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Work-from-Home and the Future Consolidation of the U.S. Commercial Real Estate Office Sector: The Decline of Regional Malls May Provide Insight

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The work-from-home phenomenon is setting conditions for the consolidation of the U.S. commercial real estate (CRE) office sector. Negative office space absorption and the increase in office space available for sublease suggest that current demand is weak. In addition, indications that actual office occupancy by workers remains at or below 50% signal that employers lease significantly more office space than they currently need. Should firms reduce their office space requirements to reflect the reality of employees' work-from-home preference, the CRE office sector could suffer a contraction, posing a risk to (1) financial institutions with exposure to the sector and (2) municipalities reliant on CRE tax revenue. In fact, a diminished CRE office sector, recently valued at $3.2 trillion,[2] could suffer a significant devaluation[3] over time. That would generate significant financial instability through loan defaults, foreclosures, and equity value depletion.

To assess the likelihood and potential extent of a CRE office sector consolidation, this brief examines another CRE sector that has suffered decline and restructuring due to changes in user preferences: regional malls. Once a ubiquitous fixture of American life, regional malls in the U.S. have declined in number by one-quarter, and no new regional malls have been built in nine years.[4] Additionally, this brief analyzes the timing and recognition of financial losses in the office sector that would likely occur should work-from-home become permanent and marginal office properties become structurally vacant and require repurposing.

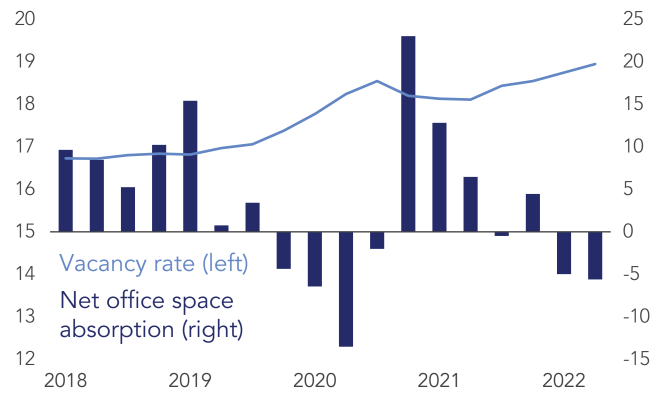
The COVID-19 pandemic fundamentally changed employer and employee perceptions of working from home.[5] During 2020 and 2021, many employees who worked in office buildings were required to work from home for months, regardless of worker or firm preferences.[6] During this period of *required* work-from-home, employees recognized the benefits of this new mode of work—including, among other things, no commute time and greater flexibility. As a result, many office employees developed a preference to continue working from home *voluntarily*, even though it was no longer required. At the same time, firms recognized that with appropriate equipment and technology, employees could maintain their productivity even if they were not present in their offices. As a result, when office buildings fully reopened in 2022, some firms responded to their workers' preferences by allowing them to continue to work from home.[7]

Although the long-term future of work-from-home has not yet solidified, the old mode of full-time physical presence in offices faces headwinds. This is due to worker preference for work-from home and the fact that firms that allow employees to work from home may have a competitive hiring advantage over those that do not.[8] Working from home is a valued amenity that allows employers to better attract and retain employees,[9] and it also reduces firm overhead expense by transferring the cost of office space and related expenses from the firm to the employee.10 Should working from home become a permanent worker preference and should firms recognize and value its competitive advantages, its effect on the CRE office sector will be profound.

