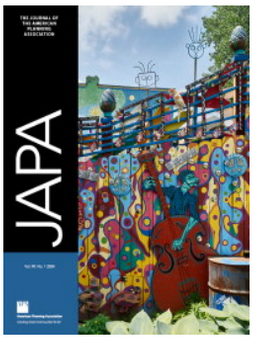

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A Spatial Big Data Analysis of Rental Housing Financialization

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ABSTRACT

Problem, research strategy, and findings: The financialization of housing is a rapidly growing concern for planning researchers and policymakers, but the opacity of property ownership in most cities has hampered efforts to rigorously measure the phenomenon. Here we introduce a new approach based on big data methods. By combining web scraping of property assessment, business registry, and rental advertisement data, we reliably identified the networks of property ownership lurking behind anonymous numbered companies and established the extent of financialized rental housing ownership. We demonstrate the effectiveness of this approach with a quantitative case study of the financialization of rental housing in Montreal (Canada). Using spatial regression and clustering analyses, we found that there are two distinct types of financialized rental housing ownership in Montreal: one characterized by precarious and student tenants and another characterized by affluent tenants. In general, high proportions of financialized ownership are associated with higher levels of housing stress and dense housing typologies.

Takeaway for practice: By demonstrating meaningful differences in housing market outcomes across financialization status—which has not usually been readily accessible to either renters or planners—our findings show the importance of rental market information asymmetry. Planners should treat landlord data as one component of the information necessary to properly regulate a rental housing market. Municipalities should make property ownership information publicly accessible to facilitate public scrutiny of residential land use and more effective protection of tenant rights.

Keywords: big data, financialization, rental housing, spatial analysis

In the last decade, a growing body of scholarship has explored the *financialization of housing*: the increasing dominance of financial actors and markets over housing development and use and the increasingly central role of housing in the broader financial system (Aalbers, 2016, 2017). Although this research originally focused on mortgage lending and homeownership—in particular in the context of the global financial crisis (Rolnik, 2013; Sassen, 2012a)—more recently planning researchers have turned their attention to the financialization of *rental* housing. Rental housing financialization has been connected to rent increases, displacement, service cuts, and landlord intimidation (August, 2020; August & Walks, 2018; Byrne, 2020; Crosby, 2020). However, although the importance of financialization in the housing market more broadly and the rental sector in particular is now widely recognized, research in this field has been hampered by the paucity of data on property ownership necessary to systematically establish the causes and consequences—and even the presence—of financialization (Graziani et al., 2020).

In contrast to demographic information about housing *occupants*, which is reliably accessible at fine scales from national censuses and administrative surveys such as the American Community Survey, exhaustive information about housing *ownership* is almost completely nonexistent in most North American jurisdictions. For example, even if local property assessment databases contain ownership records, apartment buildings are frequently owned by joint stock companies or limited partnerships, such as 123456 Quebec Inc., that are shells for anonymous controlling interests. Property ownership is a fundamental concept for urban planning (Blomley, 2017; Jacobs & Paulsen, 2009; Krueckeberg, 1995), but it is one that has rarely been studied systematically, because the data have not been accessible.

In this study, we present a novel approach for overcoming this limitation through spatial big data methods. Using a case study of Montreal (Canada), we combined four web-scraped data sets to produce an unprecedentedly exhaustive portrait of financialized rental housing ownership. Through Bayesian spatial regression and *k*-means clustering, we found that there are two distinct types of financialized rental housing ownership in Montreal: a low-cost type characterized by precarious and student tenants and a high-cost type

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characterized by affluent tenants. In general, high proportions of financialized ownership were associated with higher levels of housing stress and dense housing typologies. We conclude by discussing how increased access to property ownership information can help planners and tenant movements reduce information asymmetry in the rental market.

Conceptualizing Contemporary Financialization

Financialization refers to "the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies" (Epstein, 2005, p. 3). Though *finance* is inherent in any economic system, financialization implies the emergence of an asymmetry between the spheres of production and circulation (Lapavitsas, 2014), where the latter comes to dominate the former. In the past four decades, loosening of restrictions on capital mobility, the empowerment of private-sector actors in financial norm-setting, and new technologies and financial innovations have embedded finance in society in an unprecedented manner (Lapavitsas, 2014; Sassen, 2012b).

Financialization has, in the past several decades, cast an increasingly long shadow over the managing and making of cities in North America and Europe (Parker et al., 2018; Weber, 2010; Wyly et al., 2012). In recent years, planning scholars have studied the role of financialization in the urban land question (Roy, 2017) and in the provision of public goods and services (Weber, 2010). But most attention has been given to the financialization of housing (Brunn, 2018; Byrne, 2020; Hulse et al., 2020; Rolnik, 2019). In both the United States and Canada, the financialization of housing has unfolded via the creation of new financial instruments, en masse acquisitions of rental properties by real estate investment trusts (REITs) and other financial actors, and the leveraging of digital technologies in housing markets.

Until recently, most of the literature on housing financialization focused on the impacts of *mortgage securitization*—the process by which debt is sliced and bundled with other debts and sold to investors that have little interest in the physical asset itself—on homeownership (Sassen, 2012a). Financial innovations and deregulation in the 1990s allowed mortgages to be bundled and sold in markets, increasing the size of mortgage markets and the importance of mortgages in the broader financial system (Kalman-Lamb, 2017). This form of financialized homeownership differs from the previous, nonfinancialized one, where a mortgage represented "a contract between a single lender and borrower" (Kalman-Lamb, 2017, p. 301). Financialization has contributed to the widespread access of consumer mortgages and the vitality of the real estate sector (Sassen, 2012a), but it has also created a type of *impatient finance* (Hartwell, 2017).

In the last decade, a growing body of scholarship has begun to examine the financialization of *rental* housing. Although financialization is not a fully settled concept, rental housing is generally considered to be financialized when it is owned by financial vehicles such as REITs, private equity firms, institutional investors, or asset management firms (August, 2020). The emergence and subsequent explosion of financialized "global corporate landlords" (Beswick et al., 2016, p. 321), such as Blackstone, have been reshaping the entire rental sector, pushing out smaller landlords and driving up rents (August, 2020; August & Walks, 2018; Crosby, 2020; Fields, 2015, 2017; García-Lamarca, 2021). Multifamily buildings have been the target of predatory equity in countries such as the United States (Fields, 2017), Canada (August, 2020), Sweden (Hansen et al., 2015), and Spain (García-Lamarca, 2021). Student housing, which provides the advantage of a very high turnover rate, is a further new frontier of rental housing financialization (Nethercote, 2020; Revington & August, 2020).

