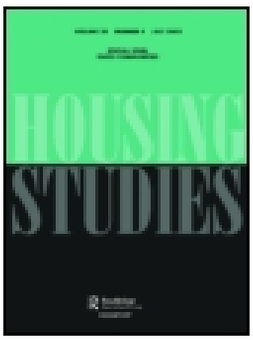

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Local power and the location of subsidized renters in comparative perspective: public support for low- and moderate-income households in the United States, France, and the United Kingdom

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ABSTRACT

In the context of worsening housing affordability for low- and moderate-income households, we assemble data from metropolitan areas in the United States, France, and the United Kingdom to analyze regional differences in the level and distribution of nationally supported affordable-housing units and renters with tenant-based housing benefits. We examine the location of subsidized renters comparatively, exploring how varying power arrangements between national and local governments over land-use and housing policy shape options for low-income renters. We find that US metropolitan areas are unique in the extent to which many municipalities exclude subsidized renters altogether; subsidized housing is disproportionately situated in areas with historically limited access to resources. The number of municipalities within metropolitan areas does not appear to impact the location of subsidized units, but the ability of localities to exclude is associated with their distribution.

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Affordable housing; social housing; vouchers; fragmentation

Introduction

The distribution of land-use powers and housing policy tools across governmental levels varies widely among nations in North America and Europe, with significant implications for urban policy and social equality. Local decisions shape where, within a region, renters with low incomes can live, and also influence their access to resources, such as high-performing schools, public transportation, and private-sector employment. In light of the variation in local powers across countries, we analyze comparatively the location of renters receiving national government subsidies across nine metropolitan regions in the United States and Europe and assess the influence of jurisdictional fragmentation on this distribution. We examine aid provided directly to low- and moderate-income households to rent housing (tenant-based support) and also public financing to support the construction of affordable rental units (project-based subsidies).

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Recent comparative research analyzes differences in national housing policies (e.g., Galster, 2002; Groves, 2007; Gurstein *et al.*, 2016; Scanlon *et al.*, 2014), but devotes little attention to the relationship between national and local powers in policy implementation (Whitehead & Goering, 2021 offer a rare exception), and offers few details as to how housing is distributed across urban regions and the extent to which people with low incomes may be excluded from communities with higher resource levels. In the context of widening metropolitan inequality and divergent resources within metropolitan areas, it is necessary to move beyond nation-to-nation comparisons of housing policy. We must consider how structures of metropolitan governance—the local state—influence how national policies operate and who they serve. For example, if tenant-based housing support is administered by localities, local choices about how to allocate such benefits and the requirements for landlords to accept them will likely play substantial roles in determining the nature and effectiveness of national programs. Similarly, local land-use regulations and permitting authorities will determine whether and where the production of subsidized housing units takes place. In addition to understanding just how much funding is allocated, then, we must also investigate in comparative perspective the local institutions that facilitate or impede the use of these housing subsidies. The structure of local governance—shaped both by the number of local jurisdictions within a region and by the rules set by higher-level governments regarding the mechanisms through which municipalities can limit access to low-income people—plays an essential role in defining whether subsidized housing policies are expanding locational options for renters with low incomes or whether they are exacerbating inequality between communities.

We analyze conditions in the three largest metropolitan areas in the United States, France, and the United Kingdom. We compare levels and distribution of nationally supported affordable-housing units and tenant-based housing support through several measures, identifying changes over time, differences among regions, and variation between nations. Consistent with previous research, we find that the provision of subsidized housing in the United States is uniquely limited. The share of renters receiving national housing subsidies in the three US regions ranges between 5 and 10%, compared to 25 to 38% in France and the United Kingdom. Moreover, subsidized renters are far more geographically concentrated in particular municipalities within the US regions than renters in Europe, regardless of the number of jurisdictions. This research offers new evidence on ways in which subsidized renters are effectively locked out of many US municipalities, and how that exclusion is qualitatively different in the US than abroad. Looking from a comparative perspective, we find that US deficiencies in affordable-housing provision and the exclusion that results from the uneven distribution of that provision extend beyond the national level to the local level.

Neighborhood effects

Metropolitan areas in the United States, the United Kingdom, and France are characterized by differing, but substantial, levels of socio-economic segregation. The concentration of affluent families in highly-resourced municipal citadels and poor families in impoverished communities is commonplace in US metropolitan areas (Galster &

Sharkey, 2017; Goetz *et al.*, 2019; Marcuse, 1997), and it is on the rise in Europe (Musterd *et al.*, 2017). The United Kingdom suffers from the worst poverty concentration in Europe (Stephens, 2008), and, in France, peripheral housing estates have become stigmatized (Blanc, 2010). In each nation, although in context-dependent ways, white-supremacist norms and systemic racial and ethnic discrimination have shaped residential patterns (Johnston *et al.*, 2007; Peach, 1999; Steil & Charles, 2020).

Scholars investigating the influence of residential context on individuals point to spatial segregation as a salient dimension of the local environment associated with negative outcomes for already marginalized people, potentially through local institutional dimensions of resource allocation (Chetty *et al.*, 2014; Ellen & Steil, 2019; Sharkey & Faber, 2014; Trounstine, 2016). Spatial conditions reflect and reinforce social inequality (Galster & Sharkey, 2017), and may limit the educational, mobility, and working opportunities of people who are poor if they are constrained to living in certain communities (Kintrea, 2013; Van Ham *et al.*, 2012). Recent experimental research, such as work by Chetty *et al.* (2016) finding significant impacts on educational attainment and income for children whose families moved from neighborhoods with high levels of poverty into communities with lower levels of poverty, has brought the issue of neighborhood effects to the forefront for urban policymakers.

Given these findings, officials in many Western nations have promoted housing-related policies designed to produce socially mixed communities (Musterd & Andersson, 2005). These policies differ in approach (Galster, 2007, 2013a; Kintrea, 2013). In the UK, New Labour's efforts to attack exclusion included a London plan promoting integration through urban regeneration (Launday, 2010). Focused on reducing suburban exclusion, French legislators in 2000 passed the Urban Solidarity and Renewal law (SRU) that, upon revision in 2013, required most urban municipalities to reserve at least 25% of housing units for social housing by 2025, or face significant penalties (Blanc, 2010; Freemark, 2019). Similar efforts in the United States, such as the 'Anti-Snob Zoning Act' (Chapter 40B of the Massachusetts General Laws), are framed around increasing social mix or combating exclusion—yet they have limited enforcement power and leave most land-use powers to local governments (Fisher & Marantz, 2015; Massey *et al.*, 2013).

Administration of housing subsidies en route to achieving social mix

As scholars devote increased attention to the spatial foundations of inequality, one question that arises is the mechanism through which to address it. Three approaches policymakers frequently advance include decreasing inequalities between populations (e.g., redistributive wealth sharing); reducing inequalities between neighborhoods (e.g., area-specific redevelopment); and creating residential options in more neighborhoods for the least well-off, increasing choice and reducing economic isolation. Housing subsidies serve as a mechanism for each approach, for example, by reducing housing costs; investing in affordable housing through community revitalization; and creating options for low-income people to live in neighborhoods with low poverty levels. Policies designed to reduce isolation and support socio-economic integration have been increasingly popular in recent decades, but have also been extensively

critiqued (Andersson & Musterd, 2005; Galster, 2013b; Khare *et al.*, 2015). The concept of social mix remains amorphous in terms of demographic composition, concentration, and geographic scale (Galster, 2013a).

In addition to spatial dimensions of inequality, many urban regions in North America and Europe are facing increasing housing costs relative to median incomes. Median rent as a share of income in large urban regions (and nationwide) in the United States, France, and the United Kingdom—those we study—has increased substantially over the past two decades, and data show the burden is elevated (Appendix A).

Extensive research documents the role of subsidies in expanding housing affordability (e.g., Collinson *et al.*, 2015; Wetzstein, 2017). The two primary approaches governments rely upon to address affordability and, to some extent, to promote social mix, is the use of funds for, first, the construction or renovation of housing units, and, second, tenant-based support (means-tested vouchers) for low- and moderate-income households.

In the United States, public-housing units and Housing Choice Vouchers cap renter payments at 30 to 40% of household income. Additional subsidized units are funded through state- and city-coordinated programs—usually financed through Low-Income Housing Tax Credits (LIHTC) distributed to states by the United States Department of the Treasury. Rents in LIHTC units are generally affordable to households with higher incomes than those using public housing or Housing Choice Vouchers, often around 60% of the area median income, although renters in LIHTC units frequently receive additional subsidies through project-or tenant-based vouchers.

French affordable housing is provided through social housing and means-tested tenant-based benefits. Social-housing planning and development is led by local actors (either municipal or subregional inter-municipal entities), though it is mostly funded by the national government and subject to national requirements, such as the SRU. Accounting for maintenance costs, average housing costs relative to gross income for French renters in social housing (25.6%) is lower than for those living in private-sector units (29.2%) (Godefroy, 2018).

In the United Kingdom, affordable housing is similarly provided through tenant-based support or through place-based subsidized housing, either council housing (mostly local-government managed) or units provided by non-profit housing associations (Whitehead, 2014). For the mean UK renter, almost 30% of monthly rents are covered by housing benefits, reducing rent as a share of household expenditures from 24.9 to 17.9% (Office for National Statistics, 2018).

