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Brokers' contractual arrangements in the Manhattan residential rental market ☆

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ABSTRACT

We bring new evidence to bear on the role of intermediaries in frictional matching markets and on how parties design contracts with them. Specifically, we examine two features of contracts between landlords and agents in the Manhattan residential rental market. In our data, 72 percent of listings involve exclusive relationships between landlords and agents (the remaining 28 percent are non-exclusive); and in 21 percent of listings, the landlord commits to pay the agent's fee (in the other 79 percent, the tenant pays the agent's the fee). Our analysis highlights that these contractual features reflect landlords' concerns about providing agents with incentives to exert effort specific to their rental units and to screen among heterogeneous tenants.

1. Introduction

In many markets with heterogeneous goods and agents, the idiosyncratic match value is an important component of the gains from trade. In these markets, the matching process between buyers and sellers often involve frictions, and, thus, specialized intermediaries emerge to facilitate the exchange. In this paper, we investigate the role of intermediaries in matching markets by examining contracts between landlords and real-estate agents in the Manhattan residential rental market.[1]

Our empirical analysis highlights two concerns that are key to understanding the main contractual features observed in this market: landlords' desires to provide agents with incentives to exert effort specific to their rental units and to screen across heterogeneous tenants. Specifically, more unusual rental units might require agents' specific investments, in line with a broad (primarily theoretical) literature on vertical contracting. One such specific investment requires learning landlords' preferences and tenancy requirements in order to screen tenants on their behalf. Moreover, we argue that a rather unusual contractual term—whether the landlord or tenant should pay the broker's fee—affects tenants' likely schedule of payments, thereby allowing landlords to screen between long-term and short-term tenants.

The Manhattan residential rental market provides an ideal setting in which to analyze the role of intermediaries in matching markets through their contractual arrangements. First, as in typical housing markets, there is a significant heterogeneity across housing units and across tenants. Second, it is a large market, as more than 75 percent of Manhattan households live in rented dwellings,

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[1] We use the terms brokers and agents interchangeably. Formally, the licensing requirements for brokers and salespersons are different, and a licensed salesbroker or associate (licensed) broker typically works for a firm owned by a licensed broker. A licensed broker will typically employ several other licensed brokers and salespersons. In common parlance, these are rental agents.

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and brokers and agents are widely used. Third, the market displays interesting variation in the way that landlords and brokers contract. More specifically, the landlord sometimes lists his unit on a real-estate platform directly and deals with any agent bringing a potential tenant—i.e., an "open" listing—and sometimes designates an exclusive agent to market the rental unit and through whom all tenants must approach the landlord (though co-brokered deals are possible and, indeed, provide the rationale for such listings)—i.e., an "exclusive" listing. Such exclusive relationships require the agent to agree to market the rental unit for a specified period of time (usually 2–3 months), on the owner's stated terms. One such term, which also appears in open listings, specifies whether the agent collects the fee from the tenant or from the landlord—the latter marketed as "no fee" apartments. Thus, four possible contractual arrangements exist—combinations of exclusive/open and fee/no fee.

To understand the role of these contractual features, we use several sources to bring together new data on the Manhattan residential real estate rental market. Our rental listings data, provided by an online platform for renting real estate, suggest that concern about providing incentives to brokers determines landlords' choices between exclusive and non-exclusive arrangements since cross-sectional variation in *apartment characteristics* is related to this choice. As we describe in Section 4, landlords face a trade-off when deciding to enter into an exclusive relationship with an agent. On the one hand, agents are more willing to exert greater effort when advertising exclusive apartments since they reap greater benefits from this effort. On the other hand, agents have renters looking for similar units, and granting exclusivity to one agent may dampen the incentives of others who may otherwise show the apartment. This trade-off varies according to the characteristics of the unit. More precisely, the more atypical the apartment, the less likely it is that an agent has renters looking for similar units. Thus, landlords should be more likely to use exclusive contracts when the apartment is more atypical.

Hence, following Haurin (1988), we construct an index of atypicality for each apartment and find that more-atypical apartments are more likely listed with exclusive deals. The magnitude of this effect is quite large: A one-standard-deviation increase in the value of the index of apartment atypicality increases the probability that a listing is exclusive by 4.6 percentage points, which is approximately a 6.4-percent increase in the probability that the listing is exclusive.

The data also suggest that landlords use exclusive agents for the purposes of screening or steering tenants. This is a rather delicate issue for landlords since some screening criteria would fall foul of fair housing rights in the NYC Human Rights Law[2] (for example, screening families with children or applicants with particular occupations, such as lawyers who might be perceived as more difficult tenants). We find that landlords use exclusive agents for apartments for which the tenant's suitability appears to be a greater concern—for example, almost all furnished units in the data feature an exclusive agent (though this is also consistent with the unit being atypical); similarly, units in co-op and condo buildings, and units that allow pets (where there may be considerable variation in tenants) are more likely to have exclusive listings. We also find that landlords are more likely to sign exclusive agreements when local vacancy rates are lower: This would be surprising if exclusivity contracts existed solely to induce agent effort; however, it is consistent with the idea that landlords are more concerned about selecting particular types of tenants when it is relatively easy to find tenants.

Turning to the other source of variation in contractual arrangements, standard economic theory suggests that whether the landlord or the tenant pays the broker's fee should have no effect on outcomes, as landlords also set the prices at which to rent their apartments. However, if landlords face external constraints over the nominal rental price that they can charge, then which party pays the broker's fee affects the parties' share of the surplus. While the extreme case of rent control does not arise in our data, they do include many rent-stabilized apartments, as we describe in Section 3.[3] For these apartments, landlords do not have full discretion to change rental prices when leases are renewed, and since many tenants anticipate renewing the lease for a rent-stabilized unit, a landlord is likely to prefer a higher initial rent (and to pay the broker's fee).

More broadly, Genesove (2003) finds nominal rigidities in apartment rents even for unregulated apartments and greater rigidities for units housing tenants who continue from the previous year. Hence, when choosing between two identical apartments with a trade-off between the annual rent and the broker's fee—i.e., one apartment with a higher annual rent, but the landlord pays the broker's fee; the other apartment with a lower annual rent, but the tenant pays the broker's fee—tenants expecting to stay in the apartment longer-term should be more willing to pay the broker's fee directly in anticipation of even lower relative rents if they renew their lease. Landlords' desire to attract longer-term tenants varies with market conditions. In particular, future nominal rigidities in rents reduce the value of a longer-term tenant relatively more in "cold" markets—i.e., when the demand is weak relative to supply, and, thus, the vacancy rate is high—than in "hot" markets. Hence, landlords should be more likely to pay brokers' fees when the vacancy rate is high. Indeed, we find that landlords are more likely to pay brokers' fees when the apartment is in a rent-stabilized building and when the vacancy rate is higher. Again, the magnitudes of these effects are sizable: The probability that the tenant pays the broker's fee is 5.3 percentage points lower for a rent-stabilized apartment than for one that is not, corresponding to a 6.7-percent decrease in the probability that the tenant pays the fee. In addition, a one-standard-deviation increase in our estimate of the appropriate vacancy rate increases the probability that the tenant pays the broker fee by approximately 5.8 percentage points, which is approximately a 7.3-percent decrease in the probability that the tenant pays the broker fee.