Research has connected financialized landlords to gentrification and displacement, in particular through aggressive practices of rent increases and evictions (August & Walks, 2018; Crosby, 2020; Teresa, 2016). August and Walks (2018) found a concentration of financialized landlords in Toronto (Canada) inner-city and suburban neighborhoods with higher percentages of visible minority and foreign-born populations. Fields and Raymond (2021) likewise noted the importance of viewing financialization as a process that "reproduces racial logics and violence" (p. 1638).

Across North America and Western Europe, the rise of financialized landlords is part of a broader "structural transformation of [the private rental] market" (Wijburg & Aalbers, 2017, p. 969). In this regard it sits with the growing prominence of institutional investors in purpose-built rental housing (Gaudreau, 2020; Nethercote, 2020; Todes & Robinson, 2020) and the valorization of small-scale investor landlordism as a component of "asset-based welfare" (Hulse et al., 2020, p. 981; see also Byrne, 2020; Gaudreau, 2020).

Rental Housing Financialization in Montreal

Montreal has had the highest share of renter-occupied housing of any large or mid-sized city in North America, at 63.3% as of the 2016 census. Montreal has

historically been known as a renter's paradise (e.g., Curtis, 2019), where an ample supply of low-rise rental housing has kept rents relatively low and vacancy rates relatively high. Rental housing affordability metrics began deteriorating in the 2010s, despite a surge in new construction of purpose-built rental units. From 2016 to 2020, Montreal added 13,500 purpose-built (i.e., non-condominium) rental units (38.2% of all newly built housing units in that period and representing 3.2% of all primary rental market units).[1] Prior to the pandemic, Montreal's rental vacancy rate hit an all-time low of 1.6% in 2019 and in the following year had the largest average yearly rent increase in two decades, at 4.2% (Canada Mortgage and Housing Corporation, n.d.).

Over the same period, Montreal, like other North American cities, has seen its housing market become increasingly financialized. The reasons include financial innovations and deregulation during the 1990s and the aftermath of the global financial crisis, alongside the Canada-specific factors of the devolution of federal and provincial responsibilities in housing provision onto municipalities and 1993 legislation legalizing REITs (August, 2020; August & Walks, 2018). More recently, two major changes in the city's housing landscape have jointly paved the way for *rental* housing financialization: first, new financial actors have entered the purpose-built rental housing construction sector; second, the difficulty of enforcing rent control measures due to limited accountability, exceptions for newly built units, and tightened housing market conditions (Gaudreau et al., 2018, 2021; Gaudreau & Johnson, 2019).

Starting in the early 2000s, denser housing typologies —particularly high-rise buildings sold as condominiums—gained popularity in Montreal. That popularity expanded to include purpose-built rentals in the 2010s (Communauté Métropolitaine de Montréal, 2019). Because of the large scale of these projects, new financial players have entered the housing development scene: investment funds, including the union-affiliated Fonds de solidarité FTQ, and the commercial actors Claridge, Fierra Immobilier, and Ipso Facto (Gaudreau et al., 2018). Although the participation of such entities in housing development is not new by itself, their recent involvement has been accompanied by the creation of so-called limited partnerships, a novel trend (Gaudreau, 2020). In a limited partnership, a developer and a fund will associate for the duration of a project, creating a temporary business of which both parties are shareholders. This partnership differs from the previously standard form of agreement where funds would grant capital to a developer, who would then undertake the project independently and be responsible for repayments. In that arrangement the fund acted as a creditor, whereas now it acts as a partner. As partners, both the fund and the developer share the revenues, but these partnerships are deemed riskier for the fund than simply lending the money to the developer because repayment is not guaranteed. As a result, funds now expect much higher yields on their investment, which constrains new housing production: Only certain building types can generate the correspondingly higher sale prices or rental rates (Gaudreau, 2020). Therefore, as the direct participation of investment funds in the production of rental units has increased, a larger proportion of rental housing has become subjected to a financial logic.

Although the province of Quebec nominally provides strong rent controls and tenant protections, scholars and activists have criticized the effectiveness of these measures (Gaudreau & Johnson, 2019; Regroupement des comités de logement et associations de locataires du Québec, 2017). To begin with, although rent control is associated with the unit rather than the tenant, in practice there is no way to ensure that rents are not raised illegally when a new tenant arrives. There is no registry to consult, the outgoing tenant does not always communicate the previous rent to the future tenant, and not everyone has the courage to speak up against their landlord's violations (Lindeman, 2020). The high demand for rental housing, as shown by low vacancy rates, also has acted to suppress tenant objections to rent increases because tenants fear they will lose their home and be unable to find a replacement. Moreover, newly built rental units are not subject to rent control for the first 5 years of their existence and, as mentioned above, a surge of new units has entered the market in the last several years. But there is currently little information on the impact of these units because they were not counted in the last census (2016, at the time of writing).

The result is a situation where observers generally suspect that the entry of financialized landlords into Montreal's rental market has had important impacts on land use patterns and on housing access and affordability, but the lack of reliable data has made it nearly impossible to substantiate this suspicion. In what follows, we take up this challenge by presenting a new methodology for investigating property ownership in general and the financialization of rental housing ownership in particular; we used this methodology to develop the first exhaustive assessment of financialized rental housing ownership at the urban scale. We explored the economic geography of financialized landlords in Montreal and the impacts of financialized landlords on the housing sector.

A Spatial Big Data Approach to Housing Financialization

As noted above, planning research has historically struggled to analyze private property ownership, due to both the lack of comprehensive, publicly available data sets and the opacity of corporate ownership structures (August & Walks, 2018; Ferrer et al., 2020). We overcame this hurdle by combining public census data with four sources of publicly available but difficult-to-access data: property ownership data from the City of Montreal, business registry data from the Province of Quebec, and private rental market advertisements from Craigslist and Kijiji. Triangulating between these data sources allowed us to uncover the structure of ownership in Montreal's housing market, determine which landlords were financialized, and correlate ownership patterns with housing market and land use characteristics.

