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Lease Expirations and CRE Property Performance

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Abstract:
This study analyzes how lease expirations affect the performance of commercial real estate (CRE) properties and how these patterns changed during the COVID-19 crisis. Even before the pandemic, lease expirations were associated with a notable increase in the downside risk to a property's occupancy or income, particularly in weaker property markets. These risks became more pronounced during the pandemic, driven mostly by office properties. During the pandemic, the adverse effect of lease expirations on office occupancy increased more than 50 percent overall, and it doubled for offices in central business districts (CBDs). This amplified effect of office lease expirations serves as a harbinger of further deterioration as leases continue to roll over in coming years, especially among CBD offices. Across lender groups, nonbank and large bank lenders are more exposed than regional and community banks to office loans in those distressed CBDs. This pattern somewhat alleviates the concern that CRE portfolio credit risk will exacerbate the headwinds faced by this latter group of banks.

JEL Classifications: R30, R33, G21, G23
Keywords: Commercial real estate, lease expirations, COVID-19, office loans, bank loan exposure

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1 Introduction

The COVID-19 pandemic has the potential to significantly disrupt the commercial real estate (CRE) market. In particular, the pandemic-induced shift to remote work appears to have led to a large and persistent decline in the demand for office space, especially in central business districts (CBDs). However, CRE loan performance has remained relatively resilient to date, as long-term leases have thus far shielded commercial-property owners from much of the impact of diminished demand for space. How these properties will perform in the longer term as more leases expire remains an open question. To shed light on this topic, we analyze how lease expirations have affected property performance historically and investigate how these patterns have changed so far for leases that have expired since the COVID-19 outbreak.

We find that before the pandemic, lease expirations tended to be associated with modest deterioration in a property's financial performance. A property with expiring leases accounting for 10 percent of its square footage would be expected to experience a roughly 70 basis point decline in occupancy rate over the next two years and a 100 basis point decline in net operating income (NOI) growth. These declines predominantly reflect downside risk; lease expirations have little effect on median or better property outcomes, but they are associated with notable declines in occupancy and income at lower performance quantiles.

These effects of lease expirations are highly dependent on the strength of the local property market. In markets with minimal vacancy, expirations bring about little change in occupancy and even modest increases in income. However, when market vacancy rates are relatively high, expirations are associated with more dramatic declines in income and occupancy. Intuitively, when local demand is weak, expiring leases are less likely to be renewed or replaced at a comparable rent. Even when the landlord does manage to lease the space again, costlier concessions may be needed to do so, resulting in weaker cash flows after the expiration.

This dynamic implies that the outcome of recent lease expirations can provide a valuable signal about the strength of demand in a local property market. For example, to the extent that demand for office space has fallen structurally due to the pandemic, we would expect the financial performance of office properties to deteriorate more substantially when leases expire. Even though not enough leases have rolled over to cause a significant deterioration in property performance so far, an environment characterized by difficulty retaining tenants upon expiration can signal that there is stress to come.

To investigate the extent to which the pandemic has stressed CRE markets, we examine how the response of CRE property performance to scheduled lease expirations differs in the pandemic and pre-pandemic periods. We find that, overall, expirations during the pandemic

have so far had only modestly larger effects on occupancy or income compared with the period before the COVID-19 outbreak. However, some segments are clearly experiencing strains. For offices, the predicted effect of lease expirations on occupancy increased by about one-half during the pandemic, and the predicted effect on NOI grew by about one-third. These effects vary substantially across localities; the effect of lease expirations on occupancy or income roughly doubled for office properties in CBDs relative to the effect before the pandemic. Additionally, we find much larger effects of lease expirations during the pandemic in counties where there has been a large and persistent decline in time spent at workplaces relative to before the pandemic.

As a final exercise, we examine the extent to which different types of lenders are exposed to the types of CRE loans that appear to be most adversely affected by pandemic developments. We show that relative to small banks, global systemically important banks (G-SIBs) and nonbank CRE lenders have higher concentrations of office lending in the most at-risk areas (that is, CBDs and areas with a greater shift to remote work). Thus, while office loans at small and regional banks still face headwinds from higher interest rates, the properties securing these loans at least appear to be located in markets with more favorable leasing dynamics. This geographic distribution should mitigate the risk of deteriorating office loan performance amplifying regional bank strains.

2 Data and Methodology

We use Morningstar property-level panel data on properties that secure commercial mortgage-backed securities (CMBS) loans to investigate the effects of lease expirations on property performance. CMBS are the second-largest category of lenders funding office properties in the United States (behind banks) and tend to specialize in larger loans.[1] This market segment is useful to study because borrowers need to provide regular updates regarding their property's financial performance and lease expiration schedule. The key variables of interest are the changes in property-level operating and financial-performance indicators on the dates when leases expire—occupancy rates and net operating income (NOI) specifically. Our sample contains office, retail, and industrial properties, the three property types for which lease expirations are important. The sample starts in 2009, when reporting of leasing variables began.

While the data are reported monthly, the main variables of interest typically are updated at a lower frequency. When constructing the panel data, we consider changes in financial

[1] See Glancy et al. (2022) for a discussion of how CMBS operate and how their loan portfolios differ from those of other major CRE lenders.

performance over a two-year horizon in relation to the share of leases potentially set to expire during the first year of that window.[2] The outcome variables of interest are the change in occupancy rate and the growth in NOI over these two years.

We measure pending lease expirations as of the last lease rollover review date that is at least one year before the reporting date of the financials. Measuring pending lease expirations using scheduled expirations from more than a year away addresses the sample selection concern that very-near-term expirations are observed only for tenants that do not extend their leases by that point.[3] The estimated effects of lease expirations are likely conservative because the different reporting timelines for property financials and lease updates introduce measurement error in our lease expiration measure, resulting in attenuation bias. Details on how we construct our measure of lease expirations are provided in Appendix A.

To analyze the effects of lease expirations and how they changed during the pandemic, we estimate equations along the lines of:

$$\begin{aligned} Y_{i,t,t+2} = \alpha_{p,t} &+ \text{Expirations}_{i,t,t+1} \times \left(\gamma_0 + \sum_{j \in J} \gamma_j Z_{j,i,t} \right) \\ &+ \text{COVID Expirations}_{i,t,t+1} \times \left(\beta_0 + \sum_{j \in J} \beta_j Z_{j,i,t} \right) \\ &+ \eta' X_{i,t} + \varepsilon_{i,t}, \end{aligned} \tag{1}$$

where $Y_{i,t,t+2}$ is the change in the occupancy rate or NOI growth for property i over the two-year window in question. $\text{Expirations}_{i,t,t+1}$ is the share of leases (in terms of square footage) potentially set to expire in the first year of that window, and $\text{COVID Expirations}_{i,t,t+1}$ is the interaction of that variable with the pandemic indicator (equal to 1 if $t+1$ is 2020 or later). $\{Z_{j,i,t}\}_{j \in J}$ is a set of variables potentially affecting the sensitivity of property performance to lease expirations, and $X_{i,t}$ is a vector of controls that include the property vacancy rate at the start of the reporting window as well as the non-interacted $Z_{j,i,t}$ variables. $\alpha_{p,t}$ is a property type-year fixed effect.

The key objects of interest are $\hat{\gamma}_0$, which estimates how lease expirations affect property

[2] We include the extra year in the performance window because NOI is a backward-looking measure. Thus, a lease expiring in year t might not be fully reflected in the reported trailing NOI until the months preceding the expiration drop out of the NOI calculation a year later.

