

# The donut effect: How COVID-19 shapes real estate

by Arjun Ramani and Nick Bloom

## KEY TAKEAWAYS

- Rents in high-density areas and central business districts of America's largest cities have fallen more than 10 percent since the start of the pandemic.
- Though housing demand *within cities* is shifting from dense urban centers to more spacious suburbs, there has yet to be a substantial move from more expensive to less expensive cities.
- Working from home has caused commercial office occupancy rates to plummet and commercial property prices to fall in crowded zip codes.
- Falling property values in cities are likely driven by richer, more skilled residents leaving high-value properties. That will cause a drop in property taxes and strain city budgets.

The pandemic has redefined how many Americans work, forced more of us to find refuge in our homes, and called into question the necessity of those dreaded commutes to a downtown office.

We are seeing these issues play out in real estate markets. Single-family home prices are on the rise — increasing 7 percent during the past calendar year. Meanwhile, commercial real estate demand has remained relatively flat — perhaps a surprise given the massive shift to working from home.

But underneath these aggregate trends lie a substantial reallocation of demand away from city centers toward city suburbs for the largest metro areas in the U.S.

This creates what we call the “donut effect”: rising prices in the suburbs and slumping prices in major city centers being hollowed out by a fear of crowds and the *growth of working from home*.

This policy brief explains what is causing this donut effect and lays out the policy concerns it poses.



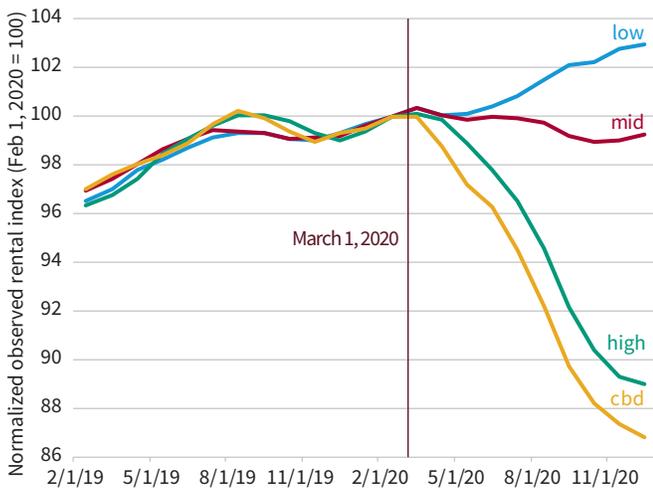
## Making the donut: Reallocation in real estate demand

The news has been *full* of stories claiming the end of America's biggest cities as we know them. In major cities including New York, Chicago, San Francisco, and Washington, D.C., cell phone data *shows* a substantial urban exodus since the virus struck, with wealthy areas taking the biggest hits.<sup>1</sup>

1 The hardest hit area in New York was downtown Manhattan, a classic example of a neighborhood vulnerable to COVID-19. Manhattan has a high-share of residents who can work from home, high population density, expensive rents and prices, and normally benefits from many in-person amenities to attract residents.

Our research has examined how these trends affect real estate markets. Figure 1 shows Zillow’s rental index for the 12 largest metro areas in the U.S.<sup>2</sup> The central business district (CBD) and top 10 percent of zip codes by population density saw more than a 10 percent drop in rents, confirming that demand for real estate in dense city centers has actually fallen. And other recent research finds that rents are declining in high-density neighborhoods across the country (Liu and Su 2020).

**Figure 1.** Normalized Zillow observed rental index broken down by density group and CBD for 12 largest metros by population (Feb 1, 2020 = 100)



But what is driving the fall in city center real estate demand?

Four key factors are at play in creating the donut effect: the economic shock from the virus, the lack of access to city amenities due to lockdowns, the aversion to dense areas due to fear of virus spread, and the ability to work from home (WFH). The first three factors are likely temporary, suggesting that markets could rebound.