2. Related literature

Our paper contributes to the literature that investigates the role of intermediaries in search markets. The theoretical literature provides useful insights into the existence and use of intermediaries (for a thorough review, see Spulber (1999)), as well as into their compensation structures and incentives (Inderst and Ottaviani, 2011; Lewis and Ottaviani, 2008; Loertscher and Niedermayer, 2012a,b). However, empirical studies of intermediaries' contractual arrangements have been hampered because data availability is usually limited and because such agreements often display little variation within an industry. Further, in most papers, the intermediary holds inventory (Rubinstein and Wolinsky, 1987; Yavas, 1992; Johri and Leach, 2002; Shevchenko, 2004; Shi and Siow, 2011). Instead, we focus on contractual arrangements between asset owners and intermediaries in a market in which intermediaries' main role is to match buyers and sellers. Finally, Inderst and Ottaviani (2011) study whether buyers or sellers should pay fees for recommendations, as well as the effects of these payments on

[2] See "Fair Housing NYC" at http://www.nyc.gov/html/fhnyc/html/home/home.shtml.

[3] To qualify for rent control, a tenant must have lived continuously in an apartment since July 1, 1971; once vacant, the unit becomes rent-stabilized or is deregulated.

intermediaries' incentives to misinform and mis-sell. We contribute to this literature by studying a setting in which who pays the fee is largely unrelated to the provision of incentives to the intermediaries. Instead, it affects matching by buyers and sellers through changing the schedule of payments, thereby helping one side to screen the other.

The literature on real estate brokerage (see, in particular, Yinger, 1981 and the surveys of Han and Strange, in press; Benjamin et al., 2000a,b; Zietz and Sirmans, 2011) focuses mainly on sales rather than rentals. As we discuss below, there is evidence that the form of the contract between the seller and agent can affect agent behavior, though little work relates this choice to characteristics of the house or to market conditions. Furthermore, sales markets do not feature variation in who pays the broker's fee. In addition, in contrast to a sale, in a rental transaction, the landlord might care about the type of tenant with whom he signs a contract. Indeed, this latter consideration suggests that discrimination is of greater concern in rental markets than in sales markets. The popular press and anecdotal discussions with brokers suggest that parties do not always strictly adhere to fair-housing laws in New York City (Toy, 2007). An extensive literature employs field experiments to document and examine such discrimination in both the U.S. and other markets; recent examples include Ahmed and Hammarstedt (2008), Hanson and Hawley (2011) and Hanson et al. (2011). These studies tend to focus on landlord and tenant characteristics, rather than on market conditions. A literature on real estate sales finds that there is evidence of broker and customer prejudice (Zhao et al., 2006) and that the level of discrimination may depend on the state of the local market and a broker's access to available units (Yinger, 1995). Hanson et al. (2011) suggest that discrimination can be subtle—in particular, through differences in language or tone in emails. Hence, the exclusive use of a particular agent could be another subtle form of encouraging (or discouraging) certain types of tenants. Although our data do not allow us to address this possibility directly, we find some evidence that suggests such behavior.

Our primary results on exclusivity suggest that the form of contracts may affect agent incentives for non-contractible efforts and that the nature of this effort (and the efficiency of more-concentrated agency) might vary with apartment characteristics. Previous work on real estate sales demonstrates a role for broker incentives. Rutherford et al. (2001, 2004), studying the effect of brokers' contracts on their performance, find that houses sell faster under some contracts, but at a higher price under alternative brokers' contracts. Levitt and Syverson (2008) compare brokers' incentives under two sets of circumstances: (1) a real estate agent is hired by others to sell a home; and (2) a real estate agent sells his or her own home. The authors find that homes owned by real estate agents sell for more and stay on the market longer than other houses. Hendel et al. (2009) study the performance of real estate marketing platforms and find a trade-off between selling faster on one platform and paying a lower commission on the other platform, but no difference in final sale prices before commissions to brokers.

Finally, influential theoretical contributions have analyzed the role of exclusive contracts; for thorough reviews, see Whinston (2006) and Rey and Vergé (2008). The most relevant papers for our analysis investigate the role of exclusive contracts in fostering relationship-specific investments.[4] The empirical literature on the role of exclusive contracts is limited; for a thorough survey, see Lafontaine and Slade (2008), Sass and Saurman (1993). Sass and Saurman (1993) and Sass (2005) study the determinants of exclusive contracts in beer distribution, and their findings are consistent with the idea that exclusive contracts protect parties' specific investments. Finally, Asker (2004) finds that exclusive contracts enhance efficiency and do not foreclose rivals. Our paper contributes to this literature by focusing on the determinants of exclusive contracts in a new empirical setting—rental apartments—that provides greater variation across assets and, thus, in parties' investment incentives.

3. Background: real estate brokerage in the Manhattan residential rental market

The Manhattan residential rental market is one of the most important in the U.S., in terms of both total number of units traded and total value. In both respects it is perhaps unusual: Rental housing is much more prevalent in Manhattan than in other U.S. cities,[5] and the Manhattan real estate market is among the most expensive in the world.

The typical Manhattan residential rental transaction involves several steps, providing landlords, renters and brokers with several choices among different contractual agreements. First, the landlord chooses between working with a real estate broker or renting the unit on her own. In contrast to the typical sales arrangement, the landlord does not necessarily promise the agent a commission for completing a transaction; rather, the agent often collects the fee from the renter—typically 15 percent of one year's rent. An exclusive agent tries to find renters directly, often advertising to other brokers through a brokers' multiple listing service (MLS), potentially co-brokering with a renter's agent, and splitting the fee (typically a 50/50 split).[6] If the landlord does not offer a broker an exclusive contract, she will advertise her rental property directly, either to potential renters (through Craigslist, the *New York Times*, listings services, etc.) or to brokers (through similar channels or through a brokers' MLS).[7] In the case of an open listing, any licensed agent in the city has the right to advertise the listing and show the rental unit.[8,9] Second, a landlord advertising an apartment on a brokers' listing service can promise a commission fee (typically either one month's rent or 15 percent of the annual rent) to the tenant's agent; agents then show these apartments to prospective tenants as no-fee or "owner-pay" listings. If the landlord does not offer agents a fee, the open listing is a "fee listing," in which case the agent recoups his costs by charging a commission directly to the prospective tenant. The agent is legally obliged to disclose if he is receiving a fee from the landlord.

[4] See, for example, Marvel (1982) and the more recent literature, including Segal and Whinston (2000), de Meza and Selvaggi (2007) and Che and Sákovics (2004). Much of this literature is focused on exclusivity affecting bargaining and hold-up under an assumption of ex-post efficient trade. Our setting is different, inasmuch as terms of trade are (largely) determined ex-ante, and investments affect the probability of trade. Exclusivity can lead a broker to exert more effort since, in the absence of exclusivity, the agent faces a free-rider problem because investing in advertising and showing an apartment might lead to no return if the apartment is rented through another agent.

[5] According to 2010 Census data, more than 75 percent of Manhattan households live in rented dwellings, in contrast to the U.S. as a whole, where approximately 65 percent of households live in owned units.

[6] Members of the Real Estate Board of New York (REBNY) are obliged to share their listings and allow other agents to co-broker through REBNY's listings service.