Work-From-Home Has Weakened the CRE Office Sector

Employees' preference for working from home is already weakening the CRE office sector. Since the beginning of the COVID-19 pandemic in March 2000, the reported U.S. office vacancy rate has risen steadily. As of Q1 2023, it reached 19.0%. Although new office construction has also added inventory, negative net absorption of office space has driven reported vacancy rates higher (see **Figure 1**). However, the reported vacancy rate does not reflect the full impact of work-from-home on the CRE office sector. For example,

Figure 1. Quarterly U.S. Office Vacancy Rate (percent, left) and Net Office Space Absorption (trillions of RSF, right)



Sources: Moody's Analytics: REIS, Office of Financial Research

demand for office space is actually weaker than reported due to the growth in office space available for sublease by firms that no longer need the space. Although office space available for sublease remains rent bearing for a building owner, it portends lower future demand for office space because sublease space competes for tenants with existing vacant space, limiting its future absorption. It also signals that current tenants may renew their future leases for less space -- also reducing future demand. The amount of subleased office space has grown by nearly 130% since Q2 2020[11] to 210 million rentable square feet. As a point of comparison, during the Great Recession, available sublease space in the U.S. peaked at 147 million rentable square feet in Q2 2009.[12] Note that the growth of office space available for sublease reflects rational behavior by firms coping with the work-from-home trend. Fewer office employees require less office space. Since a tenant cannot break its lease, subleasing allows the recovery of at least some of the cost of unused office space.

Future Demand for Office Space Also Appears Weak

The health of the CRE office sector is measured not only by the amount of space leased and paying rent today, but also by how much space will be required in the future. Unfortunately, future demand for office space appears weak. In addition to the growth of office space available for sublease, the amount of office space actually occupied by tenants remains stubbornly low (see **Figure 2**). Although the current office vacancy rate is 19.0%, the average occupancy rate measured by the Kastle Back to Work Barometer[13] is 49.8%, implying a structural vacancy rate of 50.2%. This means that on average, firms are paying rent for twice as much space as they are currently using. Although office occupancy rates have slowly increased since the beginning of the COVID-19 pandemic, they have not risen much above 50% in nearly three years. Consequently, there are three different vacancy rates we can use to consider the current and future health of the office sector (see **Figure 3**). By adding the office space available for sublease to the current *reported vacancy rate* of 19.0%, we find that the current *available vacancy rate* of the office sector is 23.2%. The *structural vacancy rate*, reflecting office space actually occupied by tenants, is 50.2%.

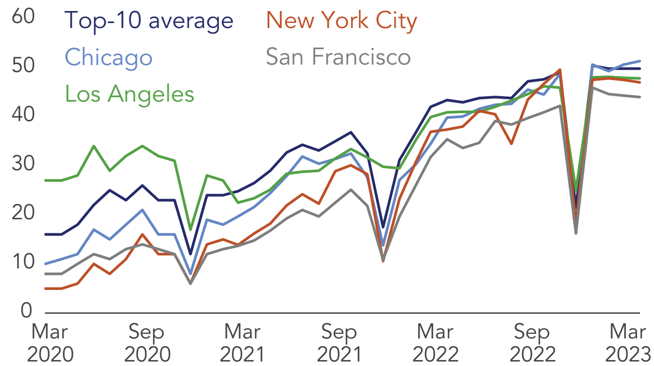
Case Study: The Decline of Regional Malls

Will occupancy rates in office buildings remain structurally lower in the future as employees continue to work from home, and if structural vacancies remain in the long term, what will happen to office buildings? Fortunately, to help us answer these questions, we can draw on a case study of regional malls—another CRE sector that downsized and restructured due to changes in user preferences. Regional malls are fully enclosed shopping centers that have at least 400,000 square feet of gross leasable area (GLA) for retailers and are anchored by several department stores.[14] Due to their size, location outside of built-up urban areas and next to major traffic arteries, and ample parking, they draw consumers from a wide trade area.

Until the 1990s, regional malls represented the quintessential American retail experience.[15] Consumers preferred regional malls to traditional downtown retail,[16] and the number of regional malls expanded, growing in number from several hundred in 1970 to over 1,400 by 1995. After 1995, another change in consumer preferences—the convenience of shopping at "big box" retailers[17]—introduced new competition for regional malls and slowed their construction. The number of U.S. regional malls peaked in 2006 at 1,522 (with nearly 1.4 billion square feet of GLA) and has since declined to 1,148 (with 1.0 billion square feet of GLA)[18]. The last regional mall built in the U.S. was completed in 2014,[19] nine years ago.

