

Distributional Effects of Exclusive Dealing in Commercial Real Estate

Camilla Schneier*

[Draft Updated Frequently: Click Here for Latest Version](#)

November 12, 2024

Abstract

We study the welfare implications of exclusive dealing in the US retail sector. Using a novel dataset, we document widespread use of exclusive dealing contracts that exclude local entry by rival stores. Public officials increasingly critique such practices as anti-competitive. At the same time, the extant literature on exclusive dealing has also shown that these contracts can stimulate entry into otherwise under-served markets. Descriptive analysis suggests that stores with covenants face fewer competitors and higher prices. At the same time, almost all major grocers in under-served neighborhoods have exclusive dealing contracts, suggesting they might encourage entry in low-demand settings. We use a structural approach to measure the counterfactual impact of a ban on exclusive dealing. We calibrate the model with estimates of household-level store choices that accounts for price sensitivity, distance sensitivity and the potential complementarities between co-located stores. On the supply side, retail contracts, store locations and prices are jointly determined in a game between retailers and landlords that accounts for retailer private information and spillovers across nearby retailers. In aggregate, we quantify how exclusive dealing changes consumer surplus and retailer distribution in different neighborhoods. Exclusive dealing also increases the probability of retailer entry into a food desert, which decreases the probability that a food desert stays a food desert. In particular, we find that banning covenants would cause an increase in the number of households living in a food desert in Chicago.

*I am grateful to my advisors, Milena Almagro, Jean-Pierre Dubé, Michael Dinerstein, and Ali Hortacsu for their advice, mentorship, and enthusiasm on this paper. I am grateful for helpful comments and discussions from participants at the Chicago Student Cities Conferences, participants at internal presentations at the University of Chicago, and participants of IO reading group. I am also grateful for support from the National Science Foundation Graduate Research Fellowship.

1 Introduction

Restrictive covenants are exclusive dealing contracts in commercial real estate which forbid certain firms from operating on designated premises. These private agreements, commonly embedded in commercial leases and deeds, are intended to protect the business interests of one or both parties. For example, a Safeway in Chicago forbids its landlord from leasing space to competing grocers, drug stores, liquor stores, and convenience stores. While such contracts are largely unstudied, there is a rising concern that exclusive dealing forecloses on competitor entry and contributes to the creation of food deserts. ([Leslie \(2021\)](#), [Kang \(2022\)](#), [Frerick \(2024\)](#)).

This paper is the first to establish the prevalence of exclusive dealing contracts, their effects on consumer welfare and firm profitability, and their distributional effects on both consumers and firms. To do so, we document the prevalence of exclusive dealing contracts using novel data scraped from publicly available leases and deeds. We then provide descriptive evidence for how exclusive dealing is correlated with prices, retail density, and consumer purchases. To quantify the underlying mechanisms, we build a model where upstream landlords rent space to retailers which sell products to consumers. Following the timing of this retail commercial real estate market, the timing proceeds in four stages: first, landlords set prices and retail contracts are determined in an entry game between retailers; second, smaller co-locating retailers enter the market; third, retailers set prices in a Bertrand game; and fourth, consumers make purchasing decisions. In the first stage, retailers anticipate consumer demand, anticipate co-locating firm entry, and form beliefs over co-locating firm entry. As a result, exclusive dealing contracts are jointly determined with rents and retail entry.

To quantify the underlying mechanisms, we build a model with two markets: first, a commercial real estate market which endogenizes the choice of exclusive dealing contracts, and second, a consumer demand model that captures retailer complementarities. The consumer demand model with retail complementarities allows me to estimate the profitability of different retailer strategy profiles which we use to estimate retailers' demand for exclusivity. The data allows us estimate landlords' supply of exclusivity. This framework enables a counterfactual analysis where landlords and retailers cannot explicitly contract on exclusivity to understand how the contracts change where retailers locate, how consumers shop, and consumer welfare.

To conduct the analysis, we construct two data sets: one on planned retail locations and another on exclusive dealing contracts. The planned retail data allows us to construct a

complete census of all the “potential ” retail locations, including already developed and planned locations. The manually-collected exclusive dealing contracts data gives us the entire set of reported retail contracts, allowing us to determine where and when exclusive dealing has been implemented.

With these data, we document the prevalence of exclusive dealing contracts, document the kinds of retailers that employ them, and show evidence consistent with the retailers’ stated goal of limiting business competition. First, we find that exclusive dealing is common in grocery, drug, and discount store industries: all the large national chains have exclusive dealin contracts in at least one location. Second, we find that prices are 20% higher for stores with exclusive dealing contracts, controlling for retail chain and surrounding demographics. Third, we find that within retail chain, stores with exclusive dealing contracts are surrounded by fewer competitors than stores without exclusive dealing contracts within .2 mi. This .2 mi radius is the radius the literature has documented as relevant for cross- store spillovers (for recent empirical evidence on spillovers in the grocery industry, see [Qian et al. \(2023\)](#) and [Knight \(2023\)](#)).

Next, we turn to effects in the downstream consumer market. Leveraging an event study design of grocery exit in a household’s zip code, we show that consumers reduce grocery expenditures when the retailer leaving the premises had an exclusive dealing contract with its landlord. Once the grocery store leaves, consumers substitute away from grocery stores and increase spending at dollar stores. The consumer spending patterns are persistent, and after a few years, the consumer expenditure recovers almost to pre-exit levels. Exploring the underlying market structure, we show that consumer expenditures – for grocery and dollar – return towards baseline once a new retailer enters the zip code. In contrast, consumers expenditure remains unchanged (before and after the grocer’s exit) when the grocery store that exits does not have an exclusive dealing agreement with the landlord. Exploring the underlying market structure, stores without exclusive dealing agreements that exit are replaced by grocers faster than stores with exclusive dealing agreements. The event study results show not only that there is likely pass through from the commercial real estate market to the product market, but that the exclusive dealing contracts may have implications for consumer welfare.

To understand how exclusive dealing affects equilibrium outcomes, we build and estimate a model which allows for price sensitivity, distance sensitivity, and potential complementarities in the product market as well as information asymmetry and spillovers across retailers in the commercial real estate market. Estimates from the product market and retailer-landlord

entry game allows us to quantify how exclusive dealing changes the market by computing a counterfactual Chicago where exclusive dealing is banned. The counterfactual allows us to compute the effect of exclusive dealing on consumer welfare, neighborhood-level retail changes, and distributional impacts for consumers and firms. Specifically, the counterfactual allows us to assess the distributional impacts because it allows us to determine which retailers – large and small – benefit the most from exclusive dealing and whether consumers in different neighborhoods are affected differently.

The retailer-landlord entry game captures both the retailers' and landlords' incentives for exclusive dealing and posits a new mechanism for the existence of explicit exclusive dealing. Complementarities in the product market means that retailer entry creates an externality: entry of possible competitors nearby. When there is information asymmetry, the landlord cannot compensate the retailer for this externality because it cannot observe retailer profits. As a result, exclusive dealing contracts prevent competitors from entering nearby and compensate the landlord for forgoing on competitor profits. A landlord choosing prices balances the probability of attracting a retailer, higher revenues from the retailer, against the increased difficulty of finding a co-locating tenant if there is exclusive dealing contract. A retailer choosing locations balances higher prices from paying for exclusivity with the probability that a co-locating retailer will decrease its profits if it does not have an exclusive dealing agreement on the premises.

We calibrate our counterfactual simulations using estimates of downstream preferences and marginal costs and upstream marginal costs, fixed costs, and information asymmetry on the supply side. Key to the estimation is obtaining consistent estimates for consumers' price sensitivity, distance sensitivity, and retail complementarities. The identifying assumption relies on instruments for prices and controls for distance and complementarities. Demand estimates allow us to compute the welfare effects on the consumer and the profitability of exclusive dealing. Next, we estimate the upstream costs to recover marginal costs, fixed costs, and an information asymmetry parameter. Key to the identification is the dataset on retailer potential locations, prices, exclusive dealing contracts, and entry decisions. These estimates allow us to compute willingness to pay for exclusive dealing, as well as the counterfactual.

The exclusive dealing contracts are highly asymmetric across retailers, with some retailers blocking a wide variety stores while other retailers in the same industry narrowly blocking close competitors. Without imposing this asymmetry in the model, my demand estimates yield consumer substitution patterns that replicate this within-industry asymmetry. The predicted demand effect from an entrant, based on the demand estimates, correlates well

with which retailer types are blocked in covenants, providing external validity to the model and the observed patterns.

We find that in the long run an exclusive dealing ban would lead to an increase in food deserts in Chicago. A back of the envelope calculation suggests that a total ban on exclusive dealing would increase the percentage of people living in food deserts by 10-15 percentage points over 20 years. However, the effects of exclusive dealing on consumers are heterogeneous and vary by consumer income and by neighborhood, with some consumers in the North areas of Chicago benefiting from lower prices and increased entry of collocating stores such as drug stores, liquor stores, and dollar stores.

The counterfactual results are also heterogeneous upstream. A ban on exclusive dealing on average benefits drug stores, liquor stores, and dollar stores, as well as a small percentage of landlords. The larger the retailer, the higher the cost from a ban on exclusive dealing. National chain grocery stores reduce the number of locations they enter in a way that their total profits remain unchanged, moving from locations with co-locating stores to locations without co-locating stores. Large big box stores both reduce the number of locations then they and profits decline. For large big box stores, rents (per square foot) were already close to landlord marginal costs, because the landlords internalized the spillovers of big box stores on their competition. Once exclusive dealing is banned, the rent cannot significantly further, and so big box retailer reduce entry and lose profits. Most landlords profits decline after a ban on exclusive dealing, indicating that they will be able to extract additional surplus from an exclusive dealing contract.

Related literature This paper contributes to the literature on exclusive dealing, grocery demand, and commercial real estate.

This paper contributes to the extant literature on exclusive dealing ([Posner \(1976\)](#), [Bork \(1978\)](#)), [Marvel \(1982\)](#), [Rasmusen et al. \(1991\)](#), [Besanko and Perry \(1993\)](#), [Aghion and Bolton \(1987\)](#), [Bernheim and Whinston \(1998\)](#), [Klein and Murphy \(1988\)](#), [Segal and Whinston \(2000\)](#), [Fumagalli and Motta \(2006\)](#), [Simpson and Wickelgren \(2007\)](#), [Asker and Bar-Isaac \(2014\)](#))¹. First, we address the conceptual role of exclusive contracts as a solution to

¹In the theoretical literature, the welfare effects of exclusive dealing are ambiguous and are tied to the theories of exclusive dealing (or why the exclusive dealing exists). Early work – called the “Chicago school” – showed that absent externalities, exclusive dealing could not be anticompetitive because upstream firm has pay the downstream firm accept exclusivity ([Posner \(1976\)](#) and [Bork \(1978\)](#)). Then, later work found many cases where externalities lead exclusive dealing contracts to be anticompetitive. To summarise the theoretical findings, exclusive dealing is considered pro-competitive when (a) it increases efficiency, for example by reducing double marginalization, (b) ensuring monopoly profits encourages investment and thus a

landlords' imperfect information about the externalities from nearby competition and complementarities between stores². To my knowledge, this externality has not yet been studied in the context of exclusive dealing.

Second, our comprehensive database on retail contracts allows us to analyze the impact of exclusive dealing empirically. In contrast, past work has had to infer the nature of the contracts indirectly: lack of data on contracts and prices has largely hampered the empirical literature: in lieu of data on the contracts, other papers have instead developed empirical tests to diagnose foreclosure ([Asker \(2016\)](#)), and estimated product market demand to determine both whether exclusive dealing is profitable and firms' willingness to pay ([Nurski and Verboven \(2016\)](#), [Sinkinson \(2020\)](#)). We can both distinguish when the exclusive dealing is explicitly contracted on³ and assess how exclusive dealing changes the equilibrium by estimating counterfactual where exclusive dealing is banned.

The exclusive dealing contracts documented here are heterogeneous and broad – the contracts vary within retailer, across retailers, and across space. Prior empirical work has focused on exclusive dealing contracts in markets such as beer, hamburgers, cable television, etc... (see [Lafontaine and Slade \(2007\)](#) for a survey of the empirical literature, as well as [Chipty \(2001\)](#), [Sass \(2005\)](#), [Lee \(2013\)](#), [Ater \(2015\)](#), [Nurski and Verboven \(2016\)](#), [Asker \(2016\)](#), [Le \(2024\)](#))⁴. In contrast, these contracts affect the location of every single retailer in Chicago.

Another contribution is to the retailing literature. This paper brings novel evidence of

higher-quality product and (c) ensuring monopoly profits allows for retailer entry in the first place; exclusive dealing is considered anti-competitive when it partially or totally forecloses on another firm's entry, due to some externality. For example [Bernheim and Winston \(1998\)](#) show that when it is possible to have an exclusive deal in one market that forecloses on a rival's entry in a different market, the exclusive dealing is contract maybe anti-competitive in that second market.

²First, this externality emerges because retailers drive foot traffic to nearby firms, and do not wish to suffer losses from the retailers they attracted to the location. In principle, exclusive dealing prevents the retailer's profits from being negatively affected by the demand it drives to the location. If the landlord knew the profitability of retailer entry combinations, the landlord could choose whichever combination achieved the highest total surplus. However, the landlord cannot observe retailer profits and thus cannot choose the set of retailers that will maximize total surplus to each location (as in in the spirit of [Bernheim and Winston \(1998\)](#), [Nurski and Verboven \(2016\)](#)). The exclusive dealing is therefore explicitly contracted on due to asymmetric information in the commercial real estate market: the landlord instead charges a premium for exclusivity.

³When there is exclusive dealing but no formal contract, all parties are in agreement that the exclusive dealing agreement is beneficial. The observed contract is a result of asymmetric information between landlord and tenant.

⁴Additionally, most empirical work focuses on exclusive dealing in the upstream market, while this paper (along with [Lee \(2013\)](#) and [Ater \(2015\)](#))) study exclusive dealing in the downstream market. The closest paper is [Ater \(2015\)](#), which studies exclusive dealing in Israeli shopping malls, where landlords commit to renting to a single hamburger shop, and finds evidence consistent with foreclosure of rival competition.

which stores retailers' vie as competition (a “revealed preference/profitability” approach to profitability). This work builds on a long literature in retail on grocery demand ([Bell et al. \(1998\)](#), [Smith \(2004\)](#), [Mehta \(2007\)](#), [Song and Chintagunta \(2007\)](#), [Hartmann and Nair \(2009\)](#), [Smith and Øyvind Thomassen \(2012\)](#), [Mehta and Ma \(2012a\)](#), [Thomassen et al. \(2017\)](#), [Handbury \(2021\)](#), [Leung and Li \(2021\)](#), [Mehta and Ma \(2012b\)](#)), as well as interest in food access and food deserts ([Allcott et al. \(2019\)](#)). Relative to the existing literature, this paper endogenizes the retailer location choice by incorporating data on real estate prices, exclusive dealing contracts, and potential locations in the estimation. Additionally, this paper uses data on store locations to estimate household preferences for specific retailer as well as households distaste for travel. [Cao et al. \(2024\)](#) also estimates preferences for specific retailers, and measures preference heterogeneity, while this paper focuses on multi-homing and complementarities across stores.

This paper builds on the growing literature on multi-homing and trip-chaining ([Oh and Seo \(2023\)](#), [Miyauchi et al. \(2022\)](#), [Rhodes and Zhou \(2019\)](#), [Relihan \(2022\)](#)), as well as the literature on local spillovers in commercial real estate ([Qian et al. \(2023\)](#), [Knight \(2023\)](#)) by studying the retailer choice location problem directly, where spillovers across retailers inform the retailer entry decision, as well as directly estimating demand for co-locating stores⁵. One challenge in the literature is determining the retailer choice set. In lieu of data on the retailer choice set, papers typically only consider the consumer demand side. [Qian et al. \(2023\)](#) address this missing retailer choice set problem by developing a neural net that predicts potential locations that are not entered. This paper instead uses new data on planned retail locations, which allows full consideration of the retailer choice problem.

This paper also contributes to a growing literature in commercial real estate, by studying a new topic – these exclusive dealing contracts ([Stanton and Wallace \(2009\)](#), [Liu et al. \(2018\)](#), [Gyourko \(2009\)](#), [Gupta et al. \(2022\)](#), [Glancy et al., 2022](#), [Dinc and Yonder \(2022\)](#), [Konishi and Sandfort \(2003\)](#), [Benjamin et al. \(1992\)](#), [Brueckner, \(1993\)](#) [Burayidi and Yoo \(2021\)](#), [Moszkowski and Stackman \(2022\)](#), [Burayidi and Yoo \(2021a\)](#), [Stackman and Moszkowski \(2023\)](#), [Burayidi and Yoo \(2021b\)](#),). This paper also builds on the literature

⁵With regard to this literature, this paper estimates demand for co-locating stores, estimates the spillover effects directly and computes a relevant radius for spillovers in retail. One important aspect of the spillover literature is to determine the radius at which spillovers in retailer is important. This paper finds that the relevant radius for spillovers is .2 miles – .3 km –, which is in line with the current estimates. This result provides additional validation to this result in the spillover literature because it uses a different method but finds the same results. The trip chaining literature determines the relevant radius with uses event study estimates of grocery entry and exit combined with data on foot traffic or consumer spending. This paper uses exclusive dealing contracts to determine the radius over which exclusive dealing binds. The results from the spillover literature also provide validation to the results in this paper.

of retailer competition in space going back to Hotelling (1929) and Salop (1979). The current literature has focused on coarse location, and often does not model the landlords' supply ([Bresnahan and Reiss \(1990\)](#), [Bresnahan and Reiss \(1991\)](#), [Seim \(2006\)](#), [Jia \(2008\)](#), [Caoui et al. \(2022\)](#), [Nishida \(2015\)](#), [Vitorino \(2012\)](#)). This paper builds on the discrete-choice entry model of [Seim \(2006\)](#) and includes many of the important features of this literature: business stealing, fixed cost of entry, and estimating product demand. Relative to these papers, however, this paper is much more granular and models the commercial real estate market explicitly.

Additionally, this paper also contributes to and expands the policy discussion on non-competes. In the United States, the Federal Trade Commission issued a rule banning non-competes in labor ([Federal Trade Commission \(2023\)](#)), following a nascent but growing literature on non-competes in labor economics ([Balasubramanian et al. \(2020\)](#), [Krueger and Ashenfelter \(2022\)](#), [Lipsitz and Starr \(2022\)](#), [Shi \(2023\)](#), [Johnson et al. \(2023\)](#), [Young \(2024\)](#)). Exclusive dealing in commercial real estate is a type of non-compete in a different factor input – land – and may be subject to similar scrutiny from policymakers. This paper determines the welfare effects of exclusive dealing in land, and provides a model that can be used to estimate when exclusive dealing is procompetitive or anticompetitive in other settings.

Finally, this paper is the first to study restrictive covenants in economics, this type of exclusive dealing contracts in commercial real estate. Legal scholarship on these exclusive dealing contracts focuses on the existence and details of the contracts ([Sturtevant \(1959\)](#), [Lundberg \(1973\)](#)), whether they encumber development ([Stubblefield \(2019\)](#)), and whether they are anti-competitive and cause food deserts in the grocery industry ([Ziff and Jiang \(2012\)](#), [Leslie \(2021\)](#), [Kang \(2022\)](#)). This paper provides an empirical answer to the question using a combination of novel data gathering, descriptive evidence, and structural estimation.