[3] Appendix Figure A.2 plots the distribution of scheduled lease expirations as of 2019. The density drops off when the expiration is less than a year away, suggesting that some leases that would have had imminent expirations were renewed instead. By comparison, the density is fairly flat for expirations that are more than a year away. Consequently, scheduled lease expirations that are more than a year away should reflect the timing of previous contract arrangements rather than endogenous renewal decisions.

performance in normal times, and $\hat{\beta}_0$, which estimates the degree to which expirations became more impactful during the pandemic. Additionally, the interaction terms $\hat{\gamma}_k$ and $\hat{\beta}_k$ allow us to estimate how certain factors such as market vacancy rates or remote-work patterns amplify the effects of lease expirations in normal versus COVID-19 times. In some specifications, we estimate equation (1) by quantile regression, in which case coefficient estimates pertain to how lease expirations affect various quantiles (rather than the expected value) of $Y_{i,t,t+2}$.

3 Effects of Lease Expirations on Income and Vacancy

Before analyzing the impact of the COVID-19 pandemic, this section establishes the baseline estimates of how lease expirations affect property performance in normal times. Section 3.1 uses quantile regressions to demonstrate that lease expirations increase the downside risk to property performance. Section 3.2 shows that the effects of expirations are amplified in markets with higher vacancy rates.

3.1 Quantile Regression Estimates

The effects of lease expirations on income and vacancy are likely to be asymmetric. The asymmetry is obvious regarding the occupancy rate, as occupancy would remain the same if the lease is renewed or the tenant replaced, but it would decline if the original tenant downsizes or completely vacates the property. Similarly, the increase in rent that could be achieved if a new lease is signed is likely much less than the loss in rent that would occur if a tenant departs.

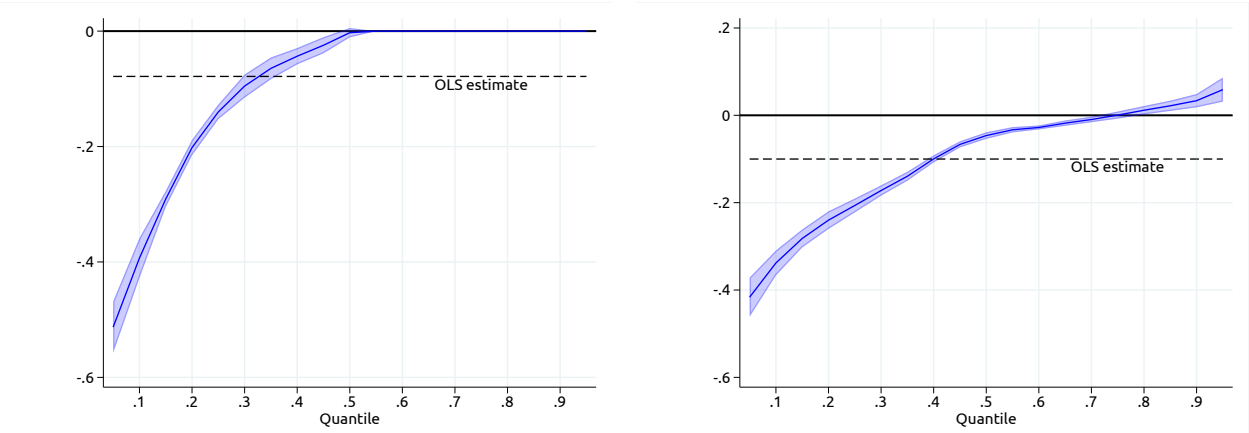
To capture this asymmetry, we start by presenting quantile regression estimates of the relationship between property performance and lease expirations, controlling for the initial vacancy rate of the property.[4] The sample covers the years 2009 through 2018 in order to examine the effects of lease expirations that occurred before the pandemic.

Figure 1 plots estimates of how lease expirations affect various quantiles of occupancy changes (the left panel) and NOI growth rate (the right panel). The dashed line provides the OLS estimate from the same specification. This figure reveals that lease expirations typically do not affect occupancy or NOI notably. At the median and higher quantiles, more expirations are associated with no change in occupancy and only modest differences in NOI growth. This suggests that leases are typically renewed, or replacement tenants are found quickly at rents comparable to those of existing leases. However, expirations

[4]We exclude property type-year dummy variables from the specification because a greater response to lease expirations in times of stress is one factor that could cause effects to be asymmetric, but results are broadly similar when conditioning on these variables.

present substantial downside risk. At the fifth percentile, the estimated elasticities are about -0.5 and -0.4 for occupancy and NOI growth, respectively, meaning expirations lead to an increase in vacancy that is about half the amount of space accounted for by the expiring leases, and they bring about a roughly proportional decline in net income.

Figure 1: Effects of Lease Expirations from Quantile Regressions



(a) ΔOccupancy (b) NOI Growth

Notes: This figure plots quantile regression estimates of the effects of lease expirations on occupancy rate changes (left panel) and NOI growth (right panel) according to equation (1). The x-axis indexes the quantiles of each outcome variable, and the y-axis displays the coefficient estimate for each quantile. The blue area represents the 95 percent confidence interval. Standard errors are clustered by CMBS deal.
Sources: Morningstar, CBRE, and authors' calculations.

A couple of factors likely contribute to lease expirations affecting performance predominantly at the lower quantiles. First, as already discussed, the effects of expirations are inherently asymmetric; if tenants depart, occupancy and income may fall sharply, whereas if they stay, the property's financials may change little. Thus, even if outcomes of lease expirations are completely determined by idiosyncratic factors related to the tenants, it would be mostly the lower quantiles that are affected. Second, lease expirations should have larger effects in weaker markets, as tenants are harder to replace and equilibrium rents may have declined relative to other markets. Again, lease expirations would affect the bottom part of the distribution, but now it would be because the effects of expirations are most pronounced for properties that are otherwise strained. We investigate this second mechanism next, showing that lease expirations have larger effects in markets with higher vacancy rates.

3.2 Role of Local Conditions

The effects of lease expirations likely depend on local conditions. In a tighter market, it is harder to find alternative space, so tenants would be less likely to leave their current space and have less bargaining power in extension negotiations. To study such effects, we now estimate equation (1) including the market vacancy rate in the set of interactions. The market vacancy rate refers to the vacancy rate reported by CBRE (Coldwell Banker Richard Ellis, a commercial real estate services and investments firm) for the given city, property type, and quarter as of the start of the financial reporting window (t).[5]

Table 1 presents the coefficient estimates from this analysis. For comparison, the first column reports the baseline OLS estimates without the market vacancy interaction term. The coefficient indicates that a 10 percentage point increase in lease expirations results in a roughly 70 basis point decline in occupancy, on average. Column 2 interacts lease expirations with the market vacancy rate, thus allowing the effects of lease expirations to depend on market conditions. The estimates indicate that in markets with no vacancy, lease expirations do not materially affect occupancy. However, the adverse effects of expirations increase sharply with the market vacancy rate; the estimates imply an elasticity of occupancy with respect to expirations of about -0.06 in markets with a 10 percent vacancy rate, compared with an elasticity of 0 in a market with no vacancy. Column 3 presents quantile regression estimates of the effect of lease expirations on the 25th percentile of occupancy changes. The estimates show that the detrimental effects of lease expirations in weaker property markets are felt predominantly on the lower end of the performance distribution, similar to the pattern shown in Figure 1.

