UBS Global Real Estate Bubble Index

September 2023
Chief Investment Office GWM
Investment Research

Content

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UBS Global Real Estate Bubble Index
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Editor in Chief
Matthias Holzhey

Authors
Matthias Holzhey
Maciej Skoczek
Claudio Saputelli
Katharina Hofer

Regional contributors
Jonathan Woloshin (US)
Dean Turner (London)
Wen Ching Lee (Singapore)
Matteo Ramenghi (Milan)
Ronaldo Patah (São Paulo)

Editorial deadline
19 September 2023

Design
CIO Content Design

Cover photo
Getty Images

Language
English

Contact
ubs-cio-wm@ubs.com

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Editorial

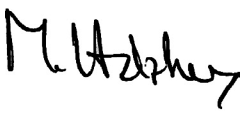
Dear reader,

Low financing costs have been the lifeblood of global housing markets over the past decade, driving home prices to dizzying heights. However, the abrupt end of the low interest rate environment has shaken the house of cards. On average of all cities, within the past year, inflation-adjusted home prices have seen the sharpest drop since the global financial crisis in 2008. Cities that have been classified in the bubble risk zone at least once in the past three years recorded an even stronger average price decline. But the impact of higher interest rates has varied markedly across cities, with the price correction depending on several other factors as well.

Where home financing was already at the limit of affordability with low interest rates, higher interest rates almost inevitably led to a slump in local demand. If a market was characterized by a significant decoupling of purchase prices from rents, the rise in mortgage rates shifted demand back to the rental market. In housing markets that were predominantly short-term financed, owner households immediately felt the higher financing costs and were forced to accept lower prices when selling. Where buy-to-let became popular during the low interest rate period, fire sales due to higher interest rates and slumping profitability intensified a correction. In cities where several of these factors came together at the same time—as in Toronto, Frankfurt, and Stockholm, for example—re-pricing took place all the faster and more severely.

In this issue, find out in which cities property prices and valuations have fallen the most, where (further) corrections are imminent, and where price increases are continuing or could happen in the future.

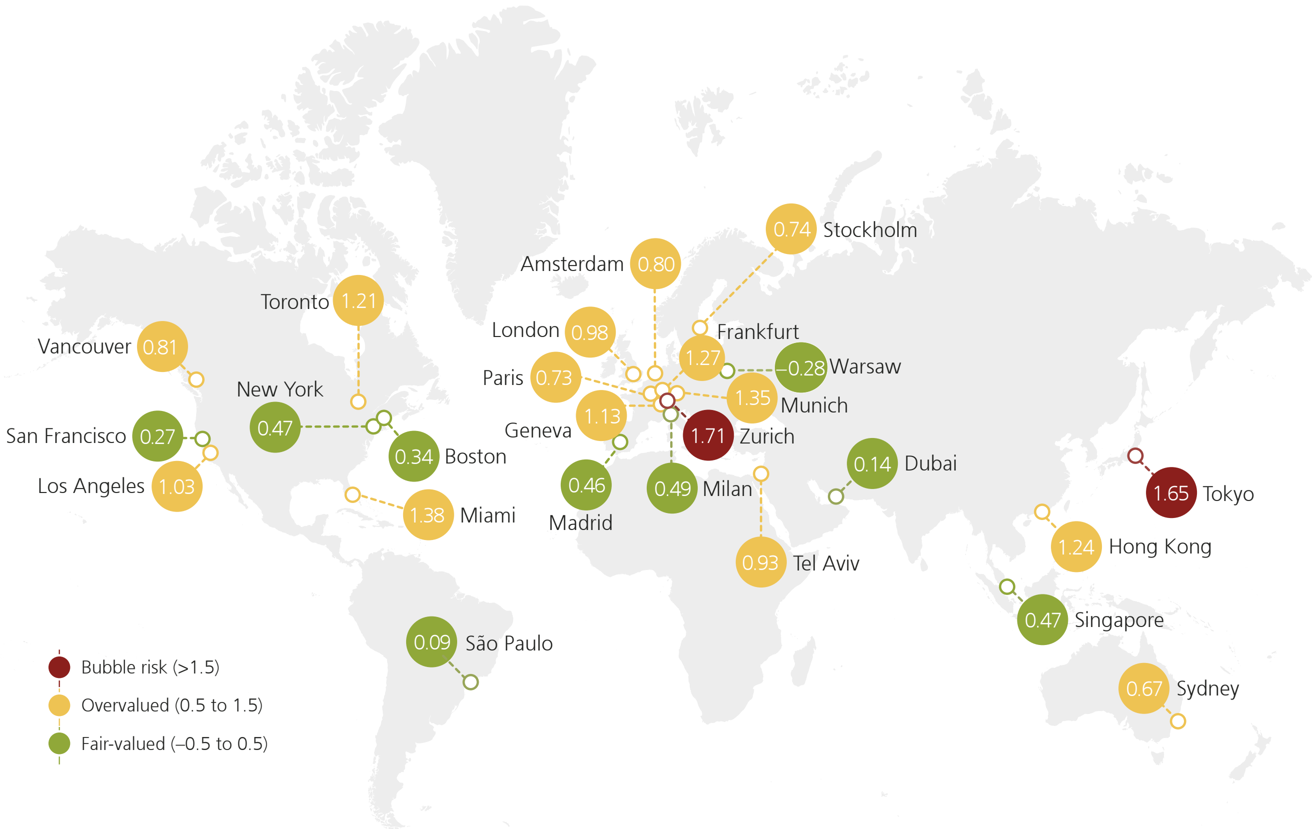
We hope you enjoy reading it.



Claudio Saputelli
Head Swiss & Global Real Estate
Chief Investment Office GWM

Matthias Holzhey
Senior Real Estate Economist
Chief Investment Office GWM

Key results



Prices in reverse gear

Most analyzed urban centers have seen a real house price drop during the last four quarters. In cities at bubble risk during the last three years, property prices have declined by 10% on average.

Fewer cities at bubble risk

Risk scores have dropped sharply in most cities in recent quarters. High imbalances persist in Zurich and Tokyo—relatively low mortgage and inflation rates have not caused any market disturbance there.

Tight financing conditions

Financial affordability of housing has collapsed as mortgage rates have roughly tripled since 2021 in most markets. Therefore, household leverage has been declining in most countries in recent quarters.

Inflation as game-changer

Inflation made a decisive contribution to the reduction in imbalances. While rising interest rates put pressure on house prices, inflation supports income and rental growth. The latter has accelerated in most cities outside the US and reached the highest value in almost a decade.

Too early for turnaround

There is more downside in real house prices. However, a housing shortage has set the stage for a renewed boom in many cities—if interest rates fall.

Defying gravity

The most sought-after destinations in recent years are Singapore, Dubai, and Miami. In those hotspots of international demand, rental and for-sale price growth clearly stand out. Prices are up as much as 40% and rents 50% higher than two years ago.

Deflating bubbles

The global surge in inflation and interest rates over the past two years has led to a sharp decline in imbalances in the housing markets of global financial centers on average, as measured by the *UBS Global Real Estate Bubble Index*. In this year's edition, only the two cities Zurich and Tokyo have remained in the bubble risk category, down from nine cities a year ago. Formerly in the bubble risk zone, Toronto, Frankfurt, Munich, Hong Kong, Vancouver, Amsterdam, and Tel Aviv saw their imbalances decline and are now in the overvalued territory. Housing markets in Miami, Geneva, Los Angeles, London, Stockholm, Paris, and Sydney are overvalued as well.

Also, New York, Boston, San Francisco, and Madrid have experienced a drop in imbalances. These markets are now fairly valued, according to the index, as are Milan, São Paulo, and Warsaw. Singapore and Dubai are fairly valued as well, even though their reputation as geopolitical safe-havens has recently triggered a surge in demand for both renting and buying there.

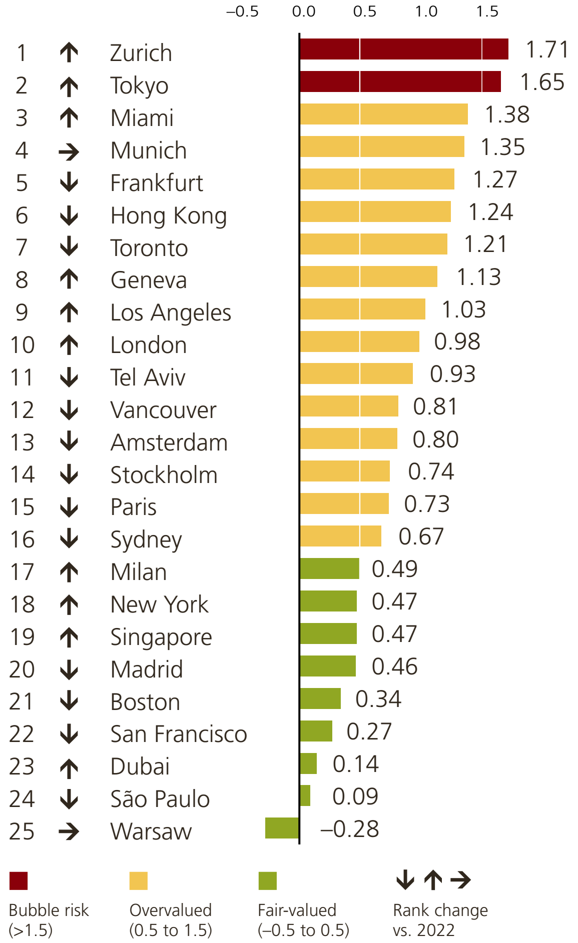
Price corrections across the board

House price growth has suffered due to rising financing costs as average mortgage rates have roughly tripled since 2021 in most markets. Annual nominal price growth in the 25 cities analyzed has come to a standstill after a buoyant 10% rise a year ago. In inflation-adjusted terms, prices are even 5% lower now than in mid-2022. On average the cities lost most of the real price gains made during the pandemic and are now close to mid-2020 levels again.

