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Commercial Real Estate Prices During COVID-19: What is Driving the Divergence?

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After dropping sharply in the early phases of the COVID-19 pandemic, commercial real estate prices are on the mend. However, the initial price decline, as well as the pace of recovery, vary widely across regions and different segments of the commercial real estate market. This note analyzes the factors that explain this divergence using city-level data from major advanced and emerging market economies. The findings show that pandemic-specific factors such as the stringency of containment measures and the spread of the virus are strongly associated with a decline in prices, while fiscal support and easy financial conditions maintained by central banks have helped to cushion the shock. A higher vaccination rate has aided the recovery of the sector, especially in the retail segment. Structural changes in private behavior such as the trend toward teleworking and e-commerce have also had an impact on commercial property prices in some segments. The outlook of the sector across regions thus remains closely tied to the trajectory of the pandemic and broader macroeconomic recovery, financial market conditions, and the pace of structural shifts in the demand for specific property types. In an environment of tightening financial conditions and a slowdown in economic activity, continued vigilance is warranted on the part of financial supervisors to minimize financial stability risks stemming from potential adverse shocks to the sector.

INTRODUCTION*

In the runup to the COVID-19 pandemic, the commercial real estate (CRE) sector had been booming globally. CRE prices rose annually at about 6 percent on average during 2009–19, with North America experiencing the steepest increase (Figure 1, panel 1).[1] This trend reversed at the onset of the pandemic as CRE prices plummeted, particularly in Europe and North America, and in the retail segment (Figure 1, panels 2-6).[2] Aggregate CRE prices started to rebound in late 2020 and early 2021, but considerable disparity remains across regions and across segments within the CRE sector. For example, the aggregate CRE price has increased noticeably in North America on the back of a surge in residential and industrial property prices (Figure 1, panels 5 and 6), while the recovery in the retail and office segments has lagged in the region. In Asia and

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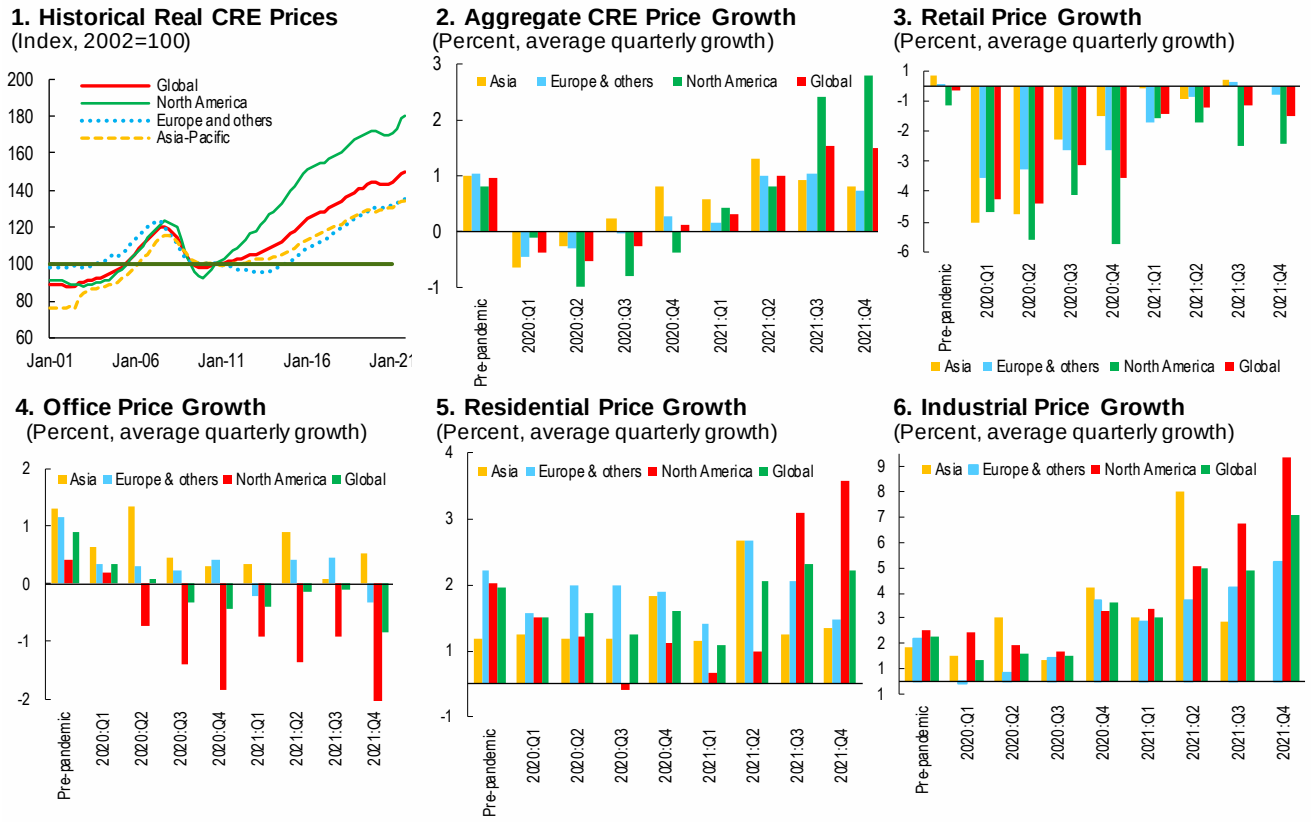
[1] The commercial real estate sector in this note includes property owned for the primary purpose of investment returns, as distinct from owner-occupied and noninvestment leased real estate, and covers the retail, office, residential (multi-family buildings), and industrial (factories, plants, and warehouses) segments.

[2] The decline in prices was accompanied by a sharp drop in CRE transaction volumes, which fell by 20 percent to 70 percent across regions, and may have limited further price declines (IMF 2021a).

Europe, the average increase in CRE prices has been smaller than in North America, but the office and retail segments performed relatively better in 2021.

Figure 1. Pre- and Post-Pandemic Trends in Commercial Real Estate Prices



Sources: MSCI Real Estate; Real Capital Analytics; and authors' calculations.
Notes: Panel 1 shows the overall CRE price index averaged over cities in corresponding regions. In panels 2-6, bars indicate the quarterly price change in the indicated periods for CRE prices averaged over cities. CRE=commercial real estate. Pre-pandemic=2016:Q1-2019:Q4.

The dispersion in CRE price movements across regions and segments during the pandemic has been significantly wider than in earlier years.[3] For example, the standard deviation of changes in aggregate CRE prices across cities has been almost twice as large in the pandemic (2020:Q1–2021:Q4) than in the pre-pandemic period (2016:Q1–2019:Q4) (Annex Figure A1). The same holds for dispersion across CRE segments within cities, where a much larger variation in price changes is observed during the pandemic than before (Annex Figure A2).

Notably, these CRE price trends are quite different from those observed during the global financial crisis when the CRE market collapsed globally. Price declines were generally larger then but, on average, prices fell across all segments, while they have stayed resilient for the residential and industrial segments in the pandemic (Annex Figure A2, panels 1 and 2). Moreover, once the recovery took hold after the global financial crisis, it proceeded at a broadly similar pace across segments, whereas it has lagged in the retail and office segments during the pandemic (Annex Figure A2, panel 3).

What factors explain this increased variation in CRE prices during the pandemic? This note examines this question using quarterly CRE price data for 96 metropolitan cities from 31 major advanced and emerging market economies from 2016 to 2021, focusing on the role played by pandemic-specific factors (such as

[3] Dispersion is measured by the standard deviation of CRE price growth across cities and across segments within a city (Annex Figure A1).