2 Exclusive Dealing In Commercial Real Estate

Since this setting has not been studied, this section provides a background on these types of exclusive dealing contracts in commercial real estate. This section covers the motivation and policy implications of this type of exclusive dealing.

The exclusive deals studied in this paper are called restrictive covenants. These restrictive covenants contractually forbid specific retailers from operating at specific locations. Restrict-

tive covenants are put in place to protect the business interests of one or both parties. For example, Figure 1 shows an excerpt from a Safeway⁶ restrictive covenant, which blocks the entry of retailers that sell similar or identical products to Safeway – retailers that sell food, drugs, and liquor – in a particular shopping center. As a result, these restrictions are important considerations for retailers choosing locations both because these contracts are an opportunity to limit the retailers' own competition, and because the set of locations they can consider may be limited by other retailers' restrictive covenants.

Figure 1: Restrictive Covenant in a Safeway Lease Memorandum

The Lease provides, in part, that no premises (nor any part thereof) in the Shopping Center other than the Premises, shall be (i) used or occupied as a retail supermarket, drug store and combination thereof, nor (ii) used for the sale of any of the following: (a) fish or meat (except in prepared form sold by a permitted restaurant operation); (b) liquor and other alcoholic beverages in package form, including, but not limited to, beer, wine and ale; (c) produce; (d) baked goods; (e) floral items; (f)any combination of food items sufficient to be commonly known as a convenience food store or department; and (g) items requiring dispensation by or through a pharmacy or requiring dispensation by or through a registered pharmacist.

Source: Cook County Record of Deeds, Document Number 0010276527. This figure is an example of a restrictive covenant. Here, Jewel Osco (whose parent company is Safeway) in Chicago at the intersection of Ashland and Roosevelt in 2001 limits the competitors in the shopping center. At this location, this portion of the lease memorandums shows Safeway is blocking grocers, drug stores, and liquor stores.

The content of the restrictive covenants vary greatly across contracts in terms of the retailers blocked, timing, and radius. The language of the exclusive dealing contracts vary from naming the retailers blocked from entering (as shown in Figure 13), to naming a narrow set of industries (as shown in Figure 14), to naming a broad set of industries (as shown in Figure 12). In each case, the contents of the exclusive dealing contract reflect – at least in part – the retailer' perceived competition. For example, Figure 12 shows an excerpt where Safeway prohibits grocers, drug stores, liquor stores, restaurants, gas stations, offices, educational facilities, thrift stores, and funeral homes: these blocked retailers are Safeway's direct competitors in the product market, retailers that compete for parking, and retailers that would bring a different aesthetic to the shopping center. The duration of the restriction varies greatly, from only valid while the retailer operates at the premises (as shown in Figure 13), to while the lease is in effect (as shown in Figure 12), to many years after the retailer has left the premises (as shown in Figure 14). The radius varies as well, from the exact premises of the store (as shown in Figure 14), to the shopping center (as shown in Figure 12), to specifying a radius (as shown in Figure 13, which specifies a 1 mile radius wherever

⁶A major grocery chain the United States.

the landlord or an affiliate owns property).

Restrictive covenants are often found in anchor store leases, or the leases of large retailers that drive foot traffic to neighboring stores (these spillovers from the anchor retailer to other retailers are documented in [Relihan \(2022\)](#), [Knight \(2023\)](#), and [Qian et al. \(2023\)](#))⁷. Additionally, these stores sign long leases and rarely exit. When exit is costly, the restrictive covenant is one way for the anchor retailer to co-locate with stores that are complements and not with stores that cut into their profit. This is the motivation for the retailer to ensure that it does not suffer lower profits due to the stores that only enter because of its presence.

In turn, the landlord has incentives to provide the exclusive dealing contracts as well. Since anchor will drive foot traffic for the whole area the landlord owns (often a shopping center), the anchor tenant will attract co-locating tenants. Therefore, the landlord leases first to the anchor, and then the landlord leases to a set of co-locating stores near the anchor. Industry experts cite both commitment and information asymmetry as reasons why restrictive covenants exist. In the former case, tenants need a commitment device to ensure that the landlord will not bring competition into a nearby property. In the later case, the landlord does not know the tenant's profitability or the effect of competition on tenant profits. On one hand, the landlord needs to rent to co-locating stores, and it doesn't want the anchor retailer to leave, so there is an incentive to not rent to co-locating competitors. On the other hand, if the landlord limits which co-locating retailers can enter, it might be hard to find additional tenants. When setting prices, the landlord balances a higher probability of retailer entry and a higher price from the restrictive covenants with the lower probability of attracting a high-paying co-locating store. Explicitly pricing the exclusive deal mitigates some of the information asymmetry.

There is little policy on exclusive dealing in commercial real estate, and the provisions are largely litigated in court. In court, the exclusive deals are held up in some instances and struck down in others. The restrictive covenant usually holds when the provision is negotiated as a legitimate business interest⁸, and are struck down then they are deemed

⁷In my data, 40% of grocery store trips also involve stops to another retailer (trip chains). When a national chain grocery store co-locates with another store, half of trips to this large grocer will also include a second store.

⁸For an example, in *Child World, Inc. v. South Towne Centre (1986)* Child World, Inc wanted to vacate the property early but had signed a restrictive covenant limiting competitors, and the “restrictive provision was negotiated as an inducement to enter the lease and in return tenant agreed to 20 years of continuous operation.” As a result, the restrictive covenant held up in the court, and as a result Child World could not vacate the premises.

not in the public interest⁹. However, there is a growing concern that restrictive covenants cause food deserts by displacing and foreclosing upon rivals ([Leslie \(2021\)](#), [Kang \(2022\)](#), [Frerick \(2024\)](#)). In line with this thinking, several cities have attempted to limit exclusive dealing contracts¹⁰. Given that food access is a priority for policymakers, it is important to understand how retailers sort into locations¹¹.

3 Data

This paper uses data from exclusive dealing contracts themselves, commercial real estate transactions, and consumer shopping transactions. In later sections, these data allow quantification of the effect of exclusives on the commercial real estate market and consumer welfare. Details on the data construction are found in the data construction appendix.

The empirical analysis focuses on data from Chicago, one of the largest and most diverse cities in the United States. Due to its mix of wealthy and poor neighborhoods, dense and sparse neighborhoods, and variety of retail environments – from standalone stores to shopping malls, Chicago is the ideal setting to study the average and distributional effects of exclusive dealing.

Exclusive dealing: To document the context of these exclusive dealing contracts, the paper scrapes little-known but publicly available county recorder pdfs, digitizes them, and extracts the parties (e.g. landlord and tenant), address, date, and details about the restrictive covenant from the document: which retailers are blocked from entering. The data comes from Cook County, Illinois, and spans 1980-present. The resulting dataset documents every single exclusive dealing contract in commercial real estate reported, as well as the location where the contract is in effect. The exclusive dealing contracts are between private parties and the parties are not required to report exclusive dealing contracts, but do so to prevent

⁹For example, court struck down a restrictive covenant that forbid the operation of a grocery store on a vacant property (similar to the termination restriction in Figure 14), arguing that the covenant was not in the public interest and contributed to food deserts by limiting the availability of grocery stores (*Davidson Bros., Inc. v. D. Katz & Sons, Inc. (1994)*).

¹⁰In 2005, [Chicago](#) attempted to ban restrictive covenants after a Dominick's Finer Foods put a restrictive covenant forbidding future grocery entry on a property in what became a food desert. At first, [the Chicago City Council proposed an ordinance](#) to ban restrictive covenants completely. However, the proposal was met by opposition from the Chicagoland Chamber of Commerce and the Illinois Retail Merchants Association. After some negotiation, a measure was passed that bans restrictive covenants put in place on larger (greater than 7500 square feet) when a retailer leaves the community.

¹¹See here for an example of how [local, state, and federal governments spend](#) resources on improving food access.

the contract from being broken. To the best of my knowledge, this is the first dataset that documents all the exclusive dealing contracts reported to a County Recorder Office in commercial real estate.

Potential Locations: We construct a landlord's locations from a dataset acquired from Build Central (formerly named Planned Grocery), a startup which collects and sells planned retail locations to retailers so that the retailers know where they and their competitors may enter; with this data, we construct the retailers' location choice set. Build Central provides early-stage, often pre-permit project data and location analytics across retail and commercial real estate (CRE), hotels, multi-family and single-family residential, medical, and energy and mining. The data is used by firms who choose where to locate, and to understand where their competitors locate and will locate. The data includes projects from the proposal to completion, and includes failed projects as well. This data allows the set of all potential builds where the retailers might locate. The time span is 2015-2024. We supplement this data with data from SNAP Retailer Locator Data and Infogroup.

Retailer locations, entry and exit: Store locations, entry, and exit dates are compiled from the [Historical Supplemental Nutrition Assistance Program \(SNAP\) Retailer Locator Data](#) and from Infogroup's Historical Database. The SNAP Retailer Location Data spans 1990-2023 and records the date, location, and store name when each store enters and exits the SNAP database. The Infogroup historical data provides a historical, yearly directory information for U.S. companies, with address, store name, and NAICS/SIC codes.

Lease Characteristics: Lease characteristics are obtained from Compstak. – such as – rent, square footage, tenant industry, location, and duration of the lease. CompStak gathers its data from a network of brokers who report lease characteristics for the properties they rent to in exchange for characteristics of the leases for nearby properties, so that they can get a sense for the other prices and lease characteristics in the market. As a result, the data is selected from the group of brokers: to ensure that the data is representative, I compare moments in the data to industry reports on rents and lease characteristics.

Panel on consumer purchases: Numerator data is a omni-channel consumer panel data available through the Kilts Center at the University of Chicago. The panel spans 2017-2022 and covers a broad range of consumer purchases as a broad range of stores, including grocery, discount, dollar, convenience, and other stores. Importantly, on the retailer side, Numerator provides both store identity and store location (longitude and latitude), retailer, and store identifier. On the consumer side, Numerator provides the household zip code as well as

household demographics. Information on the consumer panel includes purchase amount, product quantity, product descriptions, brand description, day and time of purchase. Since day and time of purchase is available, this data is used to compute when households trips to multiple stores. We consider a trip to be all of the stores a household shops at in person on the same day, and that the household takes the shortest route from home, to each store, and back (a trip is a unit of incurring a single distance cost). On a trip, a consumer purchases a set of individual items – Item ID’s – that comprise the individual’s basket of purchases for that trip. Numerator data classifies items in to several categories, broader and broader categories. Figure 15 shows these categories. For example, a single item “French’s Crispy Fried Jalapenos 5oz”, belongs to a larger category of goods that are similar to the consumer but might be quite different in terms of content. These categories are then grouped into larger departments, which are itself grouped into larger groceries.

To estimate the demand parameters, we use household-level data on trips, with detailed information of stores shopped at and household purchases. We observe households shopping at all store types, and the most frequent trips are to grocery stores. We also observe when households shop at more than one store in a day – when households multi-home – what stores are shopped at together, and the expenditures at each store. We find that household multi-home often, particularly with grocery purchases or when there is a grocery nearby, and find that 40% of trips to the grocery stores are multi-homing trips, and that percentage increases when there is a chain grocer or the chain grocer is co-located with another retailer¹².

To compute prices, bar-code price data is aggregated to the level of retailer or retailer bundle. We construct a relative relative price of the retailer in the market, and the comparison across retailers is based on products common to all retailers in the market, following [Atkin et al. \(2018\)](#)¹³. Specifically, prices are the retailer fixed effects in a regression of expenditure-weighted log bar code prices on retailer fixed effects and bar code fixed effects. Prices of two stores is the sum of the prices, weighted by the expenditures for each retailer.¹⁴ In line

¹²Shopping at more than two stores is rare, comprising less than .05% of the data.

¹³Results are robust to different aggregation methods, and relative prices are similar when following alternative aggregation methods, such as following [Thomassen et al. \(2017\)](#) or when considering only key purchase categories.

¹⁴Specifically, we construct prices within each retailer as

$$\log p_{jst} = \sum_{b \in j} \phi_{bj} \log \tilde{p}_{bjst}$$

where p_{jst} is the price of product j at retailer s in market t , which is comprised of bar codes b , ϕ_b is the household’s expenditure on bar code b divided by the household’s total expenditures on product j within a year, and \tilde{p}_b is the price paid for bar code b . To recover $\log p_{jst}$ in a way that allows different store products to have different qualities, we regress expenditure weighted log bar code prices on store fixed effects and bar

with current findings on uniform pricing and income-groups, we assume stores price at the retailer level, but allow the retailer price index to vary by income group ([DellaVigna and Gentzkow \(2019\)](#), [Hitsch et al. \(2021\)](#), [Handbury \(2021\)](#), [Thomassen et al. \(2017\)](#), [Atkin et al. \(2018\)](#)).

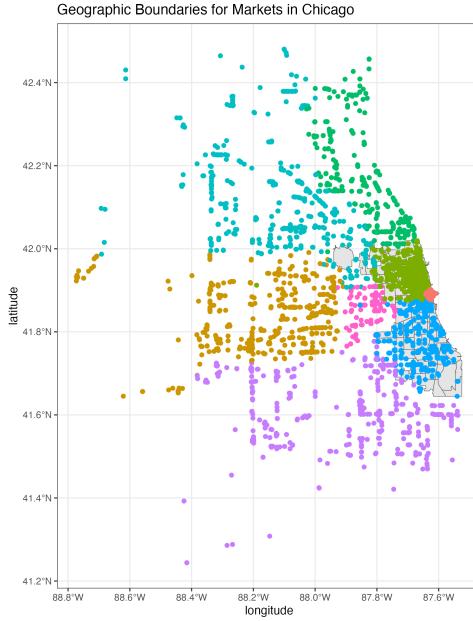
In the data, households shop close to home. Distances for each retailer and households are computed as the closest distance from home, which gives a measure of accessibility to home, and are computed as the crow flies. To impute home locations, households are placed at the center of their most likely census block group. The most likely census block group is computed with Bayes rule using household and ACS data on household size, education, ethnicity, unemployment status, income, as well the population density of each census block group within each zip code and the overlap in area between zip codes and census block groups. Then, distance is computed in log miles.

Downstream: Product market We define a market as a city-week-year, and estimate the parameters with data from 2017-2019 Chicago (Cook County). The model is estimated with retailer data (store latitude, longitude, address, retailer name), household purchase data (the bar codes scanned, and the price paid for each bar code, the stores traveled to and the time of day), and household demographic information (income, employment, marital status, number of children, ethnicity, education, zip5).

Upstream: Commercial Real Estate Market Markets are defined yearly in Chicago, are are defined by large and non-overlapping geographical areas, and Figure 2 shows the markets across Chicago.

code fixed effects, and use the store fixed effects as the retailer price. We run a regression for each market, so each price is the relative price in the market, and is measured in log dollars.

Figure 2: Markets in Chicago: Available Retailer Locations 2000-present



Source: Compstak. Data shows the seven markets in the analysis. The boundaries are defined to minimize the likelihood of shopping across boundaries, from data and conversations industry professionals.

4 Stylized Facts

In this section, we document three empirical regularities about exclusive dealing. First, the practice is extensive and has been growing over time. Second, exclusive dealing is not concentrated in certain “types” of neighborhoods as the incidence of exclusive dealing is not associated with the socio-economic status of households living in the neighborhood around a given retail location. Third, retailers pay a 20% price premium for exclusive dealing. Fourth, stores with an exclusive dealing provision in their lease contract have fewer nearby competitors.

4.1 Exclusive Dealing is Common and Increasing

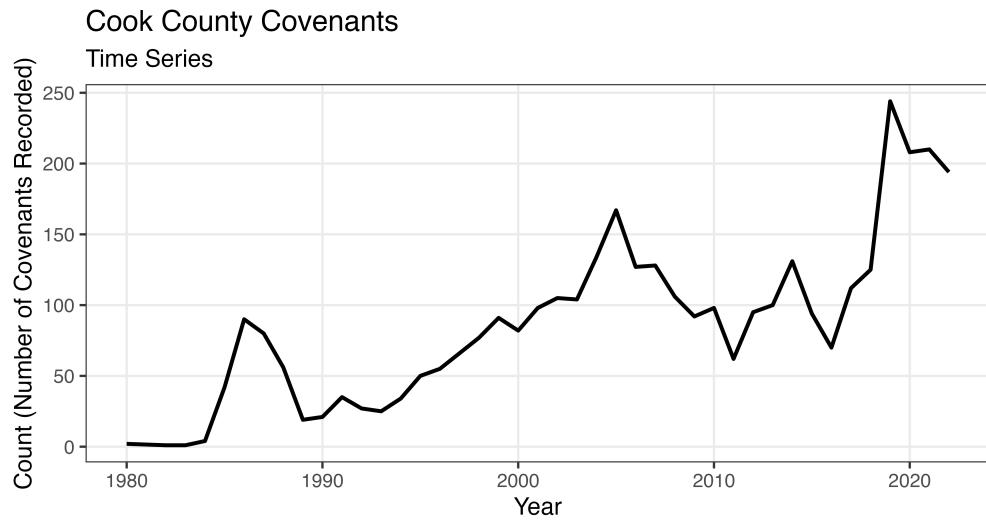
Figure 3 shows that the number of exclusive dealing contracts has grown steadily since the 1990s, peaking in 2005 and 2019.

Table 1 shows the prevalence of exclusive dealing contracts in the grocery sector in Chicago. Of the 371 contracts that forbid retailers from selling groceries, 154 are found on grocery store locations, and the rest are found in similar industries such as discount stores and drug stores. Table 12 lists the grocery chain retailers that operate in Chicago with at least one exclusive dealing contract: importantly, all of grocers with the highest market share use exclusive dealing contracts in their leases, and 30% of chain grocers have exclusive dealing contracts on premises. I conclude that exclusive dealing contracts are common, particularly in the leases of large national grocery chains.

Within grocery, the content of the contracts vary significantly. Figures 17 and 18 show the asymmetry in exclusive dealing across retail locations within the same retailer, across retail locations, and across industries.

Beyond grocery, Figure 4 and Figure 16 show the retailers with the most number of contracts, and the fraction of the retailers' properties that are affected. These figures show the breadth of retailers that employ these contracts, and that the most common store types are grocery stores, drug stores, discount stores, and dollar stores, stores that sell similar products as their competitors. In principle, the contract can soften competition by differentiating the products in space, particularly when consumers shop close to home.