What happened? In a word, e-commerce. From Q1 2000 to Q2 2020, e-commerce grew from 0.8% to 16.4% of total retail sales, settling at 14.8% at year-end 2022. As a result, the sales of traditional retailers fell. For example, quarterly department store sales fell to $33.1 billion from $57.7 during the same period (see **Figure 4**). This shift in consumer shopping preferences toward e-commerce and away from "brick-and-mortar" physical retailers had a profound impact on regional malls. Retailers consolidated their

Figure 2. Estimated Office Space Occupancy (percent)



Note: Kastle Workplace Barometer.

Sources: Haver Analytics, Office of Financial Research

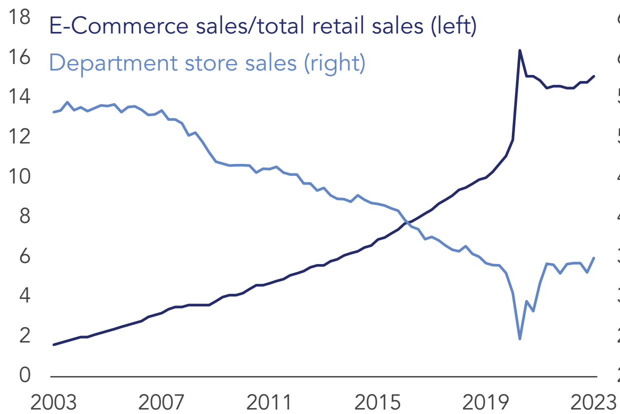
Figure 3. Q1 2023 U.S. Office Vacancy Rates

	Office space (millions of RSF)			Vacancy rate (percent)
	Vacant	Occupied	Total	
Reported vacancy rate	934	3,831	4,764	19.0
Available vacancy rate	1,103	3,662	4,764	23.2
Structural vacancy rate	2,392	2,372	4,764	50.2

Note: Available vacancy rate is calculated as vacant plus subleased space, divided by total office space. Occupied vacancy rate is calculated based on 10-city estimated office space occupancy.

Sources: Haver Analytics, Office of Financial Research

Figure 4. Quarterly E-Commerce Sales (percent, left) and Department Store Sales ($ billions, right)



Sources: U.S. Census Bureau, Office of Financial Research

physical locations to reflect lower sales and reduce costs, focusing on premium locations with the highest sales per square foot to maximize profits.

This affected regional malls in two ways:

1. It created a situation in which too many malls with too much GLA were chasing too few retail sales.
2. It caused retailers to vacate those regional malls with less-desirable locations or infrastructure in a flight to quality.

As retailers exited regional malls gradually, as leases allowed, or immediately, via bankruptcy,[20] occupancy rates declined, especially at marginal regional malls. A *feedback loop* then occurred as consumers chose not to shop at regional malls with fewer shopping options and sales at those malls declined further, catalyzing an additional exodus of tenants. This led to the eventual closure of regional malls whose occupancy fell so far that operating costs exceeded rental income. As of year-end 2022, 25% of all regional malls (composing 22% of total GLA) were vacant (see **Figure 5**). Because a vacant regional mall is worth significantly less than one in operation, approximately $7 to $9 billion in real estate value has been lost.[21]

Since newly vacated regional malls have lost their previous "highest and best use" as retail space, mall owners need a new value-maximizing purpose for their properties. In 2020, the National Association of Realtors surveyed 94 vacant regional malls seeking to

Figure 5. Decline of U.S. Regional Malls

	2007	2022	Change	Percent change
Number of regional malls	1,522	1,148	-374	-25
GLA (millions)	1,355	1,060	-295	-22

Approximate value loss (per square foot) $250–$300

Approximate value loss $7.4–$8.9 billion

Note: See endnote 25 for valuation methodology.