In France and the United Kingdom, tenant-based housing benefits are entitlements, provided to all who qualify based on income. They are widely accepted by private landlords. In the United States, by contrast, vouchers are not entitlements; only about one-quarter of income-eligible households receive them (Collinson *et al.*, 2015). Vouchers are managed by local housing authorities, and localities decide whether to participate in the voucher programs, although vouchers may be used outside of the jurisdiction of the issuing authority. Among housing authorities participating, many have closed waiting lists because the number of applicants far outpaces voucher availability; in some cities, families wait more than a decade to receive support. Once a

household receives a voucher, landlords in most US jurisdictions can legally refuse it; only 15 states and roughly 80 localities have laws discouraging or prohibiting discrimination on the basis of income source (Daniel, 2010; NYC Commission on Human Rights, 2018). Among the US regions we study, source of income protections exist among certain municipalities in each region, but the states of California and New York did not implement protections for voucher holders until 2019, and Illinois does not have such a protection, contributing to the patchwork of exclusion. Even in states or cities where discrimination against renters with vouchers is prohibited, discrimination remains common; many recipients have vouchers rescinded because they cannot find a landlord to accept them (Ellen, 2020).

Subsidized housing development and tenant-based housing support are mediated by the structure of multi-level government. National governments in the United States, France, and the United Kingdom provide most of the funding for the programs, but local governments in the different nations have varying latitude over the implementation of these housing policies (as compared recently by Whitehead & Goering, 2021). Accordingly, we must examine the extent to which regional jurisdictional composition and the balance of powers between local and national governments influence the distribution of housing support.

The question of how affordable housing supported by the national government is distributed within a region has ramifications for families that benefit from this public support. Ellen *et al.* (2016) examine whether US families taking advantage of vouchers can move to districts with higher-performing schools. Lens (2014) explores whether the location of public-housing and LIHTC units ensure access to employment. Those analyses focus on identifying how housing subsidy programs function nationwide.

Yet there is less research on how countries compare with respect to subsidy distribution within metropolitan areas. In addition to national policy structures, regional and local policy shape where project-based subsidized units are located and where subsidized tenants can access homes. As an example, the ability of US tenants with vouchers to access neighborhoods with lower levels of poverty varies substantially by region (Reina *et al.*, 2019). Local governments in the United States have incentives to exclude multi-family housing and lower-income residents, and do so through exclusionary zoning policies (Briffault, 1990; Fischel, 2001); they have also long designed policies to exclude households based on race, maintaining a white supremacist spatial order (Ellen & Steil, 2019; Freund, 2010; Self, 2005; Steil, 2018; Steil & Delgado, 2018; Taylor, 2019; Williams, 2020). The vast arsenal of exclusionary policies that local governments can wield ranges from privatizing services through homeowner associations to zoning exclusively for single-family large lot development, from declining to create a local housing authority to allowing discrimination against subsidized tenants, from passing chronic nuisance ordinances that enable targeting of subsidized tenants for eviction to creating exclusionary school districts (Briffault, 1990; Freemark *et al.*, 2020; McCabe, 2016). Exclusionary policies that hoard resources in wealthy communities are the status quo among local governments in the United States, and policies seeking to attenuate these inequalities are the rare exception.

In Europe, too, anti-immigrant policymaking contributes to growing spatial segregation by race, ethnicity, religion, national origin, and socio-economic class

(Andersson & Kährik, 2015; Uitermark, 2014). Leaders of wealthier municipalities in France, for example, have explicitly stated that they would prefer to pay fines than host more affordable housing within their borders (Blanc, 2010).

The powers of local governments thus influence the municipalities and neighborhoods where subsidized-housing recipients live—and forestall increased socio-economic integration. Increased metropolitan spatial inequality must therefore be understood in light of the structure of multi-level regional governance. One approach to understand spatial inequality in this light is to evaluate municipal fragmentation, which can be defined first as jurisdictional proliferation within a region, and second, as the legal power of localities to hoard resources, such as through restrictive zoning laws (Freemark *et al.*, 2020). Regions with high jurisdictional proliferation—more units of local government per capita—create the opportunity for more individual municipalities to exclude housing subsidies and their recipients, forcing subsidized renters to cluster into a few locations, undermining opportunities for socio-economic integration. Fragmented local governance may contribute to increased racialized and socioeconomic inequities (Mollenkopf & Swanstrom, 2019) through local control of policy areas such as land use, in order to promote hoarding. Restrictions on density—one type of zoning—are indeed associated with segregation of higher-income people into distinct communities (Lens & Monkkonen, 2016; Pendall, 2000). On the other hand, higher-level governments that limit local powers to hoard resources, such as by preventing local governments from excluding affordable housing construction, may create more locational choices for subsidized renters and higher levels of social mix (Freemark *et al.*, 2020).

Research questions

In this article, we explore the relationship between affordable housing location and metropolitan governance, extending the literature on access to subsidized housing through a transnational comparison examining differences between and within nations. We ask, how does geographic access, and thus inclusion, of households receiving government-supported housing subsidies vary across metropolitan regions, and how have trends changed over time? Do levels of access to subsidized housing differ, how are units distributed geographically, and is that distribution influenced by jurisdictional proliferation and the powers held by local governments?

Based on existing scholarship (e.g., Freemark *et al.*, 2020), we hypothesize that US regions feature higher levels of exclusion of low-income families from highly resourced communities relative to their European counterparts. We expect that US regions, whatever their levels of jurisdictional proliferation, are more likely to concentrate subsidized units, relative to French and UK regions.

Our research is limited in its scope. We do not assess comparative benefits to individuals of place-based or tenant-supporting housing programs (e.g., Eerola & Saarimaa, 2018). We do not investigate the degree to which programs we evaluate improve affordability for low-income individuals, and our goal is neither to establish whether social mix produces positive neighborhood effects, nor to identify what level or scale of social mix is most effective. Nevertheless, our findings offer new insight into cross-national differences in regional housing distribution.

Data and methods

We focus on the largest metropolitan regions in the United States (New York, Los Angeles, and Chicago), France (Paris, Lyon, and Marseille), and the United Kingdom (London, Manchester, and Birmingham). These regions are located in wealthy countries that share democratic norms, multi-level governance, and similar levels of rental housing (Hirt, 2014); they also feature accessible data on housing subsidies. Each region is unique and faces different local labour market and housing market dynamics. Nevertheless, each is affected by pressures from the high end of the market, including increasing income polarization and poverty, and all have experienced substantial immigration over the past two decades. By examining regions in multiple countries *and* simultaneously multiple regions per country, we 'incorporate and leverage variations between countries as well as within them' (Sellers, 2019, p. 85). Our research design accounts for the importance of variations in both local powers across nations (such as differences in central government oversight between countries) and local context (such as differences between New York, where subsidized units are often islands of affordability (e.g., Ellen & Weselcouch, 2015), and Chicago, where they are often concentrated in the lowest-income neighborhoods).

We focus on metropolitan regions, not simply center cities, as regional economies and housing markets extend far beyond the downtown core. We identify individual municipalities (i.e., local political jurisdictions) within areas that each census organization defines as metropolitan (details in Appendix B), and summarize regional characteristics in Table 1. We include a measure of jurisdictional proliferation—the number of municipalities per one million inhabitants—showing high levels of this type of fragmentation in the US and French regions, as compared to the UK regions.

We collected data from the National Housing Preservation Database on the distribution of units funded through the LIHTC, public housing, project-based Section 8, and Section 202 programs, and from the US Department of Housing and Urban

Table 1. Case-study regions.

				Housing units		Per-capita income as share of national median	
	Region	Municipalities in region	Municipalities per 1 m inhabitants	Total	Center-city share	Region	Center city
United States (2018)	New York	838	47.4	7.05 m	49.2%	127%	117%
	Los Angeles	181	13.8	4.57 m	32.2%	106%	104%
	Chicago	386	43.3	3.59 m	33.7%	113%	110%
France (2016)	Paris	412	38.5	4.60 m	24.8%	110%	129%
	Lyon	127	77.6	0.73 m	35.7%	106%	110%
	Marseille	49	30.9	0.70 m	55.7%	99%	88%
United Kingdom (2017)[a]	London	58[b]	5.0[b]	4.71 m	74.8%[c]	138%	143%[c]
	Manchester	13	3.8	1.50 m	14.8%	83%	68%
	Birmingham	8	2.9	1.10 m	39.3%	76%	72%

Note: Each case-study region has at least 700,000 housing units, but they vary in terms of jurisdictional proliferation (per-capita municipal units), and the share of units within the center city. Sources: US Census American Community Survey 2013-2018; Insee (niveau de vie); UK Office for National Statistics (gross disposable household income per head).

[a]Local authorities in the United Kingdom.

[b]When counting London boroughs (32 plus the City of London) as individual municipalities.

[c]When counting London boroughs together as a single unit, the GLA.

Development (HUD) on the distribution of tenant-based vouchers, in 2000 and 2018. In this analysis, we combine all project-based programs, though their levels of affordability, subsidy financing, and operations details differ.[1]

We amassed data from Insee on French municipalities for 1999, 2009, and 2016. Information included the share of social-housing units (operated by public authorities or non-profits) compared to overall housing stock. We also identified the number of recipients of means-tested housing benefits.