Columns 4 through 6 repeat this analysis for NOI growth. Overall, the effects are qualitatively similar. The impact of lease expirations on income growth is slightly worse than it is on occupancy ($\hat{\gamma}_0 = -0.10$ for NOI growth versus -0.07 for occupancy change). The importance of tightness in the local property markets is even greater for NOI growth. In fact, when market vacancy is low, lease expirations are associated with modest increases in income. However, when market vacancy rises, lease expirations are associated with effects that are more deleterious to NOI than occupancy. The estimates imply that lease expirations are neutral with respect to income growth when the vacancy is about 5.8 percent, but the elasticity between NOI and the expiring-lease share moves to about -0.06 in a market with a 10 percent vacancy rate. Again, effects are stronger for lower quantiles, indicating that weaker market conditions amplify the asymmetric effects of lease expirations rather than being the primary cause of them.

[5] We use the national index for the property type and quarter for properties not in a CBRE market. Our estimates change little when we restrict the sample to properties in a CBRE market.

Table 1: Heterogeneous Effects by Market Vacancy

	ΔOccupancy		Q_{25}(ΔOccupancy)	NOI Growth		Q_{25}(NOI Growth)
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Expirations}_{i,t,t+1}$	-0.07**	-0.00	0.03**	-0.10**	0.08**	0.07**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
$\text{Property Vacancy}_{i,t}$	0.79**	0.79**	0.16**	-0.02	-0.01	-0.14**
	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)	(0.03)
$\text{Market Vacancy}_{m(i),t}$		-0.01	-0.00		-0.07	0.04
		(0.03)	(0.00)		(0.06)	(0.04)
× $\text{Expirations}_{i,t,t+1}$		-0.57**	-1.23**		-1.37**	-2.04**
		(0.11)	(0.10)		(0.15)	(0.16)
R^2_a	0.367	0.404		0.023	0.026	
Observations	55379	50415	50415	55379	50415	50415
Property Type-Year FEs	✓	✓	✓	✓	✓	✓

Notes: The dependent variable is the change in occupancy (columns 1 through 3) or NOI growth (columns 4 through 6) from t to $t+2$. Columns 3 and 6 present estimates from quantile regressions (25th quantile), while the other columns present OLS estimates. $m(i)$ denotes property i's market as defined by CBRE. "×" denotes its interaction with the share of $\text{Expirations}_{i,t,t+1}$. Standard errors, in parentheses, are clustered by CMBS deal. $^{+}$,*,** indicate significance at 10%, 5%, and 1%, respectively.
Sources: Morningstar, CBRE, and authors' calculations.

4 Effects of Lease Expirations during the Pandemic

The estimates reported in Section 3.2 demonstrate that the effects of lease expirations are influenced by (and thus informative of) the strength of the local property market. Motivated by this finding, we now analyze how the relationship between lease expirations and property performance changed during the COVID-19 pandemic. Section 4.1 reveals that the effects of the pandemic have so far been modest for the CRE sector as a whole, but lease expirations have already started to exert larger adverse effects on the performance of office properties. Section 4.2 shows that these adverse effects have been concentrated in CBDs and areas where the shift to remote work has been more persistent. Finally, Section 4.3 analyzes the exposure of different types of office CRE lenders to these at-risk markets and presents evidence that small and regional banks are generally less exposed to such markets compared with larger banks and nonbank CRE lenders.

4.1 Effects by Property Type

To investigate how the impact of lease expirations on property performance has changed since the COVID-19 outbreak, we extend the sample to include the pandemic period and add to the specification an extra variable, $\text{COVID Expirations}_{i,t,t+1}$, which is the interaction

Table 2: Effects of Lease Expirations during the Pandemic

	ΔOccupancy				NOI Growth			
	Full Sample	Offices	Retail	Industrial	Full Sample	Offices	Retail	Industrial
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\text{Expirations}_{i,t,t+1}$	-0.07**	-0.09**	-0.06**	-0.06**	-0.10**	-0.17**	-0.05**	-0.12**
	(0.00)	(0.01)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
$\text{COVID Expirations}_{i,t,t+1}$	-0.02**	-0.05**	-0.02*	0.04**	-0.01	-0.06^{+}	0.00	0.06*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.03)	(0.01)	(0.02)
$\text{Property Vacancy}_{i,t}$	0.72**	0.60**	0.77**	0.76**	-0.02^{+}	-0.06*	-0.01	0.01
	(0.02)	(0.02)	(0.03)	(0.03)	(0.01)	(0.03)	(0.01)	(0.05)
R^2_a	0.329	0.220	0.394	0.294	0.028	0.043	0.018	0.045
Observations	77077	21003	46784	9290	77077	21003	46784	9290
Property Type-Year FEs	✓				✓			
Year FEs		✓	✓	✓		✓	✓	✓

Notes: This table presents estimates of the effects of lease expirations on occupancy (columns 1 through 4) and NOI growth (columns 5 through 8). $\text{Expirations}_{i,t,t+1}$ is the share of leases (in terms of square footage) that potentially expire in the year following the financial reporting date in year t, and $\text{COVID Expirations}_{t,t+1}$ denotes its interaction with an indicator for whether $t+1$ is 2020 or later. For each outcome variable, the first column presents estimates for the full sample of properties, and the next three restrict the sample to office, retail, and industrial properties, respectively. All specifications control for each property's initial vacancy rate and include either property type-year (the first column in each block) or year fixed effects (the other columns). Standard errors, in parentheses, are clustered by CMBS deal. $^{+}$,*,** indicate significance at 10%, 5%, and 1%, respectively.
Sources: Morningstar and authors' calculations.

of the share of leases expiring with a pandemic indicator (equal to 1 if $t+1$ is 2020 or later).

Table 2 presents the estimates from these regressions. Columns 1 through 4 report the impact on occupancy rate changes, while columns 5 through 8 report results for NOI growth. The OLS estimates reported in column 1 consider occupancy changes for the full sample of all property types for which leasing data are available. Overall, while lease expirations are associated with significant increases in vacancies (as is shown in Table 1), the effects of expirations became only slightly stronger during the pandemic. They increased by less than 30 percent (from 0.07 to 0.09) during the pandemic relative to before it.

One reason that the adverse effects of lease expirations may not appear to be greatly magnified during the pandemic is that the full sample includes many properties with limited susceptibility to the disruptions associated with the crisis. For example, while the office sector has been significantly affected by the shift to remote work, as noted by Gupta, Mittal, and Van Nieuwerburgh (2022), the acceleration in e-commerce sales during the pandemic boosted demand for industrial real estate (such as warehouses). We thus next analyze the effects of lease expirations during the pandemic separately by property type. Columns 2 through 4 report these estimates, with the sample restricted to office, retail, and industrial properties, respectively.

As would be expected, the pandemic amplified the effects of lease expirations more for office properties than for retail or industrial properties. The estimated elasticity between office occupancy growth and lease expirations rose in magnitude from −0.09 before the pandemic to −0.14 during it (column 2). Likewise, the elasticity for NOI growth changed from about −0.17 to −0.23 (column 6). Put differently, the deleterious effects of lease expirations rose by about one-half during the pandemic for office occupancy and by one-third for office income.

The other two commercial property types have fared better by comparison. For retail, the elasticity of occupancy vis-à-vis lease expirations changed from −0.06 to −0.08 during the pandemic, while elasticity for income was little changed relative to the period before the outbreak (columns 3 and 6). Lease expirations actually became less problematic for industrial properties during the pandemic, consistent with the COVID-19-induced shift in spending patterns increasing the demand for these properties (columns 4 and 8).