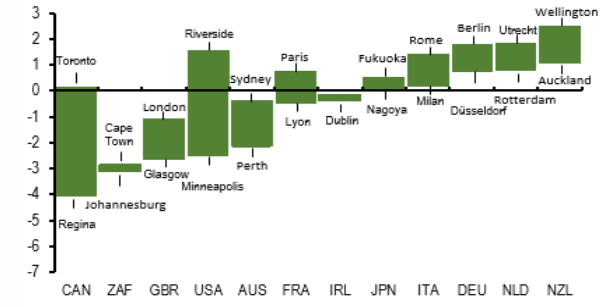
containment measures, the spread of the pandemic, and policy support), as well as potential behavioral shifts accelerated by the pandemic (for example, toward teleworking and e-commerce) in driving the dynamics of the CRE market during the pandemic.[4] The analysis shows that both pandemic-specific and behavioral factors are important in explaining the observed variation in CRE prices. The outlook of the CRE sector thus remains closely tied to the trajectory of the pandemic and the pace of structural shifts, which could continue to put downward pressure on some regions and segments. Furthermore, financial market conditions also have a significant impact on commercial property prices. A potential tightening of financial conditions as monetary policy is normalized across many advanced and emerging market economies amid rising inflationary pressures could also adversely impact the sector through higher financing costs for CRE investors as well as through a slowdown in economic activity. Continued vigilance is thus warranted on the part of financial supervisors to mitigate potential macro-financial stability risks stemming from the sector, as discussed in IMF 2021a.

DISPERSION IN COMMERCIAL REAL ESTATE PRICES: SOME STYLIZED FACTS

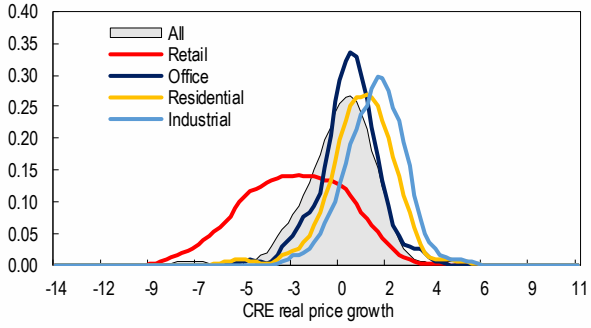
Commercial property prices have exhibited markedly different trends both across and within countries during the COVID-19 pandemic. For example, aggregate CRE prices fell, on average, by 2 percent in Canada as the pandemic evolved in the first three quarters of 2020, while they generally increased in New Zealand (Figure 2, panel 1). Within Canada, CRE prices recorded the largest decline of about 4 percent (quarter-over-quarter average) in Regina, while they remained stable in Toronto.

Figure 2. Cross-Sectional Divergence in Commercial Real Estate Prices during the Pandemic

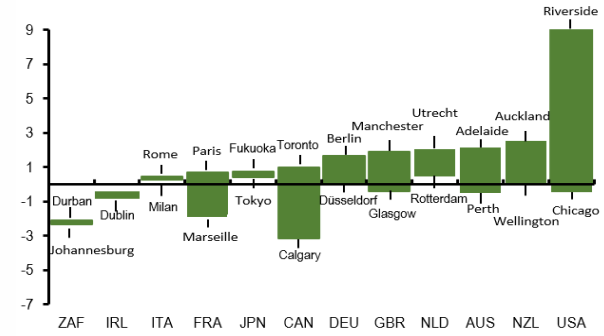
1. City-Level Change in CRE Prices, 2020:Q1–Q3
(Percent, average quarterly growth)



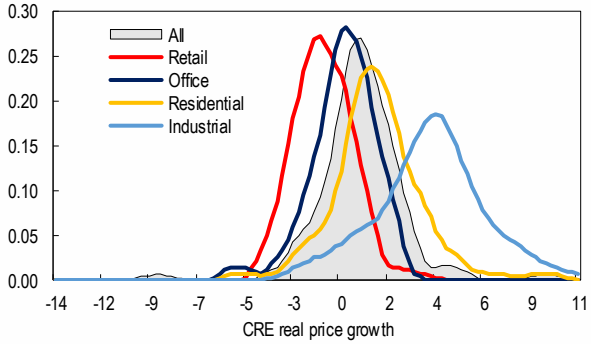
2. Distribution of CRE Prices by Segment, 2020:Q1–Q3
(Percent, average quarterly growth)



3. City-Level Change in CRE Prices, 2020:Q4–2021:Q4 (Percent, average quarterly growth)



4. Distribution of CRE Prices by Segment, 2020:Q4–2021:Q4 (Percent, average quarterly growth)

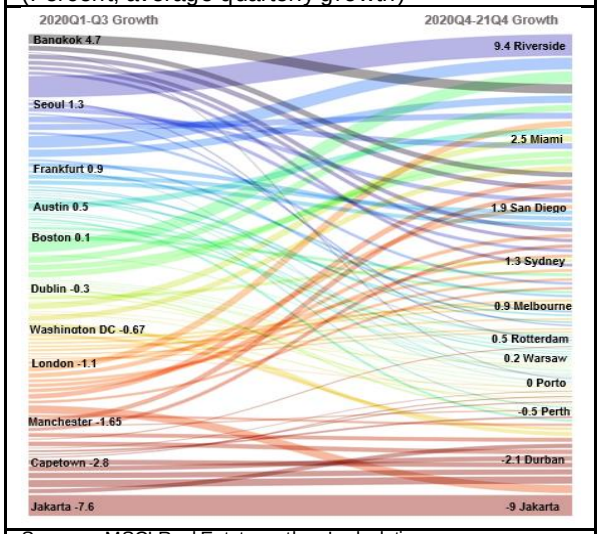


Sources: MSCI Real Estate; and authors' calculations.
Note: In panels 1 and 3, International Organization for Standardization (ISO) country codes are used and selected cities are shown. In panels 2 and 4, densities of CRE price growth are estimated using kernel density estimation. CRE = commercial real estate.

[4] The sample comprises economies for which city-level data is available from MSCI Real Estate and includes Australia, Austria, Belgium, Canada, China, the Czech Republic, Denmark, France, Germany, Hong Kong Special Administrative Region, Hungary, Indonesia, Ireland, Italy, Japan, Korea, Malaysia, The Netherlands, New Zealand, Norway, Poland, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, Taiwan Province of China, Thailand, the United Kingdom, and the United States.

Among global cities—that is, economically significant cities with strong international connectedness and a high population density—Johannesburg recorded the largest drop in CRE prices (3 percent) during the first three quarters of 2020, while at the other end of the spectrum, Berlin and Oslo experienced the largest increase (of 3–5 percent, respectively). On average, CRE prices rose slightly (0.3 percent) in global cities during the early phase of the pandemic but declined by 0.7 percent elsewhere.[5]

Figure 3. Change in CRE Prices during COVID-19
(Percent, average quarterly growth)



Sources: MSCI Real Estate; authors' calculations.
Notes: Statistics corresponding to the cities indicate the quarterly percentage change in aggregate CRE prices averaged over the first three quarters of 2020 on the left and averaged over the fourth quarter of 2020 to the fourth quarter of 2021 on the right.

The cross-regional variation in CRE prices is even more pronounced in the retail segment, with prices falling by about 7 percent in some cities (for example, in Baltimore, Glasgow, and Minneapolis) as the pandemic took hold in the first three quarters of 2020 but increasing in several others (such as in Austin, Kuala Lumpur, and Seoul; Figure 2, panel 2). On average, the retail segment—which had been under pressure for several years before the pandemic from the rise in e-commerce (Figure 1, panel 3)—faced the most severe blow from the pandemic.[6] For offices, prices remained stable, on average, though some cities in Canada, South Africa, and the United States experienced notable declines (between 2 percent to 6 percent). By contrast, the residential and industrial property segments performed generally well across regions and prices increased by about 1 and 1.3 percent, respectively, in the first three quarters of 2020.

In a similar vein, the performance of the CRE sector since the end of 2020 has also varied geographically, with cities in Australia, New Zealand, and the United States showing a rebound in CRE prices in 2021 (Figure 2, panel 3).[7] At the same time, prices have continued to fall in several other cities, for example, in Canada, Ireland, and South Africa. Overall, cities that suffered the largest hit to commercial property prices in the early phases of the pandemic have continued to experience downward pressures on prices (Figure 3).

Within the CRE sector, the industrial and residential segments have been booming, while performance of the retail and office segments has remained weak (Figure 2, panel 4). For the retail segment, however, the average quarterly decline in prices during 2020:Q4–2021:Q4 has been smaller (1.2 percent) than that observed in the first three quarters of 2020 (2.5 percent). Austin, Oslo, and Seoul have seen the strongest price growth in this segment, while Hong Kong Special Administrative Region and several cities in Canada and the United States have continued to experience steep declines. Performance of the office sector has also been uneven—prices picked up in one half of the cities in the sample (mostly Asian and European) but dropped in others (notably, in Canada, Hong Kong Special Administrative Region, South Africa, and the United States).[8]

In what follows, the factors driving these divergent price trends are formally explored through econometric analysis.

