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THE FUTURE OF COMMERCIAL REAL ESTATE AND CITY BUDGETS

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ABSTRACT

The declining values of office buildings across the country in the aftermath of the COVID-19 pandemic could significantly change how major cities and other localities raise revenue and provide public services. This paper describes the mechanics of commercial property tax collection and uses Annual Comprehensive Financial Report data to show how and why commercial property tax collections vary across 47 cities. It then combines these data with forecasts of office building values for the 13 cities in the largest office markets in the United States to forecast how much revenue cities might lose over the next decade compared with pre-pandemic trends. Depending on the assumptions in the forecast, the median projected decline in commercial property tax revenue by 2031 ranged from 2.5 to 3.5 or from 0.9 to 3.2 percent of total city revenue. However, the severity of the shortfall was far larger in some cities, and some cities saw large swings in the projected shortfall under the two different forecasts. These data highlight the major questions policymakers should ask when assessing the specific future of their local budgets.

EXECUTIVE SUMMARY

Property taxes account for roughly a third of local government general revenue and are often championed as a stable and reliable source of local government funding.[1] However, the declining value of office buildings in the aftermath of the COVID-19 pandemic could cause local property tax revenues to drop and significantly alter how major cities and other localities raise revenue and provide public services.

For example, research from Gupta, Mittal, and Van Nieuwerburgh (2023) estimated that the shift to remote work will result in New York City office values falling 49 percent from 2019 to 2029. Among the 20 largest office markets in the United States, the projected drop in market values over that period ranged from 18 percent in Charlotte to 59 percent in San Francisco, with all markets except Charlotte seeing values decline more than 40 percent.[2]

To assess how these changes might affect commercial property tax revenue, we analyzed 47 large cities across the country for which detailed data were available as of February 2024.[3] We found that the median city saw a 16 percent *increase* in commercial property assessed taxable value between 2019 and 2022. However, there was significant variation across cities. Assessed value changes ranged from -4 percent in Albuquerque, New Mexico, to 82 percent in Buffalo, New York.[4] Overall, 12 cities saw commercial property values grow less than 10 percent over those four years, including three cities that saw values decline over the period: Albuquerque, Cleveland, and New York City. In comparison, over the same period the median growth in residential property assessed taxable value was 24 percent, and no city saw residential property assessed taxable value decline. (Note: All references to property value in this report are for assessed taxable value unless described otherwise.[5])

Notably, assessed values are a lagging indicator of market values because of the method of office building assessments. For example, commercial properties, including office buildings, are often assessed by governments based on "the income approach," which uses the net income generated by a property to determine its taxable value. Commercial leases are signed for extended periods (e.g., 10 or 15 years), and thus it can take multiple years for the revenues generated by a property to reflect lower demand for office space. In addition, the current reported taxable values reflect assessments performed in 2021 or early 2022. Therefore, it is likely that the fall in office property values has not yet fully materialized into the commercial property tax base for most cities. (The process of assessing commercial real estate is discussed in detail in appendix A.)

As policymakers address this looming economic shift, they must keep in mind that a city's dependence on commercial property tax matters as much as its commercial property values for local revenue impact. Between 2013 and 2022, average commercial property tax collections as a share of a city's total general revenue ranged from 2 percent in Peoria, Arizona, to 33 percent in Boston, Massachusetts. The median city in our data collected 10 percent of its general revenue from taxes on commercial property.[6] (Our analysis only covers cities, but counties and school districts also rely heavily on commercial property taxes. For example, we

estimate that 33 percent of revenues for the Fort Worth independent school district in Texas came from commercial property tax collections.)

A city's reliance on commercial property tax can also change over time. Between 2013 and 2022, the median change was 0.1 percentage points, but reliance on commercial property declined in 24 cities by an average of -1.9 percentage points and increased in 23 cities, by an average of 1.5 percentage points. In nominal terms, the median yearly growth in commercial property taxes was 4.4 percent over the same period. To put this into perspective, the median growth of residential property taxes and of other sources of revenues was 5.2 percent and 5.3 percent, respectively.

This report also teases out how much of the change in commercial property reliance was due to the growth of commercial property values, residential property values, and changes in other revenue forces. We show wide variation across cities in the drivers of commercial property tax reliance. For example, reliance on commercial property taxes increased in Boston because commercial property tax collections grew faster than other sources of revenues. Meanwhile, in Boise, the share of total property tax revenues was roughly constant, but only because residential property revenue grew faster than commercial property revenue, leading to a 3.6 percentage point drop in commercial property tax reliance.

To give local policymakers and others a framework to think about the full potential impact of falling office values on city budgets, we combined our revenue data with estimates of the decline in market value of office buildings over the 10 years analyzed in Gupta, Mittal, Van Nieuwerburgh (2023). This allowed us to show, in 13 cities, what a shortfall in commercial property tax revenues might look like compared with a hypothetical world with all commercial property values—including office buildings—increasing at pre-pandemic rates of growth. We also show what the shortfall in revenues could look like in a world where, despite the fall in value, commercial property taxes continued to contribute the same *share* of city revenues in 2031 as in 2022.

Because of the lack of broad data on the relative importance of offices in total commercial property value, we calculated lower (offices made up 30 percent of total commercial values until 2020) and upper bounds (50 percent) for these estimates. In New York City, which uniquely reports the taxable assessed value of office spaces, we used lower and upper bounds of 40 and 45 percent, respectively, based on the city's own estimate that office buildings made up around 43 percent of commercial property taxes in 2022. In Washington, DC, based on previous estimates, we used a lower bound of 50 percent and upper bound of 65 percent for office buildings as a share of commercial property taxes.[7]

In the estimate of post-pandemic office values compared to pre-pandemic trends, we found that New York City's 2031 shortfall ranged between $4.7 and $5.3 billion, or 3 to 3.4 percent of total revenues. In Boston, the shortfall was between $401 and $668 million, or 7.1 to 11.9 percent of estimated revenues, and in San Francisco it was between $448 and $748 million, or 3.0 to 5.0 percent of estimated revenues.

In the estimate where we held the share of commercial property tax revenue constant, we found the shortfall in New York City ranged from $3.8 and $4.4 billion, or 2.5 to 2.9 percent of general revenues. In Washington, DC, the shortfall was between $1.5 to $1.7 billion, or 5.2 to 5.7 percent of revenues, and in Boston between $18 million and $280 million, or 0.3 to 5.3 percent of revenues.

Because localities have varying degrees of control over tax rates and other aspects of taxation due to state rules and other limits, how governments address declining commercial property values – through a higher reliance on residential property taxes, increased sales or incomes taxes, a reduction in expenditures, or more support from the state government– will vary. Different approaches could create very different consequences for tax efficiency, fairness, and economic growth.

THE IMPORTANCE OF PROPERTY TAXES

Property tax reliance

Major cities typically produce annual comprehensive financial report (ACFRs), which provide a detailed and audited description of city's financial situation. In the first round of our data collection, we focused on the 50 largest cities by population in the United States and analyzed their ACFRs to see if they reported assessed value by class of property (i.e., residential vs. commercial). We then randomly selected 50 additional cities among the 300 largest cities by population to broaden our search for cities with the necessary detail of data. Our final dataset included 47 cities which had the information we required.

The ACFR data confirmed that property taxes are a dominant source of revenue for most local governments, but that this dependency varied widely among localities.[8] Among the 47 cities we collected data from, the share of total property tax collections as a share of total revenues ranged from less than 7 percent in Mobile, Alabama, to more than 63 percent in Boston, Massachusetts. The median city in our dataset collected 34 percent of its general revenue from total property taxes.[9]

A city's reliance on property taxes depends on several factors. First, some states allow local governments to collect other major taxes, such as a local sales tax or local income tax, which can partially offset the need for property tax revenue. For example, three cities in Arizona (Peoria, Phoenix, and Scottsdale) that levied a relatively high general sales tax rate were in the bottom 20 of our cities in property tax reliance. Similarly, the Ohio cities of Cleveland and Cincinnati levied municipal income taxes and thus had a relatively low reliance on the property tax, 7 and 8 percent, respectively.

Second, cities with lower-than-average property values typically relied less on property taxes than cities with higher property values. For example, only 13 percent of Detroit's general revenue came from property taxes because of its relatively low value of real estate, despite the city having some of the highest property tax rates in the nation. However, the converse was not always true: New York City and Washington, DC are both home to very high property values, but these cities also impose local income and sales taxes that reduce their

reliance on property taxes. Other factors, like statewide local property tax limitations and the availability of transfers from the state and federal government, can also affect a city's dependence on property tax revenue.

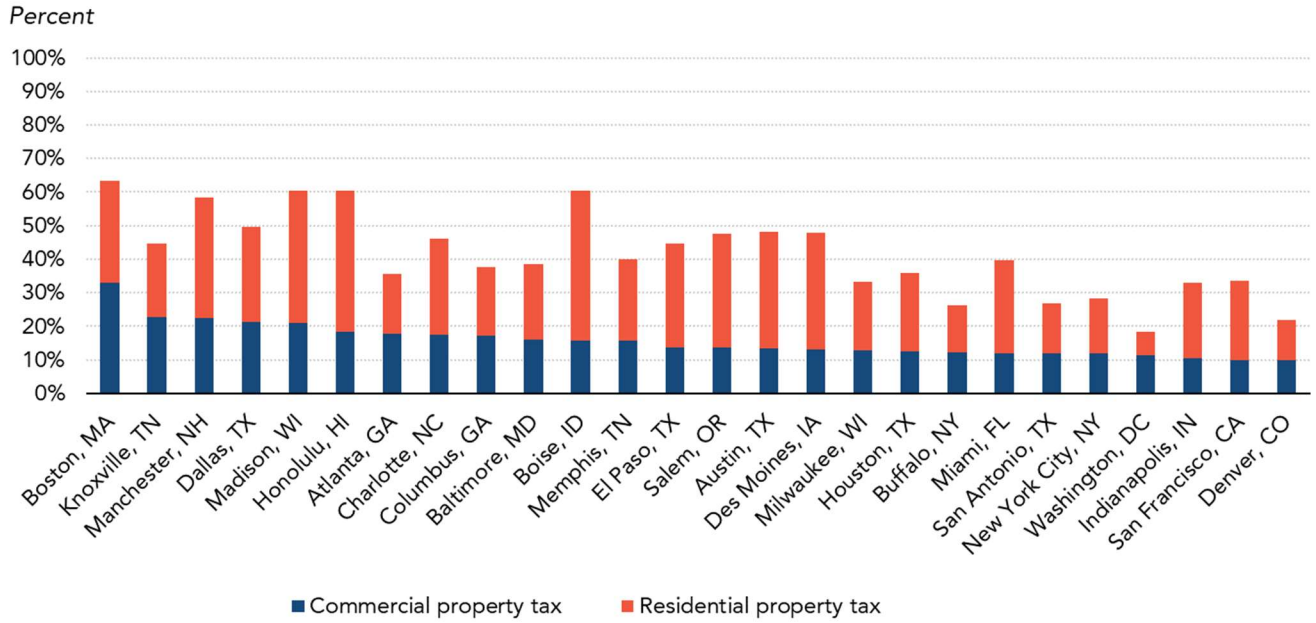
Commercial property tax reliance

In the post-pandemic economy, the vulnerability for most cities is not necessarily a high reliance on total property tax revenue, given that home values have soared across the country over the past few years, but specifically a reliance on commercial property tax revenue. In the cities we examined, Boston, Massachusetts; Knoxville, Tennessee; Manchester, New Hampshire; and Dallas, Texas, had the highest reliance on commercial property taxes.

FIGURE 1

Reliance on Commercial and Residential Property Taxes

Average as share of general revenue, 2013–22



Source: Authors' calculations based on each city's Annual Comprehensive Financial Report (ACFR).
Note: There were 47 cities in the analysis. These 25 cities had the highest reliance on commercial property taxes. General revenue includes transfers from state and federal governments. Other sources of city general revenue.

