l}$ is positively related to the pre-existing relative share of these artists in the population, which may well be the case due to the role of agglomeration economies in the formation and development of artistic labor markets.

However, these descriptive results do not ultimately prescribe the direction of the possible selection bias picked up in an ordinary least squares estimation procedure. Rather, the cross-sectional results and the prior discussion serve to motivate the subsequent instrumental variables design in my causal estimation strategy.

5.4 Additional econometric assumptions

Several additional econometric assumptions frame the inference and identification strategy. The *no-interference* component of assumption of Stable Unit Treatment Value Assignment (SUTVA) requires that Federal One treatment of cities does not affect non-beneficiary cities. This assumption has important implications for the reduced form estimation strategy. In

education, prestige, and associated socioeconomic status (where OccScore is based on the 1950's median earnings of each occupation). Unfortunately, the combined unavailability of income and wage variables in the pre-period of Federal One and the geography- and time-invariant specification of the various occupation score variables precludes the study of Federal One activity on artists' wages.

Table 7: Outcome variable city-comparison by any FPNo1 treatment status (1930)

	FPNo1	Non FPNo1	Total	Difference
No. cities	210	692	902	
Avg. Pop.	191609	23884	62933	167725.4**
	(568466.9)	(21037.05)	(283425.6)	(39186.06)
Avg. Pop. (2000)	464578	151137	362528	313441.1**
	(980395.7)	(85451.22)	(818455.8)	(106138.5)
Artists per 10k	3.398	2.415	2.644	.983**
	(3.352)	(3.667)	(3.619)	(.27)
Musicians per 10k	16.25	13.63	14.24	2.62**
	(6.066)	(6.487)	(6.483)	(.485)
Actors per 10k	1.466	1.077	1.168	0.389
	(2.881)	(5.283)	(4.833)	(.282)
Writer per 10k	0.542	0.359	0.401	.183*
	(1.015)	(1.458)	(1.369)	(.089)
Avg. age	29.94	29.53	29.62	.413*
	(2.031)	(2.584)	(2.471)	(.171)
Female share	0.509	0.506	0.507	0.00300
	(.017)	(.022)	(.021)	(.001)
White share	0.908	0.926	0.922	-0.0180
	(.12)	(.118)	(.119)	(.009)
Black share	0.0890	0.0720	0.0760	0.0170
	(.121)	(.119)	(.119)	(.009)
English-speaking share	0.984	0.985	0.985	-0.00200
	(.024)	(.033)	(.031)	(.002)
Avg. Occ-score	8.680	8.385	8.454	.294**
	(.634)	(.782)	(.76)	(.053)
Avg. literacy share	0.967	0.966	0.966	0.00100
	(.024)	(.048)	(.043)	(.002)

This table illustrates various 1930 summary statistics of FPNo1-recipient and non-recipient cities and estimates the magnitude and significance of their differences using cross-sectional regressions of the form $y_{i,1930} = \beta_0 + \beta_1 \cdot FPNo1_i + \varepsilon_i$. The regression coefficients in the "Difference" column are estimated with heteroskedasticity-robust standard errors clustered at the state-level. A city is considered an FPNo1-recipient if it reports non-zero activity on part of *any* of the four Federal One sub-programs.
$*p < .05$, $**p < .01$

particular, hypothetically, if the estimation strategy yields positive coefficient estimates, it naturally follows to ask: from where does an increase in the local share of artists arise? If the increase in the artistic professional shares in Federal One-treated cities comes at the expense of decreased artistic professional shares in un-treated cities—that is, Federal One simply induced a *mobility* response of artists in untreated to treated localities—the Federal

Table 8: Comparisons of 1930 covariates by Federal One Sub-project treatment status

	FAP	Non-FAP	Difference	FMP	Non-FMP	Difference	FTP	Non-FTP	Difference	FWP	Non-FWP	Difference
No. cities	24	878		191	711		73	829		25	877	
Avg. Pop.	1.005e+06	37182	967817.3**	202807	25358	177448.5**	418858	31591	387266.5**	998624	36260	962363.5**
	(1444589)	(53371.82)	(288993.1)	(594564.9)	(25737.02)	(42966.94)	(917807.4)	(44837.12)	(106812.8)	(1414124)	(46222.87)	(277422.7)
Avg. Pop. (2000)	1.053e+06	212794	839812.1*	474854	179138	295716.8*	645230	183602	461627.7*	1.056e+06	204045	851843.6*
	(1746103)	(225489.8)	(359549.3)	(1012634)	(208025.5)	(117199.5)	(1252772)	(172306.4)	(177826.6)	(1704236)	(214081.9)	(343861.4)
Artists per 10k	6.191	2.547	3.644**	3.539	2.404	1.135**	4.181	2.509	1.672**	6.078	2.546	3.532**
	(2.657)	(3.593)	(.545)	(3.455)	(3.626)	(.284)	(2.701)	(3.659)	(.339)	(2.645)	(3.596)	(.533)
Musicians per 10k	20.39	14.07	6.315**	16.44	13.65	2.788**	17.69	13.94	3.749**	20.40	14.07	6.332**
	(6.766)	(6.397)	(1.371)	(6.046)	(6.474)	(.5)	(6.234)	(6.42)	(.759)	(6.624)	(6.397)	(1.317)
Actors per 10k	4.112	1.087	3.025*	1.516	1.074	0.442	2.392	1.060	1.332*	4.017	1.086	2.93*
	(7.402)	(4.724)	(1.489)	(3.003)	(5.214)	(.292)	(4.585)	(4.842)	(.559)	(7.263)	(4.726)	(1.434)
Writer per 10k	0.902	0.388	.514*	0.554	0.361	.193*	0.712	0.374	.338**	0.904	0.387	.517*
	(1.137)	(1.373)	(.232)	(1.041)	(1.443)	(.093)	(.863)	(1.402)	(.112)	(1.108)	(1.374)	(.222)
Avg. age	30.71	29.59	1.117**	30.02	29.52	.498**	29.93	29.60	0.329	30.61	29.60	1.011**
	(1.688)	(2.483)	(.348)	(1.982)	(2.578)	(.173)	(1.92)	(2.513)	(.24)	(1.748)	(2.484)	(.353)
Female share	0.504	0.507	-0.00300	0.509	0.506	.003*	0.509	0.507	0.00200	0.504	0.507	-0.00300
	(.013)	(.021)	(.003)	(.016)	(.022)	(.001)	(.014)	(.021)	(.002)	(.013)	(.021)	(.003)
White share	0.923	0.922	0.00100	0.919	0.923	-0.00400	0.883	0.925	-.042**	0.919	0.922	-0.00300
	(.074)	(.12)	(.015)	(.107)	(.122)	(.009)	(.116)	(.119)	(.014)	(.071)	(.12)	(.015)
Black share	0.0710	0.0760	-0.00500	0.0780	0.0750	0.00300	0.113	0.0730	.04**	0.0750	0.0760	-0.00100
	(.077)	(.12)	(.016)	(.108)	(.122)	(.009)	(.118)	(.119)	(.014)	(.075)	(.121)	(.015)
English-speaking sh.	0.985	0.985	0	0.983	0.985	-0.00300	0.982	0.985	-0.00300	0.981	0.985	-0.00400
	(.009)	(.031)	(.002)	(.025)	(.032)	(.002)	(.021)	(.032)	(.003)	(.022)	(.031)	(.005)
Avg. Occ-score	9.027	8.438	.589**	8.658	8.399	.259**	8.930	8.412	.518**	8.998	8.438	.56**
	(.549)	(.759)	(.113)	(.633)	(.782)	(.054)	(.554)	(.761)	(.07)	(.566)	(.759)	(.114)
Avg. literacy sh.	0.975	0.966	.009**	0.969	0.965	0.00300	0.966	0.966	-0.00100	0.973	0.966	.007*
	(.013)	(.044)	(.003)	(.021)	(.048)	(.002)	(.021)	(.045)	(.003)	(.017)	(.044)	(.004)

This table illustrates various summary statistics of Federal One-recipient and non-recipient cities by specific sub-program participation and estimates the magnitude and significance of their differences using cross-sectional regressions of the form $y_{i,1930} = \beta_0 + \beta_1 \cdot FPNo1_{i,l} + \varepsilon_i$ for binary treatment variable $FPNo1_{i,l} = l \in \{FAP,\ FMP,\ FTP,\ FWP\}$. The regression coefficients in the "Difference" columns are estimated with heteroskedasticity-robust standard errors.
$*p < .05$, $**p < .01$

One treatment would violate SUTVA. Alternatively, increased movement into artistic occupations (as reported on OCC1950 or IND1950) from local individuals previously identifying a non-arts-related occupation as their primary labor force activity—effectively reflecting an impact of Federal One funding on occupation choice—would not constitute a SUTVA violation.

Historical accounts of the operations of Federal Project Number One suggest this not to be the case, where programmatic activity generally drew upon local artist populations, and

Table 9: Comparisons of 1930 artist shares (%) by Federal One Sub-project treatment status

	FPNo1 Sub-Project	FPNo1	Non-FPNo1	Difference
Artist	FAP	0.0619	0.0254	.0365***
		(.027)	(.036)	(.005)
Musician	FMP	0.164	0.137	.027***
		(.061)	(.067)	(.005)
Actor	FTP	0.0236	0.0106	.013***
		(.046)	(.048)	(.003)
Writer	FWP	0.00900	0.00390	.0052**
		(.011)	(.014)	(.002)
Dancer	FTP	0.00760	0.00430	.0032***
		(.006)	(.006)	(.001)
TV industry	FTP	0.00680	0.00360	.0031***
		(.006)	(.008)	(0)
Publishing ind.	FWP	0.733	0.437	.296***
		(.193)	(.292)	(.036)
Theater & film ind.	FTP	0.145	0.0963	.0486***
		(.112)	(.102)	(.009)
Piano tuner	FMP	0.00430	0.00430	0.000100
		(.004)	(.006)	(0)
Painter	FAP	0.0780	0.0615	.0165***
		(.038)	(.079)	(.006)
Photographer	FAP	0.0309	0.0247	0.00630
		(.013)	(.015)	(.003)
Designer	FAP	0.0140	0.00610	.0079***
		(.01)	(.012)	(.002)

This table illustrates various summary statistics of pre-period outcomes by Federal One-recipiency status by city and estimates the magnitude and significance of their differences using cross-sectional regressions of the form $y_{i,1930} = \beta_0 + \beta_1 \cdot FPNo1_{i,l} + \varepsilon_i$ for binary treatment variable $FPNo1_{i,l} = l \in \{FAP,\ FMP,\ FTP,\ FWP\}$. The regression coefficients in the "Difference" columns are estimated with heteroskedasticity-robust standard errors clustered on the state-level. Outcome point estimates represent percentage point population shares (i.e. "0.0619" represents "0.0619 percent of the population").
$**p < .05$, $***p < .01$

sub-state projects generally practiced local operation. Additionally, no administrative restrictions prevented Federal One funding to non-urban localities that might have otherwise induced a mobility response of artists from rural localities to urban centers. Moreover, limiting the study to cities further precludes the scope of a rural-urban mobility response to violate no-interference treatment assignment rules, since by design, rural localities are omitted from the analysis. However, in a future work on the impacts of Federal One on

more rural localities, I explore this possibility. For the purpose of validating or invalidating this narrative here, however, the decadal structure of the Census data does not allow any research strategies to elicit such short-run mobility responses of rural artists, but longer-run validations (over the course of the decade from 1930 to 1940) may signify such a mobility response.[24] To alleviate this concern here, I provide partial evidence against the presence of a mobility response by demonstrating that untreated localities did not demonstrate a decrease in their local artistic professional shares.

However, mobility responses are less relevant for assessing the validity of the longer-run impacts of Federal One funding on local artist population shares (i.e. for $\beta_{dd,t}$ coefficients starting and subsequent to 1950+). The longer run reduced form coefficient estimates will encompass agglomeration effects that outlast the initial short-run impacts of arts funding. However, the long run coefficients may be biased by subsequent interventions that are operationalized in a manner correlated with local artistic activity, which is in part affected by Federal One funding.[25] This condition requiring orthogonality of Federal One treatment and subsequent treatments is likely to hold for several decades after Federal One, with national arts programming via the National Endowment for the Arts only emerging more than two decades after the end of the New Deal arts programs. The rise of alternate arts funding policies and activities, such as widespread arts education in public schools and popular arts and humanities philanthropy in the subsequent decades may indeed have initiated spatially in response to local artistic activity and represents the subject of future investigation.

The validity of the analysis also depends on a final exclusion restriction specific to the empirical strategy that aligns the specific Federal One projects with their respective fields of arts. Namely, 1) the Federal One treatment in one field of art cannot affect outcomes for unrelated fields of art:

$$\mathbb{E}[FPNo1_{i,l}, \Delta y_{i,-l}] = 0$$

[24]Currently, one can investigate this possibility in a more coarse setting using the Multi-Generational Linkage Project of the US Census Bureau that connects the 1900-1940 decadal censuses in an individual panel-data format.

[25]The unbiasedness of long-run coefficients depends on the validity of the condition $FPNo1_{i,1935} \perp ArtsTreat_{i,t^+}$ for $t^+ \geq 1950$ of subsequent arts treatments.

for field of art l and unrelated field of art $-l$; and 2) outcomes in a fixed field of art also cannot directly affect the outcome of other unrelated fields of art:

$$\mathbb{E}[\Delta y_{i,l}, \Delta y_{i,-l}] = 0.$$

As an example to illustrate 1), Federal One funding that accrued to musicians through the Federal Music Project cannot affect the local share of writers in the population. As an illustration of the second restriction, local growth in the share of visual artists cannot affect local growth in the share of theater practitioners. To this end, a substantial body of work within arts and urban economics documents the spatial clustering tendencies of artistic professionals within fields (e.g. Borowiecki (2013); Hellmanzik (2010)) as well as the endogenous accumulation of amenities within space over time (e.g. Diamond (2016), but such work does not inform the existence of cross-field causal influence of spatial clustering within artistic professions.

5.5 OLS results

The OLS results reveal the largest, most sustained increases in activity among writers and certain subsets of visual artist (namely designers and photographers among visual artists), with these groups demonstrating significant increases in employment shares relative to their 1930 baselines—typically increasing several-fold. Tables 9 and 10 display the ordinary least squares difference-in-differences results for binary parameterizations of Federal One sub-project treatment status, illustrating generally positive and large correlations between program activity and post-period artist shares—with some variation in persistence across artistic disciplines. These tables distinguish between short- and long-run results, separating 1940 coefficients and averages of 1950-2015 difference-in-difference coefficients (relative to the 1930 baseline). These OLS results serve to illustrate the descriptive fact that generally, among different fields of art, the cities that received Federal One treatment did proceed to foster increased artistic activity as measured by its population share identifying as professional artists.

Figures 4-9 illustrates these results. The figures display the decadal difference-in-difference coefficients from the ordinary least squares regressions of artist share for the main artist disciplines on each respective Federal One sub-project with city fixed effects. These graphs illustrate more precisely the trajectories of artistic growth experienced by Federal One-treated cities versus non-treated cities. Without assigning causality to these results, the figures descriptively illustrate a marked increase in respective artist share in the first post-period (1940), followed by an attenuated response for the following decades, with shares rising once more at the end of the 20th century.

Generally, the Federal One-treated cities appear to have exhibited a large increase in professional artist shares the short-run—increase of between 50 and 100% of the pre-period baseline employment shares by field, with some variation in longer-run persistence between fields of art. Namely, cities benefiting from Federal Writer's and Arts Project funding appear to exhibit relatively greater artist shares (of their respective) into the present-day. Musicians demonstrated a significant short-run increase of approximately 20% relative to their baseline shares within Federal Music Project cities, but the impact appears to have dissipated by the following decade. Importantly, the table also illustrates that these increases did not come at the expense of the artist shares of untreated-cities: that is the positive difference-in-difference coefficients are the results of an increase in the artist share among Federal One treated cities as opposed to a decrease in the the artist shares of untreated cities.

The relationship between federal theater activity and theater professionals is less clear. Figure 6 illustrates a strong negative leading trend (albeit with no the leading-point estimates significantly different from zero) of actors shares in Federal Theater Project cities leading up to the program. This downward trend appears unfazed by the program, continuing to decrease throughout the 20th century among treated cities. Accounting for the this leading trend, the Federal Theater Project cities appear to have seen no increase (or decrease) following federal theater programming. However, the results for alternate, related fields such as dancers, appears more positive, with dancer shares increasing by 60% in treated cities, while the longer-run dancer shares are only generally insignificantly different from zero.

Other disciplines are also characterized by leading pre-trends that mitigate the significance of the OLS results. Painters too appear to be on a decreasing trend within cities in the decades leading up to Federal One, and continue to do so following the treatment. Moreover, the increase seen by visual artists is ostensibly sustained by trend increases from 1920.

Overall, the general tendency holds that Federal One-treated cities did demonstrate significant increases in artist shares relative to non-treated cities following the end of the New Deal arts programs—with some substantial variance in the persistence of these gains as well as variation (namely within theater) of the sign and significant of the changes to artist population shares. These descriptive results likely include confounding effects—namely of the broader trajectory of the arts in large cities over the 20th centuries—that obfuscate the causal impacts of the New Deal arts programs themselves.

Table 10: OLS results: writers and theater practitioners

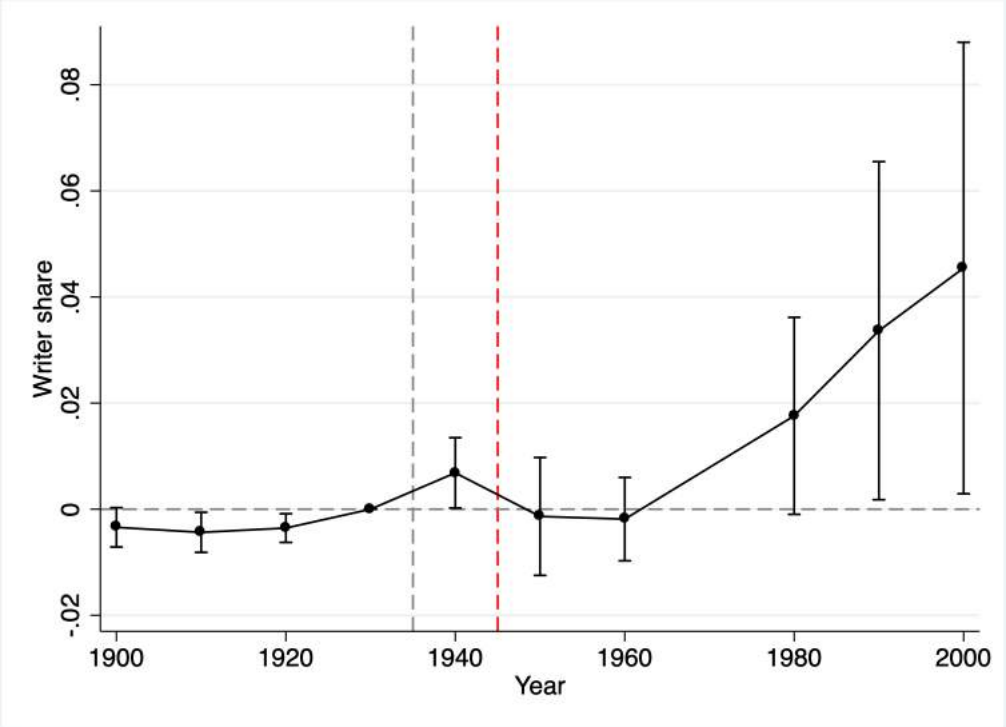
	(1)	(2)	(3)	(4)	(5)	(6)
FWP binary × Year 1940	0.0068**	0.030				
	(0.0034)	(0.022)				
FWP binary × Post 1940	0.041***	-0.057				
	(0.015)	(0.043)				
FTP binary × Year 1940			-0.0046**	-0.0080	0.0037***	0.0046***
			(0.0021)	(0.0069)	(0.0013)	(0.0012)
FTP binary × Post 1940			-0.011***	0.00079	0.0084	0.0017
			(0.0041)	(0.026)	(0.017)	(0.0020)
Year 1940	0.0053***	0.21***	-0.0013	0.063***	0.014***	0.0064***
	(0.00053)	(0.0056)	(0.00084)	(0.0028)	(0.00058)	(0.00034)
Post 1940	0.043***	0.33***	0.0018	0.091***	0.18***	0.0077***
	(0.0045)	(0.021)	(0.0029)	(0.020)	(0.012)	(0.0015)
Constant	0.0058***	0.47***	0.014***	0.11***	0.0081***	0.0057***
	(0.0015)	(0.0067)	(0.00076)	(0.0049)	(0.0029)	(0.00037)
Observations	2688	2688	2562	2688	2688	2688
Adjusted R^2	0.343	0.695	0.727	0.730	0.414	-0.035
City FEs	X	X	X	X	X	X

City-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

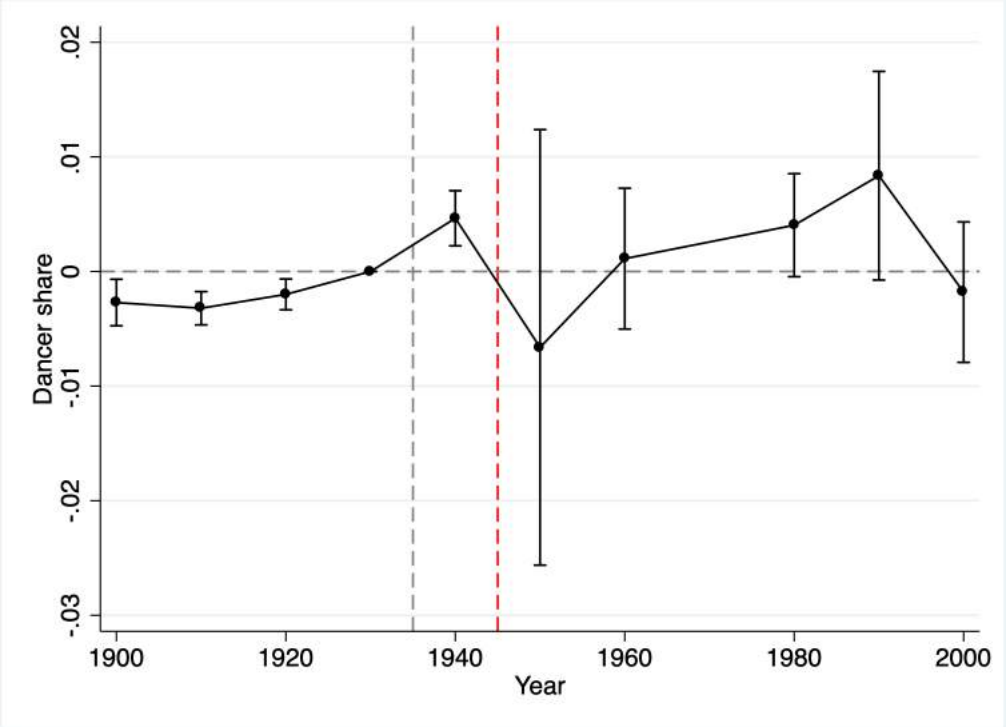
This table displays the ordinary least squares difference-in-difference estimated impacts of binary measures of Federal One activity on various artistic occupation shares by city, using 1930 as the leave-out base-period. All of the specifications include fixed effects on the city-level.

Figure 4: OLS results: City author share on Federal Writer's Project (binary)



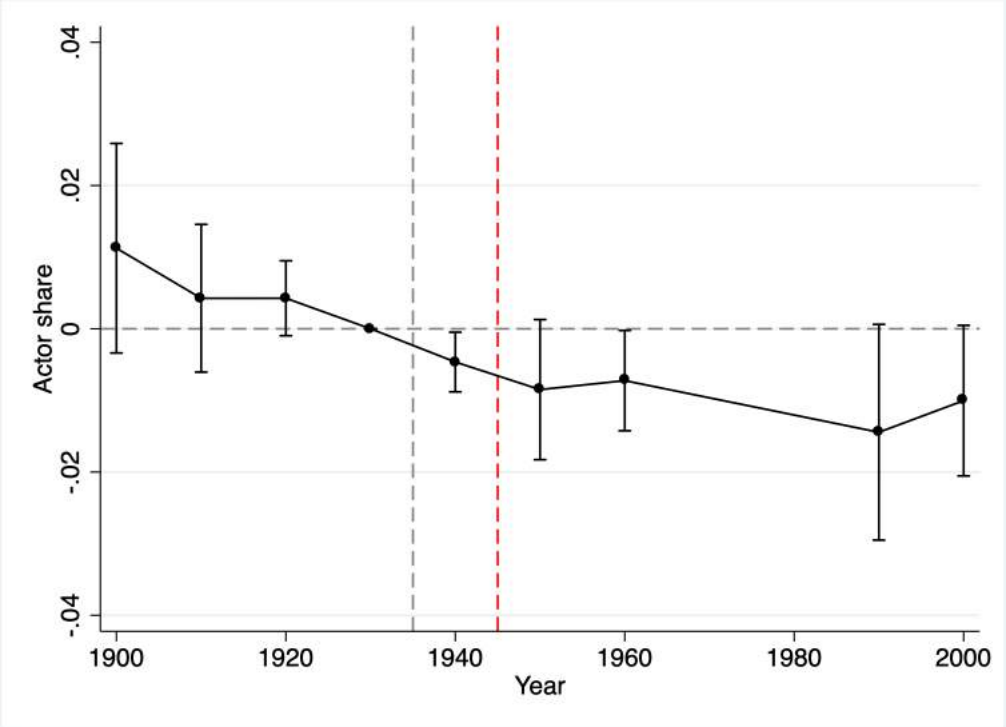
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local author population share (per OCC1950) on a binary indicator for Federal Writer's Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local author shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 5: OLS results: City dancer share on Federal Theater Project (binary)



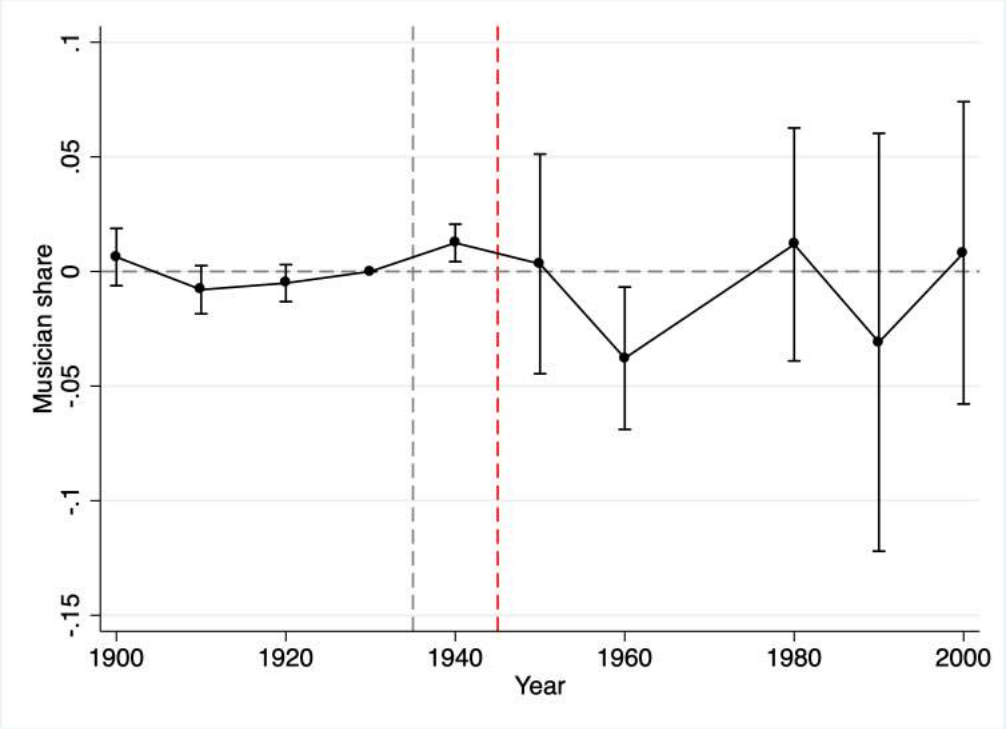
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local dancer population share (per OCC1950) on a binary indicator for Federal Theater Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local dancer shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 6: OLS results: City actor share on Federal Theater Project (binary)



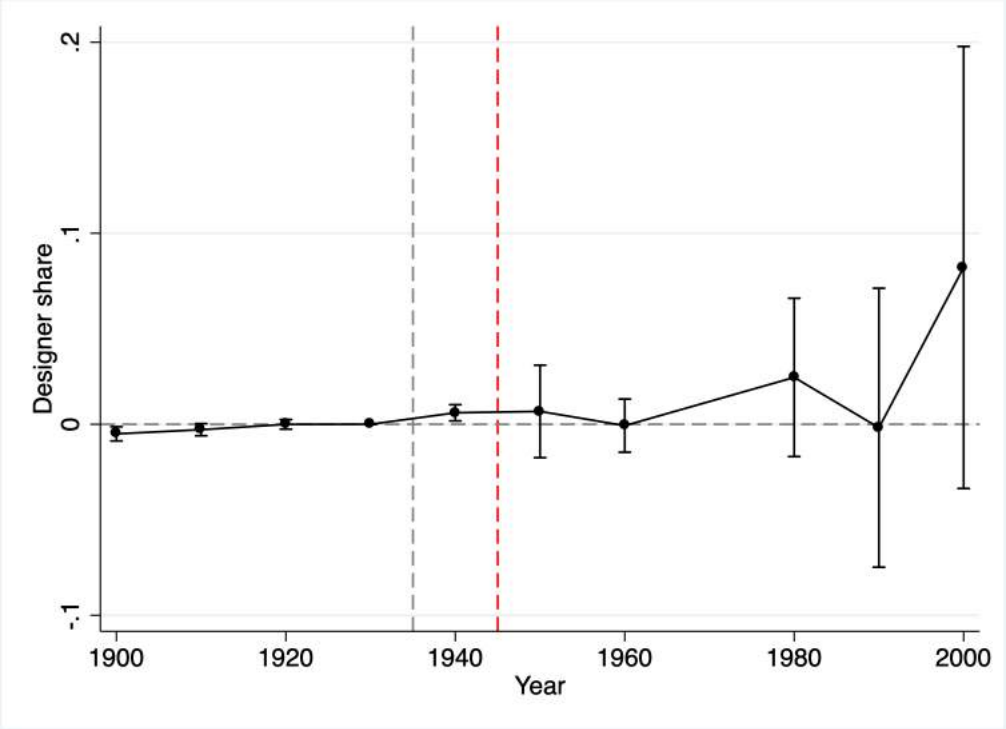
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local actor population share (per OCC1950) on a binary indicator for Federal Writer's Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local actor shares. Note the exclusion of 1970's and 1980's point estimates due to lack of city-denominated data in the US Census.

Figure 7: OLS results: City musician share on Federal Music Project (binary)



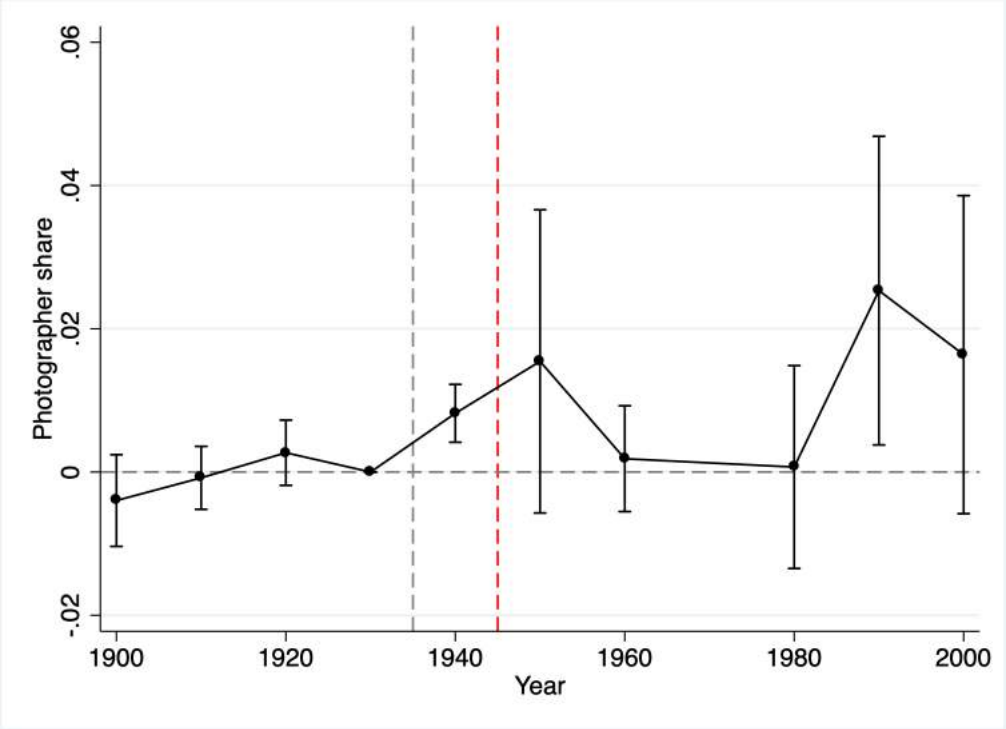
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local musician population share (per OCC1950) on a binary indicator for Federal Music Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local musician shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 8: OLS results: City designer share on Federal Art Project (binary)



This graph displays the results over time of the ordinary least squares differences-in-differences regression of local designer population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local designer shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 9: OLS results: City photographer share on Federal Art Project (binary)



This graph displays the results over time of the ordinary least squares differences-in-differences regression of local photographer population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local photographer shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Table 11: OLS results: musicians and visual artists

	(1)	(2)	(3)	(4)	(5)	(6)
FMP binary × Year 1940	0.012***	0.00011				
	(0.0042)	(0.00042)				
FMP binary × Post 1940	0.0057	0.0025**				
	(0.031)	(0.0011)				
FAP binary × Year 1940			0.018***	-0.0063	0.0082***	0.0060***
			(0.0034)	(0.0054)	(0.0021)	(0.0022)
FAP binary × Post 1940			0.0084	-0.026***	0.021***	0.083**
			(0.012)	(0.0087)	(0.0075)	(0.035)
Year 1940	0.0050**	0.0017***	0.018***	0.042***	0.017***	0.0095***
	(0.0021)	(0.00026)	(0.00094)	(0.0030)	(0.00067)	(0.00048)
Post 1940	0.23***	-0.0033***	0.058***	0.029***	0.039***	0.20***
	(0.026)	(0.00079)	(0.0045)	(0.0061)	(0.0032)	(0.011)
Constant	0.16***	0.0042***	0.030***	0.065***	0.027***	0.012***
	(0.0049)	(0.00022)	(0.0014)	(0.0021)	(0.00099)	(0.0035)
Observations	2688	2688	2688	2688	2688	2688
Adjusted R^2	0.338	-0.102	0.486	0.549	0.214	0.417
City FEs	X	X	X	X	X	X

City-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays the ordinary least squares difference-in-difference estimated impacts of binary measures of Federal One activity on various artistic occupation shares by city, using 1930 as the leave-out base-period. All of the specifications include fixed effects on the city-level.

