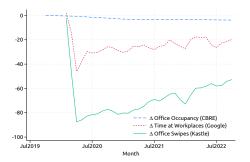
Lease Expirations and the CRE Property Performance

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Figure: Change in Contractual/Physical occupancy



- Utilization of office space plummeted since start of pandemic.
- Long leases temporarily shield CRE investors from weak demand.
- What will happen to properties when leases expire?

This Paper Studies . . .

We use data on scheduled lease expirations and the financial performance of properties securing CMBS loans to study:

- How lease expirations normally affect property performance
 Geltner (1989); Mooradian & Yang (2000); Moszkowski & Stackman (2022)
- How leasing dynamics changed during COVID Gupta et al. (2022); Rosenthal et al. (2022)
- Which markets were most affected
 Gupta et al. (2021); Ghosh et. al (2022); Monte et al. (2023)

Normal times

- Lease expirations substantially increase downside risk to occupancy and net operating income (NOI)
- Effects of lease expirations more prominent in weaker property markets

Changes during COVID-19 pandemic

- Risk from expirations amplified during COVID, driven by office sector
 - ▶ Effects of expirations on office occupancy rose by about 50% overall and more than doubled for offices in central business districts (CBDs)
 - ▶ Effects greater where time at workplaces fell more
- Change in leasing activity consistent with eventual 20pp rise in CBD office vacancy (6pp for suburban offices)
- GSIBs and nonbank lenders more exposed to the CBD offices

$$Y_{i,t-\epsilon,t+1+\epsilon} = \alpha_{p,t} + \mathsf{Expirations}_{i,t,t+1} \times \left(\gamma_0 + \sum_{j \in J} \gamma_j Z_{j,i,t} \right)$$

$$+ \mathsf{COVID} \; \mathsf{Expirations}_{i,t,t+1} \times \left(\beta_0 + \sum_{j \in J} \beta_j Z_{j,i,t} \right)$$

$$+ \eta' X_{i,t} + \varepsilon_{i,t},$$

$$(1)$$

where

- $Y_{i,t-\epsilon,t+1+\epsilon}$: Δ occupancy rate or NOI growth for property i
- Expirations $_{i,t,t+1}$: share of leases (in square footage) set to expire from t to t+1 (measured as of t-1)
- COVID Expirations_{i,t,t+1} = Expirations_{i,t,t+1} $\times \mathbb{1}(t \ge 2020)$
- {Z_{j,i,t}}_{j∈J}: variables potentially affecting the sensitivity of property performance to lease expirations
- $X_{i,t}$: controls including property vacancy at t and $\{Z_{j,i,t}\}_{j\in J}$
- $\alpha_{p,t}$: property type-year fixed effect.

Data

Property-month panel data for properties securing CMBS loans (Morningstar)

- Lease expiration schedule (industrial, retail, and office properties)
- Property performance metrics (NOI and occupancy)

Geographic risk characteristics (Z variables)

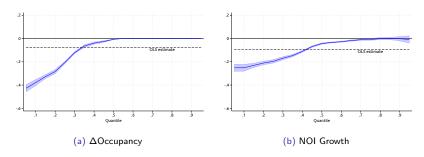
- Local vacancy rates by property type (CBRE)
- Central business district definitions (RCA)
- Change in time spent at workplaces (Google Mobility Reports)
 - Work From Home_{c(i)}: % decline in time at work places (as of Oct. 2022, relative to pre-pandemic)

► Lease/Financial Data Timeline

Lease Expirations in Normal Times

Before COVID, 10pp increase in lease expirations \implies \approx 80bp lower occupancy and NOI growth, driven by declines at lower quantiles.

Effects of Pre-COVID Lease Expirations from Quantile Regressions



Notes: This figure plots quantile regression estimates, using only pre-COVID data, of the effects of lease expirations on occupancy rate changes (left panel) and NOI growth (right panel) according to equation (1) without the interaction terms with $\{Z_{j,i,t}\}_{j \in J}$. 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 and authors' calculations.

Heterogeneous Effects by Market Vacancy

Adverse effects of lease expirations are driven by weaker property markets.