For each UK district or unitary authority in 2002, 2009, and 2017, we collected data from the Office for National Statistics on housing managed by local authorities (typically councils) and non-profit housing associations, as well as information on total units. We also assembled information on means-tested housing benefits.

Measuring the distribution of subsidized units

We develop a comparative framework for exploring government-subsidized affordable housing. These subsidies reflect only a portion of affordable-housing policy. Other policy mechanisms, such as increased construction (Freemark, 2019; Saiz, 2010), changes in zoning policy (Freemark, 2020; Glaeser & Gyourko, 2003), homeownership aid (Basolo, 2007; Taylor, 2019), rent-regulation programs (McFarlane, 2003), and tenant protections, also influence affordability. And there are examples of housing funded by subnational governments, which we do not examine (Ellen & Weselcouch, 2015).

We are specifically interested in identifying how nationally supported housing is affected by the fragmentation of contemporary metropolitan areas. We use five measures to explore the distribution of subsidized housing among municipalities in each region.

First, we use the Herfindahl index to measure the concentration of subsidized units.[2] The Herfindahl index allows us to explore the extent to which units are clustered in individual municipalities (a higher number, up to 1), or dispersed (lower, to 0):

$$\text{Herfindahl} = \sum_{i=1}^{N} s_i^2 \tag{1}$$

In (1), N is the number of municipalities and s_i is the share of each municipality of the regional total given the variable of interest (e.g., the share of regional project-based units within each city). The Herfindahl measure, as with others here, has limitations. It does not, for example, account for other types of community variation, such as wealth, ethnicity, or access to jobs.

Second, we use the isolation index to measure whether subsidized units are isolated in an environment with other subsidized units. Lower levels of isolation indicate more integration of subsidized and unsubsidized households:

$$\text{Isolation} = \sum_{i=1}^{N} \left[s_i \left(\frac{x_i}{t_i} \right) \right] \Big/ \left(\frac{x_r}{t_r} \right) \tag{2}$$

In (2), variables are the same as in (1), x_i is the number of units of interest (e.g., project-based subsidized housing), t_i is the number of housing units in a city, and (x_i/t_i) is the share of each municipality's housing stock that is subsidized. To adjust for the varying circumstances in European versus US cities (higher versus lower levels of subsidized units), we divide by (x_r/t_r), where x_r is the number of subsidized units regionwide and t_r is the number of regional housing units.

Third, we develop a measure of inclusion that identifies the share of regional housing units in cities with more than the regional median of the unit of interest (e.g. cities with a higher share of affordable housing than the region overall), scaled from 0 to 100% (a higher figure means more unsubsidized units in cities with high levels of subsidized units):

$$\text{Inclusion} = \left[\sum_{i=1}^{N}\left(t_i\left(\frac{x_i}{t_i}\right) > \eta_r\right)\right] \Big/ t_r \tag{3}$$

In (3), variables are the same as above, and η_r is the regional median level of the unit of interest.

We create a measure of exposure that examines average resident incomes in communities where subsidized units are located, versus those of the overall population. This approximates the exposure of subsidized-unit residents to people with higher or lower incomes; a ratio closer to 1 means communities where subsidized units are located are similar in income to the population overall. This figure may be representative of local fiscal capacity in cities where subsidized units are located, but we do not measure this directly, as that is also impacted by taxation rules, property values, and other local characteristics.

$$\text{Exposure} = \left[\left(\sum_{i=1}^{N} x_i * r_i\right) \Big/ x_r\right] \Big/ \left[\left(\sum_{i=1}^{N} p_i * r_i\right) \Big/ p_r\right] \tag{4}$$

In (4), variables are the same as above, and r_i is the median household income (per-capita income in the United Kingdom); p_i is the population of each municipality; and p_r is the regional population.

Finally, we measure centrality to identify the degree to which subsidized units are concentrated in the center city of each region (if we define London by its boroughs, it does not have a traditional center city). This measure, on a scale of 0 to 100%, establishes the degree to which units of interest are concentrated in the historic center of each region:

$$\text{Centrality} = [x_c/x_r] \tag{5}$$

In (5), variables are the same as above, and x_c is the number of units of interest within the region's center city.

We recognize the limitations of this work. Our focus on affordable housing supported by national subsidies means we do not address policies focused on market-

rate housing, such as rent-regulation programs or 'naturally occurring' affordable housing. Our measures do not explain all aspects of a region's housing distribution, and our focus on the municipal and regional scales only tells part of the story—though it does appropriately represent the scale of local political decision-making. There are fundamental questions of data comparability between countries; while we have done our best to reconcile sources, they remain somewhat dissimilar. The economic, social, and historical circumstances of each place examined vary, and our choice of only nine regions may hinder broad-scale applicability of this work. Even so, our effort to measure the distribution of subsidized housing offers a useful comparison across metropolitan areas and the beginnings of a wider-range discussion of the multi-level ramifications of housing policy.

Results

Provisions for subsidized affordable housing

Our results indicate that US regions are remarkable both in their low provision of government-aided affordable housing overall, and also in the uneven distribution of such units among communities. We begin by exploring the share of housing with project and tenant-based subsidies, or both (Table 2). Among units in French and UK regions, between 16 and 24% receive project-based subsidies (column I), and between 17 and 28% receive tenant-based subsidies (column II). These figures are far higher than those in the US regions, which range between 2 and 8% for both subsidy types. Despite the differences in tenant-subsidy provision, in all countries, there is a limited availability of funds for project-based units.

In each country, it is possible for tenants, developers, or property owners to combine multiple subsidies. Accordingly, we estimate the total share of housing receiving one or both subsidy types (column III). The difference between US regions (4 to 10% of units covered by at least one subsidy), and UK (25–30%) and French (32–38%) regions is stark. A far higher share of US renters lacks public support; they are thus more likely to experience rising rents, minimal affordability, and, potentially, displacement. Though support in the Chicago and New York regions is more extensive than in Los Angeles, it pales in comparison with any European region. Maps of each region, showing the low concentration of subsidized units throughout municipalities in the case-study US urban areas, as compared to those in France and the United Kingdom, are found in Appendix C.

Table 2's columns IV, V, and VI document the distribution within each metropolitan area of units with project-based subsidies, tenant-based support, or both, among municipalities (local authorities in the United Kingdom). The average municipality in US regions has about 3% of its units with dedicated public subsidies (column V). The average municipality in French and UK regions has more than 19% of its units with such subsidies. The average municipality has a smaller share of such units than its respective region as whole because subsidized units in every region are concentrated in a few localities. On the other hand, the average *resident* of each region (column VIII) lives in a community that matches the regional average (column III).

Table 2. Share of units receiving affordable-housing subsidies.

		Regional share of units with subsidies			Either subsidy, for municipalities				Either subsidy, for individuals
		I	II	III	IV	V	VI	VII	VIII
	Region	Project-based subsidies	Tenant-based subsidies	Project and/or tenant-based subsidies[a]	25th %	Average	75th %	Ratio, 75th/25th	Average
United States (2018)	New York	7.6%	3.4%	9.5%	0.1%	3.3%	3.7%	39.8	9.5%
	Los Angeles	2.6%	2.6%	4.4%	0.3%	3.4%	3.9%	13.0	4.4%
	Chicago	4.0%	4.7%	7.8%	0.1%	3.2%	4.1%	50.7	7.4%
France (2016)	Paris	23.6%	20.5%	32.3%	14.0%	25.8%	34.1%	2.4	33.0%
	Lyon	18.9%	28.3%	37.7%	8.2%	19.0%	26.8%	3.3	37.2%
	Marseille	16.0%	28.1%	36.2%	11.3%	19.8%	26.5%	2.3	35.8%
United Kingdom (2017)	London	20.8%	19.3%	27.1%	16.2%	24.3%	31.5%	1.9	27.3%
	Manchester	20.2%	17.4%	25.0%	18.4%	24.1%	28.0%	1.5	25.2%
	Birmingham	22.9%	21.3%	29.9%	17.6%	25.2%	32.9%	1.9	30.2%

Note: US regions feature a considerably lower share of housing supported by housing subsidies, compared to French or UK regions. Such subsidies are more concentrated in the upper quartile of municipalities in the US regions, compared to those in Europe (column VII).

[a]Many units receive both project- and tenant-based subsidies. To estimate the share of subsidized units, the following assumptions were made: United States: 49.6% of LIHTC units were partly funded through rental assistance, mostly housing choice vouchers (O'Regan & Horn, 2013). France: Half of social-housing tenants received housing benefits (Scanlon et al., 2014, p. 133). United Kingdom: 60% (housing association) and 65% (local authority) of tenants in subsidized project-based housing received housing benefits (Scanlon et al., 2014, p. 112). Sources: US Census American Community Survey 2013–2018; National Housing Preservation Database; Insee; Office for National Statistics.

US regions are remarkable compared to European peers on two accounts. First, even cities with the highest shares of subsidized housing—those at or above the 75th percentile of the distribution (column VI)—have a far lower share of units with public support than those with the lowest levels of subsidized housing in Europe—those at or below the 25th percentile (column IV). Second, US regions have a far greater spread between the cities with the highest levels of government-supported affordable housing and those with the lowest. In column VII, we document the ratio between those in the 75th percentile of the distribution and those in the 25th percentile. US regions have a ratio that is between 4 and 34 times their European counterparts. These findings offer initial evidence that subsidized housing locations are more uneven in the United States, and thus that recipient households are more likely to be excluded from certain communities, producing less social mix—at least at the municipal scale.