4.2 Effects of Office Lease Expirations by Geography

Since the deleterious effects of the COVID-19 pandemic are most pronounced for offices, the rest of the analysis focuses on the subsample of office properties. In particular, we explore whether offices in markets with a greater shift toward remote work exhibited greater vulnerability to lease expirations during the pandemic. We identify such vulnerable places using two metrics: being a central business district (CBD) or suffering a more persistent decline in time spent at workplaces (or equivalently, more remote work). We estimate equation (1) for office properties only, allowing the effects of lease expirations to depend on these geographic variables. The coefficients on these interaction terms measure cross-location heterogeneity in the adverse effects of lease expirations and how they changed during the pandemic.

Table 3 presents these estimates. For comparison, columns 1 and 4 repeat columns 2 and 5, respectively, of Table 2, estimating the effects of lease expirations on property performance while omitting the geographic variables. Columns 2 and 5 add interactions between the expiration variables and the share of the property's Zip code identified as being in a CBD using data from Real Capital Analytics (RCA). Columns 3 and 6 add further interactions with the decline in time spent at workplaces as of September 2022 to capture the magnitude of the enduring shift toward remote work.[6] Appendix Table B.1 presents quantile regression estimates of the same specification. As with the vacancy results, the

[6]Specifically, Central Business District$_{z(i)}$ is the fraction of properties in i's Zip code that RCA defines as being in a central business district, while Work From Home$_{c(i)}$ is the decline (relative to pre-pandemic period) in the average daily time spent at workplaces in the property's county as of September 2022 (the last full month for which data are available) according to Google's Community Mobility Reports (see Chetty et al. 2020). We use the latest data to best capture the persistent change in remote-work patterns.

effects of lease expirations on the 25th percentile of occupancy or NOI growth are generally larger than in the OLS estimates but exhibit similar cross-sectional patterns.

Columns 2 and 5 show that the adverse effects of lease expirations became much more pronounced for CBD properties during the COVID-19 pandemic. The marginal effect of lease expirations on occupancy during the pandemic was −0.21 for CBD properties, compared with about −0.14 for other office properties, and only −0.10 before the pandemic for all offices. In other words, the detrimental effect of expirations on occupancy more than doubled during the pandemic for CBD properties. In terms of income growth, for non-CBD properties, the effects of lease expirations during the pandemic were not significantly different from those in normal times. In contrast, for CBD properties, the effects on income tripled during the pandemic.[7] These estimates are consistent with the findings from Rolheiser et al. (2022) that during the pandemic, property values for suburban office properties remained more resilient than valuations for urban offices.

Another way to benchmark the magnitude of these effects is to compare them with the effects of market tightness in Table 1. Recall that when predicting occupancy change, $\hat{\gamma}_{\text{vac}}$ was −0.57. This means that the effects of the pandemic in terms of raising the sensitivity of occupancy to lease expirations is equivalent to that of a 7 percentage point (= .04/.57) increase in market vacancy rates for non-CBD offices and a 21 percentage point (= .12/.57) increase in vacancy rates for CBD offices.[8] This pandemic-induced worsening in the sensitivity of office properties' performance to lease expirations far exceeds what would have been implied by the actual increase in office vacancy rates; Panel (a) of Appendix Figure B.3 shows that as of 2022:Q4, most office markets had experienced a decline in occupancy of less than 5 percentage points.

Finally, columns 3 and 6 add interactions with the decline in time at workplaces. While larger declines in time at work are correlated with properties being located in a CBD, this variable contains additional information relevant for the effects of lease expirations.[9] Raising Work From Home$_{c(i)}$ by 0.15 (roughly the difference between New York City and the average property in the sample) increases the adverse effect of lease expirations on occupancy during the pandemic by 0.06. This incremental change roughly doubles the predicted effect of lease expirations on occupancy relative to the pre-COVID-19 period. The effect of remote work on offices' vulnerability to lease expirations is smaller for income growth. Instead, the effects

[7] The pre-COVID-19 elasticity is −0.13 ($\hat{\gamma}_0$+$\hat{\gamma}_{CBD}$), and the elasticity increased by −0.27 during the pandemic ($\hat{\beta}_0$+$\hat{\beta}_{CBD}$).

[8] For income growth, the effect of the pandemic is equivalent to a 3 percentage point (= .04/1.37) higher vacancy rate for non-CBD properties and a 20 percentage point (= 0.27/1.37) higher vacancy rate for CBD properties.

[9] The correlation is 0.4 for the sample of office properties.

of lease expirations on office income during the pandemic are more sensitive to whether the property is in a CBD.[10]

A 1 percentage point increase in Work From Home$_{c(i)}$ during the pandemic has an effect similar to a 1 percentage point increase in the market vacancy rate before COVID-19 ($\hat{\beta}_{\text{wfh}} = -0.50$ when the CBD control is omitted, whereas $\hat{\gamma}_{\text{vac}} = -0.57$ in Table 1). By comparison, the actual decline in occupancy in relation to the increase in Work From Home$_{c(i)}$ is only about one-third as large (that is, the occupancy rate fell by one-third of a percentage point for every percentage point increase in remote-work time; see Panel (a) of Appendix Figure B.3). Similar to the CBD estimates, this result indicates that the underlying demand for office space is even weaker than would be expected given the decline in occupancy rates observed to date. This finding suggests that conditions are likely to continue to deteriorate as leases roll over.[11] Indeed, Panel (b) of Appendix Figure B.3 shows that declines in occupancy in markets with more remote work were accelerating rather than moderating as of the end of 2022.[12]

[10]Before the pandemic, lease expirations had smaller adverse effects on occupancy but larger effects on income growth for properties in counties with a larger increase in remote work during the pandemic. It is possible that those were more liquid office rental markets where owners could more reliably find tenants (with a competitive asking rent).

[11]Evidence suggesting further deterioration is likely can also be seen in subleasing behavior. Table B.2 demonstrates that office sublease rates rose during the pandemic for CBDs, and that increases in sublease rates are predictive of future increases in vacancy rates. See Appendix B for more details.

[12]The shift to telework has also had adverse effects, albeit much smaller, on downtown retail; see Appendix Figure B.4 for more details.

Table 3: Effects of Office Lease Expirations during the Pandemic, Geographic Differences

	ΔOccupancy			NOI Growth		
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Expirations}_{i,t,t+1}$	-0.09**	-0.10**	-0.12**	-0.17**	-0.17**	-0.05
	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.04)
$\times$ $\text{Central Business District}_{z(i)}$		0.01	0.00		0.04	0.08**
		(0.02)	(0.02)		(0.03)	(0.03)
$\times$ $\text{Work From Home}_{c(i)}$			0.09			-0.47**
			(0.11)			(0.16)
$\text{COVID Expirations}_{i,t,t+1}$	-0.05**	-0.04**	0.06	-0.06^{+}	-0.04	0.00
	(0.01)	(0.02)	(0.04)	(0.03)	(0.03)	(0.08)
$\times$ $\text{Central Business District}_{z(i)}$		-0.08*	-0.06		-0.23**	-0.20**
		(0.04)	(0.04)		(0.06)	(0.07)
$\times$ $\text{Work From Home}_{c(i)}$			-0.41*			-0.16
			(0.17)			(0.30)
R^2_a	0.220	0.223	0.224	0.043	0.045	0.046
Observations	21003	20877	20857	21003	20877	20857
Year FEs	✓	✓	✓	✓	✓	✓

Notes: This table presents estimates of the effects of lease expirations on changes in occupancy and income growth for office properties. $\text{Expirations}_{i,t,t+1}$ is the share of leases (in terms of square footage) that potentially expire in the year following the financial reporting date in year t, and $\text{COVID Expirations}_{t,t+1}$ interacts this expiration share with an indicator for whether $t+1$ is 2020 or later. The dependent variable is the change in occupancy between t and $t+2$ in columns 1 through 3 and the growth in NOI over this period in columns 4 through 6. Columns 1 and 4 repeat results from Table 2, columns 2 and 5 add interactions for whether the property is in a central business district, and columns 3 and 6 add interactions for the percentage decline in time spent at workplaces relative to pre-pandemic levels. All specifications control for the initial vacancy rate and year fixed effects. The two location-specific measures and their interactions with the COVID-19 indicator are added to some specifications when relevant (not displayed). Standard errors, in parentheses, are clustered by CMBS deal. $^{+}$,*,** indicate significance at 10%, 5%, and 1%, respectively.
Sources: Morningstar, Real Capital Analytics, Opportunity Insights, and authors' calculations.

