Urban Resilience and Reorganization: The Economic Impact of the Great Fire of London*

Philipp Ager Maja U. Pedersen Paul Sharp Xanthi Tsoukli†

Abstract

We examine how the Great Fire of 1666 affected the spatial distribution of economic activity within London. We construct a novel georeferenced panel of 1,238 goldsmith-bankers and 39 marketplaces active between 1630 and 1690, linked to parish-level boundaries, and combine this with household-level wealth data from Hearth Tax records. We show that the fire induced a persistent decentralization of retail market access, while financial services exhibited stronger spatial persistence, consistent with sector-specific agglomeration economies. Affected areas became more socioeconomically homogeneous: average wealth increased while intra-parish inequality declined, driven by selective return migration and rebuilding costs. Our findings provide rare historical microdata evidence on how urban economic geography and inequality respond to localized shocks, contributing to debates on resilience, spatial reorganization, and the persistence of economic activity within cities.

Keywords: Urban resilience; Agglomeration; Economic geography; Natural disasters; Wealth inequality; Market access; Historical London
JEL codes: N23, N93, R12, R23, D31

*Acknowledgments: Frederikke Frehr Kristensen provided outstanding work during earlier stages of this project. We are grateful to Jacob F. Field for helpful feedback, as well as providing the 1675 Heath Tax Assessment data. This was collected by him as part of his PhD thesis, which was funded by a three-year doctoral award grant from the Arts and Humanities Research Council (https://www.ukri.org/councils/ahrc/) and has been published as: London, Londoners and the Great Fire of 1666: Disaster and Recovery (Abingdon: Routledge, 2018). Sascha Becker, Greg Clark, Neil Cummins, and Walker Hanlon also provided invaluable suggestions and feedback.

†Philipp Ager, University of Mannheim and CEPR; Maja Uhre Pedersen, University of Southern Denmark; Paul Sharp, University of Southern Denmark, CAGE and CEPR; Xanthi Tsoukli, University of Bamberg.

1 Introduction

Major city fires have occurred throughout history, and every schoolchild in the UK learns that "in 1666, London burned to sticks"[1]. Studying such events can shed light on how urban areas adapt economically and structurally in response to disasters, influencing patterns of redevelopment and migration, and raising questions central to urban economics, including resilience, agglomeration dynamics, and inequality.

By the 1660s, the City of London (referred to below as "the City"), an area of approximately one square mile, was a major cultural, social, and economic centre with an estimated population of 100,000, and the whole metropolis (referred to below as "London") was more than twice that size (Harding, 1990; Wrigley, 1967).[2] This status was threatened when on Sunday, September 2, 1666, the Great Fire began. It was only extinguished the following Wednesday, after having left 90 percent of homes in the City destroyed, although much of the surrounding metropolis was less affected or unaffected. A major reconstruction program commenced and was more or less complete a decade later (Reddaway, 1951). Exploiting perhaps the most famous city fire in the world, we ask: how do urban disasters affect the spatial organisation of economic activity and the distribution of wealth within a city?

Uniquely for this period of time, we can shed light on this question. To do so, we digitised and georeferenced historical sources on the locations of all known marketplaces and goldsmith-bankers operating in London between 1630 and 1690: 39 marketplaces and 1238 goldsmiths in London, the latter being the forerunners of modern banks (Persson and Sharp, 2015). This novel dataset constitutes, to our knowledge, the first to capture intra-urban financial and market activity in pre-industrial London at this level of detail. This information means that we can construct a reduced-form measure of market and financial access at the parish level, and thus very local economic activity. Our measures are based on a concept of market potential that is used in the

[1] Or varieties thereof, see for example Peter James (2014) novel, *A Twist of the Knife*, Pan Macmillan, p. 17.

[2] This greater area of London was broadly defined as including the 113 parishes of the City (97 of them inside the ancient Roman city walls), as well as the parishes of Middlesex, Surrey, and Westminster (Harding, 1990; Cummins et al., 2016).

trade literature (Donaldson and Hornbeck, 2016), but increasingly adopted in urban economics to proxy access within cities (e.g., Redding and Sturm, 2008), and aim to encompass the direct and indirect impact of the closings/openings of marketplaces and goldsmiths.

Although the parish unit is geographically small, the market potential measure allows us to consider general equilibrium effects, and with these measures at hand, we can evaluate whether the Great Fire substantially altered the centre of economic activity in London. Capturing such changes within a city is the major contribution of the present work. We also consider the social dimensions of the fire's aftermath through an analysis of the London Hearth Tax records (a property tax) for the years 1666 and 1675, a rare source of historical socio-economic data at the household level covering the period both before and after the disaster.

Urban theory suggests that different types of economic activity may respond differently to shocks (e.g., Ahlfeldt et al., 2015; Heblich et al., 2021; Lee and Lin, 2018; Lucas and Rossi-Hansberg, 2002; Redding and Sturm, 2024): retail markets may decentralise in response to changing population locations, while financial services may be more dependent on centralised agglomeration economies. Likewise, rebuilding costs and planning constraints may lead to selective return migration, favouring wealthier households and reshaping social structure. We test these hypotheses using a difference-in-differences approach, which exploits the timing of the fire and the fact that the fire destroyed buildings in certain parishes while others remained unaffected.

We find that economic activity reemerged in the City after the fire, but some markets also moved westwards towards the neighbouring City of Westminster – then as now the main hub of political power in England, and the location of government and parliament. We also present event-study estimates to capture the dynamic aspects of the fire. We find no evidence of pre-trends for both measures of economic activity, supporting the key identifying assumption in a difference-in-differences approach of common trends in the absence of treatment. However, after the fire, affected parishes experienced a gradual drop in access to markets and financial services compared to unaffected parishes. This gap even widens over time reflecting a longer impact of the fire. These results are robust to including parish linear trends, pre-fire values of the outcome variable interacted by time to capture potential mean reversion dynamics flexibly, and certain geographic characteristics of parishes, such as proximity to rivers interacted by time, that could have affected economic activity in a parish independent of the Great Fire. An affected parish experienced a relative decline in economic activity, as measured by access to marketplaces, by 2 percentage points by 1690 compared to unaffected parishes. Given that our measure of market access decreased by about 4 percentage points between 1660 and 1690 this effect is economically relevant.

The fire also changed the social structure of the City. Using the hearth tax records, we can trace changes in wealth distribution and housing structures within the city. By examining the number of hearths in households before and after the fire, we gain insights into how the disaster influenced the movement of different social classes and reshaped the urban landscape. Our analysis reveals that wealthier households disproportionately returned to fire-affected areas, likely due to their ability to finance reconstruction and meet new building regulations. As a result, the average number of hearths increased. However, the Gini coefficient fell, not because poorer households gained, but because they were priced out of the rebuilt areas altogether. These findings are consistent with a form of income-based sorting, in which rebuilding costs acted as an implicit filter, reshaping the social structure of the City. They imply that the Great Fire substantially changed the social structure of the City. Although the City was quickly rebuilt, low-income groups did not return and contributed to the observed shift in economic activity towards the City of Westminister and other neighbourhoods outside the city walls.

Our findings relate to a substantial literature on how natural and man-made disasters reshape the geography of economic activity and affect distributional outcomes. Glaeser (2022) argues that, for the past 650 years, cities have been quite resilient to physical damage, such as from war, natural disasters, and even plagues. Even large temporary shocks, such as the bombing of cities, leaves the distribution of city sizes unchanged (e.g., Davis and Weinstein, 2002). Closest to our work in this context are other studies of great city fires. These generally find that the destruction altered city structures and often offered new economic opportunities resulting in long-term benefits for city development (e.g., Rosen, 1986; Hornbeck and Keniston, 2017; Siodla, 2015, 2017). Compared to these studies, we provide unique insights into how a major city fire changed economic inequality in seventeenth century England.[3] Although the greater region of London remained resilient to the destruction of the Great Fire, we show that the reconstruction of the City substantially changed inequality in the burned parishes suggesting a gentrification of London's city centre similar to that which historical city centres in the US experienced at the turn of this century (e.g., Brueckner and Rosenthal, 2009; Baum-Snow and Hartley, 2020; Couture and Handbury, 2020). More broadly, our findings of lower inequality due to the relocation of poor residents as a likely result of the City's reconstruction policy after the Great Fire provides an early historical example of "slum clearance" which provides valuable insights for studies on the distributional consequences of urban renewals and place-based policies in modern settings (e.g., Almagro et al., 2023; Collins and Shester, 2013; LaVoice, 2024; Weiwu, 2024).

Our study also contributes to research in urban economics showing that path dependence and agglomeration forces also exist within cities (Ahlfeldt et al., 2015; Heblich et al., 2020; Ambrus et al., 2020; Siodla, 2021). In particular, we provide one of the few historical cases with within-city data on both economic activity and wealth distribution before and after a natural or man-made disaster. We show that the fire caused a relocation of economic activities that likely contributed to the population decline in the City and dispersed population from the city centre.[4] These findings align with a growing body of research showing that even temporary shocks can have lasting impacts on urban structure, through agglomeration dynamics and historical persistence (e.g., Redding et al., 2011; Bleakley and Lin, 2012; Hanlon, 2017; Ager et al., 2020).[5] They also relate to a large body of research on the relationship between market access and economic development showing that local shocks can affect access to wholesale and retail markets and financially services differentially (e.g.,

[3] Although recent work has explored the consequences of disasters for mobility (Hornbeck and Naidu, 2014; Long and Siu, 2018; Boustan et al., 2020; Ager et al., 2020), and growth (Cavallo et al., 2013; Imaizumi et al., 2016), evidence on their distributional effects remains mixed and case-specific (e.g., Keerthiratne and Tol, 2018; Pleninger, 2022; Howell and Elliott, 2018).

[4] Rough population estimates suggest a decline in inhabitants of the City after the fire, but an increase in the population of the greater region of London from 400,000 to 575,000 between 1650 and 1700 (Harding, 1990).

[5] For broader reviews of the literature, see Redding and Rossi-Hansberg (2017), Lin and Rauch (2020), and Hanlon and Heblich (2022)).