6 Causal impacts: IV framework and results

In this section I present and develop my instrumental variables design for producing causal estimates of the impact of Federal One activity on local artistic professional shares. I proceed by introducing my New Deal spending instruments, justifying their use through validation exercises including: their passage of first-stage correlations with Federal One treatment and their respect of exclusion restrictions against broader impacts on arts through means other than through Federal One. Lastly, I present causal estimates of the impacts on local artistic activity of the New Deal Arts Programs. I maintain the additional econometric assumptions and framework introduced in the previous section in framing the validity and interpretation of these estimated causal impacts.

6.1 Federal One New Deal spending instrument

To estimate the causal impacts of New Deal arts spending on local artist population shares, I employ an instrumental variables framework that uses locality levels of total New Deal spending less New Deal arts spending as an instrument for Federal One spending.[26] I construct the New Deal expense arts leave-out instrument for each city i as

$$NDEXP\ LO_i = NDEXP_{c(i)} - \sum_{l \in \mathcal{L}} Expense\ FPNo1_{i,l},$$

where "NDEXP" signifies "New Deal Expense" and $c(i)$ refers county c containing city i. Importantly, while Federal One represented an unprecedented instance of funding to the arts in the US, the program represented an insignificant portion—less than one percent—of of overall New Deal spending.

The mechanism behind this instrument is two-fold. First, a body of historical work emphasizes the targeted rollout of New Deal funds to localities for the simultaneous purposes of targeting relief and recovery and extending political patronage of the FDR Presidential Administration (P. V. Fishback, Kantor, and Wallis (2003)). The general flow of New Deal

[26] I use total New Deal spending variables by county as compiled by and used in P. V. Fishback, Haines, and Kantor (2007).

funding from the federal government to states within broader New Deal programming formed New Deal funding networks to localities in which benefiting from New Deal funds/activity for one program would increase the probability of benefiting from New Deal funds/activity for another unrelated program.

Second, many New Deal programs operated based on a funding initiating at the federal government level, with funds moving between administrative bodies, eventually terminating with local demand for New Deal activity on the ground-level through applications and local interest. The role of local interest and programmatic activity increasing take-up of New Deal programming across the board further substantiates the New Deal network spending channel, where local recipiency of New Deal funds for one program would increase the probability of receiving additional New Deal funds for other programs—in this case in the form of employment of local artists through Federal Project Number One—unrelated to local artistic propensity that may influence selection into Federal One programmatic funding (as in the OLS case).

I use this New Deal expense arts leave-out variable and various parameterizations as instruments for Federal One activity for each sub-program, performing permutations of the first stage projection

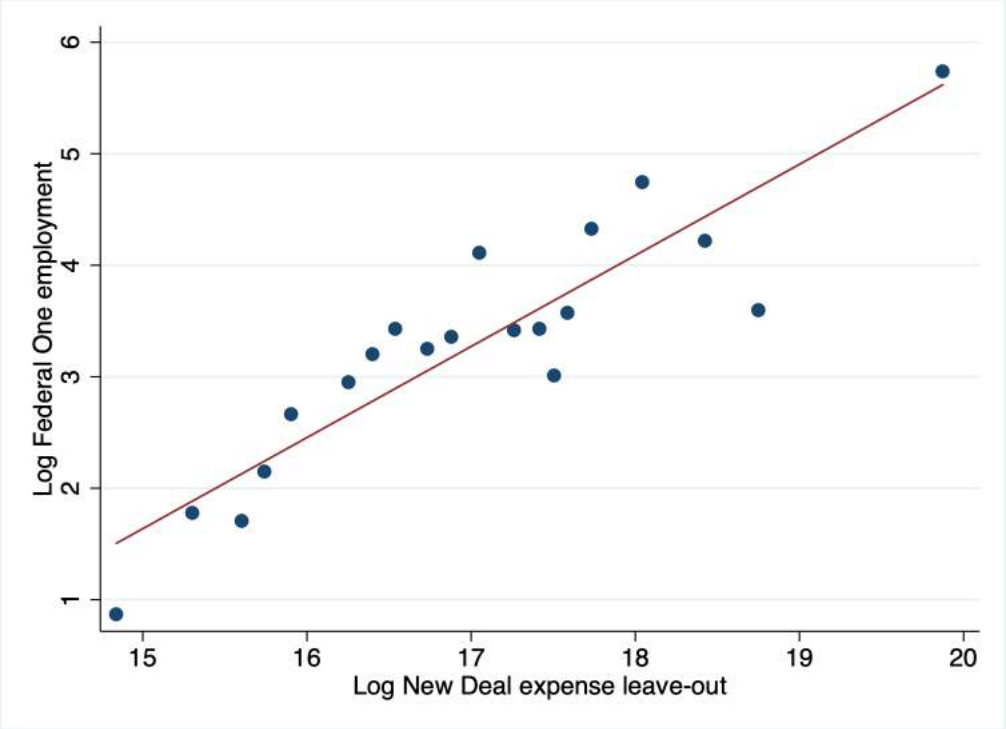
$$FPNo1_{i,l} = \beta_{0,l} + \pi_l \cdot NDEXP\ LO_i + \Gamma_l X_{i,l} + \varepsilon_{i,l}.$$

Table 12 displays results from first stage cross-sectional regressions of log Federal One activity by sub-project on the log New Deal expense leave-out instrument. In all cases, the predictive power of the instrument is considerable, generating F-statistics that well surpass standard first stage requirements.

6.2 Instrument validation

Importantly, the New Deal arts leave-out spending instrument demonstrates little correlation with pre-existing artist populations as was demonstrated with Federal One spending in the

Figure 10: First stage: Log New Deal exp. leave-out on log Federal One employment



This graph displays the binned scatter plot of the log New Deal expense arts leave-out instrument on log total Federal One employment in the cross-section.

Table 12: First stage: Log New Deal exp. leave-out on log Federal One employment

	FAP	FAP	FMP	FMP	FTP	FTP	FWP	FWP	FPNo1	FPNo1
Log New Deal exp. leave-out	1.16***	0.12***	0.69***	0.27***	0.93***	0.20***	0.65***	0.11***	0.82***	0.32***
	(0.25)	(0.024)	(0.12)	(0.062)	(0.18)	(0.043)	(0.18)	(0.021)	(0.16)	(0.074)
Constant	-17.7***	-1.87***	-8.61***	-3.88***	-12.8***	-3.06***	-8.40**	-1.74***	-10.6***	-4.59***
	(4.69)	(0.37)	(2.02)	(0.99)	(3.25)	(0.68)	(3.29)	(0.33)	(2.58)	(1.17)
Observations	23	891	181	891	69	891	23	891	190	891
Adjusted R^2	0.682	0.064	0.341	0.072	0.452	0.069	0.426	0.061	0.360	0.081
F	21.7	25.4	30.8	19.3	25.9	22.0	13.6	28.3	26.3	18.9

State-clustered errors in parentheses
* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays the results of cross-sectional regressions of log levels of Federal One employment by subprogram on the log New Deal spending arts-leave-out instrument. Even-numbered columns make use of a "log + 1" dependent variable specification, estimating the equation
$\log(y_{i,l,1930} + 1) = \beta_{0,l} + \pi_l \cdot NDEXP\ LO_i + \Gamma_l X_{i,l} + \varepsilon_{i,l}$.

OLS setting. Table 13 displays a series of cross-sectional regressions of cities' 1930's artist shares on the New Deal arts leave-out instrument. Nearly all of the twelve artist occupations exhibit insignificant correlation between their pre-period population shares and the instrument, further compelling the validity of the instrument as unrelated to artistic outcomes

within cities.

The validity of the New Deal arts leave-out spending instrument for studying the impacts of Federal One sub-project activity on the growth of local artist population share is also contingent on the exclusion restriction that total New Deal non-arts spending does not impact local arts scenes. While Federal One spending represents the overwhelming majority of ostensibly arts-related activity on part of New Deal programming, the threat remains that New Deal spending program outside the realm of the arts had impacts on urban environments that in turn affect the agglomerative behaviors of artists within cities. For instance, the case of non-arts related spending inducing significant populations in cities, and these population increases resulting in a greater than one-to-one increase in artist population (i.e. a one percent-increase in city population inducing a greater than one-percentage point increase in artist population share) would constitute an exclusion restriction violation.

While existing work has yet to conclusively and causally speak the magnitude of the relationship between city population size and artist share, I do investigate to what extent the instrument induced adjacently-related changes to cities that may ostensibly have affected the arts environments. Namely, I study the relationship between the New Deal arts leave-out spending instrument and population levels as well as income and occupational demographic characteristics of cities in the post-New Deal era. I estimate a series of reduced forms with city-level fixed effect structure as follows:

$$\tilde{y}_{i,t} = \alpha_i + \sum_{k=1900}^{2010} \delta_k \cdot 1\{Year_t = k\} + \sum_{k=1900}^{2010} \gamma_k \cdot \log NDEXP\ LO_i \cdot 1\{Year_t = k\} + \varepsilon_{i,t},$$

for alternate outcome $\tilde{y}$. I also estimate OLS and correlated random effect models (using pre-period artist levels and pre-period city demographic characteristics separately) as an alternate specification.

The results from Table 14 undermine the possibility of alternate New Deal spending enacting an impact—either in the short-run or long-run—on city population. In all specifications,

the New Deal arts leave-out spending instrument is associated with no short-run increase in city population—challenging both the presence of exclusion restriction violations through increases to city population as well as as SUTVA violations through significant migration from rural or New Deal-untreated localities to New Deal beneficiary cities. However, the longer-run impacts are less clear, demonstrating significant and positive impacts in OLS and CRE specifications, but negative and significant impacts in a city-level fixed effects specification.

As another exclusion restriction validation, I use regressions identical specification as above to study the decadal impacts of New Deal funding on city-level median income and occupational demographics. Unfortunately, socioeconomic demographic characteristics such as city racial composition, income/wages, education, and literacy are not available prior to 1940 in US Census data. For this reason, I employ more widely available, retroactively constructed indices of socioeconomic status based on occupation—termed Occupational Standing Variables by the US Census Bureau.[27] The most widely known of these indices is *OccScore* which measures income based on 1950's levels of income by occupation, but other indices include occupation-based scores of socioeconomic status, education, occupational status and prestige, earnings and education levels. These indices are all constructed as geography-time-invariant weighted averages of their specific objects of interest measured in 1950.[28] For example, the *Education Score* of a given profession consists of the percentage of each person in a said occupation in 1950 with at least one year of college education; *Prestige Score* uses averages of subjective valuations of different professions via survey.

Importantly, by nature of their construction, use of these indices may suffer from measurement error in application to different geographies and time periods, as they do not capture geographic or temporal variation in occupational characteristics. Moreover, the unit-interpretation is not necessarily immediately apparent for each index. OccScore has the interpretation of hundreds of 1950 USD in annual salary. Lastly, by nature of their

[27] See the IPUMS chapter on occupational standardization for a detailed discussion of the construction and use of these variables.

[28] Alternate constructions of these indices exist using the 1990 US Census.

construction, the indices demonstrate highly positive correlation with one another.

Thus, application of these indices to geographies reflect changes to those geographies based on differential composition of professions. *E.g.* an increase in a city's OccScore from t_0 to t_1 reflects an average increase of higher-earning occupations (whose earnings are measured in 1950) in said city—not directly measured increases in income.[29]

Table 15 displays the results city fixed effect regressions of the various Occupational Standing Variables on the New Deal arts leave-out spending instrument interacted with year dummies. In all cases, the instrument demonstrates no significantly positive impacts on median city-level outcomes in both the short- and long-run as measured by these occupational indices.

Table 13: IV validation: New Deal exp. leave out on pre-period artistic shares

	(1) Artist	(2) Musician	(3) Actor	(4) Author	(5) Dancer	(6) TV ind.
Log New Deal exp. leave-out	1.08***	0.27	0.58	0.12	0.047	0.070**
	(0.27)	(0.48)	(0.35)	(0.099)	(0.033)	(0.029)
Constant	-15.2***	9.85	-8.43	-1.66	-0.32	-0.76*
	(4.13)	(7.32)	(5.50)	(1.54)	(0.51)	(0.44)
Observations	891	891	891	891	891	891
Adjusted R^2	0.168	0.002	0.026	0.014	0.010	0.015

	(1) Pub. ind.	(2) Theater ind.	(3) Pianotuner	(4) Painter	(5) Photographer	(6) Designer
Log New Deal exp. leave-out	4.55**	1.10	-0.039**	0.096	-0.12	0.25***
	(2.09)	(0.99)	(0.019)	(0.31)	(0.084)	(0.049)
Constant	-30.6	-8.09	1.07***	4.60	4.39***	-3.57***
	(32.4)	(15.4)	(0.30)	(5.06)	(1.32)	(0.73)
Observations	891	891	891	891	891	891
Adjusted R^2	0.044	0.020	0.009	-0.001	0.010	0.094

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays the results of cross-sectional regressions of cities' 1930-levels of artist population shares on the log New Deal spending arts-leave-out instrument. Dependent variable units are expressed in artists per 10,000 inhabitants.

[29]The construction of OccScore *does* account for some changes in occupational classification in the post-1950 era.

Table 14: IV exclusion restriction validation: city population

	(1)	(2)	(3)	(4)
Log New Deal exp. LO. × Year 1940	-0.0091***	-0.0091***	-0.0091***	-0.0091**
	(0.0030)	(0.0031)	(0.0031)	(0.0038)
Log New Deal exp. LO. × Post 1940	0.17**	0.14**	0.16**	-0.24***
	(0.070)	(0.058)	(0.065)	(0.060)
Log New Deal expense leave-out	0.26***	0.23***	0.29***	
	(0.030)	(0.029)	(0.029)	
Year 1940	0.22***	0.22***	0.22***	0.22***
	(0.050)	(0.050)	(0.050)	(0.062)
Post 1940	-1.16	-0.71	-1.21	4.76***
	(1.19)	(0.99)	(1.12)	(1.03)
Constant	5.82***	5.84***	10.9***	10.6***
	(0.48)	(0.47)	(3.75)	(0.021)
Observations	2606	2606	2604	2606
Adjusted R^2	0.561	0.600	0.611	0.885
Arts demographics 1930		X		
City demographics 1930			X	
City FEs				X

City-clustered errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays results from the regressions of log city population on the log New Deal expense arts leave-out instrument by city, using 1930 as the leave-out base-period. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table 15: IV exclusion restriction validation: median occupational indices

	(1)	(2)	(3)	(4)	(5)	(6)
	OccScore	Occ. SES index	Occ. prestige	Earnings score	Education score	Status score
Log New Deal exp. LO. × Year 1940	-0.017	-0.013	-0.10*	5.72*	5.73*	5.73*
	(0.029)	(0.021)	(0.060)	(3.25)	(3.30)	(3.26)
Log New Deal exp. LO. × Post 1940	0.043	-0.34	-0.13	-7.09	-8.28	-7.41
	(0.40)	(0.53)	(0.60)	(18.1)	(18.1)	(18.0)
Year 1940	0.40	0.29	1.92*	-105.5*	-105.9*	-105.7*
	(0.47)	(0.35)	(1.03)	(56.3)	(57.0)	(56.5)
Post 1940	11.7*	16.8*	18.8*	-569.4*	-549.6*	-562.4*
	(6.97)	(9.20)	(10.5)	(315.5)	(315.3)	(314.4)
Constant	0.15	0.12	0.16	993.9***	994.4***	994.0***
	(0.14)	(0.19)	(0.22)	(6.96)	(6.99)	(6.95)
Observations	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.624	0.581	0.616	0.627	0.626	0.626

City-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays results from the regressions of socioeconomic occupational indices on the log New Deal expense arts leave-out instrument by city, using 1930 as the leave-out base-period. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts. All of the specifications include fixed effects on the city-level.

6.3 Reduced forms

The reduced forms demonstrate a strong relationship between the local artist shares and New Deal funding. Tables 16 estimates these reduced forms for the instrumental variables difference-in-differences design. For eight of the twelve all dependent variable specifications of artistic discipline, the New Deal arts leave-out spending instrument exhibits a significantly positive correlation with artist population shares in the short-run. Among these, half of the fields of art that demonstrate a significant increase in the short run see maintained impacts beyond a decade. Namely, artistic occupations dealing with writing and visual arts demonstrate strong, positive short- and long-run responses, whereas responses are more mixed and less persistent for music and theater-related occupations.

Given the strong first stage of the spending leave-out instrument on Federal One sub-program activity and the exclusion restriction validation tests that demonstrate little impact of New Deal funds on the broader socioeconomic and occupational characteristics of recipient cities, the results of these reduced form specifications reflect the impact of arts funding on local shares of artists as channeled quasi-randomly through inertial New Deal funding flows to localities.

Table 16: IV reduced forms

	(1) Author	(2) Pub. industry	(3) Actor	(4) Theater and film ind.	(5) TV and radio ind.	(6) Dancer
Log New Deal exp. LO. × Year 1940	0.0019**	0.019***	-0.00094	0.0044	-0.00035	0.00087***
	(0.00076)	(0.0046)	(0.00061)	(0.0035)	(0.00042)	(0.00028)
Log New Deal exp. LO. × Post 1940	0.014***	0.029**	0.0019	0.064***	0.0085	-0.00059
	(0.0043)	(0.014)	(0.0038)	(0.024)	(0.012)	(0.00096)
Constant	0.0043***	0.47***	0.014***	0.11***	0.0042	0.0061***
	(0.0016)	(0.0065)	(0.00095)	(0.0062)	(0.0031)	(0.00039)
Observations	2606	2606	2487	2606	2606	2606
Adjusted R^2	0.512	0.750	0.745	0.764	0.614	-0.015
City FEs	X	X	X	X	X	X

	(1) Musician	(2) Piano tuner	(3) Artist	(4) Painter	(5) Photographer	(6) Designer
Log New Deal exp. LO. × Year 1940	0.0029**	0.00027*	0.0046***	0.0031	0.0021***	0.0025***
	(0.0013)	(0.00016)	(0.00087)	(0.0022)	(0.00055)	(0.00041)
Log New Deal exp. LO. × Post 1940	-0.0061	-0.00037	0.0020	-0.014***	0.0074**	0.029***
	(0.013)	(0.00044)	(0.0052)	(0.0034)	(0.0032)	(0.0098)
Constant	0.15***	0.0044***	0.029***	0.065***	0.026***	0.0060*
	(0.0045)	(0.00021)	(0.0016)	(0.0022)	(0.0010)	(0.0034)
Observations	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.679	0.016	0.520	0.585	0.301	0.668
City FEs	X	X	X	X	X	X

City-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays results from the regressions of local artistic professional shares on the log New Deal expense arts leave-out instrument by city, using 1930 as the leave-out base-period. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts. All of the specifications include fixed effects on the city-level.

6.4 IV results

Finally, I proceed to estimate the instrumental variables difference-in-differences design, generating estimates of the causal impacts of arts funding on local artist professional shares. Figures 11-22 display the difference-in-difference estimates of the decadal causal impacts on local artist shares of Federal One sub-program activity (as a binary indicator in the graphs) of their respective field. Each of the graphs combine estimates from three specifications. The first specification includes fixed effects on the city-level, and the second and third specifications estimates correlated random effects models that include pre-period artist shares (among all artistic occupations) and pre-period growth rates in the dependent variable artist share, respectively.

The results depict generally large impacts of public arts investment through Federal One programming on local artistic shares, with some variation across fields in the persistence of these effects over the following decades. Tables 17 and 18 display the reduced form results from the IV difference-in-differences design with city-level fixed effected, aggregating longer-run impacts into a single bin.

Among the different artistic disciplines included in the set of dependent variables, writers and visual artists exhibit the largest, most persistent responses to arts funding via their respective Federal One sub-programs. Relative to their pre-period baseline in treated cities, the Federal Writer's project induced a 600% increase in author shares and a nearly 100% increase in publishing industry worker shares. Importantly, the impacts for authors has persisted to the present-day, and the impact for publishing industry workers endured several decades before mildly attenuating. Put most decisively, funding to authors generated lasting "cultural hotspots" of writers. Importantly, Tables 17 and 18 demonstrate that these effects were not generated in tandem with decreases in artistic professionals shares in un-treated cities.

Visual artist shares also saw substantial increases in response to Federal Art Project Ac-

tivity, with all visual arts professions increasing substantially in the immediate post-period. Population shares of photographers and designers exhibited 200% and 600% increases in Federal Art Project-treated cities, although only the impacts on photographers persisted significantly beyond two decades. Shares of "generic" visual visual artists (those reporting reporting either "artists" or art teachers as their primary occupation) also saw a substantial short-run increase of 275% in treated cities, although the time series is characterized by a lightly convexly increasing pre-trend leading up to the reform, and this increase immediately dissipated after a single decade.

The Federal Music Project induced large increases in music professionals share of the population of its respective cities. The program caused a short run increase in both musicians and piano tuners as shares of the population by 32% and 100%, respectively, relative to their pre-period shares. Notably, the impacts on musicians are less than for artists and writers relative to their pre-period baselines and both impacts dissipate after a single decade.

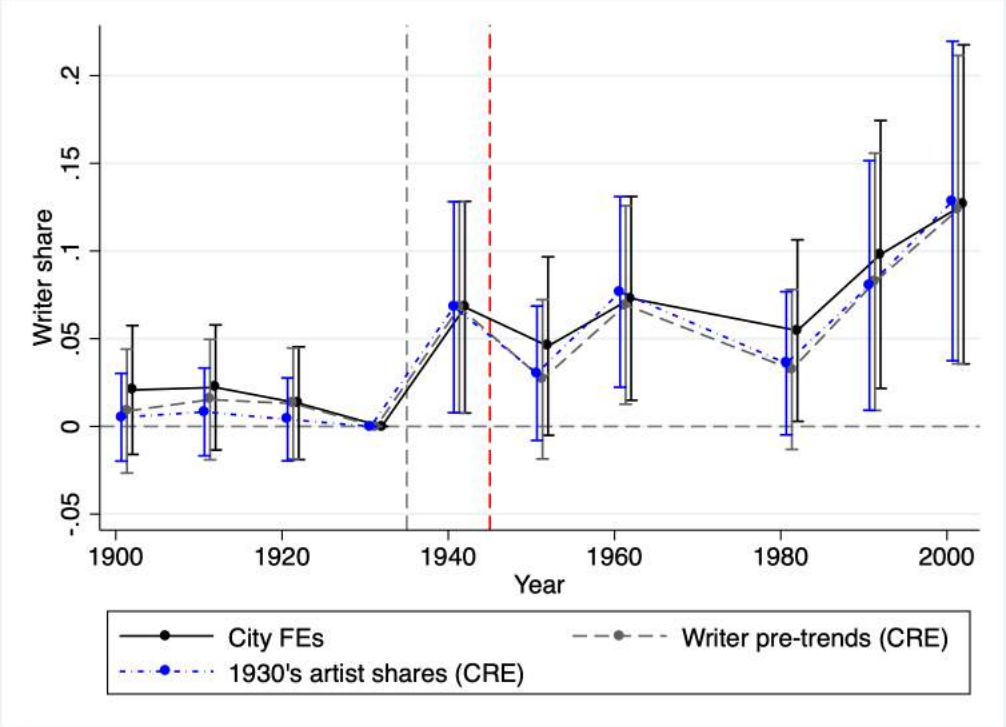
Lastly, the impacts on theater/film related industries are more mixed. Federal Theater Project activity induced steady and sustained positive impacts on the share of theater and film industry workers in treated cities, but the programs effects are not immediately significant on a 5% level. However, the coefficients eventually increasing toward a longer-run increase of 300% relative to shares of treated cities in 1930. The impacts on dancers are strongly positive and significant in the short-run, increasing by over 250%, but falling back to pre-period levels a decade after the end of program treatment. The impacts on actors and TV/radio industry workers are insignificant, and ostensibly negative for actors, whose shares among treated cities saw positive (albeit individually insignificant) pre-trends followed by a weak decline in the post-period, although actor shares are missing an additional decade due to absence from the 1970 US Census occupation question to respondees.

Finally, I generate more detailed results by outcome variable, reproduced in Tables A1-A12 in the appendix for each respective artistic profession. In these tables, I re-parameterize the treatment variables to express impacts in terms of expense per artistic professional (1000s

USD 1935), share of artistic professionals employed on part of the respective Federal One sub-program relative to the number of artistic professionals in 1930, and the log of Federal One program average monthly employment—in addition to the binary treatment as before. For each treatment variable, I also estimate two correlated random effect models with the same specifications as displayed in the long-run IV difference-in-difference graphs, in addition to the city-level fixed effects specifications.

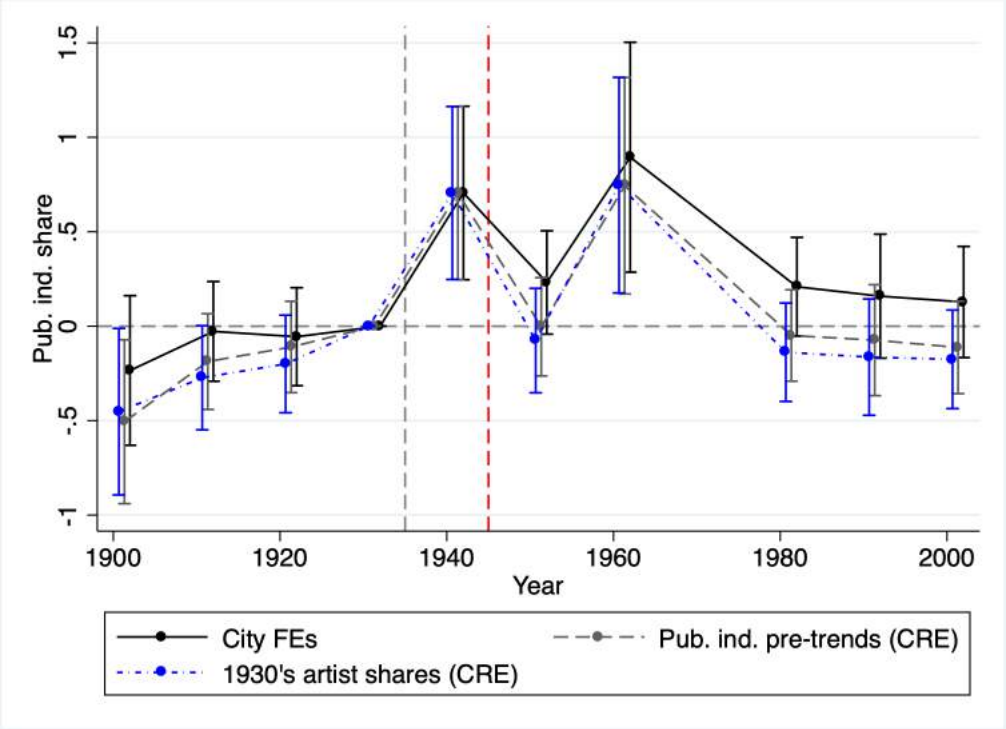
These results yield potentially useful interpretations of the results. Most notably, the results report that the share of writers increased by 74 writers in the short-run and 110 writers in the long-run per 1 million people in response to a $1000 investment per writer in 1935 (approximately $20,000 in 2020). Photographer designer shares increased by approximately 900 and 1100 professionals respectively per 1 million people for investments of the same proportional size. In the short run, dancer shares increase by 26 artists per 1 million people for an investment of present-day USD 20,000 per dancer. Results for these alternate parameterizations are not significant for musicians or piano tuners.

Figure 11: IV results: author share on Federal Writer's Project (binary)



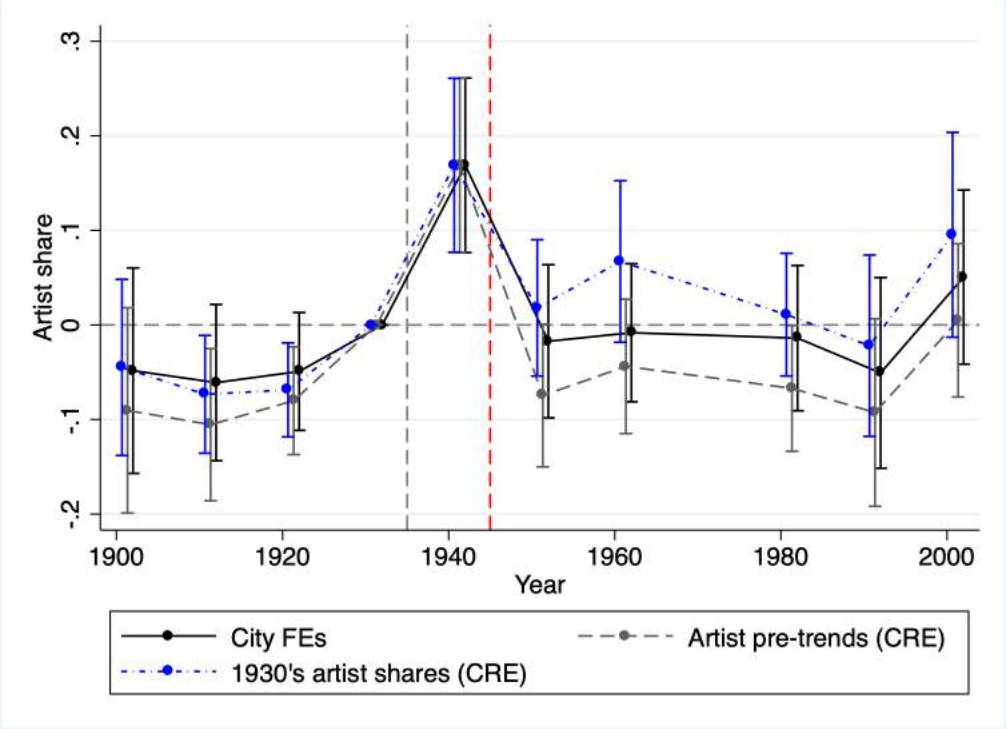
This graph displays the results over time of the instrumental variable differences-in-differences regression of local author population share (per OCC1950) on a binary indicator for Federal Writer's Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local author shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 12: IV results: publishing ind. worker share on Federal Writer's Project (binary)



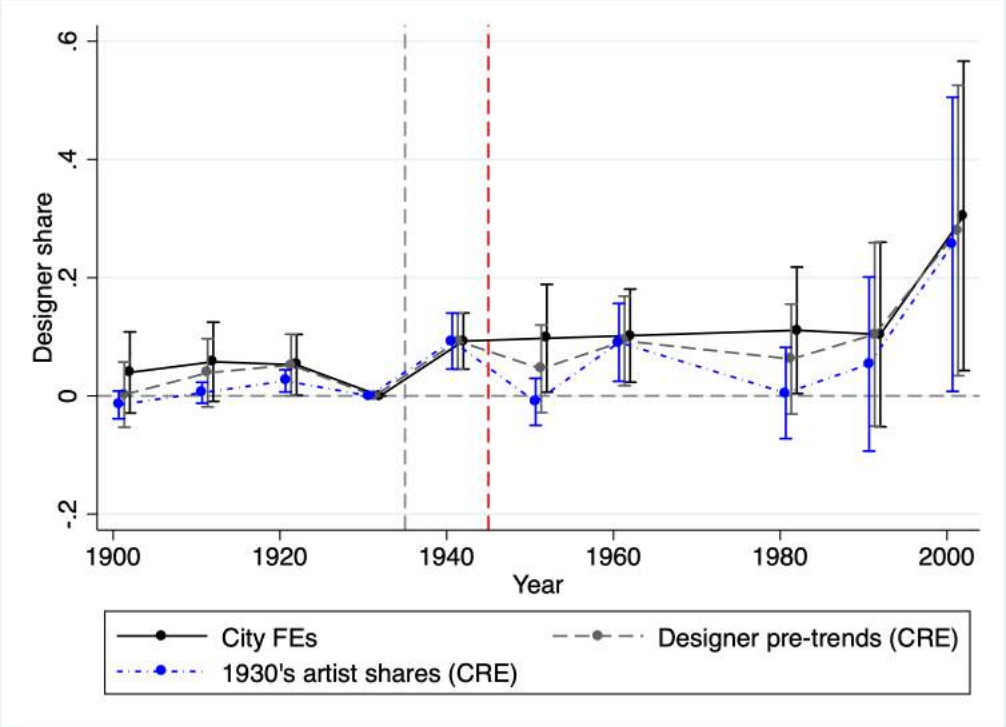
This graph displays the results over time of the instrumental variable differences-in-differences regression of local publishing industry worker population share (per IND1950) on a binary indicator for Federal Writer's Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local publishing industry worker shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 13: IV results: visual artist share on Federal Art Project (binary)



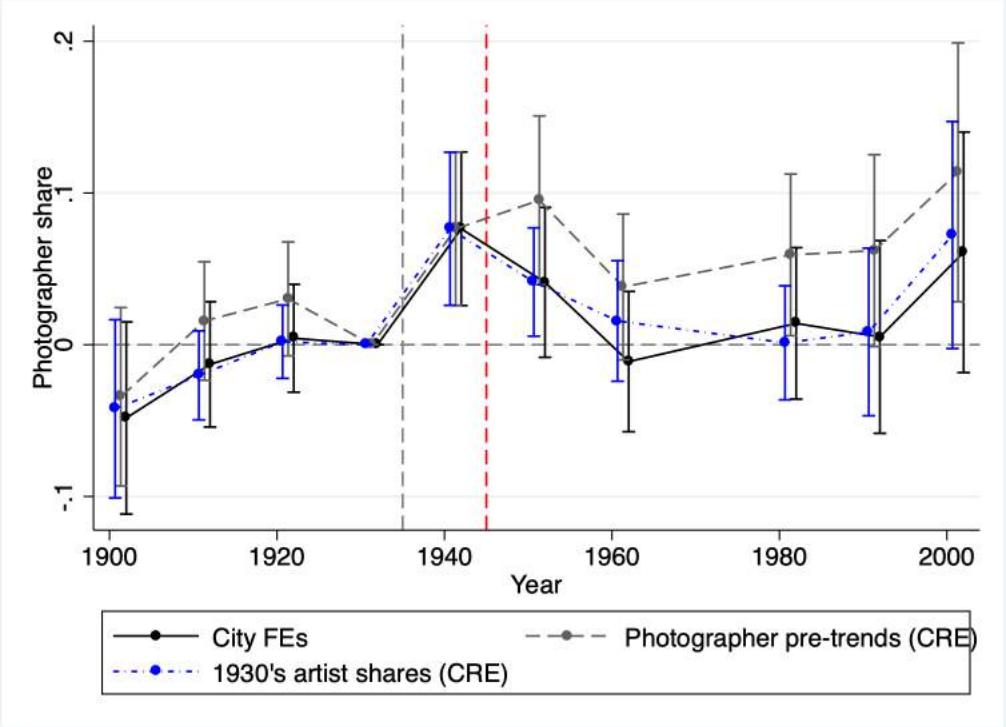
This graph displays the results over time of the instrumental variable differences-in-differences regression of local visual artist population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local visual artist shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 14: IV results: designer share on Federal Art Project (binary)