However, higher interest rates have impacted house prices differently depending on existing market imbalances and prevailing mortgage terms. In Frankfurt and Toronto —the two cities with the highest risk scores in last year's edition—real price tumbled by 15% in the last four quarters. A combination of high market valuations and relatively short mortgage terms put prices also under strong pressure in Stockholm and to a lesser degree in Sydney, London, and Vancouver. In contrast, in Madrid, New York, and São Paulo —cities with moderate risk valuations so far—real home prices have continued to rise at a subdued pace.

UBS Global Real Estate Bubble Index

Index scores for the housing markets of select cities, 2023



Source: UBS

For an explanation, see the section on Methodology & data on page 23.

Identifying a bubble

Price bubbles are a recurring phenomenon in property markets. The term "bubble" refers to a substantial and sustained mispricing of an asset, the existence of which cannot be proved unless it bursts. But historical data reveals patterns of property market excesses. Typical signs include a decoupling of prices from local incomes and rents, and imbalances in the real economy, such as excessive lending and construction activity. The *UBS Global Real Estate Bubble Index* gauges the risk of a property bubble on the basis of such patterns. The index does not predict whether and when a correction will set in. A change in macroeconomic momentum, a shift in investor sentiment or a major supply increase could trigger a decline in house prices.

Fundamentals supported by inflation
The widespread decrease in imbalances was not only a consequence of falling house prices but was supported by robust market fundamentals and declining household leverage. As buying affordability has deteriorated significantly, renting has boomed. Apart from cities in the US, nominal rental growth has accelerated markedly since mid-2022 and has been positive in all locations analyzed. The sharpest rises in rents were recorded in Singapore and Dubai.

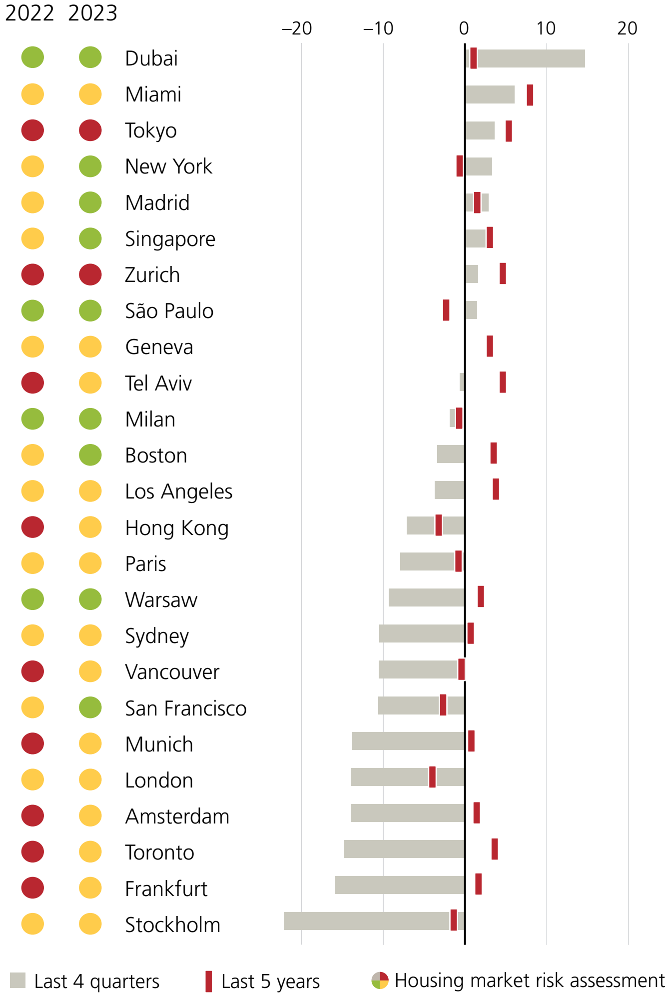
In the wake of general inflation, nominal household incomes have continued to grow at a solid pace compared to the previous decade. And as mortgage lending growth halved in the last four quarters, aggregate household debt to economic output has been declining, especially in Europe.

Demand shows green shoots
As unemployment rates in all the countries covered have remained well below their ten-year averages, the ensuing high level of job security has partly cushioned the impact of rising financing costs on housing demand. But inflation-driven income growth and price corrections have not been enough to meaningfully improve affordability. On average, the amount of living space that is financially affordable for a skilled service worker is still 40% lower than before the pandemic began. More downside in prices—at least in real terms—is likely if interest rates remain at their current elevated levels.

In some cities, however, the seeds for the next property price boom have already been planted. Housing remains undersupplied in most cities as hybrid working has not weakened demand for city-living in a sustained manner. In places where the number of building permits has been declining significantly in recent quarters—most notably in European urban centers—the housing shortage will likely intensify even more. Hence, housing demand is piling up and prices may soar again as soon as financial conditions for households improve.

Falling prices

Residential real price growth rates, as of 2nd quarter 2023, annualized in %



Sources: See page 24.

Regional focus

Eurozone

The house price level in both German cities analyzed, **Frankfurt** and **Munich**, doubled between 2012 and 2022, which was the strongest growth of all cities included in the study. Solid economic and employment growth, falling mortgage rates, strong investment demand, and supply shortages supported higher prices. But prices have been overshooting, in our view. Rate hikes and high inflation triggered a revaluation. Peaking in early 2022, real prices in Frankfurt have corrected by almost 20% since then (see spotlight Frankfurt p. 17), and by 15% in Munich. Both cities have left the bubble risk zone, but remain highly overvalued. The correction is still ongoing.

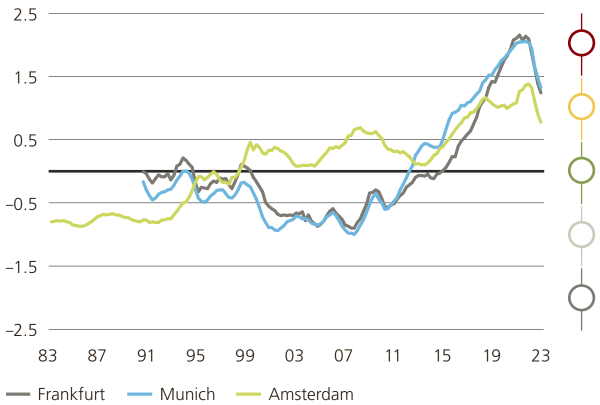
Prices in **Amsterdam** rallied by almost 20% in inflation-adjusted terms between 2020 and mid-2022 alone, decoupling from local rents and incomes. The *UBS Global Real Estate Bubble Index* was flashing warning lights. Over the last four quarters, prices have fallen by 14%—the strongest annual correction since the 1980s. Several factors have simultaneously weighed on owner-occupied demand: worsening financing conditions, inflation diminishing households' purchasing power, and their willingness to buy a home, as well as the reduction of the gift allowance for home ownership. Moreover, a higher transfer tax and prohibition of renting out after the purchase have decreased investment demand. The market is now in overvalued territory, accroding to the index.

Falling mortgage rates and strong international demand were the main drivers of a 30% real house price increase in **Paris** between 2015 and 2020. The city became less affordable and bigger flats for families were in short supply. People left France's capital city, rendering its population 5% lower than a decade ago. Prices started falling in 2021. The decline has accelerated in recent quarters as higher mortgage rates, lending restrictions, and a property tax hike dampened buyer activity. Overall, real prices corrected by 8% over the last four quarters, the strongest decline in almost three decades, pushing the city into overvalued territory.

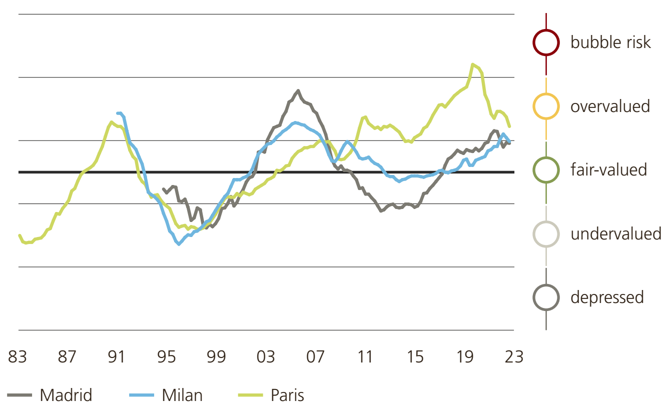
Madrid's housing market is in fair value territory. Compared to other Eurozone cities, the Spanish capital has remained affordable as measured by the price-to-income ratio. After a three-year period of stagnation, prices increased by 3% in inflation-adjusted terms over the last four quarters. Overall, they remain 25% below the all-time high in 2007. Demand is shifting to the rental market as higher interest rates reduce the attractiveness of purchasing property. More build-to-rent developments are expected, keeping the market in balance.

Milan's housing market has recorded rising prices since 2018. Falling mortgage rates, a robust economy, new developments, and a favorable tax regime supported housing demand. Though nominal prices continued to rise between mid-2022 and mid-2023, they could not keep up with inflation. Real prices dropped by 2%, in line with local real rental and income growth. We think the market remains fairly valued, virtually unchanged from last year. Solid prospects for the local economy, an extension of the underground railway, and the upcoming 2026 Olympic Winter Games all contribute to sustaining valuations in nominal terms.