Redding and Sturm, 2008; Donaldson and Hornbeck, 2016; Juhász, 2018).[6]

Finally, our study contributes to the economic history literature on the development of London after the Great Fire. Our results are consistent with the work of Field (2008, 2017), who studied the resettlement and reconstruction of London after the Great Fire based on various sources, including the hearth tax records. To this, we use the full counts of the hearth tax in 1666 and 1675, as well as detailed information on the locations of financial and retail activity within seventeenth-century London. Our quantitive analysis also complements the historical accounts of the rebuilding of London after the Great Fire, see Bell (1920), Reddaway (1951), and Porter (2011).[7] More broadly, our analysis of goldsmiths' and wholesale and retail markets' locations in London before and after the Great Fire relates to the literature on the financial history of seventeenth-century London more generally, and the history of goldsmith-bankers in particular, see, for example, Richards (2012), Quinn (1997, 2001), or Sussman (2022); for the period after 1700, see, for example, Temin and Voth (2013), and Smith (1999, 2002) on London's wholesale and retail markets. Compared to these studies our aim is to provide new insights through the lens of economic geography on how a severe urban disaster shapes the location of economic activities.

The remainder of the present work is organised as follows. The next section provides the historical background. Section 3 describes the datasets employed in the study, including the market and financial service locations and the London Hearth Tax records, which inform our analysis of economic shifts and social structure changes. Section 4 outlines our econometric model, and the results are presented in Section 5. The final section concludes.

[6]Most of this literature focuses on how variation in market access induced by a sudden change in trade openness or the construction of new transportation infrastructure affects the location of industry, city growth, or other measures of local economic activities. Unlike most of these studies, which rely on transportation improvements or trade liberalization, our setting features a sudden negative shock that reshaped the urban economic geography through physical destruction and new building regulations, rather than through planned infrastructure or trade reforms.

[7]For the financial aspects of rebuilding the city after the fire, see, e.g., Coffman et al. (2022).

2 Historical Background

London's history as a commercial centre goes back to Roman times. The earliest financial document discovered is an IOU[8] between two ex-slaves dated January 8, AD 57.[9] Before the outbreak of the Great Fire in 1666, the City was densely populated and consisted of buildings in a multitude of styles, some of which dated back three or four hundred years. The streets were narrow and many of the houses and shops were owned by institutions, such as livery companies (guilds) and the City of London Corporation (the local government), that were not willing to rebuild for their tenants. There were exceptions, however, and the houses of the richer classes were of higher quality, some of which are associated with the famous architect Inigo Jones, who was appointed Surveyor-General of the King's Works in 1615. For most properties, however, little or nothing had changed in the basic structures of the medieval house by the time of the fire (Schofield, 1984).[10]

The fire famously began in Pudding Lane on September 2, 1666, and mostly spread westwards, propelled by a strong easterly wind. England was at the time recovering from the 1665 plague and was at war with the Dutch Republic and France. Due to the nature of its housing, the City was extremely vulnerable to fire. Around London Bridge, in particular, houses were densely packed and mixed with warehouses stocked with flammable goods. In general, London mostly consisted of densely packed buildings made of wood and thatch using open hearths, and with a limited high pressure water supply and firefighting equipment. In the aftermath of the fire, St Paul's Cathedral and 84 parish churches were destroyed, as were 44 out of 51 livery company halls and 13,200 houses (Figure 1). Approximately 100,000 people were left homeless, but the impact of the fire was felt differently due to differences in wealth and social status.[11]

[8] A document, in this case, a wooden tablet, acknowledging a debt.

[9] The Museum of London Archaeology deciphered this document (see UK's oldest hand-written document).

[10] One striking feature of pre-modern London was the general level of mortality. Mortality rates were extremely high and typhus or plague outbreaks were relatively frequent. The most severe outbreak recorded was the "Great Plague" of 1665. It killed almost 70,000 people but turned out to be the last major plague outbreak in London (Sutherland, 1972). It has been speculated that this might have been due to subsequent improvements in housing or by the fire's impact on the rat population. This claim has, however, been disputed, since the plague was more severe outside the destroyed area of the City, and besides, less severe outbreaks continued in England until the twentieth century (Scott and Duncan, 2001). See also Cummins et al. (2016) for more details on the living standards and plague incidences in London between 1560 and 1665.

[11] For more details on the Great Fire of 1666 we refer the readers to Field (2017), who provides a fascinating

Figure 1: The Great Fire of 1666 in London

NOTE.— This figure shows the extent of the Great Fire of 1666 in London. We digitised this map for our empirical analysis. Source: Schofield (1984, pp. 172-173).

It was quickly decided to rebuild the city and to improve the quality of urban infrastructure, and after some discussion, the Rebuilding of London Act was passed by Parliament on February 8, 1667. This mandated specific construction standards, such as requiring buildings to be constructed from brick or stone rather than timber. These regulations significantly increased reconstruction costs, disproportionately affecting poorer residents, making it difficult for them to return to their former neighbourhoods (Field, 2017). The financial strategy to achieve rebuilding involved several key elements and sources, managed primarily by the London Corporation. The primary funding mechanisms included taxes, loans, and donations (see Coffman et al. (2022)):

1. Coal Tax: A tax on sea-coal was introduced to finance the reconstruction. The Rebuilding

account of the effects of the fire on individuals and communities in London as well as in the rest of England.

Act of 1667 allocated a duty of one shilling per ton of sea-coal landed at the Customs House, which was later increased by an additional two shillings per ton in 1670. The funds raised through this tax were designated for various purposes: 25 percent for City reconstruction, 56 percent for rebuilding parochial churches, and 19 percent for the rebuilding of St. Paul's Cathedral.

2. Loans and Borrowing: The City of London borrowed extensively to cover the immediate costs of reconstruction. This borrowing was done at relatively low interest rates compared to the rates faced by the Crown. The City borrowed from its main treasury, the Orphans' Fund, and directly from individuals, securing these loans against future coal tax receipts.

3. Charitable Donations: Nationwide charitable donations played a significant role in funding the reconstruction efforts. A proclamation by King Charles II called for donations to support Londoners affected by the fire, which helped fund the rebuilding of churches and support families.

Despite these measures, the City faced financial challenges. The revenue from coal taxes was not always timely or predictable due to fluctuations in coal imports and consumption. Consequently, expenditures on rebuilding often outpaced tax revenues, leading to additional borrowing. Moreover, the cost of rebuilding public structures and infrastructures such as the Guildhall, markets, and conduits was significant. The City spent substantial sums on these projects, alongside other pressing expenditures like fortifications against the Dutch. The total cost of the City's reconstruction efforts, including financing charges, was close to £1 million between 1667 and 1683, with about 77 percent of this covered by the coal cash fund and the rest by debt. Ultimately, the City's financial system proved unsustainable. The heavy burden of reconstruction, combined with the pre-existing debt from the Orphans' Fund and other obligations, led to the City defaulting in 1683. The inability to convert the opportunities presented by the rebuilding into stable financial gains was a critical factor in this default.

Nevertheless, the fact that London was rapidly rebuilt bears witness to the resilience of London as a major economic centre. Furthermore, in London's core activity, shipping, the centre of government in Westminster, and in the suburbs, resources were available to secure a rapid rebuilding (see also Field (2011)). A Fire Court was established to resolve disputes between tenants and landlords quickly. This ensured that the new structures that were spreading were legally secure and more safely constructed. It sat from February 1667 until September 1672, which marks the point when the City was more or less reconstructed, although the new St. Paul's Cathedral was not completed until June 1675.

In an important contribution, Field (2017) constructed a dataset, which we make use of below, linking a subsample of 1,360 Londoners in the 1666 and 1675 Hearth Tax lists and demonstrated that 67 percent of the total, and 87.5 percent of all those burned out, moved to a different location between 1666 and 1675. He explains that the fire accelerated the gradual movement of Londoners from the City to the suburbs, with a clear pattern: the prosperous moved to the west, and the less prosperous, to the east, although many returned to adjacent or nearby locations.[12] Wealthy gentry and merchants were the most likely to return, whereas unskilled labourers and poor craftsmen were the least likely quite probably because they could not bear the cost of reconstruction. This is something we find support for in our analysis.

Our measures of economic activity within London focus on marketplaces and goldsmiths. On marketplaces, Smith (1999) provides an excellent account. He defines markets as "those institutions which were publicly recognised as places of regular trade in basic commodities: meat and livestock, fish and corn, fruit and vegetables, hay and straw, cloth, coal, and animal skins". The markets' characteristics and development were shaped by a range of factors: most importantly market forces, but also political concerns. After the fire, Smith explains that the geographical pattern of London's markets took on an increasingly "centrifugal, though lopsided, appearance", with fewer marketplaces in the east, and more in the western part of London, which is consistent with what we find in our empirical analysis below. The fire facilitated a rationalisation so that markets,

[12] In fact, there was much "residential persistence" across this period, with neighbours recreating pre-fire neighbourhoods in overlapping or nearby areas. The decision to keep the original street plan aided the rapid recovery in this respect.

from having been relatively evenly spaced within the City, increasingly were spaced out across the wider metropolis.

For financial services, we consider "goldsmith-bankers" (Chaffers and Aurifabrorum, 1883), an industry that had evolved into an early form of a banking sector by the mid-seventeenth century. These goldsmiths formed a network through mutual debt dependence and inter-banker clearing and were note issuing, fractional reserve banks. The resilience of this network is reflected by their continued functioning through major events such as the plague of 1665, the fire itself, and the Stop of the Exchequer in 1672 (a repudiation of state debt). Following the Glorious Revolution of 1688, and reduced anxiety about depositing specie with an unpredictable monarch, a more modern banking system began to emerge with the Bank of England founded in 1694 (Neal and Quinn, 2001). The business of goldsmith-bankers started then to decline in the eighteenth century (Quinn, 1997).