Figure 3: Time Series of Exclusive Dealing Contracts in Cook County IL



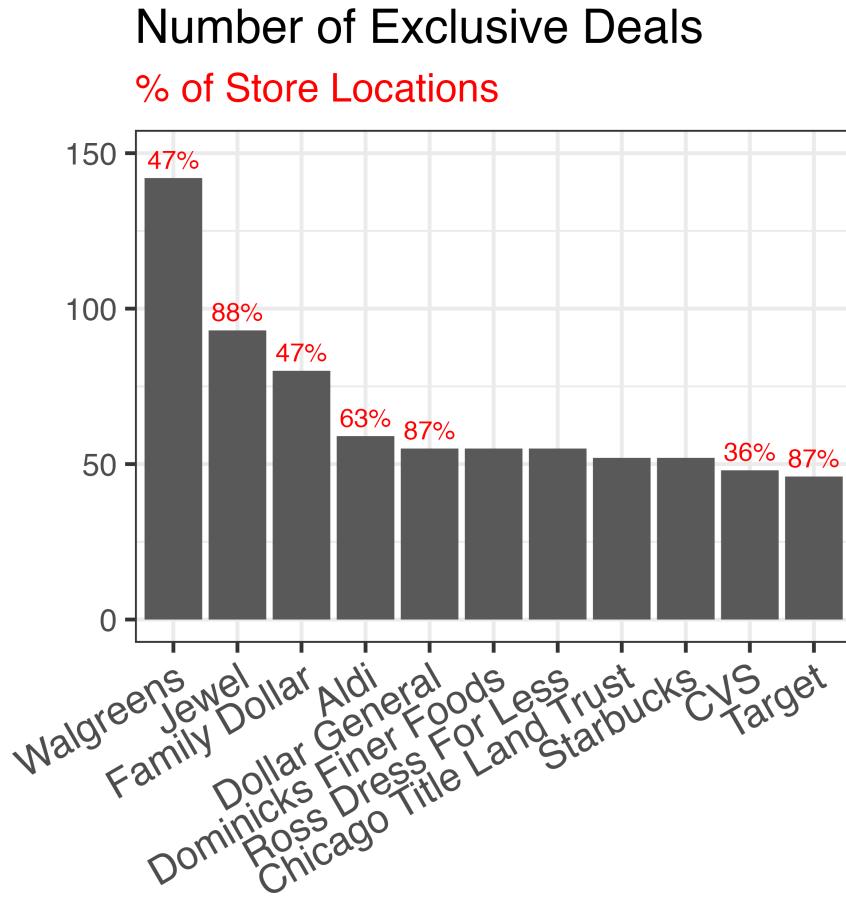
Source: Cook County Recorder Office. Figure plots a time series of exclusive dealing contracts recorded at the Cook County Recorder office, 1980-present.

Table 1: Prevalence of Exclusive Dealing in Grocery Industry

Exclusive Dealing Contracts	Block Grocers			On A Grocer Location		
	Total	Total	Fraction	Total	Total	Fraction
	371	154	0.42			
Grocery Chains	Total	with Grocery Covenants			Total	Fraction
<i>by Chain</i>	33	12	0.36			
<i>by Store</i>	491	113	0.23			

Notes: Table reports prevalence of exclusive dealing constructs amongst chains. Data is for Cook County, IL. Data comes from the Cook County office recorder.

Figure 4: Retailers with the Most Number of Exclusive Dealing Contracts



Source: Cook County Recorder Office. Figure plots the top retailers by exclusive dealing contracts use recorded at the Cook County Recorder office. Time span 1980-present.

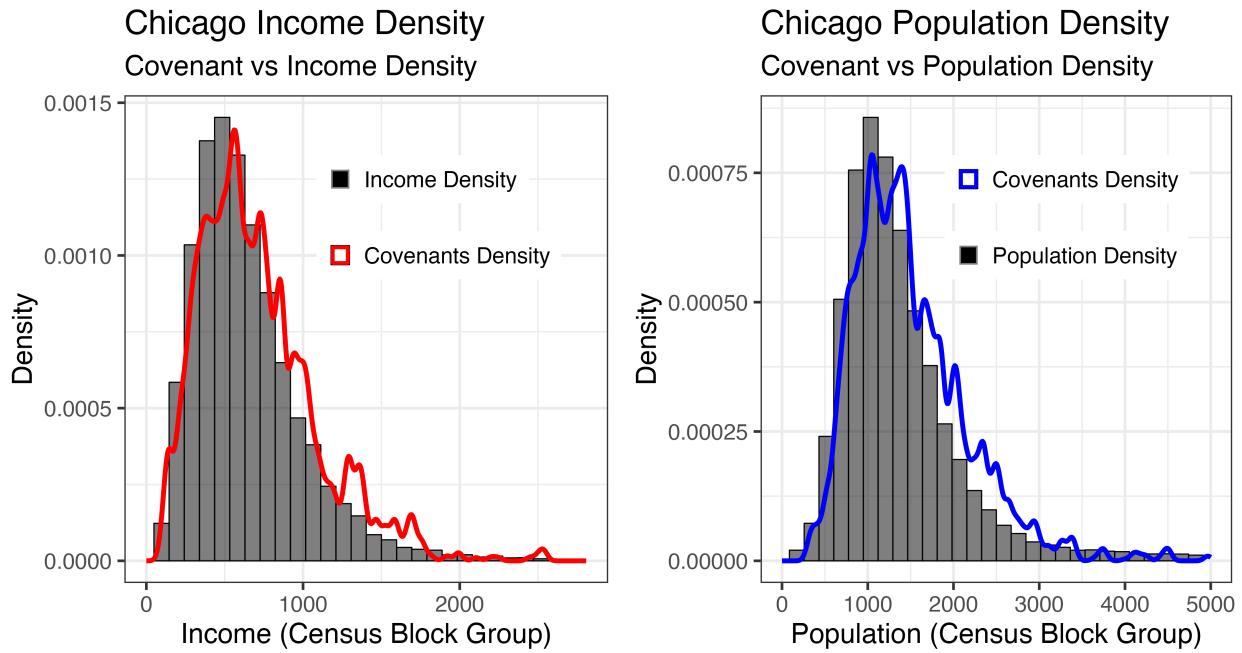
4.2 Neighborhood Demographics

Figure 5 shows that exclusive dealing contracts exist in poor and wealthy neighborhoods, as well as low-density and high-density population neighborhoods. The figure shows that exclusive dealing contracts are slightly more prevalent in high income census block groups, and are slightly more prevalent in population dense census block groups, but exist in both high and low income and sparse and dense retail environments. Table 18 regresses exclusive dealing contracts on demographic characteristics and that exclusive dealing contracts are not explained by neighborhood demographics or socioeconomic status.

$$\text{excl. deal}_{it} = \beta \mathbf{X}_{it} + \sigma_i + \lambda_t + \epsilon_{it}$$

where an exclusive dealing agreement i signed in year t is regressed on demographic factors in the census block group (median income, population density, travel time to work, ownership of homes, vacancy status, unemployment, share of the population by gender, share of the population by race), census block group group fixed effects, and year fixed effects.

Figure 5: Exclusive Dealing Contracts, Income and Population Density



Source: Cook County Recorder, ACS 2009- and Census Demographic Data 1980, 1990, 2000. Figure plots histograms of income density (left) and population density (right) in Cook County, Illinois, and overlays the density of exclusive dealing contracts.

4.3 Rental Prices

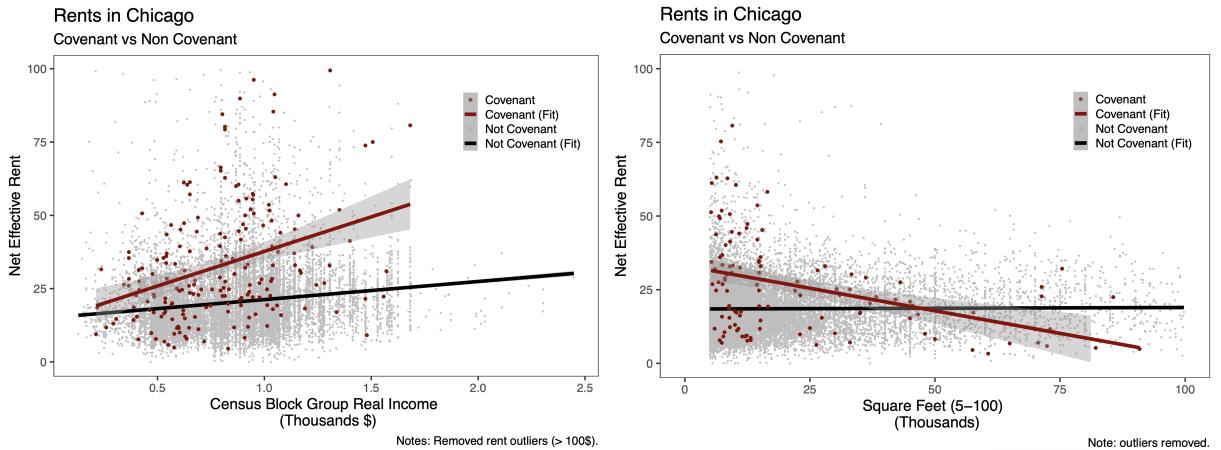
Retailers appear to pay a price premium for exclusive dealing in their lease contracts. Looking within retailer and year, we find that rental prices are 20% higher when exclusive dealing is part of the contract. Prices are higher in leases with exclusive dealing contracts, even within retailer. This is shown by regressing rents on the presence of exclusive dealing, controlling

for demographics (such as income), lease characteristics (such as store size), and property characteristics (such as building quality). Additionally, the specification includes location, time, and retailer fixed effects.

$$\log y_{ijt} = \alpha_0 + \gamma \text{exclusive deal}_{ijt} + \sum_k \beta_k \log x_{kjt} + \text{zip}_j + \text{year}_t + \text{retailer}_i + \epsilon_{ijt}$$

Table 16 shows that prices per square foot per year are 30% higher in properties with exclusive dealing, conditional on covariates. Robustness checks which vary the covariates included report estimates between 20% and 40%. The regressions indicates that the average lease prices would be 4\$ higher per square foot per year for an exclusive dealing; for a typical grocery store, this translates to an additional 120,0000\$ per year for a lease with such a contract, or approximately .24% of average annual revenue.¹⁵

Figure 6: Rental Prices as a Function of Neighborhood Income, Store Size, and Exclusive Dealing



Source: Cook County Recorder, ACS 2009-2023 and Census Demographic Data 1980, 1990, 2000, and CompStak lease characteristics data. Figure net effective rents in Cook County as a function of exclusive dealing status (covenant), census block group income, and size of the space. Net effective rent is the rent per square foot per year, averaged over the course of the lease.

¹⁵Typical grocery stores in Chicago average 30,000 square feet and make around 50 million dollars in revenue each year.

Figure 6 shows how prices with and without exclusive dealing vary as a function of neighborhood rent and store size, without controlling for covariates. Exclusive dealing contracts are more expensive for all neighborhoods but particularly more expensive in high-income neighborhoods. These findings are consistent with higher retailer demand in higher income neighborhoods, with landlords extracting higher prices for exclusive dealing. The results are also consistent with higher co-locating retailer demand in higher income neighborhoods, which means the landlord has to be compensated more to forgo profits from specific co-locating stores. Prices for exclusive dealing are inversely related to store size. When the store is small, retailers pay the highest premium for exclusive dealing (red line) relative to a similar-sized store without exclusive dealing (black line); when the store is very large, retailers with exclusive dealing contracts pay less than stores without them. This is likely due both to the fact that there are few retailers that can fill such a large store size, and because the large store likely drives demand for any nearby smaller stores; the large store entry may increase the landlords' profits in the co-locating store market. Grocery stores, which tend to be between 30,000 and 60,000 square feet around the region where prices are roughly equivalent.

4.4 Density of Nearby Competitors

Retailers with exclusive dealing contracts have fewer competitors surround them (0-.2 mi), but more competitors farther away. This is consistent with the firms' presumed goal of limiting competition, and consistent with the idea that exclusive dealing only slightly displaces competitors. Figure 7 shows a regression coefficients of the number of stores in the vicinity on whether or not there is a contract on that store.

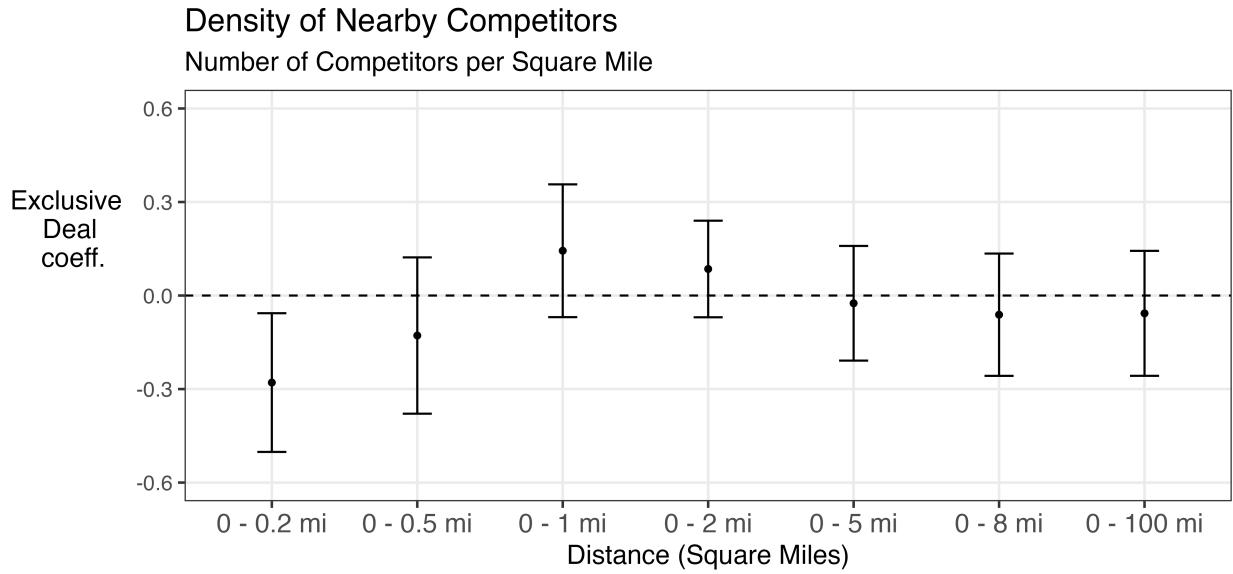
$$num\ stores_{r(i)t} = \beta_{\text{exclusive deal}_i} + \sigma_i + \lambda_t + retailer_i + \epsilon_{it}$$

where $num\ stores_{r(i)t}$ are the number of dollar, grocery, drug, and big box stores surrounding a grocery or big box store (excluding the store itself) in a radius $r(i)$ in a year t , exclusive deal_i indicates the presence of an exclusive dealing contract benefiting the property i , and σ_i , λ_t , and $retailer_i$ include zip, time, and retailer fixed effects.

The results show that in the closest vicinity to the property – 0 to .2 mi –, grocery stores with exclusive dealing contracts are surrounded by fewer competitors. This 0-.2 mile radius

is important both because it is the radius of a typical shopping mall and also because it is the radius at which the trip chaining literature has documented spillovers across stores (Qian et al. (2023), Knight (2023)). At a larger radius, expanding to 0-1 mile, the effect goes away: there are similar number of competitors. As a result, between .2 and 1 mile, the result reverses and there are more competitors surrounding stores with exclusive dealing contracts. These results are consistent with the hypothesis that the covenant restrict competitions by pushing competitors farther away. At a large radius, there is no difference between stores with and stores without exclusive dealing contracts. Table 7 and Table 21 and Table 20 show the full specification results in the appendix.

Figure 7: Density of Nearby Competitors



Notes: Figure reports coefficients and 95% confidence interval from regression of number of competitors per square mile on whether or not the store has an exclusive deal, with year, zip5, and retailer fixed effects. We only use grocery chains and big box stores. Competitors are defined as grocery, big box, and drug stores. Data is based on the exclusive deal data from the Cook County recorder office and the retailer location, entry, and exit comes from the SNAP data.

4.5 Event Study with Consumer Expenditures

In this section, we show that consumers reduce grocery purchases and switch to the dollar store following a grocery store exit only when an exclusive deal is present. To do so, I run the following event study regression where

$$Y_{it} = \Sigma_{k=-T_1}^{-2} \delta_k \times D_{ik} + \Sigma_{k=0}^{T_2} \delta_k \times D_{ik} + household_i + year_t + \epsilon_{it}$$

where the event is a chain grocery exit in household i zip in quarter t . The panel is balanced by restricting to household that appear in the year before and after the event, and to households that eventually experience a grocery exit; as a result, the control group is the not-yet-treated group and the event study is estimated using heterogeneity-robust estimators developed by [Callaway and Sant'Anna \(2021\)](#).

A common concern with the event study strategy is grocery store exit is related to other features of the local retail environment that would affect other retailers. To test for changing patterns before grocery store entry, I estimate the treatment effect in the years leading up to the grocery store exit. I find a precisely estimated flat pre-trend, and a significant trend break at the time of the exit. Similarly, if grocery stores respond to changes in local demand conditions, other grocery stores would likely enter or exit even before the grocery store enters. I estimate the effect of grocery exit on other grocery stores and find precisely estimated pretrends as well in Figure 9. Similarly, if households anticipated the grocery store exit, anticipation would likely induce a change in consumer outcomes before entry, but pre-trends in this event study are flat. The identifying assumption is that grocery stores in different zip codes that have a grocery exit in different times but will eventually lose a grocery store would have followed the same pattern regardless. One point in favor is that consumers do not observe and are not really aware of the covenants to begin with.

The outcomes are log grocery store expenditure and log dollar store expenditure, shown respectively in Figure 9. The results show consumers reduce grocery expenditures when the retailer leaving the premises had an exclusive dealing contract. Once the grocery store leaves, consumers substitute away from grocery stores and increase spending at dollar stores. The consumer spending patterns are persistent for a few years, and after a few years, the consumer expenditure recovers almost to pre-exit levels. Exploring the underlying market structure, I show that consumer expenditures – for grocery and dollar – return towards baseline once a new retailer enters the zip code. In contrast, consumers expenditure remain unchanged (before and after the grocer's exit) when the grocery store that exits does not have an exclusive dealing agreement with the landlord. Furthermore, stores without exclusive dealing agreements that exit are replaced by grocers faster than stores with exclusive dealing agreements. The event study results show not only that there is likely pass through from

the commercial real estate market to the product market, but that the exclusive dealing contracts may have implications for consumer welfare.

Figure 8: Consumer Expenditure Following Grocery Exit.