4.3 Exposures of Lenders to At-risk Office Markets

Overall, Section 4.2 shows that the effects of the COVID-19 pandemic on the office CRE sector are not uniform. In areas outside of CBDs and where the amount of time spent at workplaces has not declined notably since the start of the pandemic, leasing dynamics do not differ substantially relative to before the pandemic. That is, when leases expire, the spaces continue to be filled at rates and rents similar to those observed over the decade before the COVID-19 outbreak. However, in CBDs and markets where time spent at workplaces has declined notably, lease expirations have proven more damaging to occupancy and income. This corroborates the narrative that demand for office space in those markets has fundamentally weakened, causing property performance to deteriorate as leases roll over and property financial data become more reflective of the true underlying current market conditions. Because the various types of CRE lenders differ in their geographic footprint, these cross-market differences have potentially important implications for which lenders are most exposed to possible losses from office loans in the coming years.

Figure 2 plots the share of outstanding loans made by G-SIB banks, nonbank CRE lenders (for example, CMBS and life insurers), and smaller banks that are secured by properties in central business districts (red bars), areas where the time at workplaces declined by at least one-third relative to before the COVID-19 outbreak (blue bars), or areas with both risk factors (purple bars). The sample includes office properties in RCA's database, which covers CRE properties valued at more than $2.5 million. Because offices in central business districts are more likely to meet this reporting threshold, the estimated exposure to at-risk markets is likely biased upward, especially for smaller banks, which tend to make smaller loans. Outstanding loans are not directly reported. We impute loans that are likely to be outstanding as those associated with the last transaction for a given property that occurred no more than 10 years ago and had not passed the maturity date as of April 2023.[13]

The figure shows that small and regional banks (that is, banks other than the G-SIBs) tend to finance properties located in markets less exposed to the COVID-19–related disruptions. Roughly 45 percent of G-SIBs' and nonbanks' office portfolios are in CBDs, and slightly more than 40 percent are in counties with a high work-from-home share. In contrast, less than 30 percent of the office loan portfolios of smaller banks are subject to these risk factors. The share of office-loan volume secured by properties that are in CBDs and have a persistently high remote-work rate is nearly twice as high for G-SIBs and nonbanks as it is for smaller banks (32 percent versus 17 percent).

The comparatively lower exposure of smaller banks to the most at-risk loans is primarily

[13]In identifying the last transaction for a property, we exclude sales where the borrower assumed the existing debt since it is the lender on the previous transaction that is relevant.

driven by these banks making smaller loans, which tend to finance properties located in the parts of a city with less of a decline in office demand. Specifically, Appendix Table C.3 investigates the determinants of non-GSIB-banks' and community banks' market shares for office loans. The results confirm that smaller banks made fewer office loans in CBDs and counties with more work from home. The comparatively lower exposure of smaller banks to at-risk office loans reflects differences in where smaller banks make loans within cities.[14] Table C.3 also reveals that the differences in risk exposure are mostly due to differences in loan sizes.[15] Taken together, the findings indicate that smaller banks are less exposed to the most at-risk office segments since they tend to make smaller loans, which typically fund properties located outside the urban core.

In sum, while there remains some concern about small and regional banks facing headwinds from high concentrations of CRE loans in addition to funding pressures in the aftermath of recent bank runs, these banks appear to be at least partially protected from loan losses by having most of their office loans in less-affected CRE markets. Between this more favorable geographic distribution of lending and a superior ability to renegotiate CRE loans to avoid foreclosures (Black, Krainer, and Nichols 2020; Glancy, Kurtzman, and Loewenstein 2022), small and regional banks may be better positioned than other lenders to weather the strains in the office sector.

5 Conclusion

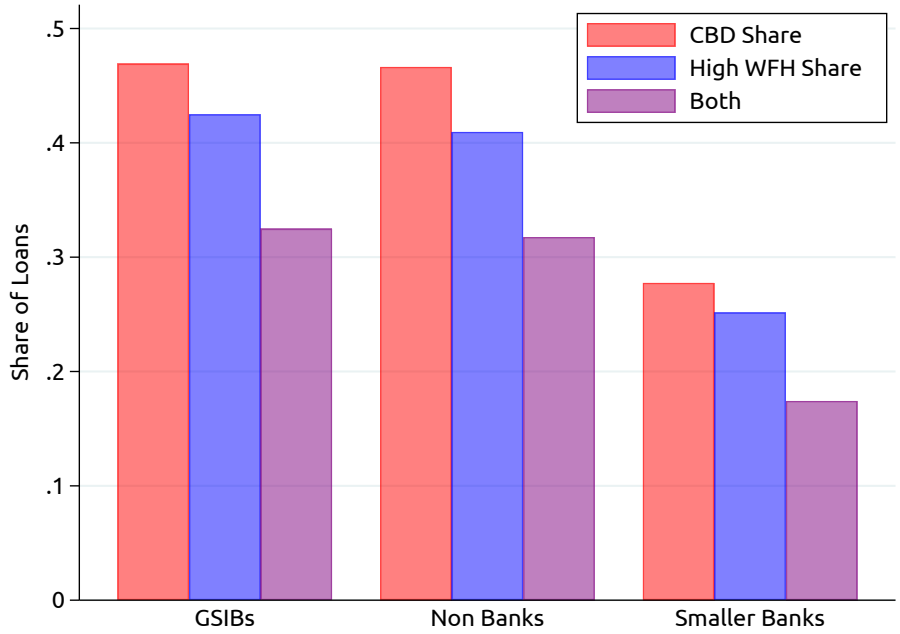
This paper documents three key facts about the relationship between lease expirations and CRE property performance. First, lease expirations create notable downside risk for the performance of commercial properties. While the intensity of lease expirations has little effect on median or better outcomes, it is an important determinant of performance at the lower end of the distribution. Specifically, lease expirations increase the likelihood that a property experiences a large decline in occupancy or income.

Second, this risk of performance deterioration following lease expirations is highly sensitive to the strength of the local property market. In markets with low vacancy rates, lease expirations have little effect on a property's occupancy and are associated with modest increases in income. Specifically, in tight markets, commercial spaces with expiring leases reliably see their leases renewed or are refilled with new tenants, and often at a higher rent

[14] Note that this pattern of properties outside of CBDs securing smaller loans is based on the loans recorded in the RCA data, which exclude properties valued at less than $2.5 million. Extending this logic, smaller banks' exposure CBDs should be even lower than estimated here because more of their loans are secured by properties below this reporting threshold and thus even less likely to be in a CBD.

[15] See Appendix C for more discussion of the determinants of banks' exposure to at-risk office loans.