To test the longer-term effects of the pandemic shock we examined real estate transaction price data from Zillow.

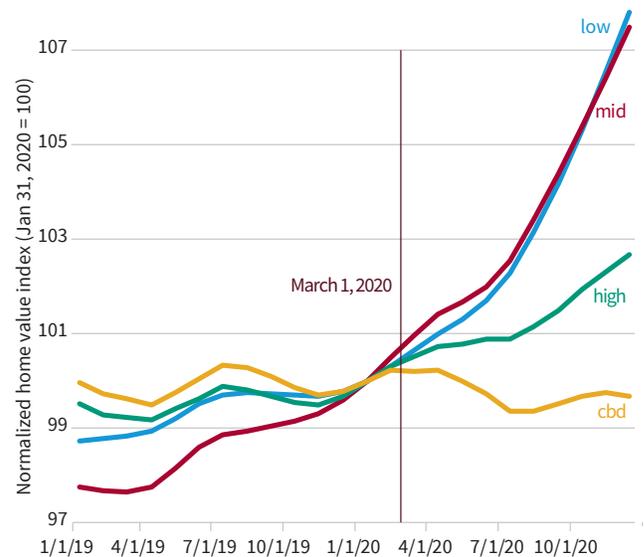
2 Our sample of the twelve largest metro areas in the US by population consists of New York, Los Angeles, San Francisco, Chicago, Washington DC, Atlanta, Philadelphia, Boston, Miami, Houston, Phoenix, and Dallas. And our zip code density buckets are high = top 10%, mid = 50-90th percentile, low = 0-50th percentile.

## In for the long haul: Look at housing prices

In theory, property prices should reflect both the short-term and long-term factors that affect the value of property. This is because owning a property is like owning any other asset. You can collect income streams by renting out the property into perpetuity. So just as the stock market is highly forward looking and weighs future income streams, so do property valuations. And with record-low interest rates, this forward-looking nature is greater than ever.

What do the price data show? Figure 2 demonstrates that although there is less of an aggregate decrease in home sale prices as compared with rents, there is a similar demand reallocation effect where city CBDs and dense areas experience relative price decreases compared with less dense areas. Interestingly, the donut effect for prices appears to be limited to highly populated dense cities. We didn’t observe much of an effect for metro areas outside the largest cities.

**Figure 2.** Normalized Zillow home value index broken down by density group and CBD for 12 largest metros by population (Jan 31, 2020 = 100)



As an example, Manhattan’s Battery Park neighborhood — close to Wall Street — saw a 9.6 percent decrease in prices from the last three months of 2019 to the last three months of 2020. By contrast, middle-class residential neighborhoods like suburban Suffolk County on Long Island have boomed. Home prices in Suffolk County are up in every zip code with an average increase of 7.2 percent over the same period.

San Francisco has also seen moderate decreases in prices. The Presidio, prized for being located directly adjacent to the city center, has seen price drops of almost 10 percent. On the other hand, housing prices in leafy Marin County, located right across the bay, have increased by about 8 percent.

Figure 3 shows heat maps of year-over-year price changes in both New York City and the San Francisco Bay Area. In both maps, Manhattan and downtown San Francisco, respectively, have taken large hits relative to surrounding areas.