Figure 1 presents the 20 cities with the highest average reliance on commercial property taxes between 2013 and 2022. At the top of the list, we estimated that commercial property taxes in Boston made up 33 percent of the city's revenues on average during this period. Second was Knoxville, where commercial property tax collections averaged 23 percent of general revenues, followed by Manchester (23 percent), Dallas (21 percent), and Madison (21 percent).

In our 47 cities, the median reliance on commercial property taxes was 10 percent, and the average was 11 percent. Large economic centers, such as New York City (12 percent), Washington, DC (11 percent), or

Houston (13 percent) fell in the middle of the list, despite their large commercial real estate tax base because of their multiple sources of revenues.

The cities with the smallest reliance on commercial property tax in our sample were Peoria, Cincinnati, and Cleveland. In each of these three cities commercial property taxes were less than 3 percent of general revenue. Commercial property tax reliance was between 3.0 percent and 3.5 percent in Albuquerque, New Mexico; Glendale, Arizona; Las Vegas, Nevada; Lexington, Kentucky; Phoenix, Arizona; and Springfield, Missouri.

Figure 1 also highlights the disparities between reliance on total property taxes and specifically on commercial property taxes. For example, Atlanta, Georgia, had the seventh highest reliance on commercial property taxes in our set of cities, but its overall dependence on property taxes was lower than most of the other 20 cities. In contrast, Boise, Idaho did not have a particularly high reliance on commercial property taxes, but its overall reliance on property tax revenue was one of the highest measured.

Notably, many cities assess commercial property at a different ratio than residential property. For example, Memphis, Tennessee, assesses residential property at 25 percent of its market value and commercial property at 40 percent of its market value.[10] And some cities, such as New York City and Washington, DC, apply different tax rates by class of properties. But most cities apply the same tax rate to commercial and residential property. In this case, we estimated the share of commercial property taxes as the share of commercial taxable assessed values in total property taxable assessed values. For each city, we checked whether the tax rate was uniform or depended on the type of property. In cities which had different tax rates, we estimated the share of property taxes from commercial property taking into account the different tax rates.

Trends in commercial property tax reliance

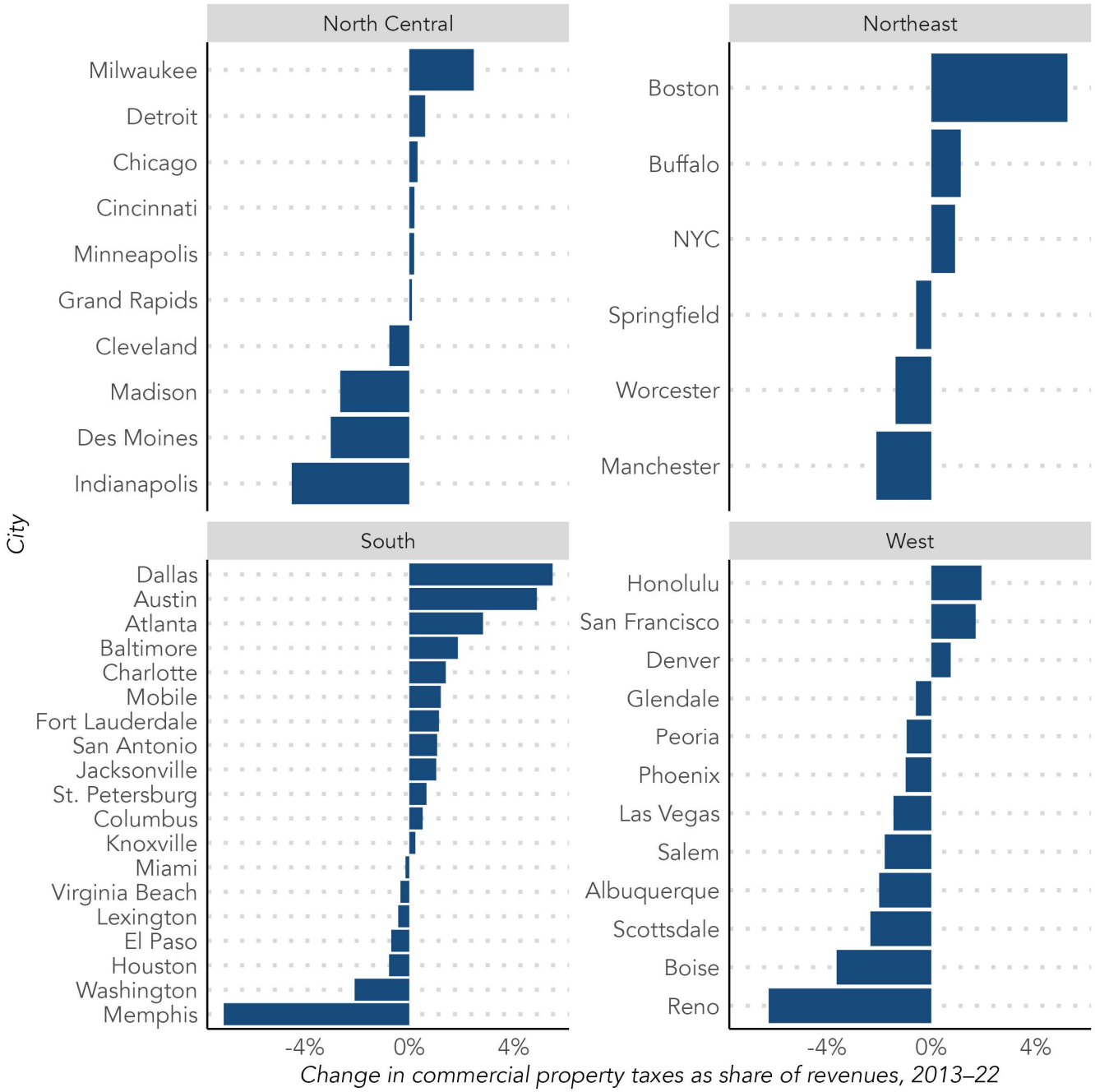
Figure 2 highlights the sizeable variation in commercial property tax changes between 2013 and 2022 across the cities in our dataset. At the top, Austin, Boston, and Dallas saw an increase of 5 percentage points or more. At the bottom, Memphis saw a *drop* in commercial property tax reliance of 7 percentage points, followed by Reno (-6 points), Indianapolis (-4.5 points), and Boise (-3.5 points). The median city saw no change in reliance on commercial property tax revenue over this period, and the average city saw a small decline (-0.2 points).

A city's share of revenue from commercial property tax collections could change both because commercial property tax collections changed or because other sources of revenues changed. For example, if commercial and residential property taxes were stagnant, but other sources of revenues fell, the share of commercial property tax would increase. Similarly, the share of commercial property taxes would fall if commercial property tax collections were stagnant, but residential property taxes increased. (See the appendix for more detail.)

FIGURE 2

Change in Reliance on Commercial Property Tax Collections

Share of general revenue from commercial property tax from 2013–22



Source: Authors' calculations based on each city's Annual Comprehensive Financial Report (ACFR).
Note: The graph represents the change in the share of total revenues coming from property taxes between fiscal year 2013 and fiscal year 2022.

To better understand the drivers of changes in commercial property tax reliance over the past decade, we first teased out how much of these changes were due to changes in total property tax collections. We found that changes in property taxes as a share of total revenue from 2013 to 2022 ranged from a decline of -7.6 percentage points (Memphis) to an increase of 6.5 percentage points (Boston), with a median and average change of 0 percentage point.

Then, we estimated how much of the change was the result of changes in commercial property values. Holding residential property taxes and the property tax share constant, higher commercial property tax collections increased commercial property tax reliance between 0.1 and 12.1 percentage points across the 47 cities, with a median increase of 2.8 percentage points. These results point to the variation in growth of commercial property taxable value.

We also estimated how much of the change in commercial property tax reliance was due to changes in residential property values. Holding commercial property taxes and the property tax share constant, higher residential property tax collections decreased commercial property tax reliance between –2.5 and 0.2 percentage points, with a median impact of -3 points. This highlights the role of growing residential taxable values in lowering the relative importance of commercial property.

This exercise shows how changes in commercial property tax reliance can occur for different reasons in different cities. For example, in Reno, Nevada, most of the decline in reliance came from a faster rise in value of residential property compared with commercial property, while in Memphis, Tennessee, most of the decline resulted from an increase in other revenue sources, because commercial and residential property grew at similar rates. In Indianapolis, half of the decline can be explained by a decrease in property tax reliance, and the other half by residential property value growth, which grew faster than commercial property. In Dallas, half of the increase came from an increase in overall property tax reliance, and the other half from rapid commercial property value growth. In Boston, reliance on commercial property would have been even higher if residential values had not increased faster than commercial property.

Trends in residential and commercial property assessed values

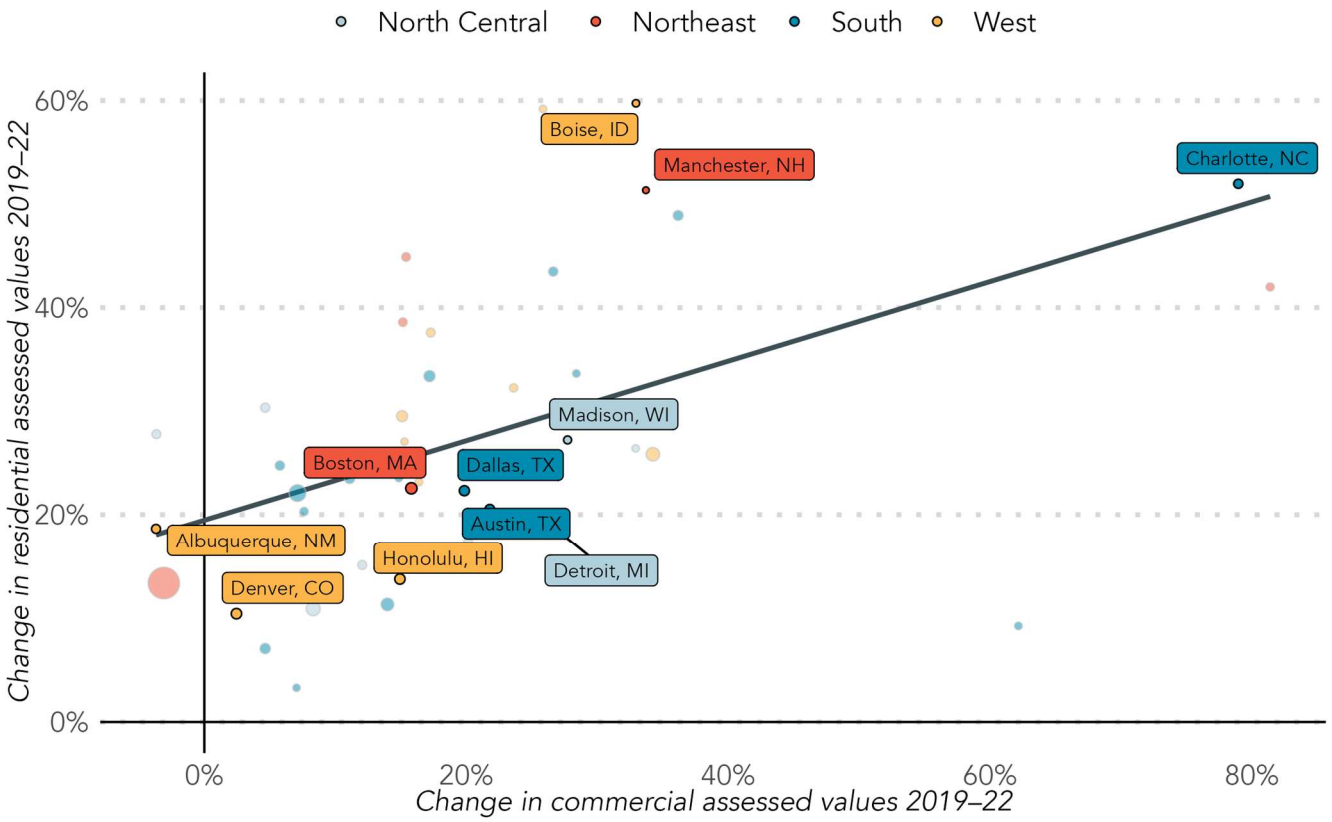
To start to assess the effects of the pandemic on city budgets, we examined changes in taxable assessed values between 2019 and 2022. The average increase in commercial assessed value was 20 percent and the median increase was 15 percent. By comparison, the average increase in residential values was 27 percent and the median increase was 24 percent.