[5] Global cities experienced faster CRE price growth relative to other cities in the pre-pandemic period as well (Annex Figure 1, panel 3).

[6] In the United States, for example, the share of e-commerce sales in total retail trade more than doubled over the last decade, rising from 4.5 percent in 2010 to 10.6 percent in 2019 (Source: United States Census Bureau Annual Retail Trade Survey: 2020, January 13, 2020).

[7] Preliminary data for the first quarter of 2022, however, indicate a slowdown in CRE prices in Australia and New Zealand amid rising global interest rates (https://www.afr.com/property/commercial/commercial-property-values-to-fall-10-to-30pc-20220713-p5b1a1).

[8] Overall, about 77 percent of the cities in the sample experienced a decline in retail prices in 2020:Q4–2021:Q4 (as compared to 84 percent in the first three quarters of 2020). For the office sector, prices fell by 0.2 percent on average in 2020:Q4–2021:Q4, compared to a small increase of 0.1 percent during the first three quarters of 2020.

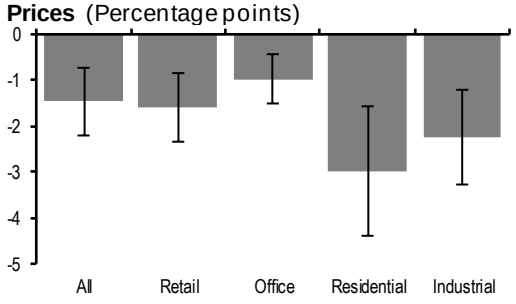
EXPLAINING CHANGES IN COMMERCIAL REAL ESTATE PRICES DURING THE PANDEMIC

The price of commercial property can be expressed in terms of current and expected net operating income growth and returns (IMF 2021a). In turn, these variables are a function of several other factors such as the vacancy rate of the property, the level of economic activity, and financial market conditions—all of which have been significantly affected during the pandemic by the prevailing health conditions in communities, the stringency of public containment measures, the strength of policy support, and possible shifts in private behavior toward teleworking and e-commerce. For example, vacancy rates generally rose during the pandemic, especially in regions with more stringent containment measures, as the closure of shops, restaurants, offices, and other businesses led to a reduction in the demand for commercial space (Annex Figure A3). It is thus plausible that the observed variation in CRE prices during the pandemic has largely been driven by these pandemic-specific factors, as investigated below.

The Great Shutdown

The containment measures taken by governments to prevent the spread of the COVID-19 virus such as lockdowns and social distancing requirements had a significant impact on CRE prices. Regression analysis shows that cities with the most stringent containment measures (proxied by the Oxford stringency index) on average experienced a 1.5 percentage points larger decline in overall CRE prices than those without any restrictions,[9] controlling for other relevant macroeconomic and location-specific factors (Figure 4).[10]

Figure 4. Containment Measures and CRE Prices (Percentage points)



Sources: MSCI Real Estate; Oxford COVID-19 Government Response Tracker; and authors' calculations.
Notes: The bars show the effect on CRE prices of an increase in the level of stringency index from no restriction to the maximum value in the sample based on the results reported in Annex Table 2. The standard error bars indicate a 90 percent confidence interval. CRE=commercial real estate.

While all CRE segments were adversely impacted by containment measures, quantitatively they had the most pronounced effect on prices in the residential segment. This result could at least partly be explained by the large household migration from densely populated urban areas to less crowded suburban areas during the pandemic that led to a decline in demand for residential real estate in cities (Coven and others 2020; Bloom and Ramani 2001; Gupta and others 2021).[11]

Pandemic Spread

In addition to containment measures, the spread of the pandemic—proxied by the change in confirmed COVID-19 cases—has also had a negative impact on CRE prices, especially in the retail segment (Figure 5, panel 1). Specifically, a one standard deviation increase in the number of COVID-19 cases (equivalent to a quarterly increase of about 200 percent) reduced prices in the retail segment by 0.3 percentage points. The statistically significant impact of the spread of the pandemic, despite controlling for the level of mandatory public

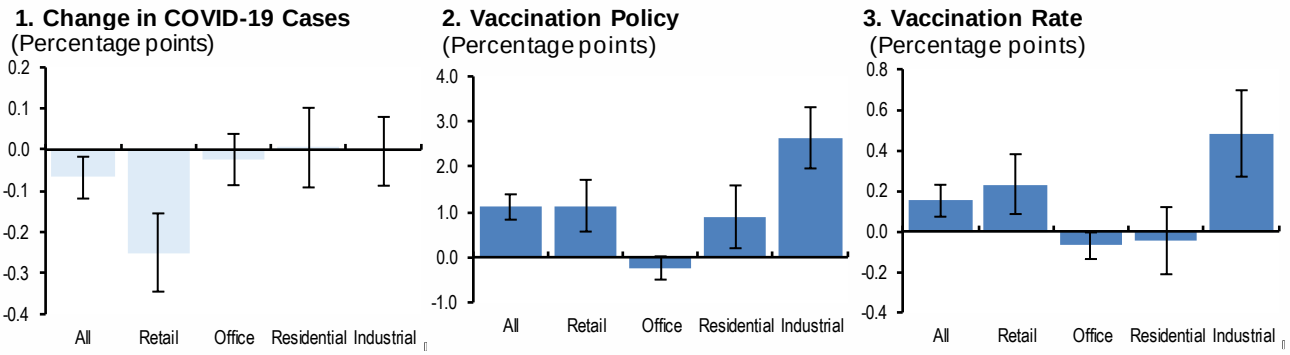
[9] The most stringent restrictions in the sample correspond to Dublin in the first quarter of 2021. The regression result holds when alternate proxies that reflect the decline in socioeconomic activity resulting from containment measures (such as the Google work and retail mobility indices) are used.

[10] The other variables included in the regressions include the size of fiscal policy support, spread of the pandemic (captured by the growth in confirmed COVID-19 cases), expected macroeconomic activity (captured by one-period ahead real GDP growth rate), financial conditions index, (lagged) CRE price growth, real house price growth, a dummy variable for the COVID-19 pandemic period (2020:Q1–2021:Q4) and quarter and city-specific effects. For variables where city-level information is not available, country-level data is used. See Annex for details on the empirical methodology, data, and the full set of regression results.

[11] Looking at granular house-price data for 154 counties across 47 metropolitan statistical areas in the United States, it is apparent that more centrally located areas—proxied by distance from the central county or population density—experienced relatively larger declines in house prices than less densely populated, suburban areas (Annex Figure A4).

containment measures, suggests that voluntary social distancing may have also played a role in adversely affecting the demand and price of CRE. This interpretation is supported by considering the adoption of vaccines—proxied by a vaccination policy indicator reflecting the population eligible to receive vaccines, or by the actual vaccination rate—across regions in the regression model. The results show that greater vaccine adoption has significantly supported the recovery of the CRE sector, notwithstanding the level of containment measures in place (Figure 5, panels 2 and 3). The impact is particularly strong for the retail and industrial segments as vaccines have boosted consumer confidence to return to shops and restaurants and stimulated the demand for goods and services (Tito and Sexton 2022).

Figure 5. CRE Prices and Pandemic Spread



Sources: MSCI Real Estate; Oxford COVID-19 Government Response Tracker; and authors' calculations.
Notes: Panel 1 shows the effect of one standard deviation increase in the growth rate of confirmed COVID-19 cases (per million people) on the quarterly change in CRE prices. In panel 2, the vaccination policy indicator is a categorical variable that captures the extent of vaccine access of different population groups over time. The indicator is coded with discrete categories ranging from 0 to 5. The bars show the effect of extending vaccines' access from no coverage (equal to 0) to universal coverage (equal to 5). In panel 3, the vaccination rate is the number of vaccinated people per million people. The bars indicate the effect of a one standard deviation increase in the vaccination rate on the change in CRE prices. Standard error bars indicate a 90 percent confidence interval. CRE = commercial real estate.