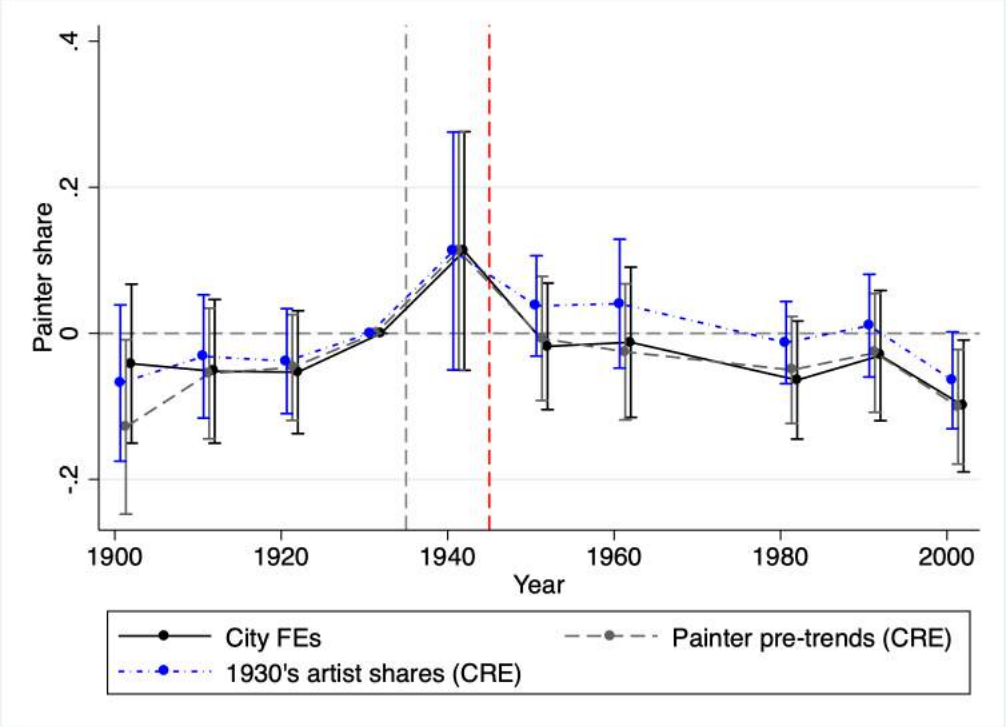
This graph displays the results over time of the instrumental variable differences-in-differences regression of local designer population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local designer shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 15: IV results: photographer share on Federal Art Project (binary)



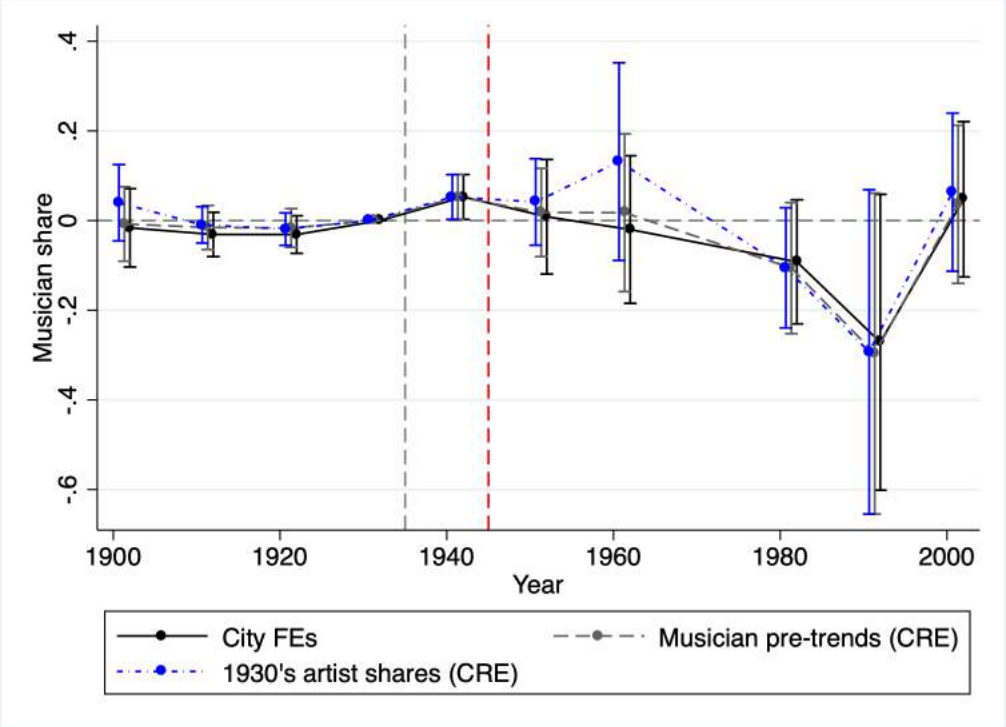
This graph displays the results over time of the instrumental variable differences-in-differences regression of local photographer population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local photographer shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 16: IV results: painter share on Federal Art Project (binary)



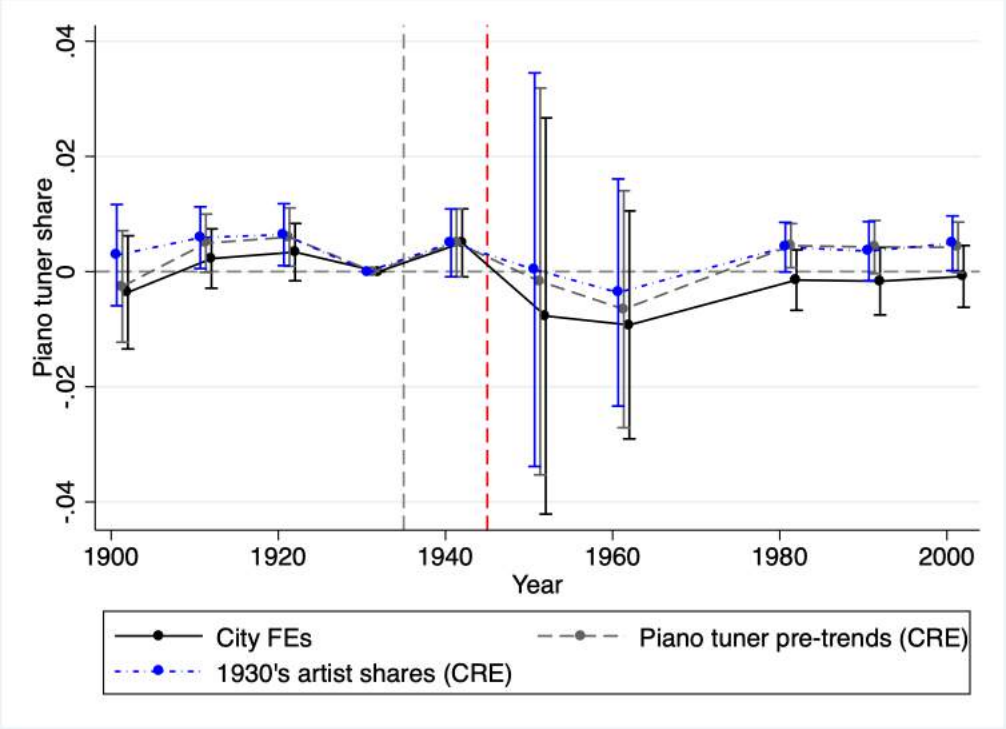
This graph displays the results over time of the instrumental variable differences-in-differences regression of local visual artist population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local painter shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 17: IV results: musician share on Federal Music Project (binary)



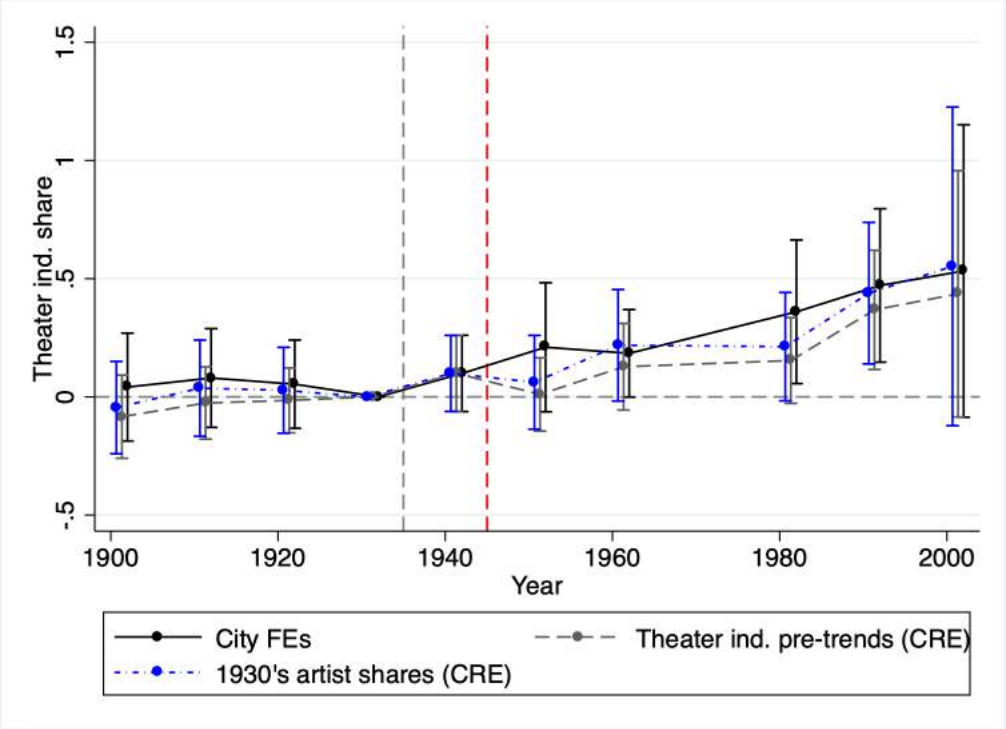
This graph displays the results over time of the instrumental variable differences-in-differences regression of local musician population share (per OCC1950) on a binary indicator for Federal Music Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local musician shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 18: IV results: piano tuner share on Federal Music Project (binary)



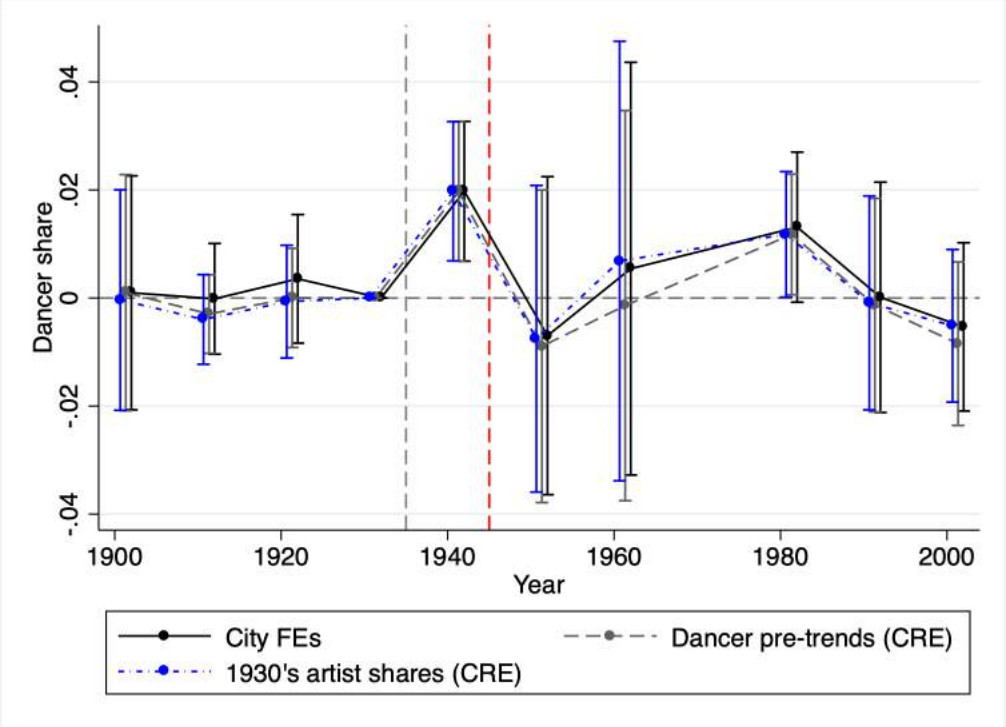
This graph displays the results over time of the instrumental variable differences-in-differences regression of local piano tuner population share (per OCC1950) on a binary indicator for Federal Music Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local piano tuner shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 19: IV results: theater/film ind. worker share on Federal Theater Project (binary)



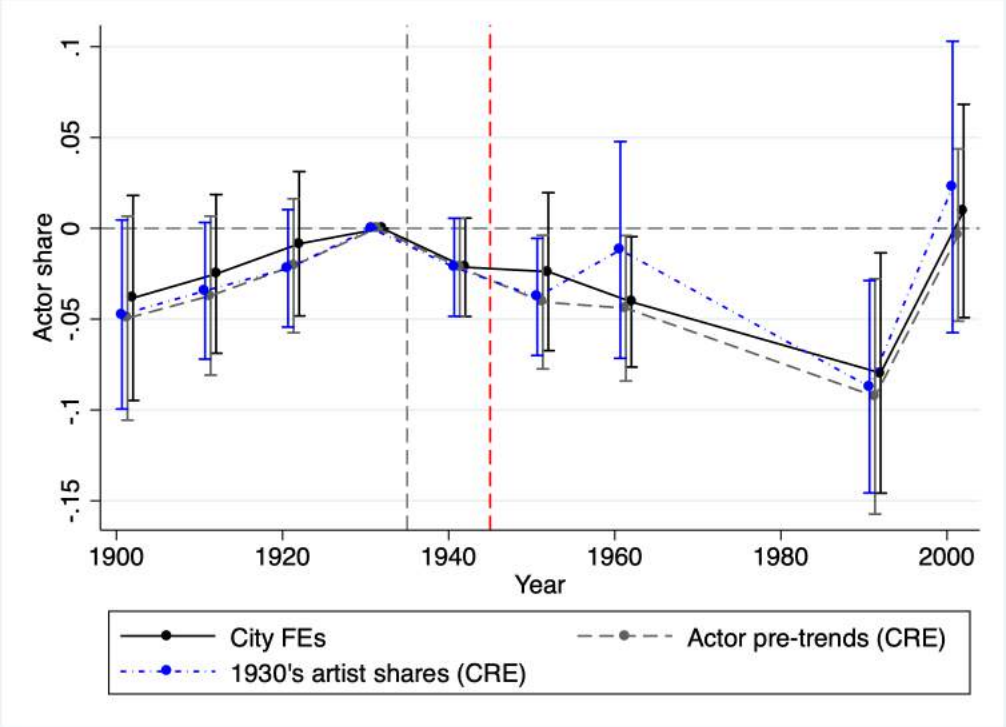
This graph displays the results over time of the instrumental variable differences-in-differences regression of local theater and film industry worker population share (per IND1950) on a binary indicator for Federal Theater Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local theater and film industry worker shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 20: IV results: dancer share on Federal Theater Project (binary)



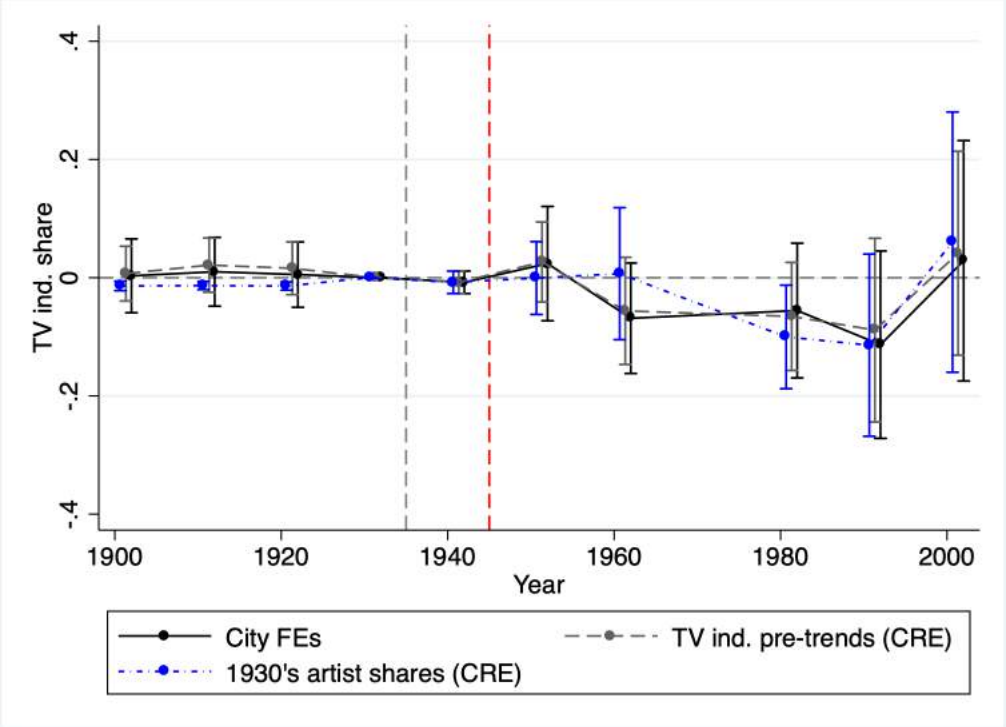
This graph displays the results over time of the instrumental variable differences-in-differences regression of local dancer population share (per OCC1950) on a binary indicator for Federal Theater Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local dancer shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure 21: IV results: actor share on Federal Theater Project (binary)



This graph displays the results over time of the instrumental variable differences-in-differences regression of local actor population share (per OCC1950) on a binary indicator for Federal Writer's Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local actor shares. Note the exclusion of 1970's and 1980's point estimates due to lack of city-denominated data in the US Census.

Figure 22: IV results: TV/radio ind. worker share on Federal Theater Project (binary)



This graph displays the results over time of the instrumental variable differences-in-differences regression of local actor population share (per IND1950) on a binary indicator for Federal Theater Project program recipiency. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing TV and radio industry worker population shares (in 1930) and leading decadal growth trends in local actor shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Table 17: IV results: writers and theater practitioners

	(1) Author	(2) Pub. industry	(3) Actor	(4) Theater and film ind.	(5) TV and radio ind.	(6) Dancer
FWP binary × Year 1940	0.068**	0.71***				
	(0.031)	(0.23)				
FWP binary × Post 1940	0.10**	0.57***				
	(0.039)	(0.21)				
FTP binary × Year 1940			-0.021	0.099	-0.0079	0.020***
			(0.014)	(0.082)	(0.0096)	(0.0066)
FTP binary × Post 1940			0.0020	0.47**	-0.0088	0.0063
			(0.030)	(0.23)	(0.093)	(0.0076)
Year 1940	0.0037***	0.19***	-0.000073	0.054***	0.015***	0.0052***
	(0.00045)	(0.0074)	(0.0012)	(0.0049)	(0.00098)	(0.00057)
Post 1940	0.037***	0.28***	-0.0045	-0.051	0.18***	0.0080***
	(0.0051)	(0.026)	(0.0071)	(0.055)	(0.028)	(0.0028)
Observations	2606	2606	2487	2606	2606	2606
Adjusted R^2	0.106	0.208	-0.028	-0.276	0.294	0.026
City FEs	X	X	X	X	X	X

City-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays the instrumental variable difference-in-difference estimated impacts of binary measures of Federal One activity on various artistic occupation shares by city, using 1930 as the leave-out base-period. All of the specifications include fixed effects on the city-level.

Table 18: IV results: musicians and visual artists

	(1) Musician	(2) Piano tuner	(3) Artist	(4) Painter	(5) Photographer	(6) Designer
FMP binary × Year 1940	0.053**	0.0050*				
	(0.026)	(0.0030)				
FMP binary × Post 1940	-0.17	0.0013				
	(0.11)	(0.0035)				
FAP binary × Year 1940			0.17***	0.11	0.076***	0.093***
			(0.047)	(0.083)	(0.026)	(0.024)
FAP binary × Post 1940			0.073	-0.044	0.066**	0.15*
			(0.047)	(0.047)	(0.029)	(0.090)
Year 1940	-0.0035	0.00067	0.014***	0.039***	0.015***	0.0073***
	(0.0059)	(0.00071)	(0.0011)	(0.0040)	(0.00082)	(0.00054)
Post 1940	0.33***	-0.0018	0.057***	0.038***	0.036***	0.19***
	(0.066)	(0.0021)	(0.0056)	(0.0069)	(0.0042)	(0.013)
Observations	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.144	0.004	0.096	0.053	0.099	0.285
City FEs	X	X	X	X	X	X

City-clustered standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

This table displays the instrumental variable difference-in-difference estimated impacts of binary measures of Federal One activity on various artistic occupation shares by city, using 1930 as the leave-out base-period. All of the specifications include fixed effects on the city-level.

6.5 Variance decompositions: A horse race of history versus policy

The IV results in the previous demonstrate significant, causal impacts of the various artistic Federal One sub-projects on the labor market share of their respective fields of art with varying degrees of persistence over time. However, to what extent can we decompose the subsequent evolution of artistic environments across cities to historic New Deal arts policies?

To evaluate the relative roles of historical trajectories and Federal One in determining urban arts environments, I perform a series of decadal variance decompositions of local artist profession shares between artist levels in 1900 and the exogenous component of Federal One activity for each respective field of art. First, figures 23-27 display the variance shares from repeated cross-sectional regressions of the form

$$\tilde{y}^t_{i,l,t} = y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l},$$ [30]

for decades t from 1900 to 2010 (excluding 1970, which lacks city-denominated census data), city i, and field-of-art l. Here, $\widehat{FPNo1}_{i,l}$ refers to the projection of the respective Federal One activity binary indicator on the log New Deal expense leave-out instrument and $\bar{y}_{l,t}$ represents the unweighted average of profession share y_l across all cities at time t.[31] This design estimates the share of variation *across* cities in artistic profession shares attributable to initial artistic profession shares in 1900 and Federal One treatment. These regressions follow from a simplification of the framework in Allen and Donaldson (2020) to decompose population growth within and across cities between initial populations (and resulting persistence/path dependence), evolution of productivity by geography, and evolution of trade access and migration.

The results from the variance decompositions demonstrate some contrast with the difference-in-differences results. Namely, in the post-1940 era, both initial profession levels and Federal

[30] The time-demeaned regressions are numerically equivalent to analogous OLS regressions due to the cross-sectional design via decadal stratification.

[31] Appendix figures A11-A15 display analogous bar graphs for this design, however using the exogenous component of log Federal One sub-program employment as the independent variable for Federal One activity.

One treatment alone explain a relatively small portion of the variation across cities of artistic profession shares—nearly entirely under 20% for any given year. For most of the professions, the effect of initial levels gradually diminishes over time, as expected; however, Federal One demonstrates greater temporal persistence as an explanatory component of artist profession shares.

For writers, the field with the largest and most significant recorded causal impact for its respective Federal One subfield, Federal Writer's Project activity tends to account for between 5% and 10% of variation across cities in any given decade after 1940, with even smaller explanatory power for writing and publishing industry shares. However, for both of these cases, the initial levels of authors and writing/publishing industry workers demonstrates consistently greater predictive power of subsequent variation in their respective fields than does Federal Writer's Project activity.

Federal One activity demonstrates much stronger explanatory power for other fields. For visual artists, other than painters, which saw little-to-no response to the Federal Art Project as an occupational group, Federal One funding strongly dominates initial levels in explaining the evolution and variation of artistic professionals in the visual arts across cities. This tendency is even stronger for theater professionals, where the exogenous component of the binary Federal Theater Project activity indicator both accounts for far greater variation in theater and theater-adjacent profession shares than their respective initial levels and increases considerably over time in explanatory power.

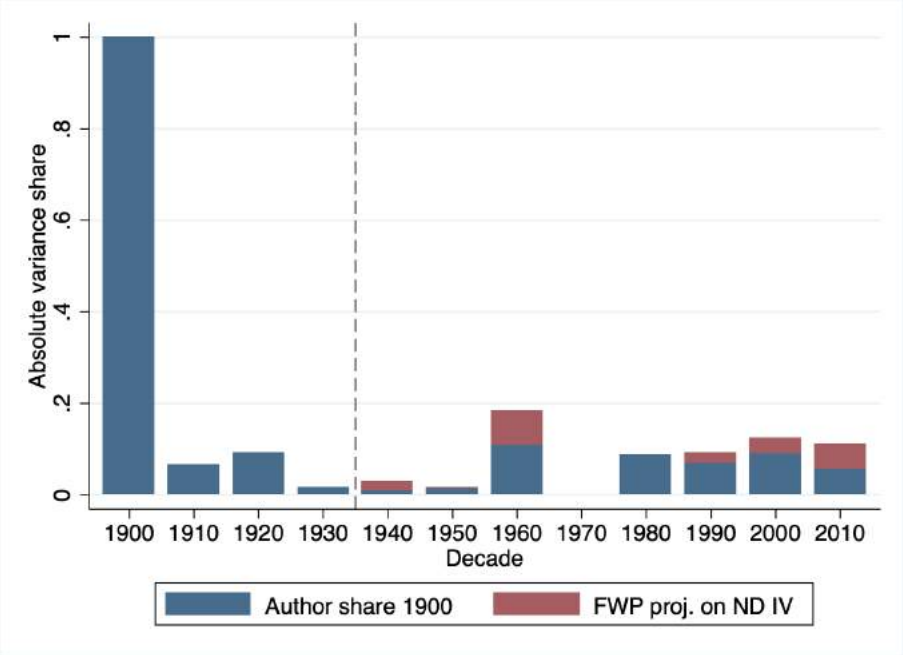
The explanatory role of Federal Music Project activity in determining the subsequent variation of musician shares across cities is more mild. In the initial post periods, the overall explanatory power of the Federal Music Project appears negligible, in spite of the significant, short-run causal impact of the Federal Music Project on local musician shares. However, this effect does grow more pronounces relative to that of 1900 musician shares starting 1960.

In the present day, Federal One activity accounts for modest, but non-negligible proportion

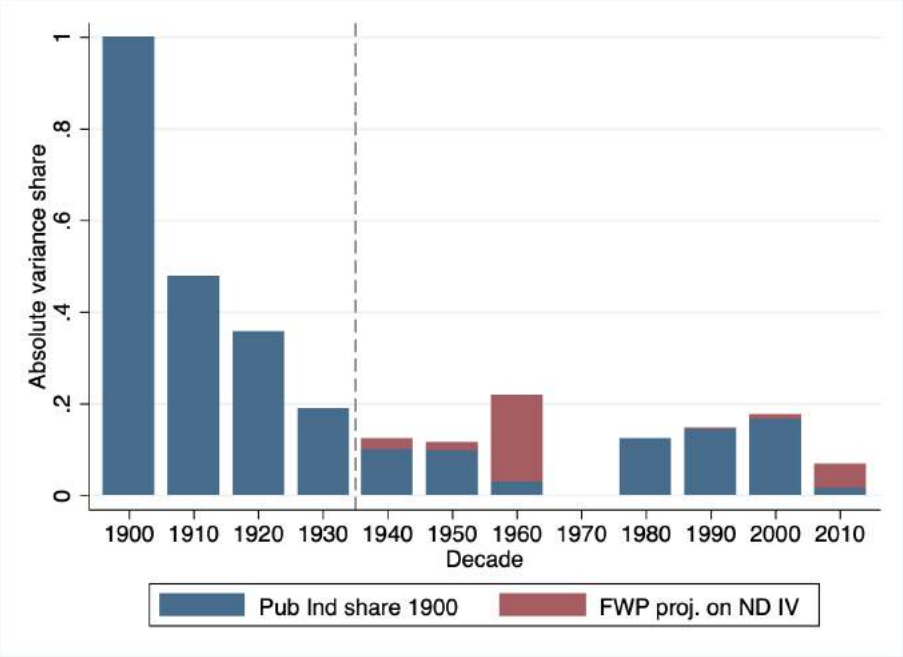
of the cross-city variation in artistic profession shares. Aside from dancers and musicians, the exogenous component of historic New Deal funding to the arts explains between 5- and 10% of variation across cities in 2010 in artistic profession shares, with the theater industries exhibited greater explanatory dependence on Federal Theater Funding.

Figure 23: Variance decomposition: FWP versus 1900 artists

(a) Authors



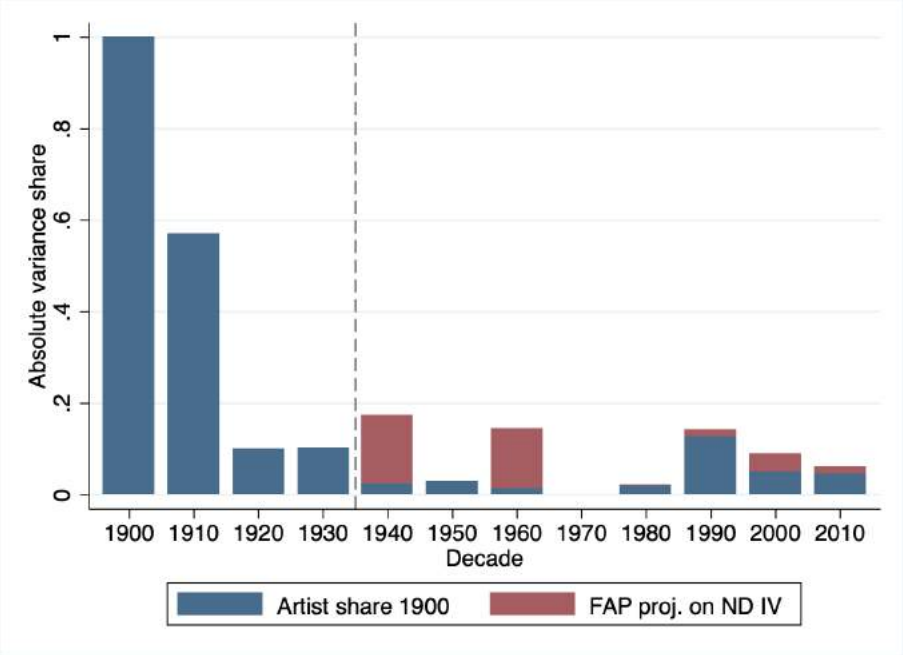
(b) Publishing industry workers



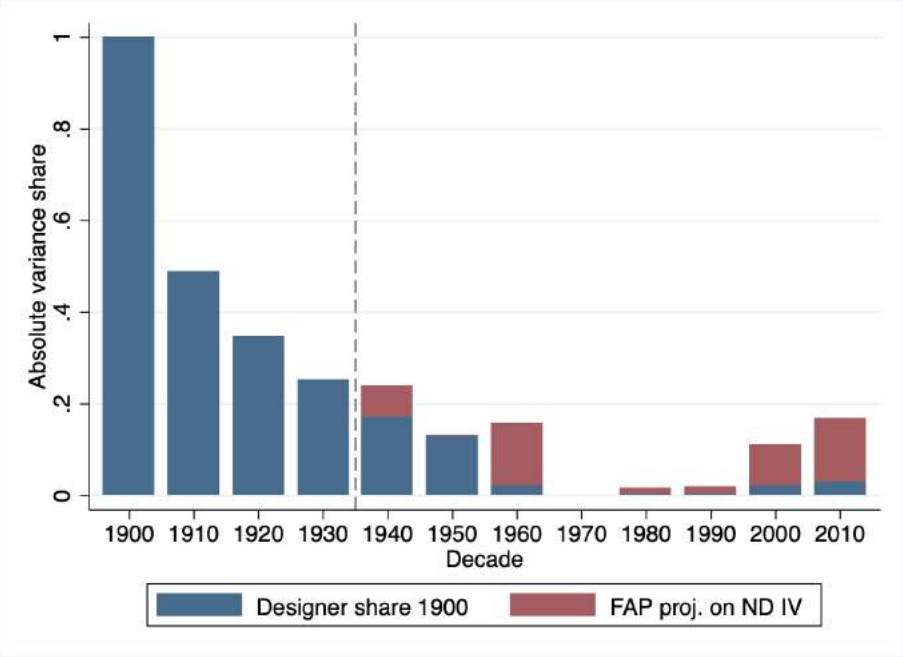
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 24: Variance decomposition: FAP versus 1900 artists