### Working from home may be a driver

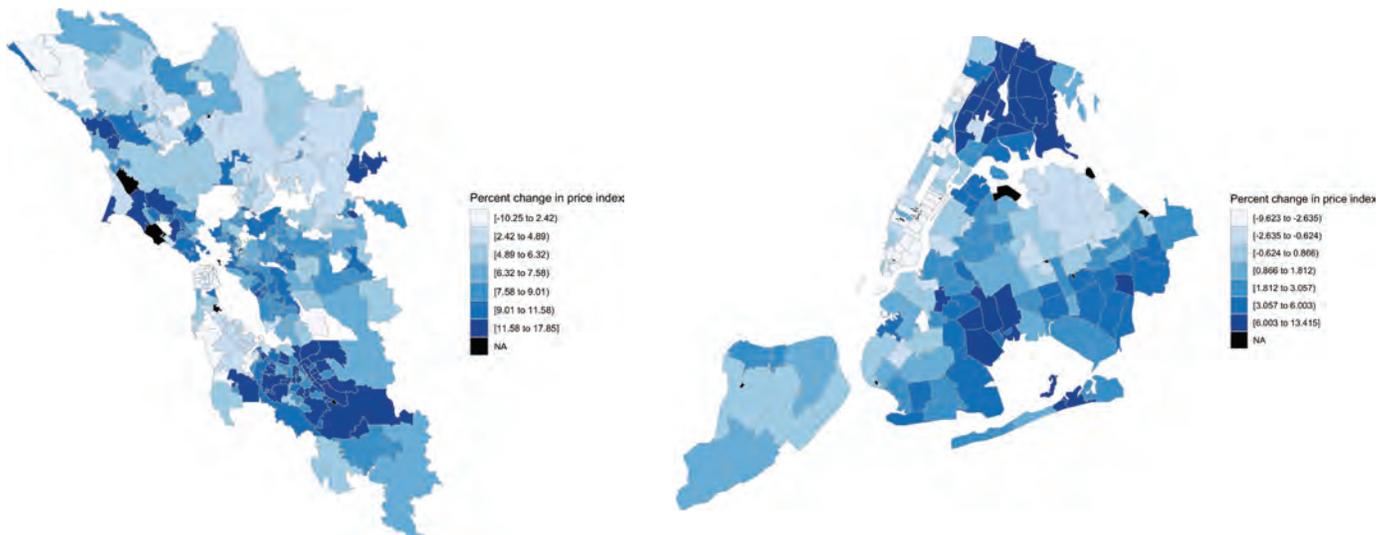
Earlier research (Barrero, Bloom, and Davis, 2020) has argued the substantial increases in working from home will likely be persistent. Indeed, managers expect about 20 percent of working days to be done from home post-pandemic. Importantly, though, the types of jobs that can be done from home are not evenly distributed over the different parts of cities. And neither are the people who do them.

We used data from a recent paper by Dingel and Neiman (2020) that classifies the share of jobs that can be done from home by occupation. Combining this with U.S. Census data on the occupations of people who reside in each zip code, we were able to construct a zip-code level measure of the share of jobs that can be done from home. We call this the work-from-home (WFH) exposure of a zip code.<sup>3</sup>

As seen in Figure 4, CBDs and dense areas of cities have a greater WFH exposure than less dense areas.

3 Dingel and Neiman (2020) calculate the share of occupations that can be done from home weighted by wage for each industry by determining whether an occupation’s tasks can be done from home or not. Our methodology assumes that this metric is relatively stable across U.S. geographies.

**Figure 3.** Year-over-year percent change in home value index by zip code for SF Bay Area and New York City

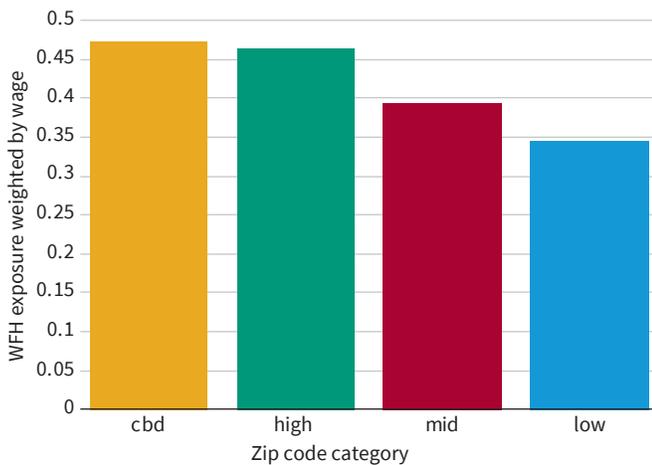


As explained by Althoff et al. (2020), this is likely due to the high concentration of skilled service industries like information technology, finance, professional services, and management in cities.