Policy Support

The unprecedented policy measures taken by governments and central banks to cushion the economic impact of the pandemic are likely to have helped the CRE sector through direct measures (such as tax relief for landlords, forbearance of commercial mortgage payments, and cash grants for severely affected retail businesses), as well as through indirect support (such as cash transfers and tax credits to tenants). This indeed turns out to be the case and overall economic fiscal support during the pandemic is positively associated with CRE prices. On average, a one standard deviation (equivalent to 9 percent of GDP) increase in stimulus spending is associated with a 0.1 percentage point smaller quarterly decline in overall CRE prices (Figure 6, panel 1).

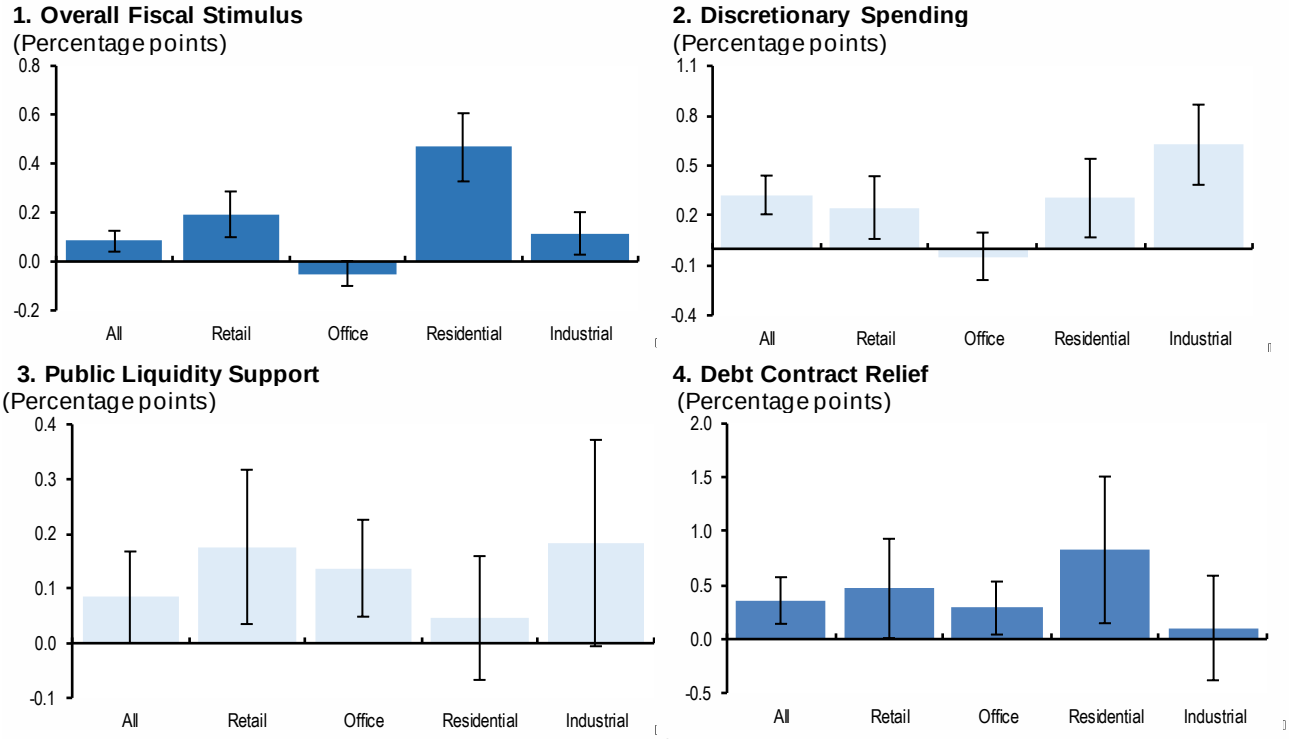
Among the different fiscal measures, discretionary spending appears to have particularly helped the retail, residential, and industrial segments (Figure 6, panel 2), while public liquidity support to the corporate sector in the form of equity injections, loans, and guarantees has mostly benefitted the retail and office segments (Figure 6, panel 3). Economies that provided debt and contract relief to households also experienced significantly smaller price declines across the various CRE segments (Figure 6, panel 4).[12]

Central banks have also played a critical role in influencing CRE prices by maintaining easy financial conditions through conventional and unconventional monetary policy measures. Financial conditions tightened significantly in the early phase of the pandemic but eased quickly after major central banks rolled out massive monetary stimulus, improving investor and occupier sentiment in CRE markets (Figure 7, panels 1). In general,

[12] The impact of debt and contract relief measures is ambiguous in principle. On the one hand, they may reduce investor demand and adversely affect CRE valuations but on the other hand, they could also support valuations by preventing sales of loss-making properties.

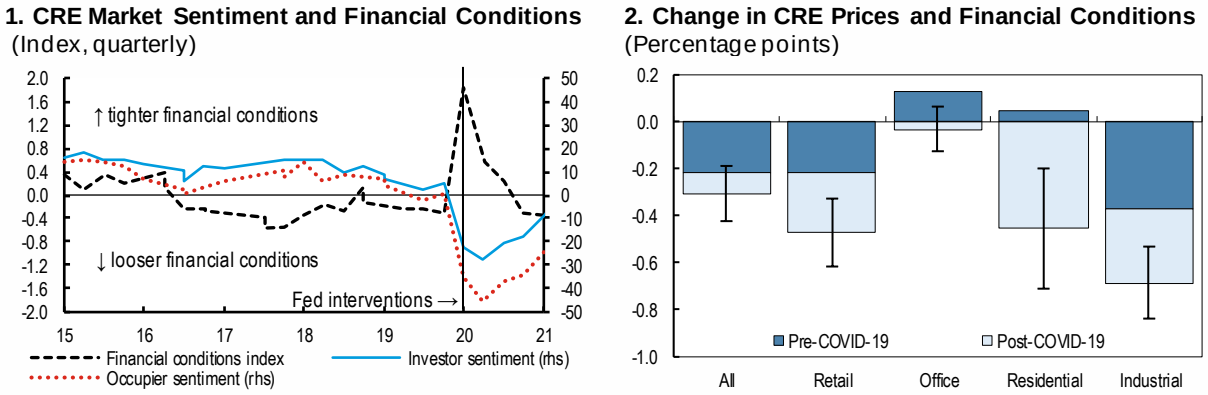
easier financial conditions lift CRE prices and the impact was more pronounced during the pandemic for the retail, residential, and industrial segments (Figure 7, panel 2).[13]

Figure 6. The Effect of Policy Support on CRE Prices during the Pandemic



Sources: IMF Fiscal Monitor database; MSCI Real Estate; Oxford COVID-19 Government Response Tracker; and authors' calculations.
Notes: Panel 1 shows the effect of one standard deviation increase in fiscal spending to GDP on CRE price changes. Panel 2 shows the effect of a one percent of GDP increase in discretionary spending. Panel 3 shows the effect a one standard deviation increase in total government equity injections, loans, and guarantees during the pandemic (about 6 percent of GDP) on the change in CRE prices. Panel 4 shows the effect of one standard deviation increase in the debt and contract relief index on the change in CRE prices. Standard error bars indicate 90 percent confidence interval.

Figure 7. CRE and Financial Conditions during the COVID-19 Pandemic



Sources: MSCI Real Estate; Real Capital Analytics; RICS; and authors' calculations.
Notes: In panel 1, investor and occupier sentiment indicators are based on survey responses and measure the proportion of respondents reporting a rise in a variable (for example, occupier demand) minus those reporting a fall. In panel 2, bars show the total effect of a one standard deviation increase in the financial conditions index on CRE price growth during the pandemic period (which is the sum of the marginal impact in the pre-pandemic period and the additional impact in the post-pandemic period). Standard errors bars reflect a 90 percent confidence interval. CRE = commercial real estate; rhs = right-hand scale.