[7] The principal listings services at the time our data were collected were brokersNYC/MLX, OLR and RealtyMX. There is substantial overlap in their listings coverage, in part because these share data from the REBNY listing service.

[8] Consequently, when agents advertise open listings, they do not give full details of apartments. Thus, it is hard for renters to view them independently, and before showing potential renters an apartment, agents ask them to sign contracts saying that they will pay a fee or contact the landlord only through the agent.

[9] This description is something of a simplification; however, our data do not allow us to refine further. In particular, our data do not allow us to distinguish open listings, in which the landlord markets to potential tenants directly and in which brokers compete with landlords, from limited listings in which a tenant must use a broker to rent the unit. Further, a landlord might employ a "pocket" listing, in which a landlord is willing to work with only a limited number of brokers with whom the landlord has a relationship. Such listings typically do not appear on a listings service and, thus, are not in our data (and this is, indeed, the case for several large landlords whom we know to have been using such arrangements in this period).

Manhattan's residential rental market is more heavily regulated than that of other U.S. cities. The New York State Controller Thomas Di Napoli reports that two thirds of New York City's two million rental apartments faced some form of regulated rental rates in 2009 (Di Napoli, 2009). On aggregate, rent regulation induces misallocation and increases the prices of non-regulated units (Glaeser and Luttmer, 2003). Moreover, regulated apartments are less likely to be available for rent and are more likely than unregulated ones to be low-rent housing. For these reasons, they are less likely to appear in our listings data. Most relevant for our study are *rent-stabilized* units, comprising approximately 45 percent of New York City rental units and 39 percent of our data.[10] These are apartments for which the NYC Rent Guidelines Board annually determines maximal rental increases for lease renewals.[11] Rent-stabilized apartments include new-construction units, since owners receive tax advantages if they include rent-stabilized units.

4. Landlords' decision-making

We focus on two key decisions of landlords: (1) whether to enter into an exclusive relationship with a broker; and (2) whether to commit to pay a broker's fee or, instead, ask brokers (or the exclusive broker) to collect their own fee from the tenant.

Landlords choose among these different contractual arrangements to find the most suitable tenants to maximize the long-term return of their units. We argue that the provision of incentives to brokers determines landlords' choice between exclusive and non-exclusive arrangements. This is consistent with our empirical finding that cross-sectional variation in *apartment characteristics* affects landlords' choices. More precisely, the literature discussed in Section 2 suggests that exclusive contracts are optimal when the agent's specific effort is key to determining the surplus of the relationship. In the case of real-estate markets, agents' effort has first-order effects on the time that the unit remains vacant and on the rent that the unit can command. In particular, an agent makes specific efforts to market an apartment: Viewing the unit to take photographs for advertising purposes; advertising and showing the unit to interested renters; learning building and neighborhood amenities in order to convey them to potential renters; and, possibly, learning landlords' preferences (for example, understanding a landlord's requirements in terms of guarantors, financial background, etc.). Some investment is at the level of the landlord or building rather than at the level of individual units, and, thus, landlords tend to use the same exclusive agents for several units, and agents tend to specialize in certain types of rental units. This specialization also reflects the fact that agents show several similar units to renters, seeking the best matches.

These arguments suggest that landlords face a trade-off when deciding to enter into an exclusive relationship with an agent. On the one hand, in the absence of any exclusive relationship, an agent may show an apartment since he may have renters looking for similar units, but his incentives may be dampened if another agent is awarded an exclusive contract (since, in this case, the agent would have a co-broker and earn only a fraction of the fee—typically half). On the other hand, an agent is more willing to exert greater effort to advertise exclusive apartments (for standard free-riding arguments). Presumably, this trade-off varies according to the unit's characteristics. Specifically, the more atypical the apartment, the less likely it is that the agent has renters looking for similar units and the more important may be the agent's specific effort; thus, it becomes more important for the landlord to contract with one agent to market it (even at the cost of reducing the incentives of other agents to do so).

To examine the landlord's decision regarding atypical units, as described in detail below, we consider several indications of how unusual an apartment is, and we construct an index of atypicality for a unit. We find evidence that landlords are, indeed, more likely to use exclusive contracts when a unit is more atypical, which supports the suggestion that landlords might use exclusive relationships for specific investments.

Furthermore, a landlord might have concerns (both legal and more questionable) regarding the kind of tenant that occupies a unit. Such concerns could depend on apartment characteristics—for example, furnished and "high-end" units, or those in co-op and condo buildings, where the landlord is more likely to be an individual and where applications might be more involved—or on potential tenants—for example, the pets that tenants may bring into "pet friendly" units—as well as market conditions. We find some suggestive evidence consistent with the increased use of exclusive agents in circumstances in which the landlord might have a heightened desire to screen tenants.

Of course, landlords choose not only a contractual arrangement with brokers, but also the prices at which to rent their apartments.[12] Hence, simple economic theory suggests that whether the landlord or the tenant pays the broker's fee should have no effect on outcomes (in the same way that tax incidence does not depend on where the revenue is collected). However, several features of this market suggest that who pays the fee may make a difference.

If landlords face external constraints to the nominal rent that they can charge, then who pays the broker's fee affects parties' share of the surplus. Genesove (2003) finds nominal rigidities in apartment rents and greater rigidities for units whose tenants continued from the previous year. As we described in Section 3, this type of price rigidity applies specifically to rent-stabilized apartments. Thus, the landlords of these rent-stabilized apartments may prefer to simultaneously pay brokers' fees and set higher *initial* rents. This is consistent with our empirical finding that landlords are more likely to pay the brokers' fees for units in rent-stabilized buildings.

Moreover, when choosing between two identical apartments with a trade-off between the annual rent and the broker's fee—i.e., one apartment has a higher annual rent, but the landlord pays the broker's fee; the other apartment has a lower annual rent, but the tenant pays the broker fee—tenants expecting to stay in the apartment longer-term should be more willing to pay the broker's fee directly, to the extent that they expect some nominal rigidity in the rental price. Similarly, credit-market imperfections imply that tenants and landlords may have different preferences for paying the fixed up-front broker's fee versus spreading it over the life of the lease. Landlords' desire to attract longer-term tenants is likely to vary with market conditions. Presumably, future nominal rigidities in rents reduce the value of a longer-term tenant relatively more in "cold" markets—i.e., when the demand is weak relative to supply, and, thus, the vacancy rate is high—than in "hot" markets. This is consistent with our empirical finding that landlords are more likely to pay the brokers' fees in cold markets.

[10] Several different forms of regulation affect Manhattan rental markets. Perhaps the most popularly known is *rent control*, which establishes the maximum allowable rent that the landlord can charge the tenant. However, this form of regulation applies to apartments that have been continuously rented by the same tenant since July 1, 1971. Hence, our data do not feature such units.

[11] For example, in our data period, the Rent Guidelines Board, in Apartment & Loft Order # 41, determined on June 21, 2009 that for one-year lease renewals for rent-stabilized apartments where the landlord provides heat, the maximum by which the base rent could rise for a new lease commencing between October 1, 2009 and September 30, 2010 was three percent.