(a) Visual artists



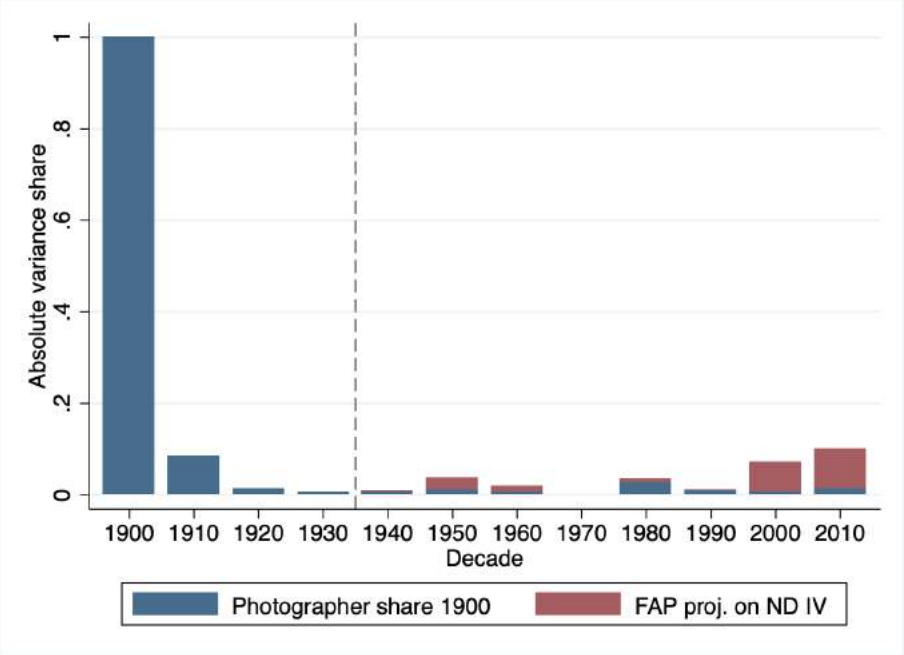
(b) Designers



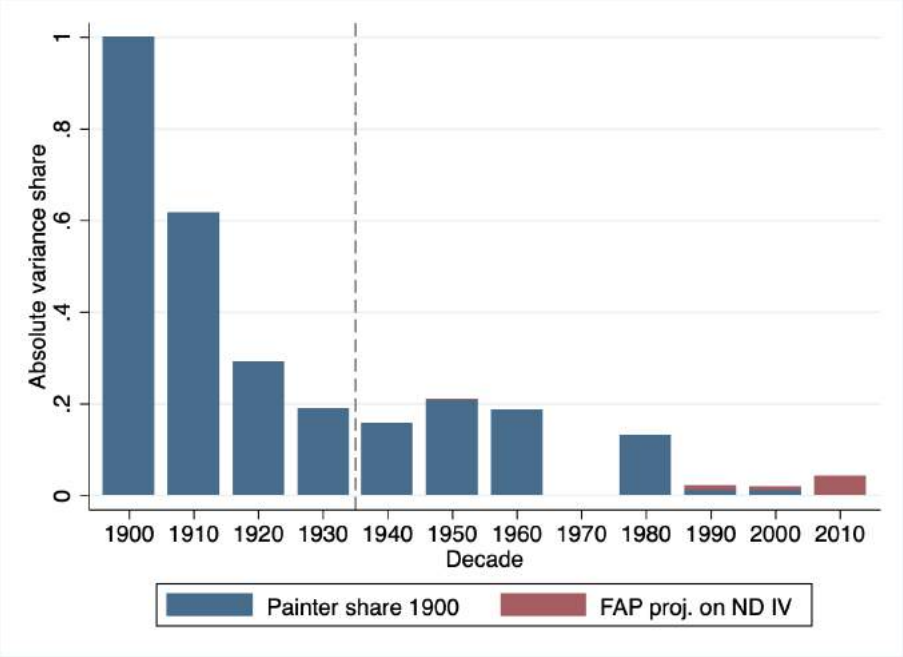
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 25: Variance decomposition: FAP versus 1900 artists

(a) Photographers



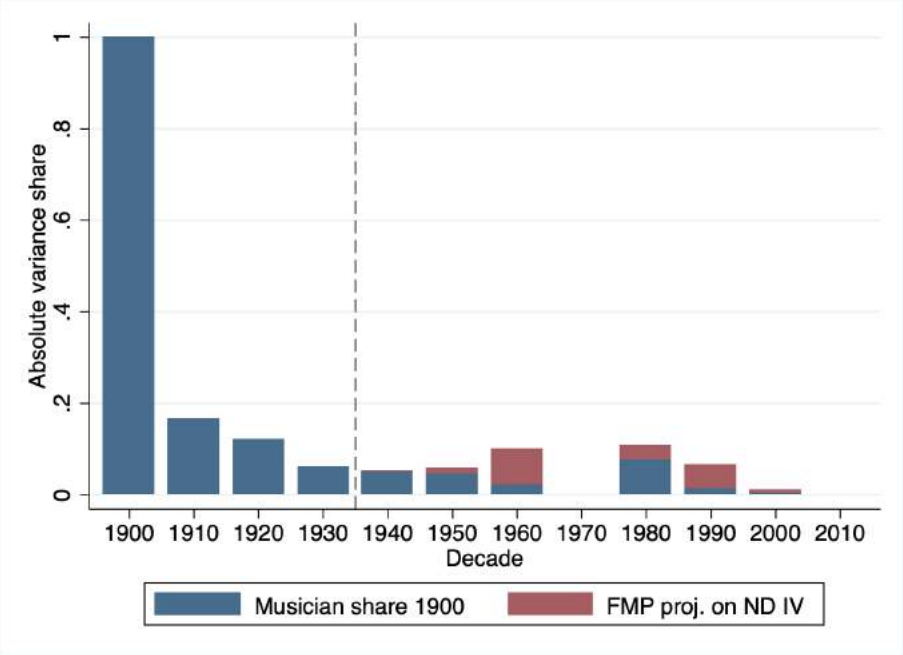
(b) Painters



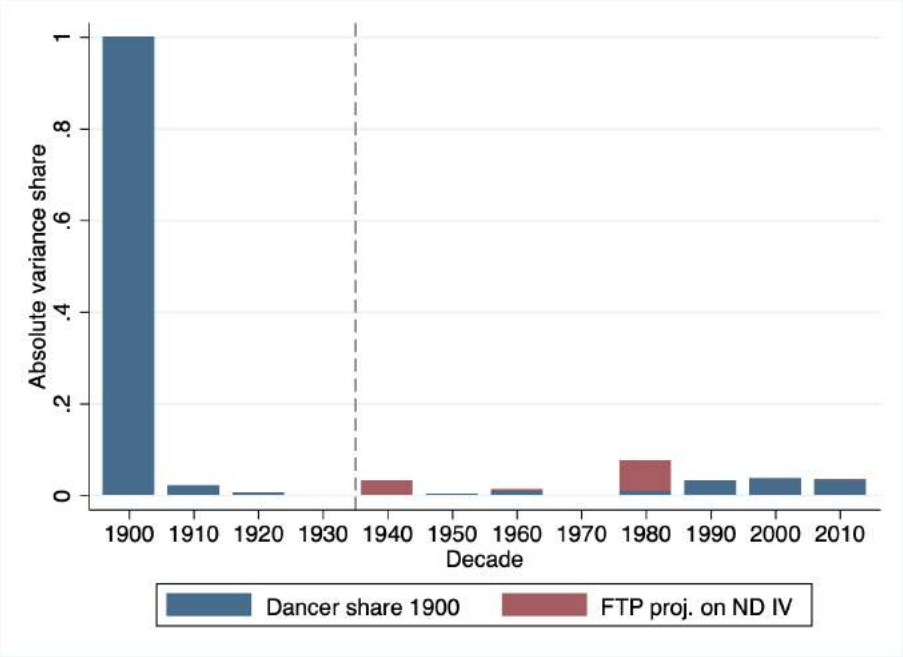
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNO}1_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 26: Variance decomposition: FMP and FTP versus 1900 artists

(a) Musicians



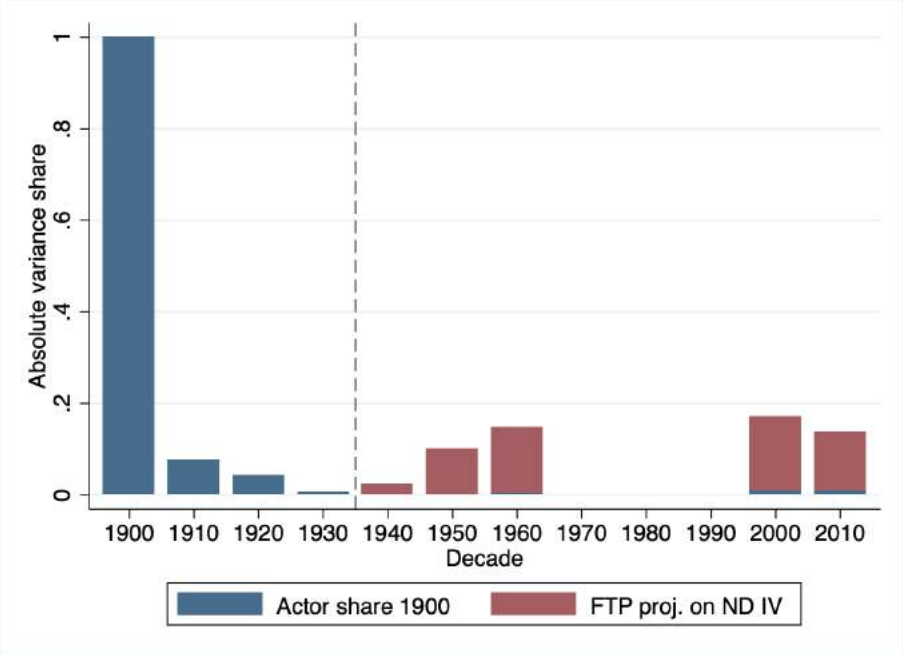
(b) Dancers



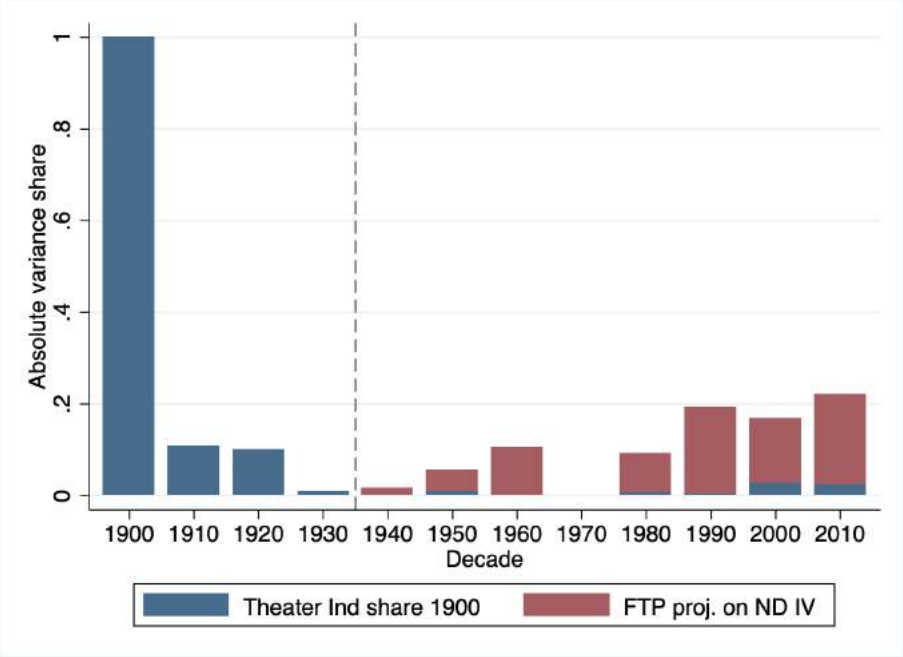
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 27: Variance decomposition: FTP versus 1900 artists

(a) Actors



(b) Theater and film industry workers



These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 and in 1980-1990 for actors due to lack of city-denominated data.

Analogously, I explore the share of *within*-city variation in artistic profession shares that can be explained by initial-levels of artistic profession shares versus the respective Federal One treatment. Here, I run similar set of cross-sectional regressions, however demeaning contemporaneous outcome variables with respect to each city's respective time-invariant average share of artistic professionals. These decompositions thus attribute intra-city variation over time in artistic professional shares to their initial levels and Federal One spending. I estimate equations of the form:

$$\tilde{y}^{i}_{i,l,t} = y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l};$$ [32]

figures 28-32 illustrate these within-city decompositions.[33] Note that in these designs in contrast to the previous baseline specification, by construction, initial levels do not perfectly predict 1900 city-level deviations from the time-invariant mean.

The central qualitative distinction between the baseline variance decompositions and the city-demeaned variance decompositions lies in the generally greater explanatory power of Federal One spending on the within-city variation in artistic professional shares. While still quantitatively small, the city-demeaned variance decompositions that between 5- and 10% of post-period intra-city variation can be explained by the exogenous component of Federal One treatment, with typically substantial shares enduring even until 2010 for theater, writing, and visual artists.

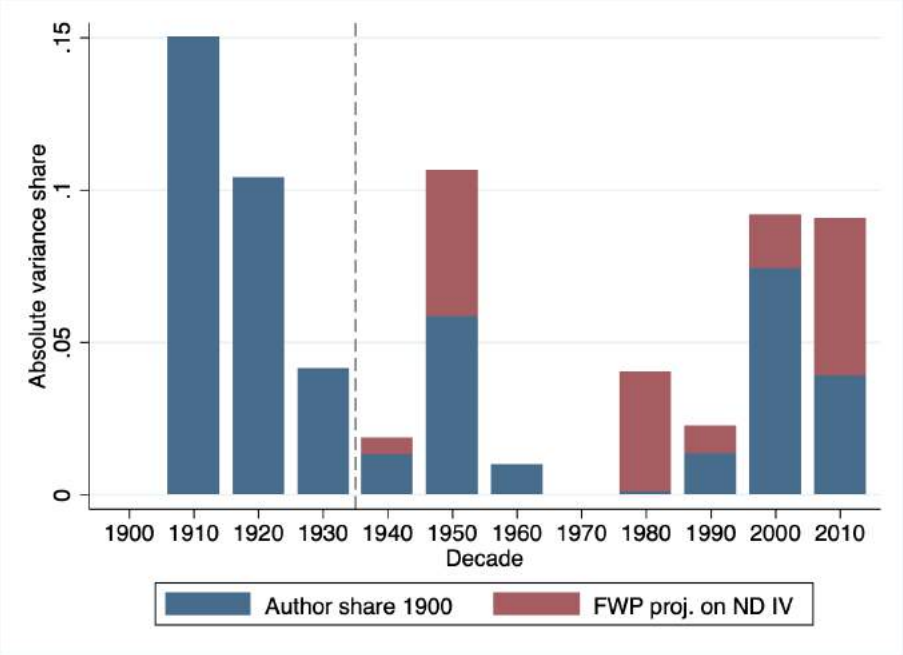
Overall, the results of the variance decomposition exercises illustrate modest, yet non-negligible explanatory power of Federal Project Number One in determining both cross- and within-city variation in the following decades—even to the present day.

[32] In this specification, the right-hand-side variables are *not* demeaned in order to preserve the intepretation of portion of within-city variation explained purely by the independent variables.

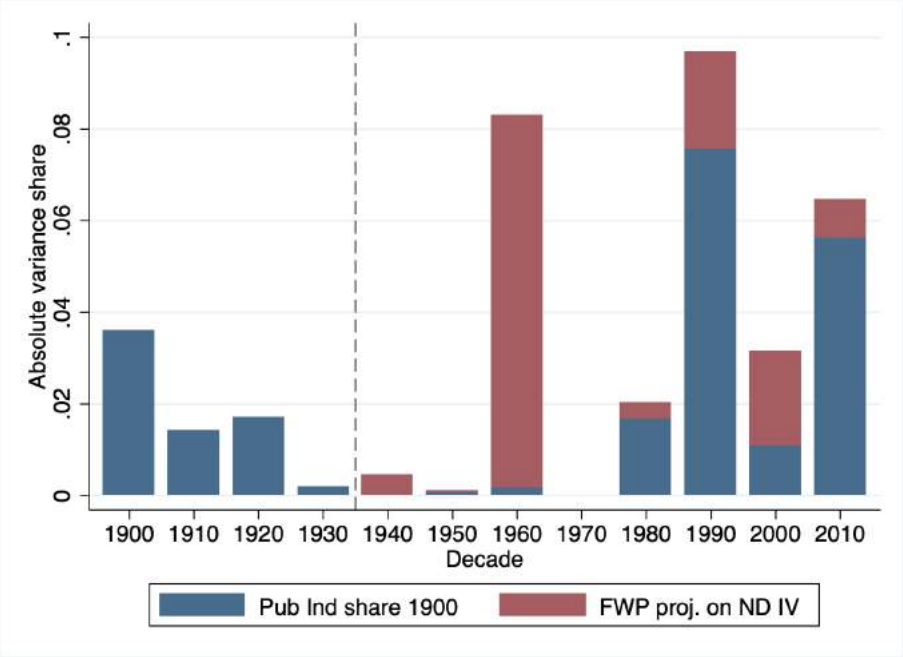
[33] Appendix figures A16-A19 display the results from analogous regressions that employ the exogenous component of log Federal One employment (of respective sub-program).

Figure 28: Variance decomposition (city-demeaned): FWP versus 1900 artists

(a) Authors



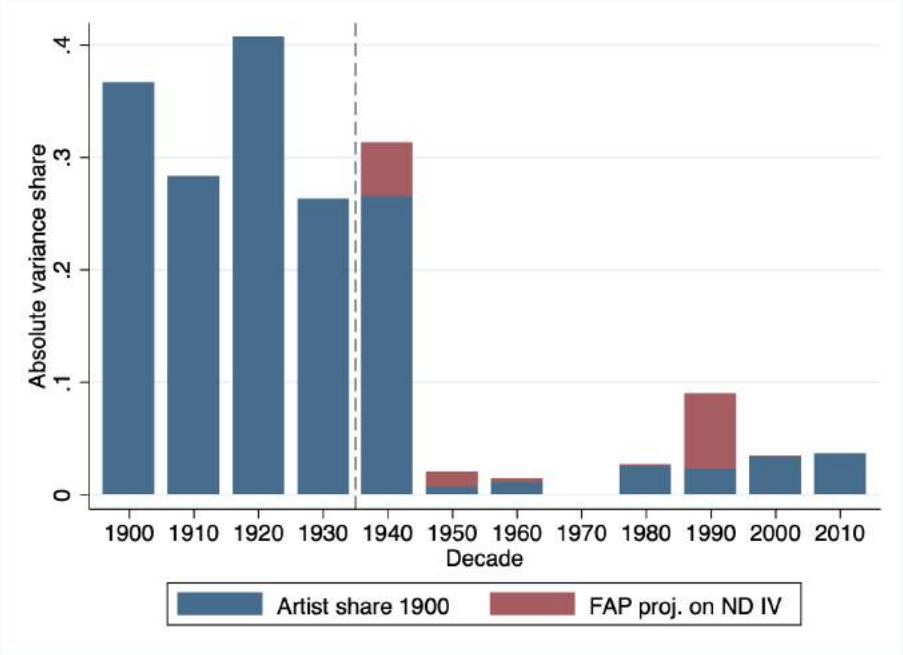
(b) Publishing industry workers



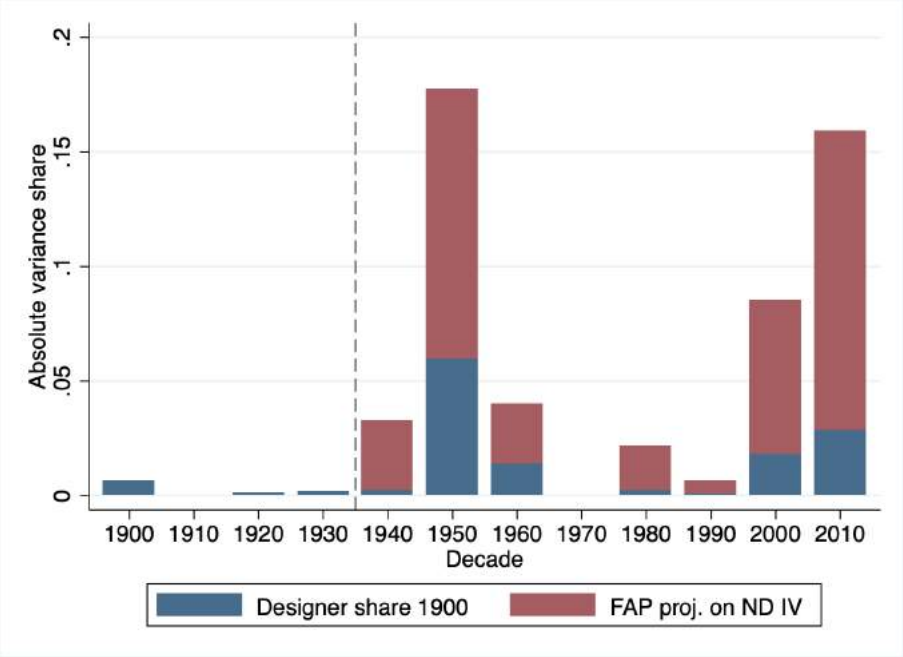
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNO1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 29: Variance decomposition (city-demeaned): FAP versus 1900 artists

(a) Visual artists



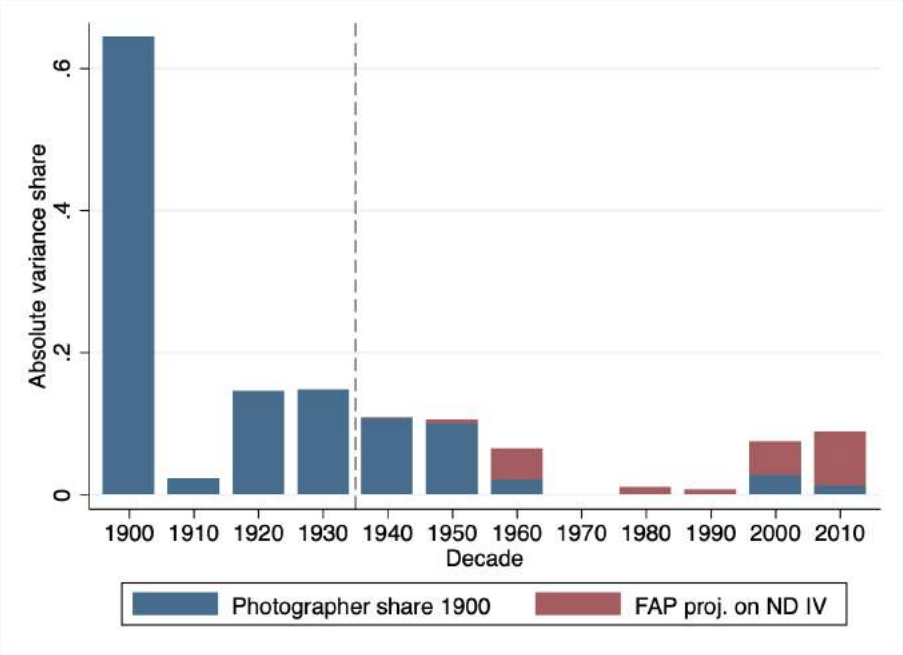
(b) Designers



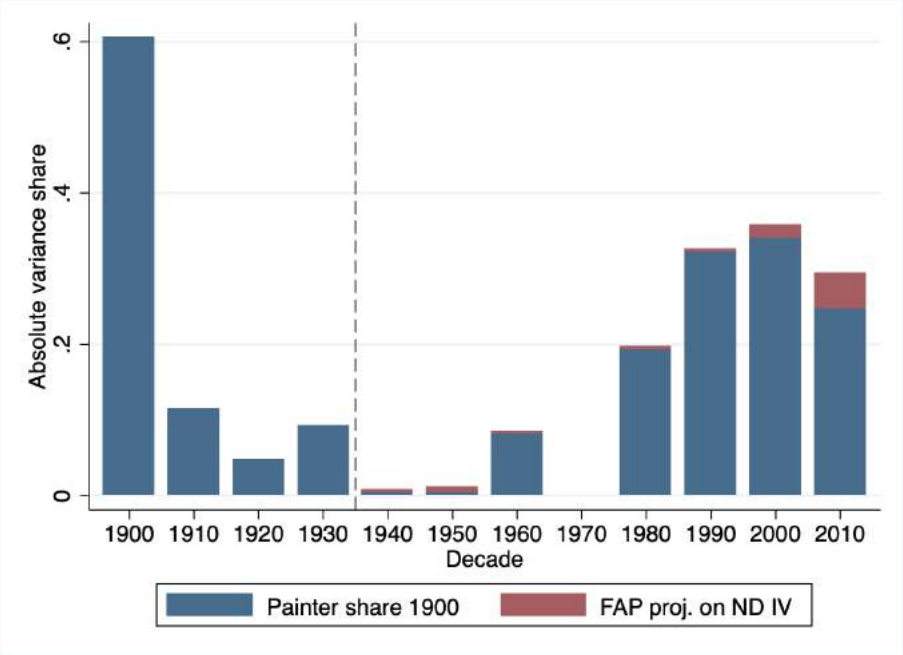
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 30: Variance decomposition (city-demeaned): FAP versus 1900 artists

(a) Photographers



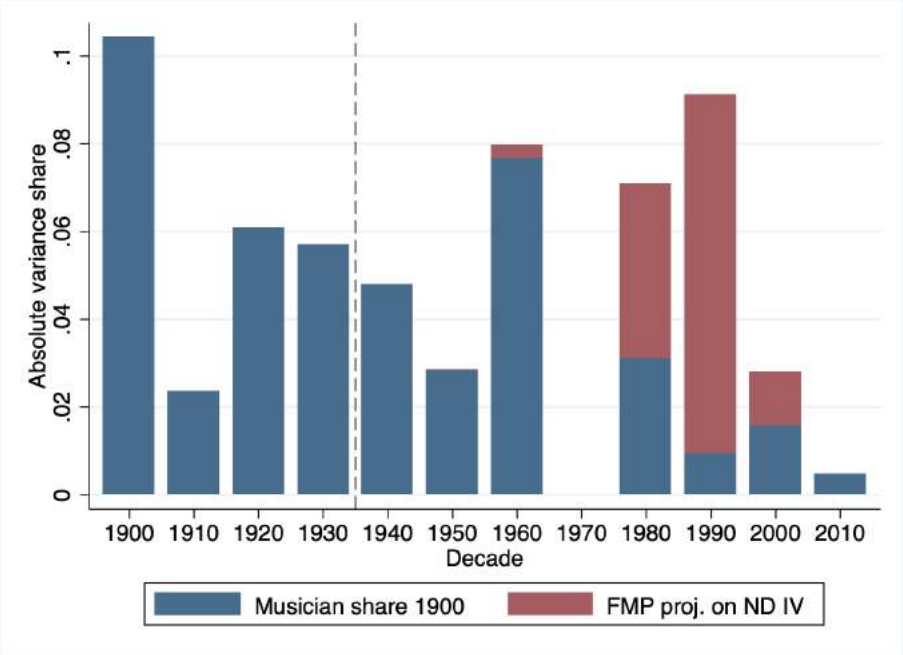
(b) Painters



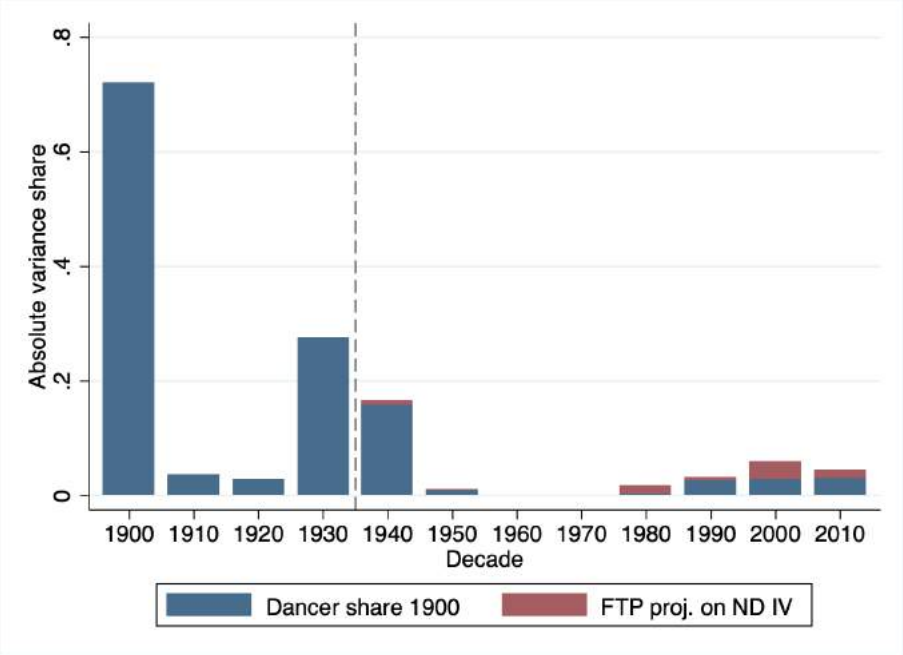
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 31: Variance decomposition (city-demeaned): FMP and FTP versus 1900 artists

(a) Musicians



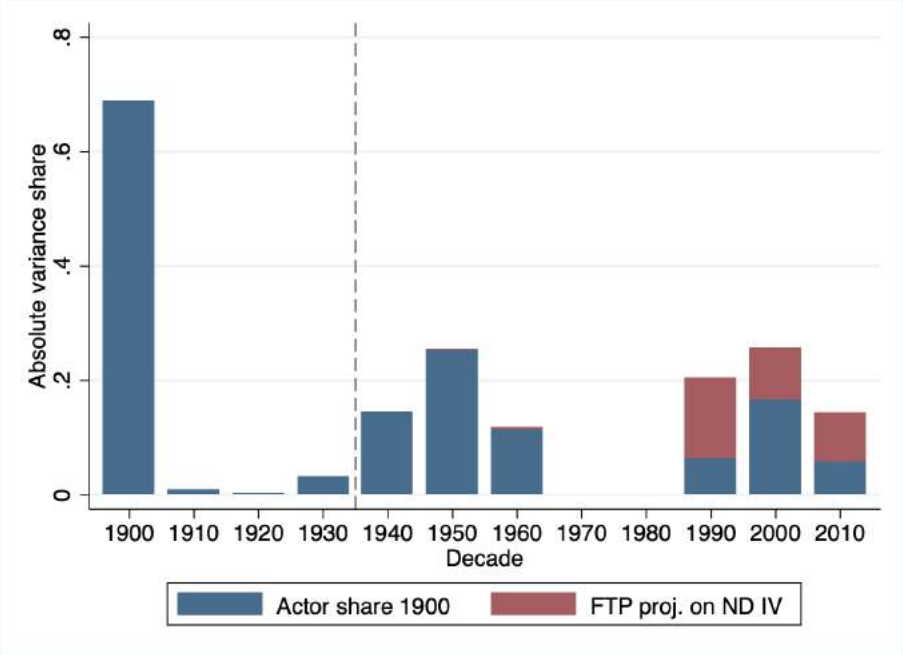
(b) Dancers



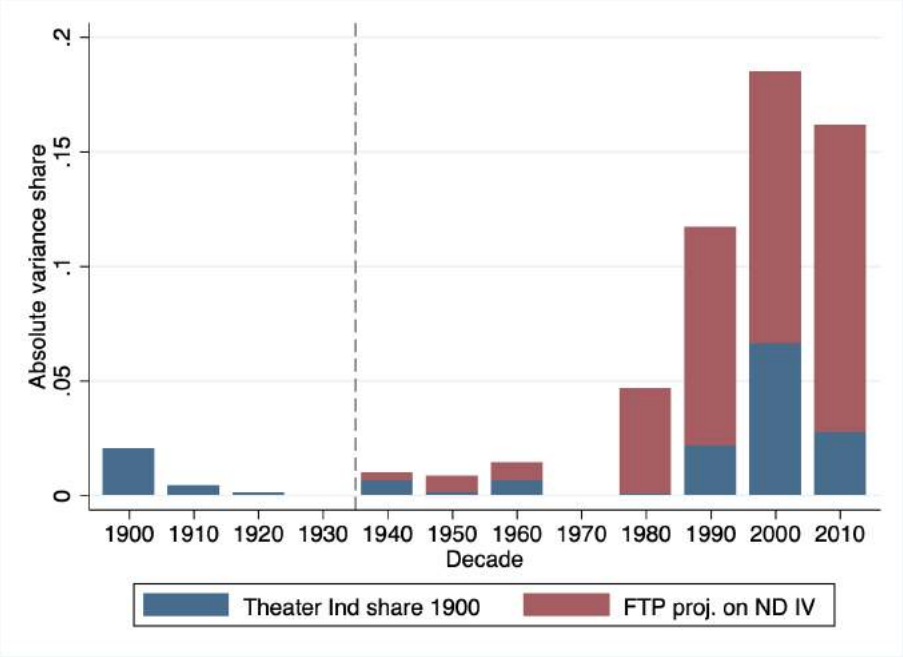
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure 32: Variance decomposition (city-demeaned): FTP versus 1900 artists

(a) Actors



(b) Theater and film industry workers



These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. The decomposition is absent for 1970 and in 1980-1990 for actors due to lack of city-denominated data.

7 Model and theoretical foundation

To illustrate the theoretical mechanisms underpinning the long-run responsiveness of the arts to unsustained bursts of funding, such as in the New Deal setting, I develop a simple model of supply and demand for artistic services that incorporates agglomerative gains to supply. The model encompasses a coordination problem where atomistic producers take agglomeration benefits exogenously. In the aggregate, the agglomeration benefits from the aggregate activity of atomisticly-behaving self-employed artists induce non-monotonicities in the aggregate supply curve and possibly generate multiple equilibria. In this case, at the lowest level of equilibrium production, the market can accommodate higher-equilibrium values of production, but individual producers cannot unilaterally deviate. A central planner can induce permanent movement to a greater Nash equilibrium level of production through setting aggregate production in excess of an unstable equilibrium for a single period, e.g. through an unsustained shock to supply.

The results of this model can be understood similarly to other big push models (e.g. Murphy, Shleifer, and Vishny (1989), Matsuyama (1992)) however in a partial equilibrium setting with some other additional departures. The model here relies on additively separable costs to producers that benefit from agglomeration monotonically, but where those benefits are relatively stronger at lower levels of productions and are asymptotically overtaken by standard convexly increasing cost specifications. Rodrik (1996) and Rodríguez-Clare (1996) both develop similar environments that result in a coordination problem; however, their source of agglomeration originates from benefits of increased production of intermediate goods. Allen and Donaldson (2020) develop a model environment of spatial path dependence through a temporal dependence structure of previous period labor and amenities provision. Other models of path dependence and agglomeration typically specify production benefits as operating multiplicatively, e.g. as some $Y = g(a)f(x)$;[34]. However, such models do not feature any independence of agglomeration benefits from total production costs, which results in agglomeration benefits operating through supply curve shifts, as opposed to the non-monotonicities

[34]See Duranton and Puga (2004) for an overview of other microfoundations of emergent agglomeration economies and spatial agglomeration.

that characterize aggregate supply in my environment.

Individuals artists produce arts and cultural goods/services atomistically, indexed on a set of measure one. They enter and exit the market at zero cost and share identical production technology. Their production costs are characterized by the difference of two additively separable pieces: $C(q_i) = f(q_i) - g(q_i, Q)$.

First, a function $f(q_i)$ exhibits standard cost characteristics: i.e. $f'(q_i) > 0$ and $f''(q_i) > 0$, with some possible fixed cost $f(0) > 0$.