So far, there is no rigorous quantitative evidence on how goldsmiths responded to the Great Fire. The only exception to our knowledge is a case study by Mitchell (1994), who considers the case of one particular goldsmith-banker, Thomas Fowle, who conducted his trade from the Black Lion at Temple Bar, Fleet Street at the time. He was fortunate enough to see the Great Fire stop just yards from his door, due to a fortuitous change in the direction of the wind. His trade expanded rapidly subsequently, which might have been due to the competitive advantage enjoyed by the goldsmiths of Fleet Street and the Strand, given that those in Lombard Street and Cheapside were burned out. Our empirical analysis complements the historical narrative by providing quantitative evidence on whether and how the Great Fire changed the locations of goldsmith-bankers and marketplaces within the parishes of London.

3 Data

A central contribution of this paper is the construction of a novel dataset tracking economic activity at the parish level in early modern London. We georeferenced over 1,200 goldsmith-bankers and

39 markets based on archival and secondary sources, allowing for detailed spatial analysis before and after the fire. We rely on two sources of data to create two measures of access of a parish to these two services; *London Goldsmiths* and *market places*. The analysis we conduct is at the parish level every ten years.[13] A parish referred to a geographical unit within the city, governed by its own local church. These parishes were central to community life and served as the basic units of both ecclesiastical and civil administration, including the administration of poor relief. Our sample includes a total of 222 parishes that can be further divided into 99 parishes that were affected by the fire and 123 that remained unaffected[14]. Given that the fire led to some redrawing of parish boundaries, in our analysis we keep the parish borders constant throughout the entire period. As explained below, by construction all our outcomes of interest do not depend much on the actual parishes at a given point in time and hence our results are not sensitive to changes in parish borders.

To quantify financial activity in the City, we construct a panel dataset that traces the activity of *goldsmith-bankers* using the list of *London Goldsmiths*, as reported by Heal (1972), who lists individual goldsmiths, jewellers, bankers, and pawnbrokers, as well as their locations. In particular, the information includes the family and first name of the individual, his occupation, the address, the year of opening and closure, as well as the name(s) of partners (if applicable).[15] The address rarely consists of both the street name and the number, but in most cases, the street name and the parish name are provided. Goldsmiths that were located in London, without mentioning the parish they were working in, are excluded from our sample.[16] For every goldsmith-banker we geo-reference the location to obtain the coordinates, using the information given about the location. Thereafter, we assign them to the relevant parish used in our analysis.

To quantify economic activity within London, we construct parish-level measures of access to

[13] Although we have yearly data for both markets and goldsmiths, the variation each year is not significant. Therefore, our analysis is conducted in decade intervals. This means that the number of markets or goldsmiths that we use in each decade represents the number of services that were active in a given year. For example, the year 1660 takes into account the active markets and goldsmiths in the year 1660.

[14] A few parishes were partly impacted by the fire. We classify these as affected, but changing this assumption does not materially affect our results.

[15] Sometimes the individual is reported to have several occupations.

[16] The goldsmiths excluded because of missing information about the parish are about 15% of all goldsmiths in our data.

goldsmith-bankers and marketplaces. For each, we develop an access index grounded in the market potential concept introduced by Harris (1954), widely used in economic geography and urban economics to measure access to economic activity (e.g., Redding and Sturm 2008; Donaldson and Hornbeck 2016). After geo-referencing the locations of 1,238 goldsmiths and 39 markets operating in London between 1630 and 1690, we use GIS to compute the average distance between the centroid of each parish and all active service locations in a given year. This approach captures both direct access (services located within the parish) and indirect access (services in nearby parishes), reflecting the broader spatial integration of London's economy. For example, a parish with no goldsmiths or markets may still have high access if it is adjacent to parishes with many services.

The average distance is computed as:

$$\text{Distance}_{it} = \frac{1}{n}\sum_{j=1}^{n}\sqrt{(X_j - X_{Ci})^2 + (Y_j - Y_{Ci})^2}, \quad \text{where } Year_{it} = t, \tag{1}$$

where $Centroid_i = (X_{Ci}, Y_{Ci})$ represents the geographic centre of parish i, and $EconomicActivity_j = (X_j, Y_j)$ denotes the location of each service j (market or goldsmith).

We take the inverse of this measure and normalise it so that the index ranges from 0 to 1, where higher values indicate better access:

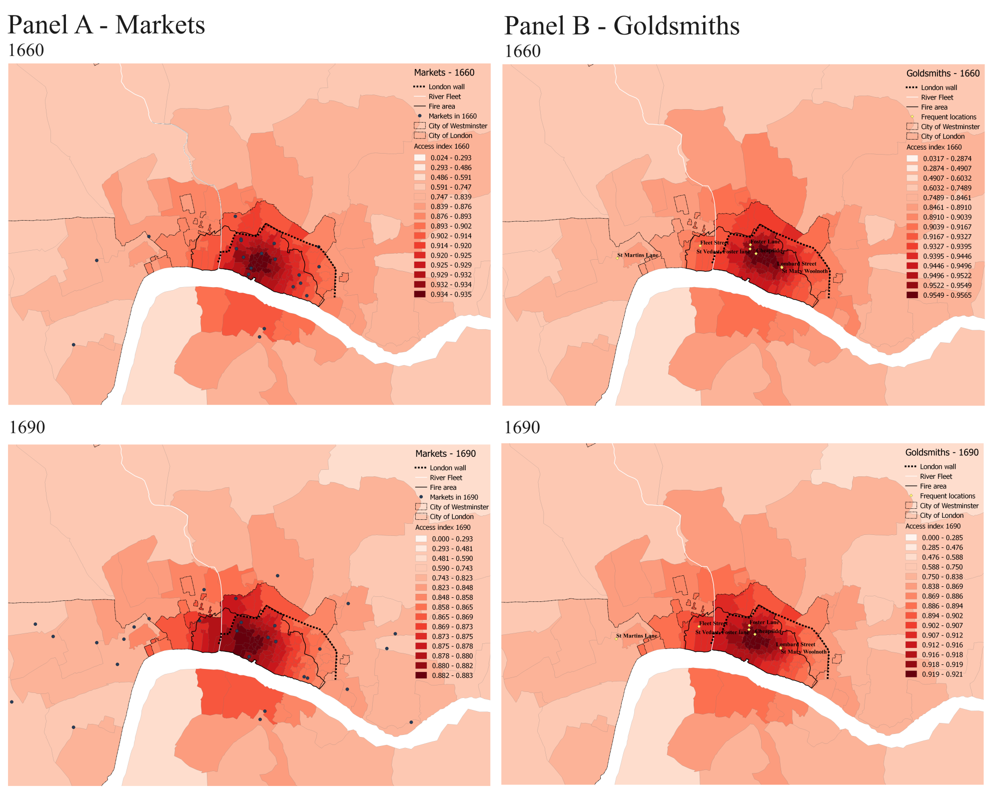
$$\text{Access Index}_{it} = 1 - \frac{\text{Distance}_{it}}{\max(\text{Distance}_{it})}. \tag{2}$$

We construct two separate indices: the *Access Index (Goldsmiths)* and the *Access Index (Markets)*. Market location data are drawn from Smith (1999), which include names, dates of operation, and identifiable street-level coordinates. Each market is assigned to its parish, and its location is incorporated into the access index calculation.

These indices serve as reduced-form proxies for local economic activity, reflecting both immediate and spillover effects of service accessibility. Compared to simpler measures, such as the number of markets or goldsmiths per parish, which are often zero and ignore spatial spillovers, our indices offer a flexible and theory-consistent alternative. They allow us to capture the reorganisation of urban economic geography following the Great Fire of 1666. Importantly, we interpret changes in the Access Index as relative shifts in accessibility. A decline in fire-affected parishes may reflect not only a direct loss of services but also the emergence of new service hubs in other parts of London. This highlights the distinction between absolute and relative change in the urban landscape.

Figure 2 displays our measures of *Market Access*, where the parishes shaded darkest on the map have the highest market access. From a visual inspection, there appears to be a shift in economic activity westwards towards Westminster. Summary statistics are presented in Table 1.

Figure 2: Access Indexes in 1660 and 1690



NOTE.— This figure shows the market access of every parish in the sample for the years 1660 (before the Great Fire) and 1690 (after the Great Fire). Panel A shows the index for marketplaces and Panel B for goldsmith-bankers. A darker shaded area reflects that a parish had greater access to marketplaces or financial services.

Figures 3 and 4 illustrate the total number of services by location and treatment status, supporting the interpretation of spatial reallocation.

Table 1: Summary Statistics for Markets and Goldsmiths

	Total					Fire area within					Fire area without				
	Mean	St.Dev	Median	Min	Max	Mean	St.Dev	Median	Min	Max	Mean	St.Dev	Median	Min	Max
Panel A - Full sample															
Parish area (km)	1.370	3.208	0.030	0.001	17.924	0.018	0.022	0.011	0.003	0.143	2.419	3.976	0.510	0.001	17.924
Min distance river (km)	1.036	1.264	0.536	0.052	6.782	0.431	0.203	0.407	0.052	1.021	1.506	1.518	0.897	0.129	6.782
Panel B - 1660															
Access index (markets)	0.781	0.226	0.898	0.024	0.935	0.925	0.009	0.928	0.897	0.935	0.669	0.249	0.771	0.024	0.919
Access index (goldsmiths)	0.791	0.235	0.911	0.032	0.957	0.945	0.012	0.948	0.909	0.957	0.673	0.257	0.783	0.032	0.937
Number of markets	0.113	0.344	0.000	0.000	2	0.155	0.391	0.000	0.000	2	0.080	0.301	0.000	0.000	2
Number of goldsmiths	0.694	2.888	0.000	0.000	37	1.134	4.155	0.000	0.000	37	0.352	1.109	0.000	0.000	9
Panel C - 1690															
Access index (markets)	0.750	0.212	0.862	0.000	0.883	0.876	0.007	0.877	0.850	0.883	0.652	0.240	0.768	0.000	0.877
Access index (goldsmiths)	0.771	0.226	0.890	0.000	0.921	0.912	0.009	0.915	0.876	0.921	0.662	0.252	0.766	0.000	0.909
Number of markets	0.131	0.421	0.000	0.000	4	0.103	0.338	0.000	0.000	2	0.152	0.476	0.000	0.000	4
Number of goldsmiths	1.667	6.203	0.000	0.000	76	2.278	8.407	0.000	0.000	76	1.192	3.652	0.000	0.000	33
Share fire parishes	0.437	0.497	0.000	0.000	1										
Parishes			222					99					123		