[12] More precisely, the landlord sets the listed price (this is the price that we observe in our data). There may be negotiation over the transacted price; however, anecdotally, the correlation between listed and transacted rental prices is high, and, most often, units are rented at the listed price.

5. Data

We combine several distinct datasets to obtain a broad picture of Manhattan's rental markets. The main one is a unique dataset on the New York rental market provided by MLX, an online platform for renting and buying real estate (www.mlx.com; in the earlier period of our sample, the name of the platform was brokersnyc.com). The website is one of the leading platforms for rental listings in New York City. It is used primarily by management companies and landlords' brokers to advertise their openings, and by renters' brokers to search among those openings.

Each listing includes key *apartment* characteristics—such as the Monthly Rent, the Number of Bedrooms, the Number of Bathrooms, etc.—and two binary variables that describe the contractual structure of each listing: (1) Exclusive, which is an indicator variable equal to one if the broker is the exclusive agent of the landlord, and zero if the listing is open; and (2) Fee, which is an indicator variable equal to one if the broker collects his own fee from prospective tenants, and zero if the landlord commits to pay the broker's fee (i.e., a no-fee apartment). The original data contain some old apartment listings; however, we restrict our analysis to data from the most recent 12-month period covered in the data (May 2009–April 2010) since there are many more missing values in the oldest listings. We also drop observations for which the monthly rent is below $500 or above $30,000, as we suspect that most of these rents are likely misreported.[13]

We complement this main dataset on apartment listings with additional data on Manhattan housing markets. First, from the website of the New York City Department of City Planning, we obtain PLUTO, an extensive land use and geographic database at the tax lot level derived from data maintained by several city agencies.[14] PLUTO reports several variables on *building* characteristics, such as the number of floors, the number of units in the building (Building Units), and the year built, from which we construct two indicator variables: Prewar, equal to one if the building was built before 1940 and zero otherwise; and New Construction, which takes the value one if the building was built in 2008 or later. The dataset further reports the major use of structures on the tax lot, from which we construct dummy variables for whether or not the building is a Co-op and for whether or not the building is a Condo; the remaining buildings, which constitute the majority of our sample, are classified mainly as elevator or walk-up apartments. PLUTO also includes the building address, which allows us to match the apartment *and* building characteristics of each listed apartment. This match is reasonably accurate, although not perfect, as we match 72 percent of the May 2009–April 2010 apartment listings. A simple comparison of the characteristics of the listings that we are able to match to their building characteristics and of those that we are unable to match indicates that the matched data are a random sample of the initial ones: The summary statistics are almost identical between the matched and unmatched samples.

Second, from the website of the New York City Rent Guidelines Board, we obtain a list of rent-stabilized buildings.[15] With these data, we create an indicator variable Rent Stabilized, equal to one for any apartment in our listing data, the exact address of which appears in this list of rent-stabilized buildings, and zero otherwise.

Finally, we obtain monthly aggregate reports for the period January 2008–April 2012 on Manhattan rental markets from the website of Citi Habitats.[16] These data report the Vacancy Rate for each month-neighborhood pair, and the Average Rent for each month-neighborhood-apartment size (i.e., studios, one-bedroom, two-bedroom, three-bedroom apartments) triple.

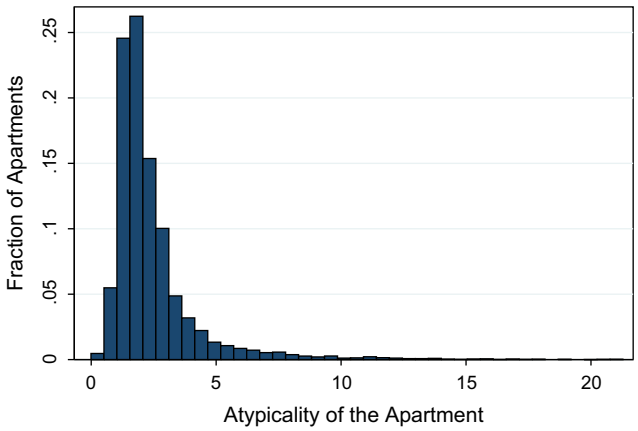

Fig. 1. Histogram of the measure of atypicality of the apartment in the data.

We use these data to construct further characteristics that our description of landlord decision-making in Section 4 suggests should be relevant in explaining the variation in contractual arrangements. Specifically, we construct a measure of atypicality for each unit and a measure of local market conditions more stratified than Vacancy Rate.

5.1. A measure of atypicality.

We follow Haurin (1988) and define an index of Atypicality as:

$$Atypicality_i = \beta\left|h_i - \bar{h}\right|, \tag{1}$$

where h_i is the vector of observable characteristics of apartment i; $\bar{h}$ is the vector of average observable characteristics in the sample; and β is the vector of implicit hedonic prices of observable characteristics derived from the hedonic regression

$$p_i = \beta h_i + \epsilon_i,$$

in which the dependent variable p_i is the monthly asking rent of the listing.

Fig. 1 displays the histogram of the index, showing that it exhibits substantial variation and a long right tail: The average equals 2.44, the standard deviation 1.87 and the skewness 3.70. Most apartments are quite typical—one-bedroom, one-bathroom, unfurnished apartments in apartment buildings on the Upper East Side—whereas other apartment types are less common—large apartments in co-ops in the Financial District or in Harlem, in particular. More specifically, the most important components of the Atypicality index are related to the size of the apartment: the number of rooms and the number of bathrooms.

5.2. Submarket vacancy rate.

The Vacancy Rate variable, while providing a useful measure, is perhaps coarse since apartments of different types may belong to different submarkets, each with its own supply and demand. Therefore, we seek a more stratified measure that captures variation in submarkets. Specifically, for each neighborhood i, we estimate by OLS the parameters $\{\beta_i, \beta_{i0}, \beta_{i1}, \beta_{i2}, \beta_{i3}\}$ of the equation:

$$\begin{aligned} Vacancy\ Rate_{it} = \beta_i + \beta_{i0} Av.\ Rent\ Studio_{it} + \beta_{i1} Av.\ Rent\ 1br_{it} \\ + \beta_{i2} Av.\ Rent\ 2br_{it} + \beta_{i3} Av.\ Rent\ 3br_{it} + \epsilon_{it}. \end{aligned} \tag{2}$$

[13] These thresholds represent approximately the first and the 99th percentile of the distribution of rents. Our results do not change when we include these observations.

[14] http://www.nyc.gov/html/dcp/html/bytes/applbyte.shtml.

[15] http://www.housingnyc.com/downloads/resources/sta _bldngs/2010ManhattanBldgs.pdf.

[16] http://www.citi-habitats.com/market.php.

Table 1
Summary statistics.

Variable	Mean	St. Dev.
Monthly Rent	3441.764	3184.35
Number of Rooms	3.341	1.293
Number of Bedrooms	1.156	0.730
Number of Bathrooms	1.267	0.589
Furnished	0.134	0.341
Atypicality	2.443	1.872
Fee	0.790	0.407
Exclusive	0.716	0.450
Building Units	121.256	148.321
Prewar Building	0.595	0.490
Co-op	0.097	0.295
Condo	0.287	0.452
New Construction	0.004	0.064
Building Number of Floors	14.017	12.535
Rent-Stabilized	0.385	0.486
Vacancy Rate Submarket	−6.378	10.919

Notes: This table provides summary statistics of the main variables in the dataset, which consists of 15,524 observations.