The second piece reflects agglomeration benefits, here reflected as decreases in costs that depend on the overall activity of other producers. The agglomerative component is defined on the same domain as the standard productino component f. Individual production aggregates up linearly, i.e. that

$$Q = \int_0^1 q_i di$$

Let $g(q_i, Q)$ be multiplicatively separable in q_i and Q, $g(q_i, Q) = a(q_i)b(Q)$ and linear in q_i: $g(q_i) = \gamma q_i b(Q), \gamma > 0$.

Because all artists produce atomistically, constituting a set with measure zero within the distribution of all producers, they observe aggregate production exogenously.[35]. Importantly, these benefits are eventually dominated by individual variable costs encompassed by $f(q_i)$ asymptotically, but bring monotonic decreases to costs. Namely, $g(q_i, Q)Q > 0$ and has second derivative such that $\lim_{q\to\infty} f(q_i) - g(q_i, Q) = \infty$; agglomeration benefits can only increase at a rate slower than individual variable costs in individual provision.

Individual producers are price takers, where prices are set according to aggregate production, as scaled up linearly from individual producers, and aggregate demand:

$$P = f'(Q) - g(Q, Q)Q = f'(Q) - G'(Q).$$

[35]In the finite setting with $N \in \mathcal{L}$ producers, we can define Q_{-i} as $\sum_{j\neq i} q_j$

Similar to as on the individual level, aggregating of agglomeration benefits may induce non-monotonicities in the inverse supply curve.[36] For instance, assume functional forms such that $f(Q) - g'(Q, Q) = 0$ for at least three distinct $Q \in \{Q_1, Q_2, Q_3\} \subset R_+$. For a continuous function $G(\cdot)$, it is necessarily the case that for at least one of these points, say Q_1, that $G''(Q_1) > 0$ and for at least one other, say Q_2, that $G''(Q_2) < 0$. I.e. The aggregate inverse supply curve features at least one local minimum and local maximum before diverging to infinity.

This specification of supply illustrates the how the competitive forces of standard production costs and agglomerative benefits vary at different scales of production. At low levels of aggregate production the agglomeration benefits are low and standard production costs dominate, but the cost benefits of agglomeration increase quickly enough to induce net decreases in marginal costs. However, the cost benefits of agglomeration are eventually drowned out by the convexly increasing production costs at large enough scale.

Assuming isoleastic demand, in general, there will exist at least one equilibrium where aggregate supply and demand intersect. However, the special case may exist where the demand curve and supply curve intersect at multiple equilibria. Namely, given a monotonically decreasing aggregate demand curve, there can exist at most $N + 1$ distinct equilibria for N unique extrema, with up to $2K - 1$ possible equilibria, where $K \in \mathcal{N}$ and $K <= N/2 + 1$ (except for tangent intersections).

Figure 33 illustrates such case characterized by three unique equilibria: At each of these points, because individual firms are price takers, they see no benefit by deviating from an equilibrium provision due to increases in their own costs at no change in price. For instance, see that at an aggregate equilibrium value (Q_1^*, P_1^*), individuals symmetrically produce q_1^*. Because $Q_1^* = \int_0^1 q_1^* d1$, we can see that

$$P_1^* q_1^* - f(q_1^*) + \gamma q_1^* g(Q_1^*) = 0,$$

[36]The microfoundations of aggregate supply, here, depend on the linear aggregation of agglomeration benefits in individual production.

and that unilaterally switching to a higher level of production results in no additional profit, due to increases in $f(\cdot)$ at no cost benefit through agglomeration.

This model framework allows us to study how equilibrium provision evolves in response to a large, unsustained shocks. From this figure, we can observe that only two of the equilibria are stable, due to the zero profit conditions. In particular, shocks located at a point of disequilibrium will see subsequent movement toward one of the stable equilibria as producers either enter or exit the market in response to the relationship between demand-determined prices and production costs.

7.1 Consistence of the model foundation and empirical results

The framework illustrates that there are three shock parameters that matter for determining the long run implications of an unsustained positive shock to supply: the magnitude of the shock, the location of the initial equilibrium, and the location of the unstable equilibrium. In order for a shock (in either direction) to induce a permanent change in equilibrium provision, the shock must cause movement past the unstable equilibrium or move from the unstable equilibrium itself (itself, a knife-edge condition). Shocks that do not cause net movement from the initial equilibrium past the unstable equilibrium result in a post-shock reversion back to the initial equilibrium.

Exploring the following shocks, assume only positive movements to some $\tilde{Q} > Q_0^*$, the initial equilibrium value.

For example, in Figure 34, government spending moves provision to some $\tilde{Q}$ between A_1^* and A^*2. At this point, production cost in excess of willingness to pay induces producer exit through negative profits, and thus a reduction in supply back toward initial equilibrium A_1^*.[37]

In the second case, government spending locates short-run supply at some $\tilde{Q}$ less than A_3^* and greater than A_2^*. At this point, demand dominates supply, and producers earn positive

[37] Alternatively, a case with a unique equilibrium also fails to generate movement to a new equilibrium.

profits, inducing firm entry that increases production to close profits to zero toward higher equilibrium value A_3^*.

In the last case, depicted in figure 36, government spending generates a supply to the right of A_3^*. Similarly to as in the first case, cost in excess of demand produces negative profits and induces firm exit. This causes a reduction in quantity provided toward the highest equilibrium value A_3^*. Note that this case makes no assumption as to the initial equilibrium.

With this special case generalizes to cases with an even greater number of equilibria, it illustrates the mechanisms that explain the empirical results. Artistic goods and services are characterized by agglomeration economies that introduce non-monotonicities into the supply curve. Under certain conditions, demand and supple can intersect at multiple equilibria. This setup can give rise to a coordination problem where all producers can cooperatively increase supply and move to a higher equilibrium, but cannot individually deviate themselves.

In this case, a central planner can possibly coordinate movement to a higher equilibrium by inducing a large enough shock in order to adjust individual cost perception due to agglomeration benefits. The empirical results reflect the different possible outcomes; both large increases in artist shares in 1940 that were sustained into a permanently higher equilibrium into the long-run as well as large short run shocks that attenuated either in the decade immediately after or gradually in the subsequent decades.

Do these scenarios rationalize the empirical results? Table 6 illustrates that in relative terms the writers and theater projects saw the largest Federal One shocks in terms of New Deal employment relative to pre-existing artist population (over 150%). In contrast, musicians and artists saw only modest increases relative to their pre-existing populations (under 30%).

The model generally supports the empirical findings. Writers and publishing industry workers simultaneously saw both a large funding shock and a short-run increase in employment

shares that persisted into the long-run. This result would suggest that the New Deal shock located the field near its higher-equilibrium.[38]

Theater and film industry workers demonstrated a small short-run increase that continued to gradually increase throughout the 20th century. This response suggests that the New Deal shock induced production to a point in between a pair of unstable and higher stable equilibria to the left and right respectively. It is worth noting that neither actors nor TV/radio industry workers demonstrated any such response. However, both of these fields also do not demonstrate any short-run causal response either, suggesting that other factors prevented the Federal Theater Project from significantly affecting these fields.

Both visual artistic fields (visual artists, painters, and photographers) and musicians (including piano tuners) appear to have seen shocks that located them to the short of the "big-push" point, and therefore returned to their initial, lower equilibrium after the large initial shock to activity. This also appears to be the case for dancers. However, designers saw a slight, permanent increase in employment share following the shock. However, this was not the case for designers (which are grouped together with visual arts as responding to Federal Art Project employment).

The model is grounded in the caveat that empirically the location of the unstable equilibrium, i.e. the tipping point, may vary substantially between fields. The difference in response between two fields that saw similar shocks—for example, designers and visual artists, where the former saw a permanent increase in employment share and the latter did not—can be attributed to differences in the field-specific unstable equilibrium point in a non-easily falsi-

[38]Writers actually appear to increase in share toward the end of the 20th century after some stability-post shock, and publishing industry workers demonstrate greater variation, if not decreasing slightly starting 1980.

fiable manner.[39]

Moreover, while the model can tractably rationalize the empirical results—the lack or presence of long-run persistence in a given artistic field—the model doesn't explain *why* such differences exist between fields. For instance, *why is the unstable equilibrium located farther away from the lower equilibrium in artistic fields than in writing-related fields?* (given that both fields saw large shocks). *Why might the scale shifter of aggregate demand be too high or too low so as to only generate a single equilibrium in a specific industry?*. Moreover, this model does not explain the reasoning behind the location of the initial equilibrium.

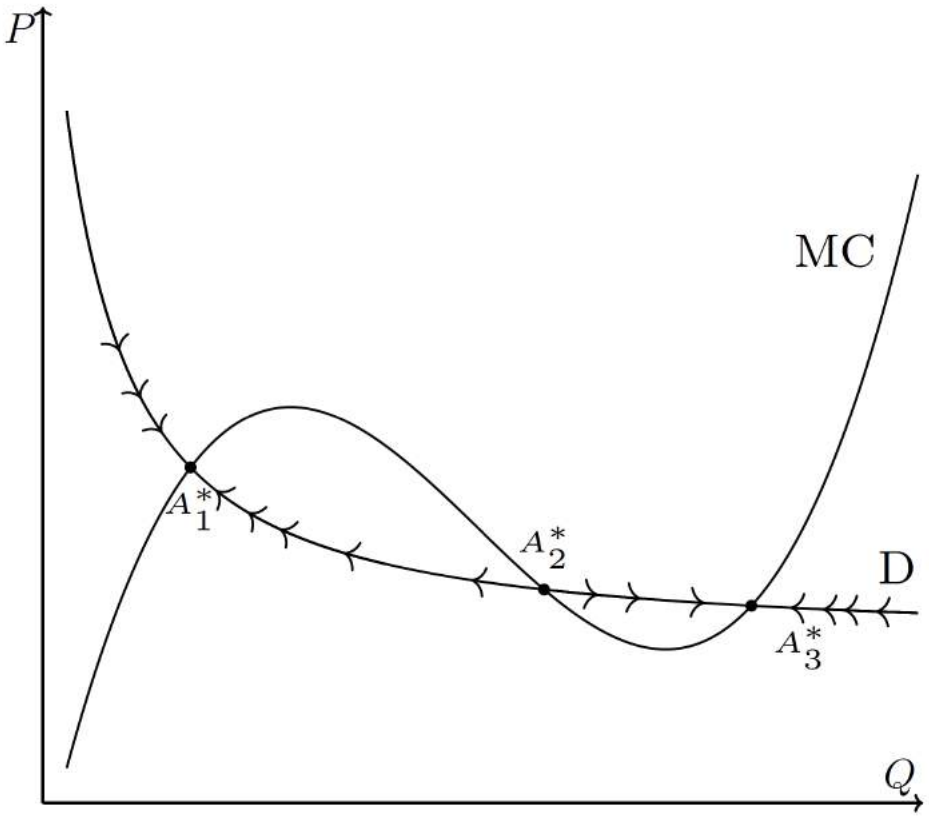
Importantly, there no factors that preclude this agglomerative non-monotonic supply framework from application to other industries in a partial equilibrium setting. For this reason, we can rationalize other industries that are not typically associated with agglomerative tendencies as characterized by too high or low value of a scale demand shifter (i.e. so that the aggregate supply and demand intersect at only a single point). This setting thus features some flexibility in allowing for more general non-monotonicites in supply without generating multiple equilibria due to the specific interaction of supply and demand.

As another caveat, other model environments may incorporate the benefits of agglomeration in different ways that lead to fundamentally different interpretation of how these effects operate. Here, I ascribe the benefits of agglomeration entirely to producers and as strictly pecuniary—in the form of lower costs of operation. This interpretation of agglomeration differs from others, such as in Moretti (2019) that describes non-pecuniary agglomerative benefits to scientists as manifesting the form of higher quality production or productivity shifters. An alternate design might specify artists that maximize utility functions that depend positively on the presence/activity of other artists.

[39]Alternatively, one could argue that Federal One treatment itself was allocated hetereogeneously by subfield within each project. For example, the model implications would align with a scenario where the Federal Art Project allocated more funds/employment to design-like activities than to painting (which is actually unlikely to be the case in reality). However, the granularity of the Federal One archival data does not permit decomposing city-program employment counts to sub-program activity in a comprehensive manner. The data *do* occasionally include such finer disaggregations, but this is not typical of the data.

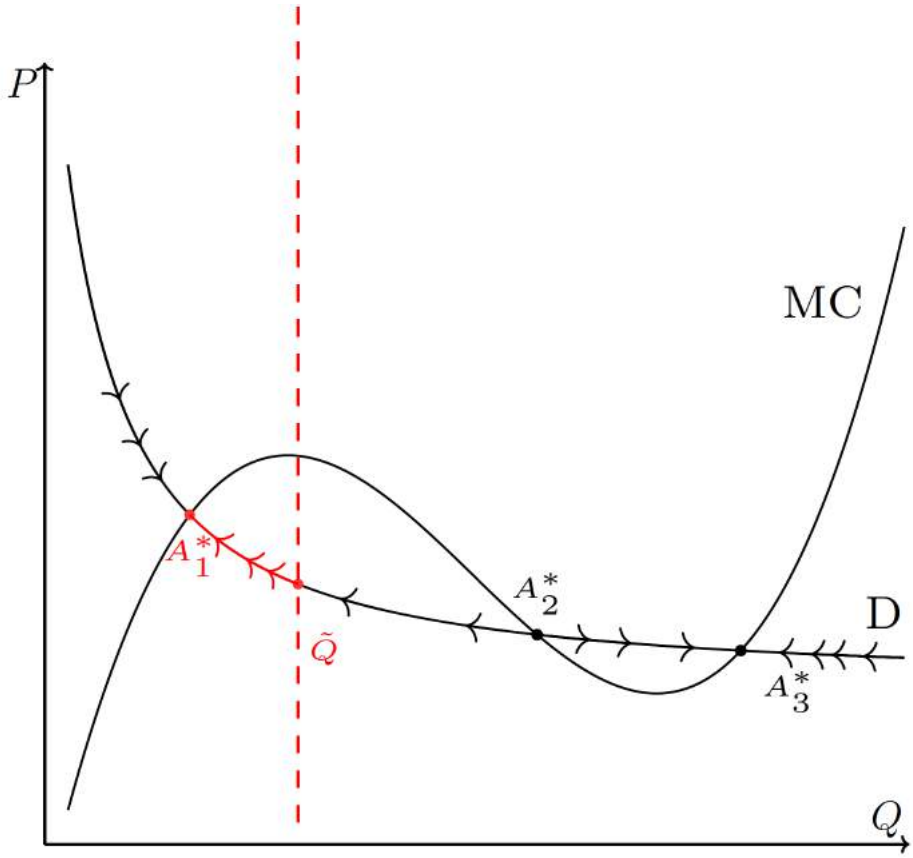
Lastly, the model here does not deeply engage with the possibility of demand-side agglomeration. It may be the case that future demand of artistic goods and services depends on present equilibrium provision. As an example, McCain (2006) describes a process of learning-by-consuming that informs future consumption of the arts. This kind of path-dependent demand framework sets up the scope for specifying demand-side agglomeration benefits. Murphy, Shleifer, and Vishny (1989) describe a simple model environment that combines demand and supply externalities where the positive profits of a single firm induces positive spillovers to other firms' demand and certain technologies exhibit increasing returns to scale; they show that this setup (combined with other conditions) can also generate a big push type industrial environment. The model in my work focuses entirely on supply-side agglomeration benefits, while demand-side agglomeration may result in a similar multiple equilibria framework through non-monotonicities—as operating through aggregate demand.

Figure 33: Special case of aggregate supply and demand



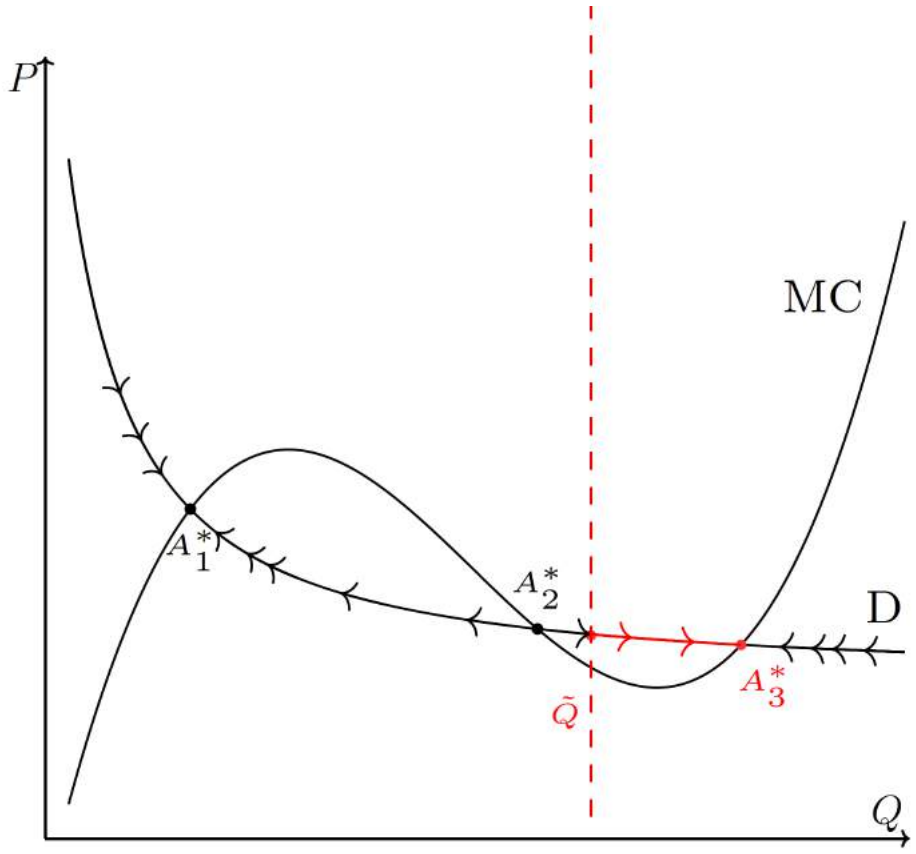
This figure depicts the three-equilibrium special case of isoelastic demand and non-monotonic aggregate supply due to agglomeration economies.

Figure 34: Government shock to supply, case 1



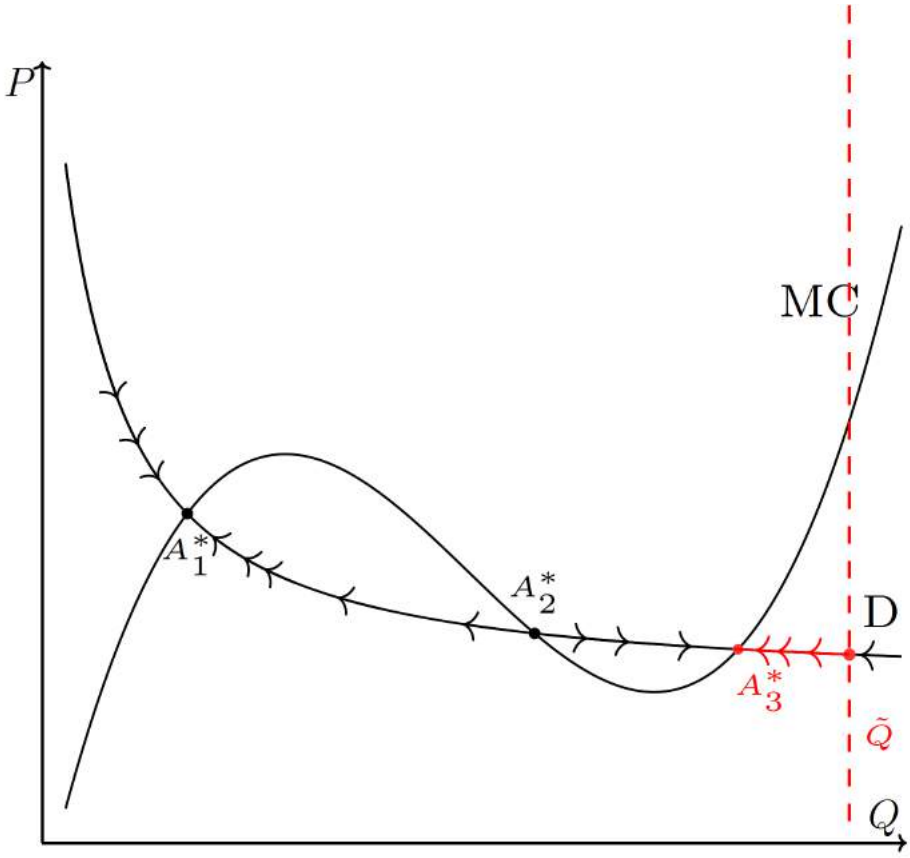
This figure illustrates the effect of a positive shock to supply that places short-run provision in disequilibrium less than unstable equilibrium provision. The figure depicts convergence back to the low equilibrium.

Figure 35: Special case of aggregate supply and demand



This figure illustrates the effect of a positive shock to supply that places short-run provision in disequilibrium slightly above the unstable equilibrium provision. The figure depicts the large initial shock followed by convergence increasing to a higher, stable equilibrium.

Figure 36: Special case of aggregate supply and demand



This figure illustrates the effect of a positive shock to supply that places short-run provision in disequilibrium slightly above the higher stable equilibrium provision. The figure depicts the large initial shock followed by convergence down to the higher, stable equilibrium.

8 Discussion and conclusion

This work has produced the first causal estimates of the impact of large-scale public arts investment on the growth of artistic professions over time. In doing so, I have also constructed the most comprehensive data on Federal Project Number One arts spending across localities. I document large impacts of historical New Deal funding to the arts through Federal Project Number One on the artist population shares of beneficiary cities, with the increases to the population shares several fields of art—typically several fold relative to their respective pre-period baselines—enduring to the present-day. Namely, I find the largest and most temporally persistent impacts of arts funding (within its respective fields) on authors, certain disciplines of visual arts (namely photographers and designers), and theater/film industry professionals. The results of these estimates imply potentially large returns over time of public arts spending in terms of fostering local arts scenes. The historical government spending to the arts through the New Deal evidently has influenced the present-day location of such cultural hotspots.

I also find positive, albeit slightly smaller impacts of arts spending on musicians, general visual arts, and dancers whose impacts do not endure into the long run. Finally, I produce evidence of either null or inconclusive growth of the shares of actors, TV/radio industry professionals, and painters in response to New Deal arts funding.

The subsequent variance decompositions demonstrate the explanatory power of this early New Deal funding in determining the variation in artistic professionals across and within cities in the following decades, and how Federal One's variance account compares to that of 1900 levels of each respective field of art. This horse race of history versus policy illustrates that overall, both components together only explain a small portion of total variance in artistic professionals across cities—typically less than 20% in a given decade. However, for many of the professions, namely those within the visual and theater-performing arts, Federal One sub-program activity proves more important in accounting for the variation in artistic profession shares than do the 1900-levels of each respective field. In the present day, historic

New Deal spending on the arts explains between 5- and 10% of variation across *and* cities, and upward of 15- and 20% for designers and theater/film industry workers.

Overall, these results suggest that the arts are highly agglomerative industries. However, the substantial variation in the magnitude and temporal persistence of results by field perhaps reflects different premiums and propensities toward spatial clustering and path-dependence over time—as evidenced by the large short-and long-run impacts of funding to writers on the share of authors versus the relatively smaller effect on musician shares that did not persist beyond a single decade. It may be the case that the differences in impacts and temporal persistence of these fields reflect differences in start-up costs (i.e. human capital requirements) to occupational participation and agglomerative propensities/benefits to clustering.

While these results indeed come with important implications for the positivistic impacts of arts funding on artists and their host cities, they come with several caveats. Namely, this work has not engaged with the normative implications of funding the arts or developing local arts scenes. To the extent that the elicited response to arts funding comes from occupational sorting, there are ambiguous welfare implications with respect to the social desirability of inducing individuals to sort between different career paths. For instance, individuals with high earning parents more frequently sort into lower-earning occupations such as the arts (Boar and Lashkari (2021)); public arts programming similar to Federal One may induce counterfactually high-earners into low-earning artistic occupations. Finally, drastic changes in the arts funding and policy environment since the New Deal—namely through the rise of public school arts education, federal arts programming through the National Endowment for the Arts, and private philanthropy—potentially complicate the external validity of these results.

In terms of broader implications, this work informs the the discussion surrounding public funding to the arts by providing large, positive, and temporally persistent causal estimates of the impacts of public arts programming on local arts scenes as measured by local labor market concentration of artistic professionals. To this end, this conclusion combined with the

results from works studying the relationship between urban growth and amenities suggests the potential presence of lasting, positive spillovers to other urban outcomes from extending funding to the arts. Ultimately, the work here substantiates a policy lever through which governments (and non-government actors) can seek to influence this process. Evidently, governments can influence and have influenced the locations of cultural hotspots, even into the long-run.

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Appendix A: Additional graphs, images and tables

Figure A1: FPNo1 total employment, thousands per month (excl. HRS)

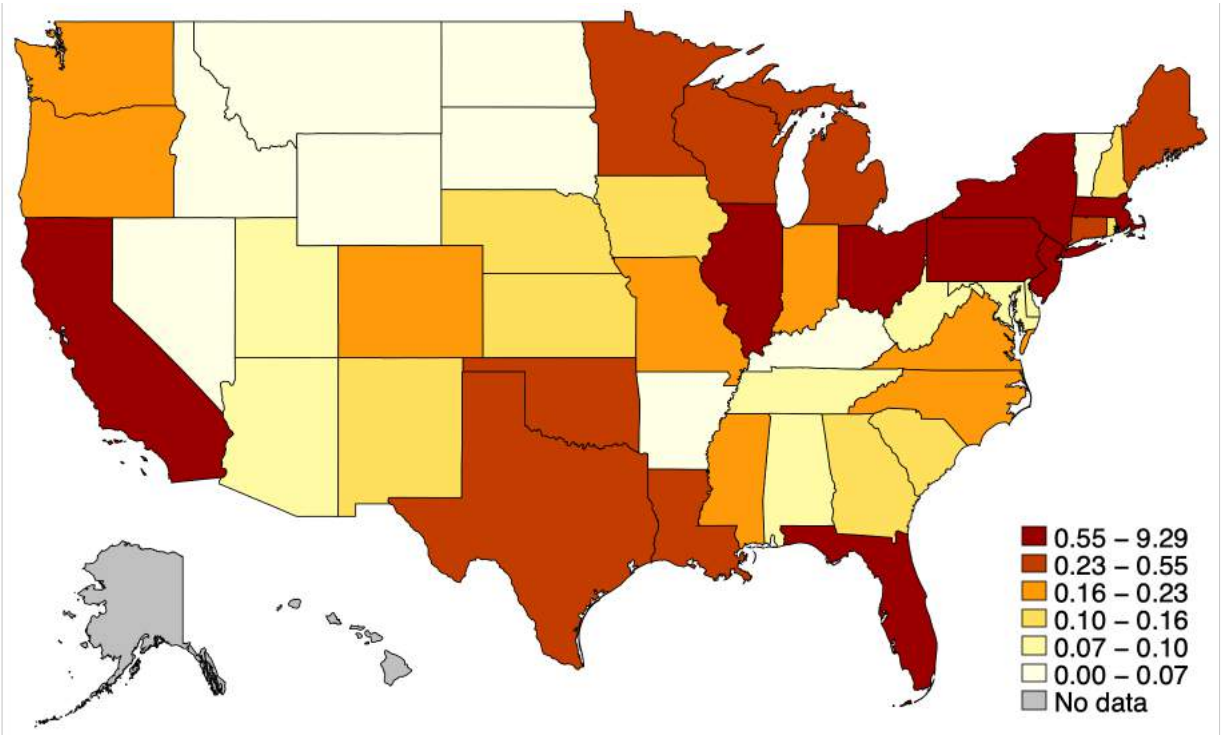


Figure A2: FPNo1 total employment per 100000 people per month (excl. HRS)

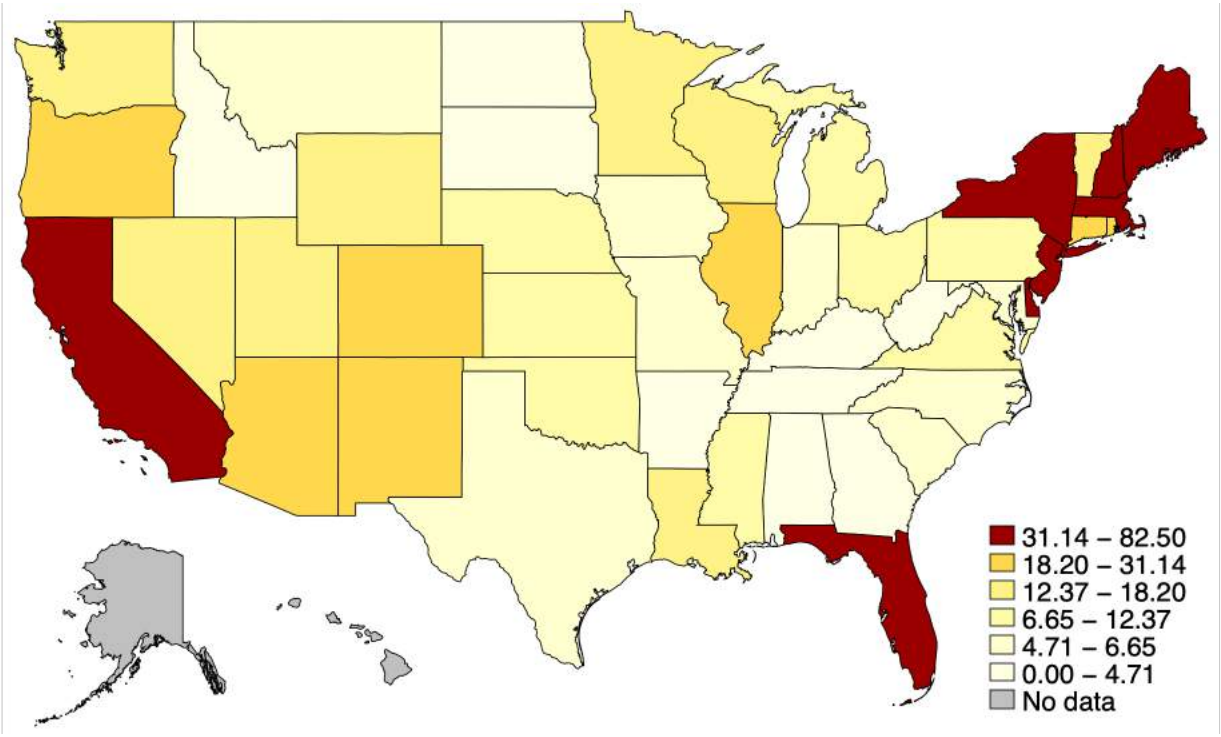


Figure A3: FPNo1 total expense, millions 2020 USD (excl. HRS)

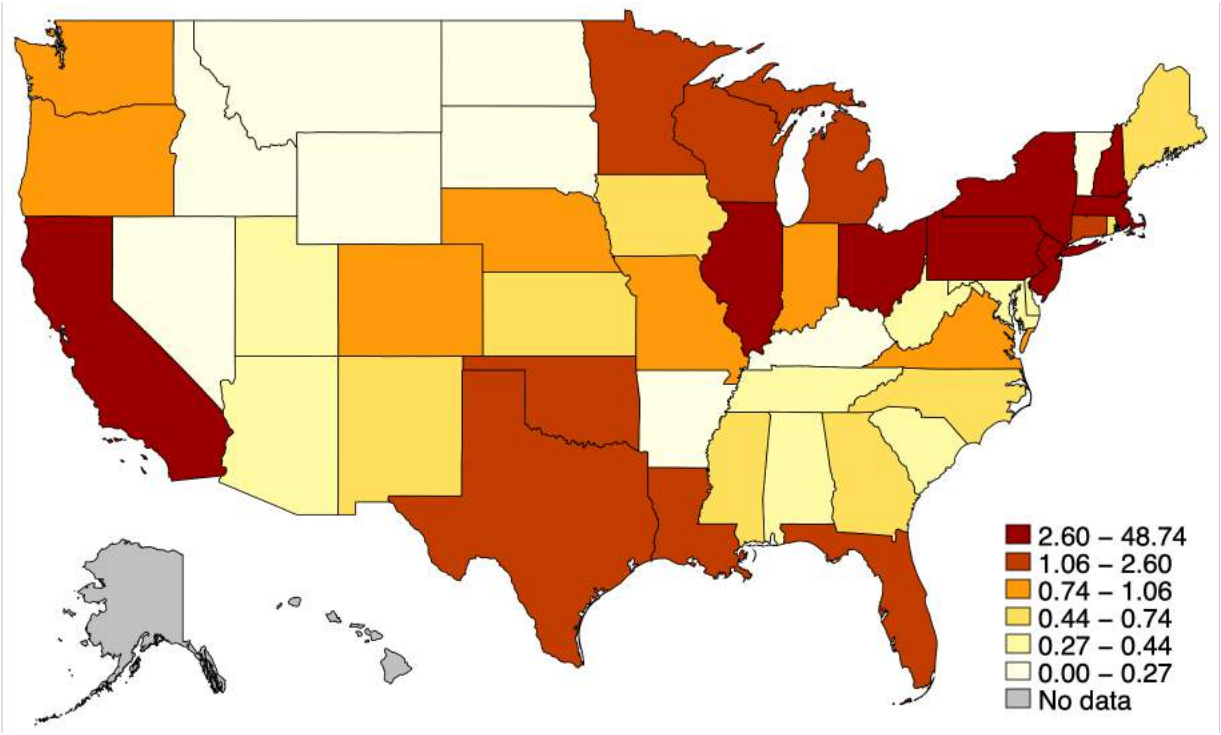


Figure A4: FPNo1 total per capita expense (excl. HRS)

