DEMOGRAPHIA INTERNATIONAL HOUSING AFFORDABILITY

2023 EDITION

PRESENTED BY THE URBAN REFORM INSTITUTE AND THE FRONTIER CENTRE FOR PUBLIC POLICY

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INTRODUCTION

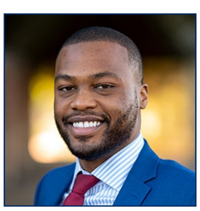
The Urban Reform Institute and the Frontier Centre for Public Policy are pleased to present the 2023 edition of *Demographia International Housing Affordability*. This report provides housing affordability ratings, using the median multiple, a measurement of income in relation to housing prices, for 94 major markets (metropolitan areas) in eight nations for the third quarter of 2022.

As the pandemic and lockdowns continued into another year, the movement of households from denser urban neighborhoods to larger homes, often with large yards (gardens) in suburban and outlying areas has continued. The result has been to drive up prices at unprecedented rates in many markets. As a result many low-income and middle-income households who already have suffered the worst consequences from housing inflation will see their standards of living further decline.

Housing affordability generally stabilized in 2022, though at higher prices than before the pandemic. In some markets there has been improvement.

Housing affordability is particularly critical due to the strong increase in remote working (telework) which is accelerating the movement to more affordable places. It will likely also help flatten or even reduce prices in the highest cost housing markets as other households seek less costly housing elsewhere.

The author, Wendell Cox is a senior fellow at both the Urban Reform Institute and the Frontier Centre for Public Policy.



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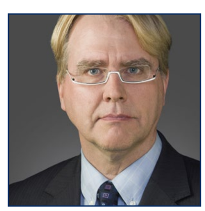

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DEMOGRAPHIA

EXECUTIVE SUMMARY

...the affordability of housing is overwhelmingly a function of just one thing, the extent to which governments place artificial restrictions on the supply of residential land.

Dr. Donald Brash
Governor, Reserve Bank of New Zealand (1988-2002),
Introduction, 4th Annual Demographia International Housing Affordability Survey (2008)

Demographia International Housing Affordability rates middle-income housing affordability in 94 major housing markets in eight nations: Australia, Canada, China, Ireland, New Zealand, Singapore, the United Kingdom and the United States. This edition covers the third quarter (September quarter) of 2022.

Assessing Housing Affordability: Often housing affordability is evaluated by simply comparing house prices. However, without consideration of incomes, housing affordability cannot be assessed. Housing affordability is house prices *in relation to incomes.*

Demographia International Housing Affordability uses the "median multiple" to rate middle-income housing affordability (Table ES-1). The median multiple is a price-to-income ratio, which is the median house price divided by the gross median household income (pre-tax).

Table ES-1
DEMOGRAPHIA HOUSING AFFORDABILITY RATINGS

Housing Affordability Rating	Median Multiple
Affordable	3.0 & Under
Moderately Unaffordable	3.1 to 4.0
Seriously Unaffordable	4.1 to 5.0
Severely Unaffordable	5.1 & Over

Median multiple: Median house price divided by median household income

Middle-income housing affordability is rated in four categories, ranging from the most affordable ("affordable") to the least affordable (severely unaffordable):

Housing markets are metropolitan areas, which are also labor markets. In a well-functioning market, the median priced house should be affordable to a large portion of middle-income households, as was overwhelmingly the case a few decades ago.

Housing affordability comparisons are made, (1) *between* housing markets (such as comparison between Adelaide and Melbourne) or (2) over time *within* the same housing market (such between years in Adelaide).

Housing affordability in 2022 is summarized by nation in Table ES-2.