Distribution of subsidized affordable housing

We now further explore the distribution of housing through several measures documented in Table 3. We provide information about the London region in two ways: first, treating the GLA as a municipality in and of itself, and second, disaggregating the area into its boroughs. This reflects the fact that both the GLA and the boroughs make land-use and affordable housing decisions.

In columns I and II, we measure the concentration of all housing units and those housing units with a project- and/or tenant-based subsidy, respectively, using the

Table 3. Measures of subsidized affordable housing distribution.

		I	II	III	IV	V	VI	VII	VIII
	Region	Herfindahl concentration		Concentration ratio	Isolation	Inclusion	Exposure	Centrality	Center-city ratio
		All units		*Units receiving project and/or tenant-based subsidies*[a]					
United States (2018)	New York	0.244	0.473	1.94	1.38	87.3%	0.82	68.6%	139%
	Los Angeles	0.111	0.208	1.88	1.33	80.2%	0.91	44.6%	138%
	Chicago	0.117	0.366	3.14	1.69	81.0%	0.80	60.2%	179%
France (2016)	Paris	0.064	0.054	0.84	1.16	78.2%	0.94	22.3%	90%
	Lyon	0.144	0.194	1.35	1.16	90.4%	0.95	40.7%	114%
	Marseille	0.325	0.426	1.31	1.08	89.5%	0.97	64.1%	115%
United Kingdom (2017)	London (GLA)[b]	0.563	0.711	1.26	1.05	86.6%	1.00	84.3%	113%
	London (boroughs)	0.021	0.026	1.27	1.14	63.7%	1.02		
	Manchester	0.088	0.105	1.20	1.09	49.9%	0.97	22.4%	152%
	Birmingham	0.215	0.272	1.26	1.06	71.5%	0.97	46.7%	119%
More social mix if …		—	—	Lower	Lower	Higher	Near 100%	Lower	Near 100%

Note: Across most measures, subsidized affordable housing contributes less to social mix in US regions than in those in Europe.

[a]Estimates and sources based on material in Table 2.

[b]In London, we combine all London boroughs into one entity (GLA) for this analysis, but also show results disaggregated by borough, though in that case there is no 'center city.'

Herfindahl index. The ratio of the two, shown in column III, indicates the degree to which the concentration of subsidized units is different than the concentration of housing overall. US regions have higher levels of subsidized-unit concentration (1.9–3.1 times) than in France or the United Kingdom (0.8–1.3 times).

In column IV, we measure isolation—assessing the degree to which publicly assisted units are surrounded by other such units, after accounting for the presence of assisted units in the region as a whole. From this perspective, US regions show higher levels of isolation than all European ones. Again, this finding demonstrates the concentrated nature of subsidized housing in the United States.

We measure inclusion, estimating the share of each region's housing units located in municipalities with higher than the regional median share of subsidized affordable housing (column V). This identifies the degree to which the provision of affordable housing has been taken on by communities regionwide. Here, UK regions are notable in the degree to which subsidized units are not shared (except when treating the GLA as a single municipality), though this may reflect lower levels of municipal proliferation. Chicago, Los Angeles, and Paris are somewhat more inclusive, and Lyon, Marseille, and New York are the most inclusive.

We measure exposure through the income of people in communities where affordable housing units are located versus the whole population (column VI). The typical community where a subsidized unit is located in the Chicago and New York regions has about 80% of the median household income as the population overall. On the other hand, the communities where subsidized units are located in France and United Kingdom have median incomes that are 94% or higher of the population as a whole. Subsidized-housing residents' access to public services and amenities may be influenced by the incomes of local residents, for instance through revenue available from local taxation. US municipalities thus appear more capable of hoarding resources.

Finally, we examine the share of subsidized housing units within each center city (column VII). US regions stand out because their center cities host 38 to 79 percentage points higher shares of their respective region's subsidized housing than if units were distributed proportionally to population (column VIII). The historically different role of center cities in the United States may be influential. US center cities in the second half of the 20th century were associated with disinvestment in residential neighborhoods as jobs and wealthy, white households moved to the suburbs, although this dynamic has changed in recent decades; in Europe, center cities have more often continued to be desirable economic and residential locations. Indeed, the fact that the city of Paris' social-housing share of the regional total is lower than its overall housing share of the regional total (90%) illustrates a different relationship between the center and the periphery than in the United States. The high levels of concentration of subsidized housing in the United States (and in the Manchester region) reflect these differing patterns of investment. In Appendix D, we map concentration of subsidized housing, as compared to regional averages, in each of the nine case-study regions. These maps show that subsidized housing is overwhelmingly concentrated in US center cities—and underdeveloped in their suburbs—while geographic concentration in the European urban areas is far less extensive.

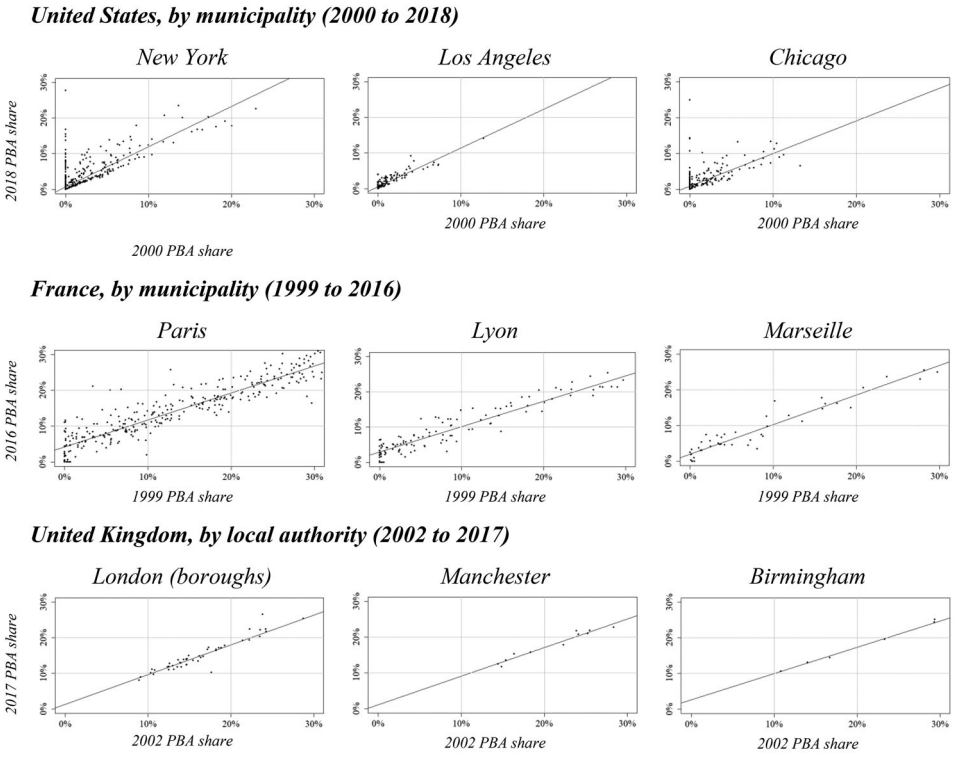
Relationship with jurisdictional proliferation

To what degree do the above results relate to jurisdictional proliferation? In Appendix E, we graph each of the aforementioned measures as dependent variables on Y-axes against the independent variable, the measure of jurisdictional proliferation in Table 1. The number of municipal governments per one million inhabitants. We graph London twice, with the GLA and without.

We identify no association between jurisdictional proliferation and any measure analyzed. The low number of units of analysis here prevents more detailed statistical insight, but the implication is clear. Both US and French regions have high levels of such proliferation, but the French regions—including both very fragmented Lyon and much less divided Marseille—appear closer to the UK ones on each of the measures of subsidized housing distribution. Indeed, despite the Los Angeles region having a third of the proliferation of New York or Chicago, its scores on these metrics are generally closer to those of other US regions than those of the less fragmented United Kingdom.

Change over time

In this section, we find that regions across the three countries have experienced similar trends in affordable-housing provision; we also explore changes in their metropolitan distribution. Although there has been increasing provision of subsidized units in the United States and France, these increases have barely expanded the share of such units compared to overall housing in US regions, and have been associated with a decline in the publicly-supported share in France because of faster overall housing-stock increases. In the United Kingdom, meanwhile, the quantity of publicly supported units declined in



	Region	Regional change in number	Change in regional share	Regional Herfindahl concentration ratio	
				Level (2018/2016/2017)	Change from 2000/1999/2002
United States	New York	+65.5%	+2.6% pts.	2.24	-0.11
	Los Angeles	+95.2%	+1.1% pts.	1.98	+0.18
	Chicago	+98.5%	+1.7% pts.	3.09	-0.01
France	Paris	+8.3%	-1.0% pts.	0.62	+0.12
	Lyon	+12.2%	-2.1% pts.	0.84	-0.02
	Marseille	+8.0%	-1.2% pts.	1.04	-0.03
United Kingdom	London	-0.3%	-2.7% pts.	1.33	-0.04
	Manchester	-10.0%	-4.5% pts.	1.20	-0.07
	Birmingham	-9.6%	-4.3% pts.	1.16	+0.02

Figure 1. Distribution of project-based subsidized affordable (PBA) housing, by municipality. Note: The concentration of project-based subsidized affordable housing in U.S. regions, as measured through the Herfindahl index, is far higher than in French or U.K. regions. Sources: Insee; Office for National Statistics; U.S. Census; National Housing Preservation Database.

most metropolitan areas. Here, we consider project- and tenant-subsidized units separately because of limited data availability over similar time periods.