Historical development of index scores



Source: UBS



Source: UBS

Rest of Europe

Buying owner-occupied real estate in **Zurich** now costs over 50% more than a decade ago in nominal terms. An increasing number of high-income earners and ultra-low interest rates supported rising prices. The price level has not yet adapted to increased financing costs. The market is in the bubble risk zone (see spotlight Zurich p. 16).

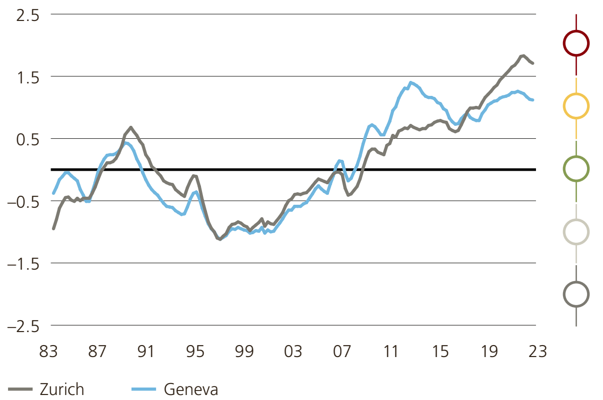
By contrast, house prices in **Geneva** are less than 20% higher than ten years ago. Between mid-2022 and mid-2023, real prices stagnated. The risk score is far lower than in 2013, when the market was in bubble risk territory. Although the Rhone-city benefits from its international status, the economic outlook is mixed, and population growth remains subdued as out-migration to more affordable regions is significant. However, new building permits are only about half their 10-year average, supporting price levels in the medium term.

Real prices in **London**'s housing market have been on a downward path since Brexit in 2016. Despite structural supply shortages, prices have lagged the nationwide average. In the absence of strong international demand, house prices remain under pressure as—due to high mortgage rates—local affordability is at its worst since 2007. Additionally, demand for buy-to-let investments has abated: Although rents have increased in nominal terms, they could not offset rising financings costs. The market remains in overvalued territory, in our view (see spotlight London p. 18).

Between 2008 and 2021, falling mortgage rates have supported demand for owner-occupied homes and led to a sharp rise in **Stockholm**'s real housing prices by almost 70%. The surge was much faster than that of local incomes and rents, as well as housing prices in other parts of the country. Excessive housing valuations and a high reliance on variable-rate mortgages turned out to be a dangerous cocktail. Currently, affordability is stretched and as a result, between mid-2022 and mid-2023, inflation-adjusted prices corrected by over 20%—more than in any other city analyzed. The market slid from bubble risk to overvalued territory. That said, demand for owner-occupied housing is likely to shoot up again as soon as affordability improves. The overregulated and undersupplied rental market is not a viable alternative for many prospective owners.

Real house prices in **Warsaw** increased by almost 40% between 2012 and 2022. The city attracted new citizens and buy-to-let investors alike. Strong employment prospects, a subway expansion, and modern housing developments kept the market attractive. Against a backdrop of strong and persistent inflation, mortgage rates spiked, reducing households' willingness to pay for homes. This has led inflation-adjusted prices to decline about 10% within a year and moved demand to the rental sector, which is seeing strong growth. However, new mortgage subsidies are about to trigger a buying frenzy.

Historical development of index scores



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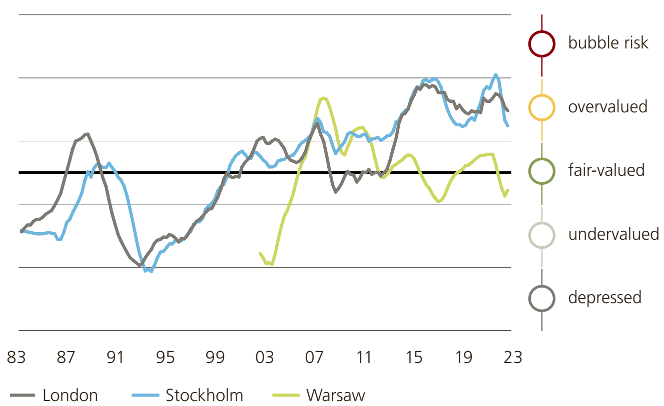


Source: UBS

United States

As a result of the sharp rise in mortgage rates and record-low affordability, housing demand has weakened significantly in the US cities we analyzed. But income growth, a lack of available for-sale inventory, and a strong labor market have prevented a meaningful correction in home prices. Nevertheless, inflation-adjusted prices fell on average of all analyzed US cities by 2% between mid-2022 and mid-2023, in stark contrast to an increase of almost 10% a year ago. Additionally, real rental growth slowed substantially as the pandemic-induced demand receded, new supply was delivered in several markets, and vacancy rates bottomed out.

While imbalances in Miami and New York increased over the last four quarters, housing markets in Boston, San Francisco, and Los Angeles recorded lower index scores.

Housing prices in **Miami** continued to increase faster than the nationwide average. The price level has more than doubled over the last 10 years. Miami is the main beneficiary of the increased attractivity of sun belt cities in the US. Demand is bolstered by continued population influx and the still relatively low absolute price level compared to incomes. Having said that, sales numbers have dropped and the upward pressure on prices has eased as mortgage rates went up.

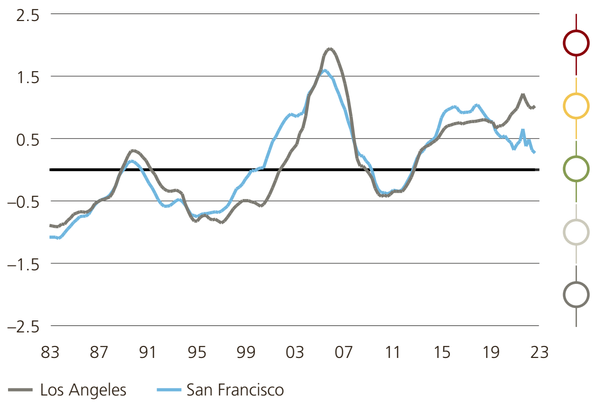
New York is in the middle of a strong comeback following the market's significant weakness during the pandemic's lockdowns as many inhabitants left the city for less dense, more affordable areas. After multiple years of eroding values, real prices in the city's housing market increased by 3% between mid-2022 and mid-2023, outpacing the national average for the first time since 2016 (see spotlight New York p. 19).

Conversely, **Boston**'s housing market dynamics have weakened. Inflation-adjusted prices corrected slightly between mid-2022 and mid-2023 while rents remained roughly stable. The market is less synchronized with the rest of the US due to its high dependency on startups, technology, and healthcare—which recently underperformed and thus were less supportive for housing demand. Overall, the market is fairly valued, in our view.

The rebound on the **San Francisco** real estate market was short-lived. Since mid-2022, prices have fallen 10% and rents dropped 3% in inflation-adjusted terms. The market is now fairly valued, in our view. San Francisco is under pressure from quality-of-life issues, elevated hybrid work patterns, and competition with sun belt cities that attract technology companies. Building permits are at their lowest in a decade, but vacancy rates have remained elevated.

Imbalances in the **Los Angeles** housing market have slightly softened, but the market remains overvalued, in our view. Los Angeles is suffering from a broad loss of economic competitivity due to its significant exposure to the technology and entertainment sectors, quality of life challenges, adverse tax legislation, and high costs of living. As income growth disappointed and housing affordability deteriorated, inventory levels have begun to climb.

Historical development of index scores



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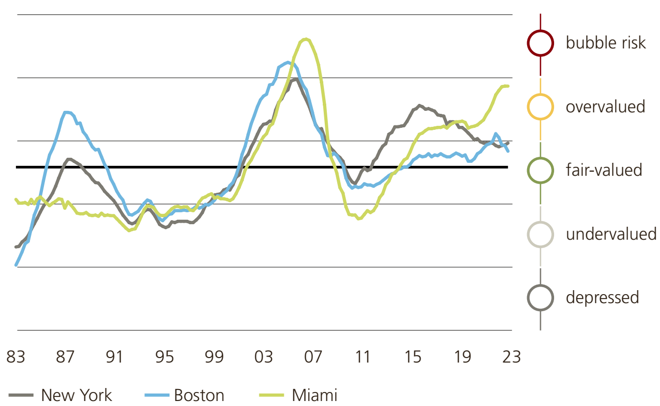


Source: UBS

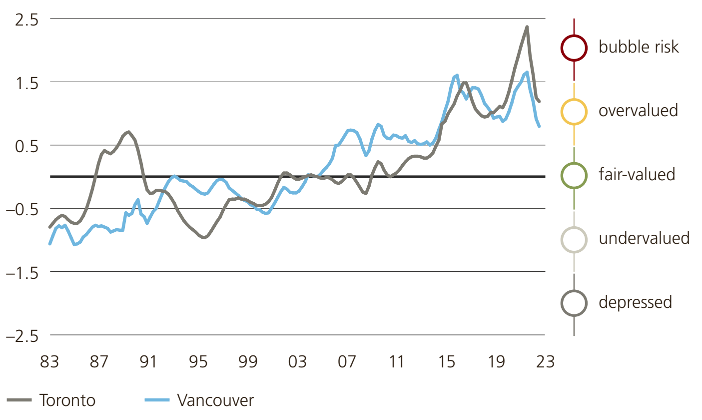
Canada

A combination of strong population growth, attractive financing conditions, high investment demand, and an urban supply shortage have fueled the housing bonanza in **Vancouver** and **Toronto** for almost a quarter of century. Real prices more than tripled in these cities between 2000 and 2022. For years, both markets were flashing warning signals as local price levels decoupled from the countrywide average and clearly outpaced rental growth. During the pandemic, the housing boom became a countrywide phenomenon as strong income growth supported upsizing and mortgage rates continued to trend downward. Overall, between mid-2019 and mid-2022, real prices in Vancouver increased by 25% and by almost 35% in Toronto, while household leverage rose at a fast pace.