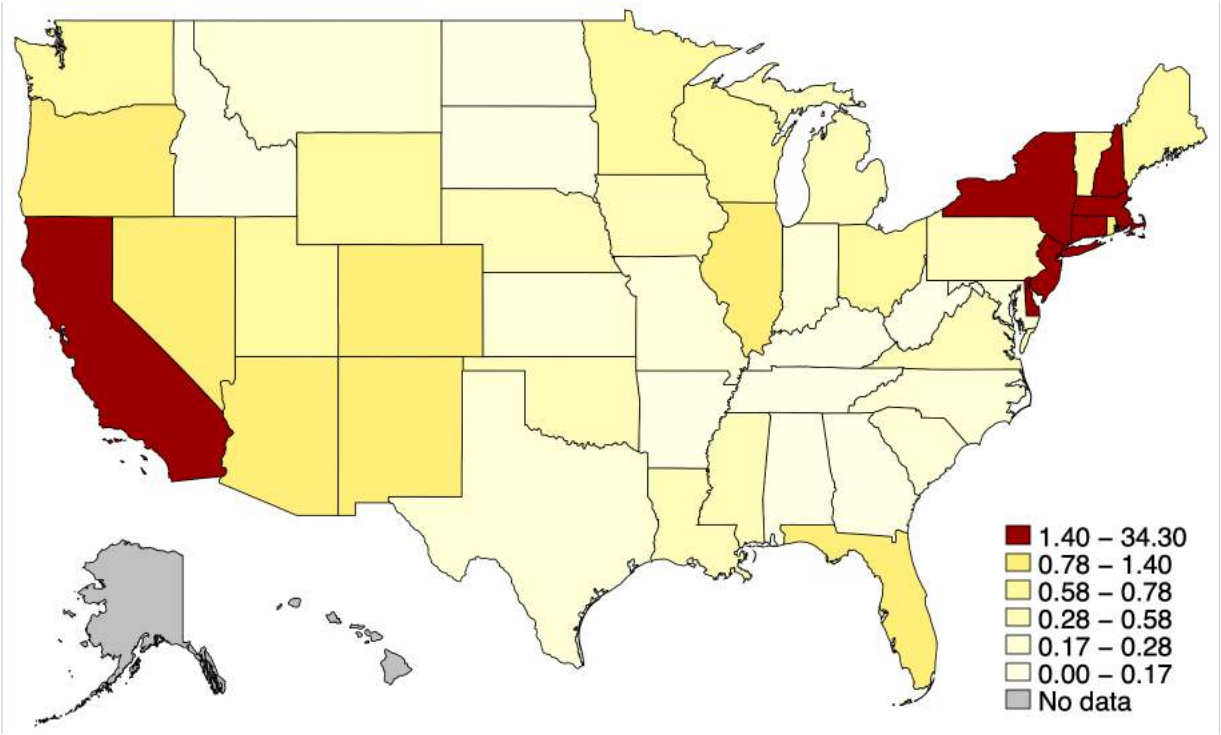
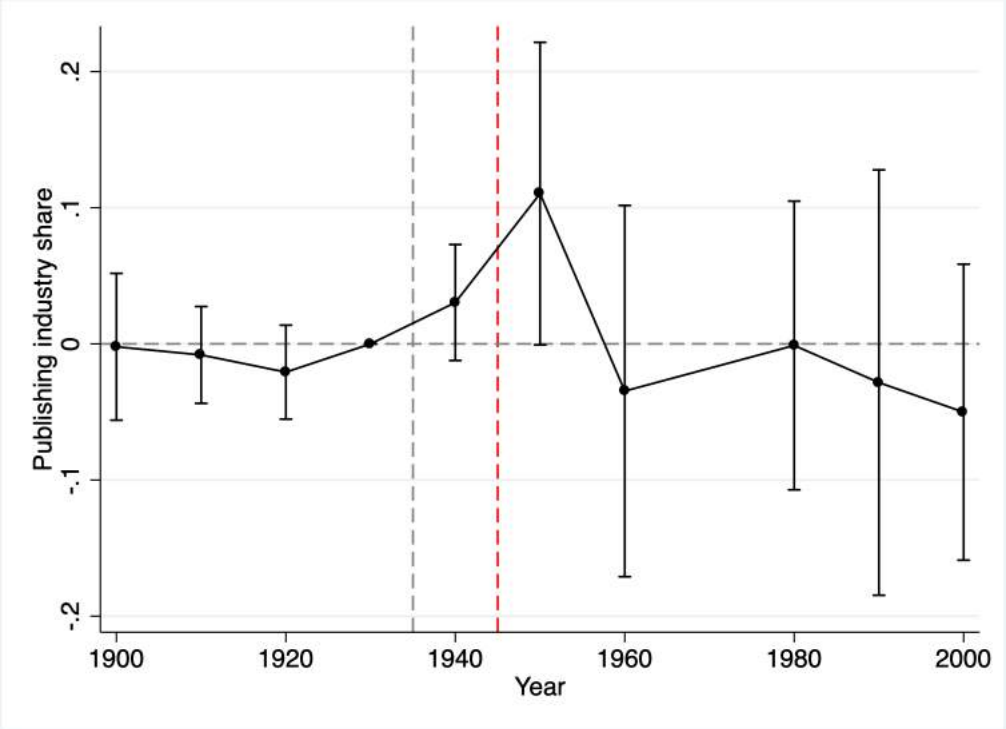
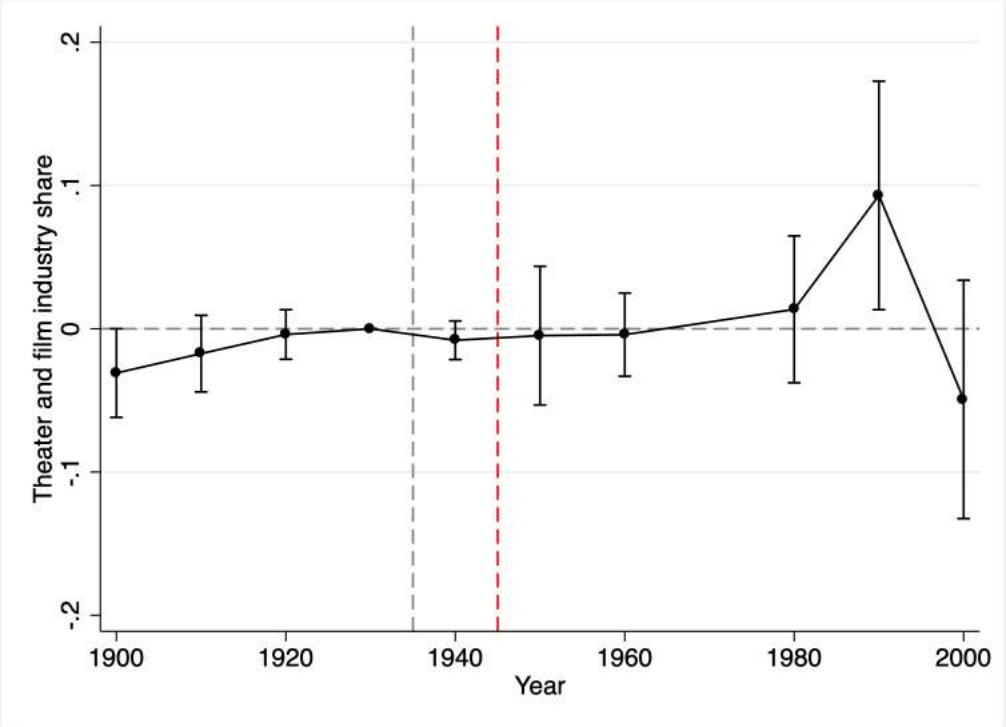


Figure A5: OLS results: City publishing industry worker share on Federal Writer's Project (binary)



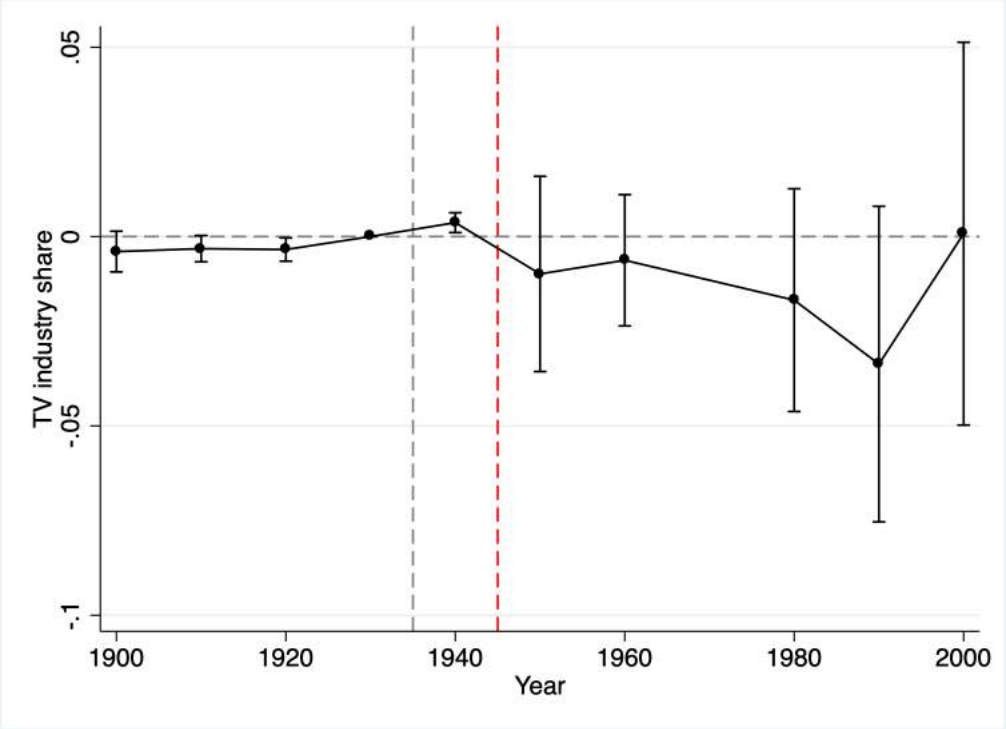
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local publishing industry worker population share (per IND1950) on a binary indicator for Federal Writer's Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local publishing industry worker shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure A6: OLS results: City theater and film ind. worker share on FTP (binary)



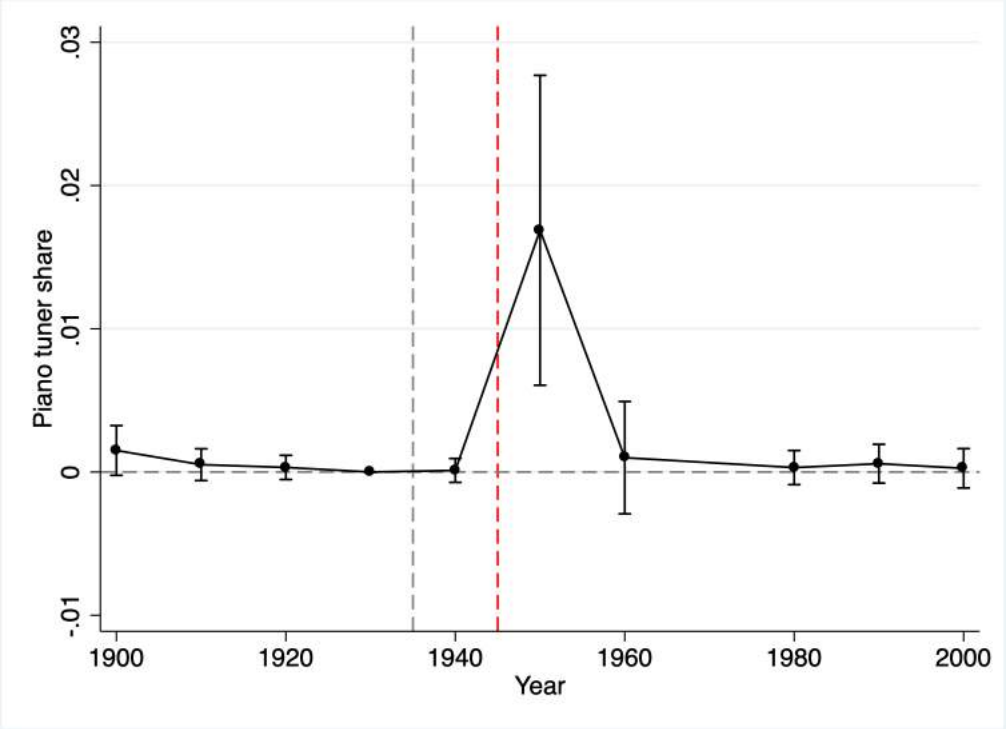
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local theater and film industry worker population share (per IND1950) on a binary indicator for Federal Theater Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local theater and film industry worker shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure A7: OLS results: City TV and radio ind. worker share on FTP (binary)



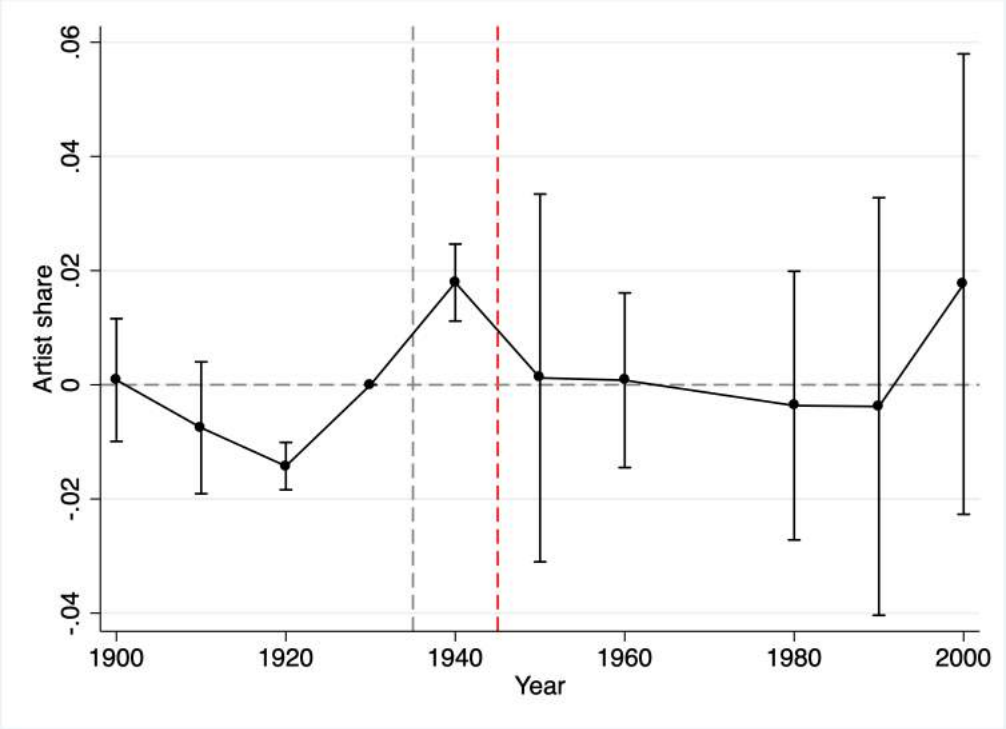
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local actor population share (per IND1950) on a binary indicator for Federal Theater Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing TV and radio industry worker population shares (in 1930) and leading decadal growth trends in local actor shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure A8: OLS results: City piano tuner share on Federal Music Project (binary)



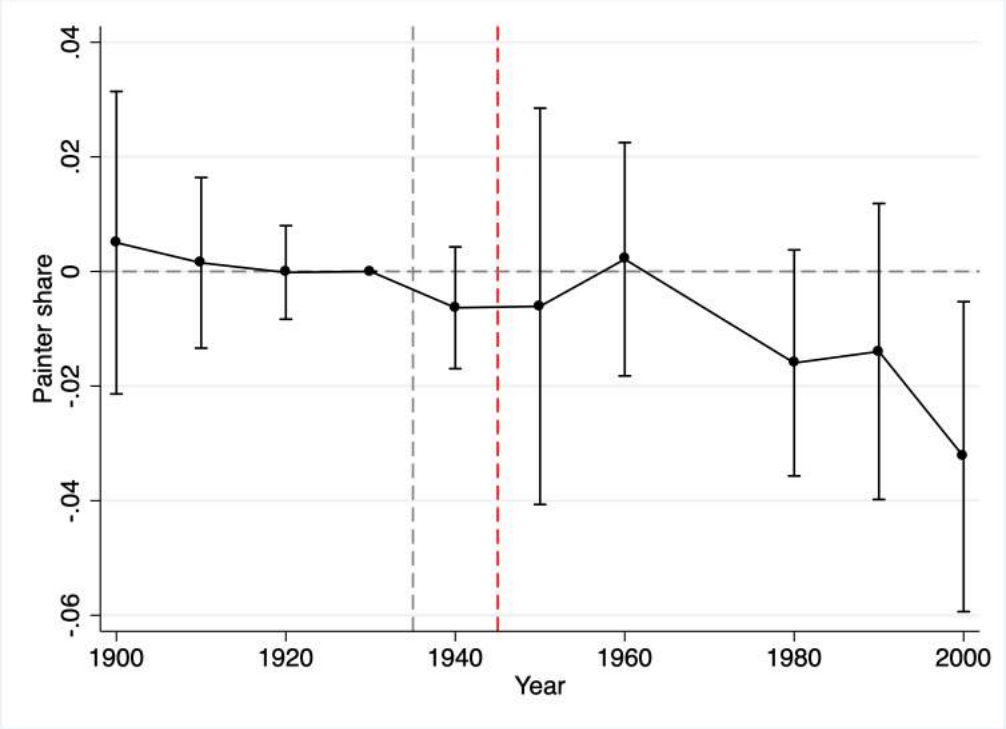
This graph displays the results over time of the ordinary least squares differences-in-differences regression of local piano tuner population share (per OCC1950) on a binary indicator for Federal Music Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local piano tuner shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure A9: OLS results: City visual artist share on Federal Art Project (binary)



This graph displays the results over time of the ordinary least squares differences-in-differences regression of local visual artist population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local visual artist shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Figure A10: OLS results: City painter share on Federal Art Project (binary)



This graph displays the results over time of the ordinary least squares differences-in-differences regression of local visual artist population share (per OCC1950) on a binary indicator for Federal Art Project program recipiency. The displayed specification includes city fixed effects. Decadal difference-in-difference coefficients are estimated relative to a 1930's baseline. The error bars of each plot display 95% confidence intervals around their respective point estimates using standard errors clustered on the city-level. The graphs includes three separate specifications of these regressions: one including city-level fixed-effects and two correlated random effect (CRE) models of pre-existing artist population shares (in 1930) and leading decadal growth trends in local painter shares. Note the exclusion of 1970's point estimates due to lack of city-denominated data in the US Census.

Table A1: Detailed IV results by discipline: Authors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.068**	0.068**	0.068**	0.068**				
	(0.031)	(0.031)	(0.031)	(0.031)				
Binary × Post 1940	0.035	0.091**	0.10***	0.10**				
	(0.036)	(0.036)	(0.035)	(0.039)				
Exp. per author × Year 1940					0.0074**	0.0074**	0.0074**	0.0074**
					(0.0037)	(0.0037)	(0.0037)	(0.0037)
Exp. per author × Post 1940					0.0044	0.011**	0.011**	0.011**
					(0.0046)	(0.0053)	(0.0054)	(0.0054)
FWP binary	0.045*	-0.044	-0.062**					
	(0.026)	(0.029)	(0.025)					
Exp. per author					0.0049	-0.0059*		
					(0.0030)	(0.0036)		
Year 1940	0.0037***	0.0037***	0.0037***	0.0037***	0.0035***	0.0035***	0.0035***	0.0035***
	(0.00045)	(0.00045)	(0.00045)	(0.00045)	(0.00050)	(0.00050)	(0.00050)	(0.00050)
Post 1940	0.041***	0.041***	0.040***	0.037***	0.039***	0.039***	0.036***	0.036***
	(0.0058)	(0.0057)	(0.0050)	(0.0051)	(0.0070)	(0.0064)	(0.0057)	(0.0057)
Constant	0.0028***	-0.013***	-0.0046***		0.0027***	-0.015***		
	(0.00038)	(0.0031)	(0.0010)		(0.00043)	(0.0041)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.127	0.319	0.340	0.106	-0.140	0.250	0.027	0.027
Arts demographics 1930		X				X		
Writer trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FWP emp. share × Year 1940	0.038**	0.038**	0.038**	0.038**				
	(0.019)	(0.019)	(0.019)	(0.019)				
FWP emp. share × Post 1940	0.023	0.056**	0.058**	0.058**				
	(0.024)	(0.028)	(0.028)	(0.028)				
Log FWP emp. × Year 1940					0.0098	0.0098	0.0098	0.0098
					(0.0063)	(0.0063)	(0.0065)	(0.0065)
Log FWP emp. × Post 1940					0.021	0.019	0.020	0.020
					(0.013)	(0.013)	(0.014)	(0.014)
FWP emp. share	0.025	-0.030*						
	(0.015)	(0.018)						
Log FWP emp.					0.0037	0.0083		
					(0.0036)	(0.033)		
Year 1940	0.0035***	0.0035***	0.0035***	0.0035***	-0.024	-0.024	-0.024	-0.024
	(0.00051)	(0.00051)	(0.00051)	(0.00051)	(0.020)	(0.020)	(0.021)	(0.021)
Post 1940	0.038***	0.039***	0.036***	0.036***	-0.00068	0.0054	0.0010	0.0010
	(0.0072)	(0.0065)	(0.0058)	(0.0058)	(0.053)	(0.052)	(0.053)	(0.053)
Constant	0.0027***	-0.015***			-0.0052	-0.22*		
	(0.00044)	(0.0042)			(0.013)	(0.13)		
Observations	2606	2606	2606	2606	196	196	196	196
Adjusted R^2	-0.160	0.243	0.020	0.020	0.153	0.360	0.158	0.158
Arts demographics 1930		X				X		
Writer trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on author shares by city, using 1930 as the leave-out base-period. Writer city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A2: Detailed IV results by discipline: Publishing industry workers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.71***	0.71***	0.71***	0.71***				
	(0.23)	(0.23)	(0.23)	(0.23)				
Binary × Post 1940	-1.07***	0.40***	0.099	0.57***				
	(0.38)	(0.15)	(0.083)	(0.21)				
Exp. per pub. worker × Year 1940					0.076***	0.076***	0.076***	0.076***
					(0.029)	(0.029)	(0.029)	(0.029)
Exp. per pub. worker × Post 1940					-0.11**	0.046**	0.063**	0.063**
					(0.046)	(0.018)	(0.025)	(0.025)
FWP binary	1.65***	-0.28**	0.11					
	(0.44)	(0.13)	(0.086)					
Exp. per pub. worker					0.18***	-0.034**		
					(0.059)	(0.015)		
Year 1940	0.19***	0.19***	0.19***	0.19***	0.19***	0.19***	0.19***	0.19***
	(0.0074)	(0.0074)	(0.0074)	(0.0074)	(0.0077)	(0.0077)	(0.0077)	(0.0077)
Post 1940	0.35***	0.28***	0.28***	0.28***	0.33***	0.27***	0.27***	0.27***
	(0.030)	(0.025)	(0.026)	(0.026)	(0.034)	(0.027)	(0.027)	(0.027)
Constant	0.40***	0.038**	0.020		0.40***	0.032*		
	(0.011)	(0.018)	(0.014)		(0.011)	(0.017)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	-0.191	0.657	0.620	0.208	-0.931	0.640	0.135	0.135
Arts demographics 1930		X				X		
Publishing industry trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FWP emp. share × Year 1940	0.39***	0.39***	0.39***	0.39***				
	(0.15)	(0.15)	(0.15)	(0.15)				
FWP emp. share × Post 1940	-0.57**	0.24**	0.32**	0.32**				
	(0.24)	(0.093)	(0.13)	(0.13)				
Log FWP emp. × Year 1940					0.051	0.051	0.051	0.051
					(0.034)	(0.034)	(0.035)	(0.035)
Log FWP emp. × Post 1940					0.0090	0.0098	0.0050	0.0050
					(0.049)	(0.049)	(0.052)	(0.052)
FWP emp. share	0.92***	-0.17**						
	(0.30)	(0.075)						
Log FWP emp.					0.065	0.0017		
					(0.058)	(0.094)		
Year 1940	0.19***	0.19***	0.19***	0.19***	0.043	0.043	0.043	0.043
	(0.0077)	(0.0077)	(0.0078)	(0.0078)	(0.13)	(0.13)	(0.13)	(0.13)
Post 1940	0.33***	0.27***	0.27***	0.27***	0.23	0.23	0.25	0.25
	(0.036)	(0.028)	(0.027)	(0.027)	(0.21)	(0.21)	(0.22)	(0.22)
Constant	0.40***	0.031*			0.48**	-0.39		
	(0.012)	(0.018)			(0.22)	(0.51)		
Observations	2606	2606	2606	2606	196	196	196	196
Adjusted R^2	-0.980	0.638	0.129	0.129	-0.000	0.529	0.103	0.103
Arts demographics 1930		X				X		
Publishing industry trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on publishing industry worker shares by city, using 1930 as the leave-out base-period. Publishing industry worker city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A3: Detailed IV results by discipline: Visual artists

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.17***	0.17***	0.17***	0.17***				
	(0.047)	(0.047)	(0.047)	(0.047)				
Binary × Post 1940	-0.28***	0.012	0.062	0.073				
	(0.087)	(0.035)	(0.040)	(0.047)				
Exp. per artist × Year 1940					0.20***	0.20***	0.20***	0.20***
					(0.062)	(0.062)	(0.062)	(0.062)
Exp. per artist × Post 1940					-0.34***	0.015	0.087	0.087
					(0.11)	(0.041)	(0.055)	(0.055)
FAP binary	0.39***	-0.0069	-0.049*					
	(0.094)	(0.030)	(0.027)					
Exp. per artist					0.47***	-0.011		
					(0.13)	(0.034)		
Year 1940	0.014***	0.014***	0.014***	0.014***	0.014***	0.014***	0.014***	0.014***
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
Post 1940	0.061***	0.056***	0.055***	0.057***	0.062***	0.056***	0.057***	0.057***
	(0.0059)	(0.0050)	(0.0052)	(0.0056)	(0.0053)	(0.0048)	(0.0053)	(0.0053)
Constant	0.016***	-0.016***	-0.0023		0.017***	-0.016***		
	(0.0014)	(0.0036)	(0.0014)		(0.0015)	(0.0036)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	-0.527	0.476	0.454	0.096	-0.695	0.469	0.085	0.085
Arts demographics 1930		X				X		
Artist trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FAP emp. share × Year 1940	1.06***	1.06***	1.06***	1.06***				
	(0.32)	(0.32)	(0.32)	(0.32)				
FAP emp. share × Post 1940	-1.78***	0.083	0.46	0.46				
	(0.59)	(0.22)	(0.29)	(0.29)				
Log FAP emp. × Year 1940					0.0064**	0.0064**	0.0064**	0.0064**
					(0.0028)	(0.0028)	(0.0029)	(0.0029)
Log FAP emp. × Post 1940					-0.0027	-0.0039	-0.0036	-0.0036
					(0.0080)	(0.0082)	(0.0084)	(0.0084)
FAP emp. share	2.46***	-0.059						
	(0.65)	(0.18)						
Log FAP emp.					0.0090***	0.0011		
					(0.0035)	(0.0075)		
Year 1940	0.014***	0.014***	0.014***	0.014***	0.013	0.013	0.013	0.013
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0099)	(0.0099)	(0.010)	(0.010)
Post 1940	0.062***	0.056***	0.057***	0.057***	0.075**	0.080**	0.079**	0.079**
	(0.0054)	(0.0048)	(0.0054)	(0.0054)	(0.035)	(0.035)	(0.035)	(0.035)
Constant	0.016***	-0.016***			0.028**	-0.14***		
	(0.0015)	(0.0036)			(0.013)	(0.036)		
Observations	2606	2606	2606	2606	196	196	196	196
Adjusted R^2	-0.717	0.469	0.083	0.083	0.091	0.487	0.112	0.112
Arts demographics 1930		X				X		
Artist trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on visual artist shares by city, using 1930 as the leave-out base-period. Visual artist city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A4: Detailed IV results by discipline: Designer

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.093***	0.093***	0.093***	0.093***				
	(0.024)	(0.024)	(0.024)	(0.024)				
Binary × Post 1940	0.059	0.16*	0.11	0.15*				
	(0.070)	(0.083)	(0.067)	(0.090)				
Exp. per designer × Year 1940					0.11***	0.11***	0.11***	0.11***
					(0.032)	(0.032)	(0.032)	(0.032)
Exp. per designer × Post 1940					0.065	0.19*	0.17*	0.17*
					(0.079)	(0.097)	(0.10)	(0.10)
FAP binary	0.092***	-0.078	0.035					
	(0.021)	(0.062)	(0.034)					
Exp. per designer					0.11***	-0.098		
					(0.028)	(0.071)		
Year 1940	0.0073***	0.0073***	0.0073***	0.0073***	0.0074***	0.0074***	0.0074***	0.0074***
	(0.00054)	(0.00054)	(0.00054)	(0.00054)	(0.00054)	(0.00054)	(0.00054)	(0.00054)
Post 1940	0.20***	0.20***	0.20***	0.19***	0.21***	0.20***	0.19***	0.19***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.013)	(0.013)
Constant	0.0038***	-0.045***	0.00057		0.0039***	-0.045***		
	(0.00044)	(0.0081)	(0.0011)		(0.00045)	(0.0083)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.396	0.450	0.412	0.285	0.395	0.451	0.284	0.284
Arts demographics 1930		X				X		
Designer trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FAP emp. share × Year 1940	0.58***	0.58***	0.58***	0.58***				
	(0.16)	(0.16)	(0.16)	(0.16)				
FAP emp. share × Post 1940	0.35	1.00*	0.92*	0.92*				
	(0.42)	(0.51)	(0.55)	(0.55)				
Log FAP emp. × Year 1940					0.0057***	0.0057***	0.0057***	0.0057***
					(0.0014)	(0.0014)	(0.0015)	(0.0015)
Log FAP emp. × Post 1940					0.0058	0.0057	0.0068	0.0068
					(0.021)	(0.021)	(0.021)	(0.021)
FAP emp. share	0.58***	-0.52						
	(0.14)	(0.37)						
Log FAP emp.					0.0054**	-0.00054		
					(0.0022)	(0.023)		
Year 1940	0.0074***	0.0074***	0.0074***	0.0074***	-0.0056	-0.0056	-0.0056	-0.0056
	(0.00054)	(0.00054)	(0.00054)	(0.00054)	(0.0048)	(0.0048)	(0.0050)	(0.0050)
Post 1940	0.21***	0.20***	0.19***	0.19***	0.26***	0.26***	0.25**	0.25**
	(0.012)	(0.012)	(0.013)	(0.013)	(0.093)	(0.092)	(0.093)	(0.093)
Constant	0.0038***	-0.045***			-0.0059	-0.57***		
	(0.00044)	(0.0082)			(0.0080)	(0.083)		
Observations	2606	2606	2606	2606	196	196	196	196
Adjusted R^2	0.394	0.451	0.284	0.284	0.181	0.330	0.221	0.221
Arts demographics 1930		X				X		
Designer trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on designer shares by city, using 1930 as the leave-out base-period. Designer city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A5: Detailed IV results by discipline: Photographer

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.076***	0.076***	0.076***	0.076***				
	(0.026)	(0.026)	(0.026)	(0.026)				
Binary × Post 1940	0.082***	0.091***	0.027	0.066**				
	(0.027)	(0.029)	(0.018)	(0.029)				
Exp. per photographer × Year 1940					0.091***	0.091***	0.091***	0.091***
					(0.033)	(0.033)	(0.033)	(0.033)
Exp. per photographer × Post 1940					0.096***	0.11***	0.078**	0.078**
					(0.034)	(0.036)	(0.036)	(0.036)
FAP binary	-0.042**	-0.085***	0.0046					
	(0.018)	(0.026)	(0.0078)					
Exp. per photographer					-0.050**	-0.10***		
					(0.022)	(0.032)		
Year 1940	0.015***	0.015***	0.015***	0.015***	0.015***	0.015***	0.015***	0.015***
	(0.00082)	(0.00082)	(0.00082)	(0.00082)	(0.00081)	(0.00081)	(0.00081)	(0.00081)
Post 1940	0.041***	0.039***	0.041***	0.036***	0.042***	0.039***	0.037***	0.037***
	(0.0044)	(0.0041)	(0.0044)	(0.0042)	(0.0041)	(0.0039)	(0.0040)	(0.0040)
Constant	0.026***	-0.0073***	-0.00062		0.026***	-0.0074***		
	(0.00064)	(0.0022)	(0.0023)		(0.00063)	(0.0023)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.166	0.307	0.258	0.099	0.156	0.301	0.093	0.093
Arts demographics 1930		X				X		
Photographer trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FAP emp. share × Year 1940	0.48***	0.48***	0.48***	0.48***				
	(0.17)	(0.17)	(0.17)	(0.17)				
FAP emp. share × Post 1940	0.51***	0.56***	0.41**	0.41**				
	(0.18)	(0.19)	(0.19)	(0.19)				
Log FAP emp. × Year 1940					0.0015	0.0015	0.0015	0.0015
					(0.0017)	(0.0017)	(0.0018)	(0.0018)
Log FAP emp. × Post 1940					0.0024	0.0020	0.0023	0.0023
					(0.0044)	(0.0045)	(0.0046)	(0.0046)
FAP emp. share	-0.26**	-0.53***						
	(0.12)	(0.17)						
Log FAP emp.					0.0018	-0.0016		
					(0.0022)	(0.0046)		
Year 1940	0.015***	0.015***	0.015***	0.015***	0.019***	0.019***	0.019**	0.019**
	(0.00081)	(0.00081)	(0.00081)	(0.00081)	(0.0065)	(0.0065)	(0.0067)	(0.0067)
Post 1940	0.042***	0.039***	0.036***	0.036***	0.050***	0.052***	0.051**	0.051**
	(0.0042)	(0.0039)	(0.0041)	(0.0041)	(0.019)	(0.019)	(0.019)	(0.019)
Constant	0.026***	-0.0073***			0.024***	-0.087***		
	(0.00064)	(0.0023)			(0.0080)	(0.019)		
Observations	2606	2606	2606	2606	196	196	196	196
Adjusted R^2	0.156	0.301	0.092	0.092	0.106	0.371	0.142	0.142
Arts demographics 1930		X				X		
Photographer trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on photographer shares by city, using 1930 as the leave-out base-period. Photographer city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A6: Detailed IV results by discipline: Painter