Source: Office of Financial Research

determine, among other things, the purchase prices of the vacant properties and their repurposed use.[22] The survey found that on average, a regional mall sat vacant for 46 months before being repurposed, and its value fell sharply during that time. The average purchase price was $80 per square foot of GLA, reflecting as much as a 90% discount from its value as a fully occupied regional mall. The redeveloped uses for regional malls include new retail space with a smaller footprint, mixed use, and warehouse/distribution space. More eclectic options include use as a cricket stadium, a police precinct, and an indoor cannabis farm. Although the next-highest and best use of vacant regional malls generated losses in their value, their intrinsic qualities—including significant land area, ample parking, and location near major traffic arteries—aided in their eventual redevelopment.

Could the CRE Office Sector Go the Way of Regional Malls?

There are striking similarities between the CRE office sector today and regional malls before their consolidation, and there is mounting evidence that CRE could experience a similar decline (see **Figure 6**). Like consumers' change in preference from brick-and-mortar retail to e-commerce, full-time employees' change in preference from work in office to working from home seems both profound and permanent. Also, despite some well-publicized holdouts,[23] many employers recognize and value work-from-home's competitive advantages. Just as the shift to e-commerce

Figure 6. Does the Decline of Regional Malls Foreshadow the Decline of Office Buildings?

	Decline of regional malls	Decline of office buildings?
1. Change in preference	Physical retail → E-commerce	Work-in-office → Work-from-home
↓	↓	↓
2. Effects of change in preference	1. Decline in retail sales. 2. Tenants require less space.	1. Decline in office occupancy. 2. Tenants require less space.
↓	↓	↓
3. Results of change in preference	1. Vacancy rates rise. 2. Operating costs > rental income. 3. Marginal properties go vacant.	1. Vacancy rates rise. 2. Operating costs > rental income. 3. Marginal properties go vacant.
↓	↓	↓
4. Outcomes for marginal properties	1. Change in highest and best use. 2. Significant loss of value	1. Change in highest and best use. 2. Significant loss of value.

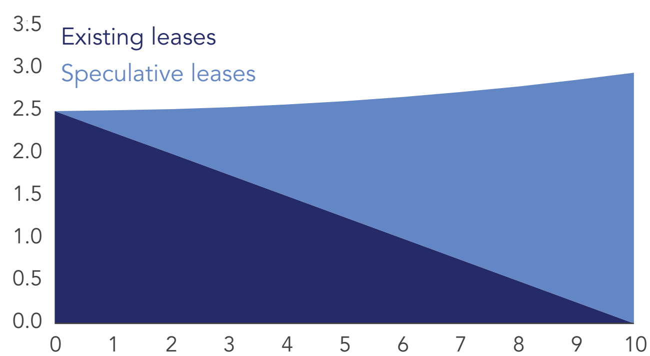
Source: Office of Financial Research

drove regional mall vacancy rates higher, the shift to work-from-home is driving reported office vacancy rates higher. Office space available for sublease is growing, and structural office occupancy rates remain at or below 50%. We have not witnessed a significant number of marginal office buildings going vacant (that is, having too much office space chasing too few tenants), but given the experience of regional malls and the extraordinary amount of office space that is leased but not used by employees, it seems possible that such buildings could go vacant in future.