In such a heated market environment, it doesn't take much for sentiment to change quickly: A mix of increasing financing costs and higher mortgage stress test rates tipped the scales. Outstanding mortgage growth in Canada has slowed to the lowest level since the beginning of the boom in 2000. The number of housing sales has dropped almost 40%, reaching its low at the beginning of 2023. Price levels in Vancouver and Toronto have corrected by more than 10% in inflation-adjusted terms since mid-2022. We now rank these markets in overvalued territory.

As demand for living space in these cities is rising steadily, the pressure is shifting to the rental market. In Vancouver, real rents have climbed around 10% compared to a year ago, while they are a good 5% higher in Toronto. Both cities were showing signs of housing market recovery in the spring with increasing numbers of transactions and positive price growth. Nevertheless, it is premature to speak of a turnaround against the backdrop of recent interest rate hikes from the Bank of Canada.

Historical development of index scores



Source: UBS

Asia Pacific

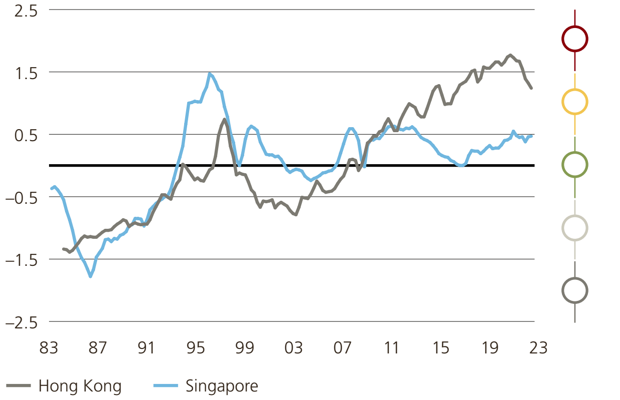
Between 2003 and 2018, real house prices in **Hong Kong** nearly quadrupled while incomes stagnated and rents increased by just 50% in inflation-adjusted terms. Housing is barely affordable: A skilled service worker requires more than 20 times the average annual income to buy a 60 sqm flat. The city has constantly been at bubble risk levels since the first edition of this study in 2015. After declining 7% between mid-2022 and mid-2023, inflation-adjusted house prices in Hong Kong are back to levels last seen in 2017. Household leverage stabilized and rents have been virtually unchanged in the last four quarters as population inflow increased. However, high mortgage rates and a slow economic recovery in mainland China put pressure on house demand. Overall, we now see the city in overvalued territory. Rising inventories are a sign that weakness on the housing market is going to persist in the near future.

Singapore's housing supply cannot keep up with strong local and international demand, which began rising significantly in 2018. Real prices have risen by 15% since then, despite regulatory tightening. However, this has been put into perspective by rents, which have shot up by roughly 40% in the same period. Overall, the housing market is fairly valued, in our view (see spotlight Singapore p. 20).

Housing market imbalances in **Tokyo** have increased from undervalued 20 years ago to bubble risk now. Real estate prices have been rising almost continuously for over two decades and decoupled from the rest of the country, bolstered by attractive financing conditions and population growth. International investors have been attracted by the defensive qualities of Tokyo's residential market, heating up the price growth. Moreover, as net immigration has weakened since the pandemic, rents started to fall in 2020, aggravating imbalances. Widespread home offices and higher availability of larger units made people leave the city center. Although income growth could not keep pace with prices and mortgage rates have increased (moderately) in recent quarters, nominal house prices dynamics have not weakened.

The housing market in **Sydney** has been very volatile in recent years. After a brief period of market weakness between 2018 and 2019, prices surged by almost 25% cumulatively across 2020 and 2021. Aggressive rate hikes by the Reserve Bank of Australia more recently triggered a new sharp price correction. Inflation-adjusted prices are back to 2018 levels. Further downside is limited though, as foreign demand has been improving. Amid robust rental growth and lower household leverage, imbalances have declined sharply. The market is classified at the lower end of the overvalued territory.

Historical development of index scores



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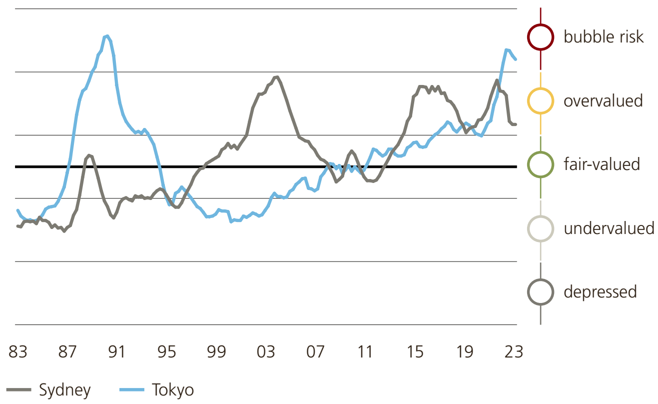


Source: UBS

Middle East

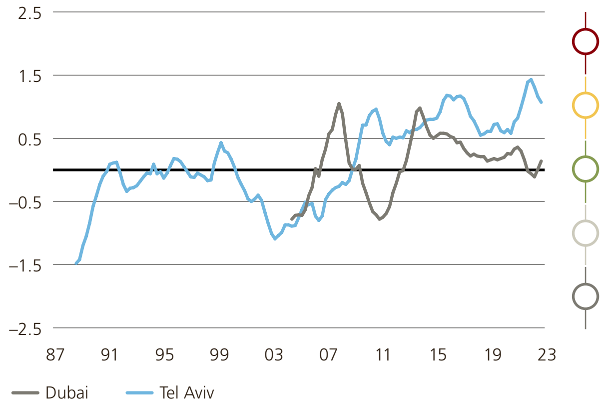
With housing prices sliding for seven straight years, the market for owner-occupied housing in **Dubai** started recovering in 2021. The risk score has dropped significantly over the course of this 10-year period. In the last four quarters, housing prices increased by a double-digit rate. Given strong income growth and a red-hot rental market, with rental growth even surpassing owner-occupied price growth, we see the market as fairly valued. While Dubai is highly cyclical and prone to overbuilding, price momentum should remain strong in the coming quarters (see spotlight Dubai p. 21).

Between 2002 and 2022, real house prices in **Tel Aviv** tripled, the highest growth of all cities we analyzed. Backed by falling interest rates and accompanied by a housing shortage, the housing price level in the city decoupled from the rental market and prices in the rest of the country. Household incomes could not keep up with prices, leading to stretched affordability. It is no surprise, that rising mortgage rates during 2022 ended the party. Mortgage volume growth has more than halved since last year. As a result, real price growth was negative in the first half of 2023. This moderate easing will likely continue as there are no signs of a demand rebound. Moreover, past efforts by the government to increase housing supply may backfire now, because unsold inventories have been piling up amid a full construction pipeline.

Brazil

The period of sharply rising real estate prices in **São Paulo** came to an abrupt halt in 2014. An economic recession, strong housing supply expansion, and rising mortgage rates triggered price declines. Since then, inflation-adjusted housing price growth has continuously remained in negative territory and has stabilized only in recent quarters, roughly 25% below the peak. While the willingness to pay has been supported by a recovery of household incomes after the pandemic, double-digit mortgage rates have suffocated demand for owner-occupied housing. Hence, many have switched from owning to renting, leading real rents to rise by almost 10% in the last four quarters. This puts the market in fairly valued territory, in our view. But the tide might be turning. Inflation is coming down and the central bank has already started a new period of monetary easing. Although economic growth will likely slow down, gradually improving financing conditions could boost the housing market in the coming quarters.