We then construct the Vacancy Rate Studio$_{it}$ as β_{i0} Av. Rent Studio$_{it}$, and similarly for the other apartment types. We then match these additional variables to each listing and define the Vacancy Rate Submarket as the vacancy rate of its corresponding neighborhood-month-apartment type triple—i.e., the Vacancy Rate Submarket equals the Vacancy Rate 1br for a one-bedroom apartment, and similarly for other apartment types. While we acknowledge that our measure Vacancy Rate Submarket may suffer from some potential biases (i.e., measurement error), the absence of easily-available alternatives makes it appealing to capture the stratification into different housing submarkets, as identified by Citi Habitats. Further advantages of our measure are: (1) it exploits the differential mix of apartment types across neighborhoods by estimating Eq. (2) separately for each neighborhood; and (2) it exploits a longer time-series (i.e., January 2008–April 2012) than the time span of our listing dataset.[17]

Table 1 provides summary statistics of the main variables used in the empirical analysis. The final dataset contains more than 15,000 listings, distributed over all Manhattan areas. The average listing is for a one-bedroom apartment—one bedroom, two additional rooms (typically, a living room and a kitchen) and one bathroom—in a prewar, 15-floor elevator building with 120 apartments. However, the dataset contains listings of apartments of many different sizes, as well as in buildings of many different sizes. The average rent is approximately $3450 per month, with a large variation, as well. Interestingly, there is substantial variation in landlords' agreements with brokers: 63 percent of all listings are Exclusive and Fee; 16 percent are Non-Exclusive and Fee; 12 percent are Non-Exclusive and No-Fee; and nine percent are Exclusive and No-Fee. Moreover, our measure of (sub) market conditions Vacancy Rate Submarket also exhibits large variation: At the aggregate neighborhood level, vacancy rates can more than double in the 12-month period, and rents can change by as much as 15 percent in some submarkets, with larger apartments exhibiting larger variations than smaller ones.

The data provide a comprehensive description of the Manhattan residential rental market and are well-suited to investigating how contractual agreements between landlords and brokers vary with apartment and building characteristics, as well as with market conditions. Even with all these advantages, however, the datasets pose some challenges. First, the data we have are not exhaustive for all Manhattan rentals and are likely to exclude some listings—for example, they are likely to exclude sublets that typically do not employ brokers but work through informal online listings. Similarly, some landlords who wish to avoid the possibility of co-brokering or prefer working only with familiar agents will necessarily seek to avoid appearing on an online platform such as the one we use. Our data consist of apartments listed by management companies and by landlords' brokers, and, thus, they represent a selected sample of Manhattan real estate. However, conversations with Manhattan real-estate brokers indicate that our data are representative of the Manhattan rental market. In the Appendix, we assess the representativeness of our data by comparing them with housing information from the U.S. Census. The comparison indicates that our database is broadly representative of the Manhattan rental market, although the apartments in our sample are, on average, smaller and more expensive than the average Manhattan apartment reported in the Census. Second, the listings do not report any landlord characteristics. In particular, they do not allow us to identify a landlord who chooses to list units in one building as open listings and through an exclusive agent in another. Finally, in our view, the main limitation is that the data do not report transaction outcomes. Specifically, we do not know tenant characteristics, how long each apartment remained on the market and the price at which it was eventually rented. Hence, one important limitation of our analysis is that we cannot evaluate the ex-post performance of the different contractual features that we focus on.

6. The role of exclusive agreements

In this section, we report descriptive patterns of the use of exclusive agreements. These patterns suggest that exclusive agreements are more likely to be used for more-atypical apartments, according to both observable and unobservable characteristics. This is consistent with the idea that unusual units require specific effort and that an exclusive agreement can induce an agent to provide such effort. Further, we find some suggestive evidence that landlords more interested in screening potential tenants are more likely to use exclusive agreements.

Table 1 shows that a minority of the listings—13 percent—refer to furnished apartments. Interestingly, 94 percent of these listings are Exclusive. This might be seen as consistent with both of these explanations of exclusive agreements since a landlord may have greater concerns regarding the tenant's behavior and since a furnished unit is likely to be relatively idiosyncratic. Similarly, listings that allow pets are significantly more likely to be Exclusive than

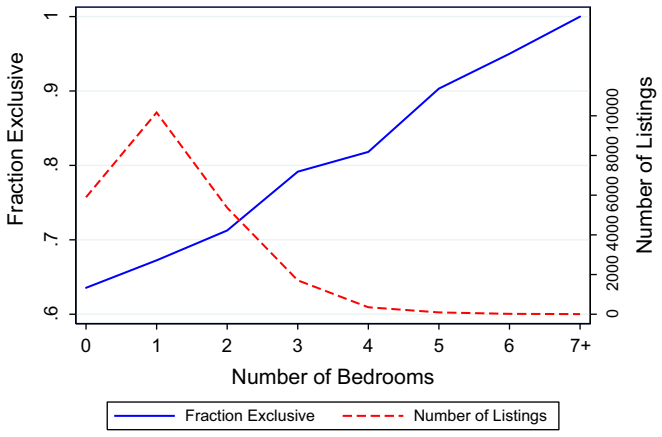

Fig. 2. The figure displays the fraction of apartments with exclusive agreements (left scale) and the number of listings (right scale), by number of bedrooms.

[17] We have also performed our empirical analysis using the neighborhood-month aggregate Vacancy Rate, as reported by Citi Habitats, and found results similar to those reported in later sections.

those that do not (76 percent versus 53 percent), suggesting, again, that landlords may be more likely to choose an exclusive agreement when concerned about tenants' behavior. Finally, Co-op boards are notoriously selective and require complicated application processes; similarly, units in Condos are more likely to be let by individual landlords rather than by large residential property owners, thus potentially involving more-idiosyncratic landlord preferences and processes. The raw correlations are consistent with these intuitions: 92 percent of Co-ops and 89 percent of Condos are Exclusive, compared to 60 percent of other apartments.

One way to investigate the role of the atypicality of an apartment is to compare apartments based on their size. The average apartment in Manhattan is notoriously small. In Fig. 2, we plot the number of listings by number of bedrooms (dotted line): Small apartments are the norm, whereas larger apartments are more atypical. Interestingly, in Fig. 2, we also plot the fraction of Exclusive listings by the number of bedrooms (solid line). Larger, more "niche" apartments are more likely to have exclusive agreements in which the broker collects the fee from the prospective tenant.

A further way to analyze whether the atypicality of an apartment matters for brokers' contractual arrangements is by classifying apartments by their listed monthly rent. Since the correlation between number of bedrooms and apartment rent is equal to 0.536, exclusive agreements are also employed more frequently for more-expensive apartments: The average monthly rent of an exclusive rental is $3,789, whereas the average monthly rent of a non-exclusive rental is $2,564. To control for the effect of size, in Fig. 3 we plot the fraction of one-bedroom Exclusive listings by quintile of monthly rent. The patterns are clearly non-monotonic: One-bedroom apartments in the tails of the distribution—i.e., either the cheapest or the most expensive ones—are more likely than apartments in the middle of the distribution to have exclusive listings. If extreme prices (either very low or very high) arise because of unusual features of the rental units, landlords are more likely to use exclusive agreements for them.