In Montreal, as in most North American cities, neither housing ownership nor business ownership data are available for bulk download.[2] To overcome this limitation and gain a full picture of the ownership relations in the real estate sector of the city, we wrote custom web scrapers for the property assessment database (PAD), the Registraire des entreprises du Québec (REQ), and the housing rental sections of Craigslist and Kijiji, two popular platforms for posting rental apartment advertisements in Montreal.[3]

The PAD includes the address, postal address, property owner(s), construction date, number of units, and property value for every property in the City of Montreal. We scraped the PAD by using a public registry of all of the property identification numbers in Montreal to conduct batch queries to the database.[4] The data set was filtered to only rental properties, which were combined first by postal address and then by landlord name to organize landlords from largest to smallest based on the number of rental properties owned.

To classify landlords, we scraped the business registration data of all companies in the PAD.[5] All landlords were then categorized by type: private, public, nonprofit, cooperative, or institutional. We then manually investigated the top 600 landlords to determine their common names and ownership type, because they represented an enormously disproportionate share of rental ownership. In 2020 they were just 0.46% of the 129,960 residential property owners in Montreal, but they owned 31.7% of the city's 566,582 rental units. The top 600 landlords owned 300 rental units on average, with the top private landlord owning 5,680 and the 600th owning 73. Landlords not in the top 600 owned three units on average.

Finally, once we had established the identity, type, and size of each landlord in Montreal, we assessed their level of financialization, relying on definitional methodologies from August (2020), Romainville (2017), and Krippner (2005). Operationalizing financialization is challenging; the concept often refers to entire sectors of the economy (Aalbers, 2016; Lapavitsas, 2014). For defining housing units as financialized, Romainville (2017) suggested an empirical assessment of firm type and activities. We defined financialized landlords as property owners whose companies operate directly in the financial sector (such as pension funds or private equity firms) or who are indirectly involved in the financial sector through being publicly listed or through having partners or shareholders who operate directly in the financial sector or who are publicly listed firms. We considered a rental unit financialized if it was owned by a financialized landlord.

Financialization status was determined using results from the REQ scrape. Companies identified in the REQ as nonprofits and cooperatives were categorized as nonfinancialized, following the criteria above. For for-profit firms, we established a classification procedure through an in-depth exploration of the largest 600 landlords in Montreal, which established that a common practice within financialized firms was using elaborate corporate structures with multiple layers of anonymous numbered companies (such as 123456 Quebec Inc.) for each of their properties.

Then, to classify financialization for the remainder of private landlords, property owners for which the first two rounds of scraping in the REQ returned another corporate entity as the first-listed shareholder, associate, or partner were investigated further to determine whether they were financialized according to the criteria above. Likewise, rental units owned by companies associated with individual control in the first two rounds of scraping were automatically categorized as nonfinancialized. Last, landlords identified as humans and not present in the top 600 were categorized as nonfinancialized as well. For the purposes of this study, we did not distinguish between small and large private landlords because financialization was our variable of interest. To verify the accuracy of this classification approach, we categorized a random sample of 250 corporations manually; this yielded a 98% accuracy against our automated criteria, with a sampling margin of error of 1.7% (at a 95% confidence interval).

Once the categorization was completed, the processed data set was joined spatially with housing market and demographic variables from the 2016 Canadian Census at the census tract scale, asking rents from Kijiji and Craigslist aggregated at the census tract scale (Wachsmuth et al., 2021), and distance from downtown Montreal (operationalized as the McGill College metro station). For each census tract, we calculated the percentage of rental units owned by financialized landlords. We then carried out a set of statistical analyses, the results of

which are presented in the next section, beginning with single-variable regressions with the percentage of financialized rental units serving as an outcome variable.

We then developed a series of regression models based on findings from our single-variable regressions and previous findings in the literature: a linear regression model, a binomial regression model, and, finally, a binomial regression model with spatial and nonspatial mixed effects similar to the updated BYM2 variant of the Besag-York-Mollié (BYM) model (Besag, 1974; Besag et al., 1991; Riebler et al., 2016). Because our outcome variable was a proportion the linear regression served merely as a simple reference model. For the simple binomial regression model the outcome variables were a pair of *n* trials (rental units) and *p* successes (financialized units). Both models exhibited moderate to high spatial autocorrelation in the outcome variable and the covariates, suggesting the utility of incorporating spatial effects into the modeling.

The independent variables for all models were normalized median rent, renter housing stress (the percentage of renters spending more than 30% of their income on housing costs), normalized average age, percentage of visible minorities, percentage of households that moved in the past year (housing mobility), percentage of households located in buildings of five stories or more, and percentage of rental units built after 2005 (all taken from the 2016 Canadian Census, except for the last variable, which was calculated using the PAD). The choice of independent variables was based on findings from previous studies: García-Lamarca (2021; rent), Soederberg (2018) and Kemp (2015; housing stress and instability), August (2021) and Revington and August (2020; tenant age), Crosby (2020) and Fields and Raymond (2021; racialization), August (2020) and Fields (2017; density), and Gaudreau et al. (2021) and Romainville (2017; building age).

Before modeling, we discarded the following variables due to multicollinearity: the percentage of immigrants (highly correlated to the percentage of visible minorities) and the percentage of households that moved in the past 5 years (highly correlated to 1-year housing mobility). For more details on all the models, see the Technical Appendix.

Finally, we used *k*-means clustering (Lloyd, 1982; MacQueen, 1967; see Short, 2010, for an application in urban studies) to identify groups of census tracts with low intragroup variation and high intergroup variation among independent variables.[6] We excluded the financialized rental housing ownership variable from the *k*-means clustering analysis but then calculated the average financialized rental ownership per cluster to identify the relationship between financialization and the other housing and demographic variables we tracked.

The Spatial Distribution and Social Impacts of Montreal's Financialized Landlords

We now provide the first exhaustive analysis of financialized rental housing ownership in a North American city. We begin by describing the prevalence and spatial distribution of financialized rental housing ownership, proceed to conduct single and multiple regression analyses, and finally use *k*-means clustering to identify five distinct rental housing neighborhood types in Montreal.