Assessing the Emerging Risk to the CRE Office Sector

If the threat of work-at-home is so acute, why haven't we seen the CRE office sector begin to consolidate already? Despite the headwinds, the CRE office sector is currently insulated from work-from-home trends due to (1) the structure and length of its leases and (2) the appraisal process used to value office buildings. However, should trends continue, it is only a matter of time before this buffer burns away. The standard office lease contractually obligates tenants to pay rent over its lease term, regardless of the tenants' use or occupancy of the space.[24] With an average lease term of seven years,[25] the structure of leases provides steady, dependable cash flow to the building owner, at least until the leases end. Upon a lease's expiration, tenants can renegotiate the lease's terms, including rent and the amount of space leased. To assess how leases can protect building owners from the impact of the work-from-home trends, this brief uses a model of a fully leased 100,000 RSF office building (Sample Office Building) that is similar to the model used by CRE appraisers to forecast property cash flow. The Sample Office Building has 10 tenants with identical 10-year

Figure 7. Sample Office Building: Annual Cash Flow From Existing/Speculative Leases ($ millions), 10-year projection



Note: See endnote 25 for office model assumptions.

Sources: Office of Financial Research

leases that expire annually and sequentially.[26] As shown in **Figure 7**, at the start of the forecast, *existing* leases generate all the Sample Office Building's cash flow—but as leases expire, *speculative* leases generate more and more cash flow. Speculative leases are prepared using assumptions negotiated between the building's owner and its appraiser about future office market conditions and how they will affect the building's cash flow. The further out one projects, the more uncertain the terms of the speculative leases become.

The importance of speculative leases in office building valuation becomes clear when one calculates the net present value of a property's cash flow using the discounted cash flow approach (DCFA).[27] In essence, the DCFA values three streams of income: (1) existing-lease cash flows, (2) speculative-lease cash flows, and (3) the sale price of the building when it is assumed to be sold at the end of the projection period—also known as the *residual*. One calculates the residual by capitalizing the final year's projected cash flow (which in this example is 100% generated by speculative leases) by the discount rate. The valuation of the Sample Office Building is shown in **Figure 8**. Note that only 22% of its value is generated by existing leases and 54% comes from a projected sale price 10 years in the future. These ratios are standard[28] in office building valuation, and they attest to the power and importance of the assumptions the building's owner and its appraiser use to forecast speculative leases.

The Recognition and Timing of Structural Vacancy Matter

If the work-from-home trend causes existing tenants to reduce their office space requirements as their leases expire, then future property cash flows will decrease. But how will this affect property values? **Figure 9** sensitizes the Sample Office Building model to assume that tenants renegotiate their leases upon expiry to reduce their leased space by up to 60%. Note that in each of the seven scenarios, the value of the existing leases remains unchanged; however, the value of the speculative-lease cash flows and the residual decline. In the most extreme case—60% structural vacancy—the value of the Sample Office Building declines to $21.6 million from $40.7 million, a 47% decrease. With so much value at stake, building owners may be

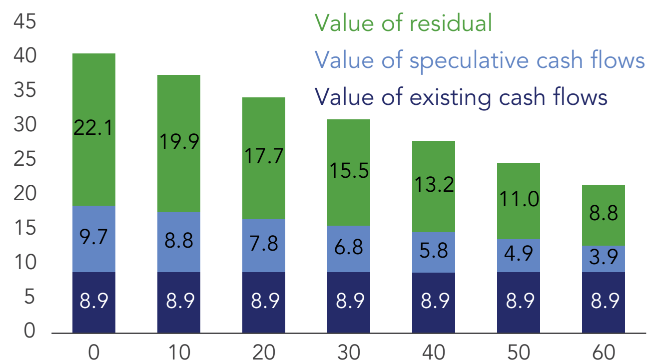
Figure 8. Valuation of Sample Office Building ($ millions)

	Value	Percent of total
Value of Existing Cash Flows	8.9	22
Value of Speculative Cash Flows	9.7	24
Value of Residual	22.1	54
Total Value	40.7	100

Note: See endnote 25 for office model data.