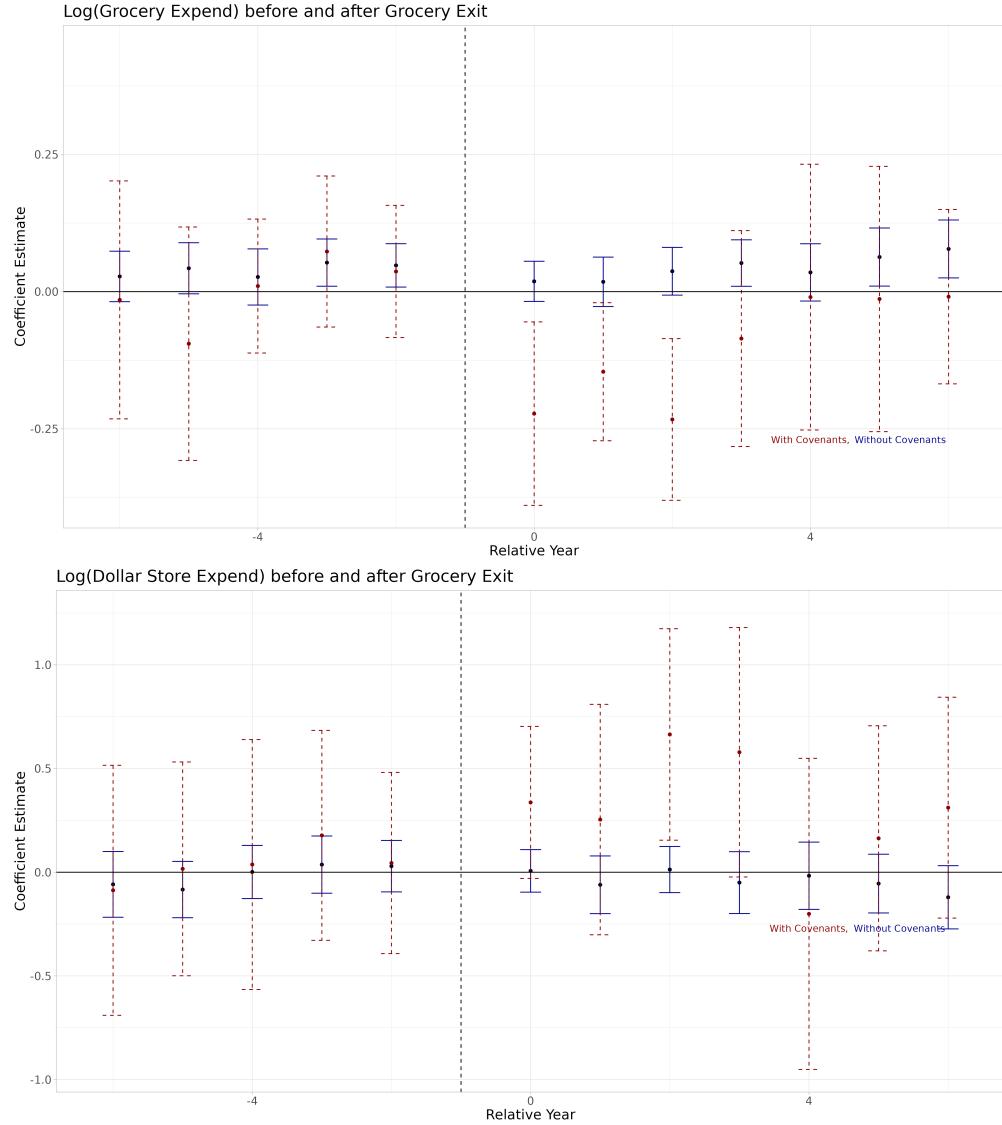


Figure 9: Consumer response (in terms of grocery expenditure) to grocery exit, for those with covenants and those without covenants.

5 Model

The stylized facts show correlation between exclusive dealing contracts, firm outcomes, and consumer outcomes; the model asses the equilibrium effects of exclusive dealing, and computes consumer welfare, firm profitability, in a counterfactual world where landlords and tenants cannot contract on exclusivity explicitly. Because the counterfactual affects all locations and all retailers, this comparison is ill-suited to reduced form analysis.

Timing: Timing in the model follows timing of grocery-anchored commercial real estate market.

First, (1) each landlord posts up to two prices per firm: a base price and a price for an exclusive contract. Landlord m offers retailer j contracts a which can be exclusive, common, or both, at rental price r_{jma} . The effect of the exclusive dealing contract is to forbid any competing firm from entering the landlord's land, as measured by the profitability estimated from the demand.

Then, (2) each retailer chooses locations and contracts. Entry is simultaneous and retailers form beliefs over the other retailer's strategies. The equilibrium is a Bayesian Nash: retailers take landlord's prices as given but form beliefs other retailer entry strategies.

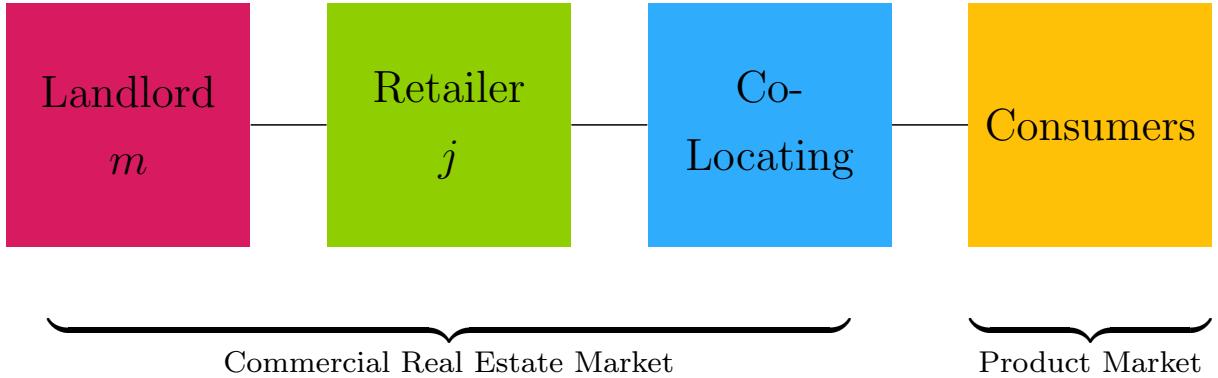
(3) The retailers attempt to enter. In the case of size or contract conflicts – due to exclusive dealing, the retailer paying the highest rent for each landlord enters.

(4) Given retailer entry, landlords set prices for co-locating firms and the co-locating firms enter. In this market, landlords set a single price and do not offer exclusive dealing contracts.

(5) Given entry decisions, retailers set prices in the product market, consumers shop, and the product market clears.

The model is estimated in reverse order.

Figure 10: Model Timing



The commercial real estate market clears in two steps. First, the landlord rents to the retailer, next the landlord rents to co-locating stores. Given entry in the commercial real estate market, the retailers set prices in the product market, consumer shops for good, and the product market clears.

5.1 Consumer Demand for Retailers

The product market is modeled at the retailer level, because the exclusive dealing contracts are signed at the retailer level. Since exclusive dealing can distort retailer locations relative to households and other retailers, the product market model allows household choice to depend on retailer fixed effects, distance to the retailers, and distance between retailers¹⁶. In the model, consumers take locations and characteristics of retailers as given and choose where to shop. Consumers' choice of retailers depend on prices, total distances, retailer fixed effects and complementarities across retailers. The complementarity is modeled as a consumer preference to shop at multiple retailers in the same day – as a choice to multi-home (the model follows the complementarity model in Gentzkow (2007), and the discrete choice problem demand Berry et al. (1995), Berry et al. (2004), Bayer et al. (2007)). Consumer utility is

$$u_{ib}^m = -\alpha^m P_b^m + \gamma^m d_{ib} + \Gamma_b + \xi_b^m + \sum_{k,l} \sigma_{kl}^m X_{k(b)} y_{l(i)} + \epsilon_{ib} \quad (1)$$

¹⁶The store fixed effect can be interpreted as store quality.

Table 2: Most Frequent Retailers

Retailer	Type
Jewel Osco (Safeway)	Supermarket
Mariano's (Kroger)	Supermarket
Whole Foods	Supermarket
Aldi	Specialty
Food 4 Less (Kroger)	Specialty
Trader Joe's (Aldi)	Specialty
Costco	Big Box
Meijer	Big Box
Sam's Club (Walmart)	Big Box
Target	Big Box
Walmart	Big Box
Drug	Drug Store
Dollar	Dollar Store
Liquor	Liquor
Other Food	Other Food
All Other	Outside Good

The retailers (and parent company, if retailers share a common parent company) included in the analysis are those with the largest market share and most frequent trips.

where u_{ib}^m is the utility household i in income group m receives from shopping at the retailers $b \in \mathcal{B}$ in market t , P_{bt}^m is the total price paid, d_{ib} is the total distance traveled, ξ_{bt} is market-level unobserved demand shock, σ_{kl}^m captures the effect of the interaction between household demographic characteristics $y_{l(i)}$ and retailer characteristics $X_{k(b)}$, and ϵ_{ib} is a household idiosyncratic preference for retailers b in market t . For example, ϵ_{ib} may represent daily preferences for a specific meal, which require a set of ingredients across stores.

The products, retailers listed in Table 2, are the retailers with the largest market share and most consumer trips: national chain grocers, discount stores, club stores, as well as categories of retailers such as drug stores, dollar stores, and liquor stores. The remaining stores comprise the outside group¹⁷.

Consumer preferences for prices, distance, retailers, and retailer complementarities determine the effects of exclusive dealing. As consumers shop for groups of retailers together, competition softens within each retail pair. Consumers that multi-home travel to multiple

¹⁷The outside group is interpreted as the most preferred of all of the other stores in the market, the same interpretation as in Cao et al. (2024)

stores in the same trip, saving on distance costs¹⁸. With regard to exclusive dealing, as γ^m becomes more negative, the distaste for distance becomes more salient, exclusive dealing becomes more effective, and the value of exclusivity to the firm increases.

The complementarity term, Γ_b determines the retailer's profitability from keeping stores nearby. Relative to a counterfactual without multi-homing, complementarities can have three effects: first, (positive) complementarity can steal business from other retailers or the outside good and benefit the retailer. In this case, retailers have an incentive to co-locate as decreasing the distances between retailers increases the relative shares, as locating nearby decreases the total trip distance¹⁹. Second, positive complementarity can still result in an overall decrease in profits if multi-homing steals business from at least one retailer. In this case, the retailer has an incentive to locate far from the second retailer to decrease the utility from the multi-homing product. Third, substitute retailers have an incentive to locate as far from each other as possible to avoid business stealing. Since retailers choose locations and thus distances to other retailers, complementarities are moderated by distance.

Consumer preferences are heterogeneous across demographics and retailer characteristics, as captured by $\sum_{kl} \sigma_{kl} X_{k(b)y_{l(i)}}$. Each household has an idiosyncratic preference for a product (a group of stores), ϵ_{ib} , modeled by an additive product-specific Type 1 Extreme Value shock. The shock represents the day-of preference for a specific bundle, and represents an idiosyncratic preference for a specific set of retailers on that day, or idiosyncratic shocks that change the set of retailers shopped.

¹⁸This model of multi-homing or trip chaining is modeled this way in [Relihan \(2022\)](#) and departs from most grocery demand literature that assumes households pay the total trip costs to each retailer (for example [Thomassen et al. \(2017\)](#)).

¹⁹Suppressing market indices for clarity, firm j 's share of the market is sum over all shares of bundles with firm j , $b \in j$, summed over the shares from all households in the market. complementarities are moderated by distance in the sense that as the distance between the stores changes, the preferences for consumers bundles change as well.

$$s_j = \underbrace{\sum_i \omega_i}_{\text{hhlds}} \underbrace{\sum_{j'=1}^J \frac{e^{-\alpha(P_j+P_{j'})+\xi_{jj'}+\Gamma_{jj'}+\gamma d_{ijj'}} + \sum \sigma X_{jj'} y_i}{1 + \sum_{j,j'} e^{-\alpha(P_j+P_{j'})+\xi_{jj'}+\Gamma_{jj'}+\gamma d_{ijj'}} + \sum \sigma X_{jj'} y_i}}_{\substack{\text{share bundle } jj' \text{ for hh } i \\ j' \text{ index is dropped for } j'=j}} \quad (2)$$

5.2 Product market supply

Prices are set after retailer entry has occurred and are static in each market. Retailers compete on prices and sell a composite good that is differentiated from other retailers goods by location, a store fixed effect, and exogenous demand shocks. A chain retailer chooses a price for all of its retailer locations in market j each week, and sets separate prices for each income group m . An independent retailer sets a price for its individual retailer for each income group as well:

$$\max_{p_j^m} \sum_m s_j^m (p_j^m - mc_j) \quad (3)$$

Consumers only shop at the closest location to home. When a retailer adds location it increases shares (and thus profits) by lowering distances a customer travels to get to the closest bundle, but new locations cannibalize existing locations because each retailer location generates less revenue, and attracts fewer customers, and has to pay rent and fixed costs of entry.

Then retailers set prices according to

$$p_{jt}^m = mc_{jt} + \left[\frac{\partial s_{jt}^m}{\partial p_{jt}^m} \right]^{-1} s_{jt}^m - \frac{\partial s_{jt}^m}{\partial p_{jt}^m} \quad (4)$$

5.3 Co-Locating Retailer Entry

The landlord leases to co-locating stores before the product market clears but after the landlord had leased to the retailer. Once the landlords rent to the retailers, the landlords with empty locations rent to the small retailers (the co-locating stores). The co-locating retailers are the products in the demand estimation that aren't considered anchor retailers: other food, drug stores, liquor stores, dollar stores, and other stores. The co-locating store market differs from the retailer market in three main ways: landlords set a single price for all tenants, there is no exclusive dealing, and when multiple retailers approach, entry is determined at random. These assumptions reflect the great number of locations retailers of

this size can enter in a market like Chicago. Each co-locating retailer k 's location choice is then determined by

$$\max_m E[\bar{\pi}_k] - r_m^{co} - F_m^{co} + \epsilon_{km}$$

The expected variable profits, $E[\pi_k^{var}]$, are determined by the parameters estimated in the product market, the distance to consumers, the rents, and the existing set of retailers (including if there is a retailer present at the location).

The landlord sets prices in the co-locating market that balance the probability of entry, s_m with revenues given entry, $p_m^{co} - mc_{mc}^{co}$. The landlord's profits from the co-locating market are

$$\max_{r^{co}} \underbrace{(s_m^{drug} + s_m^{dollar} + s_m^{other food} + s_m^{other})}_{\pi_l^{co}} (p_m^{co} - mc_m^{co})$$

When the landlord enters into an exclusive dealing contract with a retailer, the landlord sets the share from the industry that is blocked to zero; however, the landlord can always rent to the “other” firm. When determining prices for an exclusive dealing contract, the landlord balances the expected gains from the retailer market with the expected losses from the co-locating tenant market.

5.4 Retailer Entry

In the commercial real estate market, landlords set prices for contracts and then retailers simultaneously choose where to enter and whether to enter with an exclusive contract or not. If there are conflicts – if an exclusive dealing contract forbids another retailer from entering or there are size constraints – the highest-paying retailer enters. When choosing locations, retailers consider rental prices, fixed costs of entry, and the expected variable profits from the product market. A retailer j chooses across landlords m and contracts a to maximize

$$\max_{m,a} E[\bar{\pi}_{jm}(\mathbf{l}_{-j})] - \bar{\mathbb{P}}_{mja}(r_{jma} + F_m - \theta_{ja} + \epsilon_{jm}) + (1 - \bar{\mathbb{P}}_{mja})\epsilon_{j0} \quad (5)$$

where $E[\bar{\pi}_j(\mathbf{l}_{-j})]$ are the expected variable profits in the product market, \mathbf{l}_{-j} are the other retailers entry strategies, $\bar{\mathbb{P}}_{mja}$ is the probability the retailer wins entry given that it tries to enter, F_m is the fixed cost of entry.

Industry professionals cite information asymmetry as a reason for exclusive dealing in commercial real estate: the landlord does not know the retailer's profits. Information asymmetry is caused by competition and location characteristics. θ_{aj} . In the model, θ_{ja} is the retailer's sensitivity to local competition, the profit loss if the retailer operates does not operate exclusively. θ_{ja} is private information to the retailer, and unknown to the landlord and researcher, but is drawn from a known distribution. ϵ_{jm} is the idiosyncratic profitability at the location and ϵ_{j0} is the expected profitability if the retailer doesn't win entry. ϵ captures elements such as layout or square footage that are known to be profitable to the retailer. Like θ_{ja} , ϵ_{jm} is unknown to the retailer.

The exclusive dealing contract blocks both retailers and co-locating firms from entering the same location. The contract varies for each retailer in each location, and is determined by whether profits are expected to fall with the second retailer. As a result, exclusive dealing contracts can be heterogeneous within retailers across locations and across retailers at the same location.

The retailer balances higher prices of an exclusive dealing contract with its benefits: increased profitability from restricting retailer entry, increased profitability from restricting co-locating firm entry, and a higher probability of winning entry if the retailer purchases a more expensive contract.

5.5 Landlord problem

Each landlord m can set up to two prices – an exclusive and a baseline/common price for each firm j : r_{jma} . The landlord balances the probability of a tenant approaching with a higher revenues once the tenant approaches

$$\max_{r_{jma}} \sum_{j,a} \underbrace{\bar{\mathbb{P}}_{jma}}_{\text{prob. win prob. approach}} \underbrace{\mathbb{P}_{jma}}_{\text{approach}} \underbrace{(r_{jma} - mc_m)}_{\text{retailer}} + \underbrace{\pi_m^2(a_j)}_{\text{co-locating}} + \underbrace{\left(1 - \sum_{j,a} \bar{\mathbb{P}}_{jmat} \mathbb{P}_{jmat}\right) \pi_m^2(O)}_{\text{profits without retailer entry}}$$

Given the entry of the retailer, the landlord expected profits are $\pi_l^2(a_1)$ from the co-locating market. Because the landlord cannot observe the effect of competition on retailer profitability or the retailer's idiosyncratic match, the landlord cannot tell the combination of retailers that maximize total surplus.

6 Identification and Estimation

6.1 Product Market Approach

This section discusses the identification and estimation of the demand side.

Given the observed data, we can estimate parameters in the household utility in two steps. First, we construct the likelihood of observing a trip to a particular retailer or to a particular set of retailers, which allows us to identify parameters that vary across households as well as an average market-level parameter. Then, we can identify the market-specific parameters by running an (instrumental variable) regression of the average parameter on its covariates (following [Berry et al. \(1995\)](#), [Berry et al. \(2004\)](#), [Bayer et al. \(2007\)](#)).

The likelihood of observing bundle b and average parameters are

$$\mathcal{L}(b|\theta) = \prod_i \prod_b \underbrace{1\{b_i\}}_{i \text{ chooses } b} \underbrace{\frac{e^{\delta_{bt} + \gamma_b d_{ib}^m + \phi_i + \sum_{k(b),l} \sigma_{k(b)l(i)} X_{k(l')} y_{l(i)}}{1 + \sum_{b'} e^{\delta_{b't} + \gamma_b d_{ib'}^m + \phi_i + \sum_{k(b'),l} \sigma_{k(b')l(i)} X_{k(b')} y_{l(i)}}}_{\text{prob. } i \text{ chooses } b}$$

$$\underbrace{\delta_{bt}^m}_{\text{mean util.}} = -\alpha P_{bt}^m + \Gamma_b + \xi_{bt} + u_{ibt}$$

Important for exclusive dealing are the price, distance, and complementarity parameters, α^m , γ^m , and Γ_b . Parameters are identified from variation in observable characteristics and trip frequency. Prices are likely correlated with unobservable retailer quality and market demand shocks that bias estimates upwards. In order to overcome the endogeneity, we instrument with the average prices of goods in other markets, with the intuition that that price in other markets picks up common retailer costs across markets but does not reflect unobserved demand shocks (following [Hausman et al. \(1994\)](#)). Distances are measured as the total

length of the trip: home and back when the household shops at a single retailer, and home - store 1 - store 2 - home when the household stops at two retailers. Like prices, distances are also endogenous: households choose locations based on amenities and retailers choose locations based on where households are located. We address the distance endogeneity by controlling for household zip⁵. The identifying assumption is that household location within a zip code is as-good-as random and variation in household locations within the household zip code identifies the distaste for distance²⁰. Specifically, limited supply of housing and the location distribution of other amenities will cause households to locate across the zip code, regardless of their preference for groceries or other specific retailers in the demand estimation.

The complementarity term, Γ_b is defined as the additional utility of shopping at two stores together in the same day, or as the additional utility of making a single trip to both stores (controlling for total trip distance). The higher the value of Γ , the greater the complementarity between two retailers, relative to the outside good. The identifying assumption is that higher complementarity will result in more trips, higher mean utilities, which can be identified by a regression of mean utilities on bundle parameters and other aggregate characteristics (prices). One challenge with identifying the complementarity term is that the complementarity term may be identifying preference for shopping in a shopping center or that tastes are correlated across nearby retailers: that shopping at one retailer leads to shopping at another retailer. To control for this form of endogeneity, we directly control for whether retailers are co-located. The identifying assumption is that spillovers across retailers are in large part local (the literature finds that spillover are between 0-2 miles, roughly the shopping mall distance). Additionally, controlling for co-locating stores controls for preferences for shopping at a shopping center²¹.