Across the entire City of Montreal, the percentage of rental properties owned by financialized landlords in 2020 was 1.4% (2,277 out of 166,967). Financialized landlords owned properties with more rental units than average, however; 11.7% of all rental *units* were owned by financialized landlords (66,452 out of 566,582). The only comparable previous finding is August's (2020) estimation that 3% of rental units in the province of Quebec were owned by REITs. Our more comprehensive methodology, which evaluated all rental units and included all financialized property owners, nearly quadruples that figure and establishes a new baseline for understanding the extent of financial actor penetration of rental markets. Our findings also challenge the assumption that rental housing financialization is less present in Quebec cities because of stronger rent control policies (August, 2020).

Financialized rental ownership exhibits strong spatial concentration. In the central-city boroughs of Ville-Marie and Le Plateau-Mont-Royal, 31.8% and 17.9% of rental units were financialized, respectively, whereas in the peripheral boroughs of Villeray–Saint-Michel–Parc-Extension and Ahuntsic–Cartierville, the figures were only 2.5% and 3.3%. By census tract, the percentage of rental units under financialized ownership ranged from 0% to 92.0% citywide (Figure 1). The Gini coefficient for the distribution of financialized rental units was 0.8, indicating a highly uneven distribution between census tracts which matches the findings of previous research (August & Walks, 2018; Fields, 2017; García-Lamarca, 2021).

To explore the relationship between financialized landlord presence and housing conditions, we undertook bivariate and multiple regressions at the census tract scale, with percentage of rental housing units under financialized ownership as the outcome variable. Figure 2 offers a summary of the bivariate regressions. The strongest bivariate relationship was between the percentage of households in apartment buildings of five stories and more and the percentage of financialized rental ownership ($\rho = 0.6$). This indicates that the activity of financialized landlords in the city was concentrated in larger buildings, congruent with previous work (August & Walks, 2018). There was also a strong positive

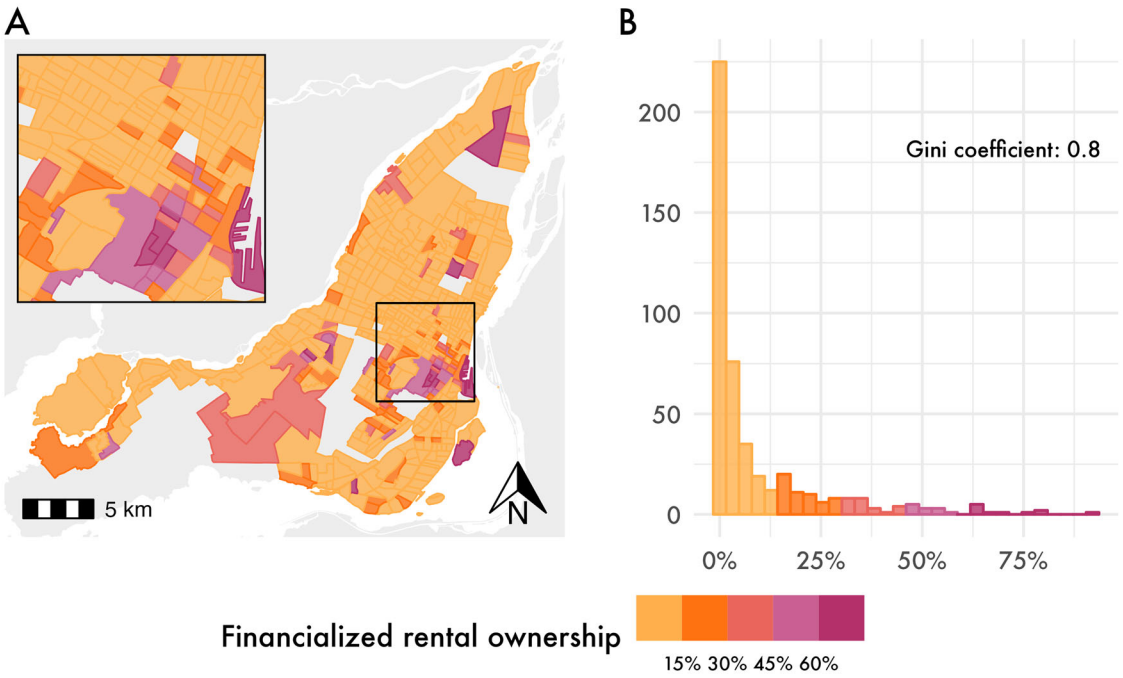

Figure 1. Percentage of financialized rental ownership by census tract as (A) a map and (B) a histogram.

($\rho = 0.51$) relationship between renter housing stress and the percentage of financialized rental ownership by census tract. The remainder of the variables in the figure display weaker positive correlations.

The credible intervals (the Bayesian equivalent of confidence intervals) for the independent variables in the three multiple regression models can be seen in Figure 3; the full model results are available in Table A1 in the Technical Appendix. Across all three models, the most important covariates were the percentage of renters experiencing housing stress and the percentage of dwellings in buildings with five or more stories. The results for the other covariates were less conclusive. The nonspatial binomial model suggested that all covariates except for the proportion of rental units built after 2005 were moderately or strongly correlated with higher proportion of financialized rental units in a census tract.

The spatial BYM2 model provided a more conservative estimate and only gave unambiguous results for the proportion of renters in housing distress and the proportion of high-rises, with the proportion of 1-year mobility, average age, and median rent likely associated with higher proportions of rental financialization but without statistically conclusive evidence. Because the BYM2 model was the best fit on the data, this provides strong evidence for a positive relationship between rental housing financialization and the prevalence of high-rise buildings and housing distress among renters. The model further provides more tentative evidence for a connection between rental housing financialization and three variables whose credible intervals include zero but where most of the probability mass is above zero: renter mobility, average age, and median rent.

Five Distinct Clusters of Rental Housing

Although the regression analyses provided a *global* analysis of the correlates of financialized rental housing, the BYM2 model revealed significant spatial variation within these correlates (see Figure A6 in the Technical Appendix). This implies that there are important *local* patterns to financialized rental housing that a global model cannot account for, a possibility we explored using *k*-means clustering.[7] The clustering gathered groups of observations (in our case, the 466 census tracts in Montreal with no missing values) based on their reciprocity with each other. We conducted this analysis *excluding* financialized rental ownership to determine whether there were patterns of housing market and land use variation that help explain patterns in financialization yet can be identified independently of the latter. Figure 4 and Table 1 display the spatial distribution and quantitative properties of the five clusters we identified: financialized precarious and student, financialized affluent, nonfinancialized suburban, nonfinancialized gentrifying, and nonfinancialized immigrant periphery.