Figure 1 graphs project-based subsidized housing in each region's municipalities. On each graph, the *X*-axis represents project-based subsidized housing as a share of all housing in each municipality about two decades ago (2000 in the United States; 1999 in France; and 2002 in the United Kingdom). The *Y*-axis represents the project-based share in each municipality in a recent year (2018; 2016; and 2017, respectively).

In each chart in Figure 1, we draw a linear correlation between these values (the standardized charts show the same range, despite the significant differences in subsidized-housing shares). Below, we document changes in the number of project-based units in each region; the percentage-point change in the share of such units; the regional Herfindahl concentration ratio (as in Table 3, column III); and the change in that measure.

The US regions experienced large increases in the number of units with project-based subsidies, with French regions experiencing less dramatic increases. In the New York region, the number of such units increased by about 300,000 between 2000 and 2018 (even as the number of public-housing units declined, there was an increase in LIHTC units). In the Paris region between 1999 and 2016, the number of social-housing units increased by about 70,000. In the United Kingdom, by contrast, there have been significant declines in the number of units with project-based subsidies in Birmingham and Manchester, and little change in the London region.

In the United States, this unit-count increase was associated with moderate increases in the share of each region's units with project-based subsidies, although the increase was on a low baseline. In France, despite the increase in number, the share of social housing declined in each region overall. In the United Kingdom, the share of council housing declined by between 3 and 5 percentage points.

With respect to the distribution of project-based subsidies in the context of the multijurisdictional metropolitan areas we study, the findings confirm their concentration in US regions through the ratio of Herfindahl concentration of subsidized units to the concentration of all housing. Most regions remained relatively consistent on this measure, although the level of subsidized housing concentration in Paris increased substantially (from a low level, a phenomenon we describe below), as did the concentration in Los Angeles, further increasing that region's spatial segregation. The New York region, and to a lesser extent the Manchester region, experienced a decline in such segregation.

To what degree did municipalities act differently in response to similar baseline conditions? Figure 2 compiles best-fit lines from each region (data from Figure 1) into one graph, with the share of units with project-based subsidies about two decades ago on the *X*-axis and the change to a more recent year on the *Y*-axis.

Figure 2 illustrates that the French and UK regions followed similar trajectories: The higher the project-based affordable-housing share in a municipality roughly two decades ago, the greater the decrease in the share to today. The entire best-fit line of each UK region indicates a regional loss of project-based subsidized units. In each French region, however, the cities with lower shares two decades ago increased their average social-housing shares between 1999 and 2016.

By contrast, in US regions, the increase in project-based subsidized housing units was not concentrated among cities that previously had low levels. In each region, the increase was driven by municipalities with higher rates of project-based subsidized housing in 2000, indicating the development of a *less* uniform distribution of project-based units. Municipalities with very few subsidized units saw virtually no increase. There has thus been a more even geographic distribution of project-based units in France, and further concentration of them in the United States, though at a low level.

In Figure 3, we present trends in the distribution of units with tenant-based subsidies in each metropolitan area. As in Figure 1, on the *X*-axis is the share of each city's units with tenant support 10 to 15 years ago, and on the *Y*-axis is the share of

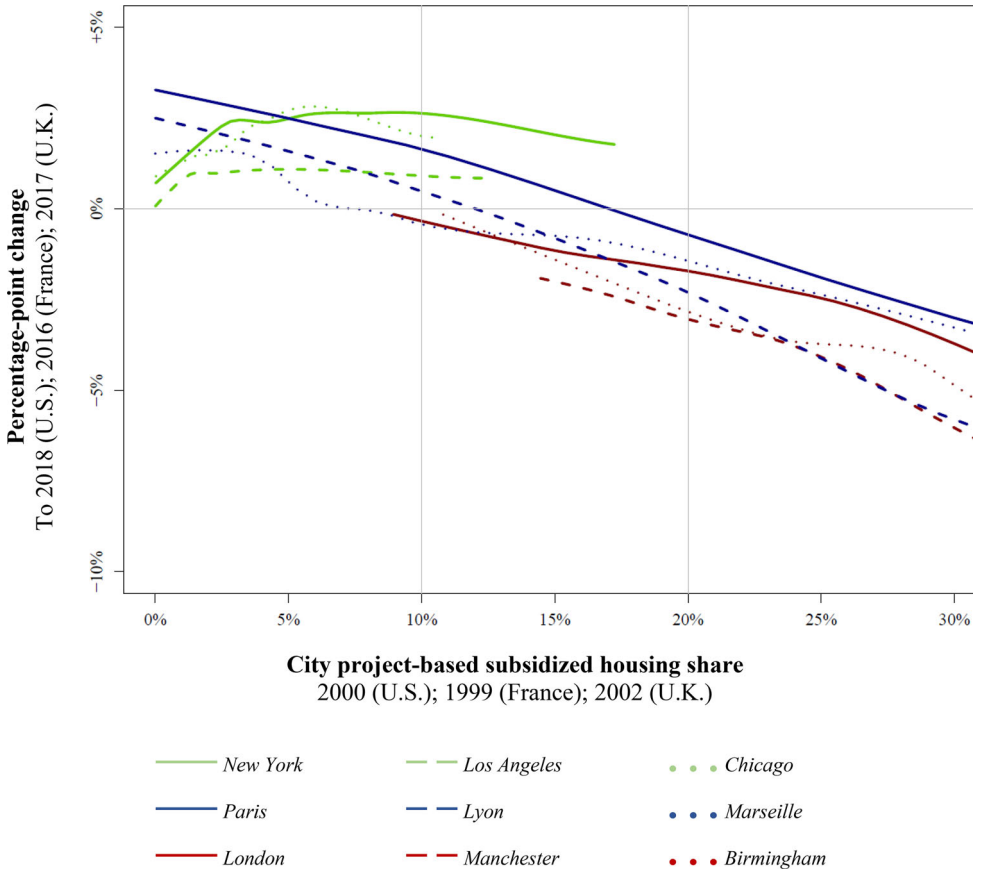
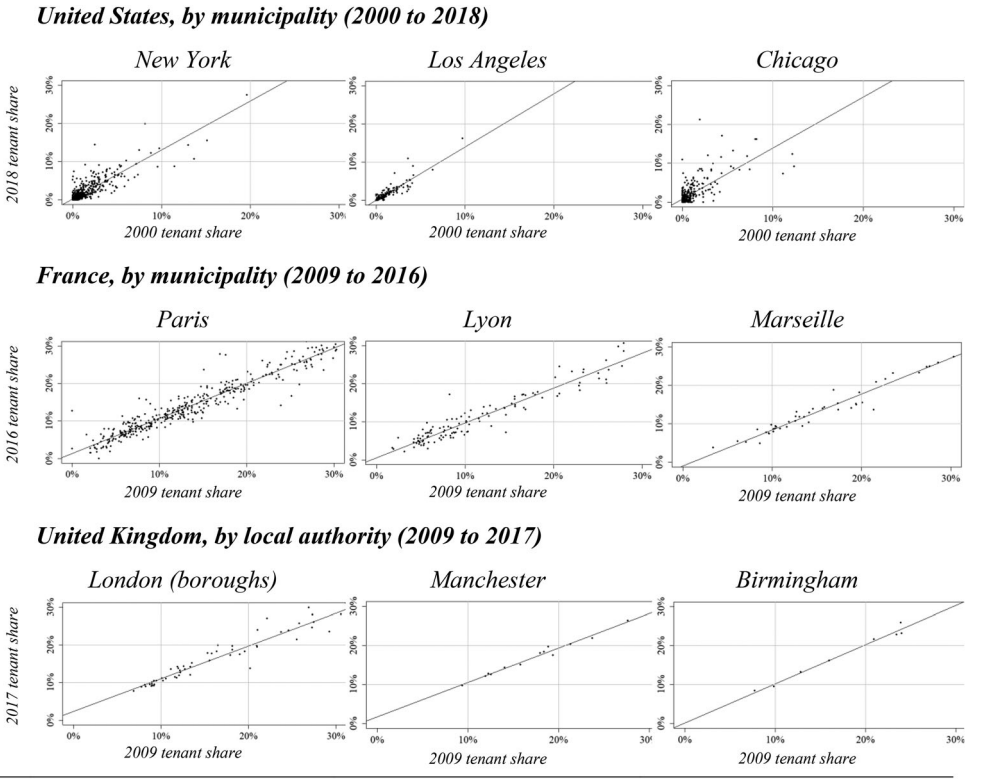


Figure 2. Comparing cities' project-based subsidized affordable housing: Best-fit graphs. Note: Levels of project-based subsidized housing increased by 2016 in French cities with low subsidized housing shared in 1999 and declined in those with high shares in 1999, levelling the overall distribution. U.K. cities have followed similar trends, but not U.S. ones. Sources: Insee; Office for National Statistics; U.S. Census; National Housing Preservation Database.

such units with such support more recently. We note changes in the number of units; the percentage-point change in the share of the region's housing stock with such subsidies; the regional Herfindahl concentration ratio; and the change in that ratio.