Source: Office of Financial Research

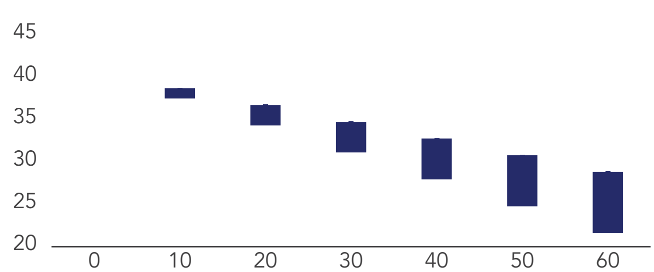
Figure 9. Change in Composition of Sample Office Value ($ millions) as Tenants Reduce RSF as Lease Renews (percent)



Note: See endnote 25 for office model data. Figures in millions.

Source: Office of Financial Research

Figure 10. Range of Sample Office Values Based on Timing of Recognition of Occupancy Reduction ($ millions) as Tenants Reduce RSF as Lease Renews (percent)



Note: See endnote 25 for office model data.

Source: Office of Financial Research

incentivized to delay recognition of structural vacancy to, say, meet loan-to-value covenants on mortgage loans, or for other personal or corporate reasons.29 This is not a far-fetched scenario—building owners have leverage over their buildings' appraisers because owners control building data and hire the appraisal firms. To measure this effect, **Figure 10** adjusts the Sample Office Model further to delay the recognition of building structural vacancy for up to five years. That is, the model projects that renewing tenants will reduce their space needs by up to 60%—but it does not recognize the space reduction in speculative-lease cash flows until up to five years later, when the building owner and appraiser bow to the inevitable. Delaying the recognition of occupancy reduction can raise a property's value significantly. For example, in the 60% structural-vacancy scenario, delaying the recognition of vacancy raises the Sample Office Building's value to $28.8 million from $21.6 million, a 33% increase.

Required Risk Premia to Hold Office Buildings Will Likely Increase—Hurting Office Valuation

Finally, should the CRE office sector continue to experience the negative effects of work-from-home, uncertainty regarding the sector's long-term future would raise the required investor risk premia to hold office buildings, further reducing those buildings' value. The DCFA calculates the net present value of future property cash flows using a discount rate incorporating the risk-free rate plus a required investor risk premium.[30] Using this methodology, a higher discount rate due to a rising risk-free rate will lower CRE cash flow valuation. **Figures 11** and **12**, which are sensitivity matrices,[31] illustrate the effects of increased investor risk premia on the Sample Office Building cash flows in two cases discussed earlier: (1) recognizing and valuing occupancy decreases immediately and (2) recognizing and valuing occupancy decreases after five years. From an initial discount rate of 7% (the shaded columns below), every 50-basis-point increase in the investor risk premium reduces the Sample Office Building Value by 4% to 7%, depending on the chosen structural vacancy rate.

Figure 11. Change in Sample Office Building Value: Occupancy Decrease Valued Immediately ($ millions)

Change in tenant RSF as leases renew (percent)	Discount rate/Residual rate				
	7.00%	7.50%	8.00%	8.50%	9.00%
0	40.7	37.8	35.4	33.2	31.2
10	37.5	34.9	32.7	30.7	28.9
20	34.3	32.0	30.0	28.2	26.7
30	31.1	29.1	27.3	25.8	24.4
40	28.0	26.2	24.7	23.3	22.1
50	24.8	23.3	22.0	20.8	19.8
60	21.6	20.4	19.3	18.4	17.5

Note: See endnote 25 for office model assumptions. The shaded column is the base case.

Source: Office of Financial Research

Figure 12. Change in Sample Office Building Value: Occupancy Decrease Valued After 5 Years ($ millions)

Change in tenant RSF as leases renew (percent)	Discount rate/Residual rate				
	7.00%	7.50%	8.00%	8.50%	9.00%
0	40.7	37.8	35.4	33.2	31.2
10	38.7	36.1	33.7	31.7	29.9
20	36.7	34.3	32.1	30.2	28.5
30	34.8	32.5	30.5	28.7	27.2
40	32.8	30.7	28.9	27.2	25.8
50	30.8	28.9	27.2	25.8	24.5
60	28.8	27.1	25.6	24.3	23.1

Note: See endnote 25 for office model assumptions. The shaded column is the base case.