Only Albuquerque, New Mexico, Cleveland, Ohio, and New York City saw a decline in their commercial assessed values, of roughly -3 percent, over this period. Large economic hubs like Charlotte, North Carolina and San Francisco saw an increase of 79 percent and 34 percent respectively, and many large cities saw increases over 20 percent (e.g., Atlanta, Dallas, Austin).

No city in our sample saw a decline in residential assessed value. The smallest increases were in Columbus, Georgia, and Baltimore of 3 and 7 percent respectively, while the largest increases were found in Boise, Idaho, and Reno, Nevada with 60 and 59 percent increases, respectively.

FIGURE 3

Change in Commercial versus Residential Assessed Values 2019–22



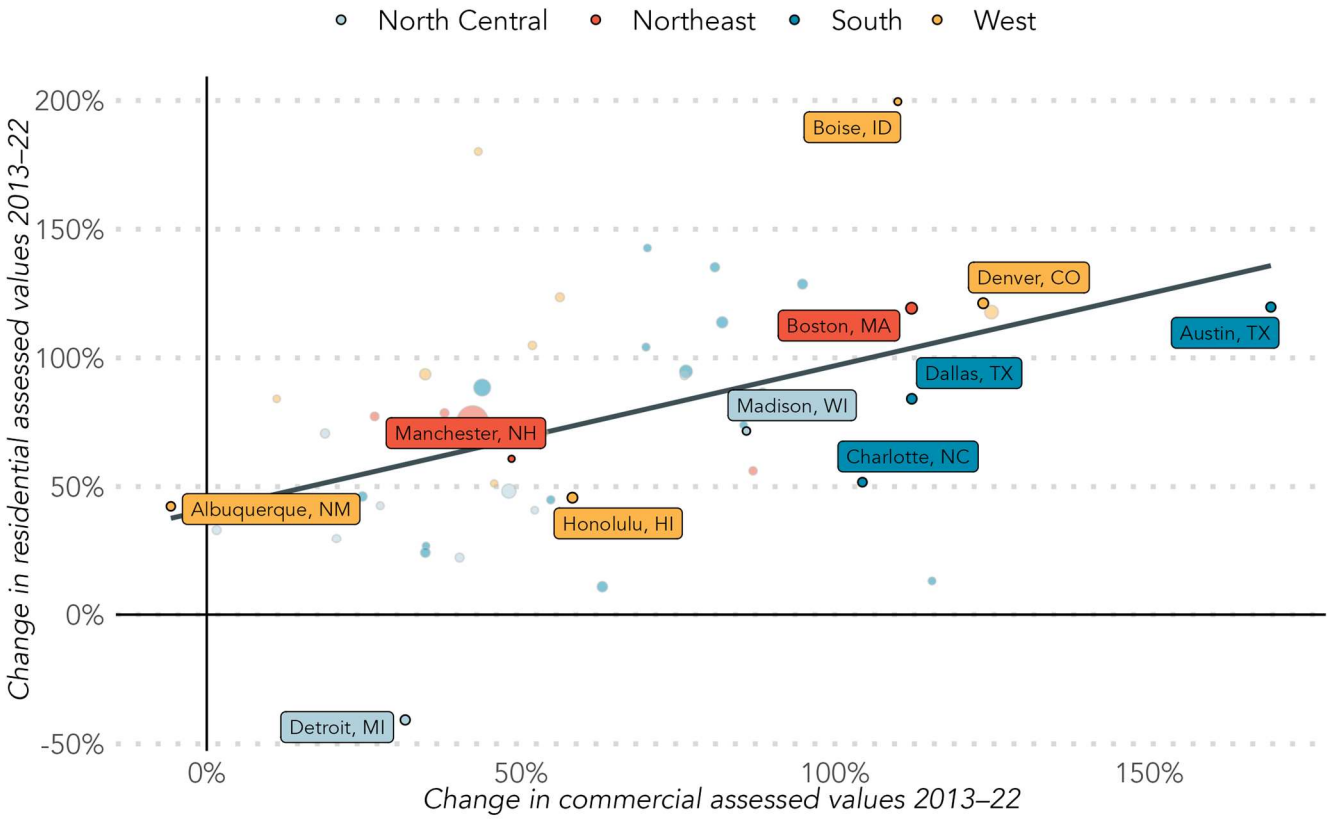
Source: Authors' calculations based on each city's Annual Comprehensive Financial Report (ACFR).

These findings highlight how the decline in office demand and office values has yet to be reflected in taxable assessed value. The data already show faster increases in residential assessment, but most of the rapid growth in the residential housing market also has yet to be reflected in assessed values.

Taking a longer perspective, between 2013 and 2022, the median increase in commercial assessed values was 54 percent, while the median increase in residential property assessed values was 74 percent, which translated into an average yearly increase of 4.5 and 5.6 percent, respectively, faster than inflation. The correlation between changes in residential and commercial taxable value was positive but moderate, at about 0.36.

FIGURE 4

Change in Commercial versus Residential Assessed Values 2013–22



Source: Authors' calculations based on each city's Annual Comprehensive Financial Report (ACFR).

Looking at specific cities, Albuquerque was the only city that experienced a decline in commercial assessed values, falling by 6 percent, from 2013 to 2022. In Austin, Boise, Boston, Charlotte, Dallas, Denver, and San Francisco, the total taxable value of commercial property more than doubled between 2013 and 2022. Meanwhile, only Detroit saw a decline in residential assessed values—40 percent over that period. Detroit was hit particularly hard by the Great Recession, and Michigan's somewhat unique property tax system in part explains why its property values are still lower than they were 10 years ago. In contrast, residential

property in Boise almost tripled over that period. Overall, assessed residential values more than doubled in 13 cities.

Specific data for each of the 47 cities we analyzed is presented in Appendix B.

FORECASTING THE IMPACT OF DECLINING OFFICE VALUES ON CITY TAX COLLECTIONS

Current taxable assessments do not yet reflect the devaluation of office properties. First, commercial properties, including office buildings, are often assessed by governments based on "the income approach," which uses the net income generated by a property to determine its taxable value. Commercial leases are signed for extended periods (e.g., 10 or 15 years), and thus it can take multiple years for the revenues generated by a property to reflect lower demand for office space.

And other complexities in the process exist. Depending on local rules, current building owners can also appeal their assessment if similar buildings have recently sold for much lower than their taxable assessed values. In addition, assessed values that determine tax collections for fiscal years 2022 and 2023 were usually determined in late 2021 or early 2022. And assessment limits in some states can create a significant wedge between market values and assessed value. This wedge can also buffer the impact of lower market values on assessed values. (Please see the appendix for a full discussion of how local governments assess property for taxation.)

Further making the situation harder to assess are gaps in available data. Specifically, there is no consistent data across cities for evaluating the share of different types of commercial real estate, such as restaurants, hotels, for-profit hospitals, and some industrial properties in total assessed taxable values. For example, New York City reports assessed values by type of commercial buildings, and we found that offices made up between 40 and 50 percent of assessed commercial real estate over the past decade. Research in Washington, DC, suggested that the share of offices in total property tax collection was roughly 40 percent, and could have represented up to 65 percent of commercial property value before the pandemic.[11] But many other cities do not break down commercial property this way. And although office values have plummeted, the picture is more complicated for other types of commercial property such as hotels, retail buildings, and industrial buildings.

To understand what fraction of commercial property may be vulnerable to declines in value stemming from the impact of remote work, Gupta, Mittal, and Van Nieuwerburgh (2023) built a model of office supply and demand. They found that current trends imply a long-run equilibrium price of office spaces nationwide almost 50 percent lower than their 2019 level. Although there was variation across areas, office values fell by more than 40 percent in all but one (Charlotte) of the 20 largest markets for office space in the United States.

To provide a framework in thinking about the future of commercial property taxes, we combined their results with the data we collected on local commercial property tax reliance and local revenues. We assumed that office values in 2030 would have incorporated the decline in price estimated in the work by Gupta, Mittal, Van Nieuwerburgh (2023).

Rather than predictions, we view our forecasts as framework to build understanding on how different factors in cities can impact future budgets. In our first forecast, we performed an estimate of the shortfall from commercial property tax revenues in *nominal terms*. That is, we simply compared total commercial property tax collections with and without the fall in office values.

Specifically, we assumed a counterfactual where there was no post-pandemic decline in office values and assumed instead that office buildings grew in value between 2022 and 2031 at the same rate they did over the past decade. We also estimated total revenue by 2031, to frame our estimates as shares of total revenue.

Importantly, this and the second forecast start from 2022 figures. This means that to the extent some of the decline in office values is already incorporated in lower assessed values for fiscal years 2022 and 2023, the decline after 2023 would be lower. For example, if 10 percent of the decline in office values was already reflected in the taxable values in New York City, roughly 40 percent decline remains, and we later discuss how slightly smaller falls in office values could affect our predictions.

In our second forecast, we estimated the shortfall in commercial property tax revenues but assumed the share of city revenue from commercial property tax remained constant. In other words, we ask the question, what would be the budget shortfall in commercial property tax revenues stemming from the drop in office values compared with a world where cities maintain the same level of commercial property tax reliance as they did on average between 2013 and 2022.

Still, there remains a major unknown in our predictions: the share of office space in total commercial property in a city. Because we do not have reliable estimates on the share of office space in commercial real estate by city, we estimated a low-end and high-end scenario. In the low-end scenario, we assumed that offices made up 30 percent of total commercial real estate, or just above the national average of 20 to 25 percent (see appendix for discussion).

In the high-end scenario, we assumed that the office share of commercial real estate was 50 percent in all cities except for New York City and Washington, DC. Because we have more precise data in New York City, where the share of office space in total commercial real estate was 43 percent in 2023, we assumed a lower bound of 40 percent and an upper bound of 45 percent. In Washington, DC, where we also had local data, we used a range of 50 to 65 percent.

In addition, we made assumptions about the growth rate of assessed values for commercial real estate that is not office space. In our baseline forecast, we assumed that commercial property outside of office space

grows at the same average rate as between 2013 and 2022. (If other types of commercial property also see a slower rate of value growth than they did over the past decade, the actual shortfalls could be much larger than our estimates.)

