The Economic Consequences of Insecure Property Rights[1]

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Abstract

Secure property rights support efficient allocation and investment, yet their effects in affluent urban markets remain understudied. We examine Jerusalem properties built on church-owned land under 99-year leases approaching expiration, creating substantial legal and political uncertainty. Using all residential transactions from 2004–2024, we compare nearby properties with secure and insecure rights within the same blocks. Insecure rights reduce transaction likelihood by about 20 percent and prices by 10–15 percent on average, revealing large costs of legal uncertainty. A present-value framework implies that market participants assign a substantial, but far from certain, probability to losing rights.

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1 Introduction

The importance of well-defined and secure property rights for the efficient allocation of resources is well established in law and economics (Coase 1960, Demsetz 1967). Secure property rights encourage investment, improve market efficiency, and promote economic growth (North 1981; Engerman and Sokoloff 2003; Acemoglu and Johnson 2005; Acemoglu, Johnson and Robinson 2005). Conversely, insecure property rights can deter investment and limit market transactions.

Most empirical work has examined how land rights affect economic development in developing economies, particularly among poor households (De Soto 2000). Thus, Brasselle, Gaspart and Platteau (2002) focus on Burkina Faso; Besley (1995) focuses on Ghana; Field (2007) focuses on Peru; Jacoby, Li and Rozelle (2002) focus on rural China; Lanjouw and Levy (2002) focus on Ecuador; Galiani and Schargrodsky (2010) study low-income households in Argentina; and Goldstein and Udry (2008) focus on Ghana. Others have focused on the importance of land rights for development historically (Alston, Libecap and Mueller 1998; Hornbeck 2010). The effect of insecure property rights on well-off individuals in modern developed economies remains a question that has received relatively little empirical attention. One reason is that most modern developed economies have legal systems that provide secure property rights, particularly in areas where well-off individuals reside. This paper aims to fill this gap by examining the economic consequences of insecure property rights using a natural experiment in the most expensive neighborhoods of Jerusalem.

To investigate the effect of insecure property rights on prices and market activity, we leverage a unique setting in Jerusalem. In some of the city's most expensive neighborhoods, land was leased from various churches (primarily the Greek Orthodox Church) to state and private developers under 99-year contracts. Hundreds of families live in apartments on such land. As these leases approach expiration, substantial legal and political uncertainty has emerged regarding the future of these properties. While some contracts contain provisions for potential extension, their terms are vague and leave considerable discretion over both duration and pricing. At the same time, recent land sales to private investors and ongoing legislative initiatives have introduced additional uncertainty, as outcomes may depend on government intervention, including possible eminent domain or mandated lease extensions. As a result, homeowners face considerable uncertainty about what will happen when leases expire, creating a setting of fundamentally insecure property rights.

Jerusalem provides an ideal setting for investigating the consequences of insecure property rights among well-off individuals in high-income urban areas. Israel had a GDP per capita of $52,261 in 2023, placing it among advanced economies. Within Israel, Jerusalem's

central neighborhoods rank among the most expensive housing markets globally: a recent analysis of over 800,000 property listings across 73 capital cities finds that Jerusalem has the fifth highest median house price (NetCredit 2024). This makes it a particularly relevant setting for studying how property-rights insecurity affects behavior in affluent markets. Consistent with this, properties in our sample are highly valuable: the average transaction price per square meter is approximately $8,400 (about $780 per square foot) for properties with insecure rights and $9,600 per square meter (about $890 per square foot) for nearby properties with secure ownership—levels far above typical U.S. housing markets, where median listing prices are on the order of $200–$250 per square foot (Federal Reserve Bank of St. Louis 2026).

We develop a model that captures two central features of insecure property rights: sellers' risk aversion and divergent beliefs between buyers and sellers regarding the probability of property loss. The model shows that greater property-rights insecurity depresses equilibrium prices, as buyers discount for the risk of losing the property. However, the effect of greater property-rights insecurity on transaction volume depends on the relative strength of these two forces. When risk aversion dominates, greater property-rights insecurity can increase transaction volume, as more risk-averse sellers are induced to exit the market. Conversely, when belief divergence is more pronounced, greater property-rights insecurity suppresses transactions, as optimistic sellers are unwilling to accept the lower prices offered by more pessimistic buyers. These effects parallel the role of risk aversion and divergent beliefs in the literature on litigation and settlement, where risk aversion tends to increase the likelihood of settlement, while divergent expectations about trial outcomes tend to reduce it (Cooter and Rubinfeld, 1989; Kaplow and Shavell, 2002).

We bring this framework to the data using a comprehensive dataset of all residential real estate transactions in Jerusalem between 2004 and 2024. A key feature of our empirical setting is the coexistence, within narrowly defined geographic areas, of properties with secure ownership rights and properties subject to long-term church leases that are approaching expiration. We identify parcels located on such leased land using original lease contracts and supplementary information from experienced real estate professionals, and define nearby freehold parcels as a control group. This allows us to compare outcomes across properties that are physically close, often within the same block, and similar in observable characteristics, but differ sharply in the security of property rights.

Our empirical analysis focuses on two margins of housing market activity: transaction likelihood and transaction prices. To study market liquidity, we construct a parcel-level panel and estimate how property-rights insecurity affects the annual probability of transaction, controlling for location and time fixed effects. To study pricing, we estimate hedonic

regressions of price per square meter on an indicator for insecure property rights, controlling for detailed property characteristics as well as location and year effects. In both cases, we exploit variation in the time remaining until lease expiration, which allows us to examine how the effects of insecurity evolve as the horizon shortens and uncertainty becomes more salient.

We find that insecure property rights have economically large effects on both market activity and prices. Properties subject to insecure rights are significantly less likely to transact, with transaction probabilities approximately 20 percent lower than comparable properties with secure rights. At the same time, these properties sell at substantial discounts, on the order of 10 to 15 percent on average, with larger discounts for properties closer to lease expiration. These patterns are consistent with a setting in which belief divergence between buyers and sellers dominates seller risk aversion, leading to both lower prices and reduced market liquidity. In economic terms, back-of-the-envelope calculations imply approximately 417 million New Israeli Shekels (NIS) in reduced housing capitalization and NIS 586 million in forgone transaction volume over our sample period.

Finally, we use a simple present-value framework to interpret the observed price discounts and to quantify the degree of legal uncertainty perceived by market participants. If homeowners were expected to lose their properties with certainty upon lease expiration, standard discount rates would predict substantially larger price gaps than those observed in the data. Instead, the empirical price ratios are consistent with market participants assigning a substantial but incomplete probability to the loss of property rights. Our estimates suggest that this probability is on the order of 30 to 50 percent and has increased over time, particularly following heightened media attention and political developments related to the sale of church lands to private investors.

This paper relates to a growing literature that uses variation in property rights and lease durations to study asset pricing in housing markets. Most closely related is Giglio, Maggiori and Stroebel (2015), who exploit differences between leasehold and freehold properties in the United Kingdom and Singapore to infer how markets value very long-run cash flows. They show that leasehold properties trade at systematic discounts relative to otherwise comparable freeholds, which they use to estimate relatively low long-run discount rates. Similarly, Bracke, Pinchbeck and Wyatt (2018) study variation in lease length in the United Kingdom and show that discount rates decline with maturity. Gautier and Van Vuuren (2019) use data on long-term leases in Amsterdam to estimate the effect of future land-lease payments on home prices. More recently, Bäcker-Peral, Hazell and Mian (2026) exploit quasi-experimental variation from lease extensions in the United Kingdom to estimate the expected long-term housing yield.

In these papers the leasehold contracts specify both duration and the consequences of expiration, typically involving the reversion of ownership to the freeholder. This clarity allows observed price differences to be interpreted primarily as reflecting the present value of future cash flows. While we also exploit variation related to leasehold structures, the central feature of our context is the uncertainty regarding what happens at the end of the lease. In our setting, the legal and political outcomes at lease expiration are ambiguous, introducing uncertainty over future ownership rights. This allows us to analyze the effects of insecure property rights on prices and market activity.

The remainder of the paper is organized as follows. In Section 2 we provide the background needed to understand the legal uncertainty around properties located on church-owned land. In Section 3 we present a simple model that guides the interpretation of the empirical results. Sections 4 and 5 describe the data and the research design. In Section 6 we discuss the details of the estimation. Section 7 presents the empirical findings and in Section 8 we quantify the legal uncertainty.

2 Institutional Background

Much of the land in central Jerusalem, particularly in neighborhoods such as Rehavia, Talbiya, and the area around the Knesset, has historically been owned by Christian churches, especially the Greek Orthodox Church, which remains the largest private real estate landowner in Israel. Portions of this land were leased directly to private developers, but the majority was leased to the Keren Kayemeth LeIsrael-Jewish National Fund (KKL-JNF), a government-controlled entity. The KKL-JNF then subleased the land to developers and homeowners through the Israel Lands Administration (ILA). Some of these leases, typically for 99 years, were signed in the 1930s under British rule, but most were executed after Israel's founding, in the 1950s, 1960s, and 1970s. As these leases near expiration in the coming decades, hundreds of families living in Jerusalem's most expensive neighborhoods are facing uncertainty regarding the property rights in their homes. Importantly, when these homes were purchased many years ago, "the homeowners then assumed their subleases from KKL would be automatically renewed, and that their homes were essentially owned." They therefore "believed [this] was a de facto home purchase" (Surkes, 2018).

The uncertainty is both legal and political. The legal framework surrounding these leases is ambiguous. Some leases contain options for renewal, but the terms and conditions for such extensions are unclear. For example, one of the main JNF-KKL leases with the Greek Orthodox Church provides that if the 99-year period ends, and no agreement for extension of the lease is reached, a person will be appointed by the President of the Supreme

Court of Israel, and that person will decide on the rent and the duration of an extended lease.[1] It is unclear what such a person will decide. It is nevertheless clear that if the lease expires and the land is returned from the leaseholders to the freeholders, the freeholders need not compensate leaseholders for buildings constructed on the land by the leaseholders.[2]

In addition to the legal uncertainty, political factors play a role. Since much of the land was leased through the government-controlled KKL-JNF, there is a widespread belief that the government will intervene to protect homeowners. As (Steinberg, 2004) notes: "There are two different kinds of leases. In one, homeowners lease the land directly from the Greek Orthodox Church. In the other, more common, homeowners sub-lease the land through the Israel Lands Administration (ILA), which has in turn leased it from the Church. The difference between the two is crucial. The general belief among most real estate experts is that the Church will renew its leases with the government. The cost of leasing, based on market value, is likely to rise dramatically, but the ILA protects the Israeli owner, and the government will almost definitely take responsibility for leases in which the Administration is involved. Land leased directly from the Church may be more problematic, says Alan Deco, a Jerusalem real estate broker who co-owns Capital Property Consultants. With many of the leases due to expire in 48 years, no one is quite sure what will happen come 2052. Whatever the Church decides, it seems unlikely that any Israeli homeowner will be thrown out on the street. Deco explains that the government could enact a law allowing those on Church-owned land to buy the freeholds of their property for a symbolic or substantially discounted sum. Another possibility is that the ILA will negotiate extensions to all the leases."

The political outcome at the end of the 99-year lease period remains uncertain. For example, a recent bill introduced in the Knesset seeks to protect residents living in these properties . The bill, which lists 41 sponsors from both the government and opposition, requires the landlord to extend the lease contract under the same terms as the current one, caps leasing fees at 5.5 percent of the value of the unimproved land, and ensures that lease extensions do not carry development levies as a land sale would. Identical legislation was put forward in 2022, but failed to move forward after the former government declined to back the measure (Surkes, 2024). The continuing salience of the uncertainty is also reflected

[1] The contract notes the following: "KKL shall be entitled to extend the period of the Lease by such further period and at such rent as will be agreed upon by the parties hereto but otherwise subject to all the terms and conditions of these presents, and failing such agreement the period of extension and the amount of the rent shall be fixed by a person to be nominated by the parties hereto, or failing agreement by the parties here to as to such person, by a person to be appointed by the President of the Supreme Court of Israel at his discretion, and the rent and period fixed by any such person shall be final and binding on the parties hereto."

[2] The main contract with Greek Orthodox Church notes that "No compensation whatsoever should be paid by the Patriarchate for any building or other structures then existing on the said immovable property."

in a July 2026 full-page advertisement in the Israeli business newspaper TheMarker, placed by an organization representing affected leaseholders, which declared that "the uncertainty is harming us" and called on KKL-JNF to resolve the issue.