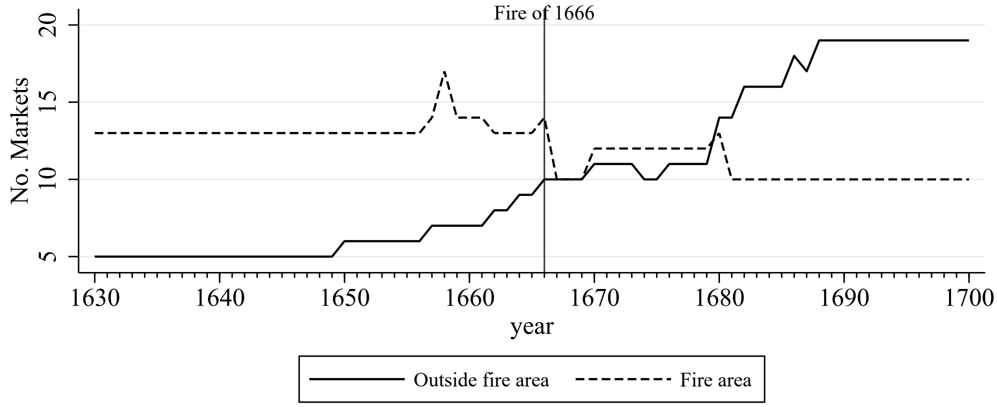
NOTE.— This table shows summary statistics of the markets and goldsmiths. Panel A shows statistics for the entire sample, while Panels B-C shows the results for the two decades 1660 and 1690 respectively. The first five columns refer to all parishes, the next five refer to parishes affected by the fire and the last five columns refer to parishes not affected by the fire.

In addition to our two measures of economic activity, we also make use of the London Hearth Tax assessments to investigate the impact of the fire on wealth and social status.[17] As explained by Field (2017), the hearth tax was a property tax collected based on the number of hearths a household possessed and can roughly be thought of as a measure of wealth and social standing. The tax was collected from 1662 to 1689 and in our analysis we make use of the already digitized records from 1666 which were created a short time before the outbreak of the fire, and those from 1675. The records list, among other things, the number of hearths the household possessed and the parish of residence, the surname, gender, status, and occupation of the owner of the property. In some cases, the amount due is also reported.[18] The records include all London households who

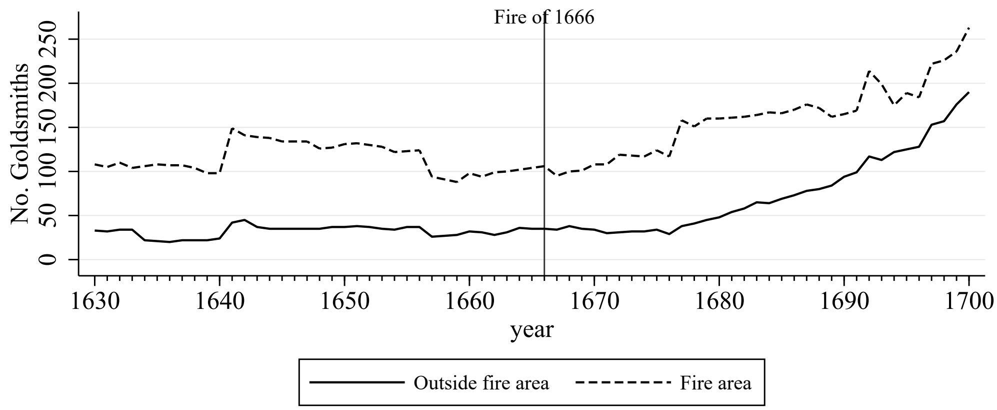
[17]The original Hearth Tax Assessments are kept at the National Archives for the years 1666 (E179/252/32) and 1675 (E179/252/23). We downloaded the former from London Hearth Tax: City of London and Middlesex, 1666 (2011); see British History Online. The 1675 data were kindly provided by Jacob F. Field.

[18]Sometimes there is a more detailed address, but we do not use this, since our analysis is on the parish level.

Figure 3: Number of Goldsmiths and Markets over Time Based on Fire



(A) Markets



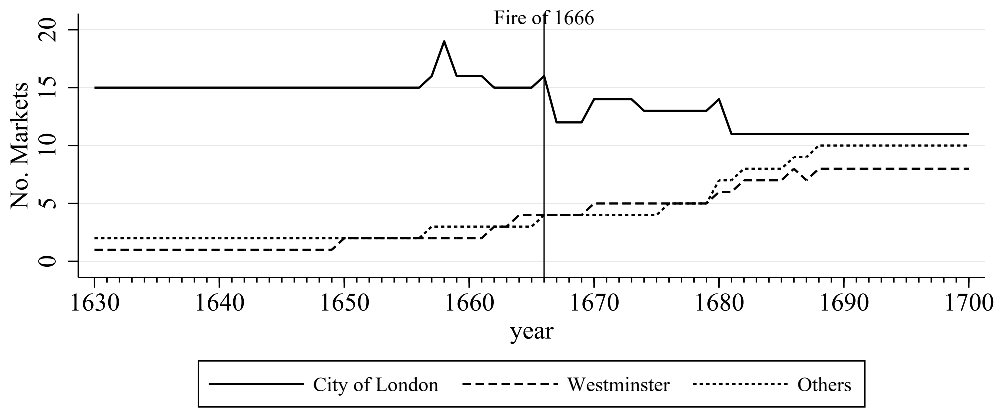
(B) Goldsmiths

NOTE.— This figure shows the evolution of the number of goldsmiths (Panel A) and markets (Panel B) for parishes that were affected by the fire or not.

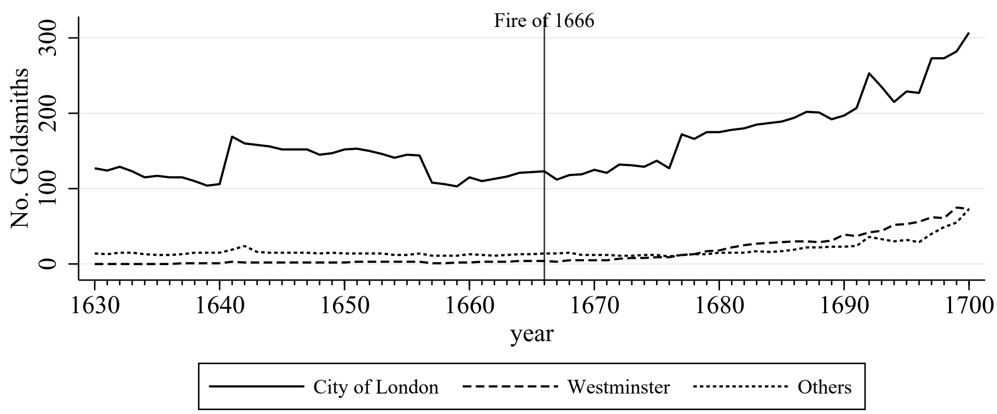
were required to pay the tax.

However, a note of caution is necessary. As Field (2008) explains, the tax "assumed that there was a direct link between the number of hearths and personal wealth," but this assumption did not always hold true. For instance, larger households could be taxed for more hearths, but this did not necessarily correlate with greater wealth, particularly if the property was old or had deteriorated (Field, 2008, p. 22). Moreover, certain occupations, such as those requiring ovens or kilns, could artificially inflate the number of hearths recorded for some households, further distorting the relationship between hearths and wealth. Field notes that studies comparing Hearth

Figure 4: Number of Goldsmiths and Markets over Time Based on Location



(A) Markets



(B) Goldsmiths

NOTE.— This figure shows the evolution of the number of goldsmiths (Panel A) and markets (Panel B) for different locations in London (City, Westminster and others).

Tax records to inventories found that the correlation between hearths and social status was not linear (Field, 2008, p. 23).

Another issue is the problem of exemptions. The Hearth Tax exempted certain poor households, but the criteria for exemption were ambiguous and inconsistently applied. As a result, the poorest households often did not appear in the Hearth Tax records, complicating its use as a tool for assessing wealth inequality. Tenants were not always exempt, but exemptions did exist under specific conditions. For example, individuals renting a house worth £1 per annum or less were often exempt from paying the tax. This suggests that some poorer tenants were excluded from taxation, especially if they did not pay church taxes or poor rates, or if their moveable goods were valued at less than £10 (Field, 2008, pp. 20-24).

Nevertheless, while imperfect, the Hearth Tax remains a unique insight into wealth distribution in the Early Modern Period. Thus, in a similar manner to our approach for markets and goldsmiths, we locate each household by geo-referencing their location to obtain the coordinates and then we assign them to the parish in which they are located, based on the parishes used in our analysis.[19] With this information, we can aggregate the data at the parish level, measuring the average number of hearths per household in each parish before and after the fire. Additionally, to measure the degree of inequality, we compute the Gini coefficient using the distribution of the number of hearths across households within each parish. When aggregating the data at the parish level, we obtained a sample of 73 parishes (with 52 parishes affected by the fire and 21 unaffected parishes) for which we have information from both before and after the fire. Finally, we assign each household to one of four social groups, based on the number of hearths according to the following classification: 1 hearth, labouring poor, husbandmen, poor craftsmen; 2-3 hearths, craftsmen, tradesmen and wealthy yeomen; 4-7 hearths, Wealthy craftsmen and tradesmen, merchants and poorer yeomen; 8 or more hearths, gentry and above.[20] This classification is used in our analysis at the household level to assess the effects of the fire on the distribution of wealth for those appearing in the Hearth Tax records. In Table 2 we present summary statistics for the hearth tax data both at the parish and household level.