Historical development of index scores



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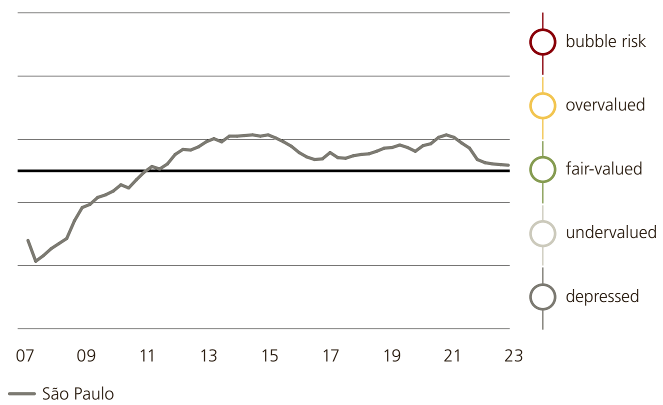


Source: UBS

City benchmarks

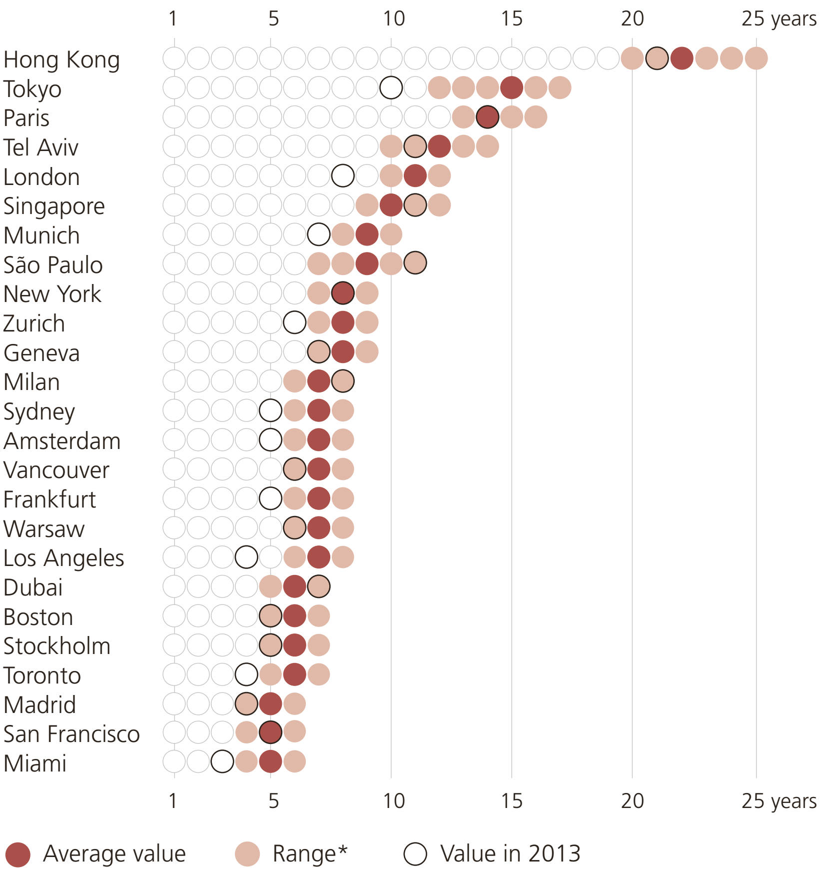
Price-to-income

Although on average of the cities analyzed, house prices have declined slightly and income growth has been relatively stable over the last four quarters, affordability remains stretched in many locations. Buying a 60 square meter (650 square foot) apartment exceeds the budget of those who earn the average annual income in the skilled service sector in most world cities. In Hong Kong, even those earning twice this income would struggle to afford an apartment of that size. House prices remain decoupled from local incomes in Tokyo, Paris, Tel Aviv, and London, where more than 10 times the annual income is required to buy a 60 square meter flat. Unaffordable housing often signals strong foreign investment, tight zoning, and strict rental market regulations. Weakening investment demand increases the risk of a price correction and weighs on long-term appreciation prospects.

By contrast, the average price-to-income ratio is much smaller to purchase a small apartment in Miami, Madrid, and Toronto, which makes the price level more sustainable in those cities. Given relatively high incomes, purchasing a 60 square meter apartment also looks relatively feasible for residents of Boston, Los Angeles, Geneva, or Zurich.

For homebuyers, affordability depends primarily on mortgage rates and amortization obligations. If interest and amortization rates are relatively high, the burden on monthly income can be heavy even in cities with low price-to-income multiples like those in the US. Conversely, elevated purchase prices can be sustained with relatively low interest rates and no requirement of full amortization, as seen in Switzerland and the Netherlands.

The number of years a skilled service worker needs to work to be able to buy a $60m^2$ (650 sqft) flat near the city center



Source: UBS. Remark: For an explanation, see the section on Methodology & data on page 23.
The data is not comparable with previous years due to a comprehensive data revision.
* Uncertainty range due to differing data quality.

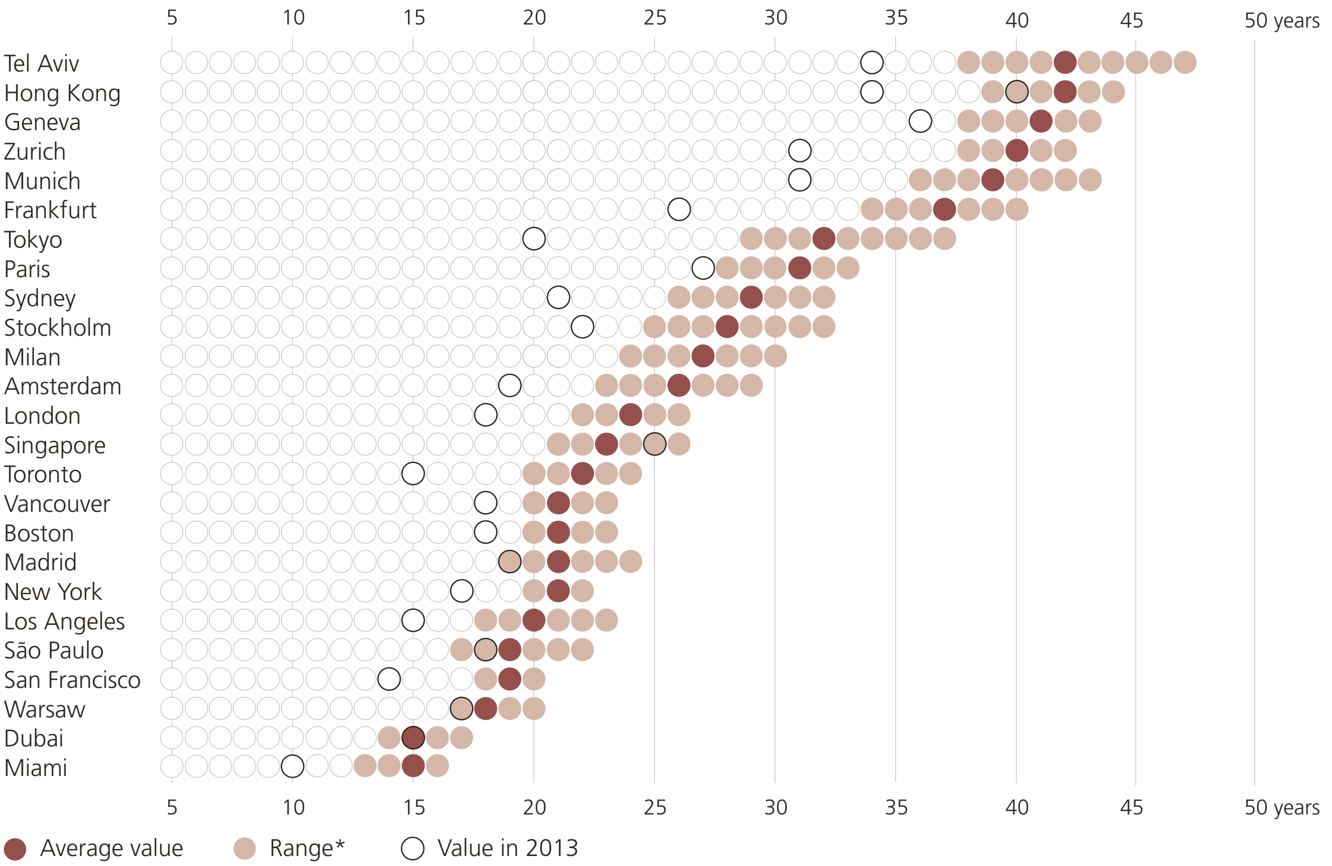
Price-to-rent

Price-to-rent multiples declined on average compared to last year, as rental growth outpaced price appreciation. That said, almost a third of the cities covered have price-to-rent multiples above or close to 30. The highest price-to-rent ratios are currently reported in Tel Aviv, Munich, and Hong Kong, followed by Zurich, Geneva, and Frankfurt. Such high multiples come from an excessive appreciation of housing prices in the wake of previously low interest rates. House prices in all these cities remain vulnerable to corrections should interest rates remain elevated for longer or continue to rise further.

The US cities analyzed in the study exhibit some of the lowest multiples among the markets analyzed. These reflect, among other things, above-average interest rates and relatively mildly regulated rental markets. Conversely, rental laws in France, Germany, and Sweden are strongly pro-tenant, keeping rents below their true market levels, as reflected in high price-to-rent ratios.

However, elevated price-to-rent multiples may also show expectations of rising prices, as is the case in Tel Aviv, Zurich, or Munich. Investors expect to be compensated for very low rental yields with capital gains. If these hopes do not materialize and expectations deteriorate, homeowners in markets with high price-to-rent multiples are likely to suffer significant capital losses.

The number of years a flat of the same size needs to be rented out to pay for the flat



Source: UBS. Remark: For an explanation, see the section on Methodology & data on page 23. The data is not comparable with previous years due to a comprehensive data revision.
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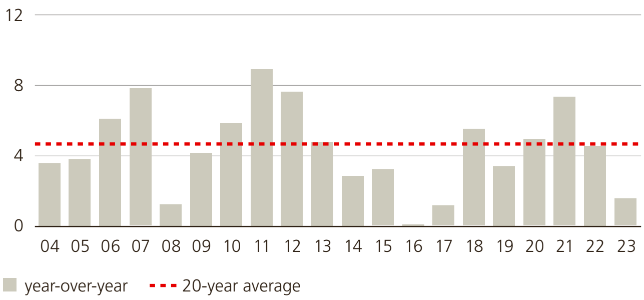
City spotlights

Zurich

Annual house price growth rates

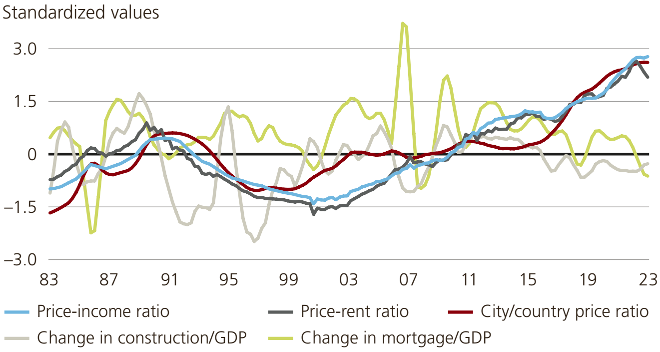
Nominal in %, as of 2nd quarter



Source: UBS

Development of sub-indices

Standardized values



Source: UBS

Sticky prices

Home prices in Zurich continued to rise in 2023, albeit at a slower pace than in previous years. Buyers of residential properties now pay 40% more in real terms than a decade ago. This was significantly more than on country average and stronger than rents, which have risen by almost 12% since 2013. The relationship between purchase prices and rents remains out of balance—especially considering the higher interest rate environment. The market therefore stays in the **bubble risk** zone.