	Δ Occupano		$Q_{25}(\Delta Occupancy)$	NOI (Growth	Q ₂₅ (NOI Growth)	
	(1)	(2)	(3)	(4)	(5)	(6)	
Expirations _{$i,t,t+1$}	-0.07**	-0.03*	0.01	-0.09**	0.02	0.00	
	(0.00)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	
Property Vacancy _{i,t}	0.61**	0.61**	0.01*	0.07**	0.07**	-0.23**	
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)	
Market $Vacancy_{m(i),t}$, ,	-0.22**	-0.00	, ,	-0.29**	-0.23**	
		(0.03)	(0.00)		(0.04)	(0.03)	
\times Expirations _{i,t,t+1}		-0.39**	-1.48**		-0.92**	-1.41**	
		(0.10)	(0.09)		(0.15)	(0.19)	
R_a^2	0.298	0.308		0.016	0.018		
Observations	114584	109778	109778	114026	109228	109228	
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. Per-COVID data (2009–2018) only. 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. Standards errors, in parentheses, are clustered by CMBS deal. $\frac{1}{i}$, ** indicate significance at 10%, 5%, and 1%, respectively. Sources: MorningStar, CBRE, and authors' calculations

Recap

Pre-COVID effects of lease expirations:

- Most lease expirations result in renewal or replacement at comparable rents
- Some tenants downsize or vacate, creating downside risk to occupancy and income
- Effects of expirations reflect strength of local property market
 - Outcomes may signal where market is heading as other leases expire

Next: What happened during COVID?

- Focus on offices (industrial and retail more resiliant)
- Study risk factors related to shift to remote work
 - ► Central business district & decline in time at work place

Effects of Office Lease Expirations Since the Pandemic Outbreak

- Effect of expirations on office occupancy increased by half during COVID, and doubled for CBD offices.
- Effects larger in counties with greater decline in time at work place

		Occupano	y	NOI Growth			
	(1)	(2)	(3)	(4)	(5)	(6)	
Expirations _{$i,t,t+1$}	-0.10**	-0.10**	-0.08**	-0.15**	-0.15**	-0.00	
	(0.01)	(0.01)	(0.03)	(0.01)	(0.01)	(0.05)	
\times Central Business District _{z(i)}		-0.01	-0.00		0.04	0.08*	
		(0.02)	(0.02)		(0.03)	(0.03)	
\times Work From Home _{c(i)}			-0.07			-0.58**	
			(0.11)			(0.18)	
COVID Expirations _{$i,t,t+1$}	-0.06**	-0.05*	0.06	-0.13**	-0.10**	0.09	
	(0.02)	(0.02)	(0.06)	(0.04)	(0.04)	(0.12)	
× Central Business District _{z(i)}		-0.10 ⁺	-0.07		-0.31**	-0.23*	
		(0.06)	(0.06)		(0.10)	(0.10)	
\times Work From Home _{c(i)}			-0.43 ⁺			-0.80 ⁺	
			(0.23)			(0.45)	
Property Vacancy _{i,t}	0.53**	0.53**	0.53**	0.06**	0.06**	0.06**	
	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	
\times COVID _t	-0.31**	-0.30**	-0.30**	-0.20**	-0.19**	-0.19**	
	(0.03)	(0.03)	(0.03)	(0.07)	(0.07)	(0.07)	
R_a^2	0.221	0.222	0.223	0.017	0.018	0.020	
Observations	38132	37929	37910	37861	37658	37639	
Year FEs	✓	✓	✓	✓	✓	✓	

Notes: This table presents estimates of the effects of lease expirations on changes in occupancy and income growth for office properties. Columns 2 and 5 add interactions for whether the property is in a central business district, and outnowns 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. 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.

Other results

The adverse effect of COVID on lease expiration outcomes attributable to:

- Effects at lower quantiles Findings
 - ▶ 10pp \uparrow in expirations during COVID $\implies Q_{25}(\Delta \textit{Occupancy}) \downarrow 1.8pp$
 - ▶ Effects on $Q_{25}(\Delta NOI\ Growth)$ somewhat worse
 - Downside risks concentrated in counties with persistently larger increases in remote work
- Office (rather than retail and industrial) properties
 - Adverse effects of expirations increased only slightly for retail properties, and decreased for industrial ones, during COVID

Back-of-the-Envelope Vacancy Projections

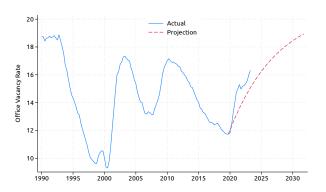
We project future vacancy rates assuming COVID-era rates at which tenants exit space and fill vacant space becomes permanent • Details

SS vacancy rates

20pp for CBD office;

6pp for suburban office

Figure: Change in U.S. Office Vacancy



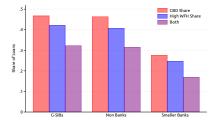
Notes: This figure plots the reported vacancy rate for U.S. offices from CBRE (blue) and the projected vacancy rate based on COVID-era leasing activity (red). The projected vacancy rate extrapolates changes in vacancy rates from 2019:Q4 levels, using regression estimates and assuming that 11% of leased space is scheduled to expire per year.