Although these lands were originally owned by churches, primarily the Greek Orthodox Church, many were recently sold to investors. In 2013 and 2016 the Greek Orthodox Church sold much of its holdings of leased lands in Jerusalem to investors. In 2023, a large share of the land was resold for $216 million to Extell, a company controlled by the American real estate businessman Gary Barnett (Nagler, 2023), who is known as "The Man Behind Billionaires' Row" on Manhattan's 57th street (Clarke and Taylor, 2019). These sales further complicate the situation for homeowners, as private investors may have different intentions regarding lease extensions or land use, raising concerns about potential redevelopment or increased costs. Interestingly, though the lands are no longer owned by churches, in 2018, when a Knesset committee considered a bill that would allow the state to expropriate lands sold by churches to those private investors, Christian leaders closed the Church of the Holy Sepulchre, which drew worldwide attention and resulted in the suspension of the bill (Lieber and Jones, 2018). The political and religious sensitivity of these lands further increases uncertainty over future legal outcomes.

Because much of the land in Israel is government owned and managed by the Israel Lands Administration (ILA), many apartment owners formally hold long-term leasehold rights from the ILA rather than fee-simple title. However, these long-term residential leases are not, by themselves, a source of insecure property rights. These leases are commonly structured around 49-year periods, and ILA has a standardized administrative framework for lease renewal. Moreover, following a 2009 reform, lessees can make a one-time advance payment of annual lease fees, which also allows those living in multi-unit residential buildings to obtain full legal ownership of their apartment without an additional payment, and indeed many lessees have done. Thus, while ordinary ILA leases are formally leaseholds, they generally do not create the kind of end-of-term uncertainty analyzed in this paper.

The consequences of this uncertainty may go beyond transactions involving existing homes to new development. Recent reporting indicates that around 25 acres of valuable land in central Jerusalem remain undeveloped because construction cannot proceed due to the legal uncertainty surrounding church land. "For example, the planned Four Seasons luxury hotel, which was to be built between Liberty Bell Park and the German Colony, has remained on paper" (Fundaminsky (2024)).

3 Theory: The Effect of Insecure Property Rights

In this section, we develop a simple model that incorporates two realistic features of markets with insecure property rights: (1) seller risk aversion, and (2) divergent beliefs between buyers and sellers regarding the probability of property loss. The model shows that greater property-rights insecurity depresses prices and that its effect on transaction volume depends on the relative importance of these two forces.

3.1 Model Setup

Consider a market with buyers and sellers. Sellers' risk preference is modeled by the parameter $\alpha \geq 0$, where $\alpha = 0$ corresponds to risk neutrality and higher values indicate greater risk aversion. A seller's property value, v, is distributed uniformly on the interval $[0, 1]$. This reflects the personal value that each seller assigns to the property.

For simplicity, assume that buyers are risk neutral, and that they all value the property at $v' \in (0, 1)$. This would be the case if there are many well-diversified investors who are willing to purchase the property for investment purposes. We assume that there are enough buyers so that aggregate demand is perfectly elastic at their expected value and buyers can purchase any quantity of properties supplied in equilibrium. In Appendix A we extend the model and consider heterogeneous buyers, with different valuations of the property, who are also risk averse, and show that the comparative statics we present in this simple model hold in such a setting.

The property, which is owned by sellers, has a value v to sellers if nothing happens, but with probability p it is taken away. The parameter $p \in (0, 1)$ therefore reflects the insecurity of property rights. A higher p reflects greater insecurity.

For simplicity, assume that the seller's certainty equivalent utility from the property is given by

$$u_s = (1 - p)v - \alpha\, p\, v,$$

where risk aversion reduces the certainty-equivalent value of the property by an amount proportional to p. Intuitively, greater risk aversion (a higher α), and a greater probability of losing the property (a higher p), lead to a lower certainty equivalent utility from the property. Since sellers always have an outside option of abandoning the property, we assume that $u_s > 0$.

Buyers can be more pessimistic than sellers and believe that there is a higher probability that the property will be taken away. This gap in beliefs could explain why sellers own the property in the first place, since in markets with heterogeneous beliefs ownership is

concentrated among investors with the most optimistic assessments of future payoffs (Harrison and Kreps 1978). This gap in beliefs could also be driven by sellers' endowment effect (Kahneman, Knetsch and Thaler 1990). Formally, from the buyers' perspective, the probability of losing the property is $p_b = (1+\gamma)\,p$. The parameter $\gamma \geq 0$ reflects the gap between buyers and sellers in their beliefs about the likelihood of losing the property. Since p_b is a probability, we naturally assume that $p_b < 1$.

It is worth clarifying the difference between risk aversion, captured by α, and the gap in beliefs about the likelihood of losing the property, captured by γ. Risk aversion reflects the disutility from bearing a given lottery: more risk-averse individuals experience a larger utility loss from exposure to the same probabilistic outcome. In contrast, the belief gap reflects disagreement about the probability distribution itself—that is, about what the lottery actually is. Two individuals with identical levels of risk aversion may nevertheless hold different beliefs about the likelihood of property loss, leading them to evaluate the same asset differently.

3.2 Equilibrium

Because aggregate demand is perfectly elastic at buyers' expected value, the equilibrium price is:

$$P^* = [1 - p(1+\gamma)]v' \tag{1}$$

A seller will choose to sell if the utility from holding on to the property is lower than the market price. Formally, a seller sells if

$$(1-p)v - \alpha\, p\, v < P^* = [1 - p(1+\gamma)]v'.$$

This inequality simplifies to:

$$v < \frac{1-(1+\gamma)p}{1-(1+\alpha)p}v' \equiv \bar{v}$$

Thus, sellers who assign a relatively low personal valuation to the property, that is those for whom $v < \bar{v}$, sell the property. Those who assign a relatively high personal valuation to the property, that is those for whom $v > \bar{v}$, do not sell the property.

Since v is uniformly distributed on $[0, 1]$, the fraction of sellers willing to sell is given by:

$$Q^* = \frac{1-(1+\gamma)p}{1-(1+\alpha)p}v' \tag{2}$$

This is also the number of transactions, or trading fraction, in the market. Because $p_b \leq 1$ and $u_s > 0$, we know that $Q^* > 0$, and we also assume that $Q^* < 1$, since it is a fraction.

3.3 Comparative Statics

Consider first the effect of property-rights insecurity on equilibrium prices. Looking at Expression 1, one can see that as property-rights insecurity increases, that is as p increases, the equilibrium price of properties P^* declines. This is because the risk-neutral buyers, who are setting the price, assign a lower value to the property given this increased risk of losing the property.

Next, consider the effect of greater property-rights insecurity, that is, an increase in p, on the number of transactions Q^*. Differentiating Expression 2 with respect to p yields:

$$\frac{\partial Q^*}{\partial p} = \frac{\alpha - \gamma}{[1 - (1 + \alpha)p]^2} v' \tag{3}$$

Expression 3 shows that when $\alpha > \gamma$, the expression is positive, which means that greater property-rights insecurity increases the number of transactions. When $\alpha < \gamma$, the expression is negative, which means that greater property-rights insecurity reduces the number of transactions.

The opposing effects of risk aversion and belief divergence parallel a central insight in the law-and-economics literature on litigation and settlement. In standard models of settlement, risk aversion tends to promote settlement because parties prefer a certain resolution to the risk associated with trial. By contrast, divergent beliefs about the likely trial outcome tend to impede settlement: when each side is relatively optimistic about its expected outcome at trial, the plaintiff's minimum acceptable settlement may exceed the defendant's maximum willingness to pay, making settlement less likely (Cooter and Rubinfeld, 1989; Kaplow and Shavell, 2002). The mechanism in our model is analogous. Sellers' risk aversion makes continued ownership of an insecure asset less attractive and can therefore increase the willingness to transact. Belief divergence, by contrast, widens the gap between buyers' and sellers' valuations of the asset and can therefore reduce transaction volume.

This can be summarized in the following proposition.

Proposition 1. *Greater insecurity of property rights results in lower equilibrium prices. The effect of property-rights insecurity on transaction volume depends on the relative strength of seller risk aversion and belief divergence. When risk aversion dominates ($\alpha > \gamma$), property-rights insecurity increases the number of transactions, as risk-averse sellers sell to exit the market, thereby boosting market turnover. When belief divergence dominates ($\alpha < \gamma$),*

property-rights insecurity reduces the number of transactions because buyers' and sellers' valuations diverge.

4 Data

To distinguish between parcels of land with insecure property rights and those with secure property rights, we first identified which homes are located on long-term leaseholds – commonly referred to as *church land* – and which are located on freeholds. Our primary source was the set of lease contracts we were able to obtain from the relevant parties. These contracts allow us to pinpoint, at the parcel level, whether the homes are held under a long lease and, if so, the exact year of lease expiration. In the few cases where contracts were not fully accessible, we supplemented the data by consulting experienced Jerusalem realtors.

In Israel, land is registered at the block-parcel level. Within a given block, parcels can be held under secure ownership rights or subject to long-term leases. This institutional structure generates a unique empirical setting: in some blocks, physically adjacent homes, built at the same time and otherwise nearly identical, differ only in whether they rest on secure or insecure property rights. Figures 1 and 2 illustrate this contrast, which motivates our within-block research design.

We define the treatment group as all parcels with insecure property rights (church land), and the control group as nearby parcels with secure property rights located within 500 meters of a treated parcel. This ensures geographic comparability and reduces concerns about unobserved location heterogeneity. Later robustness checks vary the control group radius, and results remain stable.

For outcome data, we obtained transaction records from the Israeli Tax Authority covering all residential real estate sales in Jerusalem between 2004 and 2024. Each record includes the parcel and block identifiers, transaction date, sale price, property size (square meters), number of rooms, and whether the transaction involved multiple buyers or sellers. We merged these data with municipality records on the number of apartments per parcel and neighborhood boundaries. For parcels under lease, we also have data on the year of lease expiration, allowing us to examine heterogeneity by remaining lease duration.

Our final dataset therefore combines: (i) a treatment–control definition at the parcel level, (ii) rich transaction-level detail, and (iii) variation in lease expiration timing. Descriptive statistics are presented in Table 1. These statistics show that properties located on treatment parcels sell at substantially lower average prices per square meter than properties located on control parcels. Still, the table also reveals some differences in observable characteristics between the treatment and control groups. In particular, apartments on treatment

parcels are newer on average and have more rooms. The difference in age, if anything, should work against our main finding: all else equal, newer apartments would generally be expected to command higher prices, whereas apartments on treatment parcels sell for substantially less per square meter. The implications of the difference in the number of rooms, holding other characteristics constant, are less clear. Importantly, however, as we show in the price regressions below, controlling for these and other observable property characteristics has little effect on the estimated treatment coefficient.

5 Research Design

Our empirical strategy evaluates the impact of property-rights insecurity on two key margins of housing market activity: (i) the likelihood that a transaction occurs (the extensive margin), and (ii) the price per square meter conditional on a transaction (the intensive margin).

We define the treatment group as parcels subject to long-term church leases and the control group as freehold parcels with secure ownership rights located within 500 meters of a treated parcel. This proximity-based definition ensures geographic comparability, as parcels with secure and insecure property rights are often located within the same blocks and were developed in the same periods. The designation of parcels as leased or freehold reflects historical contracting decisions made by churches and state agencies decades earlier, not contemporary economic conditions, which supports the plausibility of treating ownership status as predetermined with respect to contemporary market conditions.

To address concerns about unobserved neighborhood-level heterogeneity, we include location fixed effects (at the block or neighborhood level) and year fixed effects. The location fixed effects account for time-invariant local characteristics such as architectural style, proximity to amenities, or neighborhood prestige, while the year effects capture common shocks to the Jerusalem housing market (such as changes in interest rates or macroeconomic conditions). This design ensures that comparisons are made within narrowly defined spatial units and across the same time periods.

A potential concern is that uncertainty may spill over into nearby properties. For example, buyers might generalize risk perceptions from parcels with insecure property rights to those with secure rights in the same block. Such spillovers, if present, would attenuate the estimated treatment effects toward zero, rendering our estimates conservative. Spillovers in the opposite direction would be more concerning: if buyers substitute toward nearby secure properties, the estimated treatment effect could be overstated. We address this concern by also using properties that are farther away, up to 2.5 km, from the treated properties as a control group, since they are less likely to be affected by such spillovers.