As a form of balancing check, we can compare the pre-fire characteristics of affected and unaffected parishes using the 1660 access index values (Table 1, Panel B) and the 1666 hearth tax records (Table 2, Panel A). For markets and goldsmiths, fire-affected parishes had higher access than non-affected ones before the fire (market access: 0.925 vs. 0.669; goldsmith access: 0.945 vs. 0.673), reflecting the fact that the fire struck the commercial core of the City. These differences motivate our inclusion of parish fixed effects, parish-specific trends, and interactions with pre-fire

[19]We once again keep parishes and borders constant, and all outcomes are computed based on the geo-references locations and hence do not depend much on changes in parishes associated with the fire.

[20]This follows the system used by FamilySearch.

Table 2: Summary Statistics for London Hearth Tax Records

		Total					Fire area within					Fire area without				
		Mean	St.Dev	Median	Min	Max	Mean	St.Dev	Median	Min	Max	Mean	St.Dev	Median	Min	Max
									Panel A - 1666							
Parish level	Average no hearths	4.694	1.154	4.855	2.041	9.162	4.742	0.933	4.865	2.041	6.471	4.574	1.598	84.217	2.241	9.162
	Gini coefficient	0.338	0.057	0.328	0.194	0.451	0.323	0.054	0.310	0.194	0.438	0.375	0.049	0.371	0.280	0.451
Household level	Number of hearths	4.085	3.933	3.000	0.000	193.000	4.304	3.289	4.000	0.000	86.000	3.937	4.309	3.000	0.000	193.000
	Social Status	2.412	0.934	2.000	1.000	4.000	2.489	0.926	3.000	1.000	4.000	2.358	0.936	2.000	1.000	4.000
No. parishes				73					52					21		
No. households				38037					15374					22663		
									Panel B - 1675							
Parish level	Average no hearths	5.978	1.372	6.141	2.674	9.000	6.263	1.100	6.306	3.375	9.000	5.273	1.720	4.796	2.674	8.816
	Gini coefficient	0.246	0.059	0.240	0.000	0.398	0.226	0.035	0.221	0.168	0.312	0.295	0.077	0.310	0.000	0.398
Household level	Number of hearths	5.194	3.657	4.000	1.000	135.000	5.819	3.169	5.000	1.000	40.000	4.844	3.861	4.000	1.000	135.000
	Social Status	2.769	0.863	3.000	1.000	4.000	3.016	0.707	3.000	1.000	4.000	2.630	0.911	3.000	1.000	4.000
No. parishes				73					52					21		
No. households				26097					9379					16718		

NOTE.— This table shows summary statistics of the London Hearth Tax records. Panel A shows statistics for 1666 and Panel B for 1675. The first five columns refer to all parishes, the next five refer to parishes affected by the fire and the last five columns refer to parishes not affected by the fire.

access in the difference-in-differences specifications. In the hearth tax data, the average number of hearths was also slightly higher in fire-affected parishes (4.74 vs. 4.57), and the Gini coefficient was slightly lower (0.323 vs. 0.375), suggesting modest differences in wealth and inequality. However, the distribution of social status by household (Panel A, household level) is broadly comparable across treatment groups, and both groups have similar median values. While we observe some differences in means, they are expected given the fire's geography. Our use of controls - including initial access interacted with year, geographic controls, and fixed effects - addresses these baseline differences in our empirical strategy.

4 Empirical Strategy

We use a difference-in-differences approach to investigate the impact of the Great Fire of 1666 on economic activity within London. The sample spans the decades 1630 to 1690. Identification comes from changes in the access of marketplaces or goldsmith-bankers across parishes that were differentially affected by the fire. We use the following specification to estimate our baseline results:

$$Access\ Index_{it} = \beta Fire_i \times Post1666_t + \Gamma X_{it} + c_i + \theta_t + \varepsilon_{it}\ , \tag{3}$$

where $Access\ Index_{it}$ denotes the outcome of interest, i.e. the *Access Index* for marketplaces or goldsmiths in parish i at year t. $Fire_i$ is an indicator variable that equals one for parishes affected by the Great Fire of 1666, while $Post1666_t$ is an indicator variable that equals one for the decades after the Great Fire occurred. We further include a set of parish-specific controls, X_i, which differs by specification. Our baseline includes the initial access index interacted with decade-fixed effects. In some specifications, we also control for the nearest distance to the Thames or Fleet River or a river dummy both of which we fully interact with decade-fixed effects.

Parish fixed effects c_i are included in the estimation, which captures all time-invariant characteristics of a parish that could influence local levels of economic activity independent of the fire, such as whether a parish is located outside or inside the city walls. Decade fixed effects θ_t control for shocks that are common to all parishes. The coefficient of interest, β, can be interpreted as the relative change in *Access Index* of parishes affected compared to those non-affected by the fire.

The key identifying assumption of a difference-in-differences approach is common trends in the absence of treatment. While this assumption is not testable, we can provide support for it by looking at the dynamic patterns of access to marketplaces and financial services across the parishes in our sample. The dynamic difference-in-differences approach relaxes the assumption that the treatment effect is constant over time. In particular, there should be no evidence of pre-trends in the access to marketplaces and financial services between affected and non-affected parishes before the fire broke out in 1666. Potential differences in market access between affected and non-affected parishes should only emerge in the decades after the fire.

Hence, we modify estimating equation (3) and introduce decade-specific effects that are interacted with the fire indicator variable. This flexible difference-in-differences approach is outlined in the following equation:

$$Access\ Index_{it} = \sum_{t=1630}^{1690} \beta_t Fire_i \times Decade_t + \Gamma X_{it} + c_i + \theta_t + \varepsilon_{it} \ , \tag{4}$$

where $Decade_t$ is an indicator for the decades 1630, 1640, 1650, 1670, 1680, and 1690. We choose the decade 1660 as the reference year (i.e., the omitted category in the analysis) since it is the closest to the fire in 1666. Standard errors in all specifications are clustered at the parish level.

We estimate an equation similar to equation (3) using the London Hearth Tax aggregated at the parish level, with the average number of hearths and the Gini coefficient as our outcomes of interest. However, when using the London Hearth Tax, we only have two years, one from before and one from after the fire. Furthermore, we also include district fixed effects interacted with time, to capture characteristics that change over time but are the same within different districts of London.[21] In addition, we also perform a repeated cross-section analysis at the household level where we can compare households affected by the fire to those not affected. Two different specifications are used, depending on the outcome of interest. When using the number of hearths we use Pooled OLS while for the social groups, we use an ordered logit model. In both cases, we include fixed effects for year and parish.

We acknowledge that our design–comparing burned and non-burned parishes–may partly reflect differences between central and peripheral areas, as the fire primarily affected the central parishes of London.[22] This geographic overlap means that the treatment (burned vs. non-burned) is somewhat confounded with the general contrast between central and surrounding areas, which may limit the interpretation of results in strictly causal terms. However, while this limitation does affect the extent to which we can generalize the results, our approach still provides valuable insights into the redistribution of economic activity and population movement following the fire. Moreover, to mitigate this limitation, we carefully control for parish-level characteristics, such as

[21]Districts are areas bigger than parishes and broadly define different zones of the entire area of London. There is a total of 10 districts in our sample.

[22]A simple comparison of pre-fire variables confirms that fire-affected parishes had somewhat higher average access and larger properties, as expected for central areas (see Table 1 and Table 2). These differences are accounted for using interactions with initial values, parish trends, and fixed effects. We include parish-specific linear trends to account for gradual, idiosyncratic shifts in access over time.

proximity to rivers, that might independently affect economic outcomes.[23]

5 Results

We begin our empirical analysis by showing our difference-in-differences estimates of the effect that the Great Fire had on our measures of economic activity as defined in the previous section. The estimating equation is (3) and the method of estimation is least squares.

Table 3 displays the results. We report the impact of the fire on the access to marketplaces in columns (1)-(2) and the corresponding effects on the access to goldsmith-bankers in columns (3)-(4). All specifications (1)-(4) include decade fixed effects and parish fixed effects, as well as the corresponding initial index (in 1660) fully interacted by decade fixed effects to capture flexibly potential convergence dynamics. We have 1,554 observations for 222 parishes throughout the decades 1630 to 1690. Columns (1)-(2) also always include parish linear time trends to account for parish-specific characteristics in each decade. Columns (2) and (4) include a dummy for whether a parish is located on a river fully interacted by decade-fixed effects as a control to account for the location advantage that might have played a different role in the location of the markets/goldsmiths over time. We also report Conley standard errors with different distance thresholds to take potential spatial correlation into account.

The coefficient β is negative, statistically significant, and robust throughout all specifications in columns (1)-(4) for both indexes. After the Great Fire of London in 1666, affected parishes experienced a relative decline in their access to marketplaces and goldsmith-bankers, as measured by our spatial access index. This reflects a reorganisation of economic activity within the city, rather than a simple loss of services. In particular, new services increasingly emerged in peripheral or western parishes, reducing the relative centrality of fire-affected areas. While some economic activity returned to the City, the overall spatial pattern became more decentralised, especially for

[23] Moreover, we acknowledge that the distinction between burned and non-burned parishes may overlook spillover effects in nearby non-burned areas, where economic activities may have shifted following the fire. Some non-burned parishes likely experienced indirect gains, as in the case of goldsmiths benefiting from reduced competition. This may blur the treatment-control distinction and could lead to conservative estimates.

marketplaces. By 1690, the access index for affected parishes had declined by around two percentage points relative to unaffected areas - accounting for about half of the total city-wide change in access. This indicates that while the city as a whole was resilient, fire-affected areas were no longer at the core of London's economic geography. As Figure 4 has already illustrated, both marketplaces and goldsmiths also spread out towards the periphery after the fire occurred.