Table ES-2 Housing Affordability Ratings by Nation: Totals by Market						
Nation	Affordable (3.0 &Under)	Moderately Unaffordable (3.1-4.0)	Seriously Unaffordable (4.1-5.0)	Severely Unaffordable (5.1 &Over)	Total	Median by Nation
Australia	0	0	0	5	5	8.2
Canada	0	1	1	4	6	5.3
China: Hong Kong	0	0	0	1	1	18.8
Ireland	0	0	0	1	1	5.1
New Zealand	0	0	0	1	1	10.8
Singapore	0	0	0	1	1	5.3
United Kingdom	0	0	10	13	23	5.3
United States	0	12	18	26	56	5.0
TOTAL	0	13	29	52	94	5.3

International Housing Affordability in 2022: Housing affordability in 2022 continued to reflect the huge price increases that occurred during the pandemic demand shock. Some housing affordability improvements have since occurred and more are likely as the demand shock is hopefully replaced by more normal market trends.

Hong Kong is the least affordable market, with a median multiple of 18.8. Sydney was the second least affordable at 13.3, Vancouver at 12.0, Honolulu at 11.8, San Jose at 11.5, Los Angeles 11.3, Auckland 10.7, Melbourne at 9.9, Toronto at 9.5 and San Diego at 9.4. The most affordable market is Pittsburgh, at 3.1, followed by Rochester at 3.2, Cleveland and St. Louis, at 3.5.

How Housing Unaffordability Intensifies Inequality: There is a broad view that deteriorating housing affordability is an existential threat to the middle-class.

In *Under Pressure: The Squeezed Middle-Class*, the OECD finds that the middle-class faces rising costs of living and that increasing owned house prices are the "main driver of rising middle-class expenditure."

Much of the difference in the cost of living between metropolitan areas (within nations) is explained by housing affordability differences. Additionally, a growing body of research indicates a strong association between the declining fertility rates that afflict so many nations and the housing affordability and cost of living crises.

Moreover, as housing becomes more unaffordable, households migrate to more affordable markets. This is illustrated by the substantial net movement occurring from housing markets in the United States and Canada (especially California markets, along with Toronto and Vancouver).

French economist Thomas Piketty has described growing wealth inequality around the world.[1] Matthew Rognlie, of Northwestern University has shown that much of this inequality is traceable to rapidly rising house values[2], which results in worsening housing affordability.

1 Thomas Piketty, (2014). *Capital in the Twenty-First Century*.
2 Matthew Rognlie, "A note on Piketty and diminishing returns to capital," June 15, 2014. Available online at http://mattrognlie.com/piketty_diminishing_returns.pdf.

This is not surprising, since the dominant form of land use regulation around the world has become urban containment, which severely restricts housing construction on the urban periphery, which has been associated with material deterioration in housing affordability and the worsening cost of living crisis.

Where land use policy contributes to deteriorating housing affordability, the resulting increase in inequality can be viewed as an outcome of public policy. Solving the housing affordability problem requires reforms that restore the competitive market for land in highly regulated markets and avoiding land use policies that worsen affordability where competitive land markets continue to exist.

Rognlie suggests that, "A natural first step to combat the increasing role of housing wealth would be to re-examine these regulations and expand the housing supply."[3]

3 Matthew Rognlie, "A note on Piketty and diminishing returns to capital," June 15, 2014. Available online at http://mattrognlie.com/piketty_diminishing_returns.pdf.

DEMOGRAPHIA INTERNATIONAL HOUSING AFFORDABILITY: 2023 EDITION

...to encourage a property-owning democracy ... and to enable ... citizens in the lower middle income group to own their own homes

– Singapore Housing and Development Board 1964 Annual Report

Demographia International Housing Affordability[4] rates middle-income housing affordability in 94 major housing markets[5] in eight nations: Australia, Canada, China, Ireland, New Zealand, Singapore, the United Kingdom and the United States. This 2023 edition rates housing affordability for the third quarter (September quarter) of 2022. This is the 19th edition in the series. The 2016 edition was featured in the International Montary Fund Global Housing Watch newsletter.

1: ASSESSING HOUSING AFFORDABILITY

Sometimes housing affordability is evaluated simply by comparing house prices. However, without consideration of incomes, housing affordability cannot be assessed. Housing affordability is house prices *in relation to incomes*.