Beyond the binary classification of secure and insecure property rights, our design leverages variation in the time remaining until lease expiration. Because contracts expire at different dates, the level of property-rights insecurity varies across parcels and becomes more salient as expiration approaches. We exploit this variation to estimate heterogeneous effects by remaining lease duration. This feature allows us to capture anticipatory behavior: market participants may discount properties well before expiration, reflecting forward-looking assessments of risk.

In sum, the design compares market outcomes for properties on secure and insecure parcels within narrowly defined neighborhoods. It also exploits variation in remaining lease duration to examine how the effects of insecurity change as expiration approaches.

6 Estimation

6.1 Likelihood of Transaction

We estimate the impact of property-rights insecurity on the likelihood of transaction using the following baseline specification:

$$Prob.\ Transaction_{it} = \alpha_{\ell(i)} + \lambda_t + \beta \cdot Insecure\ Property\ Rights_i + \epsilon_{it} \tag{4}$$

where an observation is parcel i in year t. The dependent variable is the ratio of the number of transactions in properties located in parcel i during year t to the total number of residential units on that parcel. The main variable of interest, *Insecure Property Rights*, takes the value 1 for land parcels under lease contracts and 0 otherwise. We include location ($\alpha_{\ell(i)}$) and year (λ_t) fixed effects to control for other factors that could influence the likelihood of transaction. Year fixed effects capture temporal changes affecting the residential real estate market equilibrium (e.g., interest rates or the state of the economy). We use either block or neighborhood fixed effects, both of which are defined at spatial level that contain multiple parcels. Location fixed effects control for time-invariant local conditions, such as the character of the neighborhood, proximity to commercial areas or to notable landmarks like the residences of the prime minister or president. The main parameter of interest is β, which represents the effect of insecure property rights on the likelihood of transaction. Our identification strategy relies on the assumption that after accounting for time-invariant local conditions and location-invariant temporal effects, any systematic differences in the likelihood of transaction between parcels with secure and insecure property rights can be attributed to property-rights insecurity.

Since lease contracts expire at different times, the degree of property-rights insecurity varies across parcels and over time. We exploit this variability to estimate heterogeneous effects of property-rights insecurity. Specifically, we focus on parcels with active lease contracts and estimate how transaction likelihood changes with the time remaining until lease contract expiration. We extend equation (4) by replacing the insecure property rights variable with a set of dummy variables each indicating whether the lease contract expires in less than 20 years, 20-29 years, 30-39 years, and 40-49 years.

6.2 Transaction Price

To analyze how property-rights insecurity affects transaction prices, we use transaction-level data and estimate the following hedonic pricing specification:

$$log(Price\ per\ Sq.\ Meter)_i = \alpha_{l(i)} + \lambda_{t(i)} + \delta \cdot X_i + \beta \cdot Insecure\ Property\ Rights_i + \epsilon_i \quad (5)$$

where the dependent variable is the logarithm of the price per square meter for transaction i. The fixed effects, $\alpha_{l(i)}$ and $\lambda_{t(i)}$, are defined as in equation (4). The vector X_i includes characteristics such as the number of rooms, an indicator for a new apartment and a second-degree polynomial for the age of the property at the time of transaction. As in the likelihood of transaction analysis, we account for differential effects of property-rights insecurity by allowing its effect to vary with the time remaining until lease contract expiration.

The price regressions estimate the discount reflected in completed market transactions. As in other studies based on housing transactions, interpreting this discount as the effect on the value of the broader property stock requires that, conditional on the detailed property characteristics and narrow location controls included in the regressions, insecurity does not materially alter the unobserved quality composition of properties that transact.

7 Results

7.1 Likelihood of Transaction

Figure 3 plots annual transaction probability for parcels with secure and insecure property rights. While both series fluctuate with market-wide conditions such as interest rates, parcels with insecure rights generally display a lower transaction probability. The gap between the two groups widens over time.

Table 2 confirms this pattern in a regression framework. After controlling for year

and location fixed effects, parcels with insecure rights exhibit transaction probabilities that are 0.9 to 1.2 percentage points lower. To put these magnitudes in perspective, the baseline transaction probability for secure parcels is about 5 percent (Table 1, Panel B). Thus, the estimates imply a reduction of roughly 19 to 25 percent.

Recall that Proposition 1 shows that whether insecure property rights increase or decrease the volume of transactions depends on the relative strength of seller risk aversion and belief divergence. The finding that insecure property rights reduce the number of transactions is consistent with belief divergence dominating risk aversion ($\alpha < \gamma$). It also suggests that property-rights insecurity has efficiency costs, as it results in misallocation of resources.

Figure 4 and Table 3 explore heterogeneity by remaining lease duration. The graphical evidence shows that transaction probability rises as the expiration date recedes further into the future. The regression estimates reinforce this finding: relative to secure parcels, transaction probabilities are 1.2 percentage points lower for parcels with 35–43 years remaining and about 1.1 percentage point lower for those with 10–34 years remaining (though the latter effect is statistically imprecise). Even parcels with 44+ years to expiration display a negative, though statistically insignificant, effect.

Taken together, Figure 3 - 4, and Tables 2 - 3 demonstrate that property-rights insecurity significantly depresses housing market liquidity. Importantly, the effect materializes well before lease expiration date and becomes more pronounced as the expiration date draws nearer.

7.2 Transaction Price

Figure 5 shows the evolution of average transaction prices per square meter for secure and insecure parcels. The two price series move closely together until around 2013, after which a widening gap emerges. This divergence is consistent with the fact that, as time passes, properties with insecure rights move closer to the expiration date of the underlying leases. All else equal, a shorter remaining lease term reduces the expected stream of housing services available to the buyer, and therefore lowers the present value of apartments located on leased parcels.

Table 4 translates these descriptive differences into regression estimates. Column (1) suggests that properties with insecure property rights sell at a discount of about 9 percent relative to those with secure property rights. Adding controls for apartment characteristics, year, and location fixed effects increases the estimated discount to more than 14 percent (Column (5)). This pattern indicates that raw comparisons understate the true effect. That insecure property rights reduce property values is consistent with Proposition 1.

One possible alternative explanation is that owners of properties with secure property rights invest more in renovations than owners of properties with insecure property rights, thereby contributing to the observed price gap. This is unlikely to account for our findings, however. Nearly all properties with insecure property rights in our sample had more than twenty-five years remaining on their leases at the time of sale. That horizon is long enough for owners to enjoy most of the benefits of ordinary apartment renovations, and for much of the investment to depreciate before the lease expires.

To examine how the time until lease contract expiration affects property prices, Figure 6 presents average prices per square meter, grouped into four-year bins for properties with either secure or insecure rights. Properties with insecure rights are further divided into terciles based on the remaining years until lease contract expiration. The figure shows that insecure properties in the top tercile – those with more than 51 years remaining – are priced similarly to secure properties. However, as the expiration date approaches, average prices decline.

Table 5 formalizes this analysis in a regression framework, yielding results consistent with the graphical evidence. After controlling for property characteristics and fixed effects, properties with more than 51 years until expiration sell at prices only about 3 percent below those of secure properties. In contrast, properties with 41–51 years remaining transact at discounts of roughly 10 percent, while those with 11–40 years remaining sell at prices that are about 30 percent lower. These effects are both economically meaningful and statistically significant, indicating that the market begins discounting properties with insecure rights well before expiration, and that the discount deepens sharply as the lease horizon shortens.

In sum, Figures 5–6 and Tables 4–5 show that the insecurity of property rights not only reduces housing market liquidity but also depresses prices, with effects that grow stronger as the contract horizon shortens.

7.3 Extensions

7.3.1 Control Group Definitions

As discussed in Section 5, nearby secure properties may be affected by their proximity to parcels with insecure property rights. Such spillovers could either attenuate our estimates, if concerns about insecurity partly extend to nearby controls, or inflate them, if buyers substitute toward nearby secure properties. To assess the importance of these local spillover channels, we re-estimate our main specifications using alternative distance thresholds to define the control group. If the results are driven by spillovers among nearby properties, the estimated coefficients should vary meaningfully as the control group is moved closer to or

farther from treated parcels.

Our baseline specification defines the control group as properties located within 500 meters of parcels with insecure property rights. To verify that our findings are not sensitive to this definition, we re-estimate Equations 4 and 5 using alternative distance thresholds. The results, reported in Tables A.1 - A.3, confirm that the estimated effects are generally robust to alternative definitions of the control group. Table A.1 reports transaction-probability estimates using distance thresholds between 50 and 500 meters.[3] Tables A.2 - A.3 report price estimates for thresholds between 50 and 2,500 meters. For ease of comparison, the 500-meter column reproduces the baseline estimates from Tables 2 and 4. The robustness of the results to alternative control group definitions underscores that our conclusions are not an artifact of the chosen threshold.

7.3.2 Year-Specific Effects

The impact of property-rights insecurity may evolve over time, both as lease expiration dates draw nearer and as awareness of the issue becomes more widespread. To explore such dynamics, we estimate year-specific treatment effects on both the probability of transaction and transaction prices.

Figure 7 summarizes these results. The negative effect on the probability of transaction is concentrated in the later years of the sample, suggesting that market participants became more responsive as the insecurity of property rights grew more salient. In contrast, the effect on transaction prices emerges earlier: already by 2012, properties with insecure rights sell at a discount relative to comparable secure properties, and this discount deepens steadily over time. These findings indicate that prices began to reflect the insecurity of property rights well before its effect on transaction volumes became visible.

7.3.3 Neighborhood-Specific Effects

Because parcels with insecure property rights are distributed across several central Jerusalem neighborhoods, it is important to test whether the overall results are driven by a single area that may have received disproportionate media or political attention. We therefore replicate the analysis separately for Neve Sha'anan (Nayot), Talbiya–Rehavia, Rasko, and Baqa, the four neighborhoods with the largest number of parcels with insecure property rights.

[3] For the transaction-likelihood specification with block fixed effects (Equation 4), expanding the control radius beyond 500 meters does not change the estimated coefficient on Insecure Property Rights. The additional observations come from blocks that contain only land parcels with secure property rights and no insecure-rights parcels. Because treatment status does not vary within those blocks, these added blocks do not contribute to the within-block identification of the treatment coefficient. We therefore report the transaction-likelihood results only up to the 500-meter threshold.

Appendix Figures A.1 and A.2 plot annual transaction probabilities and average price per square meter in each of the neighborhoods together with their respective control groups. Appendix Tables A.4 and A.5 present the coefficient of interest from a neighborhood-specific regression analysis on the transaction probability and the transaction price, respectively. While the magnitude of the effects varies somewhat across neighborhoods, the overall patterns are consistent: insecure property rights are associated with lower transaction probabilities and lower prices. These results demonstrate that our main findings are not driven by any single neighborhood, but rather reflect a broader phenomenon.

7.4 Economic Magnitude

The estimated effects imply economically substantial consequences of insecure property rights. To illustrate their magnitude, consider a simple back-of-the-envelope calculation. There are approximately 1,050 apartments with insecure property rights in our sample, and the average transaction price in the full sample is approximately NIS 2.65 million. Applying the estimated 15 percent price discount to these properties implies a reduction in housing capitalization of approximately NIS 417 million.

Insecure property rights also reduce market activity. The annual probability of transaction is approximately 5 percent for properties with secure rights and 4 percent for properties with insecure rights. Over the 21 years covered by our data, this one-percentage-point difference implies approximately 221 forgone transactions among the 1,050 affected apartments. At the average transaction price of NIS 2.65 million, these missing transactions correspond to approximately NIS 586 million in forgone transaction volume.

These calculations capture two distinct dimensions of the economic consequences of insecure property rights and should not be added together or interpreted as a measure of social welfare loss. The first reflects reduced housing capitalization, while the second reflects reduced market turnover.

8 Quantifying Legal Uncertainty

Section 2 argues that legal and political uncertainty make property rights insecure for homes built on church-owned land. In particular, it is not clear what will happen when the leases expire. The key uncertainty is whether homeowners will lose their homes at lease expiration or retain them through contractual renewal options or political intervention. This section provides direct evidence of this uncertainty and quantifies the market-implied probability of losing property rights at lease expiration.

The price discount for homes built on church land documented above reflects the degree to which market participants discount properties with insecure property rights. We now investigate whether the observed price gaps are consistent with market participants believing that homeowners will lose their homes with certainty upon lease expiration, or whether the data suggest a more moderate assessment of homeowners' risk of losing their homes.

To address this question, we develop a simple present-value framework. In this framework the value of home ownership is the present value of the future stream of rents. Accordingly, the value of ownership depends on three factors: (1) the number of years the homeowner can enjoy the home; (2) the real growth in rent over time (g); (3) the discount rate of future streams (r). We assume $r > g$, so that the value of a freehold is finite.