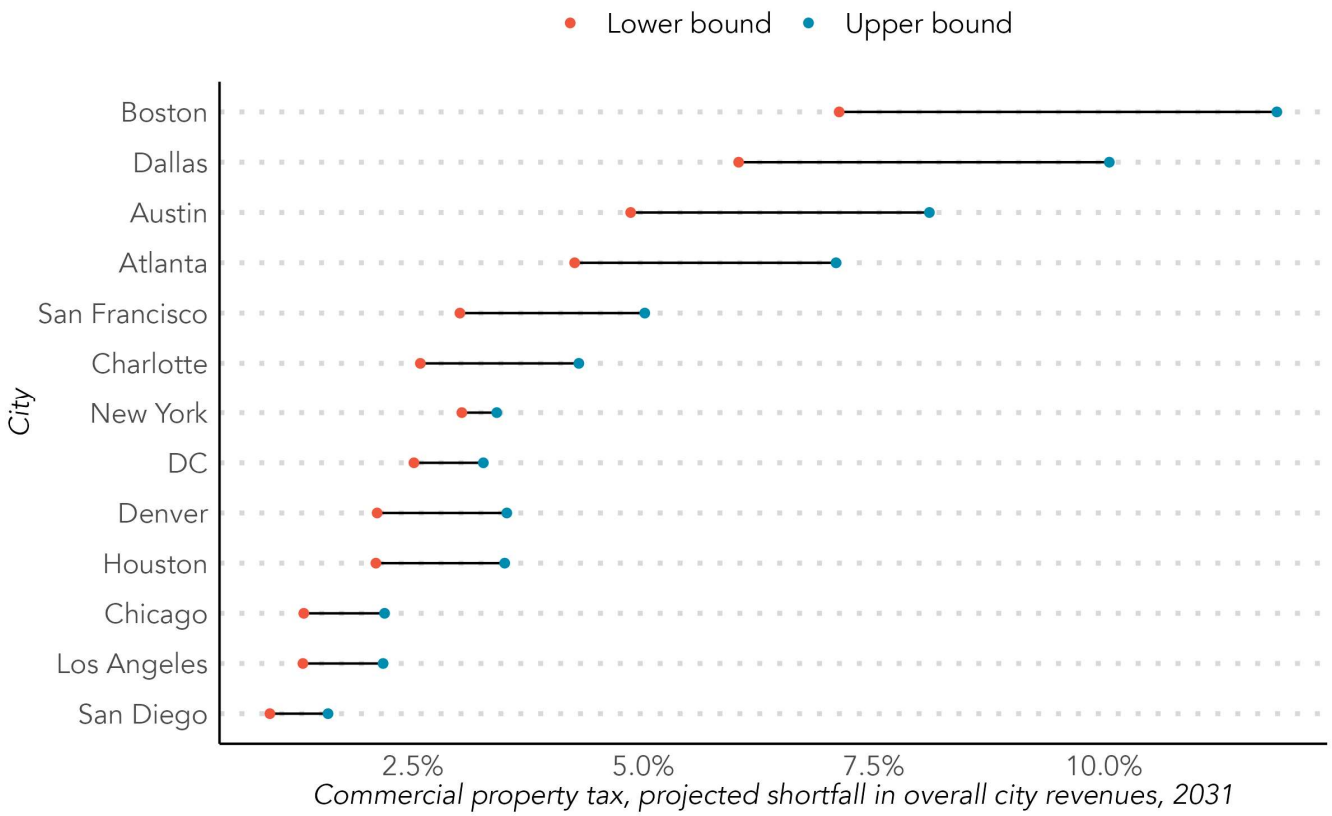
In the appendix, we discuss how alternative assumptions would impact the estimated shortfalls.

Forecast 1: continued commercial property tax growth approach

In our first forecast, we estimated the shortfall in tax revenues from the drop in office value compared with the counterfactual where *all commercial property, including office space grew at the same rate as between 2013 and 2022*.

FIGURE 5

Forecast of City Budgets Shortfall—Nominal Approach



Source: Authors' calculations. See text and appendix for details.

To calculate the shortfall, we subtracted the estimated commercial property tax collections in the low- and high-end scenarios from what commercial property taxes would have been in 2031 if they grow at the same rate as they did between 2013 and 2022. To translate the shortfall in commercial property taxes as a fraction of

revenues, we also assumed the growth rate of other sources of revenues, which we set at the same rate as between 2013 and 2022.

For example, assume that in 2023, City X has a budget of $1 million and commercial property taxes of $200,000, and that based on historical growth rate, commercial property taxes would be $325,000 by 2031. If we forecasted that in 2031 City X has $250,000 in property taxes and $1.5 million in revenues, the shortfall would be $75,000 or 5 percent of its revenues.

We find a median shortfall between 2.6 percent and 3.5 percent of 2031 revenues. In New York City, the shortfall was between $4.7 billion and $5.3 billion, or 3.0 to 3.4 percent of revenues. The importance of office space in total commercial property explains this relatively large shortfall. In Washington, DC, the shortfall was between $724 million and $941 million, or 2.5 to 3.3 percent of revenues. In Boston, which has the highest reliance on commercial property taxes, the shortfall was between $400 million and $668 million, or 7.1 to 11.9 percent of revenues.

For San Francisco, Los Angeles, and San Diego, we used the share of commercial property from county-level data between 2016 and 2022 because neither city reported assessed values by type of property. In San Francisco, we estimated a shortfall between $449 million and $747 million, or 3.0 to 5.0 percent of revenues. In Los Angeles and San Diego, which are less reliant on commercial property taxes, the shortfall is smaller: between 1.0 and 2.0 percent of revenues in Los Angeles, and between 0.9 and 1.6 percent of revenues in San Diego.

A major driver of the forecast as a share of revenues was the discrepancy between the growth rate of commercial property tax revenue and other sources of revenues. In Washington, DC, other revenues grew faster than commercial property taxes over the last decade, and if that trend continues, the shortfall could represent a smaller fraction of revenues.

The opposite is true in cities like Austin and Dallas, where commercial property taxes growth outpaced other revenue sources between 2013 and 2022. On the one hand, if commercial property other than office space grows slower than predicted in our baseline, the shortfall becomes larger, both in nominal terms, and as a fraction of revenues. On the other hand, if other revenue sources grow faster than predicted, the shortfall would be identical in nominal terms, but it would be smaller as a fraction of total revenues.

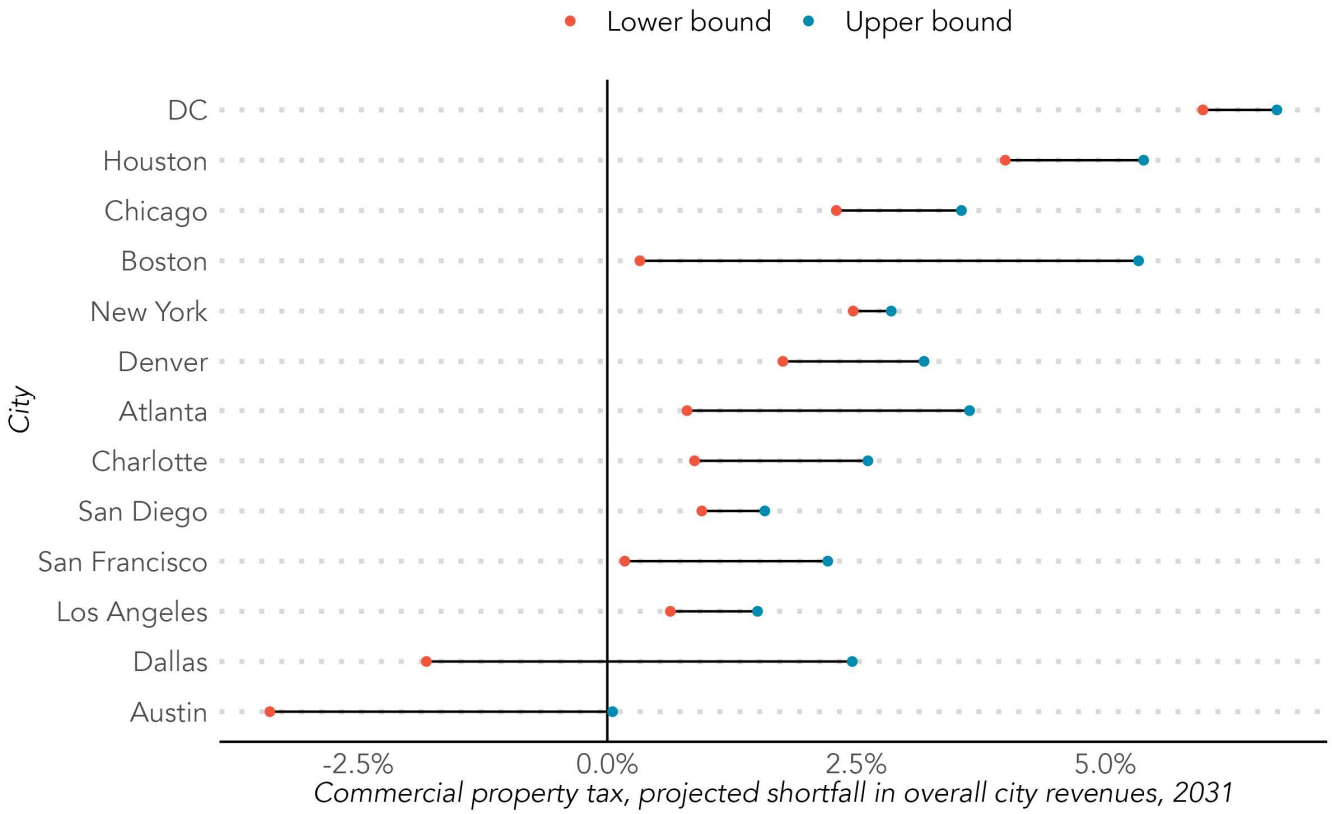
Forecast 2: Continued commercial property tax reliance approach

The previous exercise answered the question: How much could property taxes decline compared with a world without a shift to work from home and lower office values? But a more relevant question for policymakers might be: How much more revenues from other sources would a city need by 2031 to fund its expenditures, compared with a situation where commercial property tax reliance did not change from its current share?

Under this approach, we estimated the wedge between current reliance on commercial property taxes, and what commercial property tax reliance could be by 2031. For example, assume that in 2023, City X has a budget of $1 million and commercial property taxes of $200,000, implying a reliance of 20 percent. If in 2031, City X has a budget of $1.5 million and commercial property taxes of $250,000, the shortfall compared with maintaining a reliance of 20 percent would be $50,000, or 3.3 percent of revenues.

FIGURE 6

Forecast of City Budgets Shortfall—Commercial Property Tax Reliance Approach



Source: Authors' calculations. See text and appendix for details.

Under this forecast, the median shortfall was between 0.9 and 3.2 percent of revenues. In some cities, such as Austin, we estimated a surplus in 2031 compared with 2023. In New York City, the shortfall ranged between $3.8 billion and $4.4 billion. In Washington, DC, the shortfall was between $1.7 billion and $2.0 billion, or between 6.0 and 6.7 percent of revenues. In Boston, we found a shortfall going from $18 million to $285 million. In San Francisco, the range was from a surplus of $26 million to a shortfall of $325 million.

If we assume that the growth rate of revenue is smaller, the shortfall becomes smaller (or the surplus larger), since revenues in 2031 will be smaller, and maintaining the same reliance on commercial property taxes requires less tax revenues. When the growth rate of revenue is half what we use in the baseline, the

average change in revenue was between -0.4 percent and 1.3 percent. If the growth rate of other commercial property is lower, less commercial property taxes are collected by 2031, and the shortfall is a larger fraction of revenues. Assuming half of the growth rate of other commercial property value yields an average change in revenue ranging from 3.8 percent to 4.4 percent.

CONCLUSION

Budget challenges related to declining commercial property tax collections will affect many local governments over the next few years. This report provides a framework for policymakers trying to understand the severity of those looming shortfalls and possible solutions to those shortfalls.

In our two forecasts, we found the median projected decline in commercial property tax revenue represented 2.5 to 3.5 percent of total revenues by 2031, if we assume the counterfactual where commercial property grew at its pre-pandemic rate, or 0.9 to 3.2 percent, if we assume cities to maintain the same reliance on commercial property taxes that they did between 2013 and 2022. However, for some cities, the severity of the shortfall was significantly different under the two scenarios.

For example, commercial property assessed values grew slower in Washington, DC, than other cities in the sample between 2013 and 2022. As a result, the first forecast did not project a relatively large shortfall. However, over the same period, Washington, DC's revenues and expenditures grew faster than its assessed commercial values, and that divergence could compound over time. As a result, in the second forecast, where the share of the city's funds from commercial property taxes remained constant, Washington, DC's 2031 shortfall was the highest of any city we projected.

Boston illustrates the opposite situation. Boston had relatively strong growth in commercial assessed values over the past decade, and that yielded a large shortfall in the first forecast. However, Boston's commercial property values also grew faster than the city's revenues and expenditures over the period, so it saw a relatively small shortfall in the second.

That said, the key to both forecasts is that they are built on data from 2013 to 2022. Thus, it is important for policymakers to understand how much of an outlier the past decade was, and if officials expected those trends to continue in their fiscal planning.

Specially, our results suggest that to estimate the impact of the decline in office values on city budgets, it is important for cities to understand:

- how important office space is in their commercial property tax base;
- how much of an outlier the 2013–2022 decade was;
- whether city officials expected the 2013–2022 trends to continue for future fiscal planning; and,

- whether the value of commercial property other than office space is closely tied to office values.