Source: Office of Financial Research

Risks to U.S. Financial Stability from Work-from-Home

If work-from-home becomes a permanent worker preference *and* if firms recognize and value its competitive advantages, then the CRE office sector will certainly lose value due to decreased cash flows and the increased investor risk premia used to value the cash flows. The sector will also likely consolidate as tenants migrate to higher-quality office buildings and marginal office buildings become structurally vacant (as happened in the regional mall sector). In addition, the repurposing of marginal office properties (especially in central business districts) will be more difficult and costly than the repurposing of regional malls has been, and it will potentially reshape the economies and skylines of many urban centers.

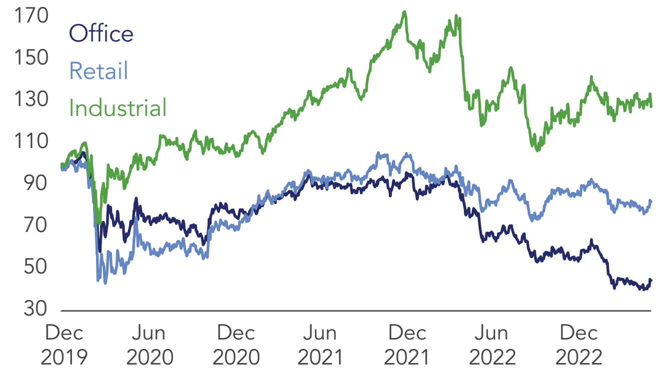
As significant as the aforementioned work-from-home-related issues may be, none of them pose threats to financial stability—but the following three issues do:

1. High potential for significant losses for financial institutions with equity or debt exposure to the CRE office sector.
2. High likelihood of losses of commercial real estate tax revenue to municipalities as appraised values for tax purposes decline.
3. High cost and difficulty of repurposing marginal office buildings.

This brief now analyzes these issues in detail.

1. High potential for losses for financial institutions with exposure to the sector. The CRE office sector is currently estimated to be nearly $3.2 trillion, which is nine times as large as the regional mall sector was at its peak.[32] Should the CRE office sector decline by the same percentage of GLA lost by the regional mall sector from its peak, institutions with exposure to offices would face significant devaluation. This is a large potential loss, but it is tempered by the fact that it will happen over time, not all at once. The regional-mall decline took place over the course of decades, and the CRE decline likely will as well. On the other hand, the Sample Office Model illustrates that every 10% increase in structural vacancy reduces an office property's value by a minimum of 8%. Applied to the

Figure 13. Change in Composition of Sample Office Value ($ millions) as Tenants Reduce RSF as Lease Renews (percent)



Note: 12/31/2019 = 100. Data as of June 9, 2023.

Sources: Bloomberg, Office of Financial Research

Figure 14. CMBS Delinquency Rate by Property Type (percent)

	May 2023	Mar 2023	Dec 2022	Sep 2022	June 2022	Mar 2022
Office	3.83	3.24	2.73	2.56	2.75	2.45
Retail	4.64	4.61	4.78	5.27	5.35	5.50
Industrial	0.83	0.85	0.90	0.61	0.62	0.75
Lodging	5.49	5.63	6.37	7.25	8.21	9.86
Multifamily	1.23	1.22	1.26	1.25	1.34	1.53
Overall	4.51	4.20	4.18	4.11	4.39	4.68

Note: Retail excludes regional malls. Delinquency of 30 days or more.

Sources: Moody's, Office of Financial Research

CRE office sector, this equates to $188 billion of value deterioration.

Indications of this financial deterioration are beginning to appear in the financial markets. For example, the office real estate investment trust (REIT) sector has underperformed other REIT indexes (see **Figure 13**). Since year-end 2020, the share price of office REITs has fallen an average of 43%, compared with a 12% increase for retail REITs and an 18% increase for industrial REITs. In fact, the current average share price of office REITs is less than its COVID-19 pandemic low in March 2020.