When an individual has full ownership of a home (freehold), the property's value at time t equals the present value of the rental stream from year t to infinity: $V_t^{\text{freehold}} = PV(\text{rents from } t \to \infty)$. Now, consider a property whose lease contract expires in year T, at which point the homeowner loses all rights to the property. This means that the property's value at time t equals the present value of the rental stream between t and T: $V_t^{\text{leasehold}} = PV(\text{rents from } t \to T)$. The ratio between the price of the latter property (leasehold) and the former property (freehold) is therefore:

$$\text{Price Ratio}(r, g, t) = \frac{V_t^{\text{leasehold}}}{V_t^{\text{freehold}}} = 1 - \left(\frac{1+g}{1+r}\right)^{T-t} \tag{6}$$

which is a function of the discount rate r, the expected rate of rent growth g, and the time remaining until lease expiration $(T - t)$. Note that this ratio is smaller than 1, since a leasehold property is worth strictly less than a freehold one. As the lease approaches expiration, fewer rents remain for the leasehold property, and the price ratio declines.

To parameterize the expected rent growth rate g, we use data from the Israeli Central Bureau of Statistics (CBS) on Jerusalem rents over the 2005–2024 period, yielding an estimate of $\hat{g} = 2.13\%$.[4] Our estimate of annual rent growth may seem high, since Giglio, Maggiori and Stroebel (2015) estimate long-run real rent growth of approximately 0.62% for the United Kingdom as a whole. However, evidence from large high-demand urban housing markets, like Jerusalem, suggests that rent growth can be substantially higher in such markets. Amaral et al. (2024) report that, between 1950 and 2018, real rents grew on average

[4]Rent growth is estimated using CBS data on average monthly rents in Jerusalem, available at the CBS price index archive (in Hebrew), covering the period 2005Q2-2024Q4. Although our transaction data begin in 2004, 2005Q2 is the earliest date for which the CBS reports rental prices for Jerusalem. Nominal rental prices in Jerusalem grew at an annualized rate of 3.42% over this period. To obtain a real growth rate, we subtract the 1.29% annualized increase in the overall CPI excluding its housing component, yielding $\hat{g} = 2.13\%$. We use this real rate as our baseline estimate of expected rent growth.

by 1.86% across 27 major agglomerations, well above the national average in their sample.

We focus on properties located in the Rehavia, Talbiya, and Nayot neighborhoods whose lease contracts expire in 2051, the modal expiration year in our sample. We estimate yearly treatment effects for church land properties relative to their neighboring control properties, derive the corresponding yearly price ratios, and treat this series as our empirical target. Given $\hat{g}$, we then estimate the discount rate r that minimizes the distance between the observed price ratios and the ratios predicted by the present-value framework.

Figure 8 plots the yearly empirical price ratios. Using Equation 6, we also plot the theoretical price-ratio curves under four candidate gross discount rates (r = 3%, 5%, 7%, 9%). We find that the gross discount rate that minimizes the distance between the predicted and observed price gaps is $\hat{r} = 5.84\%$ (s.e. = 0.197%). This estimate is substantially higher than standard measures of the risk-free discount rate. In a similar setting to ours, Giglio, Maggiori and Stroebel (2015) estimate a discount rate of 2.6%, and Bracke, Pinchbeck and Wyatt (2018) estimate a long-term discount rate of 3.62%.

Figure 8 shows that the observed price ratio is considerably higher than the ratio predicted under certain loss at lease expiration. In other words, under a standard discount rate of $r = 3\%$, we would have expected the price of apartments on church land to be lower than it actually was, if market participants believed that these homes will be lost once the lease expires. This discrepancy implies that market participants do not believe that homeowners are certain to lose their home once the lease expires.

To quantify the probability that market participants assign to the event of homeowners losing their homes at the end of the lease, we assume $r = 3\%$ as the appropriate discount rate, and estimate the probability $\hat{p}$ of losing the property that, when incorporated into the expected present-value calculation, reproduces the observed price ratio. This procedure yields an estimate $\hat{p} = 0.377$ (s.e. = 0.034).[5] In other words, the data are consistent with market participants believing that homeowners will lose their homes at lease expiration with a probability of approximately 38%, rather than with certainty.[6]

[5]Figure 9 reports the sensitivity of $\hat{p}$ to the assumed discount rate, holding expected rent growth fixed. The implied probability increases with the discount rate, from approximately 38 percent at our baseline rate of 3 percent to approximately 77 percent at 5 percent, reaching unity at 5.84 percent. Thus, the precise probability is sensitive to the discount rate, although rates below 5.84 percent imply that homeowners are not certain to lose their rights at expiration.

[6]One possible concern with this interpretation is that the difference between the observed church-land prices and what a simple present-value model predicts under standard discount rates and certain loss of ownership at lease expiration, may absorb factors other than beliefs about the probability of losing the property, such as liquidity premia, difficulty obtaining mortgage finance for church-land properties, or risk aversion. However, these additional factors would, if anything, bias the exercise against our conclusion here. The puzzle is that the observed church-land prices are *higher* than what the simple present-value model predicts. Factors such as illiquidity, financing difficulties, and risk aversion should depress the value of church-land properties. Netting out these forces would therefore imply even higher property values than what we are observing,

We further explore how this implied probability has evolved over time. The observed price ratio is substantially smaller in more recent years than the present-value framework, calibrated on the full sample, would predict. This pattern is consistent with a shift in perceived risk of losing the property following heightened media and political attention to the church-land issue. Figure 10 documents the intensity of media coverage, measured as the yearly count of articles related to church land sales in the *Jerusalem Post* and *Yediot Ahronoth* archives. Coverage was relatively subdued throughout the 2005-2015 period, before surging sharply in 2017. This spike in coverage coincides with the sale of church properties to private investors in 2016 and the ensuing legislative debates. Splitting the sample at 2017, we find that the implied risk of losing the property at the end of the lease differs markedly across sub-periods: $\hat{p} = 0.274$ (s.e. $= 0.019$) for years prior to 2017, and $\hat{p} = 0.517$ (s.e. $= 0.045$) for 2017 and later. This increase in perceived risk of losing the property aligns closely with the spike in media salience: as public awareness of the church-land issue intensified, market participants appear to have revised upward their assessment of the risk, consistent with the decreasing price ratio documented above.

Taken together, these findings suggest that while the insecurity of property rights exerts a meaningful negative effect on housing prices, market participants do not treat the loss of property rights as a foregone conclusion. Rather, they assign a substantial but partial probability to the loss of property rights, and this perceived probability has grown over time as legal and political uncertainty has deepened.

9 Discussion and Conclusions

Secure property rights are generally understood to facilitate investment and the efficient allocation of resources. Yet much of the empirical evidence supporting this proposition comes from developing economies, low-income populations, or historical settings. This paper shows that property-rights insecurity can impose substantial economic costs even in a wealthy, highly developed urban housing market. The Jerusalem church-land setting provides an unusual opportunity to compare properties with secure and insecure property rights that are located within the same neighborhoods, and often on adjacent parcels, but face sharply different uncertainty regarding their long-term ownership.

We find that insecure property rights affect both prices and market activity. Properties with insecure property rights are approximately 20 percent less likely to transact and

and hence an even lower perceived probability of losing the property at lease expiration. In this sense, our estimate of $\hat{p} = 0.377$ should be viewed as a lower-bound estimate of the market-implied probability of losing the property.

sell at discounts of roughly 10 to 15 percent on average. The price discount increases sharply as lease expiration approaches, while transaction activity is generally lower as shorter lease horizons. The reduction in transaction volume is consistent with forgone mutually beneficial trades and resulting misallocation, suggesting that the costs of insecurity extend beyond lower asset values. In terms of economic magnitude, back-of-the-envelope calculations imply approximately NIS 417 million in reduced housing capitalization for the treated housing stock and NIS 586 million in forgone transaction volume over the sample period.

Our theoretical framework highlights two competing forces through which property-rights insecurity may affect transaction volume. Seller risk aversion encourages owners to sell an asset exposed to possible loss, while disagreement between buyers and sellers about the probability of loss discourages trade by widening the gap between their valuations. The empirical finding that insecure properties transact less frequently is consistent with belief divergence dominating risk aversion in this market. This mechanism may apply more broadly whenever current owners are systematically more optimistic than prospective buyers about how legal or political uncertainty will ultimately be resolved.

The price discounts also reveal how the market prices the risk of losing property rights. Under conventional discount rates, prices would be substantially lower if buyers believed that homeowners were certain to lose their rights when the leases expire. Instead, the data imply a perceived probability of loss of approximately 38 percent. The implied probability rises form approximately 27 percent before 2017 to 52 percent thereafter, coinciding with heightened media attention, investor acquisition, and unsuccessful legislative activity. Market participants therefore appear to assign meaningful probabilities both to the loss of existing rights and to outcomes, such as negotiated extensions or government intervention, that would preserve them.

More broadly, the results show the housing markets respond to uncertainty decades before property rights might actually be lost. These findings underscore that the economic value of property rights depends not only on their formal legal definition but also on confidence about how they will be treated in the future. Accordingly, institutions that clarify future ownership rights and provide credible procedures for resolving end-of-term claims may generate significant economic benefits well before those rights are scheduled to expire.

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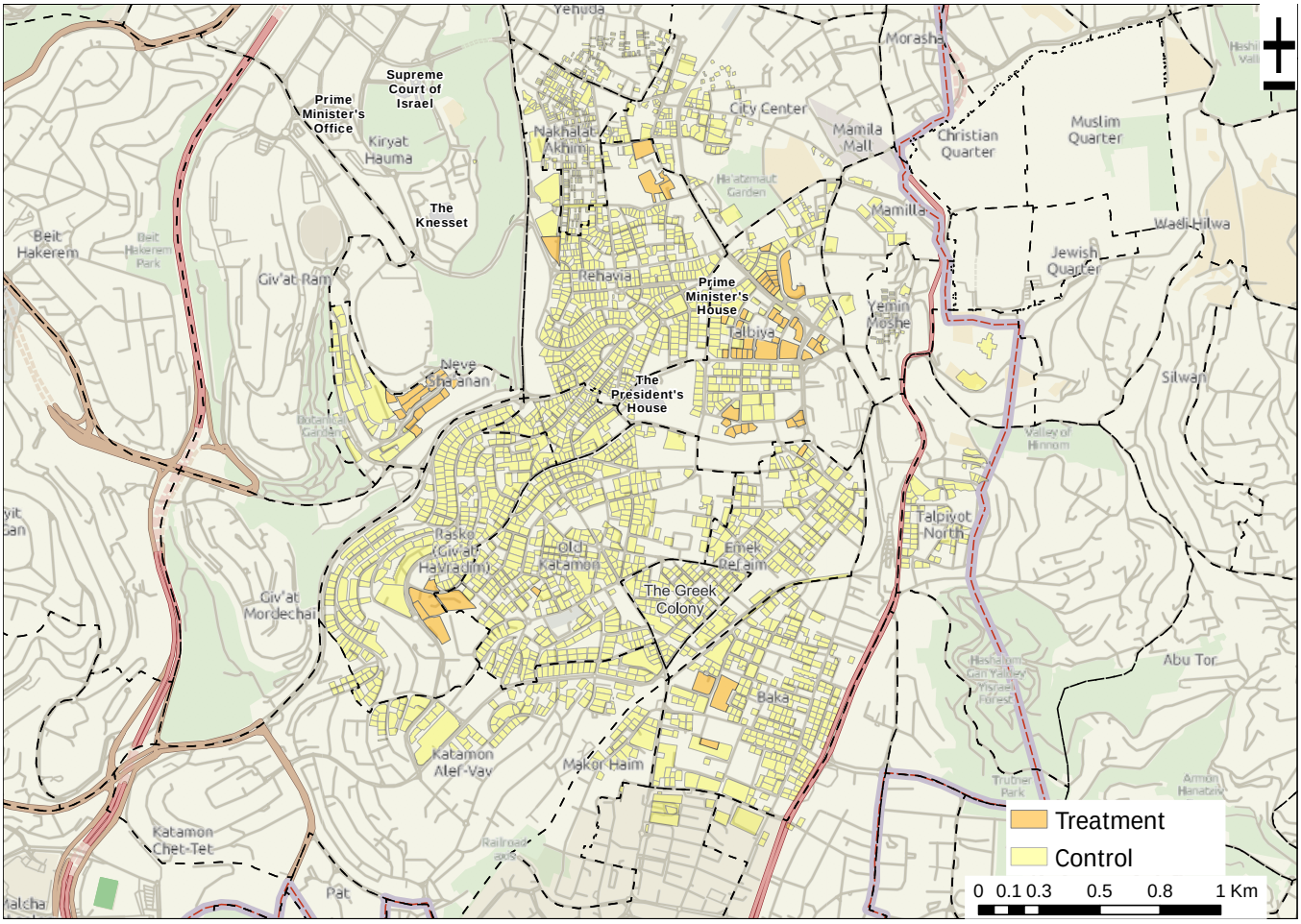

Figure 1: Map of Central Jerusalem land parcels with secure and insecure property rights

Notes: This map displays the location of land parcels in our main sample, which includes (i) all parcels with insecure property rights and (ii) parcels with secure rights located within 500 meters of them that contain residential properties. Block boundaries are indicated by thick black lines, and parcel boundaries by thin gray lines. Parcels with secure rights appear in light yellow, while parcels with insecure rights are shaded in a darker yellow. Neighborhood boundaries are delineated with dashed black lines, and neighborhood names are labeled directly on the map. Four neighborhoods emphasized in the analysis are Neve Sha'anan (south of the Knesset), Rehavia-Talbiya (surrounding the Prime Minister's House), Rasko (southwestern part of the shaded area), and Baka (southeastern part of the shaded area).