Figure 2: Exposures to At-risk Office Loans by Lender



Notes: This figure plots the shares of loans in the RCA database that are in central business districts (red bars), in counties where the time at workplaces declined by at least one-third relative to before the pandemic (blue bars), or areas with both risk factors (purple bars). These shares are plotted for three lender groups: G-SIB banks, nonbanks, and smaller banks.
Sources: Real Capital Analytics, Opportunity Insights, and authors' calculations.

than that on the expiring lease. However, when leases expire in markets with higher vacancy rates, occupancy and income fall notably.

Third, while the CRE market as a whole has remained resilient since the COVID-19 outbreak, there are segments for which the outcomes of lease expirations point toward serious stresses that are likely to contribute to loan losses in coming years. The effects of lease expirations on the financial performance of office buildings increased notably during the pandemic, especially for properties in central business districts or counties with a persistently larger shift to remote work. Consequently, while the performance of office CMBS loans has remained fairly resilient to date, with a delinquency rate of less than 3 percent as of April 2023, greater strains are likely to emerge over time as more leases expire and exert pressure on occupancy and income.

The CRE market also faces headwinds besides those from the acceleration in remote work. Higher interest rates raise debt service costs and reduce property values. Moreover, lenders' concerns about these factors may prompt them to restrict credit availability. In turn, commercial-property owners with maturing loans may struggle to refinance, causing loan performance to deteriorate even before a serious increase in vacancy occurs. To the

extent that realized or anticipated loan losses cause banks to tighten credit conditions, these developments may also feed back into the broader economy (see, for example, Peek and Rosengren 2000). Office CRE loans make up a small share of banks' portfolios, and the properties securing these loans tend to be in less adversely affected office markets, which mitigates the risk of bank CRE losses prompting a broad-based credit crunch. However, some banks' loan holdings are more concentrated in office loans in troubled markets, which may constrain credit availability for some bank borrowers going forward.

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APPENDIX

A Variable Construction

While data on the loans underlying commercial mortgage-backed securities (CMBS) deals are reported monthly, the variables concerning property performance and lease expiration schedules are updated less frequently. This appendix outlines how we address these timing issues. Figure A.1 displays a timeline for key variables pertaining to financial updates and lease expirations.

For the performance variables (occupancy rate and net operating income [NOI]), we consider changes over a two-year window. If there are multiple updates to a property's performance in a year, we keep the last observation in a given year. Since updates of performance variables are typically reported with a lag in the data, we allocate financial updates reported in the first quarter of a year to the preceding year. For example, this means that $\Delta Occupancy_{i,2019}$ would be the change in occupancy from the last financial update in 2019 (or 2020:Q1 if available) to the last financial update reported in 2021 (or 2022:Q1 if available). These two dates are shown as "Initial Fin. Data" and "Updated Fin. Data" in Figure A.1.

The primary explanatory variable is the share of leases (weighted by a tenant's square footage) potentially expiring in the first year of the financial reporting window. We say "potentially" expiring because we have to impute the timing of the lease expirations as follows. Only particular time windows of expirations are provided in the data: For each lease rollover review, the shares of space with leases expiring within one year, one to two years, two to three years, three to four years, or more than four years are reported.[16] Our measure of expirations is the share of leases expiring in the two years containing the period of interest (marked by the double-headed arrow labeled "Lease Exp. Dates Targeted" in Figure A.1). Thus, if a lease review date is 1.5 years before the start of the financial reporting window (as is the case depicted in Figure A.1), the measure of lease expirations will be the share of space expiring either one to two years after the review date or two to three years after the review date (the brackets in red).[17] Because this could include expirations that would occur before

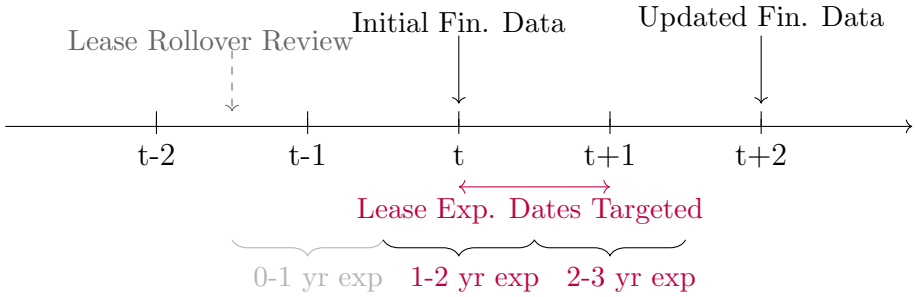
[16] We drop observations where the sum of the expiration shares is not between 0.9 and 1.1 to minimize the effects of reporting errors.

[17] As noted previously, measuring pending lease expirations using scheduled expirations from more than a year away addresses the sample selection concern that expirations less than a year away are a selected subset only for tenants that do not extend their leases by that point. Figure A.2, which plots the distribution of scheduled lease expirations as of 2019, shows that the density of of scheduled lease expirations decreases in the three quarters before expiration (consistent with extensions being executed) but levels off at about a year out.

the date occupancy is reported at date t (if some of the expirations in the one-to-two-year range are less than 1.5 years away), there will be some measurement error in the primary explanatory variables of interest.

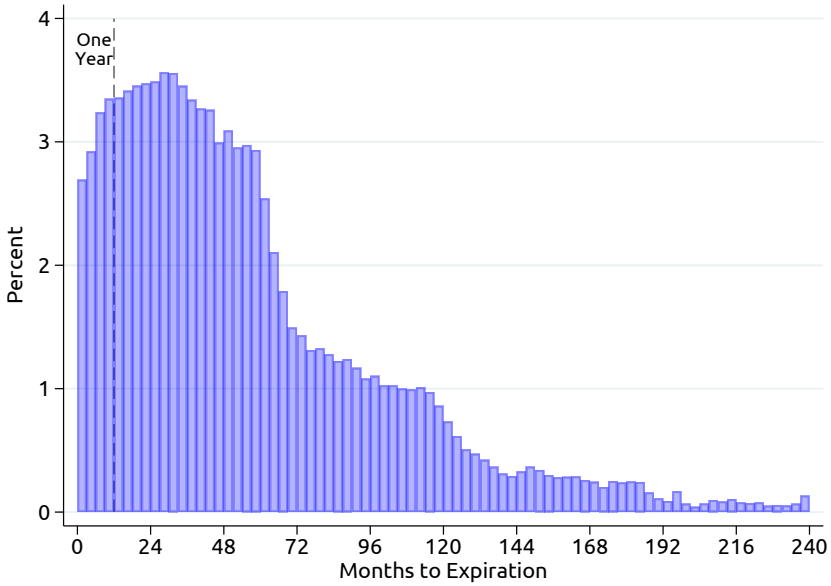
Results are similar if we use only the share of leases that we can know are scheduled to expire in the two years following the start of the financial reporting period (for example, this measure would be just the share of leases expiring in two to three years when there is a 1.5-year gap between the lease review date and the NOI date). Likewise, results are similar if we use data on lease expirations from the top five tenants by square footage of occupancy (for which the exact expiration date is reported) to remove expiration shares that are known to occur outside the window of interest. Lastly, results are similar when we use expirations data from the top five tenants to estimate expiration shares for observations where data for the annual expiration windows are missing or misreported. Since estimates are similar for all of these alternative ways of measuring lease expirations, we use the simplest measure documented in Figure A.1.

Figure A.1: Timeline of Lease Review and Lease Performance Reporting



Notes: This diagram illustrates the timing of the lease expiration date in relation to the date ranges reported in the prior lease rollover review and in relation to the date of updated financial data. See Appendix A for detailed explanations.