Table 3: Standard Difference-in-Differences Results for Market- and Goldsmiths Access Index

	(1)	(2)	(3)	(4)
Dependent Variable:	*Market Access Index*		*Goldsmith Access Index*	
Fire x Post1666	-0.010***	-0.010***	-0.008***	-0.008***
	(0.001)	(0.001)	(0.002)	(0.002)
Year FEs	Yes	Yes	Yes	Yes
Parish FEs	Yes	Yes	Yes	Yes
Initial x Year FEs	Yes	Yes	Yes	Yes
River dummy	No	Yes	No	Yes
Parish linear trend	Yes	Yes	No	No
Conley SE (0.1 km cutoff)	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Conley SE (0.2 km cutoff)	[0.001]***	[0.001]***	[0.001]***	[0.001]***
Conley SE (0.5 km cutoff)	[0.002]***	[0.002]***	[0.002]***	[0.002]***
Conley SE (1 km cutoff)	[0.002]***	[0.002]***	[0.002]***	[0.002]***
R-squared	0.931	0.932	0.600	0.602
Observations	1554	1554	1554	1554

NOTE.— This table shows the results from a simple difference-in-differences regression at the parish level using the fire dummy (=1 for parishes affected by the fire) as the explanatory variable. Columns 1-2 use the market access index as the outcome of interest and columns 3-4 use the goldsmith access index as the outcome of interest. Standard errors in parentheses are clustered at the parish level. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

Figure 5 shows the dynamic results based on estimating equation (4). Panel A (B) of Figure 5 displays the results for the market access index (goldsmith access index) including parish and time fixed effects, controls for the initial index interacted by time and a parish-specific linear time trends for markets. Reassuringly, there are no pre-trends before the fire occurred in both panels. The estimated coefficients of interest in the decades before the fire are always close to zero and never statistically significant, supporting the common trends assumption. The effects in the decades following the fire are always negative and statistically significant.

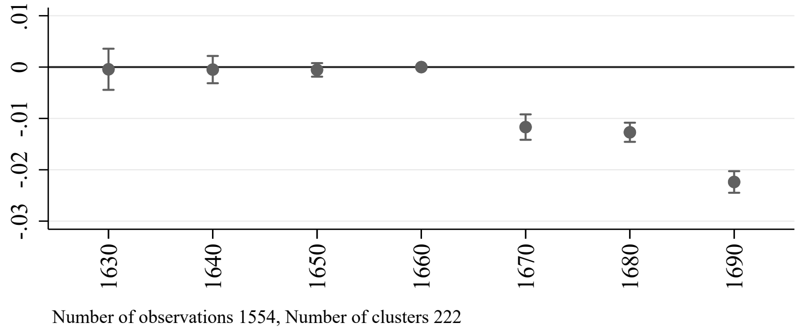
The estimates displayed in Panel A of Figure 5 reveal that affected parishes experienced a *relative* decline in market access compared to non-affected parishes. This negative effect of the fire in terms of access to marketplaces on affected parishes gradually increased (in absolute terms) over time. Specifically, compared to unaffected parishes we observe a relative decrease in access to marketplaces from one to two percentage points between 1670 and 1690 in affected parishes.

We also observe a similar downward trend in Panel B of Figure 5. Access to financial services in affected parishes decreased by around one-third of a percentage point in 1670 to 1.5 percentage points in 1690 relative to unaffected parishes. We report the corresponding point estimates together with their standard errors in Table 4. It is also important to note that even when using different specifications, the decade-specific estimates remain unaffected indicating that our results are robust. Overall, our empirical evidence suggests that towards the end of the sample period goldsmiths and marketplaces either relocated or started new businesses in the City of Westminster or in even more peripheral parishes.[24]

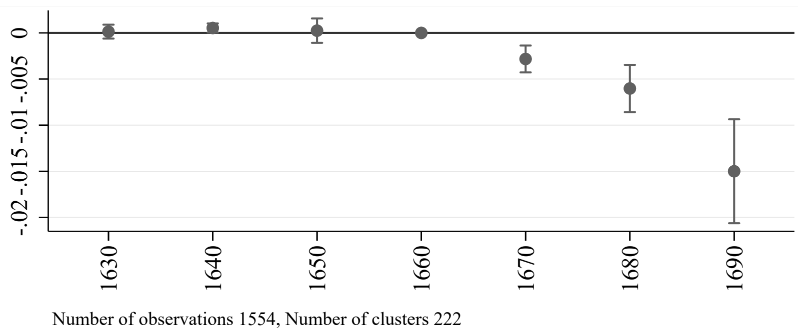
How did the fire affect the spatial distribution of wealth? Table 5 addresses this question and reports the results for the London Hearth Tax using the average number of hearths and the Gini coefficient. The specifications include fixed effects for year and parish, the corresponding initial values and the district fixed effects are both interacted by year. Columns (2) and (4) also include the river dummy interacted by year. The results reported in columns (1) and (2) reveal that parishes affected by the fire had more hearths on average after the fire than unaffected parishes. In column (2), affected parishes had on average 1.2 more hearths than the unaffected parishes. These estimates are positive and statistically significant at the 1-percent level. The increase in the average number of hearths is associated with a decline in the Gini coefficient. The estimated coefficients in columns (3) and (4) are negative and highly statistically significant. This finding suggests that affected parishes had a more equal distribution of wealth after the fire compared to unaffected

[24] Apart from the larger share of markets/goldsmiths moving towards Westminster and western parishes right outside the wall, a smaller share opens in the areas of Ossultone, Tower in the eastern part of London (about 1-1.5% of all new entrances after the fire).

Figure 5: Flexible Difference-in-Differences Results



(A) Markets



(B) Goldsmiths

NOTE.— This figure shows the dynamic estimates for the access to marketplaces and financial services of every parish for the period 1630 to 1690 (the decade 1660 is the omitted reference year). Panel A shows the index for marketplaces and Panel B for goldsmith-bankers. The estimated coefficients display the effect of the fire on market access for every decade together with 95-percent confidence intervals. In both panels, we include fixed effects for decades and parishes, and the initial access index interacted by decade fixed effects, while in Panel A we also include a parish linear trend.

parishes.

Table 6 presents results that can explain the decline in wealth inequality. These are based on the repeated cross-section analysis using the London Hearth Tax records. In columns (1)-(2) we use pooled OLS to estimate the effect of the fire on the total number of hearths in a household and in columns (3)-(4) we use ordered logit to estimate the effect of the fire on social status. The estimated value in the ordered logit model can be interpreted as the probability of observing a household affected by the fire in the lowest social group. Three cutpoints are also estimated and can be translated into the probabilities for a household being in one of the other three social groups based on being affected by the fire or not. In columns (1) and (3) fixed effects for year and parishes are included, while in columns (2) and (4) we also include district fixed effects interacted by time.

Table 4: Flexible Difference-in-differences results

	(1)	(2)	(3)	(4)
Dependent Variable:	*Market Access Index*		*Goldsmith Access Index*	
Fire x 1630	-0.004	-0.004	0.000	0.000
	(0.004)	(0.004)	(0.000)	(0.000)
Fire x 1640	-0.003	-0.003	0.001**	0.001**
	(0.003)	(0.003)	(0.000)	(0.000)
Fire x 1650	-0.002	-0.002	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
Fire x 1670	-0.010***	-0.011***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Fire x 1680	-0.010***	-0.011***	-0.006***	-0.006***
	(0.003)	(0.003)	(0.001)	(0.001)
Fire x 1690	-0.018***	-0.019***	-0.015***	-0.015***
	(0.003)	(0.003)	(0.003)	(0.003)
Year FEs	Yes	Yes	Yes	Yes
Parish FEs	Yes	Yes	Yes	Yes
Initial x Year FEs	Yes	Yes	Yes	Yes
River dummy	No	Yes	No	Yes
Parish linear trend	Yes	Yes	No	No
R-squared	0.937	0.938	0.618	0.619
Observations	1554	1554	1554	1554

NOTE.— This table shows the dynamic estimates for the access to marketplaces and financial services of every parish for the period 1630 to 1690 (the decade 1660 is the omitted reference year). Columns 1-2 show the results for marketplaces and columns 3-4 for goldsmith-bankers. The estimated coefficients display the effect of the fire on market access for every decade. Robust standard errors in parentheses clustered in 222 parishes. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

Similarly to Table 5, there is a positive and statistically significant effect on the number of hearths in households affected by the fire. The estimated coefficients indicate that, on average, affected households had about 1.2 more hearths than households outside the affected parishes. Furthermore, in columns (3)-(4) the positive and significant estimates indicate that it is less likely

Table 5: Standard Difference-in-Differences Results Using London Hearth Tax Records

	(1)	(2)	(3)	(4)
Dependent Variable:	*Average number of hearths*		*Gini index no hearths*	
Fire x Post1666	0.979***	1.156***	-0.071***	-0.067***
	(0.297)	(0.328)	(0.012)	(0.013)
Year FEs	Yes	Yes	Yes	Yes
Parish FEs	Yes	Yes	Yes	Yes
District x Year FE	Yes	Yes	Yes	Yes
Initial x Year FEs	Yes	Yes	Yes	Yes
River dummy	No	Yes	No	Yes
Conley SE (0.1 km cutoff)	[(0.221]***	[0.241]***	[0.008]***	[0.008]***
Conley SE (0.2 km cutoff)	[0.242]***	[0.266]***	[0.006]***	[0.006]***
Conley SE (0.5 km cutoff)	[0.098]***	[0.145]***	[0.006]***	[0.006]***
Conley SE (1 km cutoff)	[0.076]***	[0.093]***	[0.005]***	[0.006]***
R-squared	0.714	0.729	0.931	0.933
Observations	146	146	146	146

NOTE.— This table shows the results from a simple difference-in-differences regression at the parish level using the fire dummy (=1 for parishes affected by the fire) as the explanatory variable. Columns 1-2 show the results when using the average number of hearths as the outcome of interest and columns 3-4 use the Gini coefficient considering the distribution of hearths in households within each parish. Standard errors in parentheses are clustered at the parish level. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

for a household affected by the fire to be in the lowest social group. For example, the estimate of 0.958 in column (4) means that only about 7% of households affected by the fire would be in the lowest social group as opposed to almost 17% of the unaffected households.[25]

On the other hand, the results indicate that a larger share of households affected by the fire would be in the highest social group (65% as opposed to 42% of the unaffected households). The

[25]The probabilities can be obtained from the estimate and cutpoints of the ordered logit model according to the formulas:

$$Pr(S_j + u_j < \kappa) = 1/(1 + e^{S_j - \kappa})$$
$$Pr(S_j + u_j > \kappa) = 1 - 1/(1 + e^{S_j - \kappa})$$
$$Pr(\kappa_1 < S_j + u_j < \kappa_2) = 1/(1 + e^{S_j - \kappa_2}) - 1/(1 + e^{S_j - \kappa_1})$$

where S_j is the estimate (it is equal to 0 for unaffected households) and κ is the cutpoint. u_j is the error term of the ordered logit model. The lowest social status, group 1, corresponds to the interval $S_j + u_j < Cutpoint1$, group 2 corresponds to the interval $Cutpoint1 < S_j + u_j < Cutpoint2$, group 3 corresponds to the interval $Cutpoint2 < S_j + u_j < Cutpoint3$, and the highest social group, group 4, corresponds to the interval $S_j + u_j > Cutpoint3$.