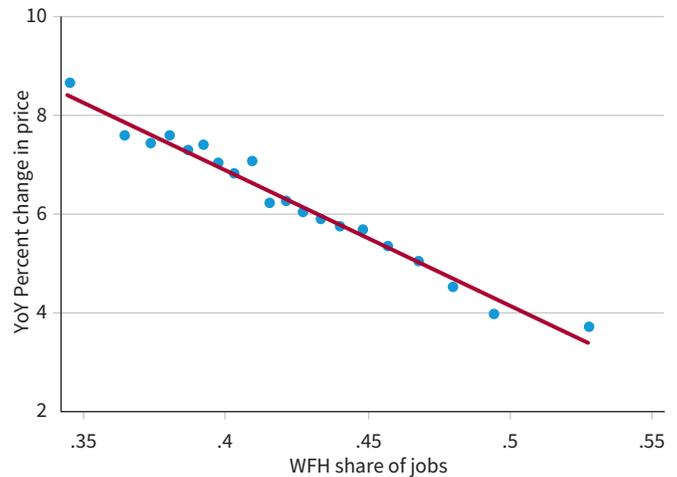
We also found that most of the changes in property prices across different zip codes can be explained by the share of jobs that can be done from home, with density only contributing a small amount. We take this as evidence that people with the ability to WFH are moving away from city centers to lower-cost areas on city outskirts because they will not have to commute as frequently.

As seen in Figure 5, even after we control for the metro region and the population density of a zip code, the share of jobs that can be done from home exhibits a striking negative relationship with the year-over-year change in home value index.

**Figure 4.** The share of jobs that can be done from home (work-from-home exposure) is positively correlated with population density



**Figure 5.** Housing price changes at the zip code level for major metros are negatively correlated with the share of jobs that can be done from home after controlling for population density and metro region. Chart bins across zip codes from largest metros into 20 points.

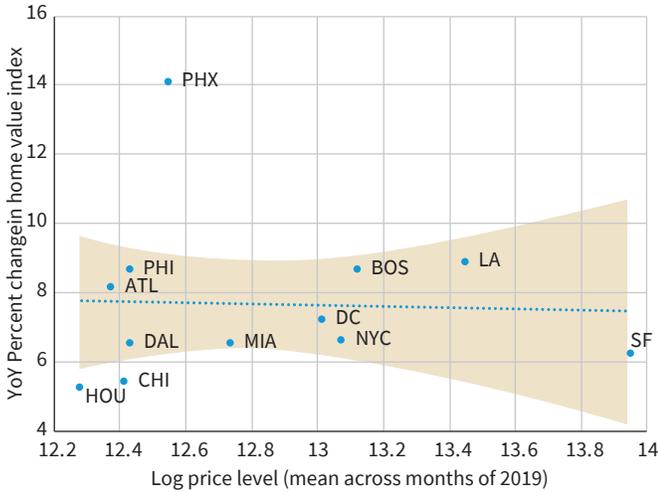


### San Francisco to Austin: A real flight risk?

So far, we have presented evidence on the reallocation of real estate demand among zip codes within metro areas like the greater New York City area. But what about the stories of people moving away from expensive areas like New York or San Francisco to cheaper ones like Austin? To test this we looked at Zillow’s metro area-wide housing price index across different areas and plotted the change in the price index over the past year against the log mean price level for 2019 as seen in Figure 6.

If there was a long-term reallocation of demand from expensive cities to cheaper ones, we would expect a strong negative correlation. But we actually observed a relatively flat trend.