Demographia International Housing Affordability uses the "median multiple" to rate middle-income housing affordability. The median multiple is a price-to-income ratio of the median house price divided by the gross median household income. Price-to-income ratios have been widely used, such as by the World Bank,[6] the United Nations, the Organization for International Cooperation and Development (OECD), the Joint Center for Housing Studies at Harvard University and others. Median price and income measures

Table 1
DEMOGRAPHIA HOUSING AFFORDABILITY RATINGS

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Moderately Unaffordable	3.1 to 4.0
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Severely Unaffordable	5.1 & Over

Median multiple: Median house price divided by median household income

4 *Demographia International Housing Affordability* provides analysis similar to the major market analysis in the 16 editions of the *Demographia International Housing Affordability Survey*, co-authored by Wendell Cox and Hugh Pavletich (2005 to 2020).

5 Major metropolitan areas have 1,000,000 or more residents.

6 The Housing Indicators Program, http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1169578899171/rd-hs7.htm. Also see Shlomo Angel, Housing Policy Matters: A Global Analysis. Oxford University Press, 2000.

better reflect the economic impacts on middle-income and lower-income households, as opposed to averages, which are skewed upward by the inclusion of the highest incomes and prices.[7]

Middle-income housing affordability is rated in four categories, ranging from the most affordable ("affordable") to the least affordable (severely unaffordable), as indicated in Table 1 (above).

The Geography of Housing Affordability

Most international housing affordability comparisons are at national level. However, these higher-level housing affordability measures miss the substantial differences in housing affordability between housing markets in the same nations. For this reason, ***Demographia*** focuses at the housing market level ***within nations***. Housing markets are essentially labor markets (which are also metropolitan areas).[8]

Housing affordability comparisons are made, (1) ***between*** housing markets (such as comparison between Adelaide and Melbourne) or (2) over time ***within*** the same housing market (such between years in Adelaide).

At the same time, there tend to be substantial housing affordability differences within housing markets, with higher median multiples in urban cores, where population densities are higher, than outside urban cores. This is illustrated in 2021 data for the New York and San Francisco markets (Figure 1).[9]

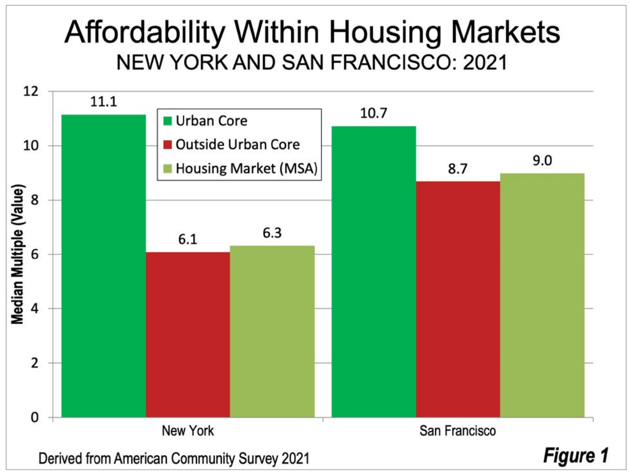

Figure 1

7 The median multiple has been criticized for not taking into account other factors that can affect housing affordability, such as interest rates, mortgage availability, and housing quality. However, these factors tend to vary little between markets within nations. Moreover, the historic, pre-urban containment median multiples were remarkably similar even between the nations in the *Demographia* series (Section 1).

8 Housing markets (and labor markets) are generally metropolitan areas, which are the "functional" definition of cities. This is in contrast to individual municipalities, often called cities, and are typically numerous in all but a few of the housing markets in *Demographia International Housing Affordability*.

9 This is based on survey data, not house prices. The urban cores are the borough of Manhattan for the New York housing market and the city/county of San Francisco for the San Francisco housing market.

2: THE SITUATION

The pandemic created a demand shock that led to rapid and unprecedented deterioration in housing affordability. According to Sam Khater, chief economist at the US Federal Home Loan Mortgage Corporation (Freddie Mac) characterized "the effect of the Covid-19 pandemic" as "unusual in that it spurred housing demand because higher-income households who were able to work from home wanted more space and were willing to live farther from their offices."