In addition, there were a growing wave of CBD office loan defaults in Q1 2023, including among premier owners such as Columbia Property Trust (seven properties and $1.7 billion of loans) and Brookfield Corporation (two properties and $750 million of loans)[33]. According to Moody's, the CMBS delinquency rate for office properties jumped 59 basis points in May 2023 to an average of 3.83%, up from 3.24% in March and 2.75% 11 months ago (see **Figure 14**). Direct lenders to office buildings include banks and insurance companies, which could bear the brunt of office loan delinquencies and defaults. Of additional concern are those financial institutions that hold CMBS supported by loans to office buildings in conduit; these include banks, insurers, pension funds, and other institutional investors. With $3.2 trillion of total value at risk, the work-at-home phenomenon could generate financial instability for holders of office loans over time.

2. High likelihood of reductions in commercial real estate tax revenue. Municipalities rely on property taxes as one of many revenue streams to fund city government and essential services. Smaller and midsize cities tend to be relatively more reliant on real estate taxes for funding because they have less diversified revenue streams; however, each municipality funds its services differently. Commercial property taxes compose up to 10% of a city's annual tax revenue, and the lion's share of such taxes are on office buildings.[34] The loss of this revenue, if not made up from elsewhere, could generate budget deficits or reduce critical city services.

3. High cost and difficulty of repurposing marginal office buildings. Redeveloping vacant regional malls is an altogether easier proposition than redeveloping marginal office buildings, especially those in dense urban or infill locations. The key advantage of vacant regional mall sites—their large land parcels in relation to their building areas—is reversed in urban office locations. For example, it is not possible to redevelop office buildings in central business districts into distribution centers or warehouses because there is limited egress and parking for semitrailers. In addition, it is generally not cost-effective and may not be possible to redevelop marginal office buildings into apartment buildings.[35] Multifamily buildings require more external surface area to internal area to accommodate windows for bedrooms and living areas than is required for office buildings, especially those with internal offices. Furthermore, the required replumbing, electrical, and life safety upgrades necessary to repurpose marginal offices are not cost-effective without subsidies. Often, the highest and best use for a marginal office building is demolition and using its land as surface parking, park area, or nothing at all.[36]

Conclusion

Working from home appears to be a preferred amenity for former full-time office workers, and many firms have recognized or are beginning to recognize its competitive advantages. If the trend becomes permanent, many firms will find that they are leasing more office space than they need and will downsize. This downsizing will result in consolidation of the office sector and may be as significant as the decline of regional malls in the 2000s. Warning signs of future CRE office sector consolidation may include the following:

1. Codification of work-from-home in future employment agreements.
2. Continued increases in office space available for sublet.
3. Continued low actual worker occupancy of office space.
4. Downsizing of firms' office space requirements in new leases.
5. Continued deterioration in the value of office REIT stocks.
6. Increases in delinquencies and defaults in the office sector.

The CRE office sector is substantial, with an estimated value of $3.2 trillion. Should firms reduce their office space requirements to reflect the reality of employees' work-from-home preference, the CRE office sector could suffer a contraction, posing a risk to financial institutions that hold loans or CMBS secured by office properties. In fact, should offices contract to the same extent as regional malls, the sector could suffer significant devaluation over time, generating financial instability through loan defaults, foreclosures, and equity value depletion. In addition, municipalities rely on property taxes as one of many revenue streams to fund city government and essential services—and given that the next-highest and best use of a marginal office building is demolition, a contracting CRE office sector could reshape the economies and skylines of many central business districts.

Endnotes

1 Tom Doolittle, Financial Analyst, Office of Financial Research (Thomas.Doolittle@ofr.treasury.gov); and Arthur Fliegelman, Senior Financial Analyst, Office of Financial Research (Arthur.Fliegelman@ofr.treasury.gov).

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