In recent quarters, however, imbalances have been slightly reduced, as rental growth has accelerated sharply and finally surpassed house price growth. At currently higher financing costs, purchasing a home only pays off financially compared to renting if its market value increases in the long run. Buy-to-let investments have become unattractive. As a result, the supply of available housing has climbed back to pre-pandemic levels and the number of transactions has declined. For the coming quarters, we do not expect to see any more price upside, contributing to lower imbalances.

A sharp price correction—as observed in other global financial centers—is generally rather unlikely. A significant countrywide drop in building permits supports the perception of property as "concrete gold." First, a persistently high share of money market financing suggests that many buyers expect interest rates to decrease again in the mid-term. Second, the market size of the owner-occupied housing segment is relatively small. And third, the city is seeing strong employment growth in well-paying industries. Hence, even though purchasing a home is financially not feasible for large parts of the local population, prices may stay relatively elevated for longer.

Frankfurt

Bottom not (yet) reached

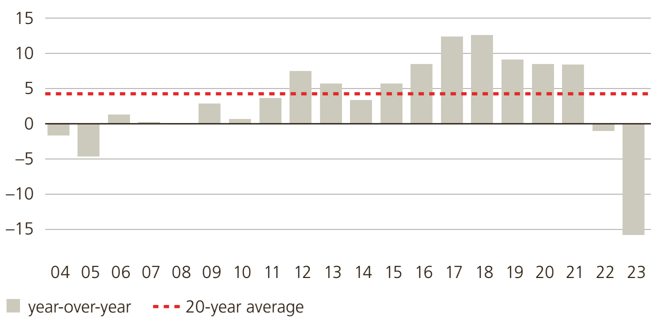
According to the *UBS Global Real Estate Bubble Index*, Frankfurt was among the cities with the highest real estate bubble risk in recent years. But the sharp rise in mortgage interest rates in Germany has abruptly ended that house price boom. Adjusted for inflation, prices have corrected by almost 20% since the end of 2021. Higher financing costs have also turned buy-to-let purchases into lossmaking investments. Overall, Frankfurt's housing market is now in **overvalued** territory, in our view.

The abrupt decline in the index score has two main causes. First, rents and incomes have risen more sharply than house prices in nominal terms, such that existing imbalances have been reduced. Second, the growth of outstanding mortgage volumes has slowed down.

The price correction is unlikely to be over yet, unless interest rates fall again. Purchase prices are currently twice as high as they were 10 years ago, while rents have risen "only" 40% during the same period. In fact, the sharp slowdown in residential construction activity and the rising population in Frankfurt suggest an exacerbated housing shortage as well as accelerated rent increases in the future. But in view of a weak economic outlook, additional demand is likely to be concentrated in the lower-priced rental segment, at least in the short term. Owners of old buildings may be confronted with high renovation costs to improve energy efficiency due to nationwide regulatory requirements. This could lead to additional discounts on property values.

Annual house price growth rates

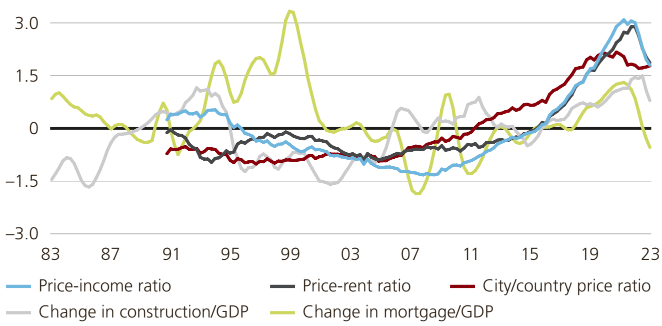
Nominal in %, as of 2nd quarter



Source: UBS

Development of sub-indices

Standardized values

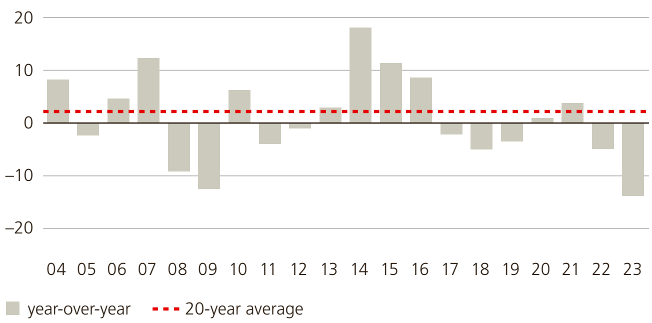


Source: UBS

London

Annual house price growth rates

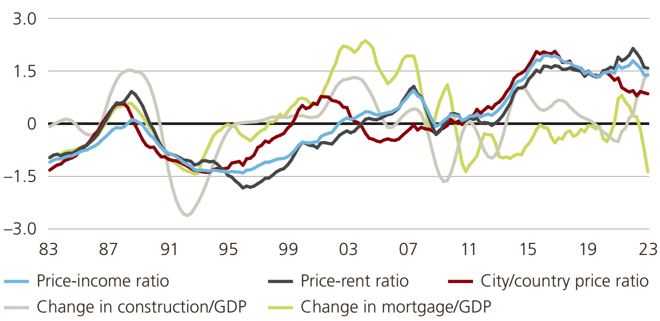
Nominal in %, as of 2nd quarter



Source: UBS

Development of sub-indices

Standardized values



Source: UBS

In no man's land

Since reaching an all-time high in 2016, houses prices in London have been falling in real terms, shedding a total of almost 25%. In the last four quarters alone, they declined by 14%, which marks the strongest correction since the global financial crisis 15 years ago. As mortgage rates roughly tripled within a few quarters, demand on the broad London housing market has crumbled. The prime sector has been impacted to a lesser degree by increasing mortgage rates as cash buyers dominate the market. Nevertheless, prime prices were only just able to hold their own without an influx of wealthy foreign buyers and the pound sterling appreciating. Overall, the market risk score according to the *UBS Global Real Estate Bubble Index* has continued to fall, but remains in **overvalued** territory.

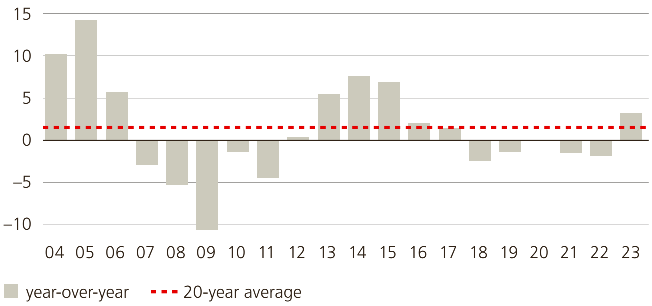
According to Nationwide, a building society, first-time buyer mortgage payments in UK's capital city currently make up roughly two-thirds of take-home pay—this value was less than half only three years ago. Leveraged buy-to-let investments have turned into lossmaking endeavors as landlords have not been able to offset elevated financing costs. Although rents increased by 5% in nominal terms over the last four quarters, they were outpaced by double-digit inflation rates. Combined with an economic slowdown, households have lost purchasing power and are less willing to make long-term investments like home purchases. Overall, the price correction to the higher interest rate environment is not over yet. That said, the slow expansion of housing supply keeps the market structurally undersupplied, which limits the downside.

New York

Surprise, surprise

Annual house price growth rates

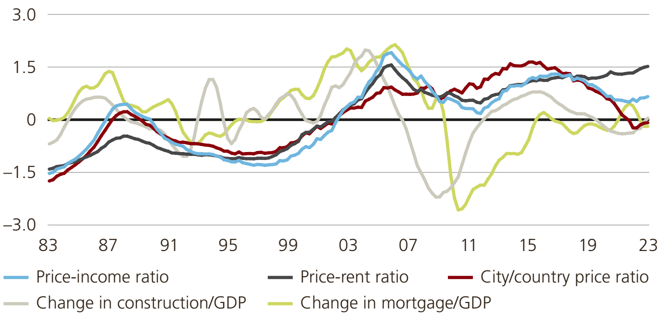
Nominal in %, as of 2nd quarter



Source: UBS

Development of sub-indices

Standardized values



Source: UBS

The pandemic-induced rollercoaster ride of New York's residential property market has largely come to an end. In 2021 and 2022, the Manhattan housing market recovered strongly as restrictions were gradually lifted and people came back to the city. As supply is structurally tight and—more importantly—the market was not at bubble risk, the sharp interest rate increases have only had a limited effect on local housing prices. Between mid-2022 and mid-2023, for-sale prices increased by more than 3% in inflation-adjusted terms and recouped all of the losses accumulated during the pandemic.