Figure 2: Adjacent Houses in the Neve Sha'anan Neighborhood

Notes: The house on the left has insecure property rights. The house on the right has secure property rights.

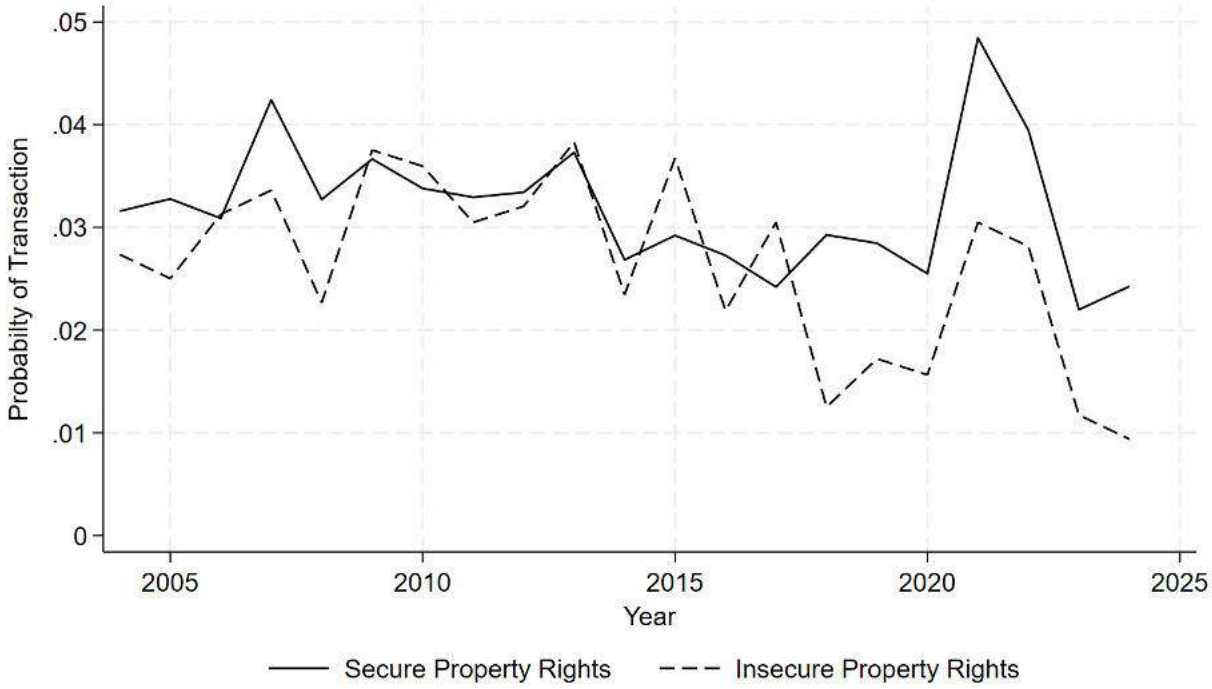

Figure 3: Probability of Transaction

Notes: The figure presents a time series showing the yearly probability of transaction for properties with secure (solid line) and insecure (dashed line) property rights. The figure demonstrates that the probability of transaction is usually lower for parcels with insecure property rights, and that the gap widens in later years.

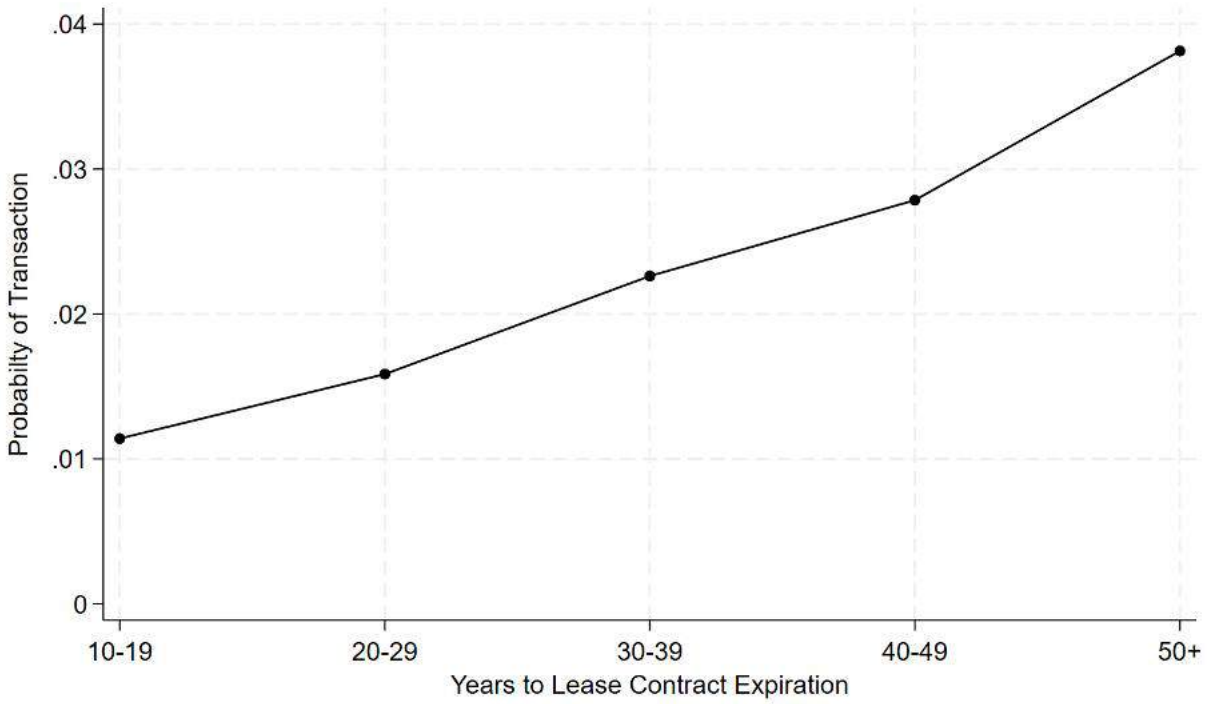

Figure 4: Transaction Probability by Years to Lease Expiration

Notes: The figure presents the yearly probability of transaction in land parcels with insecure property rights, segmented by the number of years remaining until lease contract expiration. The probabilities are calculated for parcel-year pairs grouped into the following time intervals: 11-19 years, 20-29 years, 30-39 years, 40-49 years, and 50 years or more. The figure shows that the probability of transaction increases as the time to contract expiration extends, indicating a higher likelihood of transaction when more time remains on the lease.

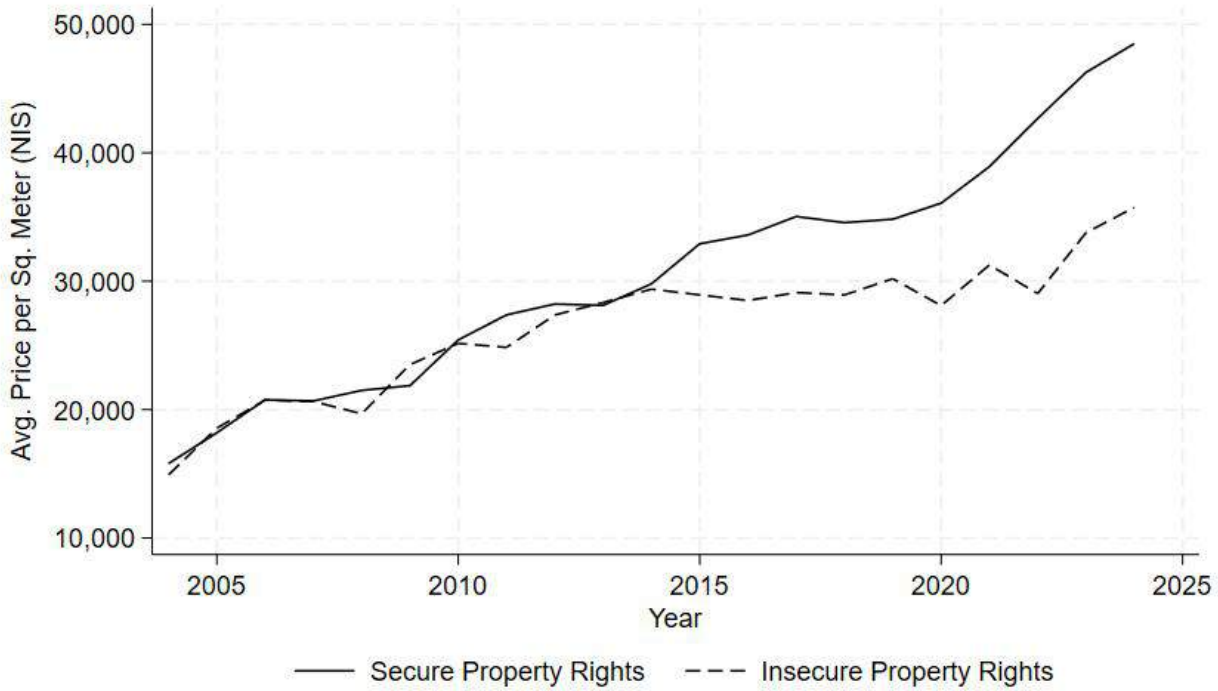

Figure 5: Price per Square Meter

Notes: The figure shows a time series of yearly prices per square meter for land parcels with secure property rights (solid line) and insecure property rights (dashed line). The data show that while prices are similar until 2013, there is an increasing price gap since then. This widening price gap may reflect growing market sensitivity to insecure property rights.

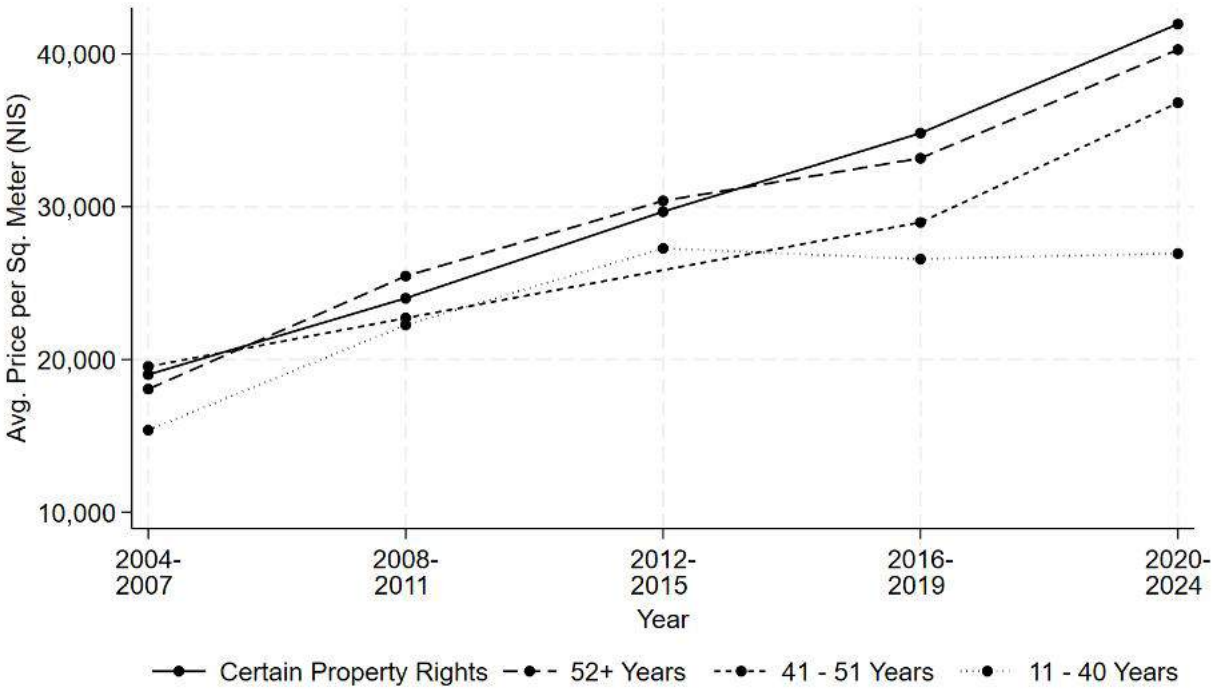

Figure 6: Price per Square Meter by Proximity to Contract Expiration

Notes: The figure presents a time series of the price per square meter, grouped into four-year bins. It includes four series: properties located in land parcels with secure property rights (solid line), and properties in leased parcels with insecure property rights, where the lease contract expires 52+ years (dashed line), 41-51 years (short-dashed line) and 11-40 years (dotted line) after the transaction date. The figure shows that properties with secure property rights and those with lease contract expiring more than 50 years from the transaction date are sell at higher prices per square meter compared to properties with lease contract expiring sooner. Furthermore, the footage prices are lower for properties whose lease contracts expire earlier.