6.2 Product Market Estimates

Price and distance estimates are reported in Table 3. Results from the estimation show disutility for prices and distance, and that low-income consumers are the most elastic with respect to price and high-income consumers are the most inelastic with respect to price. The

²⁰As robustness, we control for Chicago area instead of distance, a broader measure that controls for the neighborhood.

²¹Additionally, the demand specification includes further controls that interact household demographics with retailer characteristics. The identifying assumption is that further controls – such as household income, education, unemployment status, ethnicity, as well as the interaction of these terms with distance fully control for the relevant variables that determine shopping patterns.

price coefficient is interpreted as the disutility of a 1% increase in retail prices. Estimates for distance are salient: each income group is willing to travel only an additional additional .007, .005, and .003 mi to for a 1% price increase at a retailer half a mile away.

Table 3: Price and Distance Demand Estimates

Variable	Estimates		
	Low Income Group	Middle Income Group	High Income Group
α^m (price)	-1.569*** (0.156)	-1.262*** (0.325)	-1.001*** (0.248)
γ^m (distance) (mi)	-2.22*** (0.394)	-2.58*** (0.391)	-3.03*** (0.559)

Table 4: *Source* Numerator, Chicago, 2017-2022. Standard errors are constructed by bootstrapping a 1,000 times. Income Group 1 is the lowest income group, Income group two is the middle income group, and income group 3 is the high-income group.

Table 5 reports some of the complementarity terms, Γ , showing a large heterogeneity in complementarities across retailers. The negative estimates are substitutes relative to the outside good, and the positive estimates are complements relative to the outside good. As shown, the estimates are wide-ranging across retailers, even within retailer type, but the patterns are intuitive. For example, Aldi and Trader Joe's are owned by the same company, and it is unsurprising that there are neither strong substitutes nor are there strong complementarities²². Meanwhile, there is competition between Jewel and Trader Joe and Jewel and Aldi, as Jewel locates in both high income and low income neighborhoods, and they provide similar products. Jewel, which contains a pharmacy inside and provides all the same products as a typical drug store competes strongly with drug stores. Aldi, meanwhile, which does not contain a pharmacy inside, is viewed as complementary by consumers to the drug store. Indeed, Jewel stores often have covenants against pharmacies and drug stores, and Aldi stores typically do not.

²²Aldi targets low income neighborhoods, Trader Joe targets high income neighborhoods so these retailers tend to be differentiated in space.

Table 5: Select Demand Estimates from Cross-Store Complementarities

Variable	Jewel	Aldi	Trader Joe's	Drug	Dollar	Liquor
Jewel		-1.2*	-0.1	-2.3*	.8*	.4
Aldi	-1.2*		.5	1.2*	-1.4*	-.6
Trader Joe's	-.1	.5		-.5	.1	.9*
Drug	-2.3*	1.2*	-.5		-.3	.2
Dollar	.8*	-1.4*	.1	-.3		-1.7*
Liquor	.4	-.6	.9*	.2	-1.7*	

 Table 6: *Source:* Numerator. Table shows estimates for cross store complementarities relative to the outside good. Current standard errors mark as significant at the 5% level

Both the retail demand estimates and the exclusive dealing contracts show significant heterogeneity across firms. In part, exclusive dealing contracts should be partly determined by the expected variable profits in the product market. To test this, we compare profitability predicted by the demand estimates with the content of the exclusive dealing contracts. Similar to this exercise, Figure 22 shows each retailer's exclusive dealing contracts. The higher the bar, the greater the fraction of stores that block that industry. Substitutes, as predicted by the demand estimates – such as Jewel Osco (Safeway) and Grocery, Jewel Osco (Safeway) and drug stores, Whole Foods and grocery, and Aldi and grocery – are also stores that are most blocked by the exclusive dealing contracts. One exception is Aldi and drug stores, wherein Aldi exclusive dealing contracts stat that they block food sales at drug stores: they are not excluding the drug stores per se', but the food portion of the drug stores. Despite being (relative) complements, Jewel Osco (Safeway) still blocks dollar stores in a quarter of cases. This is likely because Jewel Osco likely drives the majority of demand for the Jewel Osco-Dollar Store bundle, and Jewel Osco would be more profitable operating alone.

6.3 Commercial Real Estate Market

This section covers the identification and estimation of the marginal costs, fixed costs, and information asymmetry parameters in the commercial real estate market.

From the model, we can compute the likelihood of observing firm entry, and from the landlord's first order conditions we can compute marginal costs. We assume $\theta_{aj} \sim N(\mu_\theta, \sigma_\theta^2)$, $\epsilon_{jm} \sim$

$N(0, 1)$. The likelihood and landlord first order condition are:

$$\log L = \underbrace{\sum_t}_{\text{markets}} \underbrace{\sum_j}_{\text{firms}} \log \left(\sum_{l_j \text{ feasible}} \mathbb{P}_j(l_j) \right)$$

$$[\text{foc: } r_{kmb}] \sum_{j,a} \left(r_{jma} - mc_m + \pi_m^2(a_j) - \pi_m^2(O) \right) \left(\frac{d\bar{\mathbb{P}}_{jma}}{dr_{kmb}} \mathbb{P}_{jma} + \frac{d\mathbb{P}_{jma}}{dr_{kmb}} \bar{\mathbb{P}}_{jma} \right) + \bar{\mathbb{P}}_{knb} \mathbb{P}_{knb} = 0$$

$$mc_m = \frac{\bar{\mathbb{P}}_{knb} \mathbb{P}_{knb} + \sum_{j,a} \left(r_{jma} + \pi_m^2(a_j) - \pi_m^2(O_j) \right) \left(\frac{d\bar{\mathbb{P}}_{jma}}{dr_{kmb}} \mathbb{P}_{jma} + \frac{d\mathbb{P}_{jma}}{dr_{kmb}} \bar{\mathbb{P}}_{jma} \right)}{\sum_{j,a} \left(\frac{d\bar{\mathbb{P}}_{jma}}{dr_{kmb}} \mathbb{P}_{jma} + \frac{d\mathbb{P}_{jma}}{dr_{kmb}} \bar{\mathbb{P}}_{jma} \right)}$$

In each market, we observe data on potential locations, retailer entry and exit, lease prices (rents) and exclusive dealing contracts. At each potential new location we observe square footage and the possibility for co-locating firms. In the data, there are typically between zero and five potential locations in each market. We observe retailer entry, retailer exit, parent company and store sizes, the later of which allows us to construct the retailer's choice set. We assume that parent companies can make entry and exit decisions for any brands of retailers they own; we consider the location choice at the parent level. We group retailers from the demand estimation by their size and ownership in Table 11²³, and use the size and ownership to guide where the retailers can enter and which parent company chooses locations. Additionally, we assume that there are other retailers – other and outside food – and include them as other potential entrants in the market. These other retailers are less frequently shopped at. From the demand estimates, we compute the expected profitability of each possible combination of locations.

An exclusive dealing contract is defined as a contract that reduces expected profits in that location, taking to account all existing locations but no future locations. The exclusive deal is assumed to bind across all stores that would decrease profits at that location. That is, given the current set of stores, the condition is that expected variable profits do not decrease

²³Grocery chain exit is rare: as shown in Figure 21, 70% of grocery chain stores that have opened since 1990 have remained open to present day. Since it is so rare, we don't explicitly model the exit choice.

for co-locating stores.

The moments of the distribution of the asymmetric information parameter, θ_j , are identified by the score of the log likelihood function, as are the fixed costs of entry F_m . We assume that $\theta_j \sim N(\mu_\theta, \sigma_\theta^2)$ and identify parameters μ_θ and σ_θ^2 . The private information is therefore a random coefficient term on the firm's profitability. Similarly, the landlord's marginal cost are computed by taking the first order condition of the profit function. We use the observed rents and marginal costs to compute the remaining costs.

Note, the marginal costs are the cost per square foot, and don't vary across product sold (or store leased to), because the stores are leasing the same space. This gives us the marginal costs, which we can then plug into the other first order conditions to compute the rents and whether or not the firm is offering one or two prices. That is, the first order condition for the observed rents give the marginal costs, the first order conditions for the other rents give the remaining other optimal rents. This setting is similar to multi-product firms but in that case the full vector of prices is observable and the first order condition recovers the full set of marginal costs; here, there is a single marginal cost and a single observable rent, and the first order condition (conduct assumption) recovers the remaining unobservable rents.

We estimate the model with simulated method of moments, comparing model in the simulated model to the data. Marginal costs are computed at the same time as fixed costs and asymmetry parameters, because the marginal costs are needed to compute the unobserved rents, the rents the landlords set for the other tenants and for the contract not taken. For any given value of parameters, we compute an inner loop to solve for optimal rents and an inner-inner loop to solve for tenant probabilities within optimal rents. While Bayesian Nash equilibrium and the landlord market will shrink the possible set of equilibria, one challenge in the entry literature and in this paper is addressing the multiple equilibria possible in model. To address this, we test for multiple equilibria by trying many starting points and find similar results in terms of the probabilities of entry and the rents.

Results for the fixed costs and marginal costs for the retailer and co-locating markets are shown in Figures 24- 25. The estimates show that fixed costs vary between 10 and 50 dollars per square foot for year, and the average cost of opening a new retail store front for a 3,000 sqft store is around 50,000\$, which is in line with industry estimates. Marginal costs are low, and average around 13\$ per square food, or approximately half of the average rent. Marginal and fixed costs (per square foot) are similar in the retailer market as the co-locating market. We find that the mean of the information asymmetry parameter is 3.2 \$ per square foot per

year, and the variance is 10\$ per square foot per year. For the average retailer which pays around 20% in rent for each square foot and year, the exclusivity contract increases profits by 15% of rent.

7 Effects of Exclusive Dealing

7.1 Effect of Exclusive Dealing on Retailers and Landlords

Using model estimates, we evaluate the average and distributional consequences across space by taking estimates and estimating landlord, retailer, and consumer outcomes where the landlords can only set one price, and cannot explicitly contract on exclusivity.

Counterfactuals show that exclusive dealing contracts encourage entry in Chicago during the time period. Table 7 shows the difference in entry probabilities for retailers in each geographic area, averaged over retailers and over years. The results show that in all areas except West Cook County, exclusive dealing increases the probability of entry for (large) retailers. The effect is most pronounced in the poorest and least population dense market, South Chicago, where probability of entry goes from 10% to 0% without exclusive dealing. The interpretation is exclusive dealing contracts are necessary to ensure entry in the most underserved markets. Suburban areas see the second largest drop in probability of entry in the counterfactual without exclusive dealing. This is likely explained by the retail environment of suburban neighborhoods: suburban areas tend to have a few shopping malls surrounded by many houses, and when the shopping mall is often owned by a single landlord, there are relatively few locations. Without the exclusive contract, the probability of competitor entry decreases the probability of retailers entering in the first place. Finally, CBD and North Chicago have the lowest difference in entry without exclusive dealing. These neighborhoods are dense both in terms of retail and population, and retail often exists in stand alone locations. As a result, the exclusive dealing contracts were least effective in these neighborhoods, and so the difference is relatively small.

Following entry, all major grocery stores reduce entry probabilities in each market. Table 8 shows difference in entry probabilities (computed in percentage points) and difference in profits (computed in percent) for each major retailer and each major co-locating store industry. Big Box stores Costco and Walmart have both a large loss in profits and also decrease the probability of entry substantially. The retailers' change in entry strategy is not

Table 7: Entry Probabilities by Geography for Retailers

Geographic Area	Difference (Percentage Points)	Counterfactual Percent	Observed Percent
West Cook County	9.61	16.7	7.09
North Chicago	-6.91	8.76	15.7
CBD	-6.96	15.8	22.8
North Suburban	-8.97	3.09	12.1
Northwest Suburban	-9.95	13.8	23.7
South Chicago	-10.0	0.00	10.0

Notes: Counterfactual: average probability of a particular retailer entry into a market, under the current pricing (Observed) and counterfactual pricing (Counterfactual). Table shows Counterfactual - Observed.

able to offset the loss in profits from competing retailers entering nearby. In fact, in the case of large retailers such as big box stores – Costco, Walmart, Target –, the landlord is already likely internalizing the spillovers to nearby stores, and is thus already charging very low rents per square foot even with the current observed exclusive dealing contracts, as shown in Figure 6. Since big box store rents are already quite low (relative to marginal costs) for in the observed equilibrium, a counterfactual without exclusive dealing results in fewer big box stores and fewer profits. The decline in profits is likely due to the fact that the landlord cannot commit to an implicit exclusive dealing contract. In contrast, retailers like Jewel Osco (Safeway), Mariano’s (Kroger), and Aldi, are able on average to change retail entry strategies to mitigate the loss in profits. These grocers enter less and change which locations they enter in response to the exclusive dealing ban. Co-locating stores see have slightly higher profits and increase their probability of entry when exclusive dealing is banned. These retailers benefit from a counterfactual world where landlords cannot contract one exclusivity. The intuition is that in locations where retailers enter, the co-locating stores will enter as well. In locations where retailers no longer enter, there still may be some demand for the smaller and cheaper co-locating stores.

The percentage change in landlord profitability is shown in Table 9, which provides intuition on the theory or underlying mechanism for exclusive dealing in this setting. The effects of a ban on exclusive dealing are heterogeneous across landlords: most landlords benefit from exclusive dealing, with only 8% of landlords see profits increase as a result of a ban on exclusive dealing. The intuition, thus, is that the exclusive dealing contract allows landlords to monetize their properties.

In this setting, however, it is more profitable to offer a baseline common price and an

Table 8: Counterfactual Profitability and Probabilities by Retailer

Store Names	Diff.	Prob.	Entry	Profits
	Percentage	Points		Percent Change
Costco	-10.0			-6.01
Walmart	-10.0			-6.17
Whole Foods	-7.82			-7.24
Target	-7.41			-13.1
Jewel	-7.36			0.139
Mariano's	-7.34			-0.459
Aldi	-6.05			-0.513
Drug	3.01			.048
Liquor	5.43			1.34
Dollar	8.23			2.85

Notes: Counterfactual: average change in probability of entry into a market for each retailer across all markets, as well as average percent change in profits for retailers, averaged across each markets. Table shows Counterfactual - Observed.

Table 9: Counterfactual Profitability For Landlords (Percent)

Quantile	5th	25th	50th	75th	95th
	-.095	-.090	-.087	-.086	.041

Notes: Counterfactual: average percent change in profits for landlords, averaged across each markets. Table shows Counterfactual - Observed.

exclusive price and less profitable for the landlord to offer a contract with two prices that changed based on co-locating store entry (a price if the co-locating retailer enters, a price if the co-locating retailer doesn't enter, as in [Aghion and Bolton \(1987\)](#)). Contracts are more profitable because in this setting the exclusive dealing is screening the tenant: the landlord doesn't know the retailer's probability of entry, or profitability loss due to nearby competition. In the [Aghion and Bolton \(1987\)](#) setting, the incumbent has already entered and so the incumbent's entry probabilities and marginal costs are known. Since the co-locating store entry can be profitable for the landlord, the screen allows retailers that are less sensitive to co-locating store competition to enter without an exclusive dealing contract (and for the landlord to extract profits from co-locating), and for the more sensitive retailers to pay additionally for exclusive dealing. In the setting with two prices that depends on co-locating retailer entry, the tenant forms expectations over profits in both cases; with the contract, the tenant knows its expected profits with certainty. Interestingly, for co-locating stores that enter without a retailer, it is just as profitable to offer two prices (one if the anchor enters, one if the anchor doesn't) as it is to offer an exclusive dealing contract. In

fact, in practice, landlords will write contracts with co-locating stores that stipulate that the rent changes whether or not a retailer (an anchor store) is present. The full detail is in the model appendix.

7.2 Effect of Exclusive Dealing on Consumers

Consumer surplus is measured as the compensating variation, the compensation required for a household in the observable world to be indifferent with the distribution of retail location and prices in the counterfactual world (no exclusive dealing). Specifically, we compute

$$\mathbb{E}_{\epsilon_{ib}} [CV_i] = \frac{1}{I} \sum_i \left(\frac{1}{\alpha^m} \left[\ln \left(\sum_{b \in \mathcal{B}} \exp(u_{ib}(P_b^0, d_{ib}^0, \phi)) \right) - \ln \left(\sum_{b \in \mathcal{B}} \exp(u_{ib}(P_b^{cf}, d_{ib}^{cf}, \phi)) \right) \right] \right) \quad (6)$$

where u_{ib} is the utility from Equation 1 and ϕ are all the other non-price and non-distance parameters that are assumed to remain unchanged in the counterfactual where 0 denotes the observed world and cf denotes the counterfactual.

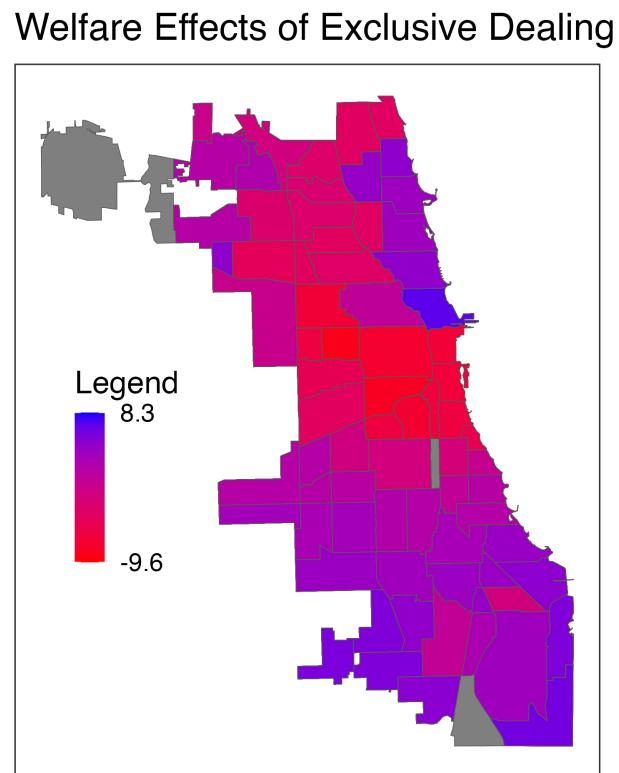
Table 10: Consumer Welfare

Geography	% Change in CV
CBD	-.911
North Chicago	-.799
Northwest Suburban	-.555
North Suburban	.330
West Cook County	.645
South Chicago	.754

Notes: Average compensating variation across all households, weighting each household equally. Observed - Counterfactual.

Table 10 shows the welfare effects of exclusive dealing in each market in Chicago, computed as the percent change from year to year, holding the market fixed. In the table, a positive value indicates that welfare is higher in the observed data with exclusive dealing. The Table shows welfare losses from banning exclusive dealing in North Suburban Chicago, West Cook County, and South Chicago, and gains in the Central Business District and North Chicago.

Figure 11: Percent Change in Consumer Welfare without Exclusive Dealing



Notes: Plot shows the average long-run welfare effects across households in different Chicago areas, observed - counterfactual. The map restricts to areas in the city of Chicago. The plot shows that exclusive dealing is welfare-improving in the lowest-income areas (towards the bottom of the map), as well as directly north of the central business district, and welfare decreasing in the central business district.