Finally, cities should pay close attention to their total revenues and expenditures when examining the future of commercial property tax revenue. If other sources of revenues were expected to grow faster than commercial property taxes, a city may see little impact of the decline in commercial property tax revenues. However, if a city's future expenditures were premised on strong commercial property tax collections, the city might face big policy questions over the next few years.

Unfortunately, there are no simple fiscal solutions to falling office values. But an important first step in talking the problem is learning mechanics of commercial property tax collection and how and why future collections could vary across different cities.

APPENDIX A: ASSESSMENT OF COMMERCIAL REAL ESTATE

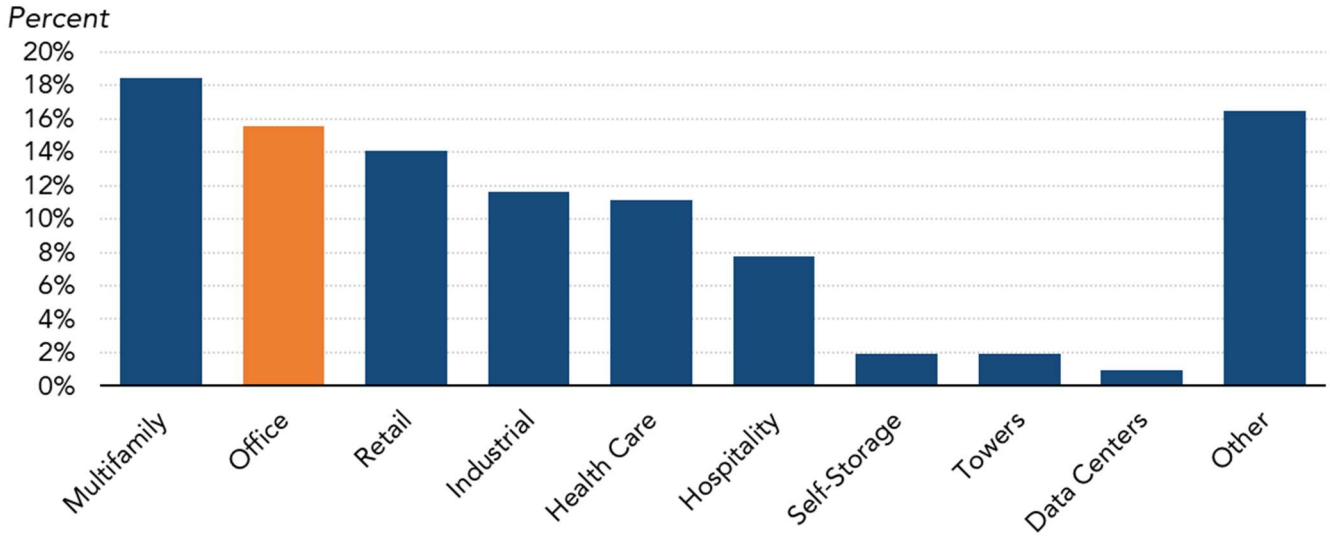
What is commercial property?

Several types of real estate property are categorized as commercial property by investors (see figure A1). According to national research by real estate investment firms[12], the first category by value in 2021 was multifamily buildings ($3.8 trillion in value), followed by the office sector ($3.2 trillion). Retail came third ($2.9 trillion), followed by healthcare ($2.3 trillion). The value of industrial property in 2021 was estimated at $2.4 trillion, and a category that includes specialty, sports, and other commercial real estate was valued at $3.4 trillion. Data centers, self-storage, and towers round up the category with an estimated combined value of $1 trillion.

FIGURE A1

Categories of commercial real estate

Share in total estimated value (2021)



Source: Nareit research, 2022.
Note: The other category includes specialy and sports related real estate.

These data suggest that office space makes up about 16 percent of commercial real estate in value nationwide. However, some cities report commercial and industrial property separately. Removing industrial property implies an office share of 18 percent. Finally, removing the specialty, sports, and other category brings up the share of office space to 22 percent. Often, cities classify multifamily buildings as residential property. Assuming multifamily residential buildings are not classified as commercial property, the share of office would be closer to 20 percent, including all other categories, and 27 percent removing industrial and other categories.

APPENDIX

How is commercial property assessed?

How governments estimate real estate property valuation can be categorized into three broad categories:

1. The sales comparison approach.
2. The income approach.
3. The cost approach.

The use of different approaches varies both across jurisdictions and by type of property. The sales comparison approach consists of finding properties in the same neighborhood with similar characteristics that have been sold recently. This is the most common approach to assessing residential property. The income approach relies on income generated by a property to determine its value. This is the most common approach to assessing office buildings, retail properties, and hotels. The cost approach estimates the cost of the land, and how much it would cost a similar property. Assessors may also combine methods on one property to increase the reliability of the assessment.

Assessors may visit properties after recent sales or after a certain number of years. In many jurisdictions, assessors can adjust assessment values to incorporate changes in market values without visiting the property. Assessment frequencies vary a lot across states and local jurisdictions. Some states require yearly reassessments, while other states allow longer time periods between reassessments. For example, in North Carolina, counties must reassess real properties only once every eight years.

Because commercial properties lack uniformity, and sales are more infrequent, commercial real property, by comparison, is often assessed according to an income approach. The income approach relies on a simple formula to determine the fair market value:

$$FMV = \frac{\text{Net Operating Income (property I, at time t)}}{\text{Capitalization rate (for property I, at time t)}}$$

Although definitions vary on what is included in income, net operating income is generally gross income net of expenses needed to maintain and operate the properties. Interest expenses and capital expenditures, like depreciation and amortization, are not considered eligible expenses to determine NOI. The capitalization rate is a measure of return on investment. For example, a building worth $50 million with a 5 percent cap rate is expected to generate $2.5 million in net income yearly. Assessors observe net income and estimate the market value by dividing NOI by the relevant capitalization rate.

Capitalization rates are determined by the assessor's office or the city's finance department, which rely on comparable sales, internal research, and third-party market sources like commercial real estate brokers, advisory firms, and private real estate research. Capitalization rates can vary by building types, area, and income generated by the building.

APPENDIX

How do recent economic changes impact assessments?

Because most residential properties rely on the market sales comparison, the largest driver of changes in assessment are persistent increases or declines in local housing values. Assessors rely on trends and average transactions, to avoid short-run fluctuations or outliers having a disproportionate impact on assessed values. And because of the lag in reassessment, it may take several years for assessed values to reflect market value changes.

Housing prices rose substantially between 2020 and 2022, partly fueled by low interest rates and work from home policies. Between March 2020 and June 2022, the average home prices rose more than 40 percent.[13] In many cities, assessed values of residential real estate may not yet fully reflect this drastic increase. And despite soaring interest rate, there is no sign of a decline in housing prices, which have held steady, with some local exceptions. In 2023, interest rates were at a 23-year high of 7.9 percent on average;[14] meanwhile, 2023 was the year with lowest number of home sales since 2001.[15] Current homeowners may not be willing to sell for two main reasons: Most homeowners who have a choice would be less likely to sell for lower values, especially if they bought their house recently. And many homeowners have locked in very low interest rates. Unless they're able to use a bridge loan, where they carry over their own loan when selling and buying a new property, most homeowners would see a substantial increase in their interest payments with a new loan. These trends suggest that most cities may see their residential property tax base increase, or at worse, not change.

The income approach for commercial properties might take even longer to show up in government assessments. Many office leases are signed for extended periods of time and thus might not reflect current demand for office space. However, short-term fluctuation in income could lead to more volatility in assessment. New York City is an interesting example. Between 2019 and 2022, commercial assessed values fell by 12 percent. However, they rebounded in the 2023 assessment rolls, and total commercial taxable value in 2023 was only 3 percent lower than in 2019. The importance of office space and the impact of the COVID-19 pandemic hit New York more than many other cities, which was reflected in assessed values. However, if new leases in office buildings reflect much lower rents, the drop in income will put downward pressure on the assessment of office buildings.

Further, building owners can appeal their assessment if they believe it does not represent the true market value of the building. For example, if similar buildings recently sold well below their assessed value, owners could use these records as evidence to lower the taxable value of their buildings. The guidelines and process of assessment appeals varies across jurisdictions, so it is unclear to what extent it will speed up the downward adjustment of office values.

Is commercial property taxed like residential property?

First, we must distinguish between assessed values and taxable values. We define assessed values as the fair market value of a property calculated by the assessor's office based on the methodologies described above. We define taxable value as the value on which the local property tax rate is applied to determine tax liability. Although they are closely related, they can differ for two main reasons. First, many localities apply an assessment ratio to the assessed market value of a property. For example, local jurisdictions in Alabama apply an assessment ratio of 20 percent to the fair market value of a property to determine the taxable value. Second, many jurisdictions offer deductions and other tax breaks to a range of residential and commercial properties, and typically provide full exemptions to property owned by religious or nonprofit organizations.

To implement different effective taxation across types of real estate, cities have several tools at their disposal. First, they can apply higher or lower mill rates (i.e., the amount of tax collected per $1,000 of taxable real estate value) on different types of property (e.g., commercial and residential properties). Among cities in our data, seven apply a different mileage rate for commercial and residential property. Second, they can use different assessment ratios. For example, Cook County and the city of Chicago require that residential property is taxed on 10 percent of its assessed value, while commercial property is taxed on 25 percent of its assessed value. Third, local governments can use more discrete tools, such as tax abatements that provide specific benefits to individual properties, that can incentivize the construction of certain types of properties (e.g., affordable housing) or attract specific businesses. For example, in 2023, Washington, DC, introduced a new abatement program for commercial property owners who convert all or portions of their properties into residential real estate.

The role of assessment limits

Assessment limits cap the growth rate of assessed and taxable real estate values. "Traditional" assessment limits, like California's Proposition 13, restrict the annual growth of taxable value at the lesser of 2 percent or the statewide inflation rate and resets the taxable value to the assessed fair market value only following a sale. Only seven states have such limits, but other states use assessment limits that are restricted to certain types of property or applied to aggregate taxable values (Bradley et al. 2023).

Economists generally have a negative view of assessment limits, as they can restrict local government's ability to raise revenues, produce horizontal inequities, and induce a "lock-in" effect for homeowners. When real estate values grow faster than the maximum allowed reassessment growth, assessment limits can over time generate large wedges between market values and taxable values.

But in our context, that means large declines in property values may have no impact on taxable values. Assume an average annual growth rate of 4 percent for commercial real estate value in San Francisco between 1990 and 2020. A building constructed in 1990 and worth $1 million would be worth $3.2 million in 2020, but

its assessed value would be at most $1.8 million. The market value of that building would need to decline by more than 40 percent to go below its assessed value. The same building constructed in 2000 would now be worth $2.2 million, with a maximum assessed value of $1.5 million. Older buildings are more likely to have a larger discrepancy between their fair market value and taxable values than newer buildings. When evaluating the potential impact of a decline in commercial real estate on property tax collection, it is critical to evaluate the existing wedge between market and taxable value. A reduction in overall market demand is likely to impact office buildings differently. Newer buildings with amenities and flexible workspaces, and buildings located in attractive areas could withstand the shift to remote work better than older buildings.

APPENDIX B: DESCRIPTION OF DATA COLLECTION

In the first round of our data collection, we focused on the 50 largest cities by population in the United States and analyzed their annual comprehensive financial report (ACFR) to see if they report assessed value by class of property. All major cities are required to produce ACFRs, which are audited and provide a detailed description of the current financial situation of the city. We relied on the statistical section of the ACFR, which typically reports information on several key financial outcomes like revenues and expenditures. Cities engage in business-like activities, such as providing utilities and other services, which are sold to the consumer. The overall financial picture of a city, which includes government and business activity, are reported in the section on changes in net position. Cities also report changes in balances in governmental funds, which excludes business-like activities and reports revenues and expenditures of the general government. These revenues usually include taxes, intergovernmental transfers, fines and fees, some charges for services, and investment earnings. Expenditures usually include general government services, public safety, health, housing, parks and recreation, culture (e.g., libraries, museums), public works, debt service, and capital outlays. Some cities also directly provide public education services, but in many states most public education expenditures are delivered by school districts. Cities also report the tax bases, including total assessed value of real property and personal property that underly their revenue collections. In addition, many cities report real property by class of property (e.g., residential, commercial, industrial, agricultural, public utilities, etc.). Some cities combine specific categories; for example, many cities report commercial and industrial property into one category. Although the way information is reported and presented varies across cities, all present tables summarizing changes in fund balances in governmental funds.