The luxury segment has also held up well, with sales prices rising in nine of the past 10 quarters as the proliferation of all cash buyers has helped bolster the market in the face of rising interest rates. However, sales activity has significantly declined since the end of 2022 as the months of available supply and listing discounts increased substantially, according to real estate firm Douglas Elliman.

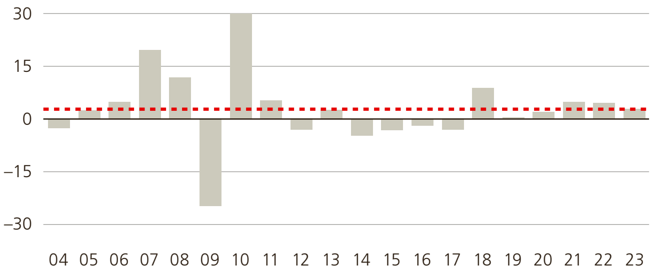
Overall, the New York residential property market is **fairly valued** and expected to stay stable for the time being, in our view. On the one hand, a combination of high interest rates, economic uncertainty, and strained affordability limit upside in the for-sale and for-rent segments over the coming quarters. On the other, low vacancy rates and subdued construction activity support current price and rental levels. This is unlikely to change soon as expiration of tax incentive programs for developers and elevated building costs combined with concerns of additional adverse rent control legislation make new development an unattractive risk-adjusted return proposition.

Singapore

Calmer waters ahead

Annual house price growth rates

Nominal in %, as of 2nd quarter

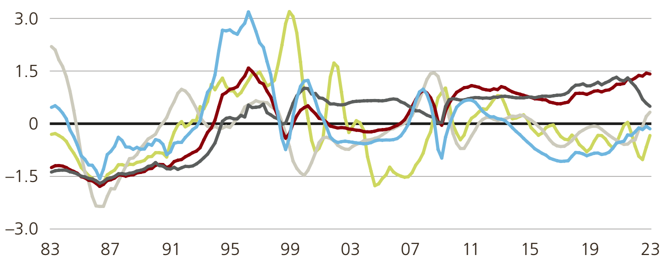


year-over-year
20-year average

Source: UBS

Development of sub-indices

Standardized values



Price-income ratio
Price-rent ratio
Real price
Change in construction/GDP
Change in mortgage/GDP

Source: UBS

Remark: The analysis refers to the private residential market only.

Singapore's private residential market continues to benefit from the city's safe-haven reputation amid geopolitical tensions attracting expats, wealthy investors, and new businesses. Younger generations seek their own apartments, creating additional housing needs. Despite strong demand for living space, the housing market has left overvalued territory and we newly classify it as **fairly valued**.

Rental growth has been accelerating since 2021 and is outpacing house prices by now. Currently, tenants pay almost 25% higher rents than a year ago, the highest inflation-adjusted increase among all cities analyzed. In contrast, price dynamics in the private market have slowed down in recent quarters and house prices increased by only 3% in inflation-adjusted terms between mid-2022 and mid-2023. That said, we expect rents to soften going forward, as supply constraints induced by pandemic lockdowns ease and physical housing completions grow. Rental demand should also moderate as the bulk of post-pandemic international relocations is now behind us.

The housing market cooling measures introduced in recent years are starting to take effect. Stamp duties for foreigners have been raised to 60%—the highest globally—significantly curtailing foreign demand. Also locals are contending with tighter policies: Lower loan-to-value ratios, tighter debt servicing ratios, and rising mortgage rates have dampened both demand and affordability. Going forward, we expect home price growth to moderate and rents to fall as housing supply ramps up and demand stabilizes. Buy-to-let investors must keep regulatory risks in mind, as the government has not ruled out rental market regulations in the future.

Dubai

Windfall profits

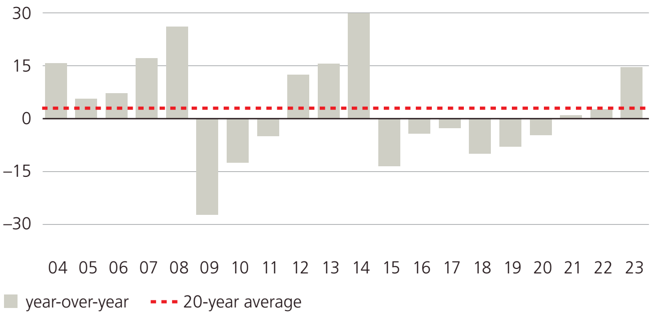
The seven-year long drought of falling real estate prices has become a distant memory. Prices have been booming since 2021 and increased by 15% in inflation-adjusted terms between mid-2022 and mid-2023, the highest growth rate among all cities analyzed in the study. Price increases in the luxury segment were even stronger.

Dubai has attracted real estate investors globally. A new visa program with looser residency requirements aimed at wealthy and skilled individuals, no personal income tax, and early lifting of travel restrictions during the pandemic have stimulated immigration. Moreover, supported by higher commodity prices, Dubai has seen strong economic and household income growth since 2021, topping other cities. Consequently, residential transaction volumes have gone through the roof, breaking all-time highs. Nevertheless, inflation-adjusted prices are around 25% below their 2014 peak. Furthermore, as many newcomers rent before potentially buying in the future, rents have increased by 20% in inflation-adjusted terms over the last four quarters. As a result, the market remains in **fair value** territory, in our view.

We expect weakening momentum in the coming quarters. Although the market is largely financed by cash purchases, increased mortgage interest rates will take their toll. An ongoing strong expansion of supply—particularly of apartments—is also likely to limit price growth. Finally, buyers' willingness to pay may abate against the backdrop of a global economic slowdown. That said, the markets outlook remains dependent on geopolitical developments.

Annual house price growth rates

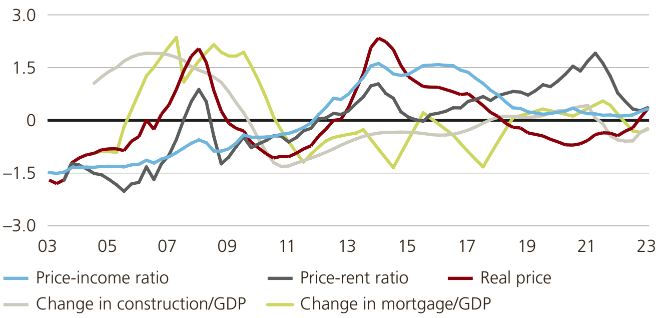
Nominal in %, as of 2nd quarter



Source: UBS

Development of sub-indices

Standardized values



Source: UBS

City overview

		UBS Global Real Estate Bubble Index							Real price growth Annualized, in %		Real rental growth Annualized, in %	
		Total		Sub-indices								
Rank	City	Score	Assessment	Price / Income	Price / Rent	City / Country[1]	Mortgage[2]	Construction[2]	Last year	Last 10 years	Last year	Last 10 years
1	Zurich	1.71	Bubble risk	Bubble risk	Bubble risk	Bubble risk	Undervalued	Fair-valued	1.5	3.4	6.9	1.2
2	Tokyo	1.65	Bubble risk	Bubble risk	Bubble risk	Bubble risk	Overvalued	Bubble risk	3.6	4.8	–3.7	0.1
3	Miami	1.38	Overvalued	Bubble risk	Overvalued	Bubble risk	Fair-valued	Fair-valued	6.0	7.6	2.0	3.8
4	Munich	1.35	Overvalued	Bubble risk	Bubble risk	Bubble risk	Undervalued	Overvalued	–13.8	4.6	–3.1	2.1
5	Frankfurt	1.27	Overvalued	Bubble risk	Bubble risk	Bubble risk	Undervalued	Overvalued	–15.9	4.8	–4.3	1.2
6	Hong Kong	1.24	Overvalued	Overvalued	Bubble risk	Overvalued	Fair-valued	Fair-valued	–7.1	0.8	–1.6	–1.2
7	Toronto	1.21	Overvalued	Bubble risk	Bubble risk	Overvalued	Fair-valued	Fair-valued	–14.7	5.7	6.0	2.2
8	Geneva	1.13	Overvalued	Bubble risk	Bubble risk	Overvalued	Undervalued	Fair-valued	–0.1	1.1	1.1	–0.2
9	Los Angeles	1.03	Overvalued	Bubble risk	Bubble risk	Overvalued	Fair-valued	Fair-valued	–3.7	5.0	–1.4	2.1
10	London	0.98	Overvalued	Overvalued	Bubble risk	Overvalued	Undervalued	Overvalued	–13.9	0.9	–5.2	–2.2
11	Tel Aviv	0.93	Overvalued	Fair-valued	Bubble risk	Overvalued	Fair-valued	Fair-valued	–0.7	4.5	2.8	2.2
12	Vancouver	0.81	Overvalued	Overvalued	Overvalued	Overvalued	Fair-valued	Fair-valued	–10.6	4.8	10.7	2.9
13	Amsterdam	0.80	Overvalued	Overvalued	Overvalued	Overvalued	Undervalued	Fair-valued	–14.0	5.2	4.1	2.1
14	Stockholm	0.74	Overvalued	Overvalued	Overvalued	Overvalued	Undervalued	Fair-valued	–22.1	2.4	–4.9	0.2
15	Paris	0.73	Overvalued	Overvalued	Bubble risk	Overvalued	Undervalued	Overvalued	–7.9	0.6	–1.3	–0.7
16	Sydney	0.67	Overvalued	Bubble risk	Overvalued	Overvalued	Undervalued	Fair-valued	–10.5	3.9	2.8	0.9
17	Milan	0.49	Fair-valued	Fair-valued	Fair-valued	Overvalued	Fair-valued	Overvalued	–1.9	–1.0	–2.4	–1.1
18	New York	0.47	Fair-valued	Overvalued	Bubble risk	Fair-valued	Fair-valued	Fair-valued	3.2	1.3	–1.5	–0.8
19	Singapore	0.47	Fair-valued	Fair-valued	Fair-valued	Overvalued	Fair-valued	Fair-valued	2.8	0.9	23.0	1.8
20	Madrid	0.46	Fair-valued	Overvalued	Fair-valued	Bubble risk	Undervalued	Fair-valued	2.9	2.3	7.6	1.5
21	Boston	0.34	Fair-valued	Overvalued	Overvalued	Fair-valued	Fair-valued	Fair-valued	–3.4	3.5	1.1	2.1
22	San Francisco	0.27	Fair-valued	Fair-valued	Overvalued	Fair-valued	Fair-valued	Fair-valued	–10.6	2.7	–3.1	–0.4
23	Dubai	0.14	Fair-valued	Fair-valued	Fair-valued	Fair-valued	Fair-valued	Fair-valued	14.6	–0.1	20.3	–0.2
24	São Paulo	0.09	Fair-valued	Undervalued	Fair-valued	Overvalued	Fair-valued	Fair-valued	1.4	–2.1	9.0	–2.5
25	Warsaw	–0.28	Fair-valued	Fair-valued	Overvalued	Fair-valued	Undervalued	Undervalued	–9.3	1.8	2.0	0.4