Cluster 1: Financialized Precarious and Student

The cluster with the highest percentage of financialized ownership was cluster 1, with a unit-weighted tract

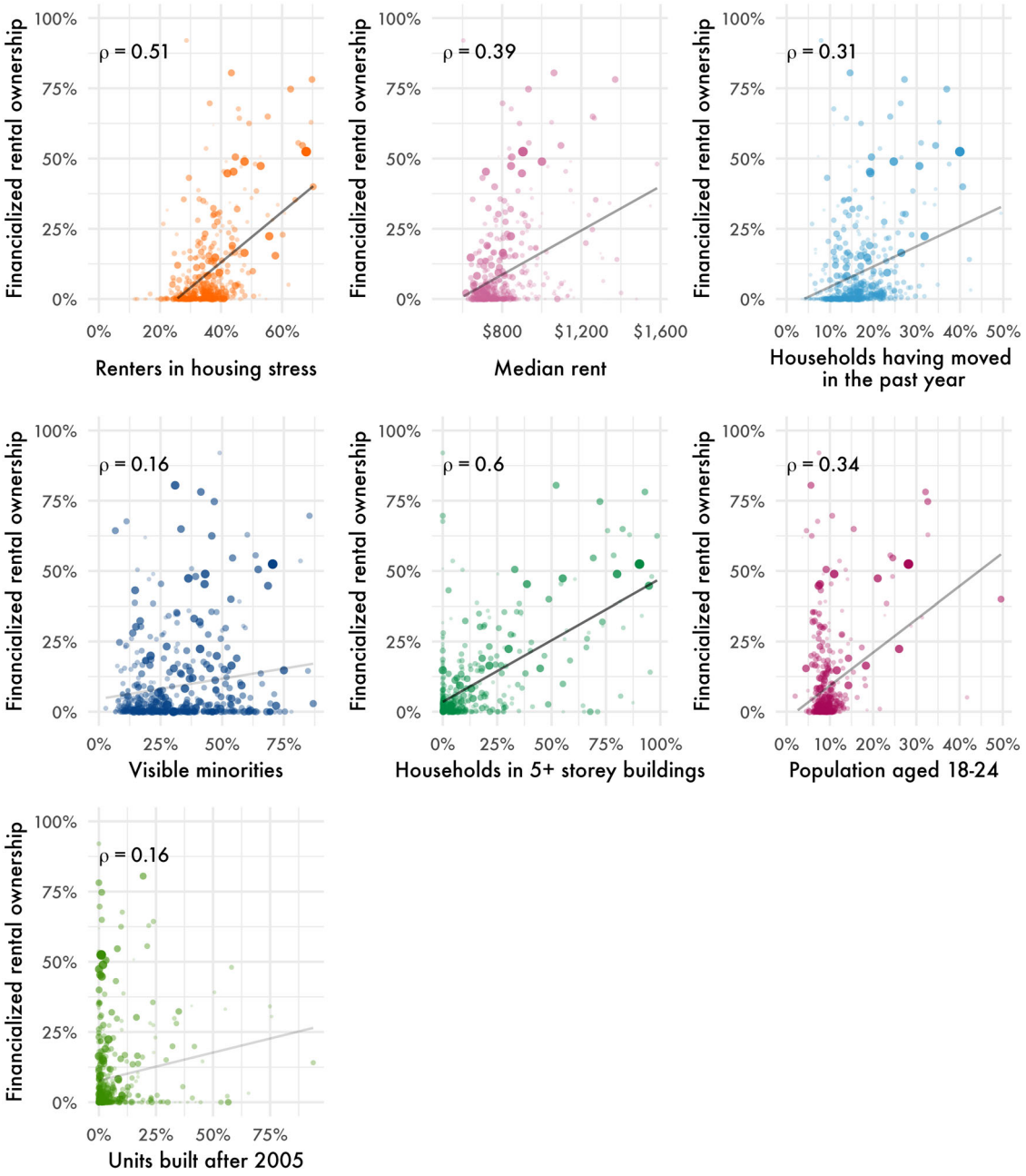

Figure 2. Bivariate regressions analyses with percentage of rental housing units under financialized ownership as the outcome variable.

average of 47.1% (compared with 10.4% citywide). Both median and asking rents were well above city averages, whereas the median household income was the lowest out of the five clusters. Thus, this cluster had the highest percentage of renter households experiencing housing stress (62.2% compared with 35.8% citywide). The cluster also had the highest percentage of renter households (87.5% compared with 62.7% citywide) and households living in buildings of five stories or more (69.0%, more than five times the citywide proportion of 12.8%). Out of all clusters, this cluster had the highest residential mobility; more than a third (34.5%) of its households moved in the past year, and almost three-quarters (73.1%) moved in the past 5 years. The tracts in this cluster were located centrally (on average 1.3 km from downtown) and were adjacent to Montreal's four universities. A total of 25.1% of the inhabitants in this cluster were between 18 and 24 years old, indicating a large student population (the city average for this age group was only 9.1%). In summary, we call this cluster *financialized precarious and student*: the population disproportionately consisted of young, highly mobile

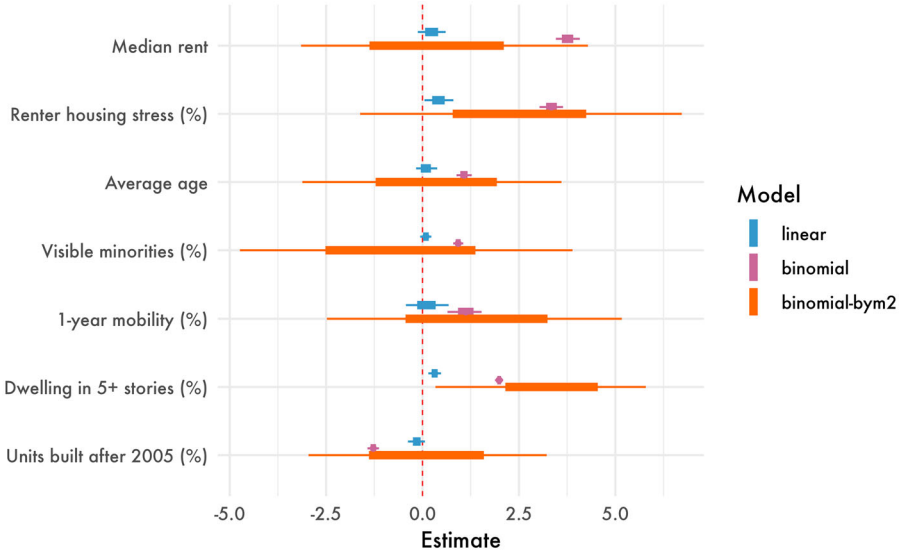

Figure 3. Point estimates and credible intervals for regression models. Thick bars are 95% credible intervals, and thin bars are the remainder of the estimate distribution.