Table 6: Household Level Using the London Hearth Tax Records

	(1)	(2)	(3)	(4)
	Pooled OLS		Ordered logit	
Dependent Variable:	*Number of hearths*		*Social status*	
Fire x Post1666	0.936***	1.179***	0.797***	0.958***
	(0.270)	(0.275)	(0.033)	(0.068)
Cutpoint 1			-1.462***	-1.613***
			(0.058)	(0.095)
Cutpoint 2			0.467***	0.316***
			(0.058)	(0.095)
Cutpoint 3			2.653***	2.506***
			(0.059)	(0.096)
Year FEs	Yes	Yes	Yes	Yes
Parish FEs	Yes	Yes	Yes	Yes
District x Year FE	No	Yes	No	Yes
R-squared	0.141	0.144		
Observations	64134	64134	62943	62943

NOTE.— This table shows the results using the London Hearth Tax records. Columns 1-2 show the results of a Pooled OLS at the household level, considering the number of hearths as the outcome of interest. Columns 3-4 show the results of an ordered logit model considering four groups of social classes as the outcome of interest: group 1 is the lowest and group 4 is the highest social group. Standard errors in parentheses are clustered at the parish level. ***, **, and * indicate significance at the 1, 5, and 10 percent level.

results resonate with Field (2017) who explains, based on a smaller but linked sample, that certain groups would be less likely to move after the fire, because of commercial ties with the zone of residence. Moreover, the new housing constructed after the fire was also bigger and of better quality. Consequently, the low-income groups would be more likely not to return to the City after the fire because housing would be more expensive and economic activity shifted, at least to some extent, to areas outside the City. Moreover, we come to similar conclusions when calculating the share of households in the areas affected by the fire which have four or more hearths. When doing so, we find that the share was 54% of households before the fire and 81% after the fire.

A possible limitation in interpreting our results is that the fire may have altered the way hearths correspond to wealth. Rebuilding allowed for architectural redesigns that could have affected heating systems and the number of hearths per property. Two scenarios are plausible: (i) new building designs may have heated larger spaces with fewer hearths, or (ii) rebuilding could have led to an increase in the number of hearths to provide more consistent heating. Either scenario could shift the mapping from hearths to wealth, potentially complicating comparisons between pre- and post-fire data. However, we consider that this is unlikely to fully undermine the relationship between hearths and wealth for a few reasons. First, the increase in the average number of hearths observed in affected parishes suggests a shift towards higher-quality housing, likely reflecting an upward movement in wealth rather than just changes in heating practices. Second, the fall in the Gini coefficient indicates a broader restructuring, where wealthier households returned to or invested in these areas.

What potential mechanisms drove the spatial and social changes we observe after the fire? For markets, decentralisation was likely driven by changes in the population distribution and improvements in accessibility for peripheral areas. Rebuilding within the City required time, capital, and compliance with new regulations, while peripheral areas were more immediately usable. As retail activity is less reliant on agglomeration economies than financial services, this made decentralisation more viable. Our findings align with historical accounts describing the rationalisation and westward movement of markets after 1666 (Smith, 2002). In contrast, goldsmith-bankers exhibited exhibited greater spatial persistence than markets, with a more limited shift away from the City, consistent with stronger agglomeration forces. These financial intermediaries benefited from network effects and close proximity to government and commercial clients. The resilience of this sector is consistent with other historical cases where financial centres persisted through shocks, though not necessarily in their original locations (e.g., Hornbeck and Keniston, 2017). The observed decline in inequality in affected areas is best understood as a compositional effect. Wealthier households were more likely to return or rebuild, while poorer residents were priced out or moved further afield. New building regulations and reconstruction costs raised barriers to re-entry. This effectively filtered the post-fire population, increasing the average number of hearths while reducing intra-parish variation. These patterns are consistent with income sorting mechanisms seen in modern urban recovery settings (Ambrus et al., 2020; Glaeser, 2022).

6 Conclusion

The Great Fire of London in 1666 was a devastating event that has been widely discussed among historians but has not yet been extensively studied quantitatively. This paper investigated the impact of this famous episode on economic activity in the parishes of the City and its surroundings. Although the City was quickly rebuilt, we have shown that locations outside of the city walls became more attractive after the fire, particularly due to the displacement of lower- and middle-income populations. A higher average number of hearths and a declining Gini coefficient suggest that the rebuilt City became both richer and more equal. These changes were not only the result of a temporary shock but appear to have reflected more permanent shifts in the spatial distribution of services and in the City's social structure. They also likely contributed to the growing importance of Westminster and other suburban neighbourhoods during the late seventeenth century.

Our findings contribute to a growing literature on the resilience of cities and the long-run effects of shocks on urban form and inequality. Most notably, we provide rare historical evidence on how a major urban disaster affected the micro-spatial geography of economic activity and wealth distribution within a single city. The data assembled for this paper - georeferenced goldsmith-bankers, marketplaces, and household-level hearth tax information – thus offer a unique view of the resilience of early modern towns. Our parish-level market potential indices capture general equilibrium effects of destruction and rebuilding in a way that is rarely possible for historical events of this kind. These contributions not only provide a new understanding of the Great Fire of London itself, but also establish a foundation for comparative research on post-disaster recovery, spatial reallocation, and the social consequences of reconstruction in urban economic history.

References

Ager, Philipp, Katherine Eriksson, Casper Worm Hansen, and Lars Lønstrup, "How the 1906 San Francisco earthquake shaped economic activity in the American West," *Explorations in Economic History*, 2020, *77*, 101342.

Ahlfeldt, Gabriel M, Stephen J Redding, Daniel M Sturm, and Nikolaus Wolf, "The economics of density: Evidence from the Berlin Wall," *Econometrica*, 2015, *83* (6), 2127–2189.

Almagro, Milena, Eric Chyn, and Bryan A Stuart, "Urban renewal and inequality: Evidence from chicago's public housing demolitions," Technical Report, National Bureau of Economic Research 2023.

Ambrus, Attila, Erica Field, and Robert Gonzalez, "Loss in the time of cholera: Long-run impact of a disease epidemic on the urban landscape," *American Economic Review*, 2020, *110* (2), 475–525.

Baum-Snow, Nathaniel and Daniel Hartley, "Accounting for central neighborhood change, 1980–2010," *Journal of urban economics*, 2020, *117*, 103228.

Bell, Walter George, *The Great Fire of London in 1660*, John Lane, 1920.

Bleakley, Hoyt and Jeffrey Lin, "Portage and path dependence," *The Quarterly Journal of Economics*, 2012, *127* (2), 587–644.

Bosker, Maarten, Steven Brakman, Harry Garretsen, and Marc Schramm, "Looking for multiple equilibria when geography matters: German city growth and the WWII shock," *Journal of Urban Economics*, 2007, *61* (1), 152–169.

Boustan, Leah Platt, Matthew E Kahn, Paul W Rhode, and Maria Lucia Yanguas, "The effect of natural disasters on economic activity in US counties: A century of data," *Journal of Urban Economics*, 2020, *118*, 103257.

Brakman, Steven, Harry Garretsen, and Marc Schramm, "The strategic bombing of German cities during World War II and its impact on city growth," *Journal of Economic Geography*, 2004, *4* (2), 201–218.

Brooks, Leah and Byron Lutz, "Vestiges of transit: Urban persistence at a microscale," *Review of Economics and Statistics*, 2019, *101* (3), 385–399.

Brueckner, Jan K and Stuart S Rosenthal, "Gentrification and neighborhood housing cycles: will America's future downtowns be rich?," *The Review of Economics and Statistics*, 2009, *91* (4), 725–743.

Bui, A., Mardi Dungey, C. Nguyen, and Thu Phuong Pham, "The impact of natural disasters on household income, expenditure, poverty and inequality: evidence from Vietnam," *Applied Economics*, 2014, *46*, 1751–1766.

Cavallo, Eduardo, Sebastian Galiani, Ilan Noy, and Juan Pantano, "Catastrophic natural disasters and economic growth," *Review of Economics and Statistics*, 2013, *95* (5), 1549–1561.

Chaffers, W. and G. Aurifabrorum, *A history of English goldsmiths and plateworkers and their marks stamped on plate*, Reeves and Turner, 1883.

Coffman, D'Maris, Judy Z Stephenson, and Nathan Sussman, "Financing the rebuilding of the City of London after the Great Fire of 1666," *The Economic History Review*, 2022, *75* (4), 1120–1150.

Collins, William J and Katharine L Shester, "Slum clearance and urban renewal in the United States," *American Economic Journal: Applied Economics*, 2013, *5* (1), 239–273.

Couture, Victor and Jessie Handbury, "Urban revival in America," *Journal of Urban Economics*, 2020, *119*, 103267.

Cummins, Neil, Morgan Kelly, and Cormac Ó Gráda, "Living standards and plague in London, 1560–1665," *The Economic History Review*, 2016, *69* (1), 3–34.

Davis, Donald R and David E Weinstein, "Bones, bombs, and break points: the geography of economic activity," *American economic review*, 2002, *92* (5), 1269–1289.

Donaldson, Dave and Richard Hornbeck, "Railroads and American economic growth: A market access approach," *The Quarterly Journal of Economics*, 2016, *131* (2), 799–858.