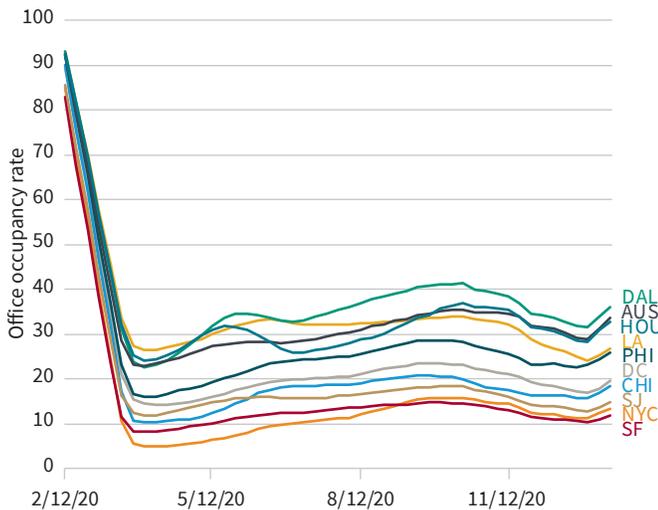
**Figure 6.** Housing price changes vs. price levels across U.S. metro areas



We now have two pieces of preliminary evidence that we can put together. We've observed *within-city* reallocation of housing demand from dense areas with a high WFH share to less dense low WFH areas.

We've also observed that housing demand hasn't shifted much from expensive cities to less expensive cities. This suggests that most who work from home after the pandemic will be doing so only a few days

**Figure 7.** Occupancy rates have fallen across cities with the most pronounced drops in areas where many jobs can be done from home

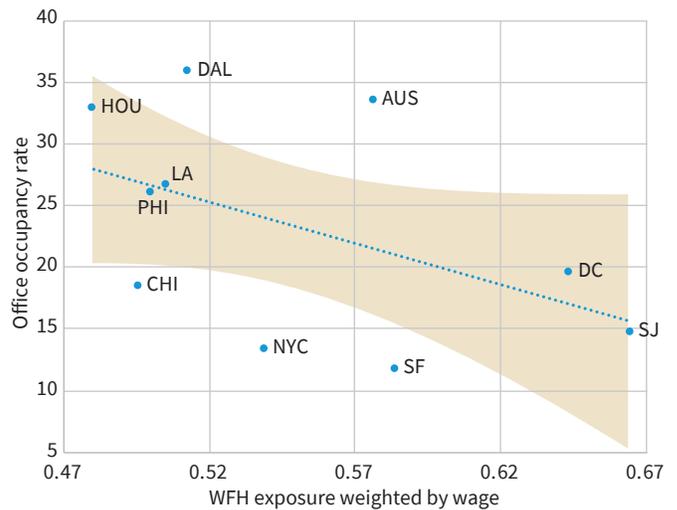


each week, rather than full time. Therefore, employees who previously lived and worked in city centers may be willing to move further away to the outskirts of cities or nearby suburbs. But since they still have to come to work sometimes, they are not willing to completely uproot their lives and move to a less-expensive city far away.

The survey evidence that has been previously documented is consistent with the real estate price movements we've seen here: Employers project that the employees will likely work from home a couple days a week.

### Long-term commercial office demand may take a hit across cities

So far, we've been exploring data on residential properties. But with an increase of employees working from home, one of the most affected markets has been commercial office property. Interestingly, short-term demand in the aggregate for commercial office space has not changed much, because the decreased quantity of people going to the office has been *counterbalanced* by the amount of space needed per employee to ensure social distancing.