Figure A.2: Distribution of Scheduled Lease Expirations as of 2019



Notes: This figure shows the distribution of the number of months to expiration for leases observed in 2019. It shows the distribution for each property's top five tenants by square footage of occupancy (for which exact dates of expiration are reported rather than aggregate expirations within a given window.)
Sources: Morningstar and authors' calculations.

B Additional Estimates of CBD Office Dynamics during the Pandemic

This subsection presents three additional sets of results pertaining to leasing dynamics in central business districts (CBDs), paying special attention to the change since the onset of COVID-19. First, we present quantile regression estimates demonstrating that the adverse effects of lease expirations in at-risk office markets (CBDs and counties with a larger shift to remote work) are particularly pronounced at lower quantiles. Second, we show that sublet rates rose for CBDs during the pandemic, and that such increases tend to predict future increases in vacancy. Last, we provide additional analysis on the effect the shift to remote work has had on downtown office and retail occupancy.

This section first presents a supplemental quantile regression of the form presented in Table 3. The results in Table B.1 confirm that lease expirations during the pandemic had more severe effects on occupancy and net operating income (NOI) for offices in CBDs or counties with more remote work. Declines in occupancy and income following leases expirations in these more at-risk markets are stronger at the 25th percentile than in the OLS estimates, further demonstrating that lease expirations substantially increase the downside risk to property performance.

Second, in Table B.2, we investigate subletting behavior in CBD office markets. Another potential leading indicator of further deterioration in occupancy for downtown offices is the growing availability of office space for sublet. Using the CoStar database, we indeed find that office sublet rates rose for CBDs during the pandemic (column 1), and that increases in sublet rates predict higher vacancy rates four quarters out, especially for downtown office markets (columns 2 and 3).[18] Moreover, the relationship between CBD office sublet rates and subsequent changes in vacancy rates has become even stronger since the onset of the pandemic (the last row of coefficients in columns 2 and 3 of Table B.2). These results suggest that vacancy rates will continue to rise for CBD offices, corroborating the findings from the lease expirations analysis.[19]

Finally, Figures B.3 and B.4 document the relationship between the rise of remote work and changes in occupancy for office and retail properties, respectively. The decline in foot traffic from office workers in counties with more remote work has also reduced demand at retail establishments in those markets. However, the relationship between remote-work intensity and occupancy is only about a third as strong for retail as it is for offices (left panels).

[18] Sublet rate is defined as the amount (in square feet) of available space listed for sublet as a fraction of total office building space in a market.

[19] We are unable to combine the Morningstar loan and CoStar submarket data due to a lack of consistent geographic identifiers.

The decline in retail occupancy in those remote-work-heavy counties started around 2017, whereas the decline in office occupancy commenced following the onset of the pandemic (right panels). In unreported results, we find that retail lease expirations have not had a disproportionate effect on occupancy or income in these markets, indicating that the occupancy declines are due to bankruptcies or difficulty filling already vacant space.

Table B.1: Effects of Office Lease Expirations during the Pandemic, Quantile Regressions

	$Q_{25}(\Delta\text{Occupancy})$			$Q_{25}(\text{NOI Growth})$		
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Expirations}_{i,t,t+1}$	-0.20**	-0.20**	-0.22**	-0.27**	-0.28**	-0.21*
	(0.01)	(0.01)	(0.04)	(0.01)	(0.02)	(0.08)
$\times$ Central Business $\text{District}_{z(i)}$		-0.00	-0.01		0.09*	0.11*
		(0.02)	(0.02)		(0.04)	(0.04)
$\times$ Work From $\text{Home}_{c(i)}$			0.07			-0.28
			(0.14)			(0.30)
$\text{COVID Expirations}_{i,t,t+1}$	-0.08**	-0.06*	0.25**	-0.08	-0.04	0.20*
	(0.02)	(0.02)	(0.06)	(0.05)	(0.06)	(0.10)
$\times$ Central Business $\text{District}_{z(i)}$		-0.14**	-0.08		-0.32*	-0.27*
		(0.05)	(0.06)		(0.13)	(0.11)
$\times$ Work From $\text{Home}_{c(i)}$			-1.17**			-0.93*
			(0.26)			(0.44)
R^2_a						
Observations	21003	20877	20857	21003	20877	20857
Year FEs	✓	✓	✓	✓	✓	✓

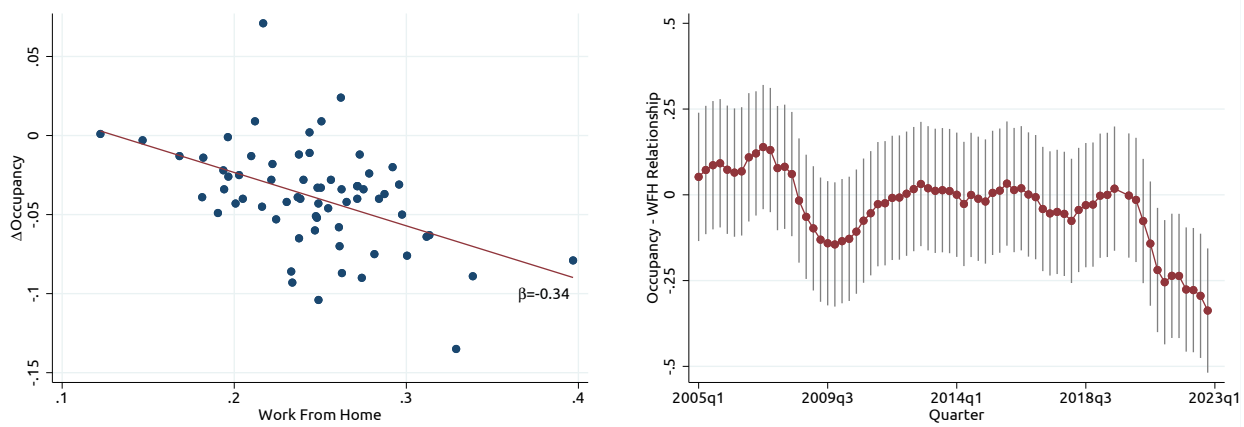
Notes: This table presents quantile regression estimates of the relationship between lease expirations and the 25th percentile of occupancy changes (columns 1 through 4) and NOI growth (columns 5 through 8) for office properties. $\text{Expirations}_{i,t,t+1}$ is the share of leases (in terms of square footage) that potentially expire in the year following the financial reporting date in year t, and $\text{COVID Expirations}_{t,t+1}$ interacts this expiration share with an indicator for whether $t+1$ is 2020 or later. The dependent variable is the change in occupancy between t and $t+2$ in columns 1 through 3, and the growth in NOI over this period in columns 4 through 6. Columns 1 and 4 repeat results from Table 2, columns 2 and 5 add interactions for whether the property is in a central business district, and columns 3 and 6 add interactions for the percentage decline in time spent at workplaces relative to pre-pandemic levels. All specifications control for the initial vacancy rate and year fixed effects. The two location-specific measures and their interactions with the COVID indicator are added to some specifications when relevant (not displayed). Standard errors, in parentheses, are clustered by CMBS deal. $^{+}$,*,** indicate significance at 10%, 5%, and 1%, respectively.
Sources: Morningstar, Real Capital Analystics, Opportunity Insights, and authors' calculations.