- Bubble risk (above 1.5 standard deviations)
- Overvalued (between 0.5 and 1.5 standard deviations)
- Fair-valued (between –0.5 and 0.5 standard deviations)
- Undervalued (below –0.5 standard deviations)

[1] Price ratio. For Hong Kong, Singapore and Dubai real prices.
[2] Compared to GDP, annual change

Source: UBS

Methodology & data

The *UBS Global Real Estate Bubble Index* traces the fundamental valuation of housing markets and the valuation of cities in relation both to their country and to economic distortions (lending and building booms). Tracking current values, the index uses the following risk-based classifications: depressed (score below –1.5), undervalued (–1.5 to –0.5), fair-valued (–0.5 to 0.5), overvalued (0.5 to 1.5), and bubble risk (above 1.5). This classification is aligned with historical bubble episodes. We cannot predict if or when a correction will happen. Hence, "bubble risk" refers to the prevalence of a high risk of a large price correction.

The index score is a weighted average of the following five standardized city sub-indices: price-to-income and price-to-rent ratios (fundamental valuation), change in mortgage-to-GDP ratio and change in construction-to-GDP ratio (economic distortion), and city-to-country price ratio. The city-to-country price ratio in Singapore, Hong Kong, and Dubai is replaced by an inflation-adjusted price index. The approach cannot fully account for the complexity of the bubble phenomenon.

The sub-indices are constructed from specific city-level data, except for mortgage-to-GDP and construction-to-GDP ratios, which are calculated on the country level. In most cases, publicly available data is used. But in a few cases, the data consists of, or is supplemented by additional sources, including the results of the UBS Prices and Earnings survey. The index length varies by city depending on data availability. The longest data series starts in 1980, the shortest in 2009. For time series shorter than 30 years, the coefficient of variation of an equivalent indicator on the country level is used as a floor value to calculate the volatility of the city-level indicator (subject to availability). We also took into account the availability of data when deciding which cities to include in the index. We considered the importance of the city for global financial markets and residential real estate investments. Please see the description of data sources on page 24.

The weights of the sub-indices are determined using factor analysis, as recommended by the OECD Handbook on Constructing Composite Indicators (2008). Factor analysis weights the sub-indices to capture as much of the common underlying bubble risk information as possible. As the drivers of bubbles vary across cities, this method results in city-specific weights on sub-indices. To prevent overweighting country level variables and to increase the comparability of cities, the deviation from the average weight across all cities is limited. Weights adjusted this way approximate the average factor analysis weight of single indices across the cities and complement the calculation. The final weights are subject to minor changes when new data enters the calculation or past data is revised.

Benchmarking

The analysis is complemented by a city benchmarking using current price-to-income and price-to-rent ratios. The price-to-income ratio indicates how many years a skilled service worker needs to work to be able to buy a 60 square meter (650 square foot) flat near the city center. The price-to-rent ratio signals how expensive owner-occupied homes are relative to rental apartments. The higher the ratios, the more expensive buying becomes. Earnings data is taken primarily from the *UBS Prices and Earnings* survey and from official statistical sources. Real estate prices and rents vary widely near the city center. Our estimates are cross-checked, validated using different sources, and are updated and challenged on an annual basis. However, we also specify an uncertainty range due to the differing quality of data sources.

Data sources

		Price Index (City)	Rent Index (City)	Income Index (City)	Price Index (Country)	Mortgage, Construction, GDP, Inflation (Country)
Amsterdam	2023Q2	CBS, Maastricht University	NVM, UBS P&E	UBS P&E, CBS	CBS, FED Dallas	DNB, CBS, EUKLEMS, Bloomberg
Boston	2023Q2	FHFA, S&P/Shiller	CBRE, FED St. Louis	BEA	FHFA	FED, BEA, Bloomberg
Dubai	2023Q2	Reidin, BIS	Reidin, UBS P&E	UBS P&E, Morgan Stanley, Bloomberg	–	Central Bank UAE, Dubai Statistics Center, Morgan Stanley, Bloomberg
Frankfurt	2023Q2	Bulwiengesa	Bulwiengesa, OECD	Destatis, UBS P&E, OECD	FED Dallas	Deutsche Bundesbank, Destatis, EUKLEMS, Bloomberg
Geneva	2023Q2	Wüest Partner	Statistique Genève	FTA, FSO	Wüest Partner	SNB, SECO, FSO
Hong Kong	2023Q2	RVD	RVD	Census and Statistics Department Hong Kong, Bloomberg	–	Census and Statistics Department Hong Kong, HKMA, Macrobond, Bloomberg
London	2023Q2	Nationwide	ONS, UBS P&E	ONS	Nationwide	BoE, ONS, EUKLEMS, Bloomberg
Los Angeles	2023Q2	FHFA, S&P/Shiller	CBRE, FED St. Louis	BEA	FHFA	FED, BEA, Bloomberg
Madrid	2023Q2	BoS	Ayuntamiento de Madrid	INE	BoS	INE, BoS, EUKLEMS, Bloomberg
Miami	2023Q2	FHFA, S&P/Shiller	CBRE, FED St. Louis	BEA	FHFA	FED, BEA, Bloomberg
Milan	2023Q2	Nomisma	Nomisma, OECD	Dipartimento delle Finanze, UBS P&E	FED Dallas	Banca d'Italia, Hypostat, Istat, EUKLEMS, Macrobond, Bloomberg
Munich	2023Q2	Bulwiengesa	Bulwiengesa, OECD	Destatis, UBS P&E, OECD	FED Dallas	Deutsche Bundesbank, Destatis, EUKLEMS, Bloomberg
New York	2023Q2	FHFA, S&P/Shiller	CBRE, CoStar, FED St. Louis	BEA	FHFA	FED, BEA, Bloomberg
Paris	2023Q2	BIS, CGEDD	Insee	Insee, Bloomberg, UBS P&E	FED Dallas	BdF, Insee, EUKLEMS, Macrobond, Bloomberg
San Francisco	2023Q2	FHFA, S&P/Shiller	CBRE, FED St. Louis	BEA	FHFA	FED, BEA, Bloomberg
São Paulo	2023Q2	Fipe	Fipe	Fundação Seade	Fipe	Banco do Brasil, IBGE, Bloomberg
Singapore	2023Q2	Government of Singapore	Government of Singapore, UBS P&E	Government of Singapore	–	Government of Singapore, Bloomberg
Stockholm	2023Q2	Statistics Sweden, Valueguard	Statistics Sweden, UBS P&E	Statistics Sweden, UBS P&E	Statistics Sweden	Statistics Sweden, Bloomberg
Sydney	2023Q2	REIA, ABS	REIA, NSW Government, UBS P&E	ABS, UBS P&E	FED Dallas	ABS, RBA, Bloomberg
Tel Aviv	2023Q2	CBS	CBS, UBS P&E	CBS, UBS P&E	FED Dallas	BoI, Bloomberg
Tokyo	2023Q2	The Real Estate Transaction Promotion Center, Haver Analytics	Miki Syoji, Official Statistics of Japan	INDB, Tokyo Metropolitan Government, UBS P&E	FED Dallas	ESRI, EUKLEMS, Bloomberg
Toronto	2023Q2	Sauder School of Business UBC, Bloomberg	Canadian Housing Observer, Sauder School of Business UBC	Statistics Canada	FED Dallas	Statistics Canada, BoC, Bloomberg
Vancouver	2023Q2	Sauder School of Business UBC, Bloomberg	Canadian Housing Observer, Sauder School of Business UBC	Statistics Canada, Government of British Columbia	FED Dallas	Statistics Canada, BoC, Bloomberg
Warsaw	2023Q2	National Bank of Poland	National Bank of Poland	Statistics Poland	National Bank of Poland	National Bank of Poland, Statistics Poland, Bloomberg
Zurich	2023Q2	Wüest Partner	Statistik Stadt Zürich	FTA, FSO	Wüest Partner	SNB, SECO, FSO

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Version C/2023. CIO82652744

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