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.11	0.11	0.11	0.11				
	(0.083)	(0.083)	(0.083)	(0.083)				
Binary × Post 1940	-0.045	-0.10**	-0.040*	-0.044				
	(0.060)	(0.046)	(0.023)	(0.047)				
Exp. per painter × Year 1940					0.13	0.13	0.13	0.13
					(0.10)	(0.10)	(0.10)	(0.10)
Exp. per painter × Post 1940					-0.053	-0.12**	-0.050	-0.050
					(0.072)	(0.056)	(0.056)	(0.056)
FAP binary	0.035	0.078	-0.0044					
	(0.059)	(0.054)	(0.016)					
Exp. per painter					0.042	0.091		
					(0.071)	(0.062)		
Year 1940	0.039***	0.039***	0.039***	0.039***	0.039***	0.039***	0.039***	0.039***
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.0039)	(0.0039)	(0.0039)	(0.0039)
Post 1940	0.034***	0.030***	0.025***	0.038***	0.034***	0.030***	0.037***	0.037***
	(0.0058)	(0.0055)	(0.0059)	(0.0069)	(0.0056)	(0.0054)	(0.0068)	(0.0068)
Constant	0.061***	0.029***	0.012		0.061***	0.029***		
	(0.0032)	(0.011)	(0.0084)		(0.0031)	(0.010)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.015	0.424	0.440	0.053	0.011	0.417	0.042	0.042
Arts demographics 1930		X				X		
Painter trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FAP emp. share × Year 1940	0.70	0.70	0.70	0.70				
	(0.53)	(0.53)	(0.53)	(0.53)				
FAP emp. share × Post 1940	-0.28	-0.64**	-0.27	-0.27				
	(0.38)	(0.29)	(0.29)	(0.29)				
Log FAP emp. × Year 1940					0.0065*	0.0065*	0.0065	0.0065
					(0.0039)	(0.0039)	(0.0040)	(0.0040)
Log FAP emp. × Post 1940					0.0018	0.0022	0.0020	0.0020
					(0.0043)	(0.0042)	(0.0043)	(0.0043)
FAP emp. share	0.22	0.48						
	(0.37)	(0.32)						
Log FAP emp.					0.0023	-0.0020		
					(0.0060)	(0.0045)		
Year 1940	0.039***	0.039***	0.039***	0.039***	0.012	0.012	0.012	0.012
	(0.0040)	(0.0040)	(0.0040)	(0.0040)	(0.014)	(0.014)	(0.014)	(0.014)
Post 1940	0.034***	0.030***	0.037***	0.037***	-0.0036	-0.0059	-0.0047	-0.0047
	(0.0057)	(0.0054)	(0.0068)	(0.0068)	(0.016)	(0.015)	(0.016)	(0.016)
Constant	0.061***	0.029***			0.072***	0.12***		
	(0.0032)	(0.010)			(0.020)	(0.031)		
Observations	2606	2606	2606	2606	196	196	196	196
Adjusted R^2	0.010	0.416	0.040	0.040	0.006	0.214	0.035	0.035
Arts demographics 1930		X				X		
Painter trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on painter shares by city, using 1930 as the leave-out base-period. Painter city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A7: Detailed IV results by discipline: Musician

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.053**	0.053**	0.053**	0.053**				
	(0.025)	(0.025)	(0.025)	(0.026)				
Binary × Post 1940	-0.11	-0.18*	-0.13	-0.17				
	(0.088)	(0.097)	(0.083)	(0.11)				
Exp. per musician × Year 1940					0.034	0.034	0.034	0.034
					(0.023)	(0.023)	(0.023)	(0.023)
Exp. per musician × Post 1940					-0.13	-0.24	-0.22	-0.22
					(0.13)	(0.15)	(0.13)	(0.13)
FMP binary	0.049	0.039	-0.00044					
	(0.036)	(0.046)	(0.024)					
Exp. per musician					0.032	0.017		
					(0.029)	(0.032)		
Year 1940	-0.0035	-0.0035	-0.0035	-0.0035	-0.0033	-0.0033	-0.0033	-0.0033
	(0.0059)	(0.0059)	(0.0059)	(0.0059)	(0.0071)	(0.0071)	(0.0071)	(0.0071)
Post 1940	0.33***	0.35***	0.33***	0.33***	0.35***	0.39***	0.35***	0.35***
	(0.058)	(0.058)	(0.058)	(0.066)	(0.082)	(0.091)	(0.077)	(0.077)
Constant	0.13***	-0.0100	0.0082		0.13***	-0.017		
	(0.0070)	(0.011)	(0.0096)		(0.0084)	(0.016)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.312	0.365	0.366	0.144	0.255	0.212	0.074	0.074
Arts demographics 1930		X				X		
Musician trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FMP emp. share × Year 1940	0.19	0.19	0.19	0.19				
	(0.14)	(0.14)	(0.14)	(0.14)				
FMP emp. share × Post 1940	-0.83	-1.61	-1.41	-1.41				
	(0.94)	(1.16)	(0.93)	(0.93)				
Log FMP emp. × Year 1940					-0.00018	-0.00018	-0.00018	-0.00018
					(0.0048)	(0.0048)	(0.0048)	(0.0048)
Log FMP emp. × Post 1940					-0.0049	-0.0086	-0.0068	-0.0068
					(0.022)	(0.024)	(0.025)	(0.025)
FMP emp. share	0.18	0.064						
	(0.17)	(0.22)						
Log FMP emp.					0.0090	0.027		
					(0.0060)	(0.022)		
Year 1940	-0.0059	-0.0059	-0.0059	-0.0059	0.018	0.018	0.018	0.018
	(0.0095)	(0.0095)	(0.0095)	(0.0095)	(0.017)	(0.017)	(0.017)	(0.017)
Post 1940	0.37***	0.45***	0.39***	0.39***	0.28***	0.28***	0.26***	0.26***
	(0.12)	(0.15)	(0.11)	(0.11)	(0.094)	(0.096)	(0.098)	(0.098)
Constant	0.13***	-0.017			0.14***	-0.14**		
	(0.011)	(0.020)			(0.019)	(0.066)		
Observations	2606	2606	2606	2606	875	875	875	875
Adjusted R^2	0.205	0.021	-0.013	-0.013	0.201	0.269	0.159	0.159
Arts demographics 1930		X				X		
Musician trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on musician shares by city, using 1930 as the leave-out base-period. Musician city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A8: Detailed IV results by discipline: Piano tuner

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.0050*	0.0050*	0.0050*	0.0050*				
	(0.0030)	(0.0030)	(0.0030)	(0.0030)				
Binary × Post 1940	0.0075**	0.0041	0.0034	0.0013				
	(0.0033)	(0.0027)	(0.0026)	(0.0035)				
Exp. per pianotuner × Year 1940					0.0032	0.0032	0.0032	0.0032
					(0.0022)	(0.0022)	(0.0022)	(0.0022)
Exp. per pianotuner × Post 1940					0.0053	0.0020	0.00022	0.00022
					(0.0039)	(0.0039)	(0.0040)	(0.0040)
FMP binary	-0.0070**	-0.0050***	-0.0036***					
	(0.0027)	(0.0018)	(0.0013)					
Exp. per pianotuner					-0.0046	-0.0032*		
					(0.0028)	(0.0018)		
Year 1940	0.00067	0.00067	0.00067	0.00067	0.00069	0.00069	0.00069	0.00069
	(0.00071)	(0.00071)	(0.00071)	(0.00071)	(0.00076)	(0.00076)	(0.00076)	(0.00076)
Post 1940	-0.0035**	-0.0026	-0.0026	-0.0018	-0.0036*	-0.0023	-0.0017	-0.0017
	(0.0015)	(0.0016)	(0.0016)	(0.0021)	(0.0020)	(0.0023)	(0.0023)	(0.0023)
Constant	0.0057***	0.0016***	0.0025***		0.0057***	0.0019***		
	(0.00061)	(0.00048)	(0.00033)		(0.00086)	(0.00063)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	-0.013	0.073	0.084	0.004	-0.105	0.030	-0.018	-0.018
Arts demographics 1930		X				X		
Piano tuner trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FMP emp. share × Year 1940	0.018	0.018	0.018	0.018				
	(0.013)	(0.013)	(0.013)	(0.013)				
FMP emp. share × Post 1940	0.031	0.0100	0.00024	0.00024				
	(0.026)	(0.027)	(0.026)	(0.026)				
Log FMP emp. × Year 1940					0.00092	0.00092	0.00092	0.00092
					(0.00057)	(0.00057)	(0.00057)	(0.00057)
Log FMP emp. × Post 1940					-0.00021	-0.00032	-0.00027	-0.00027
					(0.00077)	(0.00066)	(0.00093)	(0.00093)
FMP emp. share	-0.026	-0.019						
	(0.018)	(0.012)						
Log FMP emp.					-0.00036	-0.00070		
					(0.00037)	(0.00064)		
Year 1940	0.00044	0.00044	0.00044	0.00044	-0.00095	-0.00095	-0.00095	-0.00095
	(0.00098)	(0.00098)	(0.00098)	(0.00098)	(0.0019)	(0.0019)	(0.0019)	(0.0019)
Post 1940	-0.0042	-0.0022	-0.0015	-0.0015	0.00016	0.00076	0.00059	0.00059
	(0.0028)	(0.0034)	(0.0031)	(0.0031)	(0.0034)	(0.0030)	(0.0040)	(0.0040)
Constant	0.0061***	0.0022**			0.0054***	0.0050***		
	(0.0012)	(0.00087)			(0.0013)	(0.0017)		
Observations	2606	2606	2606	2606	875	875	875	875
Adjusted R^2	-0.172	-0.011	-0.039	-0.039	0.001	-0.004	0.000	0.000
Arts demographics 1930		X				X		
Piano tuner trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on piano tuner shares by city, using 1930 as the leave-out base-period. Piano tuner city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A9: Detailed IV results by discipline: Actor

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	-0.021	-0.021	-0.021	-0.021				
	(0.014)	(0.014)	(0.014)	(0.014)				
Binary × Post 1940	-0.041	-0.027	0.0024	0.0020				
	(0.062)	(0.021)	(0.031)	(0.030)				
Exp. per actor × Year 1940					-0.0028	-0.0028	-0.0028	-0.0028
					(0.0018)	(0.0018)	(0.0018)	(0.0018)
Exp. per actor × Post 1940					0.0091	-0.0028	0.0017	0.0017
					(0.018)	(0.0042)	(0.0069)	(0.0069)
FTP binary	0.13**	0.032**	0.030***					
	(0.056)	(0.015)	(0.010)					
Exp. per actor					0.017**	0.0040**		
					(0.0078)	(0.0020)		
Year 1940	-0.000073	-0.000073	-0.000073	-0.000073	0.00067	0.00067	0.00067	0.00067
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0016)	(0.0016)	(0.0016)	(0.0016)
Post 1940	-0.018	-0.00075	-0.0067	-0.0045	-0.054	-0.0014	-0.0079	-0.0079
	(0.013)	(0.0042)	(0.0086)	(0.0071)	(0.052)	(0.0094)	(0.015)	(0.015)
Constant	0.0014	-0.0057***	0.0020**		-0.0031	-0.0065**		
	(0.0030)	(0.0020)	(0.0010)		(0.0057)	(0.0026)		
Observations	2487	2487	2487	2487	2487	2487	2487	2487
Adjusted R^2	-0.469	0.748	0.631	-0.028	-5.841	0.664	-0.207	-0.207
Arts demographics 1930		X				X		
Actor trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FTP emp. share × Year 1940	-0.013	-0.013	-0.013	-0.013				
	(0.0087)	(0.0087)	(0.0087)	(0.0087)				
FTP emp. share × Post 1940	0.073	-0.012	0.011	0.011				
	(0.12)	(0.023)	(0.039)	(0.039)				
Log FTP emp. × Year 1940					-0.0028	-0.0028	-0.0028	-0.0028
					(0.0023)	(0.0023)	(0.0023)	(0.0023)
Log FTP emp. × Post 1940					-0.0028	-0.0064**	-0.0073**	-0.0073**
					(0.0034)	(0.0031)	(0.0033)	(0.0033)
FTP emp. share	0.081**	0.019**						
	(0.037)	(0.0095)						
Log FTP emp.					0.018**	0.010***		
					(0.0080)	(0.0036)		
Year 1940	0.00099	0.00099	0.00099	0.00099	0.0037	0.0037	0.0037	0.0037
	(0.0018)	(0.0018)	(0.0018)	(0.0018)	(0.0087)	(0.0087)	(0.0088)	(0.0088)
Post 1940	-0.072	-0.0018	-0.0097	-0.0097	0.00064	0.015	0.018	0.018
	(0.079)	(0.012)	(0.020)	(0.020)	(0.014)	(0.012)	(0.012)	(0.012)
Constant	-0.0051	-0.0070**			-0.039	-0.038***		
	(0.0067)	(0.0030)			(0.026)	(0.013)		
Observations	2487	2487	2487	2487	405	405	405	405
Adjusted R^2	-9.110	0.619	-0.316	-0.316	0.147	0.687	0.032	0.032
Arts demographics 1930		X				X		
Actor trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on actor shares by city, using 1930 as the leave-out base-period. Actor city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A10: Detailed IV results by discipline: Theater and film industry workers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.099	0.099	0.099	0.099				
	(0.082)	(0.082)	(0.082)	(0.082)				
Binary × Post 1940	0.40	0.30**	0.40**	0.47**				
	(0.24)	(0.15)	(0.20)	(0.23)				
Exp. per theater/film worker × Year 1940					0.013	0.013	0.013	0.013
					(0.011)	(0.011)	(0.011)	(0.011)
Exp. per theater/film worker × Post 1940					0.15	0.074*	0.10*	0.10*
					(0.12)	(0.043)	(0.060)	(0.060)
FTP binary	0.25**	-0.049	-0.10					
	(0.12)	(0.090)	(0.11)					
Exp. per theater/film worker					0.032**	-0.0090		
					(0.016)	(0.015)		
Year 1940	0.054***	0.054***	0.054***	0.054***	0.051***	0.051***	0.051***	0.051***
	(0.0049)	(0.0049)	(0.0049)	(0.0049)	(0.0079)	(0.0079)	(0.0079)	(0.0079)
Post 1940	-0.10	-0.023	-0.033	-0.051	-0.38	-0.12	-0.16	-0.16
	(0.089)	(0.036)	(0.041)	(0.055)	(0.35)	(0.12)	(0.14)	(0.14)
Constant	0.081***	-0.047***	-0.038**		0.072***	-0.069**		
	(0.0064)	(0.014)	(0.015)		(0.012)	(0.027)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	-0.525	0.623	0.553	-0.276	-8.034	-0.247	-3.245	-3.245
Arts demographics 1930		X				X		
Theater and film industry trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FTP emp. share × Year 1940	0.061	0.061	0.061	0.061				
	(0.051)	(0.051)	(0.051)	(0.051)				
FTP emp. share × Post 1940	0.91	0.42	0.58	0.58				
	(0.78)	(0.27)	(0.37)	(0.37)				
Log FTP emp. × Year 1940					0.0053	0.0053	0.0053	0.0053
					(0.0095)	(0.0095)	(0.0096)	(0.0096)
Log FTP emp. × Post 1940					0.045	0.029	0.034	0.034
					(0.030)	(0.019)	(0.021)	(0.021)
FTP emp. share	0.15**	-0.032						
	(0.077)	(0.080)						
Log FTP emp.					0.039*	-0.013		
					(0.020)	(0.021)		
Year 1940	0.049***	0.049***	0.049***	0.049***	0.034	0.034	0.034	0.034
	(0.0092)	(0.0092)	(0.0092)	(0.0092)	(0.030)	(0.030)	(0.031)	(0.031)
Post 1940	-0.51	-0.17	-0.23	-0.23	-0.087	-0.023	-0.043	-0.043
	(0.53)	(0.18)	(0.21)	(0.21)	(0.11)	(0.065)	(0.071)	(0.071)
Constant	0.069***	-0.078**			0.0073	0.0097		
	(0.014)	(0.038)			(0.063)	(0.062)		
Observations	2606	2606	2606	2606	460	460	460	460
Adjusted R^2	-13.353	-0.939	-5.822	-5.822	0.186	0.753	0.085	0.085
Arts demographics 1930		X				X		
Theater and film industry trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on theater and film industry worker shares by city, using 1930 as the leave-out base-period. Theater and film industry worker city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A11: Detailed IV results by discipline: Dancer

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	0.020***	0.020***	0.020***	0.020***				
	(0.0066)	(0.0066)	(0.0066)	(0.0066)				
Binary × Post 1940	0.00039	0.0055	0.0030	0.0063				
	(0.0064)	(0.0060)	(0.0055)	(0.0076)				
Exp. per dancer × Year 1940					0.0026***	0.0026***	0.0026***	0.0026***
					(0.00095)	(0.00095)	(0.00095)	(0.00095)
Exp. per dancer × Post 1940					0.0017	0.00078	0.00046	0.00046
					(0.0022)	(0.0013)	(0.0017)	(0.0017)
FTP binary	0.011***	-0.0049	0.0033*					
	(0.0039)	(0.0044)	(0.0019)					
Exp. per dancer					0.0014**	-0.00068		
					(0.00055)	(0.00056)		
Year 1940	0.0052***	0.0052***	0.0052***	0.0052***	0.0045***	0.0045***	0.0045***	0.0045***
	(0.00057)	(0.00057)	(0.00057)	(0.00057)	(0.00088)	(0.00088)	(0.00089)	(0.00089)
Post 1940	0.0084***	0.0089***	0.0080***	0.0080***	0.0040	0.0086**	0.0086*	0.0086*
	(0.0026)	(0.0024)	(0.0025)	(0.0028)	(0.0070)	(0.0042)	(0.0046)	(0.0046)
Constant	0.0038***	-0.0018*	0.0014***		0.0034***	-0.0015		
	(0.00037)	(0.00093)	(0.00029)		(0.00055)	(0.0012)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.021	0.134	0.098	0.026	-0.914	0.004	-0.130	-0.130
Arts demographics 1930		X				X		
Dancer trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FTP emp. share × Year 1940	0.012***	0.012***	0.012***	0.012***				
	(0.0046)	(0.0046)	(0.0046)	(0.0046)				
FTP emp. share × Post 1940	0.012	0.0038	0.0014	0.0014				
	(0.014)	(0.0075)	(0.0095)	(0.0095)				
Log FTP emp. × Year 1940					0.0032***	0.0032***	0.0032***	0.0032***
					(0.00074)	(0.00074)	(0.00075)	(0.00075)
Log FTP emp. × Post 1940					0.00069	0.00092	0.00077	0.00077
					(0.0012)	(0.0013)	(0.0012)	(0.0012)
FTP emp. share	0.0066**	-0.0032						
	(0.0026)	(0.0027)						
Log FTP emp.					0.0016**	-0.0025		
					(0.00064)	(0.0020)		
Year 1940	0.0042***	0.0042***	0.0042***	0.0042***	-0.00045	-0.00045	-0.00045	-0.00045
	(0.0010)	(0.0010)	(0.0010)	(0.0010)	(0.0030)	(0.0030)	(0.0030)	(0.0030)
Post 1940	0.0018	0.0084*	0.0090	0.0090	0.0077	0.0061	0.0071	0.0071
	(0.010)	(0.0051)	(0.0057)	(0.0057)	(0.0053)	(0.0058)	(0.0055)	(0.0055)
Constant	0.0032***	-0.0014			0.0019	-0.0018		
	(0.00062)	(0.0013)			(0.0022)	(0.0053)		
Observations	2606	2606	2606	2606	460	460	460	460
Adjusted R^2	-1.373	-0.049	-0.201	-0.201	0.084	0.125	0.034	0.034
Arts demographics 1930		X				X		
Dancer trends			X				X	
City FEs				X				X

Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on dancer shares by city, using 1930 as the leave-out base-period. Dancer city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Table A12: Detailed IV results by discipline: TV and radio industry workers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Binary × Year 1940	-0.0079	-0.0079	-0.0079	-0.0079				
	(0.0096)	(0.0096)	(0.0096)	(0.0096)				
Binary × Post 1940	0.018	0.026	0.032	-0.0088				
	(0.073)	(0.063)	(0.069)	(0.093)				
Exp. per TV/radio worker × Year 1940					-0.0010	-0.0010	-0.0010	-0.0010
					(0.0012)	(0.0012)	(0.0012)	(0.0012)
Exp. per TV/radio worker × Post 1940					0.0075	-0.0024	-0.0016	-0.0016
					(0.022)	(0.014)	(0.021)	(0.021)
FTP binary	0.016***	-0.071**	-0.0022					
	(0.0042)	(0.035)	(0.0084)					
Exp. per TV/radio worker					0.0021***	-0.0082*		
					(0.00060)	(0.0046)		
Year 1940	0.015***	0.015***	0.015***	0.015***	0.015***	0.015***	0.015***	0.015***
	(0.00097)	(0.00097)	(0.00097)	(0.00098)	(0.0013)	(0.0013)	(0.0013)	(0.0013)
Post 1940	0.18***	0.19***	0.18***	0.18***	0.17***	0.20***	0.18***	0.18***
	(0.026)	(0.020)	(0.025)	(0.028)	(0.060)	(0.040)	(0.051)	(0.051)
Constant	0.0027***	-0.034***	-0.00036		0.0021***	-0.029***		
	(0.00039)	(0.0056)	(0.0014)		(0.00060)	(0.0087)		
Observations	2606	2606	2606	2606	2606	2606	2606	2606
Adjusted R^2	0.408	0.464	0.413	0.294	0.316	0.333	0.295	0.295
Arts demographics 1930		X				X		
TV industry trends			X				X	
City FEs				X				X

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FTP emp. share × Year 1940	-0.0049	-0.0049	-0.0049	-0.0049				
	(0.0059)	(0.0059)	(0.0059)	(0.0059)				
FTP emp. share × Post 1940	0.046	-0.022	-0.0088	-0.0088				
	(0.13)	(0.083)	(0.12)	(0.12)				
Log FTP emp. × Year 1940					-0.00100	-0.00100	-0.00100	-0.00100
					(0.0016)	(0.0016)	(0.0016)	(0.0016)
Log FTP emp. × Post 1940					0.0090	0.0097	0.0090	0.0090
					(0.013)	(0.012)	(0.013)	(0.013)
FTP emp. share	0.0097***	-0.041*						
	(0.0029)	(0.023)						
Log FTP emp.					0.00065	-0.047***		
					(0.00057)	(0.018)		
Year 1940	0.015***	0.015***	0.015***	0.015***	0.021***	0.021***	0.021***	0.021***
	(0.0014)	(0.0014)	(0.0014)	(0.0014)	(0.0054)	(0.0054)	(0.0054)	(0.0054)
Post 1940	0.16**	0.21***	0.18***	0.18***	0.15***	0.15***	0.15***	0.15***
	(0.078)	(0.052)	(0.065)	(0.065)	(0.050)	(0.046)	(0.050)	(0.050)
Constant	0.0019***	-0.027**			0.0046*	0.092*		
	(0.00068)	(0.011)			(0.0024)	(0.050)		
Observations	2606	2606	2606	2606	460	460	460	460
Adjusted R^2	0.255	0.242	0.295	0.295	0.267	0.314	0.281	0.281
Arts demographics 1930		X				X		
TV industry trends			X				X	
City FEs				X				X

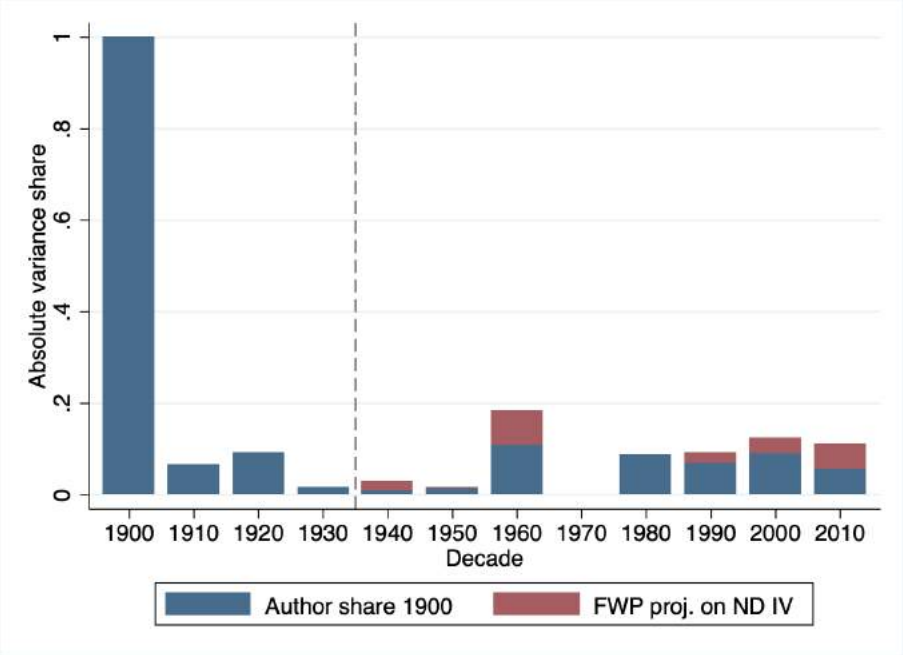
Standard errors in parentheses

* $p < .10$, ** $p < .05$, *** $p < .01$

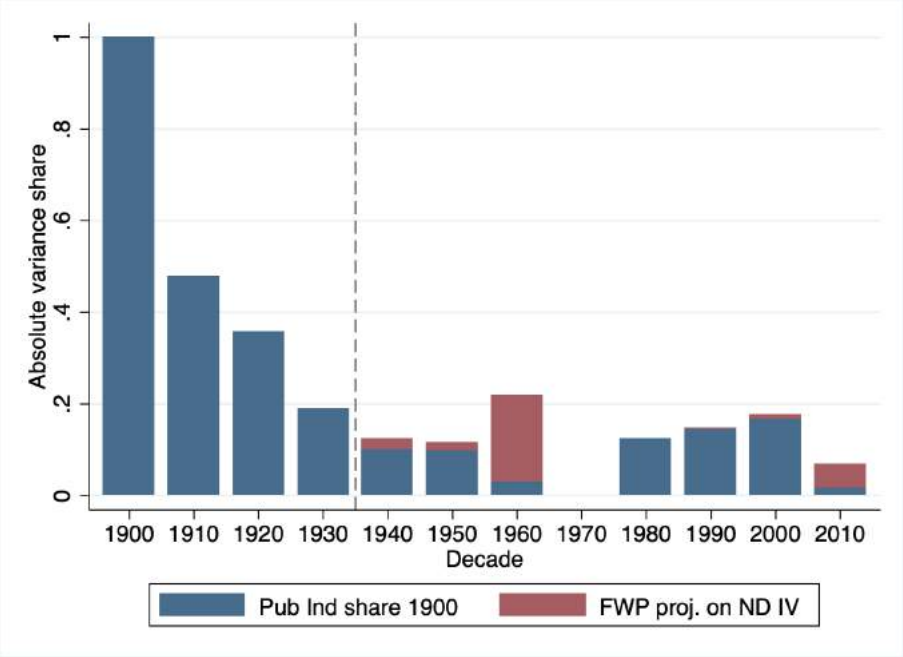
These tables displays the instrumental variable difference-in-difference estimated impacts of various parameterizations of Federal One activity on TV and radio industry worker shares by city, using 1930 as the leave-out base-period. TV and radio industry worker city population share is the dependent variable in all of the specifications. The independent variables compress dynamic effects into short-run (1940) and long-run (1950-2015) impacts.

Figure A11: Variance decomposition: FWP versus 1900 artists

(a) Authors



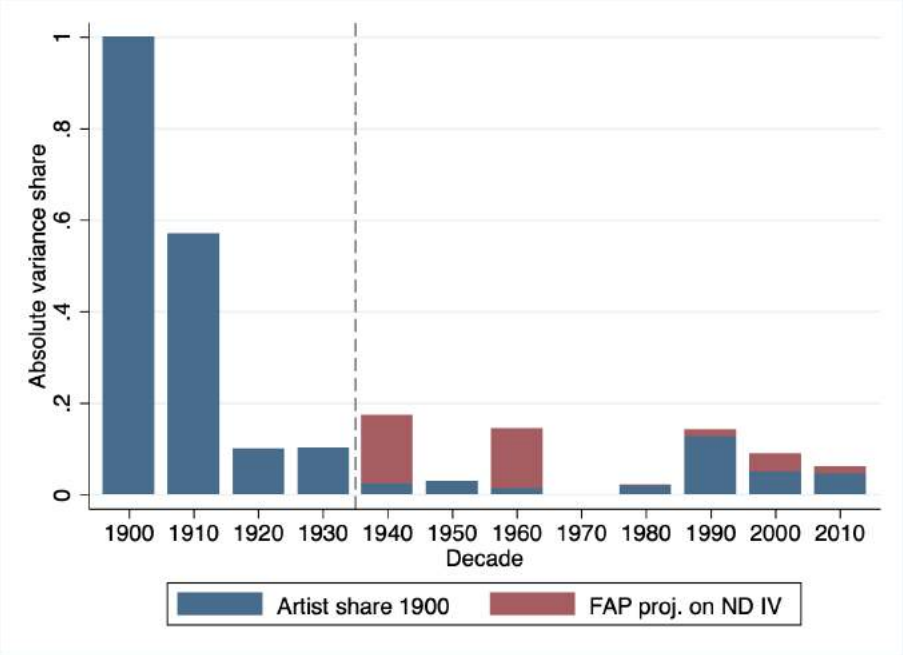
(b) Publishing industry workers



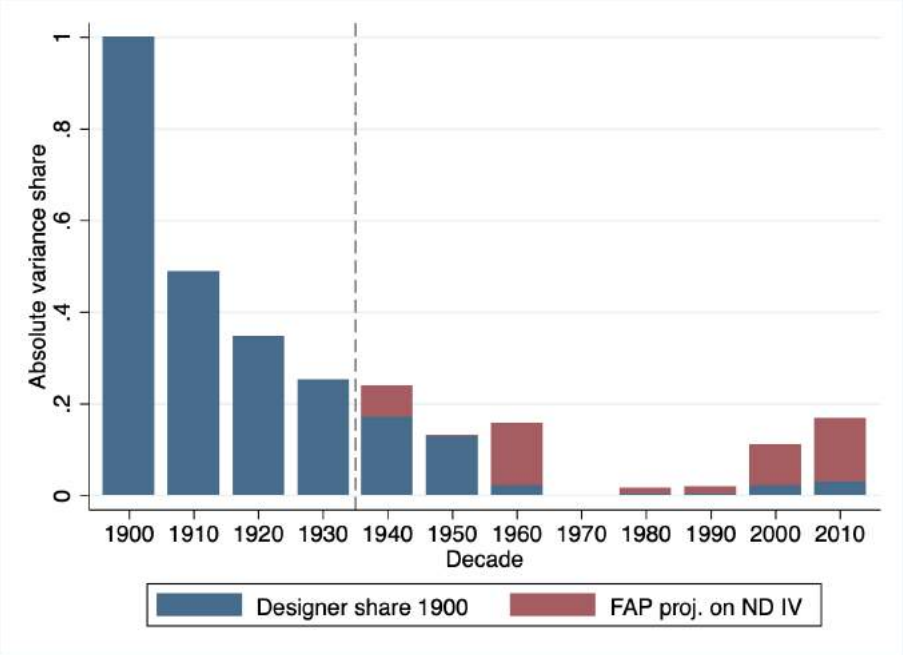
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A12: Variance decomposition: FAP versus 1900 artists

(a) Visual artists



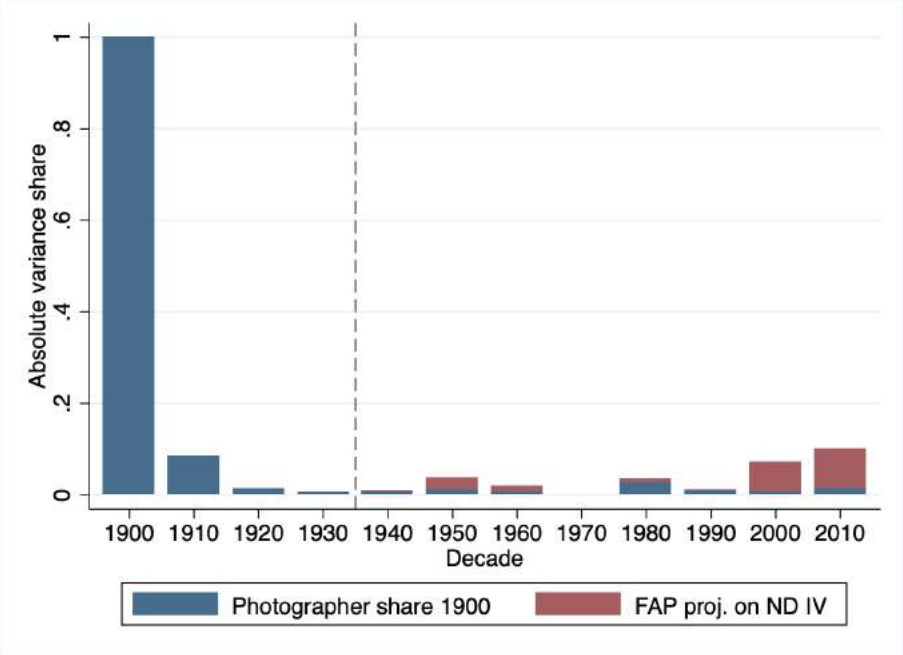
(b) Designers



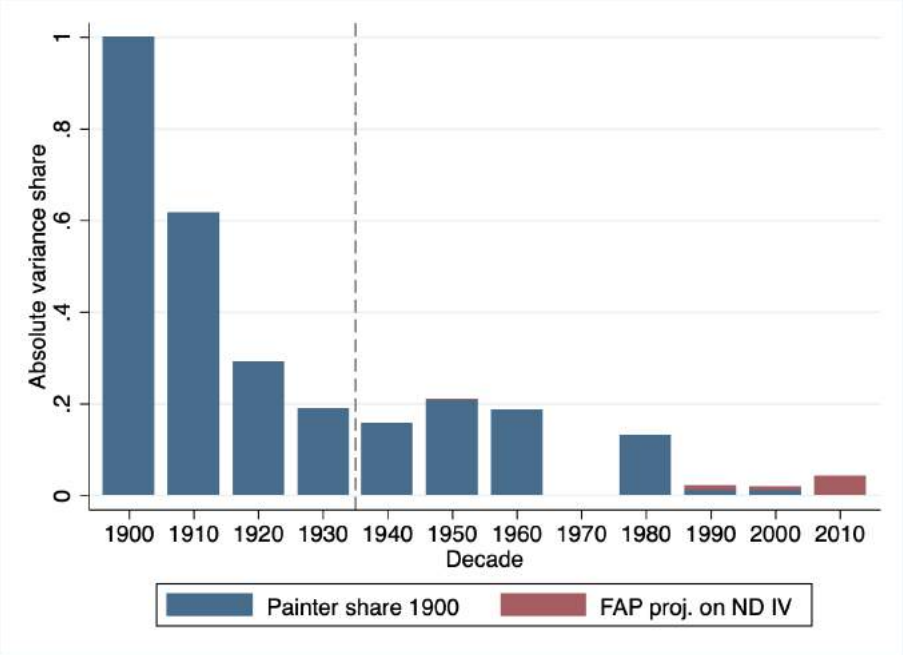
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A13: Variance decomposition: FAP versus 1900 artists