In all regions, the number of tenant-supported units increased over the time periods evaluated (2000–2018 for the United States; 2009–2016 in France; and 2009–2017 in the United Kingdom). This increase was particularly strong in the United States, though the change was over a longer period than the European countries and it started from a lower baseline. Given the growth in housing units overall, however, the share of housing units with tenant-based subsidies declined in the French metropolitan areas and in Manchester.

With regard to the distribution of tenant-based support, again, the US regions had generally higher levels of concentration (adjusted for overall housing concentration), though the New York region was less concentrated than Lyon. We identified no major changes for the regions outside the United States. But the Chicago region's



				Regional Herfindahl concentration ratio	
	Region	Regional change in number	Change in regional share	Level (2018/2016/2017)	Change from 2000/2009/2009
United States	New York	+75.5%	+1.3% pts.	1.51	-0.11
	Los Angeles	+53.4%	+0.7% pts.	1.77	+0.16
	Chicago	+265.0%	+3.3% pts.	3.17	+0.97
France	Paris	+5.9%	-0.0% pts.	0.99	-0.06
	Lyon	+12.0%	-0.3% pts.	1.56	+0.05
	Marseille	+1.7%	-1.4% pts.	1.40	+0.06
United Kingdom	London	+7.6%	+0.2% pts.	1.28	-0.03
	Manchester	+1.6%	-0.4% pts.	1.20	-0.02
	Birmingham	+7.9%	+0.8% pts.	1.31	+0.07

Figure 3. Changes in distribution of tenant-based subsidized affordable housing, by municipality. Note: The concentration of tenant-based subsidized affordable housing grew dramatically in the Chicago region between 2000 and 2018, while declining in the New York and Paris regions. Sources: Insee; Office for National Statistics; U.S. Census; National Housing Preservation Database.

Herfindahl concentration ratio increased by 0.97 during this period. This change coincided with the city of Chicago increasing its share of its region's vouchers from less than 54% in 2000 to greater than 60% in 2018, because of the replacement of many public-housing units by vouchers (Vale & Freemark, 2012). Los Angeles also saw a modest increase in the concentration of its tenant-based support, while New York experienced a slight decline.

In Appendix F, we examine how each region's concentration of tenant-based support has changed recently. Again, we find downward slopes for French and UK regions, meaning that the geographic distribution of renter households with vouchers has become more even. The US regions, by contrast, have upward-sloping trends, meaning that households with vouchers are increasingly living in fewer municipalities within each region, indicating overall higher levels of segregation of people receiving tenant-based support and less likelihood of achieving social mix.

Discussion

The cost of housing is increasing for the typical household across much of the world, and low-income households are particularly adversely affected. Our findings reinforce previous research (e.g., Galster, 2007) in documenting a striking gap between the share of units subsidized through national affordability programs in US regions and those in France and the United Kingdom. Though housing support has increased in US regions over the past two decades, it remains limited. From this perspective, it is unsurprising that low-income renters in France and the United Kingdom generally pay less than a third of incomes toward rent, while most low-income renters in the US pay more than 50% of incomes to rent.

Subsidized renters are almost completely excluded from more than a quarter of municipalities in each of the three US regions studied. In the six regions studied in France and the United Kingdom, by contrast, even in the quarter of municipalities with the lowest share of subsidized renters, between roughly one-tenth and one-fifth of units received some subsidy. The extreme exclusion of subsidized renters by many US municipalities, compared with higher levels of integration abroad, occurs partly because localities have more tools to exclude and hoard resources in the United States compared to France and the UK. The universal availability of tenant-based housing support in France and the United Kingdom reduces the concentration of subsidized-housing recipients and encourages municipal-level social mix.

In terms of changes in the relative concentration of affordable units—their distribution in various parts of each region—the case-study areas differed. In most French areas, the concentration of deeply subsidized units fell; this finding contrasts with recent scholarship finding rising European geographic socio-economic inequality (Musterd *et al.*, 2017). French cities with higher subsidized-housing rates experienced declining concentration, and those with lower subsidized-housing rates had a relative increase. French regions, spurred on by national mandates, are headed toward more equitable distribution of subsidized housing. At the same time, the concentration of units in US regions worsened, especially in Los Angeles in terms of project-based units and Chicago in terms of tenant-based support.

One key question for scholars is whether, in the context of local jurisdictional proliferation, the current structures of government subsidies reinforce well-documented inequalities among individual municipalities—or counter them. Tenant-based support as an entitlement in France and the United Kingdom confronts the exclusionary and resource-hoarding dimensions of local fragmentation. On average, the distribution of housing-benefit claimants across localities in French and UK regions became more

even over the past two decades, although there remain wide differences between communities with high and low shares of tenant-based support. In the United States, by contrast, voucher holders increasingly clustered in fewer municipalities.

Differences in how jurisdictional fragmentation works in the three countries likely influence these outcomes (Freemark *et al.*, 2020). The sheer number of local governments does not drive the exclusion of subsidized housing. The New York and Paris regions are both fragmented in terms of number of municipalities per-capita. Yet while New York's subsidized housing has, by some measures, clustered further in recent years, in Paris, social-housing has become more evenly distributed. The Los Angeles region features far less jurisdictional proliferation than its US peers—yet its subsidized housing concentration has increased. This divergence in trends in the location of subsidized renters across areas with similar numbers of municipalities per-capita suggests that higher-level government laws limiting municipal resource hoarding—such as housing benefits as entitlements and required minimum levels of affordable housing across all municipalities—are likely more influential than the sheer number of governments in impacting social mix at the local scale.

The patterns in the location of subsidized renters across regions in these three countries are consistent with the broad fiscal incentives for municipal governments in each nation. Local jurisdictions in the United States rely heavily on local property tax revenue and receive few transfer payments from the federal government, unlike jurisdictions in France and the United Kingdom. Localities in the United States thus have greater fiscal incentives to use exclusionary land use policies (often called 'fiscal zoning') to exclude low-income households and subsidized rental units, although in the US federalist system there is also variation by state legal and fiscal context.

Additional mechanisms further limit options for subsidized renters in the United States. In the case of renters with tenant-based vouchers, private landlords in most of the nation can reject an applicant precisely because of their housing subsidy, and market incentives will encourage this 'opt-out' discrimination in higher-income municipalities with stronger private rental markets (regardless of their local land-use policies). In the case of subsidized rental units, the majority of new subsidized units are financed through the LIHTC program, whose regulations provide a preference to projects that serve the lowest income tenants, that serve these tenants for the longest period of time, and that are located in qualified census tracts (tracts which have a poverty rate of at least 25% or in which 50% or more of the households have an income less than 60% of the area median gross income), in which the project contributes to a concerted community revitalization plan (26 U.S.C. § 42(m)(1)(B)(ii); 26 U.S.C. § 42(d)(5)(B)(ii)). The requirement to target LIHTC investment toward tracts with high-poverty rates or low incomes may help spur community revitalization yet also reinforces the concentration of LIHTC units in particular municipalities, as observed in the data here.

In contrast to the multi-level policies limiting options for subsidized renters in the United States, municipalities in France have fewer avenues through which to hoard resources. The SRU law requires a minimum level of social-housing production, and individual French municipalities face significant penalties for non-compliance. The more even distribution of subsidized units in the study regions in France suggests that the SRU law has had an impact (the increase in Paris-region concentration that we documented in Figure 1 is indicative). There is no such mandate in most of the

United States. Jurisdictional proliferation in the New York context is associated with low levels of socio-economic integration, but it is not associated with similar segregation in Paris. Accordingly, claims that fragmented local governance is a primary cause of segregation (e.g., Mollenkopf & Swanstrom, 2019) must be understood to be contingent on the distribution of powers between local and national governments.

The diminishing concentration of low-income households in French and UK regions, however, does not guarantee equity. More even distribution of subsidized units would be beneficial if that distribution provided low-income households the ability to live near places or resources to which they want or need access, such as schools and work. An uneven distribution of subsidized housing options, concentrated in resource-rich areas, could potentially be more desirable than an even one. We find that the typical municipality where a subsidized housing unit is located in US regions still has residents with considerably lower incomes than the average municipality for the overall population—a condition that is not true in Europe.

Addressing affordability through concentrating poverty because of the exclusionary decisions of many suburban areas—in other words, the typical approach in US regions—is not a fair outcome. For policymakers interested in expanding opportunities for households with low and moderate incomes, increasing mandates from above to limit exclusionary local policies are necessary. Local governments with restrictive land-use regulations that exclude households with low and moderate incomes and disproportionately exclude households of colour, and local governments that permit landowners to discriminate against voucher holders, are hoarding opportunity. Higher-level governments do not have to allow many localities within a region to mean metropolitan inequity.

As George Galster (2019) has argued, reforms that encourage economically, socially, and racially diverse neighborhoods, including reforms to site-based and tenant-based housing assistance programs in the United States, are essential. Actions by regional or national governments to make decent, affordable housing a right; to prohibit source of income discrimination; to strengthen regional assisted or social housing institutions; to encourage affordable housing construction in high-income neighborhoods; to preserve public housing in revitalizing neighborhoods; to calculate housing voucher amounts based on small area fair market rents; and potentially to recapture and redistribute some gains in property equity, among other actions, can begin to reduce the connections between jurisdictional fragmentation and metropolitan inequality in the United States and make access to housing more equitable (Galster, 2019; Katz & Turner, 2001; Reina *et al.* 2019; Steil *et al.* 2021).