In this report, we collected assessed values as reported in the ACFR for commercial property, residential property, and total assessed values. In practice, commercial and residential property make up a vast majority (typically 95 percent and above) of the property tax base. We also collected total property taxes between 2013 and 2022 or 2023 (whichever was the latest available year), total taxes, total revenues, and total expenditures, as reported on the changes in fund balances statistical section.

APPENDIX

Cities use different fiscal years, and we combine fiscal years the following way: a fiscal year that runs July 2022 to June 2023 would be considered 2023 in our data. A fiscal year that runs October 2021 to September 2022 would be considered 2022. Finally, a fiscal year that maps calendar years is coded as the same year (e.g., January 2022 to December 2022 is simply 2022 in our data). We collected data between in February 2024. We collected data for 2023 from most cities that used fiscal years ending in mid-years. We typically only have data for 2022 for cities that use fiscal years ending in September or December.

Table A1 presents the data shows in figures 1–4 in the text.

TABLE A1

Summary Data on Property Tax Reliance and Growth of Assessed Values

	Average share of revenue from commercial property tax (2013–2022)	Average share of revenue from total property tax (2013–2022)	Change in commercial assessed values 2019–2022	Change in residential assessed values (2019–2022)	Change in commercial assessed values (2013–2022)	Change in residential assessed values (2013–2022)
Albuquerque, NM	3.5%	19.0%	-3.7%	18.6%	-5.7%	42.3%
Atlanta, GA	18.0%	36.0%	26.7%	43.5%	80.9%	135.2%
Austin, TX	13.4%	48.1%	21.8%	20.5%	169.4%	119.7%
Baltimore, MD	15.9%	38.5%	4.6%	7.0%	63.0%	10.8%
Boise, ID	15.8%	60.5%	33.0%	59.7%	110.0%	199.6%
Boston, MA	32.9%	63.5%	15.8%	22.6%	112.2%	119.3%
Buffalo, NY	12.3%	26.2%	81.4%	42.0%	87.0%	56.1%
Charlotte, NC	17.4%	46.2%	79.0%	52.0%	104.4%	51.7%
Chicago, IL	6.7%	18.0%	8.3%	10.9%	48.1%	48.3%
Cincinnati, OH	2.4%	7.9%	20.1%	17.4%	20.7%	29.6%
Cleveland, OH	3.3%	6.6%	-3.7%	27.8%	1.6%	33.1%
Columbus, GA	17.1%	37.6%	7.0%	3.3%	34.9%	26.6%
Washington, DC	11.3%	18.4%	7.1%	22.1%	43.8%	88.5%
Dallas, TX	21.3%	49.7%	19.9%	22.3%	112.2%	84.1%
Denver, CO	10.0%	21.8%	2.5%	10.4%	123.6%	121.2%
DesMoines, IA	13.3%	47.9%	14.4%	24.4%	27.6%	42.6%
Detroit, MI	4.1%	12.9%	26.6%	18.9%	31.6%	-40.7%
El Paso, TX	13.6%	44.6%	7.6%	20.3%	17.3%	38.6%
Fort Lauderdale, FL	8.8%	33.1%	8.7%	18.3%	69.9%	104.2%
Glendale, AZ	3.7%	17.9%	16.4%	23.2%	53.7%	70.8%
Grand Rapids, MI	4.9%	17.1%	32.9%	26.4%	52.2%	40.8%
Honolulu, HI	18.4%	60.5%	14.9%	13.7%	58.2%	45.7%
Houston, TX	12.7%	35.9%	17.2%	33.4%	82.1%	113.8%
Indianapolis, IN	10.4%	33.1%	4.6%	30.3%	18.8%	70.7%
Jacksonville, FL	9.2%	37.8%	36.2%	48.9%	94.8%	128.7%
Knoxville, TN	22.7%	44.8%	42.2%	53.8%	85.5%	73.9%
Las Vegas, NV	3.4%	12.7%	17.3%	37.6%	56.2%	123.6%
Lexington, KY	3.4%	13.7%	14.9%	23.6%	54.8%	44.9%
Madison, WI	21.1%	60.3%	27.7%	27.2%	85.9%	71.6%
Manchester, NH	22.4%	58.5%	33.7%	51.3%	48.5%	60.8%
Memphis, TN	15.7%	40.1%	15.1%	25.9%	34.8%	24.0%
Miami, FL	12.0%	39.7%	14.0%	11.3%	76.3%	94.7%
Milwaukee, WI	12.8%	33.3%	12.1%	15.1%	40.2%	22.1%
Minneapolis, MN	7.5%	40.2%	6.9%	18.0%	76.1%	93.2%
Mobile, AL	3.7%	6.5%	62.2%	9.2%	115.5%	13.0%
NYC, NY	12.0%	28.2%	-3.1%	13.3%	42.3%	75.3%
Peoria, AZ	2.2%	8.8%	15.3%	27.1%	11.1%	84.1%
Phoenix, AZ	3.9%	9.3%	15.1%	29.5%	34.8%	93.6%
Reno, NV	9.8%	25.7%	25.9%	59.2%	43.2%	180.2%
Salem, OR	13.6%	47.7%	25.3%	19.1%	45.8%	51.2%
San Antonio, TX	12.0%	26.8%	11.1%	23.5%	88.5%	86.3%
San Francisco, CA	10.0%	33.7%	34.3%	25.8%	124.9%	117.8%
Scottsdale, AZ	3.5%	13.4%	23.6%	32.3%	51.8%	104.9%
Springfield, MA	3.4%	22.6%	15.4%	44.9%	37.9%	78.6%
St. Petersburg, FL	7.5%	36.2%	28.4%	33.6%	70.1%	142.7%
Virginia Beach, VA	7.9%	49.0%	5.8%	24.8%	24.8%	46.2%
Worcester, MA	7.4%	35.6%	15.2%	38.6%	26.7%	77.3%

Source: Authors' calculations based on data on revenues and assessment of residential and commercial property comes from city Annual Comprehensive Financial Reports (ACFRs).

APPENDIX C: TEASING OUT THE CHANGE IN RELIANCE ON COMMERCIAL PROPERTY TAXES

The change in the share of commercial property taxes in total revenues is equal to

$$\Delta\frac{Com\ proptax}{Tot\ revenues} = \frac{Com\ proptax_{n+1}}{Tot\ revenues_{n+1}} - \frac{Com\ proptax_n}{Tot\ revenues_n}$$

which we can write as

$$\Delta\frac{Com\ proptax}{Tot\ revenues} = \frac{Com\ proptax_{n+1}}{Tot\ proptax_{n+1}} * \frac{Tot\ proptax_{n+1}}{Tot\ revenues_{n+1}} - \frac{Com\ proptax_n}{Tot\ proptax_n} * \frac{Tot\ proptax_n}{Tot\ revenues_n}$$

We add and subtract

$$\frac{Com\ proptax_{n+1}}{Tot\ proptax_{n+1}} * \frac{Tot\ proptax_n}{Tot\ revenues_n}$$

and we can write the change in commercial property reliance as

$$\Delta\frac{Comtax}{Revenues} = \frac{Comtax_{n+1}}{Proptax_{n+1}}\left(\frac{Proptax_{n+1}}{Revenues_{n+1}} - \frac{Proptax_n}{Revenues_n}\right) + \frac{Proptax_n}{Revenues_n}\left(\frac{Comtax_{n+1}}{Proptax_{n+1}} - \frac{Comtax_n}{Proptax_n}\right)$$

where the first term represents the change explained by the change in property taxes in total revenue while holding the share of commercial property taxes in total property taxes constant. The second item represents the change in the share of commercial property taxes holding property taxes as a share of total revenue constant.

We can disentangle the change in commercial property tax reliance as a share of total property taxes in the second term further:

$$\Delta\frac{Comtax}{Proptax} = \left(\frac{Comtax_{n+1}}{Comtax_{n+1} + Restax_n} - \frac{Comtax_n}{Proptax_n}\right) + \left(\frac{Comtax_{n+1}}{Proptax_{n+1}} - \frac{Comtax_{n+1}}{Comtax_{n+1} + Restax_n}\right)$$

where the first equation (second term in total decomposition) represents the change in the share of commercial property taxes in total property taxes due to changes in commercial property taxes collected (holding residential property taxes constant at their initial level).

The second equation (third term in total decomposition) represents the fraction that can be attributed to the change in residential taxes (holding the share of commercial property tax constant at their new level).

Table A2 highlights each term separately, as well as the total change in commercial property tax reliance.

TABLE A2

Decomposition of the Change in Commercial Property Tax Reliance

	Change in commercial property tax reliance 2013–2022			
	Total	Change in share of property taxes in total revenues	Impact of commercial assessments, holding residential constant	Impact of residential assessments, holding commercial constant
Dallas, TX	5.5%	3.0%	11.5%	-9.0%
Boston, MA	5.2%	6.5%	6.9%	-8.2%
Austin, TX	4.9%	2.3%	12.1%	-9.5%
Milwaukee, WI	2.5%	1.3%	3.2%	-2.1%
Atlanta, GA	2.4%	2.9%	4.0%	-4.5%
Honolulu, HI	1.9%	1.0%	5.7%	-4.8%
Baltimore, MD	1.9%	-1.7%	4.6%	-1.0%
San Francisco, CA	1.7%	1.5%	6.1%	-5.8%
Charlotte, NC	1.4%	-1.9%	11.0%	-7.8%
Mobile, AL	1.2%	0.4%	1.8%	-1.1%
Fort Lauderdale, FL	1.1%	1.8%	2.6%	-3.2%
Buffalo, NY	1.1%	0.0%	3.7%	-2.6%
San Antonio, TX	1.1%	0.9%	4.1%	-4.0%
Jacksonville, FL	1.0%	1.0%	8.5%	-8.5%
NYC, NY	0.9%	1.2%	2.5%	-2.7%
Denver, CO	0.7%	0.0%	5.7%	-4.9%
St. Petersburg, FL	0.7%	1.9%	1.2%	-2.4%
Detroit, MI	0.6%	-1.2%	2.1%	-0.3%
Columbus, GA	0.5%	-2.1%	2.3%	0.2%
Knoxville, TN	0.2%	-0.8%	9.2%	-8.3%
Cincinnati, OH	0.2%	0.3%	0.8%	-0.9%
Minneapolis, MN	0.2%	0.6%	4.6%	-4.9%
Grand Rapids, MI	0.1%	-0.4%	2.5%	-2.0%
Chicago, IL	0.1%	0.1%	1.6%	-1.6%
Miami, FL	-0.1%	0.2%	2.7%	-3.0%
Virginia Beach, VA	-0.3%	0.6%	1.7%	-2.6%
Lexington, KY	-0.4%	-0.8%	2.4%	-2.1%
Springfield, MA	-0.6%	0.0%	1.5%	-2.1%
Glendale, AZ	-0.6%	-0.3%	1.9%	-2.2%
El Paso, TX	-0.7%	0.1%	1.6%	-2.4%
Cleveland, OH	-0.8%	-0.2%	0.2%	-0.8%
Houston, TX	-0.8%	-0.4%	7.8%	-8.2%
Peoria, AZ	-0.9%	-0.1%	0.4%	-1.2%
Phoenix, AZ	-1.0%	-0.2%	0.8%	-1.6%
Worcester, MA	-1.4%	0.3%	1.9%	-3.6%
Las Vegas, NV	-1.4%	-0.3%	1.2%	-2.3%
Salem, OR	-1.8%	-1.6%	5.7%	-5.9%
Albuquerque, NM	-2.0%	-0.9%	0.1%	-1.2%
Washington, DC	-2.1%	-0.9%	1.4%	-2.6%
Manchester, NH	-2.1%	-1.0%	5.9%	-7.0%
Scottsdale, AZ	-2.3%	-1.4%	1.4%	-2.4%
Madison, WI	-2.6%	-4.2%	10.7%	-9.1%
Des Moines, IA	-3.0%	-1.9%	2.9%	-4.1%
Boise, ID	-3.6%	0.2%	8.7%	-12.5%
Indianapolis, IN	-4.5%	-2.6%	5.9%	-7.8%
Reno, NV	-6.2%	-0.7%	1.1%	-6.7%
Memphis, TN	-7.1%	-7.6%	6.8%	-6.3%

Source: Authors' calculations based on data on revenues and assessment of residential and commercial property comes from city Annual Comprehensive Financial Reports (ACFRs).See text above for detailed explanation of the decomposition.