(a) Photographers



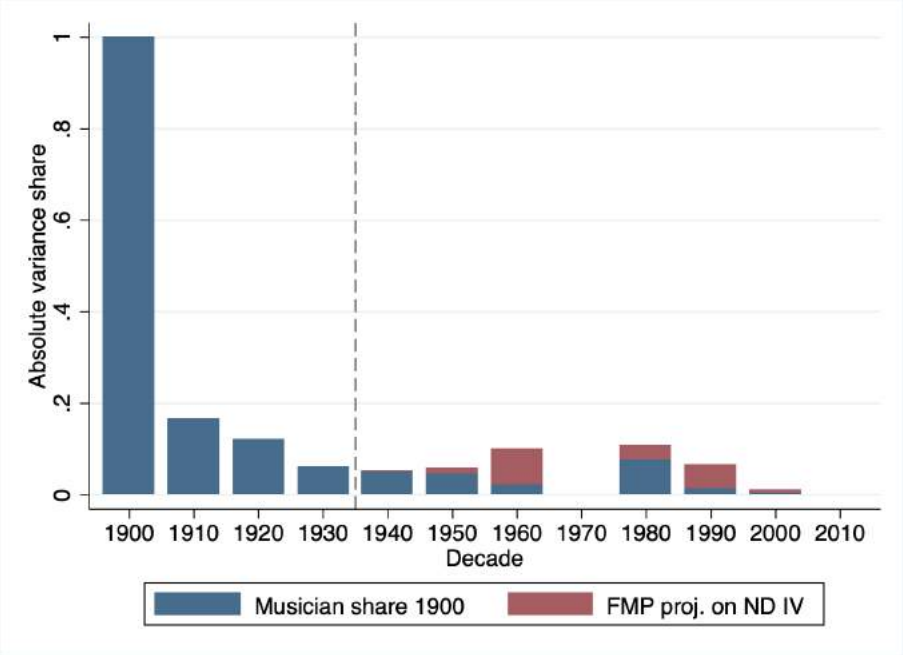
(b) Painters



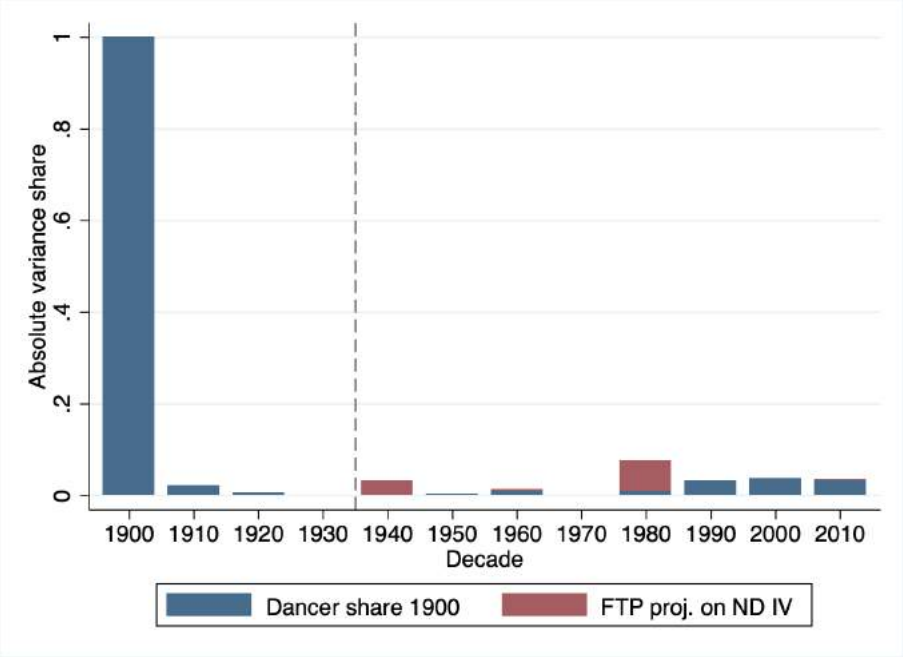
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A14: Variance decomposition: FMP and FTP versus 1900 artists

(a) Musicians



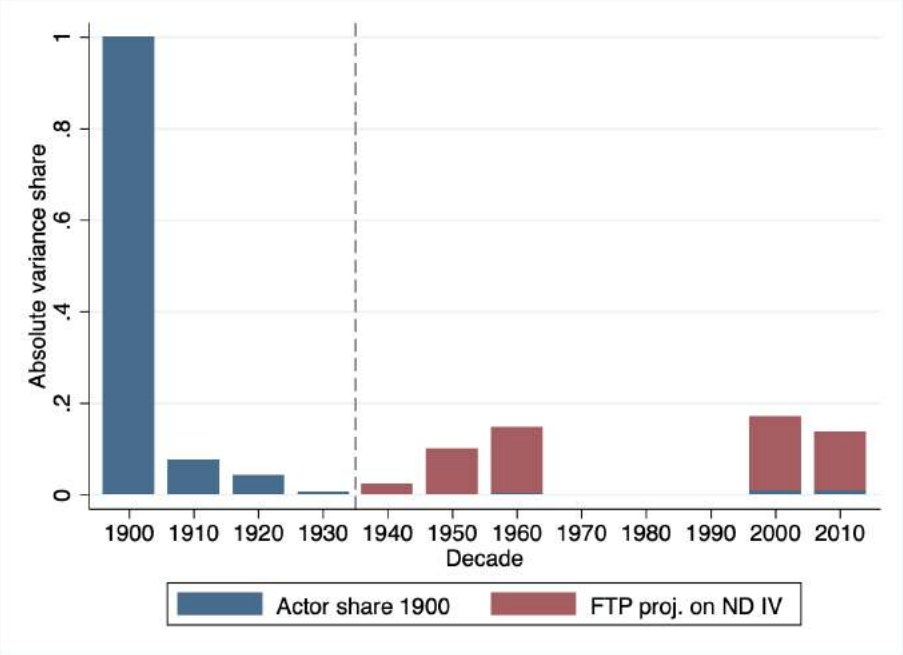
(b) Dancers



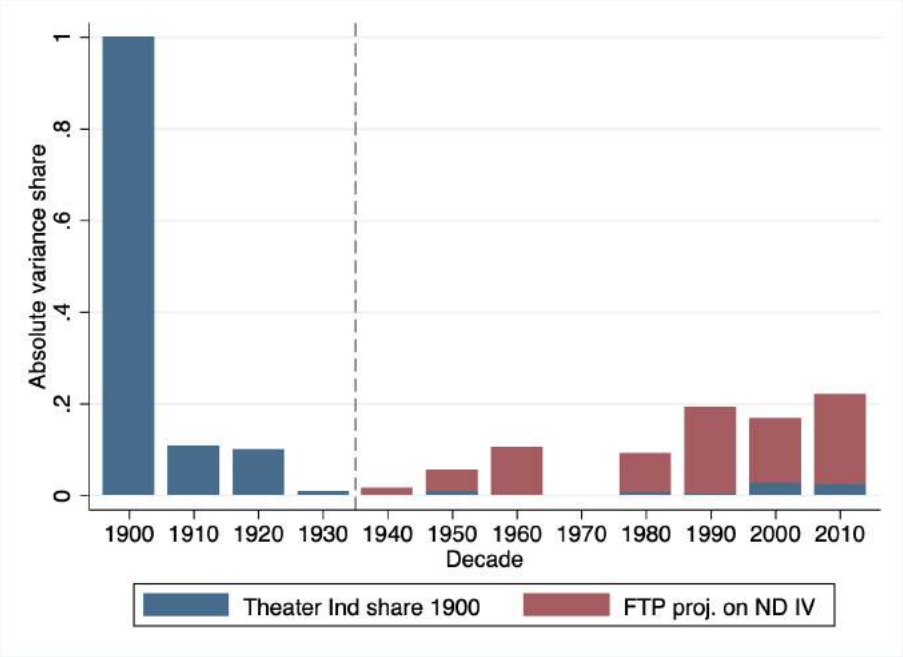
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A15: Variance decomposition: FTP versus 1900 artists

(a) Actors



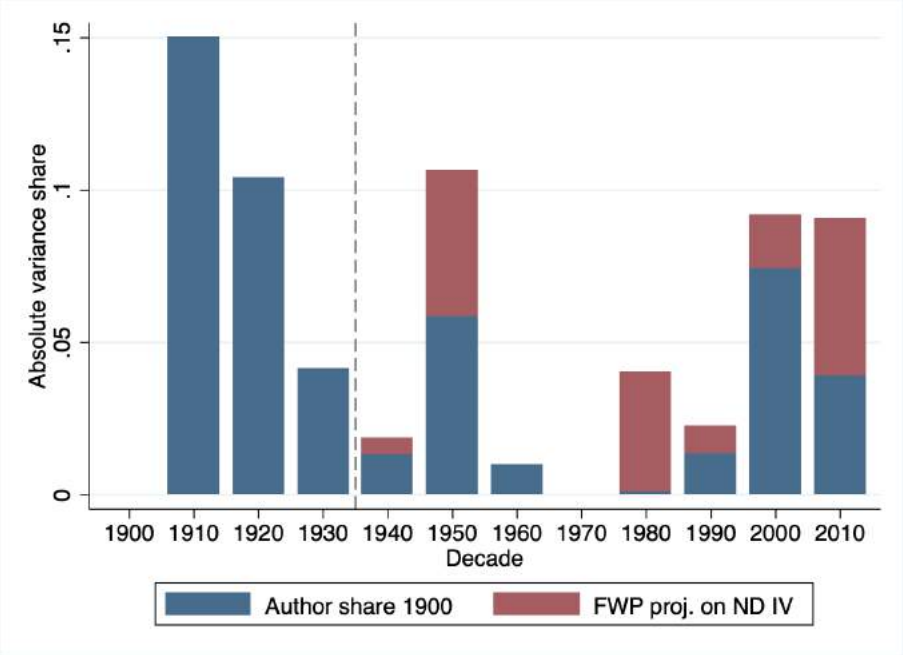
(b) Theater and film industry workers



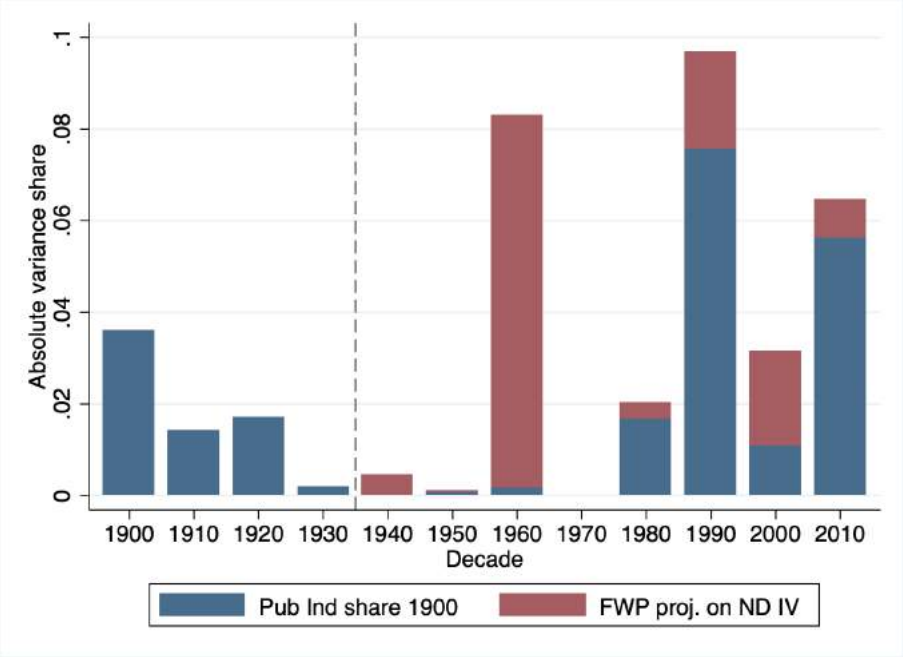
These figures display the repeated cross-sectional variance decomposition over decades of contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{l,t} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 and in 1980-1990 for actors due to lack of city-denominated data.

Figure A16: Variance decomposition (city-demeaned): FWP versus 1900 artists

(a) Authors



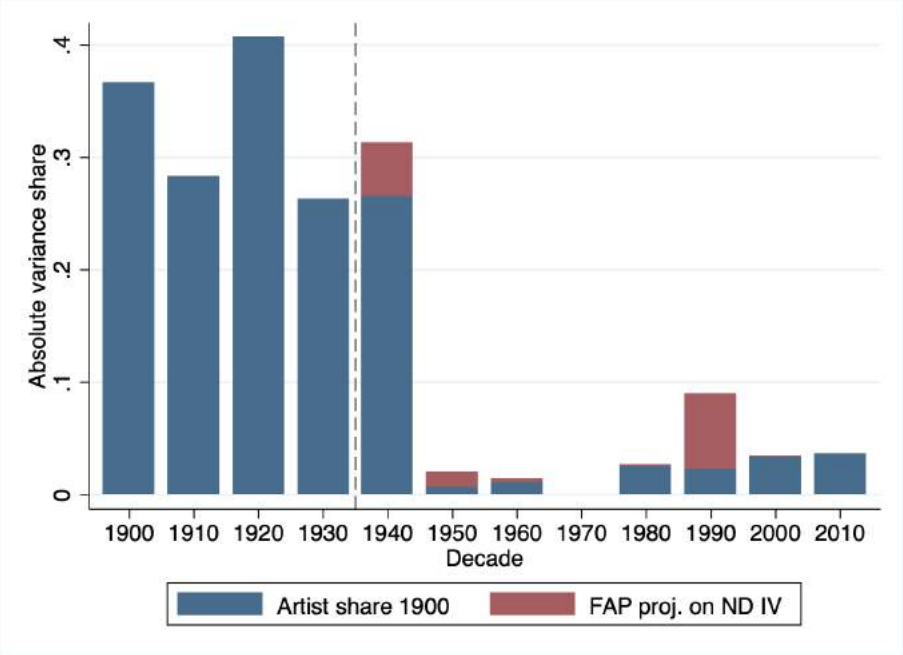
(b) Publishing industry workers



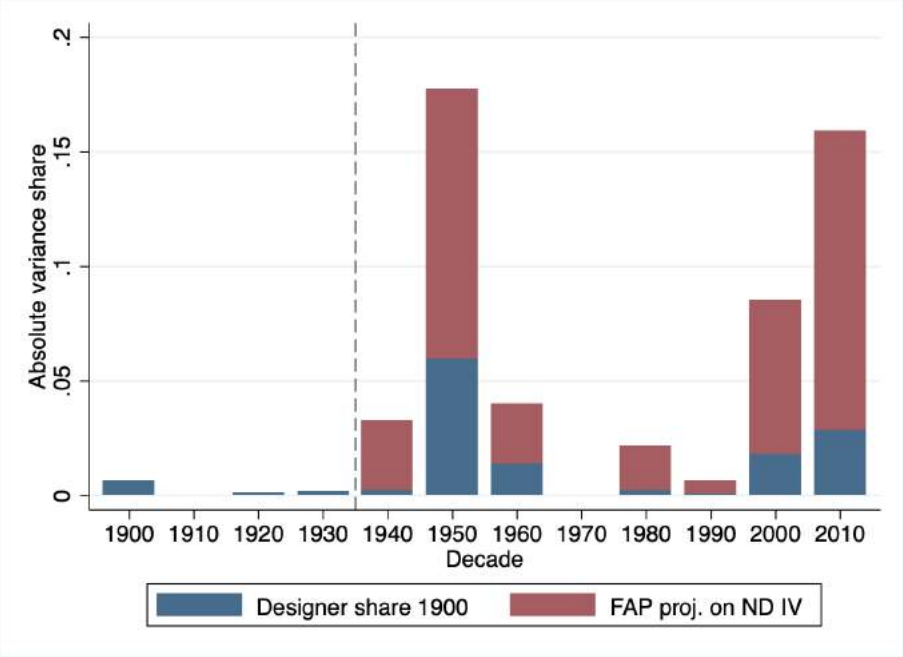
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A17: Variance decomposition (city-demeaned): FAP versus 1900 artists

(a) Visual artists



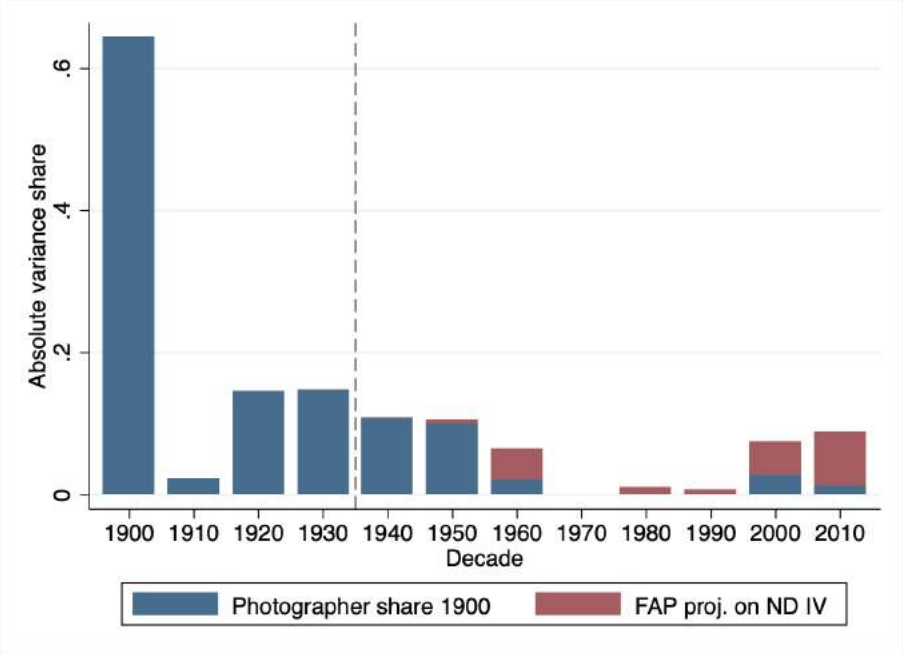
(b) Designers



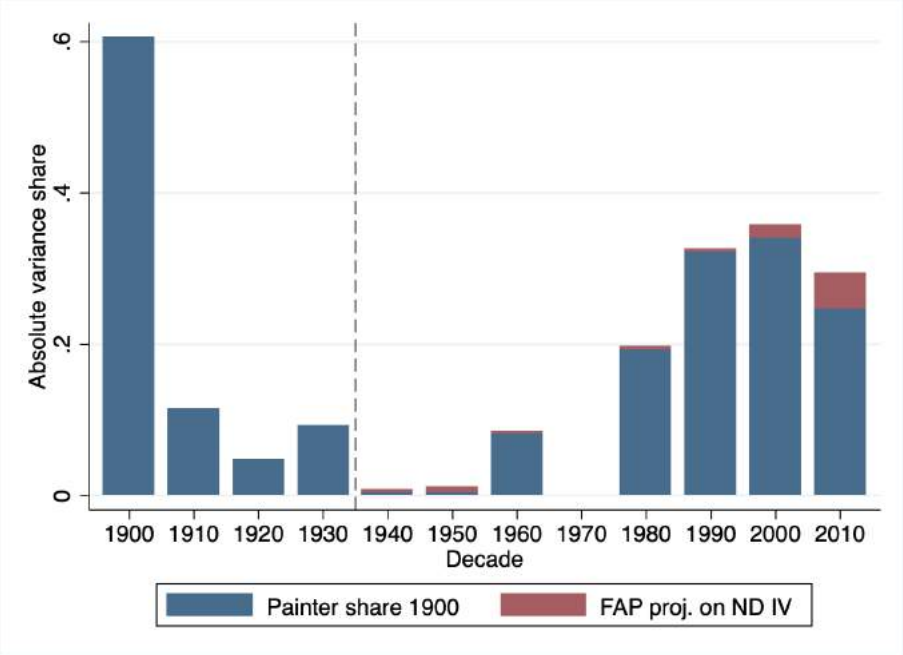
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A18: Variance decomposition (city-demeaned): FAP versus 1900 artists

(a) Photographers



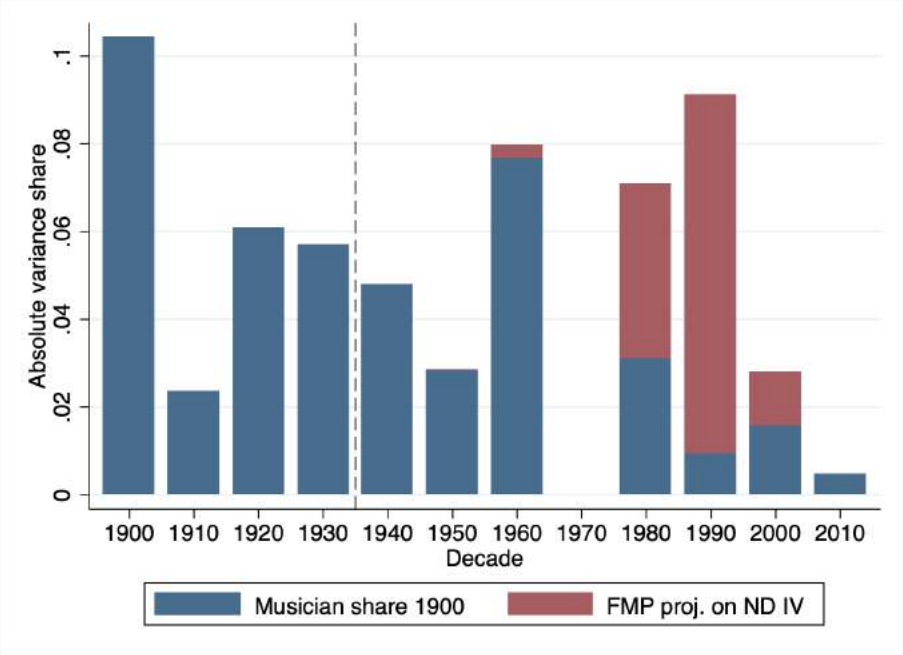
(b) Painters



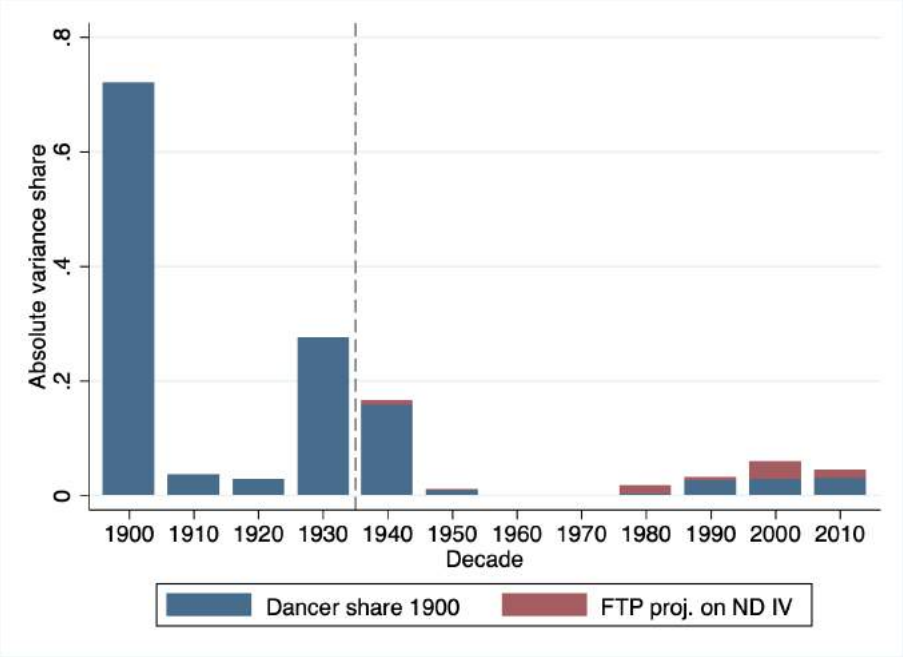
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A19: Variance decomposition (city-demeaned): FMP and FTP versus 1900 artists

(a) Musicians



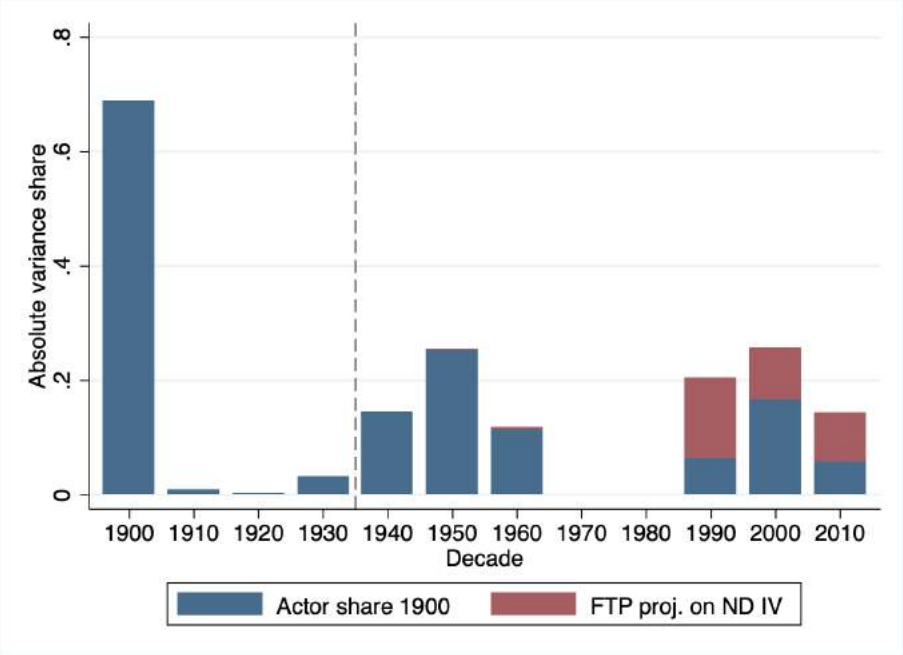
(b) Dancers



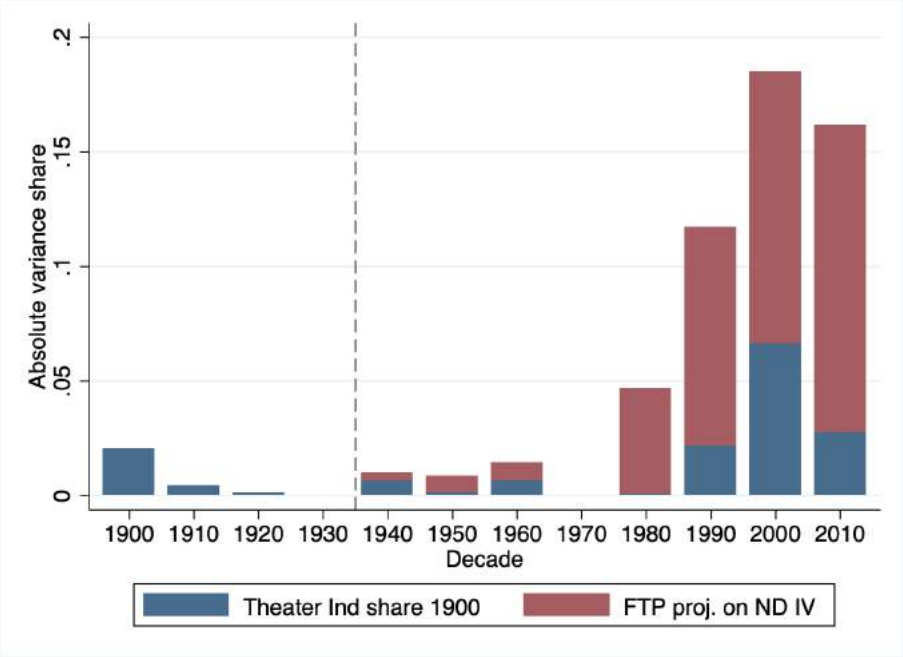
These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 due to lack of city-denominated data.

Figure A12: Variance decomposition (city-demeaned): FTP versus 1900 artists

(a) Actors



(b) Theater and film industry workers



These figures display the repeated cross-sectional variance decomposition over decades of city-demeaned contemporaneous artist shares between the exogenous component of their Federal One activity and their respective 1900 population levels. Bar of profession l in year t sums up to the R^2 value from corresponding regression: $y_{i,l,t} - \bar{y}_{i,l} = \beta_1 y_{i,l,1900} + \beta_2 \widehat{FPNo1}_{i,l} \cdot 1\{Year_t \geq 1940\} + \varepsilon_{i,l}$. Here, the independent variable $\widehat{FPNo1}_{i,l}$ represents the projection of log Federal One employment of subfield l in city i on the log New Deal leave-out spending instrument. The decomposition is absent for 1970 and in 1980-1990 for actors due to lack of city-denominated data.

Appendix B: Proofs

B1: Demonstration of failure of simple path-dependent supply and demand shifters to produce equilibrium shifts

Here I demonstrate the that the equilibrium path of provision of artistic services with linear dependence of cost on previous-period equilibrium production fails to propagate unsustained shocks into the steady-state.

Artists provide services that are consumed in a perfectly elastic manner, selling their services at market-clearing price $p \in \mathbb{R}_+$, taken by producers as given. They produce as profit maximizers according to their convexly increasing variable costs that here are based on a productivity shifter that depends positively on previous production equilibrium consumption:

$$\Pi_t = pQ_{s,t} - B(Q^*_{t-1})Q_{s,t}^{\frac{\varepsilon_s+1}{\varepsilon_s}},$$

for previous period equilibrium quantity Q^*_{t-1} and a price elasticity of supply $\varepsilon_s > 0$. Importantly, individual producers behave atomistically and are not cooperatively forward-looking, and only optimize to generate contemporaneous aggregate provision of services. For simplicity I adopt the parameterization $B(Q^*_{t-1}) = \frac{\varepsilon_s}{\varepsilon_s+1} \cdot (bQ^*_{t-1})^{\frac{-1}{\varepsilon_s}}$, for $b > 0$, which reflects lower production costs based on the previous period's equilibrium production, the primary mechanism of path dependence. This functional form generates supply of artistic services:

$$Q_{s,t} = bQ^*_{t-1}p^{\varepsilon_s}.$$

Parameterizing demand as $Q_{d,t} = ap^{-\varepsilon_d}$ for price elasticity of demand $\varepsilon_d > 0$ and demand shifter $a > 0$ induces equilibrium path of provision of artistic services

$$Q^*_t = a^{\frac{\varepsilon_s}{\varepsilon_s+\varepsilon_d}} \cdot \left(bQ^*_{t-1}\right)^{\frac{\varepsilon_d}{\varepsilon_s+\varepsilon_d}}.$$

Restricting to some $a, b, \varepsilon_s, \varepsilon_d > 0$ and taking some initial point $Q^*_0 > 0$, I proceed by

iterating out the first terms.

$$Q_1^* = \underbrace{(a^{\varepsilon_s} b^{\varepsilon_d})^{\frac{1}{\varepsilon_s+\varepsilon_d}}}_{\rho} \overbrace{Q_0^{*\frac{\varepsilon_d}{\varepsilon_s+\varepsilon_d}}}^{Q_0^{*\chi}} = \rho Q_0^{*\chi}$$

$$Q_2^* = \rho Q_1^{*\chi} = \rho(\rho Q_0^{*\chi})^{\chi} = \rho^{1+\chi} Q_0^{*\chi^2}$$

$$Q_3^* = \rho Q_2^{*\chi} = \rho(\rho^{1+\chi} Q_0^{*\chi^2})^{\chi} = \rho^{1+\chi+\chi^2} Q_0^{*\chi^3} \dots$$

The equilibrium provision of services in period $t = n + 1$ can thus be expressed as

$$Q_{n+1}^* = \rho^{\sum_{i=0}^{n} \chi^i} Q_0^{*\chi^{n+1}}.$$

Applying the ratio test to this quantity allows us to gauge the convergence:

$$\begin{aligned} \lim_{t\to\infty} \left| \frac{Q_{t+1}^*}{Q_t^*} \right| &= \lim_{t\to\infty} \left| \frac{\rho^{\sum_{i=0}^{t} \chi^i} Q_0^{*\chi^{t+1}}}{\rho^{\sum_{i=0}^{t-1} \chi^i} Q_0^{*\chi^t}} \right| \\ &= \lim_{t\to\infty} \left| \rho^{\chi^t} Q_0^{*\chi^t(\chi-1)} \right|. \end{aligned}$$

Both $\varepsilon_s > 0$ and $\varepsilon_d > 0$ implies $0 < \chi < 1$, and in turn $\implies$ $\lim_{t\to\infty} \chi^t = 0$. Since $\rho = (a^{\varepsilon_s} b^{\varepsilon_d})^{\frac{1}{\varepsilon_s+\varepsilon_d}} > 0 \ \forall \ a, b, \varepsilon_s, \varepsilon_d > 0$, this value clearly tends toward zero. Because the limit of this argument approaches zero, which is less than one, as the index grows arbitrarily large, regardless of additional restrictions upon our constants, this sequence is convergent with no additional restrictions. □

What is the limit of this sequence? Having established the convergence of the sequence, its limit follows simply as a steady-state condition:

$$\begin{aligned} Q^* &= \rho Q^{*\chi} \\ \implies Q^{*1-\chi} &= \rho \\ Q^* &= \rho^{\frac{1}{1-\chi}} = \left((a^{\varepsilon_s} b^{\varepsilon_d})^{\frac{1}{\varepsilon_s+\varepsilon_d}} \right)^{\frac{1}{1-\chi}} \\ &= \left((a^{\varepsilon_s} b^{\varepsilon_d})^{\frac{1}{\varepsilon_s+\varepsilon_d}} \right)^{\frac{\varepsilon_s+\varepsilon_d}{\varepsilon_s}} \\ &= (a^{\varepsilon_s} b^{\varepsilon_d})^{\frac{1}{\varepsilon_s}} \\ \therefore Q^* &= a b^{\frac{\varepsilon_d}{\varepsilon_s}}. \end{aligned}$$

Steady state provision of services in this specification only depends on scale and behavioral parameters.