renter households living in high-rise apartments near the city's universities, where rents were high and housing stress was higher.

Cluster 2: Financialized Affluent

In cluster 2, 32.0% of rental units were owned by financialized landlords. Renters in this cluster faced the highest rents in the city but, because median household income was also the highest in the city, substantially fewer renters experienced housing stress than in the also highly financialized cluster 1 (42.4% in cluster 2 vs. 62.2% in cluster 1). More than half (54.6%) of households in cluster 2 lived in buildings of five stories or more, but the overall share of renters was much lower than the citywide average. The percentage of condominiums was the highest among all five clusters (55.6%, three times the citywide rate of 18.5%). Cluster 2 had by far the highest percentage of rental units built after 2005: 28.4% compared with 6.0% citywide. Although young adults were overrepresented in cluster 1, cluster 2 had the highest share of population older than 65 years. In summary, cluster 2 can be described as *financialized affluent*: residents of this cluster experienced an above-average rate of financialized rental housing ownership, housing stress, and rents, but these households had higher incomes and were located in newer buildings.

Cluster 3: Nonfinancialized Suburbs

The third cluster exhibited characteristics typical of suburban areas: low percentages of renter households, low percentages of households living in tall buildings, low levels of residential mobility, and high distances from the downtown core. The median rent, asking rent, and average property value averages in cluster 3 were lower than the citywide average, but households had median incomes that were *higher* than the Montreal average. The presence of relatively few renters, little residential mobility, and low building density presented a difficult geography for financialized landlords to invest in. This may explain why this *nonfinancialized suburbs* cluster had such a low percentage of financialized rental ownership (6.6%). Notably, this finding contrasted with American studies of housing financialization that have seen a growing pattern of mass acquisition of single-family houses by financialized actors (Fields, 2022).

Cluster 4: Nonfinancialized Gentrified

As illustrated in Figure 4, tracts in cluster 4 were located in a ring around the downtown core (which itself is mostly represented by the financialized clusters 1 and 2). Cluster 4 had a higher-than-average proportion of renters (70.3%) but the lowest proportion of financialized ownership (5.6%). Given the results of the regression analyses discussed above, the most likely explanation is land use: Only a small proportion of cluster 4's rental housing consisted of buildings of five stories or more (7.5%). Meanwhile, cluster 4 had the lowest share of visible minority and immigrant populations among the five clusters, higher than average resident mobility, and a distinctive combination of low median rents but high asking rents. These characteristics matched the classic profile of gentrified or gentrifying neighborhoods (Lees et al., 2013). Cluster 4 can thus be described as *nonfinancialized gentrified*. Although it was

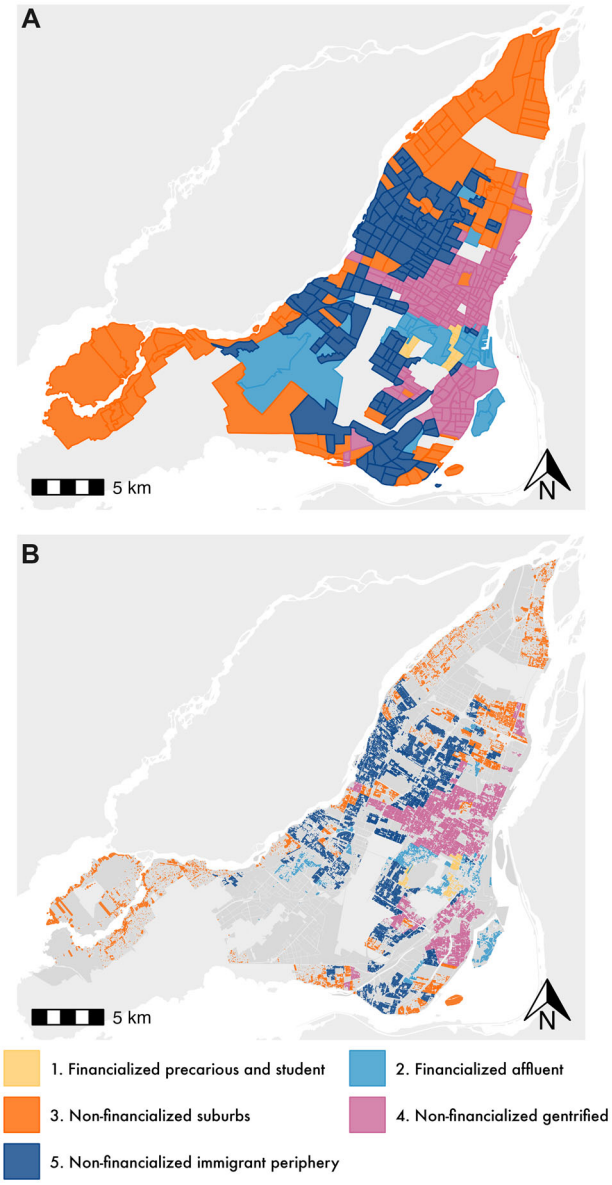

Figure 4. Spatial distribution of clusters by (A) census tract and (B) rental buildings.

situated relatively centrally, the composition of its housing stock seemed to have inhibited financialization.

Cluster 5: Nonfinancialized Immigrant Periphery

Census tracts in cluster 5 were mostly situated at the outskirts of the city. This cluster had a rate of rental housing financialization (9.3%) slightly below the city-wide average. Cluster 5 had the lowest rents and the second-lowest median household incomes. Most rental housing was situated in lower density buildings, and housing mobility was lower than the city average. Cluster 5 had the highest proportions of both visible minorities and immigrants and thus can be described as the *nonfinancialized immigrant periphery*.