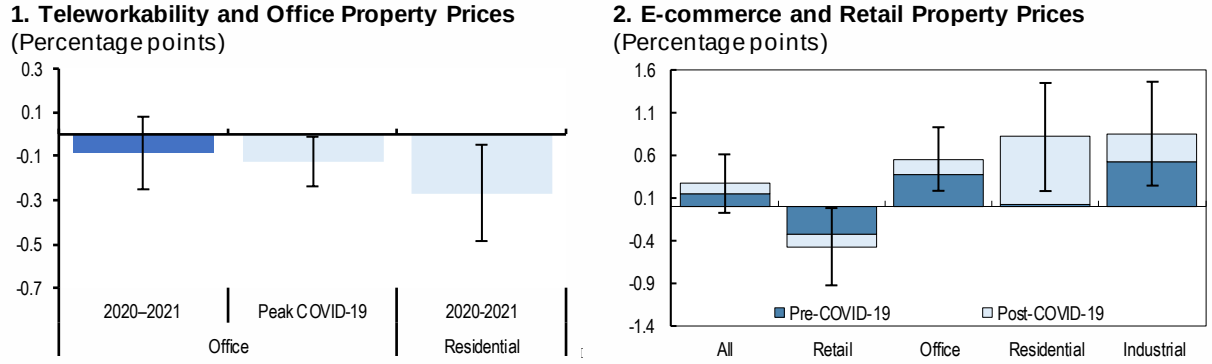
[13] The impact of policy support during the pandemic on the CRE market is also evident from the absence of wide-scale deleveraging in the sector which was observed during previous downturns (for example, the global financial crisis and the early 1990s recession) and by the lower level of distressed deals (Annex Figure A5).

Behavioral Shifts

The pandemic catalyzed shifts in private behavior such as toward teleworking and e-commerce that may also have had an effect on CRE prices. For example, based on survey data, Bloom and others (2020) estimate that 42 percent of the labor force in the United States—accounting for two-thirds of economic activity—was working from home full time in the second quarter of 2020, while about 26 percent was working onsite at the business premises. By contrast, only 6 percent of those employed in the United Stated in 2019 worked primarily from home and about three-quarters had never worked from home (Coate 2021). For e-commerce, the shift is equally staggering and sales in the United States jumped by 43 percent in 2020 relative to the year before to reach almost 15 percent of total retail trade (Brewster 2022).

The increased trend toward teleworking and e-commerce has also been observed in other countries, though the rate of change varies widely depending on, for example, the severity of containment measures, individual risk preferences, and the availability of technology (OECD 2020; Ker and others 2021; UNCTAD 2021). Regression analysis suggests that cross-sectional differences in the ability to telework and conduct e-commerce explain some of the variation observed in CRE prices, even after controlling for pandemic-specific factors (stringency index, spread of the pandemic, fiscal support, and so on). For example, cities with a higher share of teleworkable jobs—captured by Dingel and Neiman's (2020) teleworkability index[14]—experienced a larger decline in office property prices, particularly in the initial phase of the pandemic, as the potential to work from home dampened the demand for such property (Figure 8, panel 1).[15,16] In sync with this result, residential property prices have also been lower during the pandemic in regions with a higher level of teleworkability, which made it easier for workers to relocate out of urban areas, as noted previously.

Figure 8. Impact of Teleworkability and E-Commerce on CRE Prices during the Pandemic



Sources: MSCI Real Estate; Dingel and Nieman (2020); World Bank; and authors' calculations.
Notes: Panel 1 shows the additional effect of a one standard deviation increase in the the teleworkability index on quarterly office property price growth during the full pandemic period (2020:Q1–2021:Q4) and in the initial phase of the pandemic (the first three quarters of 2020), as well as the impact on residential price growth. Panel 2 shows the effect of a one standard deviation increase in the United Nations Conference on Trade Development e-commerce index on price growth across sectors before the pandemic (2016:Q1–2019:Q4) and the additional effect after the pandemic (2020:Q1-2021:Q4). Standard error bars reflect a 90 percent confidence interval. These results are based on the estimation of equations (2) and (3) in the Annex. CRE = commercial real estate.

[14] Dingel and Neiman (2020) construct the teleworkability index by classifying the feasibility of working at home for all occupations and combining it with occupational employment counts to indicate the percentage of jobs that are "teleworkable"—that is, workers in these occupations can potentially perform their duties from home. The employment counts are obtained from cross-sectional surveys conducted in 2015 or later; hence this index is of a cross-sectional nature, and it is assumed here that the share of teleworkable jobs across regions has not changed much over time. The index is mostly available at the country level, so those values are applied to corresponding cities in the analysis.

[15] The regression results for the office segment show a significantly negative impact of the COVID-19 dummy variable (equal to one for 2020:Q1–2021:Q4 and zero otherwise) on prices, while controlling for pandemic-related factors such as containment measures, the growth in COVID-19 cases, and fiscal support. Given the limitations of the teleworkability index noted previously, it is plausible that its impact on office property prices is partly captured by this variable.

[16] Analyzing granular data of commercial office buildings in New York City, Gupta and others (2022) find large shifts in lease revenues, renewal rates, and durations; office occupancy; and market rents as firms shifted to remote work after the pandemic. They estimate a 32 percent decline, on average, in office values in 2020, with higher quality office buildings impacted somewhat less than lower quality office buildings.

Similarly, the ability to conduct e-commerce—proxied by an e-commerce index reflecting the extent to which people can shop online—has had a significantly negative effect on retail property prices during the pandemic, but a positive impact on industrial property prices (Figure 8, panel 2).[17,18] Specifically, a one standard deviation increase in the index is associated with a 0.5 percentage point reduction in prices in the retail segment and a 0.9 percentage point increase in the industrial segment.[19]

These findings suggest that some segments of the CRE market may remain under pressure at least in the near to medium terms even after the pandemic subsides if the trends toward teleworking and e-commerce persist.[20] For example, recent surveys indicate that many workers in the United States are now choosing to work from home for reasons unrelated to the pandemic (such as savings on commute time, increased flexibility and well-being, and so on) and would like to continue doing so for at least some days in the future.[21] This shift in preferences could arguably help to explain why vaccination adoption in itself does not appear to have had a strong effect on office property prices thus far (Figure 5). For e-commerce, although evidence points to in-store retail activity picking up, at least partly because of vaccinations in some countries (Tito and Sexton 2022), the long-term trend points toward a more persistent shift in consumer preferences in many countries.[22]

Other Factors

In addition to the factors mentioned previously, changes in commercial property prices are generally positively associated with house prices, as noted in earlier studies (Gyourko 2009). During the pandemic period, the variation in house prices appears to have increased across cities, particularly in Asia and Europe, possibly contributing to the increased variation in CRE prices.[23] Price momentum—captured by lagged CRE price growth—is also important in explaining the variation in commercial property prices. Thus, cities that experienced higher price growth in the runup to the pandemic were less affected in the initial phase of the pandemic and have subsequently experienced faster price growth, controlling for other possible factors.[24]

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[17] A potential limitation of this index is that it is available only at the country level and at an annual frequency. Hence, it does not capture any within country variation in e-commerce potential.

[18] According to estimates, the different business model of e-commerce (built around offering a large number of products and fast delivery to consumers) necessitates up to three times more industrial warehouse and logistics space than a traditional brick-and-mortar supply chain (https://www.cbre.us/real-estate-services/real-estate-industries/omnichannel/the-definitive-guide-to-omnichannel-real-estate/real-estate-impact/how-has-e-commerce-shaped-industrial-real-estate-demand).

[19] Considering the availability of secure internet servers per million people as an alternative proxy for the ability to conduct e-commerce, the results show a strong adverse impact on the retail segment during the pandemic.

[20] The downward pressure on prices could potentially be offset if demand for specific properties picks up for alternative use. For example, anecdotal evidence suggests that office properties are increasingly being converted into residential buildings in some cities in the wake of the pandemic (https://www.wsj.com/articles/empty-wall-street-offices-to-be-revived-as-apartments-11655812801; https://www.bbc.com/worklife/article/20220505-the-office-spaces-transforming-into-luxury-apartments; https://www.cnbc.com/2021/11/24/a-record-number-of-office-buildings-turned-into-apartments-this-year.html). Similarly, retail property, such as malls, are being purchased for conversion to industrial warehouses (https://www.forbes.com/sites/zengernews/2021/08/14/new-leases-on-life-malls-converting-to-fulfillment-centers-other-non-retail-uses/?sh=a5659b842fad); https://www.naiglobal.com/shopping-malls-turned-warehouse-cre-might-be-onto-something/).