Table B.2: Effects of Office Sublet Rate on Vacancy during the Pandemic

	4-Q ΔSublet Rate	4-Q ΔVacancy Rate	
	(1)	(2)	(3)
Central Business District × COVID	0.003*	0.011**	0.011**
	(0.001)	(0.003)	(0.003)
Δ_{4Q}Sublet Rate$_{t-4}$		0.082**	0.068*
		(0.029)	(0.026)
× Central Business District		0.280**	0.255**
		(0.065)	(0.062)
Δ_{4Q}Sublet Rate$_{t-4}$ during COVID		0.001	0.031
		(0.067)	(0.065)
× Central Business District		0.382^{+}	0.382^{+}
		(0.195)	(0.204)
R_a^2	0.009	0.073	0.101
Observations	191026	179776	179776
Submarket FEs	✓	✓	✓
Year FEs	✓		✓

Notes: This table presents estimates of the dynamic relationship between changes in vacancy rate and lagged change in sublet rate for office properties. The dependent variable is the four-quarter change in vacancy rate (equal to one minus occupancy rate). Sublet rate is the amount (in square feet) of available space listed for sublet as a fraction of total office building space in a market. Its four-quarter change lagged by four quarters, along with the interaction terms, enters as covariates. COVID equals 1 for all the quarters since 2020:Q2, and 0 otherwise. Central Business District is an indicator to identify the downtown commercial district in major metropolitan areas, defined as those submarkets where the average price per square foot over the past five years (that is, 2015:Q1—2019:Q4) as of 2020:Q1 is ranked in the top decile across all the core-based statistical areas (CBSAs) covered in the CoStar database and ranked in the top quintile within its own CBSA. Submarkets in CoStar data roughly correspond to neighborhoods for the major cities, such as Times Square in New York City. Columns (2) and (3) also control for four-quarter lag of the change in vacancy rate and its interactions with the CBD and COVID indicators. The sample starts in 2005:Q1 for most CBSAs. Standard errors, in parentheses, are clustered by CBSA. $^{+}$,*,** indicate significance at 10%, 5%, and 1%, respectively.
Sources: CoStar and authors' calculations.

Figure B.3: Relationship between Work from Home and Office Occupancy Rate



(a) Change in Office Occupancy during COVID

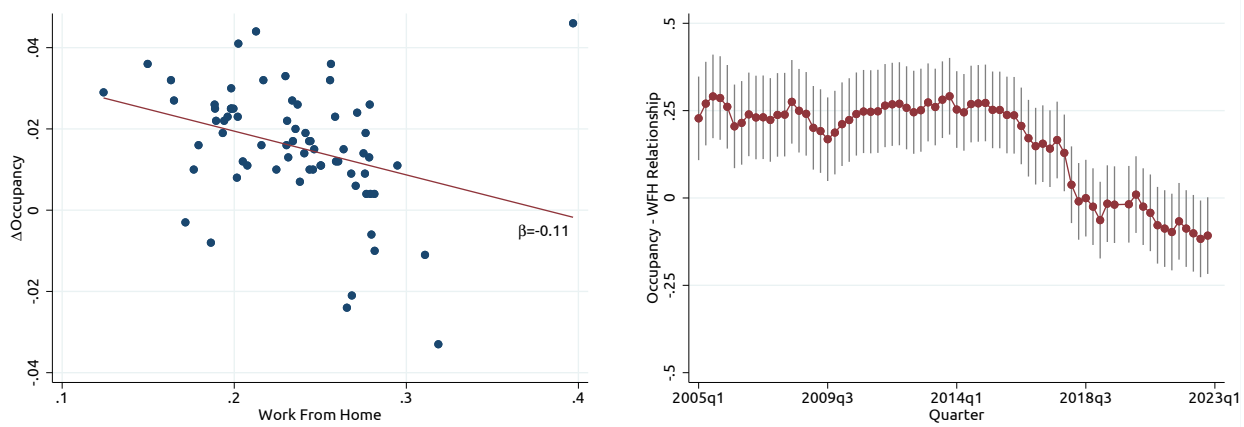
(b) Occupancy over Time

Notes: The left figure plots a scatter point between the change in office occupancy (from 2019:Q4 to 2022:Q4) and the decline in time spent in office during the pandemic for markets covered in the CBRE database. Work From Home is the population weighted average across the counties in market m. The right chart presents estimates of $\{\beta_t\}$ and 95% confidence intervals from the specification:

$$\text{Occupancy}_{m,\tau} = \alpha_m + \alpha_t + \sum_{t \in T} \beta_t \text{Work From Home}_m \times \mathbb{1}(\tau = t),$$

representing how occupancy changes in markets with a high 2022 work-from-home share over time. *Sources:* CBRE, Opportunity Insights, and authors' calculations.

Figure B.4: Relationship between Work from Home and Retail Occupancy Rate



(a) Change in Retail Occupancy during COVID (b) Occupancy over Time

Notes: The left figure plots a scatter point between the change in retail occupancy (from 2019:Q4 to 2022:Q4) and the decline in time spent in office during the pandemic for markets covered in the CBRE database. Work From Home is the population weighted average across the counties in market m. The right chart presents estimates of $\{\beta_t\}$ and 95% confidence intervals from the specification:

$$\text{Occupancy}_{m,\tau} = \alpha_m + \alpha_t + \sum_{t \in T} \beta_t \text{Work From Home}_m \times \mathbb{1}(\tau = t),$$

representing how occupancy changes in markets with a high 2022 work-from-home share over time. *Sources:* CBRE, Opportunity Insights, and authors' calculations.

C Bank Exposures to At-risk Office Markets: Additional Results

This section presents evidence showing that banks, especially smaller banks, are less exposed to CBD office loans than other CRE lenders because they generally make smaller loans, which tend to be located more in suburban markets. Table C.3 analyzes the exposure of non-GSIB banks (columns 1 through 3) and community banks (columns 4 through 6) to at-risk office loans. It shows that office loans in CBDs, or counties with a higher remote-work intensity, are less likely to be held by non-GSIB banks (column 1) or community banks (column 4). The coefficient estimates change little with the inclusion of core-based statistical area (CBSA) fixed effects, meaning that the differences are driven by locations *within* cities rather than across cities (columns 2 and 5). Namely, smaller banks do more lending in suburban markets, where demand appears to have fallen less than it has around city centers. Finally, the estimated differences in exposure to high-risk markets fall to almost zero when we control for loan size, indicating that the results are due to smaller banks making smaller loans (columns 3 and 6).

Table C.3: Determinants of Bank Exposure to At-risk Office Loans

	Non-GSIB Bank Indicator			Community Bank Indicator		
	(1)	(2)	(3)	(4)	(5)	(6)
Work From Home$_{c(i)}$	-0.83**	-0.66**	-0.18^{+}	-0.44**	-0.35**	-0.12
	(0.10)	(0.10)	(0.10)	(0.10)	(0.08)	(0.07)
Central Business District$_i$	-0.07**	-0.08**	-0.02^{+}	-0.03**	-0.04**	-0.00
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
ln(Loan Amount)			-0.10**			-0.05**
			(0.00)			(0.00)
R^2_a	0.018	0.042	0.090	0.008	0.052	0.072
Observations	40649	40511	40511	40649	40511	40511
CBSA FEs		✓	✓		✓	✓

Notes: This table presents estimates of a linear probability model predicting whether a lender is a non-GSIB-bank (columns 1 through 3) or a community bank (columns 4 through 6) based on whether the property securing a loan is in a central business district and the decline in the time spent at workplaces. The second and third columns in each set add in CBSA fixed effects and a control for the size of the loan, respectively. The sample is of office loans reported in RCA that are imputed as currently outstanding, as described in Section 4.3. Community banks are those with under $10 billion in assets. $^{+}$,*,** indicate significance at 10%, 5%, and 1%, respectively.
Sources: Real Capital Analytics, Opportunity Insights, and authors' calculations.