This distribution masks heterogeneity at the neighborhood level, as well as the long run effects of banning exclusive dealing. To explore the welfare effects in more spatial detail, we compute the welfare effects for a representative household living at the center of a census tract in Chicago. We can then average welfare effects for each Chicago area (similar to a neighborhood). To understand the long-run effects of an exclusive dealing ban, we set a baseline year for 2000, and compute the aggregate effects of exclusive dealing for each household in each census tract, updating from year to year and using the estimated probabilities from the previous section; the outputs of one year’s counterfactuals are the existing locations to the next year’s counterfactuals. Additionally, we assume that 10% of chain grocers exit every 20 years, in order to account for exit as well. We then plot the observed reality today subtracted from the the counterfactual welfare over a period of 20 years.

We show the long run effects of an exclusive dealing ban across Chicago in Figure 11. Variation in the consumer welfare is a result of variation in the distances to retailers, prices that change for each income group, and consumer demographics. The effects vary within and across neighborhoods, with the most negative effects of exclusive dealing in Chicago in wealthier areas around the downtown, and the most positive effects of exclusive dealing in South Chicago, an undeserved area. Key to the effect is that in South Chicago, there is essentially no entry and there is some exit, which eventually leads to food deserts. In a back-of-the-envelope calculation, we find that the percentage of people living in food deserts would increase by 10-15 percentage points as a result of a total long-run ban on exclusive dealing.

8 Conclusion

This paper presents an empirical analysis of the effects of exclusive dealing in Chicago. We study a particular type of exclusive dealing – called restrictive covenants – which exist to protect the business interest of retailers. Typically, these exclusive dealing contracts ban a retailers’ competitors within .2 miles – approximately a shopping mall – and limit local spillovers across certain types of retailers. While it is clear that the retailer may benefit from limiting nearby competition, we show that landlords also benefit from exclusive dealing by extracting additional rents from the retailer and increasing the probability of retailer entry. In signing the exclusive dealing contract, the retailer and landlord may prevent additional efficient entrants from entering the co-locating property, notably, dollar stores and drug stores, which may decrease consumer surplus. However, the welfare effects of exclusive

dealing are ambiguous, as shown by a large extant theoretical literature on exclusive dealing. We find that the welfare effects are heterogeneous across locations. We also find that the profitability of exclusive dealing is heterogeneous across location, and varies both across landlords and store types, with 8% of landlords, dollar stores, and drug stores benefiting from a total ban on exclusive dealing, but large Big Box retailers losing the most. Retailers that suffer the most from are retailers where the landlords already internalized the spillover effects from the retailer onto neighboring properties, and already set low rents even when they can contract on exclusivity.

This paper makes three conceptual points that are relevant for policy. First, the paper studies a type of non-compete in the land market, highlighting the heterogeneous effects on welfare and profitability. Second, the paper contributes to the policy debate on government intervention in local retail markets, in particular, government intervention which attempts to increase food access for under-served households, or pay retailers to encourage entry to revitalize a neighborhood. This paper highlights the role of the landlord, in particular, that the landlord already internalizes some of the benefits and spillovers of retailer entry. Second, this paper highlights the role of exclusive dealing in firm entry, limiting the probability that a neighborhood becomes a food desert.

References

- Aghion, Philippe and Patrick Bolton**, “Contracts as a Barrier to Entry,” *The American Economic Review*, 1987, 77 (3), 388–401. Publisher: American Economic Association.
- Allcott, Hunt, Rebecca Diamond, Jean-Pierre Dubé, Jessie Handbury, Ilya Rahkovsky, and Molly Schnell**, “Food Deserts and the Causes of Nutritional Inequality,” *The Quarterly Journal of Economics*, November 2019, 134 (4), 1793–1844.
- Asker, John**, “Diagnosing Foreclosure due to Exclusive Dealing: Diagnosing Foreclosure due to Exclusive Dealing,” *The Journal of Industrial Economics*, September 2016, 64 (3), 375–410.
- and Heski Bar-Isaac, “Raising Retailers’ Profits: On Vertical Practices and the Exclusion of Rivals,” *American Economic Review*, February 2014, 104 (2), 672–86.
- Ater, Itai**, “Vertical Foreclosure Using Exclusivity Clauses: Evidence from Shopping Malls,” *Journal of Economics & Management Strategy*, 2015, 24 (3), 620–642.
- Atkin, David, Benjamin Faber, and Marco Gonzalez-Navarro**, “Retail Globalization and Household Welfare: Evidence from Mexico,” *Journal of Political Economy*, 2018, 126 (1), 1–73.
- Balasubramanian, Natarajan, Jin Woo Chang, Mariko Sakakibara, Jagadeesh Sivadasan, and Evan Starr**, “Locked In? The Enforceability of Covenants Not to Compete and the Careers of High-Tech Workers,” *Journal of Human Resources*, 2020. Published online before print.
- Bayer, Patrick, Fernando Ferreira, and Robert McMillan**, “A Unified Framework for Measuring Preferences for Schools and Neighborhoods,” *Journal of Political Economy*, 2007, 115 (4), 588–638.
- Bell, David R., Teck-Hua Ho, and Christopher S. Tang**, “Determining Where to Shop: Fixed and Variable Costs of Shopping,” *Journal of Marketing Research*, 1998, 35 (3), 352–369.
- Bernheim, B. Douglas and Michael D. Whinston**, “Exclusive Dealing,” *Journal of Political Economy*, February 1998, 106 (1), 64–103.
- Berry, Steven, James Levinsohn, and Ariel Pakes**, “Automobile prices in market equilibrium,” *Econometrica*, 1995, 63 (4), 841–890.

—, —, and —, “Differentiated products demand systems from a combination of micro and macro data: The new car market,” *Journal of Political Economy*, 2004, 112 (1), 68–105.

Besanko, David and Martin K. Perry, “Equilibrium Incentives for Exclusive Dealing in a Differentiated Products Oligopoly,” *RAND Journal of Economics*, 1993, 24 (4), 646–667.

Bork, Robert H., *The Antitrust Paradox: A Policy at War with Itself*, New York: Basic Books, 1978.

Bresnahan, Timothy F. and Peter C. Reiss, “Entry in Monopoly Markets,” *The Review of Economic Studies*, October 1990, 57 (4), 531.

— and —, “Empirical models of discrete games,” *Journal of Econometrics*, April 1991, 48 (1-2), 57–81.

Burayidi, Michael A. and Sanglim Yoo, “Shopping Malls: Predicting Who Lives, Who Dies, and Why?,” *Journal of Urban Design*, 2021, pp. 60–81.

— and —, “Shopping Malls: Predicting Who Lives, Who Dies, and Why?,” *Journal of Real Estate Literature*, 2021, 29 (1), 60–81.

Callaway, Brantly and Pedro H.C. Sant'Anna, “Difference-in-Differences with multiple time periods,” *Journal of Econometrics*, December 2021, 225 (2), 200–230.

Cao, Yue, Judith A. Chevalier, Jessie Handbury, Hayden Parsley, and Kevin R. Williams, “Distribuonal Impacts of the Changing Retail Landscape,” April 2024. Accessed: 2024-10-31.

Caoui, El Hadi, Brett Hollenbeck, and Matthew Osborne, “The Impact of Dollar Store Expansion on Local Market Structure and Food Access,” *SSRN Electronic Journal*, 2022.

Chipty, Tasneem, “Vertical Integration, Market Foreclosure, and Consumer Welfare in the Cable Television Industry,” *American Economic Review*, June 2001, 91 (3), 428–453.

DellaVigna, Stefano and Matthew Gentzkow, “Uniform Pricing in U.S. Retail Chains*,” *The Quarterly Journal of Economics*, 06 2019, 134 (4), 2011–2084.

Federal Trade Commission, “Non-Compete Clause Rule,” Technical Report, Federal Trade Commission 2023. Accessed: 2024-10-27.

Frerick, Austin, *Barons: Money, Power, and the Corruption of America's Food Industry*, Island Press, 2024.

- Fumagalli, Chiara and Massimo Motta**, “Exclusive Dealing and Entry, when Buyers Compete,” *American Economic Review*, June 2006, 96 (3), 785–795.
- Gentzkow, Matthew**, “Valuing New Goods in a Model with Complementarity: Online Newspapers,” *American Economic Review*, June 2007, 97 (3), 713–744.
- Handbury, Jessie**, “Are Poor Cities Cheap for Everyone? Non-Homotheticity and the Cost of Living Across U.S. Cities,” *Econometrica*, 2021, 89 (6), 2679–2715.
- Hartmann, Wesley R. and Harikesh S. Nair**, “Retail Competition and the Dynamics of Demand for Tied Goods,” *Marketing Science*, September 2009, 28 (5), pp. 926–939.
- Hausman, Jerry, Gregory Leonard, and J. Douglas Zona**, “Competitive Analysis with Differentiated Products,” *Annales d’Économie et de Statistique*, 1994, (34), 159–180.
- Hitsch, Günter J., Ali Hortaçsu, and X Lin**, “Prices and promotions in U.S. retail markets,” *Quantitative Marketing and Economics*, 2021, 19, 289–368.
- Jia, Panle**, “What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retailing Industry,” *Econometrica*, 2008, 76 (6), 1263–1316.
- Johnson, Matthew S., Kurt J. Lavetti, and Michael Lipsitz**, “The Labor Market Effects of Legal Restrictions on Worker Mobility,” Technical Report Working Paper 31929, National Bureau of Economic Research December 2023.
- Kang, Karissa**, “How to Stop Stop Shop’s Anti-Competitive Land-Acquisition Tactics,” March 2022.
- Klein, Benjamin and Kevin M. Murphy**, “Vertical Restraints as Contract Enforcement Mechanisms,” *The Journal of Law Economics*, 1988, 31 (2), 265–297.
- Knight, Samsun**, “Retail Demand Interdependence and Chain Store Closures,” 2023.
- Krueger, Alan B. and Orley Ashenfelter**, “Theory and Evidence on Employer Collusion in the Franchise Sector,” *Journal of Human Resources*, 2022, 57 (S), S324–S348.
- Lafontaine, Francine and Margaret Slade**, “Vertical Integration and Firm Boundaries: The Evidence,” *Journal of Economic Literature*, September 2007, 45 (3), 629–685.
- Le, Quan**, “Network Competition and Exclusive Contracts: Evidence from News Agencies,” 2024.

Lee, Robin S., “Vertical Integration and Exclusivity in Platform and Two-Sided Markets,” *American Economic Review*, December 2013, 103 (7), 2960–3000.

Leslie, Christopher, “Food Deserts and Antitrust Law,” 2021.

Leung, Justin and Zhonglin Li, “Big-Box Store Expansion and Consumer Welfare,” *SSRN Electronic Journal*, 2021.

Lipsitz, Michael and Evan Starr, “Low-Wage Workers and the Enforceability of Non-compete Agreements,” *Management Science*, 2022, 68 (1), 143–170.

Lundberg, Wilford, “Restrictive Covenants and Land Use Control: Private Zoning,” *Montana Law Review*, 1973, 34, 199.

Marvel, Howard P., “Exclusive Dealing,” *Journal of Law and Economics*, 1982, 25 (1), 1–25.

Mehta, Nitin, “Investigating Consumers’ Purchase Incidence and Brand Choice Decisions Across Multiple Product Categories: A Theoretical and Empirical Analysis,” *Marketing Science*, 2007, 26 (2), 196–217.

— and **Yu Ma**, “A Multicategory Model of Consumers’ Purchase Incidence, Quantity, and Brand Choice Decisions: Methodological Issues and Implications on Promotional Decisions,” *Journal of Marketing Research*, 2012, 49 (4), 435–451.

— and —, “A Multicategory Model of Consumers’ Purchase Incidence, Quantity, and Brand Choice Decisions: Methodological Issues and Implications on Promotional Decisions,” *Journal of Marketing Research*, August 2012, 49 (4), 435–451.

Miyauchi, Yuhei, Kentaro Nakajima, and Stephen J Redding, “Consumption Access and Agglomeration: Evidence from Smartphone Data,” 2022.

Moszkowski, Erica and Daniel Stackman, “Option Value and Storefront Vacancy in New York City,” 2022.

Nishida, Mitsukuni, “Estimating a Model of Strategic Network Choice: The Convenience-Store Industry in Okinawa,” *Marketing Science*, January 2015, 34 (1), 20–38.

Nurski, Laura and Frank Verboven, “Exclusive Dealing as a Barrier to Entry? Evidence from Automobiles,” *The Review of Economic Studies*, 01 2016, 83 (3), 1156–1188.

Oh, Ryungha and Jaeeun Seo, “What Causes Agglomeration of Services? Theory and Evidence from Seoul,” 2023.

Posner, Richard A., *Antitrust Law: An Economic Perspective*, Chicago: University of Chicago Press, 1976.

Qian, Franklin, Qianyang Zhang, and Xiang Zhang, “Identifying Agglomeration Spillovers: Evidence from Grocery Store Openings,” 2023.

Rasmusen, Eric B., J. Mark Ramseyer, and John S. Wiley, “Naked Exclusion,” *The American Economic Review*, 1991, 81 (5), 1137–1145.

Relihan, Lindsay E., “Is online retail killing coffee shops? Estimating the winners and losers of online retail using customer transaction microdata,” March 2022, (dp1836).

Rhodes, Andrew and Jidong Zhou, “Consumer Search and Retail Market Structure,” *Management Science*, June 2019, 65 (6), 2607–2623.

Sass, T. R., “The Competitive Effects of Exclusive Dealing: Evidence From the U.S. Beer Industry,” *International Journal of Industrial Organization*, 2005, 23, 203–225.

Segal, Ilya R. and Michael D. Whinston, “Naked Exclusion: Comment,” *American Economic Review*, March 2000, 90 (1), 296–309.

Seim, Katja, “An empirical model of firm entry with endogenous product-type choices,” *The RAND Journal of Economics*, September 2006, 37 (3), 619–640.

Shi, Liyan, “Optimal Regulation of Noncompete Contracts,” *Econometrica*, March 2023, 91 (2), 425–463.

Simpson, John and Abraham L. Wickelgren, “Naked Exclusion, Efficient Breach, and Downstream Competition,” *American Economic Review*, September 2007, 97 (4), 1305–1320.

Sinkinson, Michael, “Pricing and Entry Incentives with Exclusive Contracts: Evidence from Smartphones,” January 2014 2020. Available at SSRN: <https://ssrn.com/abstract=2391745> or <http://dx.doi.org/10.2139/ssrn.2391745>.

Smith, Howard, “Supermarket Choice and Supermarket Competition in Market Equilibrium,” *The Review of Economic Studies*, 01 2004, 71 (1), 235–263.

— **and Øyvind Thomassen**, “Multi-category demand and supermarket pricing,” *International Journal of Industrial Organization*, 2012, 30 (3), 309–314. Selected Papers, European Association for Research in Industrial Economics 38th Annual Conference, Stockholm, Sweden, September 1-3, 2011.

Song, Inseong and Pradeep K. Chintagunta, “A Discrete–Continuous Model for Multicategory Purchase Behavior of Households,” *Journal of Marketing Research*, 2007, 44 (4), 595–612.

Stackman, Daniel and Erica Moszkowski, “Bleaker on Broadway: The Contractual Origins of High-Rent Urban Blight,” 2023.

Stubblefield, Jo Anne, “The Impact of Private Covenants and Equitable Servitudes on Commercial Development and Redevelopment,” *UIC John Marshall Law Review*, 2019, 52, 783.

Sturtevant, Peter J., “Restrictive Covenants in Shopping Center Leases,” *New York University Law Review*, 1959, 34, 940.

Vitorino, Maria Ana, “Empirical Entry Games with Complementarities: An Application to the Shopping Center Industry,” *Journal of Marketing Research*, April 2012, 49 (2), 175–191.

Young, Samuel G., “Noncompete Clauses, Job Mobility, and Job Quality: Evidence from a Low-Earning Noncompete Ban in Austria,” March 2024. 70 pages, posted on SSRN.

Ziff, Bruce and Ken Jiang, “Scorched Earth: The Use of Restrictive Covenants to Stifle Competition,” *WYAJ*, October 2012, 30 (2), 1–N.

Øyvind Thomassen, Howard Smith, Stephan Seiler, and Pasquale Schiraldi, “Multi-Category Competition and Market Power: A Model of Supermarket Pricing,” *American Economic Review*, August 2017, 107 (8), 2308–2351.

A Example of Exclusive Dealing Contracts

Figure 12: Restrictive Covenant in a Safeway Lease Memorandum

2. Restrictions. By virtue of the Lease, Tenant, its subtenants, invitees, customers and employees and parties holding possessory rights in the Premises shall have, and are hereby granted, the use in common with Landlord and other tenants of Landlord and their respective invitees, customers, employees and parties holding possessory rights in the Shopping Center, of "Building Areas" and those portions of Building Areas upon which buildings are not constructed (all of which are referred to as the "Common Areas"). "Building Areas" shall refer to the areas designated as "Jewel/Osco", "Retail Bldg A", Retail Bldg B", "Retail Bldg C" and "Bank" on the Site Plan. The Common Areas are required by the terms of the Lease to be devoted to the purposes of driving and parking motor vehicles, loading and unloading of motor vehicles and vehicular and pedestrian ingress and egress to and from and within the Shopping Center. Additional rights are granted by the Lease to such parties in connection with the construction and maintenance of utility facilities necessary to the Shopping Center. All buildings constructed in the Shopping Center shall be located wholly within the "Building Areas". Additional use and development restrictions and maintenance, development and performance obligations with regard to the Premises and the Shopping Center are specified in the Lease.

In addition to other restrictions and obligations set forth in the Lease, the Lease provides that the types of uses permitted in the Shopping Center shall be of a retail and/or commercial nature found in shopping centers of a similar size and quality in the metropolitan marketing area in which the Shopping Center is located.

The Lease provides, in part, that no premises (nor any part thereof) in the Shopping Center other than the Premises, shall be (i) used or occupied as a retail supermarket, drug store and combination thereof, nor (ii) used for the sale of any of the following: (a) fish or meat (except in prepared form sold by a permitted restaurant operation); (b) liquor and other alcoholic beverages in package form, including, but not limited to, beer, wine and ale; (c) produce; (d) baked goods; (e) floral items; (f)any combination of food items sufficient to be commonly known as a convenience food store or department; and (g) items requiring dispensation by or through a pharmacy or requiring dispensation by or through a registered pharmacist.

In addition, except as expressly permitted in the Lease, none of the following uses shall be conducted in the Shopping Center: (a) offices; (b) funeral homes; (c) any production, manufacturing, industrial, or storage use of any kind or nature; (d) entertainment or recreational facilities; (e) training or educational facilities; (f) restaurants; (g) car washes, gasoline or service stations, or the displaying, repairing, renting, leasing, or sale of any motor vehicle, boat or trailer; (b) dry cleaner with on-premises cleaning; (i) any use which creates a nuisance or materially increases noise or the emission of dust, odor, smoke, gases, or materially increases fire, explosion or radioactive hazards in the Shopping Center; (i) any business with drive-up or drive-through lanes; *(k) second-hand or thrift stores, or flea markets; and (l) any use involving any Hazardous Material (as defined in the Lease).