[21] See, for example, Remote Work Persisting and Trending Permanent and COVID-19 Pandemic Continues To Reshape Work in America. Based on a large survey, Barrero and others (2021) estimate that one-fifth of all full workdays in the United States will be supplied from home after the pandemic ends, compared with just 5 percent before.

[22] See, for example, UNCTAD (2021); U.S. Census Bureau News: Quarterly Retail E-Commerce Sales 1st Quarter 2022, May 19, 2022; Unpacking E-commerce Business Models, Trends and Policies; The Signal for Industrial Property Amid E-Commerce Noise.

[23] The standard deviation of quarterly growth in real house prices in the sample has increased by a factor of approximately 1.5 between the pre-pandemic and pandemic periods.

[24] For retail property, expected future economic activity—which is tightly linked to the projected net operating income for investors—is also a strong driver of prices. The increased heterogeneity across countries in the pace of economic recovery is thus a significant contributor to the large variation observed in retail prices.

CONCLUSION

CRE prices have varied widely both across regions and segments during the COVID-19 pandemic. The analysis in this note suggests that regions with more stringent public measures to contain the spread of the pandemic and faster growth in COVID-19 cases have experienced larger CRE price declines on average, while larger fiscal policy support and easier financial conditions have helped to cushion the shock. The outlook of the sector is thus closely tied to the trajectory of the pandemic, broader economic recovery, and prevailing financial conditions. At the same time, structural shifts accelerated by the pandemic, such as the trend toward teleworking and e-commerce, also pose considerable uncertainty for the sector, in particular for the office and retail segments, in the near and medium terms. The industrial segment has benefitted significantly from the rise in e-commerce during the pandemic but may see more moderate price gains going forward as greater vaccine adoption encourages at least some consumer return to in-store retail.

Overall, the CRE sector may come under renewed pressure as global financial conditions tighten sharply amid monetary policy normalization by major central banks and if economic activity slows down. This could pose financial stability risks given the interconnectedness of the sector with the rest of the financial system, as discussed in IMF 2021a.[25] Continued vigilance is thus warranted on the part of financial supervisors to monitor vulnerabilities in the sector to minimize potential financial stability risks. To ensure banking sector resilience and inform decisions regarding the adequacy of capital buffers for commercial real estate exposures, stress testing exercises embedding large declines in commercial real estate prices could be considered.[26] Supervisors should also review banks' commercial real estate valuation assumptions and ensure that provisions are adequate.

[25] IMF 2021a also notes potential price misalignments in the CRE sector in the aftermath of the pandemic, which could amplify the impact of an adverse shock through large corrections in prices.

[26] In cases where nonbank financial institutions are important players in CRE funding markets, risks stemming from their vulnerabilities to the broader financial system also need to be monitored, and the policy perimeter needs to be broadened to mitigate such risks (IMF 2021b).

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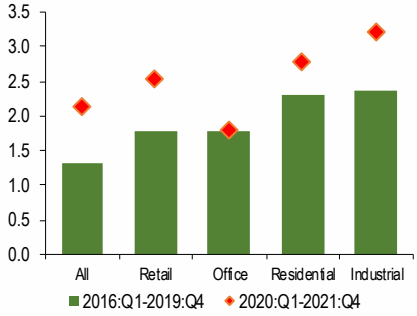
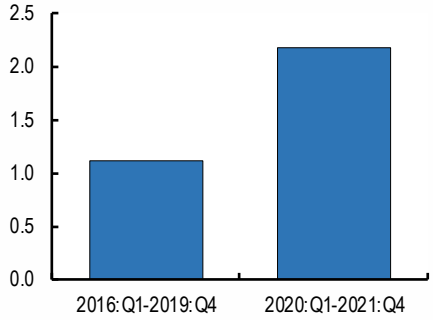
A. Additional Analysis

Figure A1. Changes in Commercial Real Estate Prices before and during the COVID-19 Pandemic

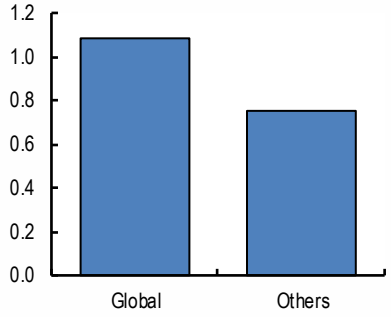
1. Price Dispersion across Cities (Percent)



2. Price Dispersion across Segments Within Cities (Percent)



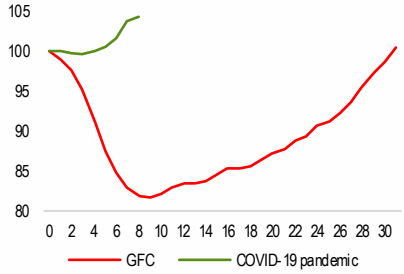
3. Price Growth by City Type (Percent, 2016:Q1–2019:Q4)



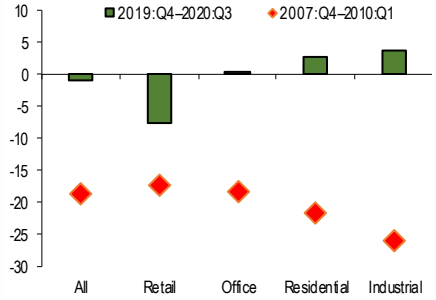
Sources: MSCI Real Estate; and authors' calculations.
Note: In panel 1, dispersion is calculated by taking the standard deviation of quarterly CRE price changes across cities over the indicated time periods. In panel 2, disperision is calculated by taking the standard deviation of quarterly CRE price changes across CRE segments for each city and averaging it across cities and over time as indicated. In panel 3, global refers to economicaly significant, highly interconnected, and densely populated cities. Statistics pertain to quarterly growth in CRE prices averaged over respective cities over the indicated time period. CRE = commercial real estate.

Figure A2. Changes in Commercial Real Estate Prices: Global Financial Crisis vs. COVID-19 Pandemic

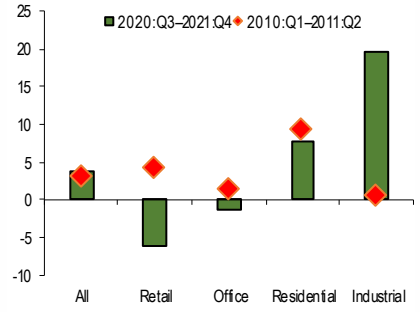
1. Global Bust and Recovery (Index)



2. Global Financial Crisis vs. COVID-19: CRE Price by Sector during Bust (Percent, cumulative growth)



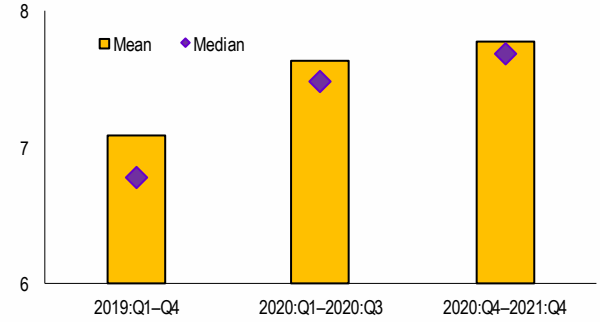
3. Global Financial Crisis vs. COVID-19: CRE Price by Sector during Recovery (Percent, cumulative growth)



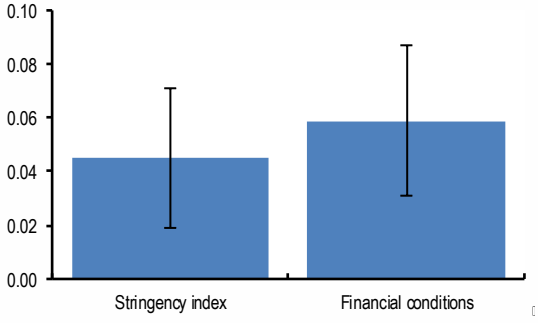
Sources: MSCI Real Estate; and authors' calculations.
Notes: In panel 1, t=0 indicates the precrisis peak in global CRE price (average across all segments and regions). CRE = commercial real estate; GFC = global financial crisis.