However, house affordability has generally stabilized recently, though at higher levels than before the pandemic. In some markets there has been improvement. This is the type of market behavior that is expected when a demand shock passes. Economists have found that house prices in more highly regulated housing markets tend to be more volatile,[10] and the largest house price declines have been in the most highly regulated markets.

In a well-functioning market, the median priced houses should be affordable to middle-income households, as they were in virtually all markets before the inception of more restrictive land use policies, especially urban containment. Only a few markets had adopted such policies by the 1970s, with many more to follow (see Appendix: Urban Containment). As late as about 1990 national price-to-income ratios were "affordable," at 3.0 or less in Australia, Canada, Ireland, New Zealand, the United Kingdom and the United States (Figure 2).

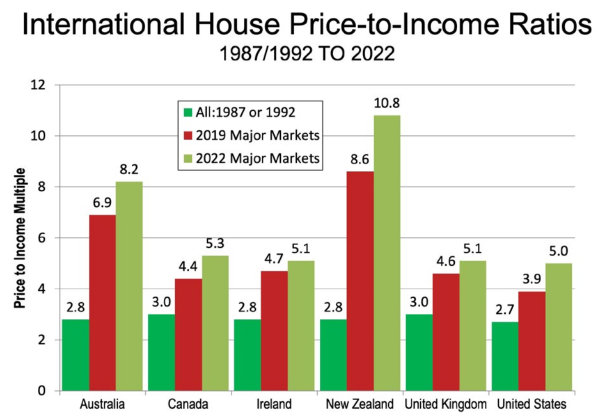

Figure 2

10 E. L., Glaeser, J. Gyourko, J., and A. Saiz, A. (2008). Housing Supply and Housing Bubbles. Journal of Urban Economics, 64 (2), 198-217. http://dx.doi.org/10.1016/j.jue.2008.07.007

3: INTERNATIONAL HOUSING AFFORDABILITY IN 2022

Housing affordability in 2022 followed similar patterns in 2021, following the huge pandemic demand shock increases.

In 2022, none of the 94 major markets were affordable. This is the first time in the 19 years of the Demographia International Housing Affordability series that there has not been an affordable market. By contrast, there were 10 affordable markets in 2019, or 11 percent of the major markets. In 2011, 25 percent of the major markets were affordable. There has been a substantial increase in severely unaffordable markets, including 52 of the 94 major markets (55 percent) in 2022. This compares to 30 percent in 2011 and 34 percent in 2019, the last pre-pandemic year.

Some housing affordability improvements have since occurred and more are likely as the demand shock seems likely to be replaced by more normal market trends. For example, median house price reductions were sufficient to return Pittsburgh and Rochester to "affordable" ratings by the end of 2022.

Housing affordability in 2022 is summarized by nation in Table 2.

Table 2
Housing Affordability Ratings by Nation: Totals by Market

Nation	Affordable (3.0 &Under)	Moderately Unaffordable (3.1-4.0)	Seriously Unaffordable (4.1-5.0)	Severely Unaffordable (5.1 &Over)	Total	Median Market
Australia	0	0	0	5	5	8.2
Canada	0	1	1	4	6	5.3
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United States	0	12	18	26	56	5.0
TOTAL	0	13	29	52	94	5.3

The least affordable market is Hong Kong, with a median multiple of 18.8, followed by Sydney at 13.3, Vancouver at 12.0, Honolulu (HI) at 11.8, San Jose (CA) at 11.5, Los Angeles (CA) at 11.3, Auckland at 10.8, San Francisco (CA) at 10.7 and Melbourne at 10.1. The most affordable market is Pittsburgh (PA), at 3.1, followed by Rochester (NY) at 3.2, Cleveland (OH) and St. Louis (MO-IL), at 3.5.

Housing affordability for all 94 markets is shown by median multiple in Table 3 and by nation in Table 4 (following Section 5: Appendix – Urban Containment).