APPENDIX D: FORECASTING DECLINES IN COMMERCIAL PROPERTY TAXES

We estimated a lower and upper bound on the potential shortfall in commercial property tax revenues if predictions on the decline in market value of office properties by Gupta, Mittal, Van Nieuwerburgh (2023) materialize. We relied on table A4 in their analysis, which estimated the steady-state decline in office values in the largest 20 metropolitan areas for commercial office space (Arlington, Atlanta, Austin, Boston, Charlotte, Chicago, Dallas, Denver, Houston, Los Angeles, New York, North Jersey, Orange County, Palo Alto, Philadelphia, San Diego, San Francisco, San Jose, Seattle, and Washington, DC). New York stands out with three times the amount of active square foot of office space of the next two largest markets (Chicago and Washington, DC).

TABLE A3

Forecast Assumptions

Cities	2022–23 Total revenues (in 1,000s)	2022–23 Commercial property tax revenue (in 1,000s)	2013–2022 Average revenue growth rate	2013–2022 Average commercial assessed values growth rate	2022–2023 Commercial property tax reliance	Drop in office value in 2031
Atlanta	1,462,554	283,352	6.6%	5.1%	17.8%	-44.3%
Austin	1,855,364	292,619	12.5%	7.9%	13.4%	-44.9%
Boston	4,047,399	1,401,670	5.4%	3.5%	32.9%	-42.9%
Charlotte	1,298,539	232,947	5.3%	4.5%	17.4%	-17.6%
Chicago	10,214,805	633,952	5.8%	6.7%	6.7%	-48.8%
Dallas	2,301,065	535,500	8.5%	5.3%	21.3%	-47.0%
DC	18,726,635	1,720,042	3.6%	5.7%	11.3%	-51.7%
Denver	2,725,658	262,725	6.9%	6.0%	10.0%	-46.2%
Houston	3,931,895	447,306	3.6%	4.3%	12.7%	-52.7%
Los Angeles	10,378,641	599,127	6.1%	4.8%	5.7%	-49.5%
New York	110,943,170	##########	5.0%	4.1%	12.0%	-42.1%
San Diego	2,900,792	132,485	6.0%	5.6%	4.7%	-47.1%
San Francisco	8,673,710	983,417	8.6%	6.8%	10.0%	-59.3%

Source: Authors' calculations based on data on revenues comes from Annual Comprehensive Financial Reports (ACFRs) and represents the latest fiscal year available. In some cities it is January 2022 to December 2022, in others, it is July 2022 to June 2023. Data on the drop in office value comes from Gupta, Arpit, Vrinda Mittal, and Stijn Van Nieuwerburgh. 2023. "Work From Home and the Office Real Estate Apocalypse." Social Science Research Network.

Although the decline in office space was estimated at the metro level in the Gupta paper, these should be reasonable estimates for the decline in office values at the city level within the metro area. We assumed that commercial property taxes collected on offices by 2031 was their estimated share of commercial property taxes in 2022 times the estimated decline in Gupta, Mittal, Van Nieuwerburgh (2023). For example, if office assessed value in 2021 is $100,000, and the estimated value change is -44 percent, the assessed value of office space in 2031 is $56,000.

TABLE A4

Revenue Forecast 1 (Nominal): Baseline

Cities	2031 estimated revenues (no office value fall)	2031 commercial property taxes (no office value fall)	2031 Shortfall (Lower Bound)	2031 Shortfall (Upper Bound)	Shortfall as share of 2031 revenues (LB)	Shortfall as share of 2031 revenues (UB)
Atlanta	2,211,845	392,834	94,559	157,598	4.3%	7.1%
Austin	3,616,615	736,402	176,259	293,765	4.9%	8.1%
Boston	5,609,457	2,009,323	400,984	668,307	7.1%	11.9%
Charlotte	1,860,400	328,250	48,038	80,064	2.6%	4.3%
Chicago	17,109,416	918,672	225,085	375,141	1.3%	2.2%
Dallas	3,674,367	982,558	222,297	370,495	6.0%	10.1%
DC	28,839,586	2,519,016	724,120	941,356	2.5%	3.3%
Denver	4,360,722	428,422	92,098	153,497	2.1%	3.5%
Houston	5,484,185	581,266	115,013	191,688	2.1%	3.5%
Los Angeles	15,152,941	871,916	197,962	329,936	1.3%	2.2%
New York	154,666,813	19,547,288	4,688,125	5,274,141	3.0%	3.4%
San Diego	4,475,287	188,068	42,395	70,658	0.9%	1.6%
San Francisco	14,888,888	1,941,121	448,585	747,641	3.0%	5.0%

Note: Authors' calculations. Data on revenues comes from ACFRs and represents the latest fiscal year available. In some cities it is January 2022 to December 2022, in others, it is July 2022 to June 2023. Data on the drop in office value comes from Gupta et al. (2023). The lower bound assumes that office buildings made up 30 percent of the value of commercial property until 2002. The upper bound assumes office buildings made up 50 percent of the total value of commercial property. We assume revenues other than commercial property taxes grow at the same rate as they did between 2013 and 2022.

We do not have data on the share of office space in total commercial real estate at the city level. In New York City, the only city that reports commercial property by class of property, we estimated that 43 percent of commercial real estate was office space in fiscal year 2023. Nationally, data suggest office space makes between 15 and 20 percent of commercial real estate. Because the cities we look at are business centers, we use a lower bound of 30 percent, and an upper bound of 50 percent of office space in total commercial property value. In New York City, the lower bound is between 40 and 45 percent, and in Washington, DC, it is between 50 and 65 percent.

To estimate the decline in commercial real property, we start with the assessed value of office in the latest fiscal year available. This is a reasonable starting point, as these assessed values are typically calculated before the start of the fiscal year, which means early 2022 or late 2021. The lag between assessed values and market values implies that only a fraction, if any, of the decline in office values is represented in 2022 assessed values.

TABLE A5

Revenue Forecast 1 (Nominal): Alternative Scenarios

Estimates represent the shortfall in 2031 revenue

Cities	Growth of commercial real estate other than office grows at half historical rate				Growth of revenues other than commercial property tax are 50 percent faster than historical rate			
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
Atlanta	168,407	210,347	7.6%	9.5%	94,559	157,598	3.7%	6.1%
Austin	368,173	430,846	10.2%	11.9%	176,259	293,765	3.8%	6.4%
Boston	682,230	869,197	12.1%	15.4%	400,984	668,307	6.5%	10.9%
Charlotte	93,460	112,508	5.0%	6.0%	48,038	80,064	2.2%	3.7%
Chicago	397,054	497,976	2.3%	2.9%	225,085	375,141	1.0%	1.7%
Dallas	417,632	510,020	11.3%	13.8%	222,297	370,495	5.2%	8.7%
DC	872,549	1,045,256	3.0%	3.6%	579,296	941,356	2.1%	2.7%
Denver	164,640	205,313	3.8%	4.7%	92,098	153,497	1.7%	2.9%
Houston	169,925	230,911	3.1%	4.2%	115,013	191,688	1.8%	3.0%
Los Angeles	338,347	430,211	2.2%	2.8%	197,962	329,936	1.1%	1.8%
New York	6,709,138	7,126,736	4.3%	4.6%	4,688,125	5,274,141	2.6%	3.0%
San Diego	72,804	92,379	1.6%	2.1%	42,395	70,658	0.8%	1.3%
San Francisco	813,369	1,008,201	5.5%	6.8%	448,585	747,641	2.4%	4.0%

Note: Authors' calculations. Data on revenues comes from ACFRs and represents the latest fiscal year available. In some cities it is January 2022 to December 2022, in others, it is July 2022 to June 2023. Data on the drop in office value comes from Gupta et al. (2023). The lower bound assumes that office buildings made up 30 percent of the value of commercial property until 2002. The upper bound assumes office buildings made up 50 percent of the total value of commercial property. We assume revenues other than commercial property taxes grow at the same rate as they did between 2013 and 2022 (except in the second alternative scenario). In the first alternative, we assume that commercial property grows at half the rate it did between 2013 and 2022. This applies to both the counterfactual estimate for 2031, and to the growth of commercial property besides office buildings. In the second alternative, we assume revenues other than commercial property taxes grow at a rate 50 percent higher than it did between 2013 and 2022

APPENDIX

Forecast 1: Nominal revenue approach

Our first forecast calculated the 2031 shortfall in commercial property tax revenue in cities where office values incorporated the decline estimated by Gupta, Mittal, Van Nieuwerburgh (2023). To calculate this, we estimate total commercial property tax collections under the counterfactual where commercial property value grows at the same rate between 2023 and 2031 as it did between 2013 and 2022 (see table A3). We then estimate commercial property tax collections if office values fall as predicted in table A3, assuming commercial property other than office space grows at the same rate between 2023 and 2031 as it did between 2013 and 2022. To estimate the shortfall in commercial property tax collections as a share of revenues, we assumed revenues other than commercial property taxes grow at the same rate as they did between 2013 and 2022, and we combined the estimated other sources of revenues with our estimated counterfactual baseline for commercial property taxes (table A4, column 2), which provides the estimated 2031 revenues if there was no fall in office values (table A4, column 1).

Table A5 presents two alternative specifications. First, we assumed that commercial property other than office buildings will grow at half the rate it did between 2013 and 2022. One would expect lower growth of all commercial property if the values of office buildings and other types of commercial real estate were correlated. In the second specification, we assumed that revenues other than commercial property taxes would grow 50 percent faster than they did between 2013 and 2022. In this instance, the nominal shortfalls were the same as in our baseline, but they represented a smaller share of revenues by 2031.

Forecast 2: Commercial property tax reliance approach

These estimates capture the shortfall in total revenues if commercial property taxes make up a smaller fraction of revenues compared with 2022 or 2023. For example, suppose that the current revenues of city Metropolis are $1,000,000 and that commercial real estate makes up 20 percent of revenues, or $200,000. If in 2031 revenues are $1,500,000 and commercial real estate makes up 10 percent of revenues, we would estimate the shortfall to be $150,000 (the difference in reliance times total revenues in 2031). To estimate total revenues in 2031, we use revenues in 2023 and assume that the growth rate of revenues will be equal to the average nominal growth rate between 2013 and 2022.

For commercial property other than office space, we assumed as before that the growth rate of their assessed value was equal to the growth rate of total commercial assessed values between 2013 and 2022. To estimate 2031 total revenues, we similarly assumed revenues other than commercial property taxes grew at the same rate as they did between 2013 and 2022. We then estimated the shortfall by comparing what commercial property taxes would have been if cities had the same reliance in 2031 as they did in 2022.