Figure A3. Commercial Real Estate Vacancy Rates Pre- and Post-Pandemic

1. Vacancy Rates, 2019:Q1–2021Q4 (Percent)

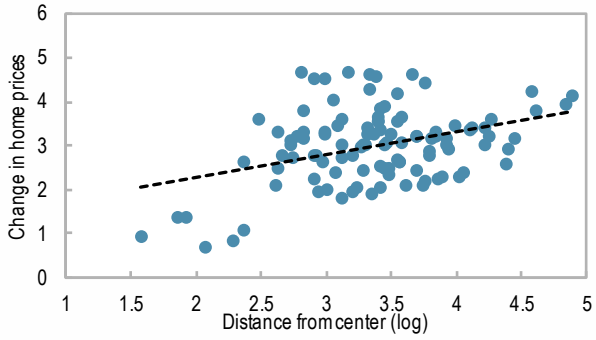


2. Vacancy Rates and Stringency Index (Percent)



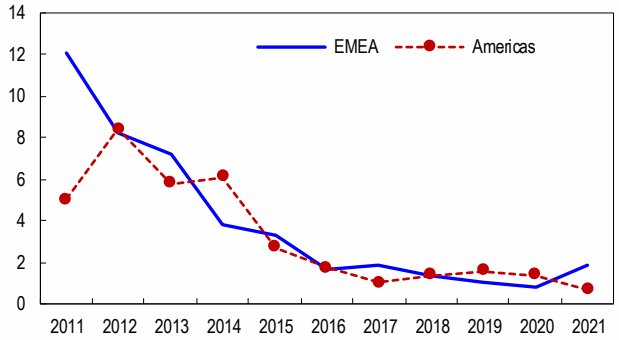
Sources: MSCI Real Estate; Oxford COVID-19 Government Response Tracker; and authors' calculations.
Note: Panel 1 shows overall CRE vacancy rate levels averaged over the sample. Panel 2 shows the effect of a one unit increase in the stringency and financial condition indices during the pandemic on the overall vacancy rate with a 90 percent confidence interval, controlling for a lagged vacancy rate, city and quarter fixed effects, and a dummy variable for the COVID-19 pandemic period. Standard errors are clustered at the city level. The sample period for the estimation is 2016:Q1-2021:Q4.

Figure A4. House Price Growth and Distance from Center, 2020:Q1–2021:Q4
(Percent, average quarterly growth)



Sources: Zillow; and authors' calculations.
Note: The figure shows the relationship between Zillow's all homes price growth (quarterly average) for 154 counties in the United States and the distance from the central county in the same metropoliatan area from the first quarter of 2020 to the fourth quarter of 2021.

Figure A5. CRE Distressed Transactions
(Percent of total transaction volume)



Sources: MSCI Real Estate; Real Capital Analytics; RICS; and authors' calculations.
Note: Americas = North and Latin America; CRE = commercial real estate; EMEA = Europe, the Middle East, and Africa.

B. Empirical Framework

To examine the dynamics of commercial real estate (CRE) prices during the COVID-19 pandemic, the following baseline specification is estimated drawing on the existing literature (for example, BIS 2020; IMF 2021a):

$$CRE\ price\ growth_{i,c,t} = \beta_1 CRE\ price\ growth_{i,c,t-1} + \beta_2 Financial\ Condition\ Index_{c,t} + \beta_3 Stringency\ Index_{i,c,t} + \\ + \beta_4 Change\ in\ COVID\ cases_{c,t} + \beta_5 Fiscal\ Measures_{c,t} + + \beta_6 \text{Real GDP growth}_{c,t+4} + \\ \beta_7 Change\ in\ House\ Prices_{c,t} + \beta_8 COVID_t + \sum_{s=1}^{S} \lambda_s X_{i,c,t} x\ COVID_t + \sum_{q=1}^{3} D_{q,t} + \alpha_i + \epsilon_{i,c,t} \qquad [1]$$

where *i*, *c*, and *t* indicate a given city, country, and quarter, respectively. The dependent variable is quarterly real commercial property price growth (in percent). A lagged dependent variable is included to capture any momentum effects in CRE prices.[27] $Financial\ Condition\ Index_{c,t}$ is an indicator of the ease of domestic financial market conditions (with higher values indicating tighter financial conditions and vice versa). $Stringency\ Index_{c,t}$ indicates the stringency of public containment measures (with higher values indicating more severe lockdown restrictions and closure measures, and vice versa) and $Change\ in\ COVID\ \ cases_{c,t}$ corresponds to the quarterly percentage change in the number of confirmed COVID-19 cases.[28] $Fiscal\ Measure_{c,t}$ is the level of additional economic stimulus spending as a percent of GDP reported by the government in each quarter during the pandemic. Real GDP growth reflects the projected one-year ahead real GDP growth obtained from the IMF's World Economic Outlook (WEO) database.[29] $COVID_t$ is an indicator variable equal to one in 2020:Q1–2021:Q4, and zero otherwise. To capture the potential association between CRE and housing markets, quarterly growth in house prices ($Change\ in\ House\ Prices_{c,t}$) is also included in the model. In addition, to assess whether the association between non-pandemic-specific variables (such as lagged CRE price changes, one-year ahead real GDP growth, the financial conditions index, and growth in house prices) and CRE prices has changed over the pandemic, the interactions of these variables with the COVID-19 dummy are added to the model (where $X_{i,c,t}$ reflects the matrix containing non-pandemic-specific variables). $D_{q,t}$ and a_i indicate quarter- and city-level fixed effects, respectively.

[27] Including a lagged dependent variable in a fixed effects regression can lead to biased estimates (the so-called "Nickell bias"), which is approximately equal to 1/T, where T is the length of the sample time period. To attenuate this possible source of bias, eq. (1) is also estimated: i) with country-level fixed effects, and ii) without the lagged dependent variable. The results remain robust to these changes.

[28] To avoid potential bias in results from large outliers in these variables, values above the 99th percentile are excluded from the sample.

[29] Projected future real GDP growth is used to capture the effect of expected economic activity/income on CRE prices. Results remain robust when using current real GDP growth instead.

The model is estimated for each CRE segment (retail, office, residential, industrial) individually and for the overall market ("All") using data for 2016:Q1–2021:Q4. Price indices are value-weighted, which implies that the contribution of each asset is proportionate to its monetary weight. Information on the variables is collected at the city-level to the extent possible.[30] If city-level observations are not available, data are proxied at the metro or country level. Results for the baseline specification are reported in Table 2 (columns 1-5).

The impact of possible changes in private behavior (such as toward teleworking and e-commerce) on CRE prices is examined by extending the baseline specification with the relevant variables, as follows:

$$CRE\ price\ growth_{i,c,t} = \beta_1 CRE\ price\ growth_{i,c,t-1} + \beta_2 Financial\ Condition\ Index_{c,t} + \beta_3 Stringency\ Index_{i,c,t} + \\ + \beta_4 Change\ in\ COVID\ cases_{c,t} + \beta_5 Fiscal\ Measures_{c,t} + + \beta_6 \text{Real GDP growth}_{c,t+4} + \\ \beta_7 Change\ in\ House\ Prices_{c,t} + \beta_8 COVID_t + \beta_9 Teleworkiability\ Index_{i,c} + \\ \beta_{10} Teleworkability\ Index_{i,c}\ x\ COVID_t + \sum_{s=1}^{S} \lambda_s X_{i,c,t} x\ COVID_t + \sum_{q=1}^{3} D_{q,t} + \alpha_i + \epsilon_{i,c,t} \quad [2]$$

$$CRE\ price\ growth_{i,c,t} = \beta_1 CRE\ price\ growth_{i,c,t-1} + \beta_2 Financial\ Condition\ Index_{c,t} + \beta_3 Stringency\ Index_{i,c,t} + \\ + \beta_4 Change\ in\ COVID\ cases_{c,t} + \beta_5 Fiscal\ Measures_{c,t} + + \beta_6 \text{Real GDP growth}_{c,t+4} + \\ \beta_7 Change\ in\ House\ Prices_{c,t} + \beta_8 COVID_t + \beta_9 Ecommerce\ Index_{i,c} + \beta_{10} Ecommerce\ Index_{i,c}\ x\ COVID_t + \\ \sum_{s=1}^{S} \lambda_s X_{i,c,t} x\ COVID_t + \sum_{q=1}^{3} D_{q,t} + \alpha_i + \epsilon_{i,c,t} \quad [3]$$

The estimation results for equations (2) and (3) are reported for overall CRE prices in Table 2, columns 6-8, and for specific segments in Figure 8 in the main text. The full set of results is available upon request.