Table 3
HOUSING MARKETS RANKED BY AFFORDABILITY: MOST AFFORDABLE TO LEAST AFFORDABLE
Median Multiple (Median House Price/Median Household Income): 2022: Third Quarter

Rank	Nation	Metropolitan Market	Median Multiple	Rank	Nation	Metropolitan Market	Median Multiple
1	U.S.	Pittsburgh, PA	3.1	47	U.K.	Nottingham	5.3
2	U.S.	Rochester, NY	3.2	47	U.S.	Nashville, TN	5.3
3	U.S.	Cleveland, OH	3.5	50	Australia	Perth, WA	5.4
3	U.S.	St. Louis, MO-IL	3.5	50	Canada	Montreal, QC	5.4
5	U.S.	Cincinnati, OH-KY-IN	3.6	50	U.K.	Warrington & Cheshire	5.4
5	U.S.	Oklahoma City, OK	3.6	50	U.S.	Charlotte, NC-SC	5.4
7	U.S.	Buffalo, NY	3.7	54	U.K.	Greater Manchester	5.5
8	U.S.	Detroit, MI	3.8	54	U.S.	Jacksonville, FL	5.5
9	U.S.	Louisville, KY-IN	3.9	56	U.K.	West Midlands	5.7
9	U.S.	Tulsa, OK	3.9	57	U.S.	Providence, RI-MA	5.8
11	Canada	Edmonton, AB	4.0	58	U.S.	Austin, TX	5.9
11	U.S.	Hartford, CT	4.0	58	U.S.	Tucson, AZ	5.9
11	U.S.	Kansas City, MO-KS	4.0	60	U.S.	Phoenix, AZ	6.0
14	U.S.	Columbus, OH	4.1	60	U.S.	Sacramento, CA	6.0
14	U.S.	Grand Rapids, MI	4.1	62	U.S.	Fresno, CA	6.1
14	U.S.	Indianapolis. IN	4.1	62	U.S.	Tampa-St. Petersburg, FL	6.1
14	U.S.	Minneapolis-St. Paul, MN-WI	4.1	64	U.K.	Leicester & Leicestershire	6.2
14	U.S.	Philadelphia, PA-NJ-DE-MD	4.1	64	U.S.	Orlando, FL	6.2
19	U.K.	Glasgow	4.2	66	U.K.	Northampton	6.4
19	U.S.	Chicago, IL-IN-WI	4.2	67	U.K.	Swindon	6.5
21	Canada	Calgary, AB	4.3	68	U.S.	Boston, MA-NH	6.6
21	U.K.	Blackpool & Lancashire	4.3	68	U.S.	Salt Lake City, UT	6.6
21	U.S.	Baltimore, MD	4.3	70	U.S.	Portland, OR-WA	6.7
21	U.S.	Virginia Beach-Norfolk, VA-NC	4.3	71	U.S.	Las Vegas, NV	6.9
25	U.K.	Newcastle	4.4	71	U.S.	Seattle, WA	6.9
25	U.K.	Sheffield	4.4	73	U.K.	Plymouth & Devon	7.0
27	U.S.	Atlanta, GA	4.5	73	U.S.	Denver, CO	7.0
28	U.K.	Middlesbrough & Durham	4.7	73	U.S.	Riverside-San Bernardino, CA	7.0
28	U.S.	Houston, TX	4.7	76	U.S.	New York, NY-NJ-PA	7.1
28	U.S.	Memphis, TN-MS-AR	4.7	77	U.K.	London Exurbs	7.3
28	U.S.	New Orleans. LA	4.7	78	Australia	Brisbane, QLD	7.4
32	U.K.	Liverpool	4.8	79	U.K.	Bristol-Bath	7.5
32	U.S.	Birmingham, AL	4.8	80	U.K.	Bournemouth & Dorsett	8.0
34	U.K.	Edinburgh	4.9	81	Australia	Adelaide, SA	8.2
34	U.K.	Stoke on Trent & Staffordshire	4.9	82	U.S.	Miami, FL	8.5
34	U.S.	Dallas-Fort Worth, TX	4.9	83	U.K.	Greater London	8.7