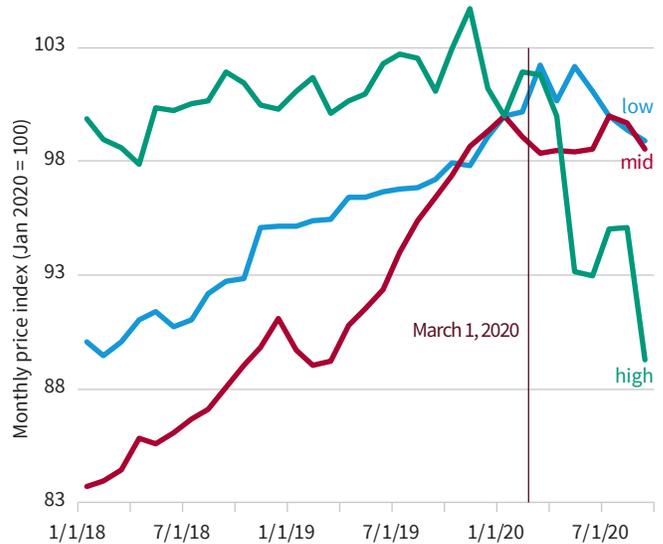


But, Figure 7 shows that occupancy rates have *fallen* to 15-40 percent across major U.S. cities and there is substantial variation across U.S. cities.<sup>4</sup> Specifically, occupancy has fallen more in cities with a greater share of jobs that can be done from home, as might be expected (though the negative slope is not statistically significant).

It is hard to say right now whether the short-term decline in occupancy is indicative of a larger trend for commercial real estate in the price data. Commercial property transaction data is much sparser than residential property data, so we constructed an index ourselves using transaction level data from Zillow.<sup>5</sup>

Transactions in CBDs are especially limited, but a similar pattern of divergence between high density tracts and lower density tracts can be seen after the pandemic shock. As seen in Figure 8, all three price indices experience slowdowns in price growth since the start of the pandemic, with the effect being most pronounced in the densest zip codes. Overall, we estimate the pandemic led to a 10 percent drop in commercial office building prices in the densest decile of zip codes relative to other zip codes.

**Figure 8.** Commercial office buildings have fallen in value in dense areas relative to less dense areas for largest metros



### What policymakers can start thinking about

Though people will still go to work in America's biggest cities, there will certainly be shifts in urban structure. State and local governments must ease the transition. People will commute to work less frequently, which will cause more people to flock to areas farther from city centers. This may increase the need for expansive public transportation networks with slower frequencies.

Furthermore, tax revenues in city centers will take a hit, which may require city governments to make tough choices on cutting services unless the federal government continues to step in. The loss of revenues will come from many directions.

Sales tax revenues are falling in the short term due to less city economic activity from the pandemic. And the long-term loss will come from less frequent commuting to cities in the WFH world. Cities with hotel taxes, extensive public transportation systems, and income taxes like New York City will further suffer from the pandemic shock.

4 We obtain office occupancy data across 10 major U.S. metros from Kastle Systems, a building security technology company.

5 We build a hedonic model of commercial property transaction prices to construct a monthly price index across zip code density groups for our sample of MSAs. Our methodology is similar to that of Gindelsky et al. (2019) and aims to control for changes in the composition of properties sold. Data provided by Zillow through the Zillow Transaction and Assessment Dataset (ZTRAX). More information on accessing the data can be found at <http://www.zillow.com/ztrax>. The results and opinions are those of the author(s) and do not reflect the position of Zillow Group.

The *largest source* of local government revenue in the U.S. besides intergovernmental transfers is property taxes. Property tax revenues may fall in the long run due to lower property valuations in city centers, although cities with more widespread jurisdictions will be less affected due to increased valuations for properties on the outskirts.

In the short run, the federal government may continue to support cities through the recovery. So far, the CARES Act, the Fed's municipal lending facilities, and historically low-interest rates have *mitigated* the impact on local governments. But in the longer run, cities will need to "right size" their budgets. New York, San Francisco, Chicago, Washington, D.C., and other large cities seeing falling revenue from slumping city centers will have to cut back spending to balance their budgets.

On the upside, the decline in city property prices is curtailing the affordability crisis as middle- and lower-income employees are more able to afford living in city centers. And with the rise in working from home, commuting costs will go down.

A best-case scenario is a more livable city center with fewer commutes to work rather than congested cities that price out many residents.

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