Table 1. Variable Description and Data Sources

Variable	Description	Source	Coverage
Change in COVID-19 cases	Quarterly growth in COVID-19 total cases per one million people (in percent)	https://ourworldindata.org/	City- and country-level
CRE price growth	Quarterly change in asset value growth	MSCI Real Estate and authors' calculations	City-level
Debt and contract relief	The index captures the public relief on financial obligations during the COVID-19 pandemic, such as loan moratoria, banning of evictions, delayed payment of utility bills.	Oxford COVID-19 Government Response Tracker.	City- and country-level
Discretionary spending	Total discretionary fiscal response to the COVID-19 pandemic (cumulative; percent of GDP)	*Fiscal Monitor*	City- and country-level
E-commerce index	The UNCTAD B2C E-commerce Index measures an economy's preparedness to support online shopping. The index consists of four indicators that are highly related to online shopping and for which there is wide country coverage.	Netcraft retrieved from World Bank	Country-level
Expected real GDP growth	Projected quarterly change in real GDP one year ahead	IMF's WEO database.	Country-level
Financial Conditions Index	Based on a principal component analysis of 11 variables—including real short-term interest rates, equity prices, sovereign and corporate debt spreads, the exchange rate, and real house prices	See Online Annex 1.1 of the October 2018 *Global Financial Stability Report*	Country-level
Fiscal support measure	Cumulative additional economic stimulus spending (percent of GDP)	Oxford COVID-19 Government Response Tracker.	City- and country-level
House price growth	Quarterly change in real house prices (in percent)	Bank of International Settlements	City- and country-level
Public liquidity Support	Equity, loans, and guarantees extended during the pandemic (cumulative; percent of GDP)	*Fiscal Monitor*	Country-level
Stringency Index	Indicator capturing the stringency of containment measures with higher values indicating greater stringency	Oxford COVID-19 Government Response Tracker.	City- and country-level
Teleworkability	Percentage of teleworkable jobs in an economy	Dingel and Neiman (2020)	City-level (Mixed)
US county-level data (house price growth, population density, distance from central county)	House prices are a seasonally adjusted measure of the typical home value in a county. Population density and distance from central county are calculated using the ZIP Code Tabulation Area Distance Database from NBER.	Zillow database; National Bureau of Economic Research (NBER)	County-level
Vacancy rate	All available property to total rental property (in percent)	MSCI Real Estate	City-level
Vaccination Policy Indicator	Categorical variable capturing the coverage of policies for vaccine delivery to different population groups [0-5]	Oxford COVID-19 Government Response Tracker.	City-level (Mixed)
Vaccination rate	Cumulative number of vaccines weighted by population	https://ourworldindata.org/	City-level (Mixed)

Notes: If complete or partial city-level information is not available, missing data are proxied at the metro- or country-level. These cases are indicated as "Country-level" or "City-level (Mixed)"" in the last column of the table. CRE = commercial real estate; UNCTAD = United Nations Conference on Trade and Development; WEO = *World Economic Outlook*.

[30] All the control variables in the regressions are standardized for comparability.

Table 2. Estimation Results for Drivers of CRE Price Changes, 2016:Q1–2021:Q4

	(1) All	(2) Retail	(3) Office	(4) Residential	(5) Industrial	(6) All	(7) All	(8) All
Lagged CRE price growth	0.360***	0.695***	0.292***	1.007***	0.348***	0.354***	0.327***	0.345***
	(0.086)	(0.123)	(0.083)	(0.295)	(0.126)	(0.082)	(0.085)	(0.086)
Financial conditions index	-0.213***	-0.215**	0.129	0.048	-0.372***	-0.278***	-0.109*	-0.164***
	(0.060)	(0.098)	(0.087)	(0.135)	(0.120)	(0.083)	(0.061)	(0.060)
Change in house prices	0.123**	0.293***	0.096*	0.186	-0.141	0.125**	0.149**	0.137**
	(0.058)	(0.089)	(0.055)	(0.161)	(0.094)	(0.060)	(0.060)	(0.059)
Expected real GDP growth (1-year ahead)	0.124	0.548**	0.160	0.243	0.040	0.165	0.119	0.113
	(0.137)	(0.212)	(0.152)	(0.173)	(0.227)	(0.134)	(0.133)	(0.135)
Stringency Index	-0.457***	-0.496***	-0.302***	-0.928***	-0.698***	-0.453***	-0.364***	-0.381***
	(0.140)	(0.142)	(0.102)	(0.268)	(0.196)	(0.132)	(0.132)	(0.137)
Fiscal support (% GDP)	0.083***	0.193***	-0.049	0.467***	0.115**	0.123***	0.052**	0.072***
	(0.026)	(0.057)	(0.031)	(0.085)	(0.053)	(0.038)	(0.021)	(0.024)
Change in COVID-19 cases	-0.068**	-0.250***	-0.024	0.005	-0.004	-0.066**	-0.015	-0.051
	(0.031)	(0.058)	(0.038)	(0.059)	(0.051)	(0.031)	(0.033)	(0.033)
COVID-19 period	0.260	-0.023	-0.711**	1.689**	2.097***	0.431	-0.488	-0.179
	(0.300)	(0.402)	(0.286)	(0.730)	(0.480)	(0.279)	(0.318)	(0.340)
Lagged CRE price growth x COVID-19	0.282***	-0.044	0.024	-0.154	0.322***	0.244***	0.273***	0.274***
	(0.096)	(0.050)	(0.054)	(0.132)	(0.076)	(0.084)	(0.093)	(0.096)
Financial conditions index x COVID-19	-0.092	-0.256**	-0.030	-0.454**	-0.312**	-0.040	0.029	-0.040
	(0.096)	(0.108)	(0.095)	(0.219)	(0.125)	(0.104)	(0.103)	(0.101)
Change in house prices x COVID-19	0.063	-0.246*	0.048	-0.186	0.422***	0.063	0.049	0.077
	(0.087)	(0.144)	(0.070)	(0.207)	(0.114)	(0.087)	(0.090)	(0.090)
Expected real GDP growth x COVID-19	-0.012	-0.193	0.049	-0.090	-0.184	-0.077	0.025	0.017
	(0.108)	(0.175)	(0.094)	(0.156)	(0.162)	(0.100)	(0.106)	(0.108)
Teleworkability index x COVID-19						-0.387***		
						(0.112)		
Vaccination policy indicator							0.312***	
							(0.048)	
Vaccination rate								0.151***
								(0.048)
Observations	1,821	1,650	1,647	1,165	1,329	1,821	1,821	1,821
R-squared	0.559	0.456	0.462	0.419	0.459	0.569	0.570	0.562
City fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Quarter fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cities	96	88	91	68	75	96	96	96
Countries	31	28	30	18	22	31	31	31

Notes: Dependent variable is quarterly real CRE price growth (in percent). COVID-19 is a dummy variable equal to one for 2020Q1-2021Q4. Cols. (1)-(5) report the estimated coefficients from the baseline specification [1] described in Annex Section B for overall and segment-specific commercial property price change. Col. (6) presents the results with teleworkability index (defined as in Dingel and Neiman, 2020) and its interaction term with COVID-19 variable added to the baseline specification. In cols. (7) and (8), vaccination policy indicator capturing the degree of vaccine roll-out in an economy and the vaccination rate are included, respectively. Cols. (6)-(8) present the results for the overall commercial property price (the results for specific segments are available upon request). The sample period covered in the estimations is 2016:Q1-2021:Q4. All specifications include a constant term, city and quarter fixed effects. Clustered standard errors at the city-level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.1.