TABLE A6

Revenue Forecast 2 (Commercial Property Reliance): Baseline

Cities	2031 estimated commercial property tax reliance (Lower bound)	2031 estimated commercial property tax reliance (Upper bound)	2031 Shortfall (Lower Bound)	2031 Shortfall (Upper Bound)	Shortfall as share of 2031 revenues (LB)	Shortfall as share of 2031 revenues (UB)
Atlanta	17.0%	14.2%	17,805	80,844	0.8%	3.6%
Austin	16.8%	13.3%	-115,701	1,805	-3.4%	0.1%
Boston	32.5%	27.5%	17,488	284,811	0.3%	5.3%
Charlotte	16.5%	14.8%	16,122	48,147	0.9%	2.6%
Chicago	4.4%	3.1%	393,218	608,154	2.3%	3.6%
Dallas	23.2%	18.9%	-62,966	85,232	-1.8%	2.5%
DC	5.8%	4.6%	1,749,395	1,966,631	6.0%	6.7%
Denver	8.2%	6.8%	76,391	137,790	1.8%	3.2%
Houston	8.7%	7.3%	220,417	297,092	4.0%	5.4%
Los Angeles	5.1%	4.2%	95,432	227,407	0.6%	1.5%
New York	9.5%	9.1%	3,789,830	4,375,846	2.5%	2.9%
San Diego	3.8%	3.1%	42,435	70,698	0.9%	1.6%
San Francisco	9.9%	7.8%	25,789	324,845	0.2%	2.2%

Note: Authors' calculations. Data on revenues comes from ACFRs and represents the latest fiscal year available. In some cities it is January 2022 to December 2022, in others, it is July 2022 to June 2023. Data on the drop in office value comes from Gupta et al. (2023). The lower bound assumes that office buildings made up 30 percent of the value of commercial property until 2002. The upper bound assumes office buildings made up 50 percent of the total value of commercial property. We assume revenues other than commercial property taxes grow at the same rate as they did between 2013 and 2022.

Table A7 presents two alternative specifications. First, we assumed that commercial property other than office buildings would grow at half the rate it did between 2013 and 2022. This leads to a larger shortfall, as there is less revenue coming from commercial property taxes. In the second specification, we assumed that only half of the predicted decline in office values materializes. In this instance, the shortfall is smaller, but it remains positive in most cities, and large in some (e.g., Washington, DC).

TABLE A7

Revenue Forecast 2 (Commercial Property Reliance): Alternative Scenarios

Estimates represent the shortfall in 2031 revenue

Cities	Growth of commercial real estate other than office grows at half historical rate				Only half of the predicted fall in office values materializes			
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
Atlanta	91,654	133,593	4.1%	6.0%	-1,003	49,498	0.0%	2.2%
Austin	76,212	138,886	2.2%	4.1%	-135,414	-31,049	-4.0%	-0.9%
Boston	298,733	485,701	5.6%	9.1%	-72,625	134,622	-1.4%	2.5%
Charlotte	61,544	80,591	3.3%	4.4%	9,962	37,880	0.5%	2.1%
Chicago	565,188	730,989	3.3%	4.3%	298,126	449,665	1.7%	2.6%
Dallas	132,368	224,757	3.8%	6.5%	-100,735	22,284	-2.9%	0.6%
DC	1,897,825	2,070,532	6.5%	7.1%	1,527,166	1,677,733	5.2%	5.7%
Denver	148,933	189,606	3.4%	4.4%	58,192	107,458	1.3%	2.5%
Houston	275,330	336,315	5.0%	6.1%	185,064	238,171	3.4%	4.3%
Los Angeles	235,817	327,682	1.6%	2.2%	50,983	153,325	0.3%	1.0%
New York	5,810,844	6,228,442	3.8%	4.1%	2,687,821	3,136,085	1.8%	2.0%
San Diego	72,845	92,419	1.6%	2.1%	33,067	55,085	0.7%	1.2%
San Francisco	390,573	585,405	2.7%	4.0%	-61,657	179,103	-0.4%	1.2%

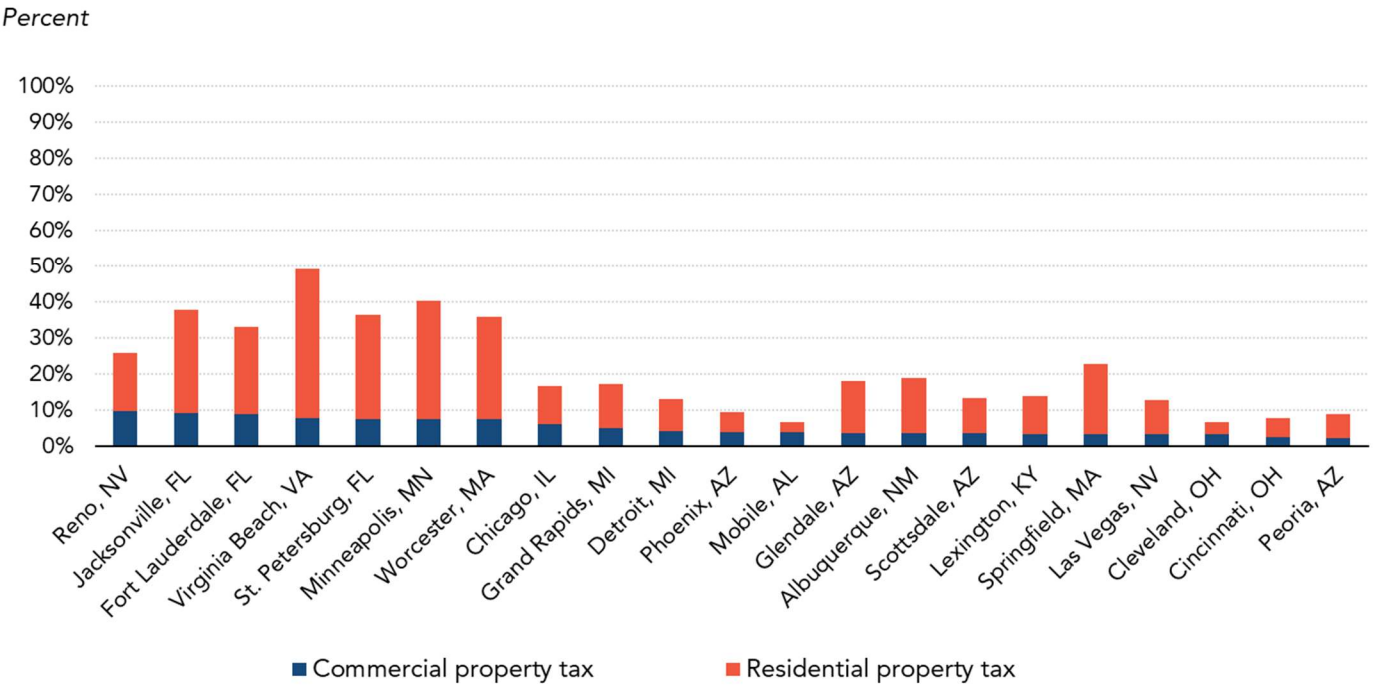
Note: Authors' calculations. Data on revenues comes from ACFRs and represents the latest fiscal year available. In some cities it is January 2022 to December 2022, in others, it is July 2022 to June 2023. Data on the drop in office value comes from Gupta et al. (2023). The lower bound assumes that office buildings made up 30 percent of the value of commercial property until 2002. The upper bound assumes office buildings made up 50 percent of the total value of commercial property. We assume revenues other than commercial property taxes grow at the same rate as they did between 2013 and 2022 (except in the second alternative scenario). In the first alternative, we assume that commercial property grows at half the rate it did between 2013 and 2022. This applies to both the counterfactual estimate for 2031, and to the growth of commercial property besides office buildings. In the second alternative, we assume that only half of the fall in office values predicted by Gupta et al. (2023) materializes.

APPENDIX E: ADDITIONAL FIGURES

FIGURE A2

Reliance on commercial and residential property taxes

Bottom 22 cities, average 2013–22



Source: Authors' calculations.
Note: We present the 22 cities with the lowest reliance on commercial property taxes bewteen 2013 and 2022 in our sample.

NOTES

[1] Musgrave Richard A. 1983. "Who Should Tax, Where and What?" In Tax Assignment in Federal Countries, edited by McLure Charles E., 2–19. Canberra: Australian National Univ. or Alm James, Buschman Robert D., Sjoquist David L. 2011. "Rethinking Local Government Reliance on the Property Tax." Regional Science and Urban Economics 41 (4): 320–31.

[2] Gupta, Arpit, Vrinda Mittal, and Stijn Van Nieuwerburgh. 2023. "Work From Home and the Office Real Estate Apocalypse." *Social Science Research Network* (https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4124698)

[3] We focus on cities and collect data from the annual comprehensive financial reports (AFCR). However, some cities share the same boundary as the county. For these cities (e.g., Denver) the ACFR for the city also includes county operations. We could not access the ACFR for Miami, and data for Miami represent Miami-Dade County. Because cities in specific states are more likely to report assessed values by type of property, our final sample is not representative and includes cluster of cities in certain states.

[4] Cities use different fiscal years. Many cities in our sample have a fiscal year that maps the calendar year (January to December). For these cities, we have data for fiscal year 2022. Many cities use a fiscal year that spans that starts in July to June. For most of these cities, we have data for fiscal year 2023, which covers July 2022 to June 2023. A handful of cities have fiscal years from October until September. For these cities, we either have data for fiscal year 2022 or 2023. It takes several months and sometimes up to a year or more between the end of a fiscal year and the release of the annual comprehensive financial reports, which we use to collect data. We use 2022 broadly to cover cities with both types of fiscal year with the latest data available.

[5] We collected taxable assessed values, which subtract homestead and other exemptions from assessed values. Some cities directly report taxable values, whereas others report assessed values and exemptions by type of property, in which case we calculate the net taxable value. Some cities only report total exemptions, in which case we allocate them proportionally to the assessed values by type of property to derive the net taxable value.

[6] We also estimate the average reliance between 2013 and 2019, to exclude the effect of the COVID-19 pandemic and the increase in aid transfers such as the American Rescue Plan. We found a similar median of 10 percent change over that period, and the top and bottom cities were identical.

[7] Sayin (2023) reports that office buildings assessed at $10 million or more contributed to 40 percent of total property taxes in the district. Our calculations from the 2022 and 2023 District of Columbia annual financial report indicate that commercial property taxes in total contributed a little over 60 percent of total property taxes, which implies office buildings assessed over $10 million contributed about 65 percent of total property taxes.

[8] Among the 47 cities on which we collected data, we estimate reliance on property taxes by dividing reported property tax levy by total revenues, and we compute the average between 2013 and 2022. We collect data on property taxes and total revenues from the annual comprehensive financial report published by the cities and use data from the general funds, which exclude business-like activities, such as providing utilities.

[9] In 2017, the most recent year that national data are available, property taxes accounted for 28 percent of county general revenue (i.e., including federal and state transfers), 24 percent of municipality general revenue, and 37 percent of school district general revenue. See, "How do state and local property taxes work?" Tax Policy Center. (https://www.taxpolicycenter.org/briefing-book/how-do-state-and-local-property-taxes-work.)

[10] When a city used a different calculation in their assessments of residential and commercial property, and the reported assessed taxable values of those properties reflected that assessment ratio, we made no adjustment.

[11] Sayin, Yesim. 2023. *Chart of the week: How much is commercial office property worth in D.C.?* Washington, DC: DC Policy Center (https://www.dcpolicycenter.org/publications/commercial-office-property-values/#easy-footnote-bottom-2-9923)

[12] "Estimating the Size of the Commercial Real Estate Market in the U.S.," Nareit, accessed April 10, 2024. https://www.reit.com/data-research/research/nareit-research/estimating-size-commercial-real-estate-market-us-2021

[13] S&P CoreLogic Case-Shiller U.S. National Home Price Index," FRED, accessed April 10, 2024. https://fred.stlouisfed.org/series/CSUSHPINSA.

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[14] "U.S mortgage rates soar to highest in more than 23 years," Reuters, accessed April 10, 2024. https://www.reuters.com/markets/us/us-mortgage-rates-soar-highest-more-than-23-years-2023-10-25/.

[15]Diana Olick, "Pending home sales drop to a record low, even worse than during the financial crisis," *CNBC*, November 30, 2023, https://www.cnbc.com/2023/11/30/pending-home-sales-drop-to-record-low.html.

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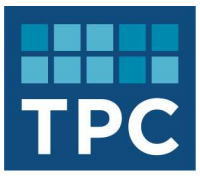

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