Sources: CBRE. and authors' calculations.

Lender Exposure to At-Risk Office Markets

Small and regional banks less exposed to at-risk markets

- Driven by loan sizes (smaller loans generally outside urban core)
- May contribute to lower CRE delinquency rates at small banks Delinquency



Notes: This figure plots the shares of office 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.

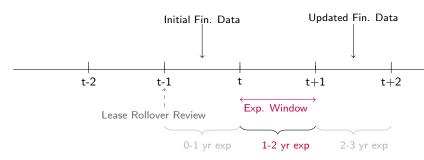
Sources: Real Capital Analytics, Opportunity Insights, and authors' calculations.

- Lease expirations substantially increase downside risk to occupancy and income, particularly in weaker local property markets.
- During COVID, the adverse effects of lease expirations on office occupancy intensified by about half overall, and more than doubled for CBD properties.
 - COVID-era change in leasing dynamics consistent with 20pp rise in long-run vacancy for CBD offices, but only 6pp rise for suburban offices.
 - Modest holdings of CBD office loans may mitigate CRE losses at small and regional banks.

Appendix

Timeline of Lease Review and Lease Performance Reporting

Figure: Timeline of Lease Review and Lease Performance Reporting



Notes: This diagram illustrates the timing with which lease expirations and financial data are reported. "Lease Rollover Review" is the time lease data is reported, "Exp. Window" is the period over which lease expirations are measured, and "Initial Fin. Data" and "Updated Fin. Data" delineate the time span over which changes in occupancy or NOI growth are calculated.



Downside Risk from COVID

	Q ₂₅	(ДОссира	ncy)	Q ₂₅ (NOI Growth)			
	(1)	(2)	(3)	(4)	(5)	(6)	
Expirations _{$i,t,t+1$}	-0.29**	-0.29**	-0.25**	-0.23**	-0.24**	-0.23**	
	(0.01)	(0.01)	(0.05)	(0.01)	(0.01)	(80.0)	
\times Central Business District _{z(i)}		0.01	0.01		0.07	0.08	
		(0.03)	(0.04)		(0.05)	(0.05)	
\times Work From Home _{c(i)}			-0.13			-0.04	
			(0.20)			(0.27)	
COVID Expirations _{$i,t,t+1$}	-0.18**	-0.13^{+}	0.40**	-0.23**	-0.19*	0.59**	
	(0.04)	(80.0)	(0.06)	(0.05)	(0.09)	(80.0)	
\times Central Business District _{z(i)}		-0.11	0.02		-0.43**	-0.13	
		(0.12)	(0.20)		(0.11)	(0.11)	
\times Work From Home _{c(i)}			-2.01**			-2.85**	
			(0.25)			(0.36)	
Property $Vacancy_{i,t}$	0.01**	0.01**	0.01**	-0.39**	-0.39**	-0.39**	
	(0.00)	(0.00)	(0.00)	(0.03)	(0.03)	(0.03)	
\times COVID $_t$	-0.10**	-0.07*	-0.08**	-0.42**	-0.39**	-0.41**	
	(0.02)	(0.03)	(0.02)	(0.07)	(0.05)	(0.06)	
Observations	38132	37929	37910	37861	37658	37639	
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 3) and NOI growth (columns 4 through 6) for **office** properties. All specifications control for the initial vacancy rate and year fixed effects. 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.



Effects of Expirations during COVID by Property Type

	ΔOccupancy				NOI Growth				
	Full Sample	Offices	Retail	Industrial	Full Sample	Offices	Retail	Industrial	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Expirations _{i,t,t+1}	-0.07**	-0.10**	-0.07**	-0.05**	-0.09**	-0.15**	-0.06**	-0.10**	
	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	
COVID Expirations _{$i,t,t+1$}	-0.02**	-0.06**	-0.00	0.01	-0.06**	-0.13**	-0.02	0.04	
	(0.01)	(0.02)	(0.01)	(0.02)	(0.02)	(0.04)	(0.02)	(0.03)	
Property Vacancy _{i,t}	0.61**	0.53**	0.67**	0.53**	0.07**	0.06**	0.06**	0.10	
	(0.02)	(0.01)	(0.02)	(0.06)	(0.01)	(0.02)	(0.01)	(80.0)	
\times COVID _t	-0.27**	-0.31**	-0.28**	0.06	-0.05	-0.20**	-0.00	0.67**	
	(0.02)	(0.03)	(0.03)	(0.07)	(0.04)	(0.07)	(0.06)	(0.16)	
R_a^2	0.290	0.221	0.344	0.248	0.019	0.017	0.018	0.032	
Observations	133663	38132	80652	14879	133026	37861	80458	14707	
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). 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.