Local Patterns and Wider Comparisons of Rental Housing Financialization

Financialized landlords in Montreal make up a small percentage of total landlords but collectively own a large proportion of the city's rental housing stock, especially in central areas. Our regression models determined that, in general, the prevalence of financialized landlords was positively associated with the percentage of dwellings situated in buildings of five and more stories, the presence of housing stress, and, to a more uncertain degree, the average age in a tract, the median rent, and the percentage of residents moving in and out of a tract on a yearly basis.

K-means clustering analysis allowed us to deepen that *global* analysis with a more *local* perspective. Five clusters were identified without considering their levels of financialized rental ownership. However, taken together, they point to important regularities and differences among neighborhoods with high levels of rental housing financialization. Clusters 1 and 2, the two clusters with high levels of financialized ownership, shared some important housing market and land use features that distinguished them from the rest of the city. Both had median and asking rents well above the city average, as well as high levels of housing stress. These two clusters also had denser living typologies, but the first *financialized precarious and student* cluster far surpassed the second *financialized affluent* cluster in that measure. Both clusters were also situated close to the downtown core.

We can also draw a sharp contrast between these two clusters. On one hand, cluster 1—*financialized precarious and student*—had the lowest median household income out of all clusters, the highest levels of household mobility, and high proportions of visible minority and immigrant populations. It also had a far above-average share of young adults. This suggests that the cluster included a disproportionate share of student neighborhoods, consistent with a larger trend of student housing financialization in Canada (Revington & August, 2020). On the other hand, cluster 2—*financialized affluent*—also had a high proportion of financialized ownership and housing stress but, at the same time, more than double the median household income of cluster 1. Average property values in cluster 2 were the highest of all clusters, accompanied by low levels of housing mobility and a large addition of rental units since 2005. The population in cluster 2 was predominantly White, with higher homeownership rates than the rest of the city. And although housing stress was high in

Table 1. *K*-means clustering analysis results for the five clusters, along with city averages.

Variable	Montreal census tract average	1. Financialized precarious and student	2. Financialized affluent	3. Nonfinancialized suburbs	4. Nonfinancialized gentrified	5. Nonfinancialized immigrant periphery
Financialized rental units	10.4%	47.1%	32.0%	6.6%	5.6%	9.3%
Median rent	$780	$910	$1,140	$770	$780	$740
Average asking rent	$1,220	$1,330	$1,590	$1,140	$1,340	$1,100
Renters in housing stress	35.8%	62.2%	42.4%	31.8%	35.1%	35.1%
After-tax median household income	$53,000	$25,000	$76,000	$65,000	$50,000	$45,000
Average dwelling value	$425,000	$562,000	$550,000	$380,000	$426,000	$429,000
Renter households	62.7%	87.5%	41.6%	41.4%	70.3%	71.3%
Condo households	18.5%	17.4%	55.6%	15.6%	20.5%	11.6%
Rental units built after 2005	6.0%	13.4%	28.4%	8.1%	4.1%	2.7%
Households in 5+ story buildings	12.8%	69.0%	52.8%	4.8%	7.5%	11.1%
Households that moved in the past year	15.0%	34.5%	15.4%	9.6%	19.7%	14.2%
Households that moved in the past 5 years	44.3%	73.1%	47.1%	32.7%	52.9%	43.5%
Visible minorities	34.4%	52.9%	29.9%	28.1%	18.2%	49.7%
Immigrants	34.6%	36.9%	38.8%	28.6%	21.3%	46.9%
Distance from downtown	7.8 km	1.3 km	4.7 km	14.4 km	4.4 km	8.6 km
Population aged 18–24 years	9.1%	25.1%	7.8%	8.5%	9.5%	8.8%
Population aged 65+ years	16.0%	11.4%	20.4%	18.9%	12.0%	16.4%

Note: All variables calculated using the 2016 census, except for financialized rental units and rental units built after 2005, which were calculated using the property assessment database.

cluster 2, it is of reduced significance given that incomes are also high.

A notable contrast between these findings and previous research is that, in Montreal, rental housing financialization is rare in smaller housing typologies. In the United States, by contrast, single-family rental housing financialization has been an important pattern in recent years (Fields, 2022). The difference between these two geographies could be a reflection of different land use patterns (Montreal has a much higher quantity of renter-occupied multifamily housing than most American cities) or different policy responses following the global financial crisis (Walks & Clifford, 2015) but might also indicate that single-family-home rental financialization has simply not yet arrived in Montreal.

Implications for Planning Practice: Ameliorating Rental Market Information Asymmetries

Although property ownership is a fundamental concept for urban planning (Davy, 2012; Jacobs & Paulsen, 2009; Krueckeberg, 1995; Porter, 2014), research on the relations between planning and "the institution of private property" has been scarce (Blomley, 2017, p. 361). One reason for this scarcity has been the lack of accessible data on property ownership, which has arguably limited the extent to which the planning–property relationship has been systematically studied and the extent to which planners and community actors have been able to design or advocate for policies to improve rental market outcomes. The results of our research demonstrate that ownership data would help planners better understand the presence and impacts of financial actors in housing and help tenants better organize to protect their collective interests. In both cases the key issue is information asymmetry.

Most rental housing provision in North America occurs through free market mechanisms. One of the pillars of free market economics is the importance of equal information between participants in a transaction; by contrast, where information asymmetry occurs, the result will frequently be a proportionate asymmetry in power and a biased outcome (Stiglitz, 2002). Rental housing market relations are characterized by extreme information asymmetries. Landlords conduct credit checks of prospective tenants and rely on "tenant blacklists" to deny tenancy applications from individuals who have previously appeared in housing court (Franzese, 2017, p. 666). By contrast, tenants have no comparable ability to verify that landlords have respected rent guidelines or to penetrate the anonymity of corporate property holdings to identify patterns of landlord bad behavior.