Notes

1. Because of inadequate data in the New York region, we exclude 291 places (representing 5 percent of the population) from our examination of voucher units.
2. The Herfindahl index is equivalent to the Simpson index, used to measure diversity.

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Appendix A: Renter costs and affordability

	Region	Median rent as share of income
United States (2017)	New York	32.1%
	Los Angeles	34.5%
	Chicago	30.1%
France (2013)[a]	Paris	26.3%
United Kingdom (2014)[b]	London	31.6%
	Manchester	24.7%
	Birmingham	21.7%

Note: Typical renter costs as a share of income are high throughout regions studied. Sources: US Census American Community Survey 2013–2017; Insee 2017a, 2017b; Observatoire des inégalités 2017; UK Office for National Statistics 2016b.
[a]For Paris, Île-de-France region, based on 58.2% of renters in social sector, the remainder in private sector (Insee 2017b, 6).
[b]For Birmingham, West Midlands region; for Manchester, North West England region.

Appendix B: Defining metropolitan regions

There is no universal understanding of what defines a metropolitan region, particularly across national lines. Some analyzes connect the border of the region with political boundaries (such as the Greater London Authority (GLA) area or the Île-de-France region), whereas others choose to rely on specific metrics, such as adjacent built-up areas. These two approaches, however, each present their own obstacles. One, political boundaries are difficult to compare across regions, even within individual countries, as they do not align with similar built forms (for example, Île-de-France includes large rural areas, whereas the GLA does not). Two, metrics based on standardized built forms do not adjust to political boundaries, which is a problem if we are to believe that the political choices of communities play a major role in influencing access to housing. There is no way to resolve these issues systematically, but we have chosen a pragmatic approach.

For the United States, we began with the relevant core-based statistical areas identified by the US Census. These were Chicago-Naperville-Elgin IL-IN-WI for Chicago; Los Angeles-Long Beach-Anaheim, CA for Los Angeles; and New York–Newark–Jersey City NY-NJ-PA and Bridgeport–Stamford–Norwalk, CT for New York (we included the latter so as to ensure that we included the Connecticut suburbs of the region). We did not extend our analysis to the larger Census-defined Combined Statistical Areas, such as New York-Newark NY-NJ-CT-PA, as these include places that are far from the core of each region and are regional centers in their own right, such as Michigan City, Indiana; Barstow, California; and Allentown, Pennsylvania.

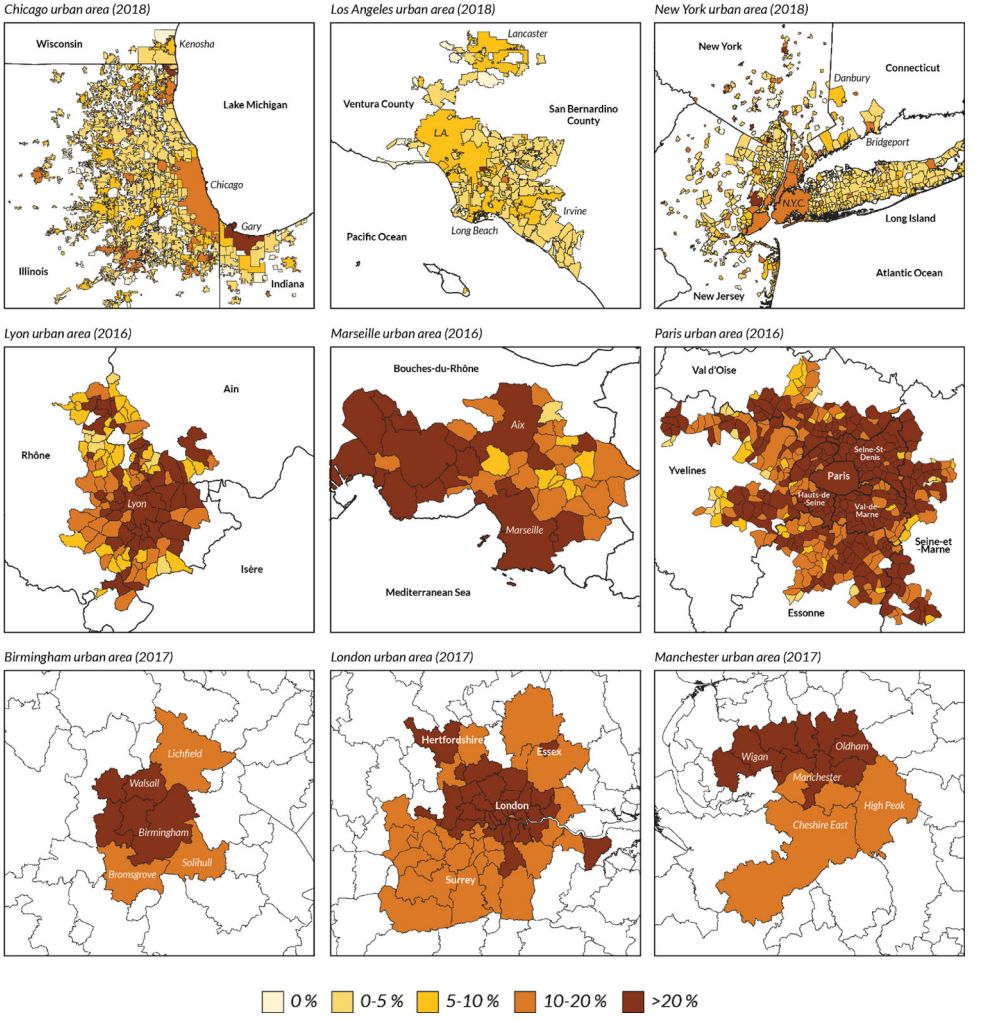
For each area, we identified all Census-designated places, which are generally cities, but can also be boroughs, villages, and towns. Most of these places have control over zoning, which determines the ability, for example, to build multi-family housing. Many also have housing authorities that can distribute housing vouchers for low-income households to use in renting private-market housing. As of 2017, these places had about 3.6 million, 4.5 million, and 7.0 million housing units, respectively, in the Chicago, Los Angeles, and New York regions.

For France, we defined the metropolitan areas as urban areas (*unités urbaines*), statistical units defined by the French government Insee census service; this is a measurement of contiguously built-up areas. In the Paris region, there are both a larger unit of regional governance, the Île-de-France region, and a smaller unit, the Métropole du Grand Paris, but neither of these correspond to the Paris urban region. As of 2016, the urban areas had about 0.7 million, 0.7 million, and 4.6 million housing units, respectively, in the Lyon, Marseille, and Paris regions.

Finally, for the United Kingdom, we took advantage of the urban areas as defined by the United Kingdom's Office for National Statistics' (ONS) 2011 Census. For Birmingham, London, and Manchester, this included both the counties at the center of each area, and villages and towns located within districts or unitary authorities (which combine county and district functions), all of which have their own elected leaders who supervise council taxes, housing benefits, planning, and affordable housing options. As of 2017, the regions had about 1.1 million, 4.7 million, and 1.5 million housing units, respectively, in the Birmingham, London, and Manchester regions.

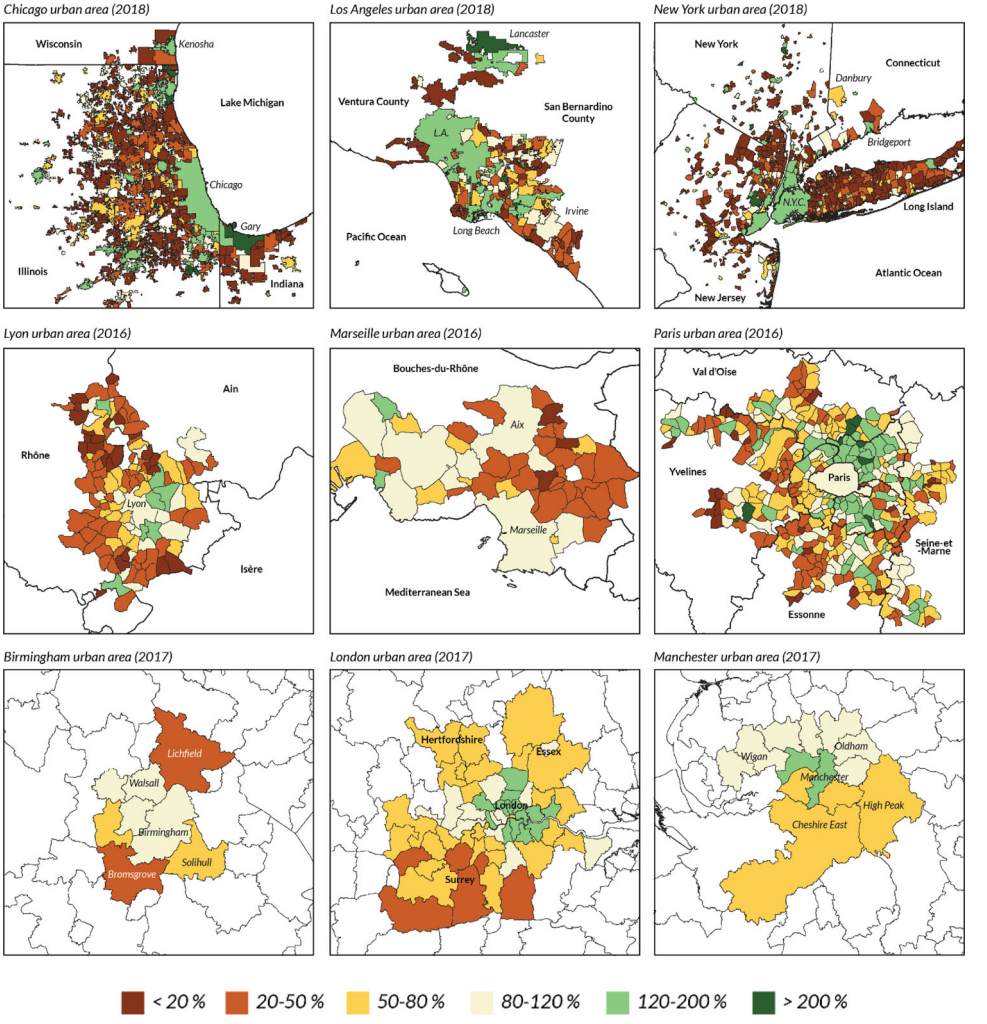
It is worth noting that, while the regions in France and the United Kingdom are fully contiguous, because in both all land is incorporated, the regions in the United States include significant gaps between municipalities because of the lack of incorporation of many rural, exurban, and sometimes even suburban zones. Given our focus on the role of metropolitan fragmentation, and thus the importance of individual municipalities within a broader urban area, these differences are unlikely to significantly bias results.