6.1. Regression analysis

We use the following specification to investigate what is driving the use of exclusive agreements and, in particular, the extent to which these are more likely to be employed for more-atypical apartments:

$$\text{Exclusive}_i = f(\beta_0 + \beta_A\,\text{Atypicality}_i + \text{Vacancy Rate Submarket}_i + \beta_X X_i). \quad (3)$$

The dependent variable Exclusive_i is equal to 1 if listing i is exclusive, and 0 otherwise. The main variables of interest are Atypicality, our measure of apartment idiosyncrasy defined in Eq. (1) and Vacancy Rate Submarket, as described in Section 5. X_i is a set of variables specific to each apartment i, such as Number of Bedrooms, Number of Bathrooms and other characteristics of the unit and its building. We also include in our specifications zipcode fixed-effects and month-of-listing fixed-effects to capture any unobserved zipcode- and month-specific factor, thus allowing a cleaner identification of apartments' Atypicality. Letting f be the c.d.f. of the normal distribution, Eq. (3) is a simple probit regression that we estimate by maximum likelihood.

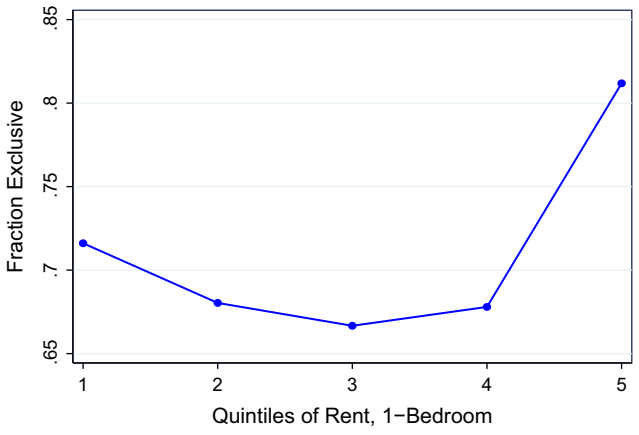

Fig. 3. The figure displays the fraction of one-bedroom apartments with exclusive agreements by quintiles of rent.

Table 2
Exclusive agreements.

Exclusive	(1)	(2)
Atypical	0.0199***	0.0185***
	(0.0075)	(0.0072)
Vacancy Rate Submarket	−0.0047*	−0.0051**
	(0.0024)	(0.0024)
Rent Stabilized	−0.0612***	−0.0592***
	(0.0150)	(0.0150)
Log(Monthly Rent)	−0.0007	0.0033
	(0.0325)	(0.0327)
Co-op	0.1775***	0.1774***
	(0.0075)	(0.0075)
Condo	0.2715***	0.2698***
	(0.0152)	(0.0152)
Number of Rooms	0.1560***	0.1558***
	(0.0153)	(0.0153)
Number of Bedrooms	−0.1188***	−0.1195***
	(0.0122)	(0.0123)
Number of Bathrooms	−0.0465**	−0.0449**
	(0.0205)	(0.0202)
Floor Number	0.0009	0.0009
	(0.0007)	(0.0007)
Penthouse	−0.0925*	−0.0906*
	(0.0507)	(0.0502)
Furnished	0.1289***	0.1289***
	(0.0216)	(0.0215)
Pet Allowed	0.0780***	0.0785***
	(0.0211)	(0.0211)
Elevator	−0.0328**	−0.0331**
	(0.0159)	(0.0159)
Elevator and Doorman	0.1747***	0.1736***
	(0.0224)	(0.0223)
Building Units	−0.0004***	−0.0004***
	(0.0001)	(0.0001)
Prewar Building	0.1880***	0.1895***
	(0.0224)	(0.0224)
New Construction	0.1476***	0.1414***
	(0.0364)	(0.0426)
Building Number of Floor	−0.0014	−0.0013
	(0.0012)	(0.0012)
Zipcode fixed effects	41	41
Monthly fixed effects	11	11
School District fixed effects	0	5
Observations	15,524	15,524

Notes: Specifications (1)–(2) present the marginal effects calculated from probit regressions. The dependent variable is equal to one if the listing is exclusive, and zero otherwise. The estimated regressions further include binary indicator variables for whether the building is a landmark and for whether the building is in an historic district. The standard errors in parentheses are clustered at the neighborhood level.
* Significance at the 10 percent level.
** Significance at the 5 percent level.
*** Significance at the 1 percent level.

Table 2 reports the estimates of the marginal effects obtained from the estimated coefficients of the probit model. Specification (1) includes 11 month-of-listing and 41 zipcode fixed-effects, and specification (2) further adds five school-district fixed-effects. The marginal effects of the Atypicality are significantly larger than zero in both specifications, indicating that more-atypical apartments are more likely to have exclusive agreements. Moreover, the estimates reported in Table 2 imply that the proxy for the atypicality of the apartment is also economically significant. According to specification (2), a one-standard-deviation increase in the value

of Atypicality increases the probability that a listing is exclusive by 4.6 percentage points, which is, approximately, a 6.4-percent increase in the probability that the listing is exclusive.

The marginal effects of other explanatory variables confirm the previous descriptive evidence. Specifically, condos and co-ops, as well as larger apartments, are more likely to be listed as exclusive. Similarly, furnished rentals are almost always exclusive. The positive coefficient on Prewar Building and the negative coefficient on Building Units perhaps supply further evidence consistent with landlords using exclusive agreements for more-atypical units. Prewar buildings tend to be more idiosyncratic and feature more heterogeneous units, whereas units in buildings with very many units (the largest building in our data contains 1,118 units) are likely to be "cookie-cutters" that require relatively little specific effort on the part of agents, and such buildings are likely to have dedicated marketing resources. It is noteworthy that Rent-Stabilized apartments are less likely to be listed as exclusive. This may be consistent with the view that Rent-Stabilized apartments are appealing to renters, and so marketing them may require less effort from agents. Conversely, units in newly-constructed buildings may require agent effort that is specific to these new units.

In addition, there is suggestive evidence that landlords are more likely to use exclusive agents for more-atypical units when concerns about screening tenants are more pronounced. In particular, they do so for co-op and condo units, for units that allow pets, for higher-end tall buildings with doormen, and for large units on high floors. In addition, the negative marginal effects of the Vacancy Rate Submarket suggests that landlords are less likely to use exclusive agents to screen tenants in "cold" markets.

7. The Role of fee listings

In this section, we report descriptive patterns on the use of Fee listings. Specifically, we document that the broker is more likely to collect the fee from the tenant than from the landlord when the apartment is not rent-stabilized and when the Vacancy Rate Submarket is lower. Moreover, the broker is more likely to collect the fee from the tenant than from the landlord in Co-op and Condo buildings. Overall, these patterns suggest that an important role of Fee listings is to attract longer-term tenants.

The simplest tests are suggestive: Among listings of rent-stabilized apartments, 74 percent are Fee, whereas 82 percent of non rent-stabilized apartments are Fee (the p-value of the t-test of the null hypothesis that the difference is equal to zero is 0). Similarly, our measure Vacancy Rate Submarket is negatively correlated with the submarket's fraction of Fee listings, although this correlation is quite low: −.03. Moreover, 88 percent of Co-ops and 84 percent of Condos are Fee, compared to 75 percent of other apartments.