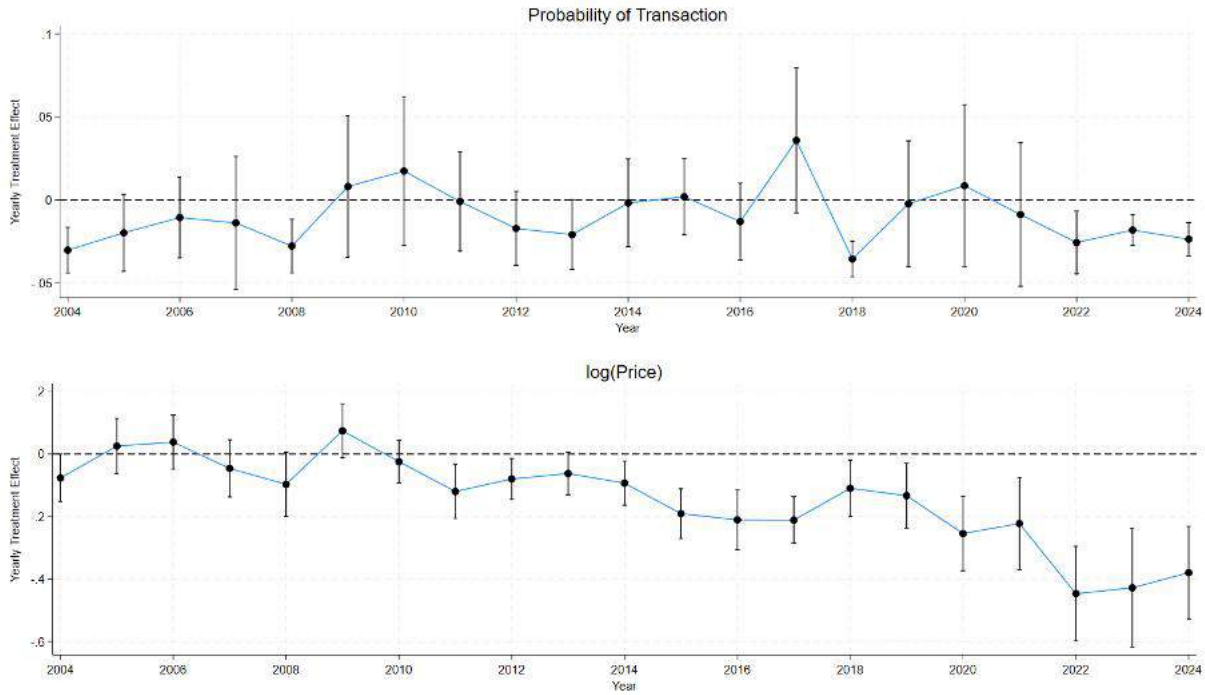

Figure 7: Yearly Treatment Effects

Notes: The figure presents the yearly treatment effects obtained from estimating variants of Equations 4 and 5, where the coefficient on the *Insecure Property Rights* variable, β, is allowed to vary by year. Each point estimate is shown with its corresponding 95% confidence interval. The top panel displays the estimated effect on the probability of transaction, while the bottom panel shows the effect on the log of the price per square meter. The results indicate that the treatment effect on transaction probability is generally negative but statistically distinguishable from zero only toward the end of the sample period. In contrast, the effect on log prices becomes statistically significant starting in 2012, and grows in magnitude (in absolute value) in subsequent years—suggesting a deepening negative impact of insecure property rights on transaction prices over time.

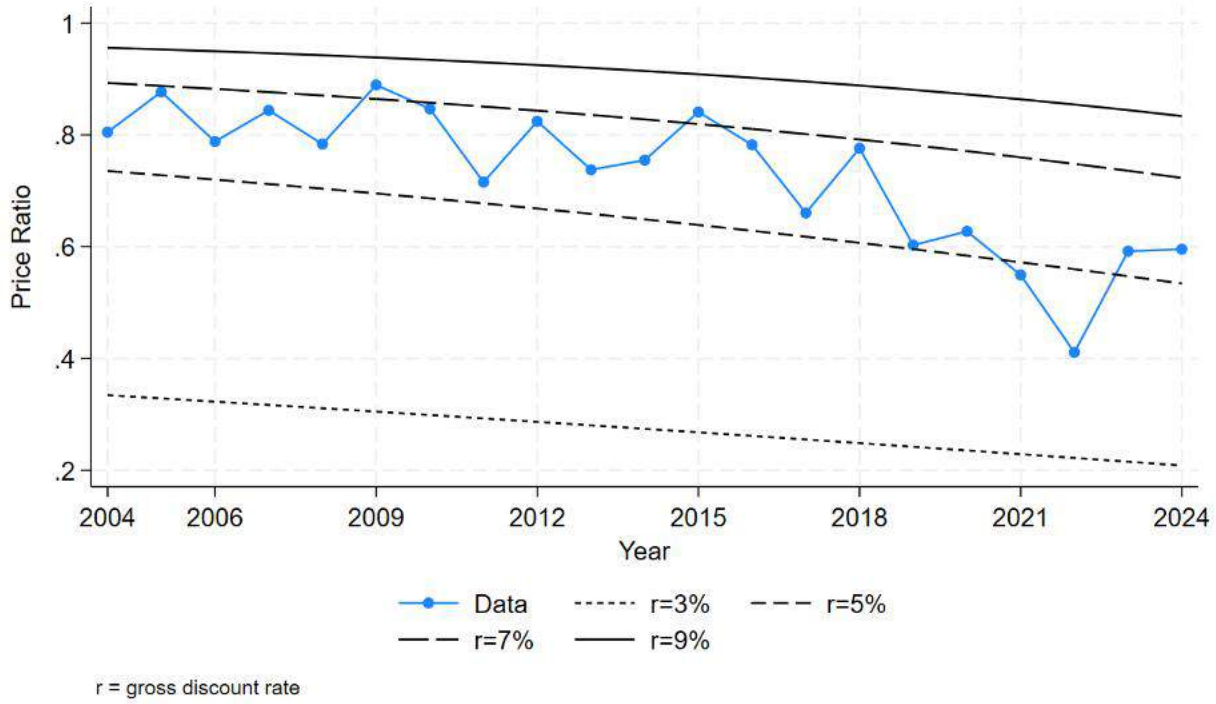

Figure 8: Estimated Gross Discount Rate

Notes: The figure plots the yearly empirical price ratios $V_t^{\text{leasehold}}/V_t^{\text{freehold}}$ between properties with insecure property rights and those with secure property rights (solid line with dots), together with the theoretical price ratio curves implied by the present value framework under four candidate gross discount rates: $r = 3\%$ (dotted line), $r = 5\%$ (short-dashed line), $r = 7\%$ (long-dashed line), and $r = 9\%$ (solid line). The empirical series is obtained from yearly treatment effect estimates for properties whose lease contracts expire in 2051, the modal expiration year in our sample, relative to neighboring properties with secure property rights, located in the Rehavia, Talbiya, and Neve Sha'anan (Nayot) neighborhoods. The theoretical curves are computed using the present value framework described in Section 8, with rent growth fixed at $\hat{g} = 2.13\%$. The gross discount rate that minimizes the distance between the predicted and observed price ratios is $\hat{r} = 5.84\%$ (s.e. $= 0.197\%$).

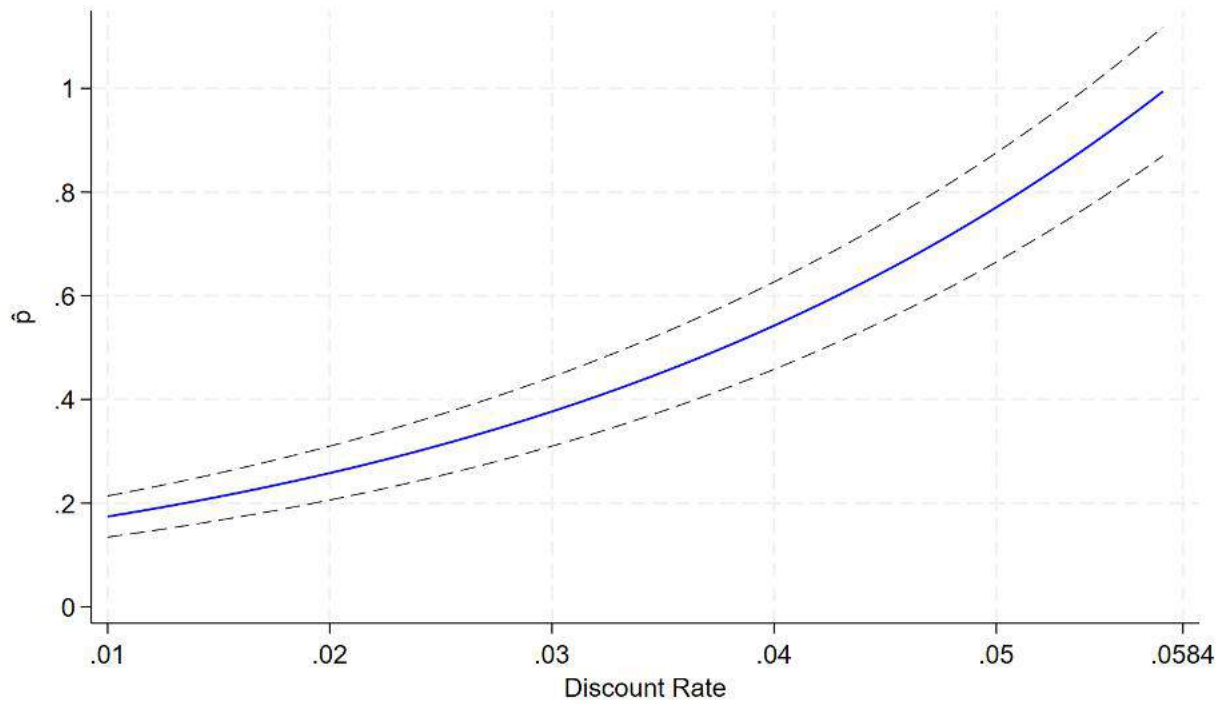

Figure 9: Sensitivity of the Implied Probability of Property Loss to the Discount Rate

Notes: The figure plots the estimated probability of losing property rights at lease expiration, $\hat{p}$, for alternative assumed discount rates, holding expected annual real rent growth fixed at $g = 2.13\%$. Estimates use properties whose leases expire in 2051, as described in Section 8. The solid line reports point estimates, and the dashed lines indicate confidence bands. The implied probability is approximately 38 percent at the baseline discount rate of 3 percent and reaches unity at a discount rate of 5.84 percent.