▶ Rack

Estimation of COVID-Era Change in Vacancy Dynamics

Assume occupancy dynamics follow equation:

$$\Delta Occ_{i,t} = f_{i,t} Vac_{i,t} - \lambda_{i,t} Exp_{i,t} - \delta_{i,t} (1 - Vac_{i,t} - Exp_{i,t})$$

Estimate by regression, allowing coefficients to vary by $COVID_t \times CBD_i$.

Project vacancy rates forward in time starting from 2019:Q4 levels, assuming

- f, λ , and δ remain at COVID-levels going forward
- Annual scheduled expiration share remains around 11%

Market	Overall		Suburt	oan	CBD	
Period	Pre-COVID	COVID	Pre-COVID	COVID	Pre-COVID	COVID
	(1)	(2)	(3)	(4)	(5)	(6)
δ	0.062	0.034	0.060	0.030	0.072	0.051
	(0.001)	(0.003)	(0.001)	(0.003)	(0.003)	(0.007)
f	0.464	0.183	0.451	0.199	0.543	0.154
	(0.005)	(0.016)	(0.005)	(0.017)	(0.013)	(0.040)
λ	0.164	0.191	0.161	0.180	0.176	0.309
	(0.005)	(0.010)	(0.005)	(0.011)	(0.014)	(0.035)
Steady State Vacancy (%)	13.9	23.7	14.0	20.4	13.5	38.7
SS Vacancy if λ reverts		22.3		19.5		31.6

Notes: This table presents estimates of the structural parameters affecting office occupancy based on regressions of changes in occupancy on the property-level vacancy rate, the lease expiration share, and their interactions with a COVID indicator (columns 1–2), or fully interacted with the COVID indicator, the CBD share, and the latter terms' interaction (Columns 3–6). Columns (1) and (2) present estimates for dynamics before and during COVID, respectively, pooling across markets. Columns (3) and (4) present equivalent estimates for suburban office properties, and columns (5) and (6) for CBD office properties. The steady-state vacancy rate implied by the estimates is reported in the second-to-last row, and the steady-state vacancy rate assuming λ_1 , returns to pre-pandemic levels is in the last row.

Determinants of Bank Exposure to At-Risk Office CRE Markets

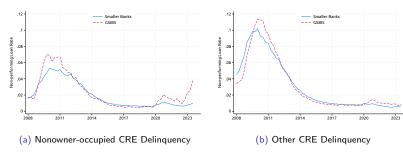
	Non-GS	SIB Bank I	ndicator	Community Bank Indicator			
	(1)	(2)	(3)	(4)	(5)	(6)	
Work From $Home_{c(i)}$	-0.83**	-0.65**	-0.18^{+}	-0.44**	-0.35**	-0.12^{+}	
	(0.10)	(0.10)	(0.10)	(0.10)	(80.0)	(0.07)	
Central Business District _i	-0.07**	-0.08**	-0.02^{+}	-0.03**	-0.03**	-0.00	
	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	
In(Loan Amount)			-0.10**			-0.05**	
			(0.00)			(0.00)	
R_a^2	0.018	0.042	0.090	0.008	0.053	0.073	
Observations	40635	40497	40497	40635	40497	40497	
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 we imputed to be outstanding as of 2023:Q1. 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.



Nonperforming Loan Rates by Bank Size



Notes: Each figure plots CRE non-performing loan rates over time for G-SIB (red) and non-G-SIB (blue) banks. Nonperforming loans are loans that are 30 days or more past due or nonaccrual, plotted as a share of aggregate outstanding balances. The left chart plots nonperforming loan rates for nonowner-occupied nonfarm nonresidential loans, while the right plots nonperforming loan rates for other CRE (an aggregation of multifamily, construction and land development, and owner-occupied CRE loans).

Sources: Call Reports, and authors' calculations.

▶ Back