7.1. Regression analysis

We further estimate regression equations similar to those reported in Table 2. However, the dependent variable is now Fee: an indicator equal to 1 if the listing specifies that the broker collects his fee from the prospective tenant, and 0 if the landlord pays brokers' fees. The main variables of interest are now the Vacancy Rate Submarket and whether the apartment is Rent-Stabilized. As before, we control for a set of variables specific to each apartment i and to its building. We also include in our specifications zipcode fixed-effects and month-of-listing fixed-effects to capture any unobserved zipcode- and month-specific factor, thus allowing a cleaner identification of the effects of a Rent-Stabilized apartment and the Vacancy Rate Submarket.

Table 3 reports the estimates of the marginal effects of probit models. Specification (1) includes 11 month-of-listing and 41 zipcode fixed-effects, and specification (2) adds five school-district fixed-effects. The coefficients of the variable Rent-Stabilized are negative in both specifications. This is consistent with the view that landlords of rent-stabilized units, anticipating the constraints on the increase in nominal rents for lease renewals, should prefer to pay brokers' fees so that they can set higher initial rents. The magnitude of this effect is quite large. According to the coefficients of specification (2), a Rent-Stabilized apartment has a 5.3-percent lower probability of having a Fee listing than an unregulated apartment, which represents a 6.7-percent decrease in the likelihood that the listing is Fee.

The coefficients of neighborhoods' Vacancy Rate Submarket are negative in all specifications, indicating that landlords (rather than tenants) are more likely to pay brokers' fees when market is less tight. Furthermore, the estimates of specifications (2) mean that a one-standard-deviation increase in the value of Vacancy Rate Submarket decreases the probability that a listing is Fee by approximately 5.8 percentage point, which is, approxi-

Table 3
Who pays the fee?

Fee	(1)	(2)
Atypical	0.0107*	0.0115*
	(0.0060)	(0.0062)
Vacancy Rate Submarket	−0.0053**	−0.0053**
	(0.0027)	(0.0026)
Rent Stabilized	−0.0534***	−0.0533***
	(0.0123)	(0.0123)
Log(Monthly Rent)	−0.0287	−0.0297
	(0.0191)	(0.0189)
Co-op	0.0734***	0.0734***
	(0.0132)	(0.0132)
Condo	0.1155***	0.1164***
	(0.0191)	(0.0191)
Number of Rooms	0.0117	0.0114
	(0.0077)	(0.0076)
Number of Bedrooms	−0.0113	−0.0106
	(0.0089)	(0.0089)
Number of Bathrooms	0.0212	0.0193
	(0.0190)	(0.0188)
Floor Number	−0.0012*	−0.0013*
	(0.0007)	(0.0007)
Penthouse	−0.0894**	−0.0903**
	(0.0369)	(0.0367)
Furnished	0.1247***	0.1247***
	(0.0108)	(0.0107)
Pet Allowed	−0.0119	−0.0130
	(0.0154)	(0.0152)
Elevator	0.1080***	0.1049***
	(0.0240)	(0.0239)
Elevator and Doorman	−0.0687***	−0.0691***
	(0.0152)	(0.0151)
Building Units	−0.0003***	−0.0003***
	(0.0001)	(0.0001)
Prewar Building	0.0975***	0.0959***
	(0.0168)	(0.0167)
New Construction	−0.1356	−0.1397
	(0.0920)	(0.0922)
Building Number of Floor	0.0018*	0.0018*
	(0.0009)	(0.0009)
Zipcode fixed effects	41	41
Monthly fixed effects	11	11
School District fixed effects	0	5
Observations	15,524	15,524

Notes: Specifications (1)–(2) present the marginal effects calculated from probit regressions. The dependent variable is equal to one if the broker collects fees from the tenants, and zero if the owner pays brokers' fees. The estimated regressions further include binary indicator variables for whether the building is a landmark and for whether the building is in an historic district. The standard errors in parentheses are clustered at the neighborhood level.

* Significance at the 10 percent level.

** Significance at the 5 percent level.

*** Significance at the 1 percent level.

Table 4
Joint decisions, bivariate probit.

Outcome	(1)		(2)	
	Exclusive	Fee	Exclusive	Fee
Atypical	0.0182**	0.0117*	0.0167**	0.0123*
	(0.0071)	(0.0062)	(0.0068)	(0.0064)
Vacancy Rate Submarket	−0.0038	−0.0050*	−0.0042*	−0.0049*
	(0.0024)	(0.0026)	(0.0025)	(0.0026)
Rent Stabilized	−0.0598***	−0.0502***	−0.0579***	−0.0501***
	(0.0146)	(0.0123)	(0.0146)	(0.0123)
Log(Monthly Rent)	0.0098	−0.0295	0.0138	−0.0302
	(0.0326)	(0.0196)	(0.0327)	(0.0195)
Co-op	0.1760***	0.0745***	0.1758***	0.0746***
	(0.0075)	(0.0133)	(0.0075)	(0.0133)
Condo	0.2699***	0.1198***	0.2682***	0.1205***
	(0.0148)	(0.0187)	(0.0148)	(0.0187)
Number of Rooms	0.1580***	0.0112	0.1578***	0.0110
	(0.0152)	(0.0079)	(0.0151)	(0.0079)
Number of Bedrooms	−0.1239***	−0.0100	−0.1246***	−0.0094
	(0.0120)	(0.0092)	(0.0121)	(0.0092)
Number of Bathrooms	−0.0490**	0.0180	−0.0472**	0.0165
	(0.0198)	(0.0193)	(0.0195)	(0.0191)
Floor Number	0.0010	−0.0012*	0.0010	−0.0013*
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Penthouse	−0.0885*	−0.0904**	−0.0862*	−0.0908**
	(0.0502)	(0.0382)	(0.0497)	(0.0380)
Furnished	0.1212***	0.1235***	0.1212***	0.1237***
	(0.0222)	(0.0111)	(0.0221)	(0.0111)
Pet Allowed	0.0770***	−0.0063	0.0773***	−0.0075
	(0.0204)	(0.0153)	(0.0205)	(0.0151)
Elevator	−0.0295*	0.0993***	−0.0300*	0.0967***
	(0.0158)	(0.0235)	(0.0158)	(0.0234)
Elevator and Doorman	0.1686***	−0.0662***	0.1676***	-0.0669***
	(0.0220)	(0.0151)	(0.0218)	(0.0150)
Building Units	−0.0004***	−0.0003***	−0.0004***	−0.0003***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Prewar Building	0.1871***	0.0930***	0.1884***	0.0918***
	(0.0223)	(0.0161)	(0.0223)	(0.0160)
New Construction	0.1526***	−0.1438	0.1469***	−0.1470
	(0.0280)	(0.0931)	(0.0343)	(0.0931)
Building Number of Floor	−0.0012	0.0018*	−0.0012	0.0018*
	(0.0012)	(0.0009)	(0.0012)	(0.0009)
ρ	0.406		0.405	
	(0.037)		(0.036)	
Zipcode fixed effects	41		41	
Monthly fixed effects	11		11	
School District fixed effects	0		5	
Observations	15,524		15,524	

Notes: Specifications (1)–(2) present the marginal effects calculated from bivariate probit models. The dependent variables are equal to one if the listing is exclusive, and zero otherwise; and equal to one if the broker collects fees from the tenants, and zero if the owner pays brokers' fees. The estimated equations further include binary indicator variables for whether the building is in a landmark and for whether the building is in an historic district. The standard errors in parentheses are clustered at the neighborhood level.