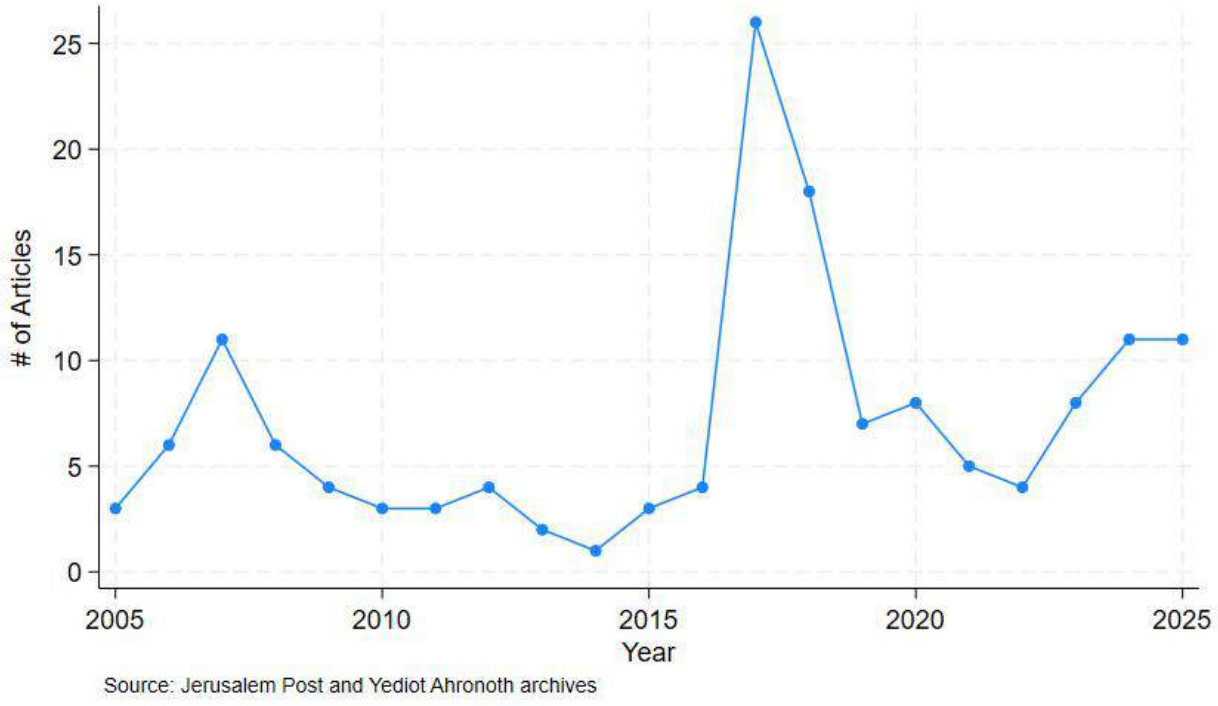

Figure 10: Media Coverage Intensity

Notes: Yearly count of newspaper articles related to church land sales in Jerusalem, based on the *Jerusalem Post* and *Yediot Ahronoth* archives. The sharp spike in 2016-2017 coincides with the sale of church properties to private investors and the surrounding legislative debates.

Table 1: Descriptive Statistics of Treatment and Control Groups

Panel A: Unit of Observation – Transaction

	Control	Treatment
Price per Sq. Meter (NIS)	30,157.19	26,141.91
	(14,793)	(9,297)
# Rooms	3.45	4
	(1.26)	(1.27)
New Apartment	0.13	0.14
	(0.34)	(0.35)
Multiple Buyers or Sellers	0.18	0.16
	(0.38)	(0.36)
Transaction Year	2,013.75	2,013.42
	(6.03)	(5.66)
Property Age at Transaction	41.92	35.45
	(25.25)	(21.32)
Distance to Treated Parcel (meters)	276.79	.
	(124.02)	
Lease Contract Expiration Year	.	2,065.51
		(26.91)
Main Neighborhoods		
Neve Sha'anan (Nayot)	346	84
Talbiya-Rehavia	3,840	495
Rasko	3,408	156
Baqa	1,920	124
N	15,865	876

Panel B: Unit of Observation – Land Parcel × Year

	Control	Treatment
Probability of Transaction	0.051	0.035
	(0.209)	(0.118)
N	47,674	1,232

Notes: Panel A reports transaction-level characteristics for properties located on parcels with insecure property rights (treatment) and parcels with secure rights within 500 meters (control). Prices are expressed in NIS per square meter; values are nominal. Panel B aggregates to the parcel–year level and reports the annual probability of transaction, defined as the ratio between the yearly number of transactions and the number of apartments in the parcel. Standard deviations are in parentheses.

Table 2: The Effect of Insecure Property Rights on Housing Liquidity

	(1)	(2)	(3)
Insecure Property Rights	-0.012***	-0.009***	-0.009**
	(0.003)	(0.003)	(0.005)
Year F.E.	✓	✓	✓
Neighborhood F.E.	✗	✓	✗
Block F.E.	✗	✗	✓
R^2	0.004	0.009	0.013
N	46,683	46,683	46,683

Notes: An observation is a parcel–year pair. The coefficient on Insecure Property Rights compares parcels with insecure rights to nearby parcels (within 500m) with secure rights. The sample covers 2004–2024. Year, neighborhood, and block fixed effects included as indicated. Robust standard errors in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Effect of Time to Lease Contract Expiration on Housing Liquidity

	Probability of Transaction		
	(1)	(2)	(3)
44+ Years to Lease Contract Expiration	-0.009	-0.006	-0.006
	(0.006)	(0.006)	(0.007)
35-43 Years to Lease Contract Expiration	-0.013***	-0.011**	-0.012**
	(0.005)	(0.005)	(0.006)
10-34 Years to Lease Contract Expiration	-0.013**	-0.011*	-0.011
	(0.006)	(0.006)	(0.007)
Year F.E.	✓	✓	✓
Neighborhood F.E.	✗	✓	✗
Block F.E.	✗	✗	✓
R^2	0.004	0.009	0.013
N	46,683	46,683	46,683

Notes: An observation is a parcel–year pair. Observations of land parcels with insecure property rights were divided into terciles based on the time between the year corresponding to the observation and the year of lease contract expiration (10-34, 35-43, and 44-146 years). The omitted group consists of land parcels with secure property rights. The sample covers 2004–2024. Year, neighborhood, and block fixed effects included as indicated. Robust standard errors in parentheses.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 4: The Effect of Insecure Property Rights on Housing Price

	log(Price per Sq. Meter)				
	(1)	(2)	(3)	(4)	(5)
Insecure Property Rights	-0.097***	-0.073***	-0.080***	-0.127***	-0.156***
	(0.012)	(0.012)	(0.011)	(0.017)	(0.013)
Apartment Characteristics	✗	✓	✓	✓	✓
Year F.E.	✗	✗	✓	✓	✓
Street F.E.	✗	✗	✗	✓	✗
Block F.E.	✗	✗	✗	✗	✓
R^2	0.002	0.100	0.435	0.595	0.557
N	15,669	15,584	15,584	15,422	15,581

Notes: An observation is a transaction. The sample includes transactions in properties with insecure property rights and transactions in properties with secure rights located within 500 meters of parcels with insecure rights. The time period is 2004–2024. Apartment characteristics include the number of rooms, a new-apartment indicator, an indicator for whether the transaction involves more than one buyer or seller, and a quadratic in the property's age at the year of transaction. Robust standard errors are reported.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table 5: The Effect of Insecure Property Rights on Housing Price

	log(Price per Sq. Meter)				
	(1)	(2)	(3)	(4)	(5)
52+ Years to Lease Contract Expiration	-0.008	-0.011	-0.016	0.032	-0.031*
	(0.023)	(0.023)	(0.017)	(0.024)	(0.016)
41-51 Years to Lease Contract Expiration	-0.210***	-0.182***	-0.033*	-0.080***	-0.117***
	(0.021)	(0.019)	(0.019)	(0.021)	(0.019)
11-40 Years to Lease Contract Expiration	-0.079***	-0.034*	-0.176***	-0.326***	-0.366***
	(0.018)	(0.019)	(0.019)	(0.024)	(0.022)
Apartment Characteristics	✗	✓	✓	✓	✓
Year F.E.	✗	✗	✓	✓	✓
Street F.E.	✗	✗	✗	✓	✗
Block F.E.	✗	✗	✗	✗	✓
R^2	0.004	0.101	0.436	0.599	0.561
N	15,669	15,584	15,584	15,422	15,581

Notes: An observation is a transaction. The sample includes transactions in properties with insecure property rights and transactions in properties with secure rights located within 500 meters of parcels with insecure rights. Transactions with insecure property rights were divided into terciles based on the time between the year of transactions and the year of lease contract expiration (11-40, 41-51 and 52-137 years). The omitted group consists of properties with secure property rights. The time period is 2004–2024. Apartment characteristics include the number of rooms, a new-apartment indicator, an indicator for whether the transaction involves more than one buyer or seller, and a quadratic in the property's age at the year of transaction. Robust standard errors are reported.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

A Appendix: Heterogeneous Buyers

This appendix extends the baseline model by allowing for heterogeneity on *both sides* of the market. Buyers, like sellers, differ in their valuations and are risk averse. As a result, demand is downward sloping. We show that the main comparative statics of the baseline model are preserved. Assume a unit mass of sellers and a unit mass of buyers. Each seller owns one property and has a personal valuation $v \sim U[0,1]$. Property rights are insecure: with probability p the property is lost. Sellers have a risk-aversion parameter $\alpha \geq 0$. A seller's certainty-equivalent utility from holding the property is

$$u_s = (1-p)v - \alpha p v = \Big[1 - (1+\alpha)p\Big]v.$$

Each buyer has valuation $w \sim U[0,1]$ for the property. Buyers perceive a higher probability of loss, $p_b = (1+\gamma)p$, with $\gamma \geq 0$, and have risk-aversion parameter $\beta \geq 0$. The buyer's certainty-equivalent value is

$$u_b = (1-p_b)w - \beta p_b w = \Big[1 - (1+\beta)(1+\gamma)p\Big]w.$$

We assume that the certainty-equivalent value of holding the property is positive for both buyers and sellers with positive valuations. Thus,

$$1 - (1+\alpha)p > 0 \qquad \text{and} \qquad 1 - (1+\beta)(1+\gamma)p > 0.$$

At price P, a buyer purchases if $u_b \geq P$, i.e.

$$w \geq \frac{P}{1 - (1+\beta)(1+\gamma)p}.$$

Since $w \sim U[0,1]$, aggregate demand is

$$Q_d(P) = 1 - \frac{P}{1 - (1+\beta)(1+\gamma)p}.$$

Equivalently, inverse demand is

$$P = \Big[1 - (1+\beta)(1+\gamma)p\Big](1-Q). \tag{7}$$

A seller sells if $P \geq u_s$, i.e.

$$v \leq \frac{P}{1-(1+\alpha)p}.$$

With $v \sim U[0,1]$, aggregate supply is

$$Q_s(P) = \frac{P}{1-(1+\alpha)p}. \tag{8}$$

An interior equilibrium satisfies $Q_d(P) = Q_s(P) = Q^*$. Let us define, for simplicity, $A \equiv 1-(1+\alpha)p$ and $B \equiv 1-(1+\beta)(1+\gamma)p$. Using (7) and (8), equilibrium is given by

$$Q^* = \frac{B}{A+B}, \qquad P^* = \frac{AB}{A+B}.$$

Prices. Both A and B are decreasing in p, implying that equilibrium prices P^* strictly decrease as property-rights insecurity increases.[7]

Transaction volume. Differentiating equilibrium volume yields

$$\frac{\partial Q^*}{\partial p} = \frac{\alpha - [\gamma(1+\beta)+\beta]}{(A+B)^2}. \tag{9}$$

Thus, the numerator, which determines the effect of property-rights insecurity on transaction volume, depends on how large is seller risk aversion (α) relative to buyer risk aversion (β) and the belief divergence (γ).

Proposition 2. *When buyers differ in valuation and are risk averse, property-rights insecurity continues to depress equilibrium prices. The effect on transaction volume is positive if seller risk aversion dominates buyer pessimism and buyer risk aversion* ($\alpha > \gamma(1+\beta)+\beta$)*, and negative otherwise.*

Relative to the baseline model, introducing heterogeneity and risk aversion on the buyer side does not alter the core economic forces. Sellers' risk aversion encourages exit in response to the insecurity of property rights, while buyers' pessimism and risk aversion reduces willingness to pay. The sign of the volume response reflects which force dominates, consistent with the intuition and comparative statics of the main text.

B Additional Figures

[7] Since $\frac{dP^*}{dp} = \frac{A'(p)B(p)^2 + A(p)^2B'(p)}{(A(p)+B(p))^2} < 0$ if $A'(p) < 0$ and $B'(p) < 0$.