Fales, Raymond L. and Leon N. Moses, "Land-use theory and the spatial structure of the nineteenth-century city," in "Papers of the Regional Science Association," Vol. 28 Springer 1972, pp. 49–80.

Field, Jacob F., "Reactions and responses to the Great Fire: London and England in the later seventeenth century." PhD dissertation, University of Newcastle upon Tyne 2008.

_ , "Charitable giving and its distribution to Londoners after the Great Fire, 1666-1676," *Urban History*, 2011, *38* (1), 3–23.

_ , *London, Londoners and the Great Fire of 1666: Disaster and Recovery*, 1 ed., Routledge, 2017.

Gabaix, Xavier, "Zipf's Law and the Growth of Cities," *American Economic Review*, 1999, *89* (2), 129–132.

Glaeser, Edward L, "Urban resilience," *Urban studies*, 2022, *59* (1), 3–35.

Glass, D. V., "Two papers on Gregory King," in D. V. Glass and D. E. C. Eversley, eds., *Population in history: essays in historical demography*, London: Edward Arnold (Publishers) Ltd., 1965, chapter 8, pp. 159–220.

Hanlon, W. Walker, "Temporary shocks and persistent effects in urban economies: Evidence from British cities after the US Civil War," *Review of Economics and Statistics*, 2017, *99* (1), 67–79.

Hanlon, W Walker and Stephan Heblich, "History and urban economics," *Regional Science and Urban Economics*, 2022, *94*, 103751.

Hanson, Gordon H., "Localization economies, vertical organization, and trade," *The American Economic Review*, 1996, *86* (5), 1266–1278.

Harding, Vanessa, "The Population of London, 1550-1700: a review of the published evidence," *The London Journal*, 1990, *15* (2), 111–128.

Harris, Chauncy D., "The, Market as a Factor in the Localization of Industry in the United States," *Annals of the association of American geographers*, 1954, *44* (4), 315–348.

Heal, A., *The London Goldsmiths, 1200-1800: A Record of the Names and Addresses of the Craftsmen, Their Shop Signs and Trade-cards*, David & Charles Reprints, 1972.

Heblich, Stephan, Alex Trew, and Yanos Zylberberg, "East-side story: Historical pollution and persistent neighborhood sorting," *Journal of Political Economy*, 2021, *129* (5), 1508–1552.

_ , Stephen J. Redding, and Daniel M. Sturm, "The making of the modern metropolis: evidence from London," *The Quarterly Journal of Economics*, 2020, *135* (4), 2059–2133.

Hornbeck, Richard and Daniel Keniston, "Creative destruction: Barriers to urban growth and the Great Boston Fire of 1872," *American Economic Review*, 2017, *107* (6), 1365–98.

_ and Suresh Naidu, "When the levee breaks: black migration and economic development in the American South," *American Economic Review*, 2014, *104* (3), 963–90.

Howell, Junia and James R. Elliott, "Damages Done: The Longitudinal Impacts of Natural Hazards on Wealth Inequality in the United States," *Social Problems*, 2018.

Imaizumi, Asuka, Kaori Ito, and Tetsuji Okazaki, "Impact of natural disasters on industrial agglomeration: The case of the Great Kantō Earthquake in 1923," *Explorations in Economic History*, 2016, *60*, 52–68.

Jaworski, Taylor and Carl T Kitchens, "National policy for regional development: Historical evidence from Appalachian highways," *Review of Economics and Statistics*, 2019, *101* (5), 777–790.

Juhász, Réka, "Temporary protection and technology adoption: Evidence from the napoleonic blockade," *American Economic Review*, 2018, *108* (11), 3339–76.

Keerthiratne, Subhani and R. Tol, "Impact of Natural Disasters on Income Inequality in Sri Lanka," *World Development*, 2018, *105*, 217–230.

Krugman, Paul, "Increasing returns and economic geography," *Journal of political economy*, 1991, *99* (3), 483–499.

LaVoice, Jessica, "The long-run implications of slum clearance: A neighborhood analysis," *Journal of Public Economics*, 2024, *236*, 105153.

Lee, Sanghoon and Jeffrey Lin, "Natural amenities, neighbourhood dynamics, and persistence in the spatial distribution of income," *The Review of Economic Studies*, 2018, *85* (1), 663–694.

Lin, Jeffrey and Ferdinand Rauch, "What future for history dependence in spatial economics?," *Regional Science and Urban Economics*, 2020, p. 103628.

Loayza, Norman V., Eduardo Olaberria, Jamele Rigolini, and Luc Christiaensen, "Natural disasters and growth: Going beyond the averages," *World Development*, 2012, *40* (7), 1317–1336.

Long, Jason and Henry Siu, "Refugees from dust and shrinking land: Tracking the dust bowl migrants," *The Journal of Economic History*, 2018, *78* (4), 1001–1033.

Lucas, Robert E and Esteban Rossi-Hansberg, "On the internal structure of cities," *Econometrica*, 2002, *70* (4), 1445–1476.

Macaulay, Dendy, "The importance of neighborhood ties: Relocation decisions after the Chicago fire of 1871." PhD dissertation, The University of Chicago 2007.

Mitchell, D. M., "'Mr. Fowle Pray Pay the Washwoman': The Trade of a London Goldsmith-Banker, 1660-1692," *Business and Economic History*, 1994, *23* (1), 27–38.

Neal, Larry and Stephen Quinn, "Networks of information, markets, and institutions in the rise of London as a financial centre, 1660-1720," *Financial History Review*, 2001, *8* (1), 7–26.

Persson, Karl Gunnar and Paul Sharp, *An economic history of Europe*, Cambridge University Press, 2015.

Pleninger, Regina, "Impact of natural disasters on the income distribution," *World Development*, 2022, *157*, 105936.

Porter, Stephen, *The great fire of London*, The History Press, 2011.

Quinn, Stephen, "Goldsmith-Banking: Mutual Acceptance and Interbanker Clearing in Restoration London," *Explorations in Economic History*, 1997, *34* (4), 411–432.

_ , "The Glorious Revolution's effect on English private finance: a microhistory, 1680-1705," *Journal of Economic History*, 2001, pp. 593–615.

Reddaway, Thomas Fiddian, *The rebuilding of London after the Great Fire*, Arnold, 1951.

Redding, Stephen J. and Daniel M. Sturm, "The costs of remoteness: Evidence from German division and reunification," *American Economic Review*, 2008, *98* (5), 1766–97.

Redding, Stephen J and Daniel M Sturm, "Neighborhood effects: Evidence from wartime destruction in London," Technical Report, National Bureau of Economic Research 2024.

_ **and Esteban Rossi-Hansberg**, "Quantitative spatial economics," *Annual Review of Economics*, 2017, *9*, 21–58.

Redding, Stephen J., Daniel M. Sturm, and Nikolaus Wolf, "History and industry location: evidence from German airports," *Review of Economics and Statistics*, 2011, *93* (3), 814–831.

Richards, Richard D, *The early history of banking in England (RLE Banking & Finance)*, Routledge, 2012.

Rosen, Christine M., "Infrastructural improvement in nineteenth-century cities: A conceptual framework and cases," *Journal of Urban History*, 1986, *12* (3), 211–256.

Schofield, J., *The Building of London: From the Conquest to the Great Fire*, British Museum Publications Ltd., 1984.

Schumann, Abel, "Persistence of population shocks: Evidence from the occupation of West Germany after World War II," *American Economic Journal: Applied Economics*, 2014, *6* (3), 189–205.

Scott, Susan and Christopher J. Duncan, *Biology of Plagues: Evidence from Historical Populations*, Cambridge University Press, 2001.

Shtob, Daniel A., "The Impact of Natural Disasters on Systemic Political and Social Inequities in the United States," *Contemporary Sociology: A Journal of Reviews*, 2022, *51*, 455–456.

Siodla, James, "Razing San Francisco: The 1906 disaster as a natural experiment in urban redevelopment," *Journal of Urban Economics*, 2015, *89*, 48–61.

_ , "Clean slate: Land-use changes in San Francisco after the 1906 disaster," *Explorations in Economic History*, 2017, *65*, 1–16.

_ , "Firms, fires, and firebreaks: The impact of the 1906 San Francisco disaster on business agglomeration," *Regional Science and Urban Economics*, 2021, *88*, 103659.

Smith, Colin, "The market place and the market's place in London, c. 1660-1840." PhD dissertation, University of London 1999.

_ , "The wholesale and retail markets of London, 1660–1840," *The Economic History Review*, 2002, *55* (1), 31–50.

Strobl, Eric, "The economic growth impact of natural disasters in developing countries: Evidence from hurricane strikes in the Central American and Caribbean regions," *Journal of Development economics*, 2012, *97* (1), 130–141.

Sussman, Nathan, "Financial Developments in London in the Seventeenth Century: The Financial Revolution Revisited," *The Journal of Economic History*, 2022, *82* (2), 480–515.

Sutherland, Ian, "When was the Great Plague? Mortality in London, 1563 to 1665," in D. V. Glass and R. Revelle, eds., *Population and Social Change*, London: Edward Arnold (Publishers) Ltd., 1972, pp. 287–320.

Temin, Peter and Hans-Joachim Voth, *Prometheus shackled: goldsmith banks and England's financial revolution after 1700*, Oxford University Press, 2013.

Tsivanidis, Nick, "Evaluating the impact of urban transit infrastructure: Evidence from bogotaâs transmilenio," *Unpublished manuscript*, 2022, *18*.

Wang, Wen and Yifan Zhao, "Impact of Natural Disasters on Household Income and Expenditure Inequality in China," *Sustainability*, 2023.

Weiwu, Laura, "Unequal access: Racial segregation and the distributional impacts of interstate highways in cities," 2024.

Wrigley, E. Anthony, "A simple model of London's importance in changing English society and economy 1650-1750," *Past & Present*, 1967, (37), 44–70.

Yamamura, Eiji, "The Impact of Natural Disasters on Income Inequality: Analysis using Panel Data during the Period 1970 to 2004," *International Economic Journal*, 2015, *29*, 359–374.

Replication and data: Replication files and underlying data will be made available upon publication.