* Significant at the 10 percent level.
** Significant at the 5 percent level.
*** Significant at the 1 percent level.

mately, a 7.3-percent decrease in the probability that the listing is Fee. Since the time-series variation in the Vacancy Rate Submarket over the business cycle is likely to be larger than our 12-month sample variability, this may understate the economic significance of this relationship.

Some statistically significant results have no easy interpretation (in particular, the result on "penthouse" units, though this may reflect that it is a fairly common designation), whereas other significant variables in the regression may reflect concerns over selection: For example, turnover is a significant concern for units in co-ops and condos, as well as for furnished apartments, which tend to be Fee apartments (i.e., the tenant pays the broker's fee), and may be of greater concern in more-idiosyncratic pre-war buildings and buildings with few units.

8. Joint choices

We use a bivariate probit model to analyze in a more-complete way the range of contractual arrangements between landlords and brokers. Specifically, based on the analyses in the previous sections, the bivariate probit considers four possible outcomes: (1) a Non-Exclusive, Fee listing—i.e., a listing in which the broker collects a fee from the prospective tenant; (2) a Non-Exclusive, No-Fee listing—i.e., a listing in which the broker collects a fee from the landlord; (3) an Exclusive, Fee listing—i.e., an exclusive listing in which the broker collects a fee from the prospective tenant; and (4) an Exclusive, No-Fee listing—i.e., an exclusive listing in which the broker collects a fee from the landlord.

Table 4 presents the estimated marginal effects of two different specifications. Specification (1) includes month-of-listing and zip-code fixed-effects, and specification (2) further adds school-district fixed-effects. The coefficients of the Atypicality index are positive in the equations explaining Exclusive listing, in line with earlier results that landlords are relatively more likely to rent out an atypical apartment through an exclusive agent. The coefficients of the Vacancy Rate Submarket are negative in the case of Exclusive and Fee listings, confirming our previous finding that landlords are more likely to pay brokers' fees in cold markets than in hot markets. Similarly, Rent-Stabilized apartments are less likely to have Exclusive and Fee listings; this is consistent with the intuition that rent-stabilized apartments require relatively little marketing effort from agents (accounting for the lack of exclusivity) and that landlords might aim for slightly higher initial rents when the rate at which they can increase an existing tenant's rent is limited (accounting for the no fee). Moreover, Co-op and Condo apartments, which are likely to be somewhat more idiosyncratic in landlord preferences (and imply a greater desire for screening), are more likely to have Exclusive and Fee listings.

Overall, the results presented in Table 4 confirm our previous results on the use of different listing contracts, and the magnitudes of the estimated effects reported are comparable to those reported in Tables 2 and 3. At the same time, they present a perhaps richer and more nuanced picture of the role of the different contractual features that we examine—i.e., the exclusivity of the agreement and who pays the broker fee. More specifically, the signs of the estimated marginal effects of several (but not all) observable characteristics are the same in the equations that determine whether or not the listing is Exclusive and whether or not it is a Fee listing, suggesting that the two contractual features are complements. However, the estimated relative magnitudes of the observable characteristics differ quite substantially in the two equations, suggesting that different contractual features are different margins that adjust in response to different apartment and market characteristics. The correlation coefficient between the unobservable characteristics, estimated to be approximately equal to 0.4, further confirms these views.

9. Concluding remarks

We present new evidence on the design of contracts for intermediaries in frictional matching markets. Using data from the Manhattan residential rental market, our results highlight a role both for providing incentives for specific efforts (consistent with a large theoretical literature) and for screening candidates (either directly, in a way that can be interpreted as another form of specific effort, or through the induced schedule of repayments through time). Specifically, in the Manhattan residential market, landlords are more likely to use exclusive contracts with real-estate agents when the apartment is more atypical—suggesting that agents' provision of specific effort is relevant for this decision—and when the type of tenant is of greater concern, suggesting a screening role. The latter consideration appears to play a role in a landlord's decision to pay the broker's

Table 5
Comparison among datasets.

Variable	MLX	2000 Census	2000 Census, Moved in Last Year
Number of Rooms	3.341	3.355	2.589
	(1.293)	(1.457)	(1.359)
Number of Bedrooms	1.156	2.575	2.055
	(0.730)	(1.027)	(0.978)

Notes: This table compares the MLX dataset with the 2000 Census. The last column reports statistics conditioning on households that reported having moved into their residence "This year or last year."

fee since this can influence the rent in the case of renewal and, thus, the selection of tenants that a listing attracts.

Our analysis has some important limitations. First, it is a study of just one market in one locality—i.e., Manhattan—and its institutions. Moreover, while our empirical findings are consistent with our theoretical explanations, a lack of further data prevents us from examining these mechanisms in more detail. Specifically, our data provide few outcome measures, such as whether the unit transacts at the listed price (though we believe that most units do); the length of time that the unit is on the market before it is rented;[18] and the satisfaction of the renter/landlord with the match (for example, characteristics of the renter; whether the renter pays rent in a timely fashion; whether the lease is renewed). Thus, our data do allow us to document some interesting correlates with contractual form but are not amenable to exploring their consequences.

One of the unusual features of the data is the variation in who pays the broker's fee. Our data suggest that this contractual arrangement may play a role in screening tenants, but this poses a theoretical challenge in that as one could imagine screening through more-sophisticated contracts (for example, longer-term contracts with provisions for renewal rather than standardized 12-month contracts). In part, this may reflect legal restrictions in a market that is subject to substantial regulation, or it may reflect other features of the market and its participants that lie beyond the scope of this paper.

Appendix A. Representativeness of the MLX data

We compare our listings data with the publicly-available five-percent sample of the 2000 Census. The Census asks some dwelling questions, including ownership status (rent versus own), along with detailed geographic information, such as the county. Hence, we can construct a sample of all households in rented apartments in Manhattan. Glaeser and Luttmer (2003), among others, have constructed similar samples.

Table 5 reports this comparison. The Number of Rooms in the MLX dataset is almost identical to that in the 2000 Census, whereas the Number of Bedrooms is smaller in the MLX than in the Census. The last column of Table 5 reports Census statistics conditioning on households that reported having moved into their residence "This year or last year." Those households report living in apartments that have fewer rooms (2.589 versus 3.312), but more bedrooms (2.055 versus 1.127). The latter difference might reflect the fact that in Manhattan, sharing an apartment (with friends, colleagues, or others) is common. In these cases, tenants often convert rooms for use as bedrooms, whereas brokers cannot legally advertise these rooms as bedrooms.

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[18] This is a concern not only about selection into our dataset—which may not be at the "start" of the time in which the landlord seeks a renter—but also about the nature of our data, which provides poor measures of time listed in the MLS, our data provider.