Appendix C: Project and/or tenant-based subsidized units as a share of all units, by municipality



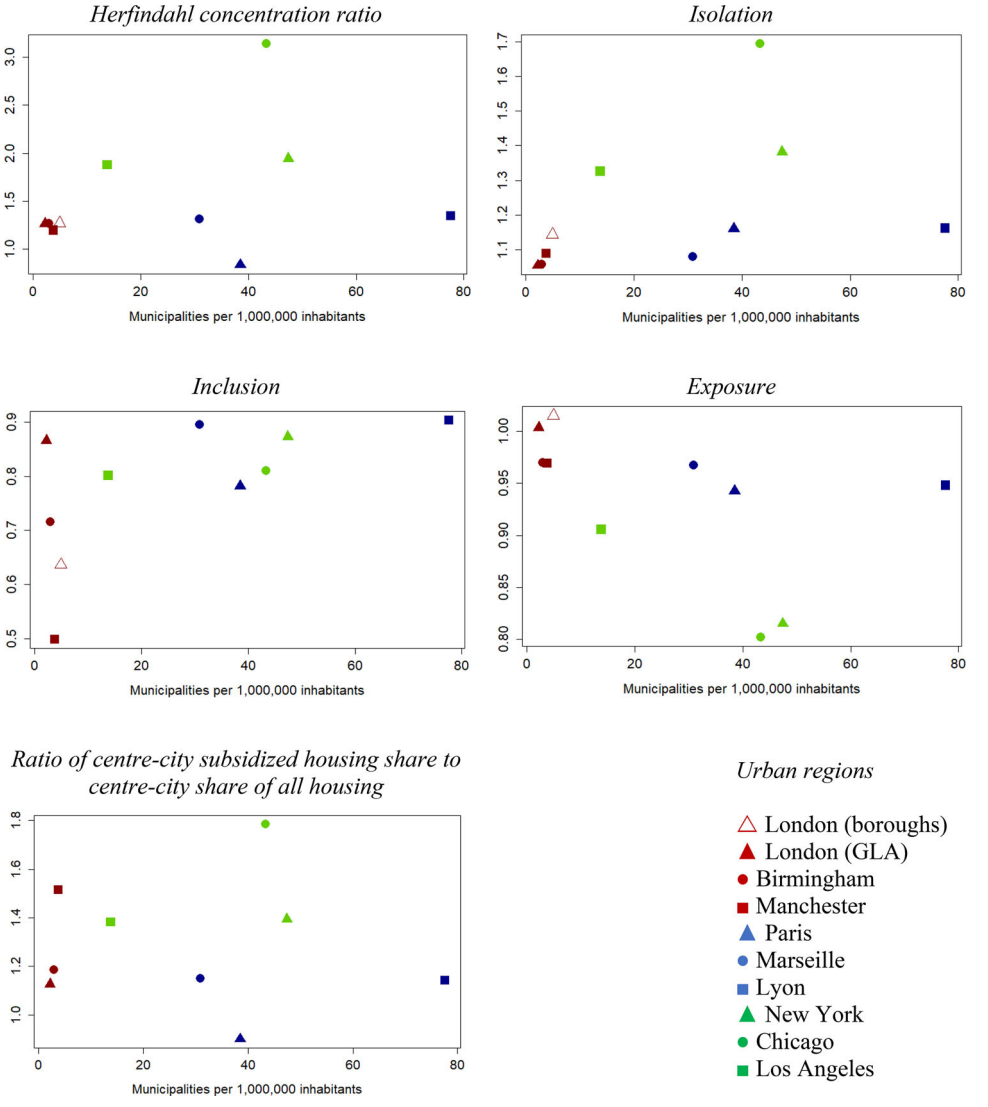
Note: Maps show each municipality within the nine regions by share of all units subsidized through national project and/or tenant-based affordable-housing programs. Sources: See Table 2.

Appendix D: Project and/or tenant-based subsidized share, by municipality, as a share of regional average



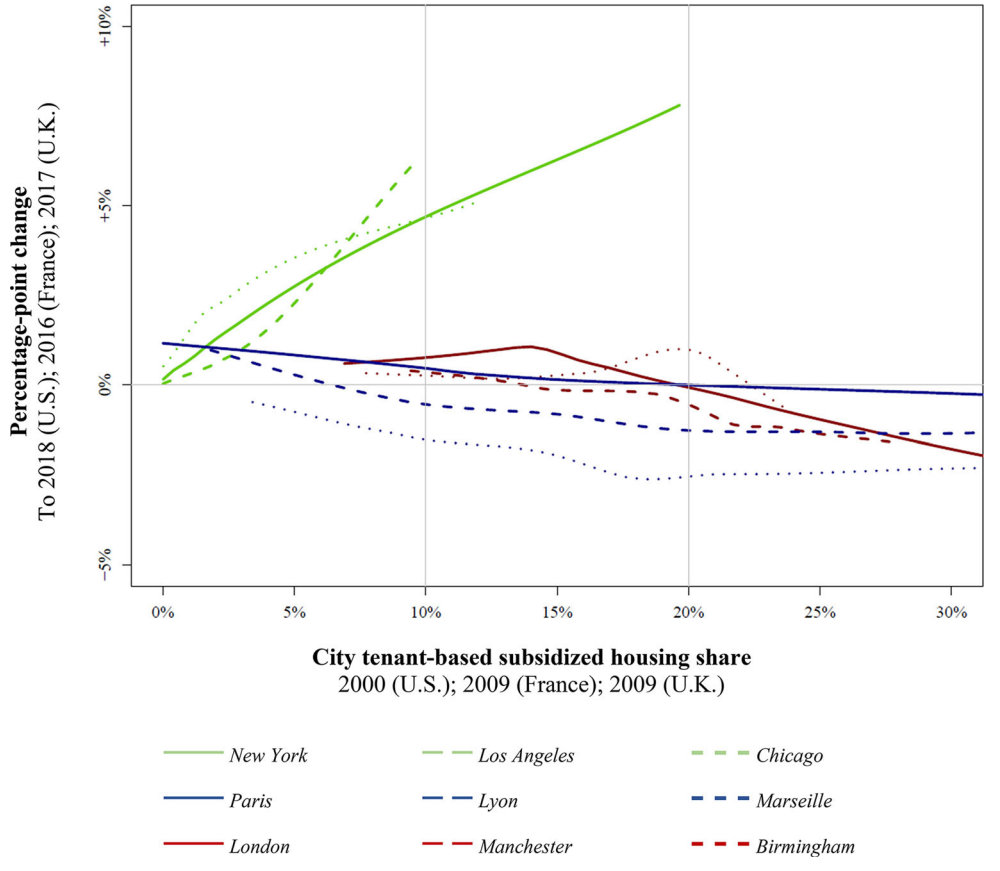
Note: Maps show the share of each municipality's housing stock subsidized through national project- or tenant-based affordable-housing programs, divided by the overall regional average. Sources: See Table 2.

Appendix E: Regional jurisdictional proliferation versus measures of subsidized unit distribution



Note: Jurisdictional proliferation, defined as the number of municipalities per 1,000,000 residents in each urban area, is unrelated to any of the measures of subsidized housing distribution. Sources: See Table 3.

Appendix F Comparing cities' tenant-based subsidized affordable housing: Best-fit graphs



Note: In recent years, the distribution of tenant-based subsidized housing has become more concentrated in US urban areas; cities with higher tenant-based housing shares in 2000 gained more units with tenant-based support than those with lower shares by 2018. These trends were not replicated in European urban areas. Sources: See Figure 3.