Both planners and tenant groups have developed strategies for responding to rental market information asymmetry, although neither is yet very common. At the municipal level, some cities have developed rental registries, which collect and make public information about landlord identity, rent levels, or both. These tend to have two distinct but related objectives, both aimed at reducing information asymmetries in the rental housing market: for renters, transparency about rents (including landlord adherence to rent control or rent stabilization laws), landlord practices, and state of repair (Castaneda et al., 2019); for municipalities, easier enforcement of bylaws against property owners (Rissoff, 2009). In fact, the City of Montreal is currently in the process of establishing a rental price registry to prevent abusive rent increases and illegal evictions (MacLellan, 2022). A common strategy in tenant organizing, meanwhile, is *name and shame* campaigns that draw attention to particularly exploitative landlords. One prominent example is the Parkdale Tenant's Association in Toronto, which periodically bestowed a "Golden Cockroach Award" on the neighborhood's worst landlord (Horgan, 2018, p. 511).

Our research points to the importance of reducing information asymmetries and increasing data transparency and simultaneously suggests a plausible mechanism for doing so. The research demonstrates meaningful differences in housing market outcomes across landlord attributes that have not usually been readily accessible to either renters or planners. It thus suggests that planners and other municipal officials should treat landlord data as one component of the information necessary to properly regulate a rental housing market. Municipalities routinely publish information on the owners of municipal business licenses, but they tend not to publish information on the owners of rental housing. This disparity should not exist. In addition, we note the complexity of identifying the actual ownership networks—financialized or otherwise—that lie behind the anonymous companies that directly own many rental buildings. To address this complexity, municipal officials could establish rental registries that require the identification of *beneficial ownership*: the actual human beings who own or who have controlling interests in a company. Increased landlord information could then help ensure proper application of rent control measures, reduce unlawful eviction practices, and ultimately act as a catalyst for policies on rental housing ownership.

Conclusion

Here we provide an analysis of the financialization of rental housing in Montreal, along with a methodological toolkit based on scraping public—but poorly accessible—data to explore the relationship between financialized

landlords and land use and demographic variables. Our unique data set has provided an unprecedented opportunity to analyze landlords and financialization in the City of Montreal and allowed us to produce the first exhaustive analysis of financialized rental housing ownership at the urban scale, as well as new methods for studying rental housing financialization that can be adapted to other jurisdictions. We have shown that financialized rental ownership in Montreal has a strong land use correlate in dense housing typologies and a strong sociodemographic correlate in tenants experiencing housing stress. The former confirms the tendency of financialized landlords to prioritize high-density buildings in both acquisitions (August & Walks, 2018; Fields, 2017) and construction (Gaudreau et al., 2021). The latter contributes to the body of literature finding negative impacts of the presence of financialized landlords on housing affordability (Crosby, 2020; García-Lamarca, 2021; Romainville, 2017). Both highlight the contradiction between investors' financial expectations and housing's primary purpose: fulfilling the human need for shelter.

We have further identified a not previously observed pattern of two distinct neighborhood types where rental housing financialization is disproportionately concentrated: a precarious type and an affluent type. The former comprises tracts with an ethnically diverse and young population with small disposable incomes and an overrepresentation of students, in line with previous research finding that financialized landlords tend to target racialized, precarious, and/or marginalized populations (Crosby, 2020; Fields & Raymond, 2021). The latter is predominantly White, has low levels of housing mobility, and, given high incomes and the tracts' high proportion of newly constructed units, appears to be spending more on housing-related costs by choice.

The categorization of landlords based on their engagement with financial markets has enabled an exhaustive assessment of financialized rental housing ownership in the City of Montreal. Building off previous work defining and analyzing financialized housing actors (August, 2020; Ferrer et al., 2020; Graziani et al., 2020; Romainville, 2017), our research contributes to the efforts of empirically defining urban financialization. In contrast with this previous work, however, we have been able to exhaustively classify every rental property owner in Montreal as financialized or nonfinancialized and thereby to establish that the presence of financialized landlords in a city's rental housing stock is associated with distinctive land use patterns and tenant impacts. Our hope is that these results can serve as a starting point for future research in other locations that could establish to what extent the patterns we have identified in Montreal are generalizable to other urban geographies.

Finally, we offer a proof of concept for the importance of complete property ownership information in planning research and practice. Even though property ownership is a fundamental concept for urban planning (Krueckeberg, 1995), the lack of accessible data has limited the extent to which it has been studied and limited the extent to which planners and community actors have been able to design or advocate for policies to improve rental market outcomes. Ownership data would help planners better understand the extent and impacts of financial actors in housing and help tenants better organize to protect their collective interests. Our findings highlight the importance of reducing information asymmetries via access to property data for both more informed decision making and better tenant outcomes.

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DATA AVAILABILITY STATEMENT

All of the code used in this project is available at https://github.com/UPGo-McGill/montreal-finance-2022; https://github.com/UPGo-McGill/mtl_landlords.

SUPPLEMENTAL MATERIAL

Supplemental data for this article can be found at https://doi.org/10.1080/01944363.2022.2126382.

NOTES

1. Calculated by the authors using the Canada Mortgage and Housing Corporations's Housing Market Information Portal (n.d.). The primary rental market includes both apartment buildings and row houses.

2. The city's property assessment database is accessible only through a web portal that allows users to access one property at a time, without any possibility for batch queries. Similarly, business ownership data in Quebec can be accessed on a case-by-case basis by searching for a company's name in the Registraire des entreprises du Québec.

3. Although web scraping is usually a violation of the terms of use of the website being scraped, it is a common research practice that is generally considered noncommercial fair use (Boeing & Waddell, 2017; Scassa, 2019). For example, Statistics Canada uses web scraping to gather official statistics and does not consider a website's terms of use when making the decision to scrape (Statistics Canada, 2021).

4. Several scrapes were conducted, and our study uses the data from the most recent one, conducted in November 2020, which had a 95% success rate. See the Technical Appendix for more details.

5. For example, if 123456 Quebec Inc. were the owner of a property, we would use business registration data to identify the owner of 123456 Quebec Inc, and would repeat the process until a nonanonymous or out-of-province primary shareholder, associate, or partner was identified.

6. For more information, refer to Figures A1 and A2 in the Technical Appendix.

7. As discussed in the Technical Appendix, two other common approaches to incorporating local spatial variation—geographically weighted regression or spatially varying coefficient models—are possibilities for further analysis but are difficult to implement due to the binomial and zero-inflated nature of our outcome variable.

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