Source: Cook County Record of Deeds, Document Number 0010276527. This figure is an example of a restrictive covenant. Here, Jewel Osco (parent company Safeway) in Chicago at the Intersection of Ashland and Roosevelt in 2001 limits the competitors in the shopping center. At this location, this portion of the lease memorandums shows Safeway is blocking (a) stores that sell similar products: grocers, drug stores, and liquor stores, (b) stores that also compete for food: restaurants and gas stations, (c) stores that compete for parking: offices, educational facilities, and (d) stores that would bring a different aesthetic to the shopping center: funeral homes, second-hand or thrift stores, stores that create a nuisance or materially increase noise.

Figure 13: Restrictive Covenant in a Dollar General Lease Memorandum

4. So long as the Demised Premises is being operated as a Dollar General store, Landlord covenants and agrees not to lease, rent or occupy, or allow to be leased, rented or occupied, any property now or hereafter owned by Landlord or an affiliate of Landlord, or developed by Landlord or an affiliate of Landlord (for a third party), within a one (1) mile radius of the boundaries of the Demised Premises for the purpose of conducting business as, or for use as, a Family Dollar Store, Bill's Dollar Store, Fred's, Dollar Tree, Dollar Zone, Variety Wholesale, Ninety-Nine Cents Only, Deals, Dollar Bills, Bonus Dollar, Maxway, Super Ten, McCory's, McCory's Dollar, Planet Dollar, Big Lots, Odd Lots, Walgreens, CVS, Rite Aid, or Wal-Mart Supercenter.

This covenant shall run with the land and shall be binding upon Landlord and its affiliates and their respective successors, assigns and successors in title to the Demised Premises and to any such land owned, developed or acquired in the future within a one (1) mile radius. As of the Effective Date, Landlord does not own land within a one (1) mile radius of the Demised Premises. So long as the Demised Premises is being operated as a Dollar General store, Landlord agrees (for itself and its affiliates) not to accept any engagement as a developer for such purposes in violation of the foregoing restrictive covenants within such one (1) mile radius.

Source: Cook County Record of Deeds, Document Number 1532115028. This figure is an example of a restrictive covenant from a Dollar General Lease Memorandum in 2015, for a store at the intersection of 79th and Marquette Avenue. This restrictive covenant limits the landlord and affiliates from leasing to competitors within a mile radius for as long as the Dollar General is in operation on the premises. The restrictive covenant runs with the land, which means that it binds even if the landlord stays the same. The competitors are listed explicitly, and are largely other dollar stores, but also include discount stores and drug stores that sell similar snacks: Family Dollar Store, Bill's Dollar Store, Fred's, Dollar Tree, Dollar Zone, Variety Wholesale, Ninety-Nine Cents Only, Deals, Dollar Bills, Bonus Dollar, Maxway, Super Ten, McCory's Dollar, Planet Dollar, Big Lots, Odd Lots, Walgreens, CVS, Rite Aid, or Wal-Mart Supercenter.

Figure 14: Restrictive Covenant upon Termination of Dominick's Finer Foods Lease

USE RESTRICTION AGREEMENT
October

THIS USE RESTRICTION AGREEMENT ("Agreement") is dated as of September 1, 2015, and is made and entered into by and between RAMCO-GERSHENSON PROPERTIES, L.P., a Delaware limited partnership ("Landlord"), and DOMINICK'S FINER FOODS, LLC, a Delaware limited liability company ("Tenant").

C. On the date hereof, Tenant operates one or more grocery supermarkets within a radius of five (5) miles of the Property. The properties within such radius on which Tenant, any "Affiliate" (defined later) of Tenant, and/or its or their respective successors and assigns may in the future sell "Grocery Merchandise" (defined later), and/or "Prescription Pharmacy Merchandise" (defined later) are together called the "Benefited Properties." "Affiliate" of a named legal person or entity shall mean any legal person or entity that controls, is controlled by, or is under common control with the named legal person or entity.

D. Landlord acknowledges that (i) Tenant or its Affiliate has made a considerable investment in the Benefited Properties, (ii) Tenant or its Affiliate has invested its business reputation in the Benefited Properties, which reputation will be adversely affected if the sales volume of Tenant is negatively impacted, (iii) the addition of other businesses to the Property that may violate the "Restrictions" (defined later) will result in a reduction of Tenant's sales volume and thus impair the benefit of the bargain for which Tenant negotiated in entering into the Termination Agreement, and (iv) Tenant's agreement to terminate the Lease is predicated upon Landlord's acknowledgement of all of the foregoing, and Landlord's agreement to the terms of this Agreement.

1. USE RESTRICTION. Landlord agrees, on behalf of itself and its successors and assigns, that for the "Restriction Period" (defined later) (collectively the "Restriction Periods"), the Property will not be used in violation of the "Restrictions" (defined later). The "Restrictions" are the "Supermarket Restriction" (defined later) and the "Prescription Pharmacy Restriction" (defined later).

1.1. Supermarket Restriction. No portion of the Property shall be used or occupied for a general food market, supermarket, grocery store, meat market, fish market, fruit store, vegetable store, convenience store, or any combination of the foregoing ("Supermarket Restriction"). Notwithstanding the Supermarket Restriction, stores on the Property may devote up to, but not more than, the lesser of (i) five thousand (5,000) square feet of sales area (including aisle space adjacent thereto), or (ii) sales area (including aisle space adjacent thereto) of up to fifteen percent (15%) of the total square footage of the store, to the sale of Grocery Merchandise. "Grocery Merchandise" means, for off premises consumption, baked goods, fish, poultry or meat, liquor or other alcoholic beverages, fruits and vegetables, produce, floral items, pet food, greeting cards, photo processing services, health and beauty aids. Notwithstanding anything to the contrary contained herein, the Supermarket Restriction shall not apply to: (i) a restaurant-bakery, such as Panera or Atlanta Bread Company, of not more than 2,500 square feet in size; (ii) a retailer selling arts and craft supplies, including party supplies and dried floral arrangements; (iii) a beauty supply retailer that specializes in the sale of beauty and/or body care products, cosmetics, health care items, and/or beauty aids; (iv) a retailer selling greeting cards, giftware, stationary and/or keepsake ornaments; or (v) a retailer selling live animals as pets and pet food and related accessories.

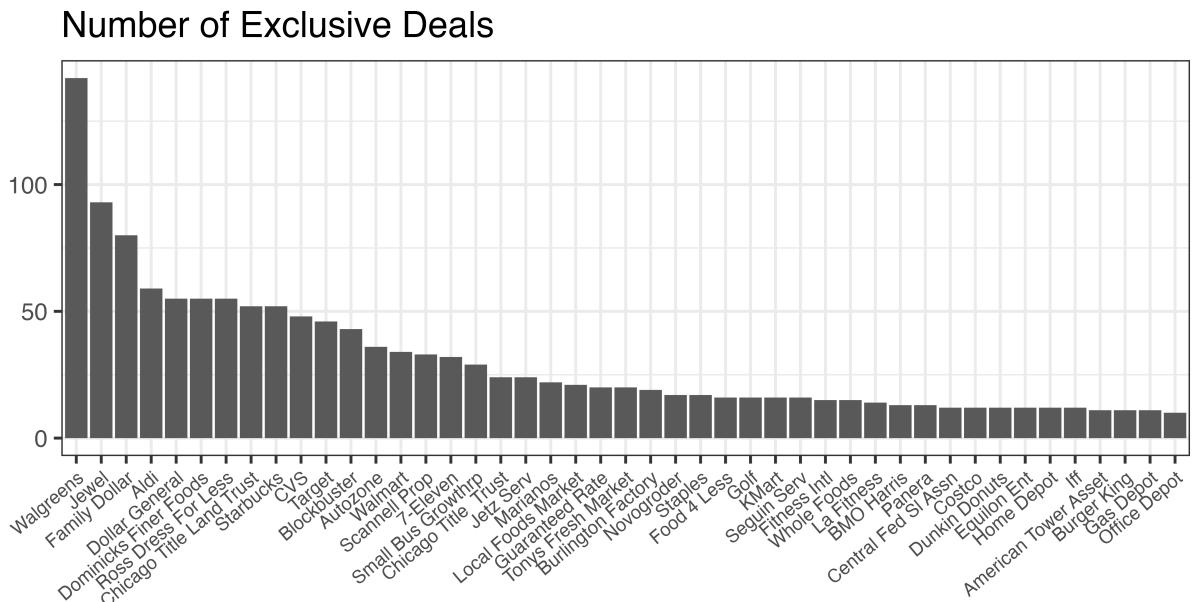
Source: Cook County Record of Deeds, Document Number 1527955057. This figure is an excerpt from a Dominick's Finer Foods Lease Termination in 2015. In 1998, Safeway purchases Dominick's Finer Foods. In 2013, Safeway is in the process of closing all of Dominick's Finer Foods stores. Then, in 2015, Safeway acquires Jewel Osco. At this Dominick's location in 2015, Safeway and landlord agree to put a restrictive covenant on the property to prevent the entry of a grocery store for five years after Safeway leaves the premises ("no portion of the property shall be used as a grocery store"). The restrictive covenant specifies the motivation for the restrictive covenants: the tenant made investments to the property which benefited the landlord ("landlord acknowledges tenant has made considerable investment in the property"), and the tenant would stand to lose business if a competitor opened ("tenant operates a grocery store within 5 miles of the property").

B Figures

Figure 15: Numerator Definitions

Item ID (ex: French's Crispy Fried Jalapenos 5 oz)	Department (ex: Condiments)	Sector (ex: Grocery)
$n = 13,589,708$	$n = 312$	$n = 23$

Figure 16: Retailers with Exclusive Dealing Contracts



Source: Cook County Recorder Office. Figure plots the top retailers by exclusive dealing contracts use recorded at the Cook County Recorder office. Time span 1980-present.

Figure 17: Contents of Exclusive Dealing Contracts



Figure 18

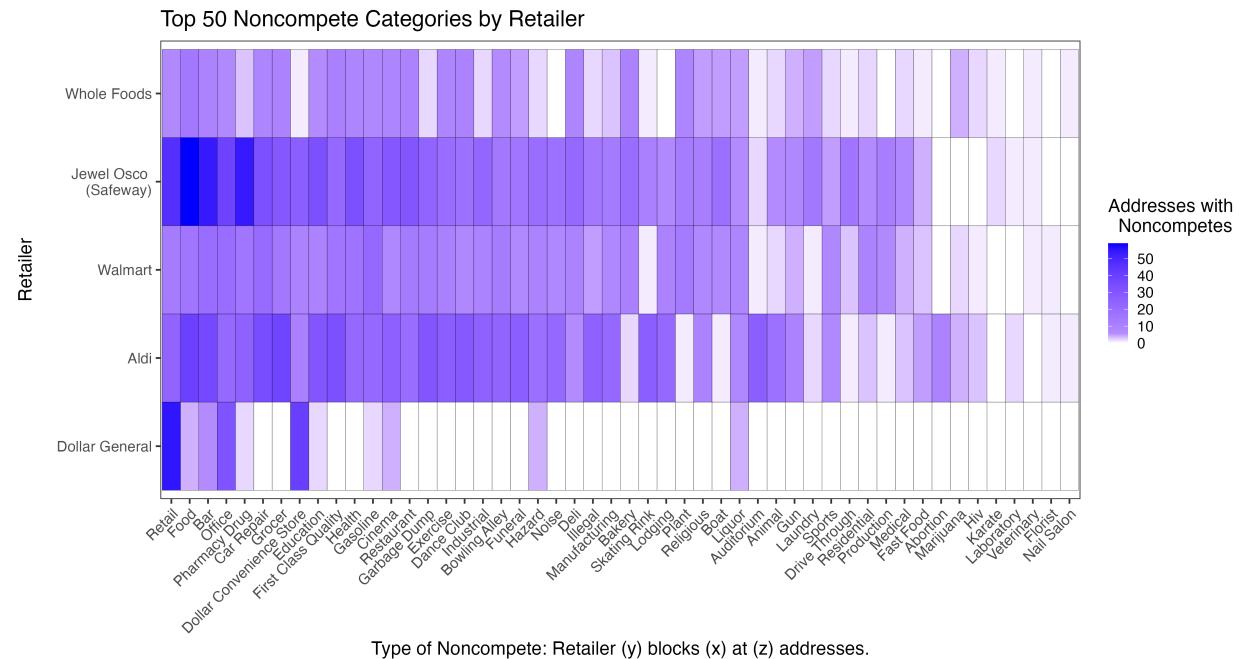


Figure 19: Contents of Exclusive Dealing Contracts: Variation Across Drug Store Chains



Figure 20: Contents of Exclusive Dealing Contracts: Variation Across Drug Store Chains

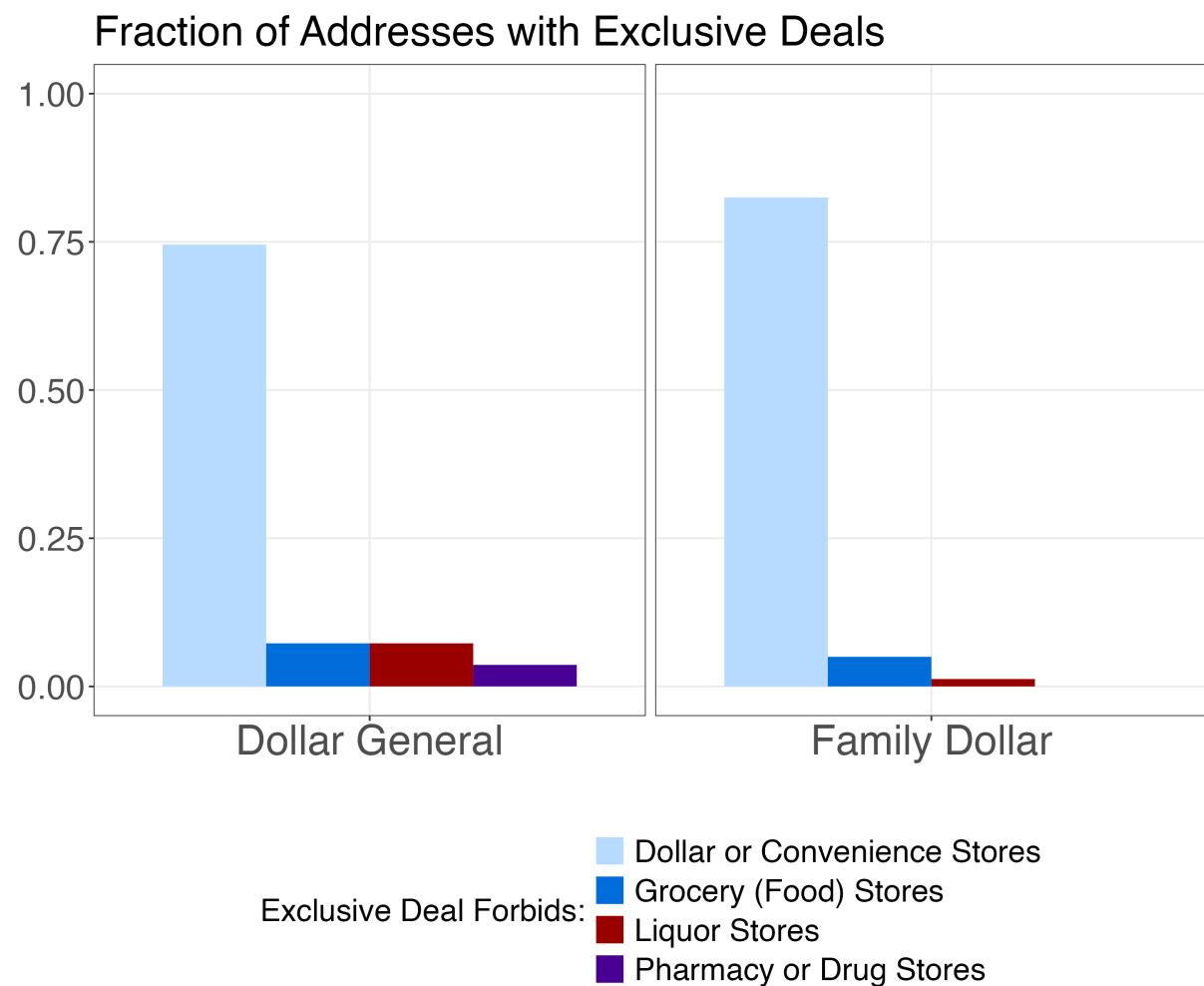
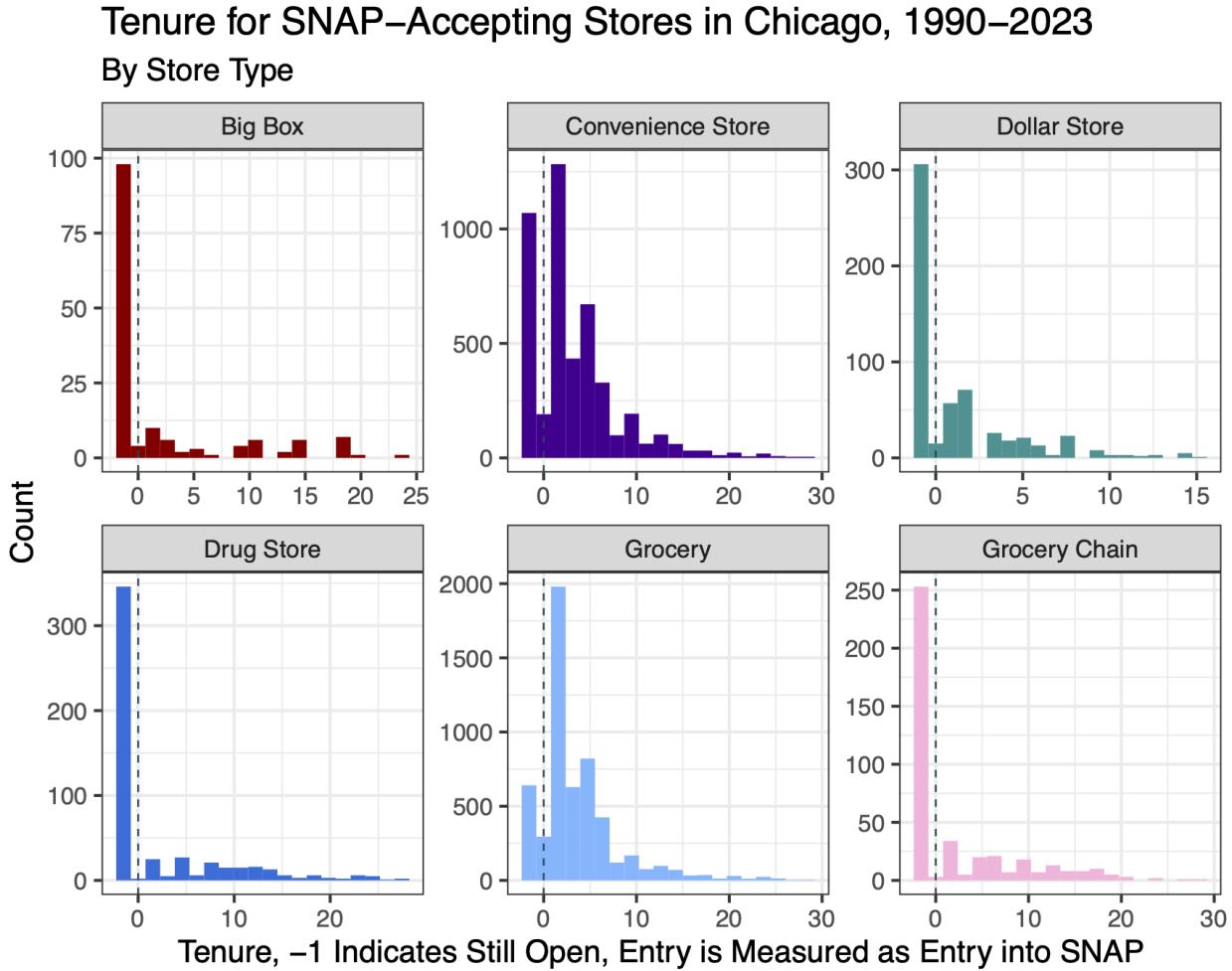


Figure 21: Grocery Store Tenure: Age of the Retailer Location When it Closes



Source: SNAP Retailer Database. Figure plots the number of years each store stays open by store type. At $x = -1$ is the mass of stores that has not yet closed. The vast majority of chain grocery stores or big box stores do not close over the time period. Each row represents a different city, and each column represents a different variable. Most stores do not exit (column 5), and grocery chains have even fewer exits (column 4). Conditional on there being an exit, the grocery tenure doesn't follow super clear patterns, however there are spikes at 5, 15 and 25 years. Exit is especially common in NYC and for small grocers, and so I expect these all have a good guy guarantee and can leave beforehand. In NYC, these tenures are actually on the upper end of the distribution of lease ages at exit compared other types of commercial space in NYC ([Moszkowski and Stackman \(2022\)](#)), even if the NYC grocers exit at a much younger lease age than grocers in other cities. Large grocers tend to have longer tenures than small grocers and convenience stores.