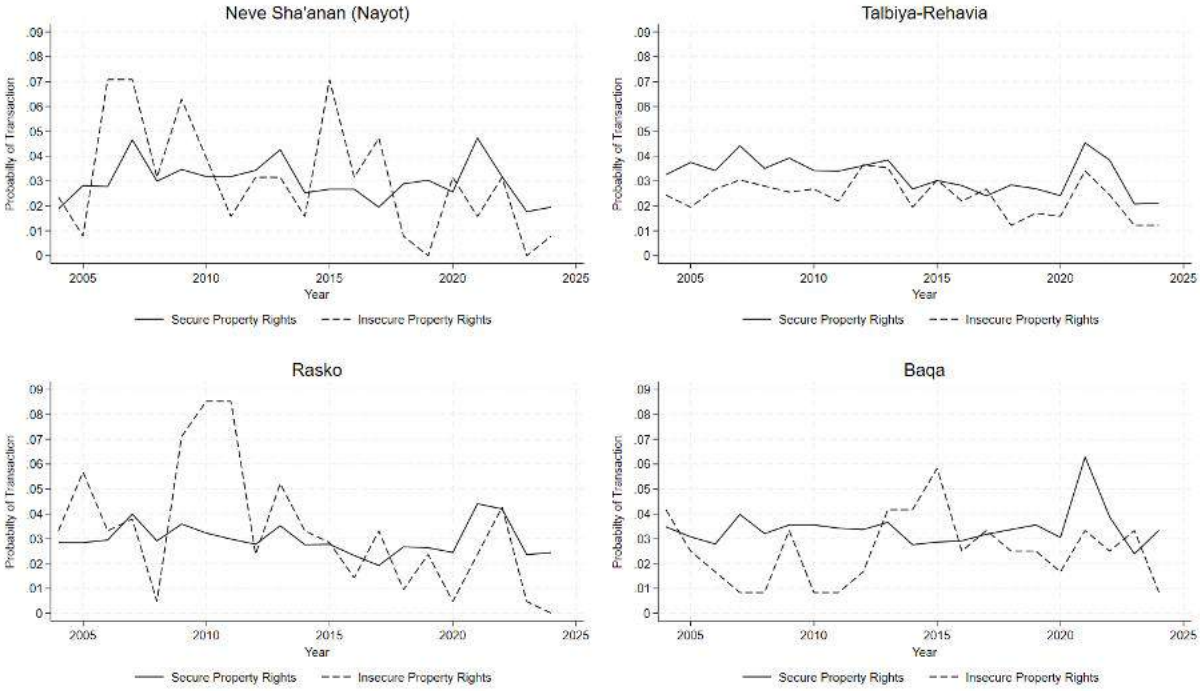

Figure A.1: Neighborhood-Specific Probability of Transaction

Notes: The figure presents time series showing the yearly probability of transaction for land parcels with secure (solid line) and insecure (dashed line) property rights. Each sub-figures corresponds to a distinct neighborhood. While the neighborhood-specific figures are naturally noisier than the sub-figure based on all the neighborhoods, they still demonstrate a tendency for a lower probability of transaction for parcels with insecure property rights.

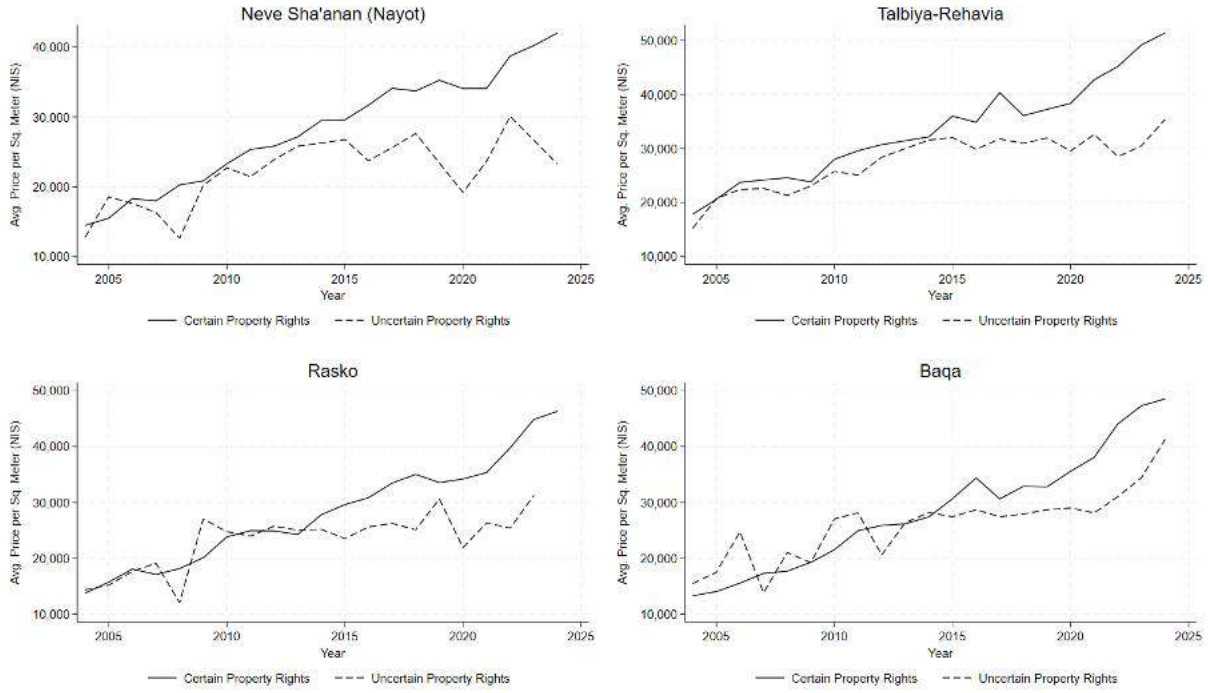

Figure A.2: Neighborhood-Specific Price per Square Meter

Notes: The figure presents time series showing the average yearly price per square for land parcels with secure (solid line) and insecure property rights (dashed line). Each sub-figure corresponds to a distinct neighborhood. The neighborhood-specific sub-figures demonstrate a price gap between the secure and insecure property rights time series that increase over time.

C Additional Tables

Table A.1: The Effect of Insecure Property Rights on Housing Liquidity - Alternative Control Group Thresholds

	25m	50m	100m	150m	250m	500m
	(1)	(2)	(3)	(4)	(5)	(6)
Insecure Property Rights	0.07453**	-0.01380**	-0.01215***	-0.00908*	-0.00970**	-0.00942**
	(0.03052)	(0.00617)	(0.00355)	(0.00474)	(0.00464)	(0.00463)
Avg. Transaction Prob.	0.082	0.044	0.046	0.049	0.049	0.048
R^2	0.154	0.044	0.021	0.013	0.018	0.013
N	147	1,491	4,830	9,030	19,740	46,683

Notes: The unit of observation is a parcel–year pair. The coefficient on Insecure Property Rights compares parcels with insecure rights to nearby parcels with secure rights. Columns vary the maximum distance threshold (25m–500m) used to define the nearby control group. Column (6) reproduces the estimates from Table 2, column (3) for ease of comparison. To improve comparability between land parcels with insecure and secure rights, the estimation includes only land parcels with insecure rights that have land parcels with secure rights within the maximum distance threshold and land parcels with secure rights that have land parcels with insecure rights within that threshold. All regressions include year and block fixed effects. The sample covers 2004–2024. **Avg. Transaction Prob.** is the average transaction probability in a given year. Robust standard errors are reported. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.2: The Effect of Insecure Property Rights on Housing Price - Alternative Control Group Thresholds

	50m	100m	150m	250m	500m
	(1)	(2)	(3)	(4)	(5)
Insecure Property Rights	-0.170***	-0.177***	-0.166***	-0.159***	-0.156***
	(0.026)	(0.015)	(0.014)	(0.013)	(0.013)
R^2	0.444	0.525	0.485	0.532	0.557
N	772	2,280	3,504	7,175	15,581

Notes: An observation is a transaction. The dependent variable is the log of the price per sq. meter. The coefficient on Insecure Property Rights compares properties with insecure rights to nearby properties with secure rights. Columns vary the maximum distance threshold (50m–500m) used to define the nearby control group. Column (5) reproduces the estimates from Table 4, column (5) for ease of comparison. To improve comparability between properties with insecure and secure rights, the estimation includes only properties with insecure rights that have properties with secure rights within the maximum distance threshold and properties with secure rights that have properties with insecure rights within that threshold. All regressions include year and block fixed effects. Apartment characteristics include the number of rooms, a new-apartment indicator, an indicator for whether the transaction involves more than one buyer or seller, and a quadratic in the property's age at the year of transaction. The time period is 2004–2024. Robust standard errors are reported.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.3: The Effect of Insecure Property Rights on Housing Price - Alternative Control Group Thresholds

	500m	1000m	1500m	2000m	2500m
	(1)	(2)	(3)	(4)	(5)
Insecure Property Rights	-0.156***	-0.143***	-0.135***	-0.126***	-0.124***
	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
R^2	0.557	0.567	0.586	0.599	0.615
N	15,581	25,783	37,730	50,892	59,023

Notes: An observation is a transaction. The dependent variable is the log of the price per sq. meter. The coefficient on Insecure Property Rights compares properties with insecure rights to nearby properties with secure rights. Columns vary the maximum distance threshold (500m–2500m) used to define the nearby control group. Column (1) reproduces the estimates from Table 4, column (5) for ease of comparison. All regressions include year and block fixed effects. Apartment characteristics include the number of rooms, a new-apartment indicator, an indicator for whether the transaction involves more than one buyer or seller, and a quadratic in the property's age at the year of transaction. The time period is 2004–2024. Robust standard errors are reported.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.4: The Effect of Insecure Property Rights on Housing Liquidity

	Neve Sha'anan	Talbiya-Rehavia	Rasko	Baqa
	(1)	(2)	(3)	(4)
Insecure Property Rights	-0.008	-0.012**	0.006	-0.025***
	(0.007)	(0.005)	(0.012)	(0.006)
Avg. Transaction Prob.	0.049	0.048	0.049	0.049
Year F.E.	✓	✓	✓	✓
Neighborhood F.E.	✗	✗	✗	✗
Block F.E.	✗	✓	✓	✓
R^2	0.004	0.013	0.013	0.013
N	45,759	46,263	45,633	45,549

Notes: The unit of observation is a parcel–year pair. Each column reports results for a different neighborhood (see Figure 1 for neighborhood boundaries). In each column, the treated parcels are parcels with insecure property rights located in the neighborhood indicated in the column heading. The comparison group consists of parcels with secure property rights located within 500 meters of these treated parcels, regardless of whether the comparison parcels are located within the indicated neighborhood. Column (1) includes year fixed effects (FEs) only; columns (2)–(4) additionally include block FEs. Block FEs are omitted in column (1) due to the small number of blocks in Neve Sha'anan. **Avg. Transaction Prob.** is the neighborhood mean annual transaction probability (reported as a fraction). Robust standard errors are reported.
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A.5: The Effect of Insecure Property Rights on Housing Price

	Neve Sha'anan	Talbiya-Rehavia	Rasko	Baqa
	(1)	(2)	(3)	(4)
Insecure Property Rights	-0.088	-0.168***	-0.029	-0.109***
	(0.055)	(0.023)	(0.027)	(0.034)
Apartment Characteristics	✓	✓	✓	✓
Year F.E.	✓	✓	✓	✓
Street F.E.	✓	✓	✓	✓
Block F.E.	✗	✗	✗	✗
R^2	0.655	0.542	0.637	0.679
N	1,995	7,919	3,949	3,181

Notes: An observation is a transaction. The dependent variable is the log of the price per sq. meter. Each column reports results for a different neighborhood (see Figure 1 for neighborhood boundaries). In each column, the treated properties are properties with insecure rights located in the neighborhood indicated in the column heading. The comparison group consists of properties with secure rights located within 500 meters of these treated properties, regardless of whether the comparison properties are located within the same neighborhood. All columns include apartment characteristics, year fixed effects, and street fixed effects. Street fixed effects are used instead of block fixed effects because, in Neve Sha'anan (Nayot), the treated properties fully overlap with a single block, rendering the treatment indicator perfectly collinear with block fixed effects. For consistency and comparability across neighborhoods, the same specification is applied to all columns. Robust standard errors are reported.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$