Figure 22: Exclusive Dealing Contracts and Demand Estimate Complementarities



Figure 23: *Source:* Numerator and Cook County Recorder of deeds. Figure overlays blocking patterns from exclusive dealing contract and product demand estimates.

Figure 24: Fixed Costs, Co-Locating Market

Distribution of Fixed Costs

Co-Locating Market

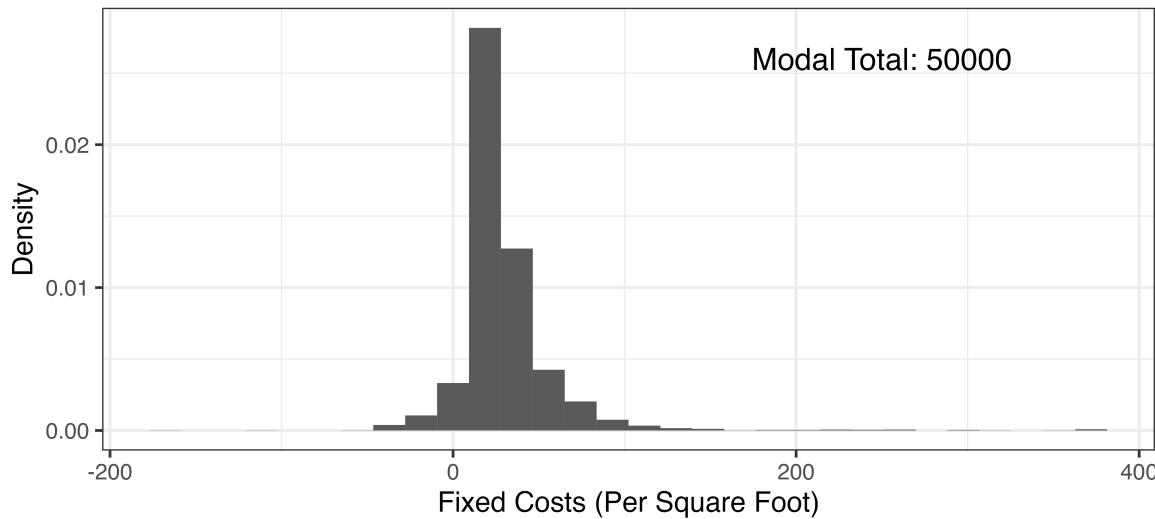
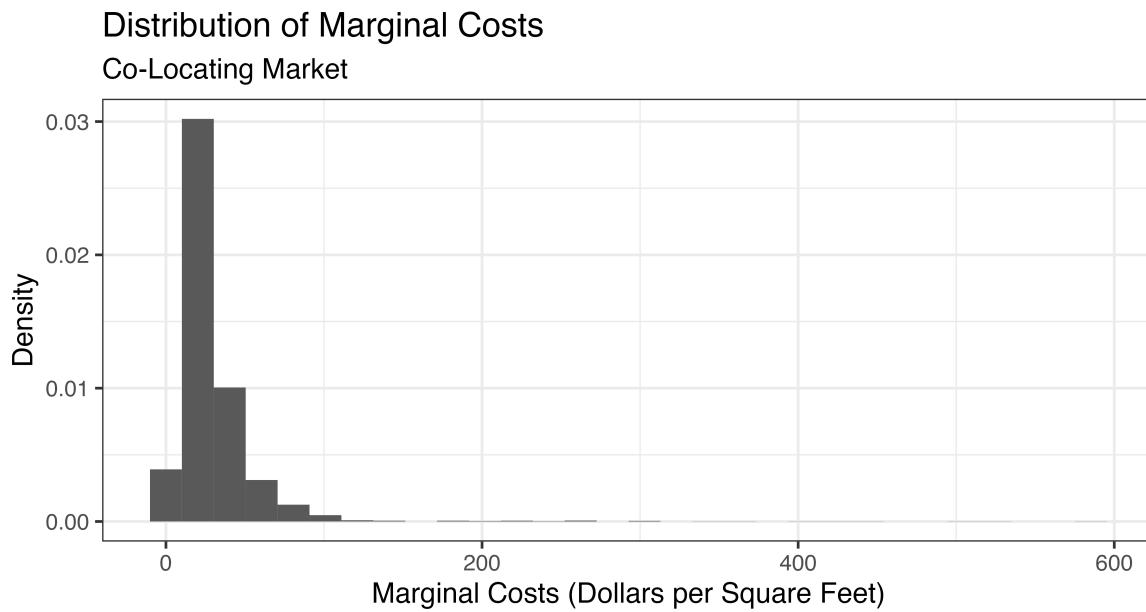


Figure 25: Marginal Costs, Co-Locating Market



C Tables

Table 11: Most Frequent Retailers by Size and Parent Company

Parent	Retailer	Size
Amazon	Whole Foods	Large
Safeway	Jewel Osco	Large
Kroger	Mariano's (Kroger)	Large
Kroger	Food 4 Less	Large
Aldi	Aldi	Medium
Aldi	Trader Joe's	Medium
Costco	Costco	Very Large
Meijer	Meijer	Very Large
Walmart	Sam's Club	Very Large
Walmart	Walmart	Very Large
Target	Target	Large
	Drug Store	Medium / Small
	Dollar	Medium / Small
	Liquor	Small
	Other Food	Medium / Small
	All Other	Medium / Small

Notes The retailers (and parent company, if retailers share a common parent company) included in the analysis are those with the largest market share and most frequent trips. Retailers and potential locations are categorized into coarse location size groups.

Table 12: Chicago Grocery Chains with Exclusive Dealing Contracts

Aldi	Jewel Osco (Safeway)	Trader Joe's
Delray Farms	Mariano's (Kroger)	Whole Foods
Dominicks Finer Foods (Safeway)	Meijer	
Food 4 Less (Kroger)	Save a Lot	
Gordon Food Service Store	Tony's Fresh Market	

Notes: Table reports retailers in Chicago which have exclusive contracts. Data is for Cook County, IL. Data comes from the Cook County office recorder and the SNAP database.

Table 13: Subset of Exclusive Dealing Data

			<i>Num</i>	<i>Frac</i>
Total	→		196	
Own/Lease	→	Own	64	0.33
		Lease	131	0.67
Buy/Sell	→	Buy	8	0.21
		Sell	30	0.79
Type	→	Deed	28	0.19
		Agreement	27	0.19
		Memorandum	77	0.53
		Restriction	11	0.08
		Termination	2	0.01
Grocery Grantor	→	Yes	80	0.5
		No	72	0.54
Covenant Timing	→	Enter	94	0.48
		During	74	0.38
		Exit	13	0.07
		Not Grocery	15	0.08

Table 14: Exclusive Dealing Observed in Chicago

Notes: Source: Cook County Recorder and SNAP. Subsetting to 196 grocery covenants in Chicago, and characterizing the restrictions. The majority of the covenants from leasing agreements between a landlord and a grocery store tenant, the majority of which are entry covenants (half of the covenants overall are entry covenants). Amongst the covenants for properties that are owned by the grocery store, 80% are established when the property is sold: after the grocery store presence is gone from that specific location (whether there was a grocery store to begin with is unclear). These covenants are found in a variety of legal documents: lease memoranda, deeds, agreements, restrictions, easements, and terminations.

Table 15: Exclusive Dealing Observed in Chicago: Subset of Data

			<i>Num</i>	<i>Frac</i>
Total	→		196	
Text Length	→	Short	72	0.39
		Long	113	0.61
Radius	→	Property	104	0.58
		Adjacent Property	44	0.25
		Miles (median 0.5)	30	0.17
Duration After	→	Years (median 8)	62	0.46
		No	72	0.54
Covenant Timing	→	Enter	94	0.48
		During	74	0.38
		Exit	13	0.07
		Not Grocery	15	0.08

Notes: Source: Cook County Recorder. Detail of the extent to which the covenants might restrict competition. Covenants that are longer restrict more store types, and constitutes 60% of the observed covenants. Shorter covenants typically only block the same store type. Next, the covenant can bind at a variety of different radii: the property (typically the shopping center), within a certain mile radius (the median is .5), and the adjacent property. The vast majority of covenants bind at that specific shopping center. Finally, covenants can last even when a grocery store is not present at that location. The median duration is 8 years, and 62 explicitly detail a duration after exit.

Table 16: Hedonic Price Regression

	log(Net Effective Rent) OLS
Exclusive Dealing	0.3221*** (0.0811)
1{Grocer}	0.0458 (0.0533)
log(Transaction Sqft)	-0.0579*** (0.0072)
log(Lease Term)	0.0008 (0.0186)
log(Real Income)	-0.0823 (0.0480)
log(Pop Density)	0.0402* (0.0179)
Share Unemployed	0.1379* (0.0705)
Poverty	0.4996 (489,924.0)
Share Women	-1.331 (304,593.8)
Share Black	-0.4683 (0.4032)
Share White	0.3861 (0.3181)
Share Hispanic	0.3058* (0.1410)
Share Asian	0.4250 (0.3330)
Share Advanced Degree	0.1095 (2,976.9)
Share Travel Time to Work: < 30 mins	-0.0474 (4,862.6)
Share Travel Time to Work: 30-60 mins	5.43×10^{-7} (0.0037)
Housing Occupied	0.1405 (15,739.9)
1{Covenant} 1{Grocer}	-0.4604 (0.5900)
Observations	6,478
R ²	0.41514
<i>Fixed Effects</i>	
Submarket	✓
Year Start	✓
Tract	✓
Space Type	✓
Building Class	✓

Table 17: Source SNAP, Cook County Recorder Office, and Compstak.

Table 18: Regressing Exclusive Dealing Status on Demographics

	Exclusive Dealing Balance (1)
log(Real Income)	0.0153 (0.0466)
log(Pop Density)	-0.0017 (0.0067)
Share Unemployed	0.0242 (0.0622)
Poverty	-0.0703 (227,876.7)
Share Women	0.0062 (5,607.7)
Share Black	-0.1409 (0.2889)
Share White	0.0046 (0.0819)
Share Hispanic	-0.0267 (0.0321)
Share Asian	-0.0054 (0.1143)
Share Travel Less 30	-0.0002 (1,097.3)
Share Travel 30 to 60	0.0039 (4,216.7)
Share Travel 60 to 90	-0.0007 (1,174.7)
log(Housing Rent)	0.0005 (5,496.0)
Housing Occupied	3.28×10^{-6} (21.19)
Housing Vacant	-0.0010 (2,878.2)
Observations	6,252
R ²	0.96883
submarket fixed effects	✓
year start fixed effects	✓
tract fixed effects	✓
space type fixed effects	✓
building class fixed effects	✓
tenant id fixed effects	✓

 Table 19: *Source* SNAP, Cook County Recorder Office, and Compstak.

Table 20: Density of Nearby Competitors

	Log Density of Competitors (Count Per Square Mile)						
	0-.2 mi	0-.5 mi	0-1 mi	0-2 mi	0-5 mi	0-8 mi	All mi
Exclusive Dealing	-0.2792** (0.1135)	-0.1283 (0.1279)	0.1436 (0.1087)	0.0852 (0.0790)	-0.0248 (0.0938)	-0.0615 (0.1001)	-0.0571 (0.1023)
Observations	1,846	2,609	2,932	3,167	3,193	3,193	3,193
R ²	0.65702	0.65095	0.77363	0.83512	0.84039	0.82224	0.54131
zip5 fixed effects	✓	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓	✓
Retailer fixed effects	✓	✓	✓	✓	✓	✓	✓

Notes: Table reports coefficients and 95% confidence interval from regression of number of competitors per square mile on whether or not the store has an exclusive deal, with year, zip5, and retailer fixed effects. We only use grocery chains and big box stores. Competitors are defined as grocery, big box, and drug stores. Data is based on the exclusive deal data from the Cook County recorder office and the retailer location, entry, and exit comes from the SNAP data.

Table 21: Density of Nearby Competitors

	log(density)						
	0-.2mi (1)	0-.5mi (2)	0-1mi (3)	0-2mi (4)	0-5mi (5)	0-8mi (6)	Allmi (7)
Exclusive Dealing	-0.2787*** (0.0963)	0.0750 (0.1481)	0.1448 (0.1087)	0.0650 (0.0625)	0.0473 (0.0704)	0.0172 (0.0698)	0.0393 (0.0725)
Observations	1,846	2,609	2,932	3,167	3,193	3,193	3,193
R ²	0.57742	0.59761	0.75900	0.82751	0.82982	0.80714	0.47704
RHS_zip5 fixed effects	✓	✓	✓	✓	✓	✓	✓
RHS_year_open fixed effects	✓	✓	✓	✓	✓	✓	✓

Notes: Table reports coefficients and 95% confidence interval from regression of number of competitors per square mile on whether or not the store has an exclusive deal, with year and zip5 fixed effects. We only use grocery chains and big box stores. Competitors are defined as grocery, big box, and drug stores. Data is based on the exclusive deal data from the Cook County recorder office and the retailer location, entry, and exit comes from the SNAP data.

D Additional Data Facts

D.1 Retailer Density: Entry and Exit

The change in the consumer responses is almost certainly driven by changes in market structure. Ultimately, the goal is to understand how covenant affects entry, exit, and the density of grocery store locations. As an example of how covenants might affect consumers through changes at market structure, I look at the effect of grocery exit on market structure (to compare with the consumer results above). Specifically, I compare grocery exit with and without covenants. Since covenants are all chains, the control group are chain stores that also exit in Cook county, but those that do not enter with a covenant. The goal is then to compare the market structure within a radius after a grocery store exits with a covenant as opposed to when a grocery store enters without a covenant. The specification run is then the two-way fixed effect difference-in-difference-in-difference:

$$y_{r(i)t} = \sum_{k=-T, k \neq 1}^T \delta_k D_{it} + zip_i + year_t + \epsilon_{it}$$

$$y_{r(i)t} = \sum_{k=-T, k \neq 1}^T \beta_k cov_i D_{it} + cov_i + zip_i + year_t + cov_i year_t + cov_i zip_i + zip_i year_t + \epsilon_{it}$$

Figure 26 shows the results of these event studies. The outcome, $y_{r(i)t}$, is the number of grocery stores within radius $r(i) = 1$ mile of the grocery store entry. The coefficient of interest are β_k and δ_k . The results show that the loss of a grocery store is mechanical in both cases: both coefficients fall to -1 in the first year. However, there is recovery in locations without covenants as compared to locations with covenants.

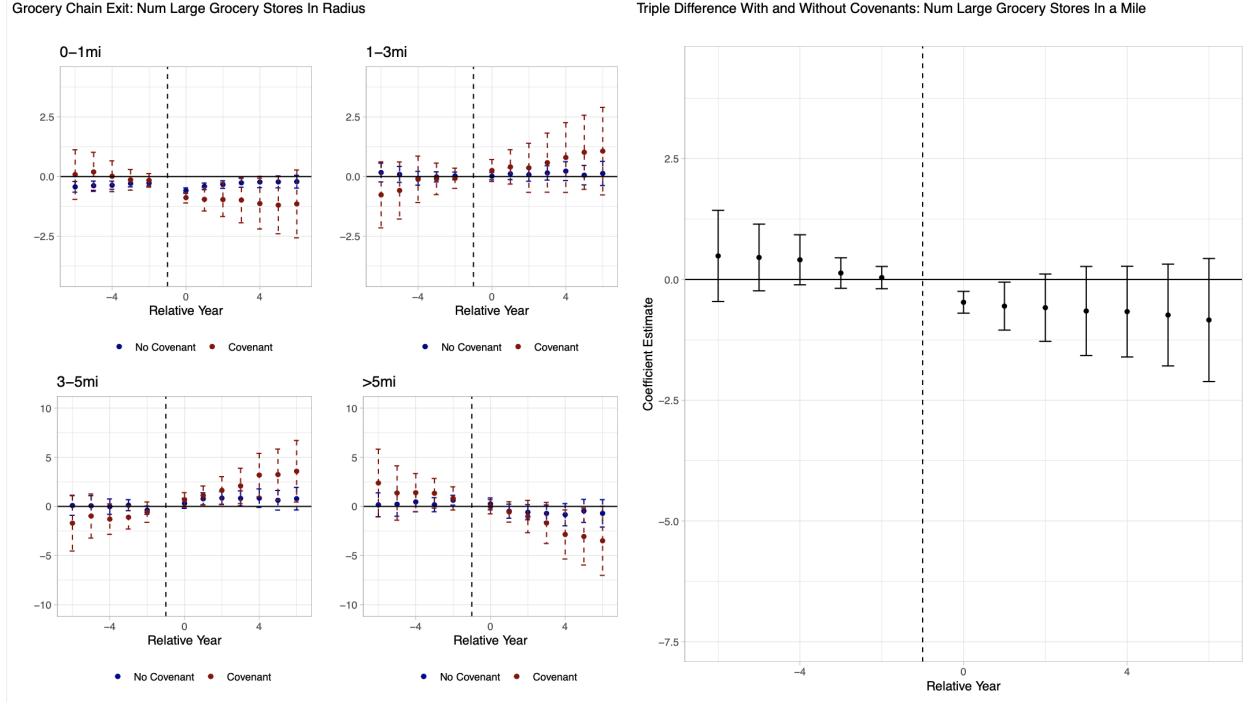


Figure 26: Number of grocers response to grocery store exit.

D.2 Exclusive Deals Predict whether Stores are Substitutes or Complements

Evidence from the dollar store:

$$\log y_{jt} = \alpha + \beta_{j'} 1\{t \in t^*\} 1\{j' \in J\} + \phi_{j'} + \sigma_t + \sum_{k,\tau,r} \beta_{k\tau r} x_{krj\tau} + \epsilon_{ijt} \quad (7)$$

where y_{jt} (approx) revenue store j in market t , or consumer expenditures, and j' is the competing/complementary store.