Table 3, contd.
HOUSING MARKETS RANKED BY AFFORDABILITY: MOST AFFORDABLE TO LEAST AFFORDABLE
Median Multiple (Median House Price/Median Household Income): 2022: Third Quarter

Rank	Nation	Metropolitan Market	Median Multiple	Rank	Nation	Metropolitan Market	Median Multiple
34	U.S.	Richmond, VA	4.9	84	U.S.	San Diego, CA	9.4
34	U.S.	San Antonio, TX	4.9	85	Canada	Toronto, ON	9.5
39	U.K.	Derby & Derbyshire	5.0	86	Australia	Melbourne, VIC	9.9
39	U.K.	Leeds	5.0	87	U.S.	San Francisco, CA	10.7
39	U.S.	Milwaukee, WI	5.0	88	N.Z.	Auckland	10.8
39	U.S.	Washington, DC-VA-MD-WV	5.0	89	U.S.	Los Angeles, CA	11.3
43	Ireland	Dublin	5.1	90	U.S.	San Jose, CA	11.5
43	U.K.	Hull & Humber	5.1	91	U.S.	Honolulu, HI	11.8
43	U.S.	Raleigh, NC	5.1	92	Canada	Vancouver, BC	12.0
46	Canada	Ottawa-Gatineau, ON-QC	5.2	93	Australia	Sydney, NSW	13.3
47	Singapore	Singapore	5.3	94	China	Hong Kong	18.8

Australia: Australian markets have a median multiple of 8.2, up from 6.9 in 2019. This is an increase of 1.3 years of median household income. All five of Australia's major housing markets have been severely unaffordable since the early 2000s.

Sydney has the least affordable market, with a median multiple of 13.3, the second least affordable market internationally (ranking 93rd in affordability out of 94 markets) (Figure 3).

With a median multiple of 9.9, Melbourne is the 86th least affordable of the 94 markets. Adelaide had a median multiple of 8.2, ranked 81st among the 94 markets. Brisbane, at 7.4 ranked 78th, while Perth, at 5.4 was the 50th least unaffordable market.

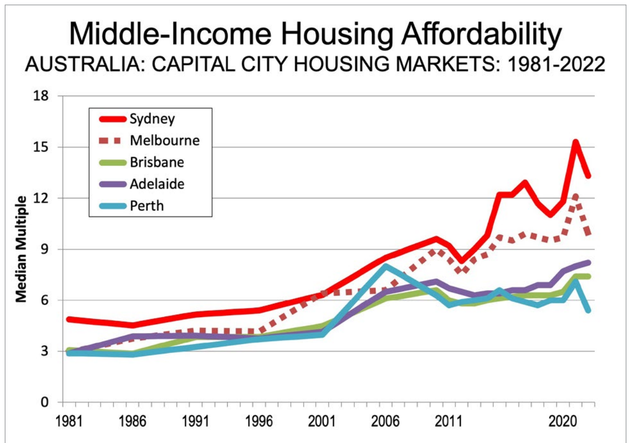


Figure 3

Australia's major housing markets have had especially severe housing affordability losses. Adelaide median house prices have increased 6.1 times the rate of inflation since 2020, as measured by the Consumer Price Index (CPI). Sydney prices increased 6.0 times the CPI, Brisbane 5.2 times, Melbourne 4.9 times and Perth 4.2 times. In each of these five housing markets, the house price inflation since 2000 exceeded that of all of the product groups constituting the CPI (such as food, clothing, transportation and education and health).[11]

11 Calcualted from Australian Bureau of Statistics and REIA data.

Canada: The markets in Canada have a median multiple of 5.3. Four of the six markets in Canada are rated severely unaffordable. There has been a considerable loss of housing affordability in Canada since the mid-2000s, especially in the Vancouver and Toronto markets (Figure 4, below). By contrast, there was ***no*** housing affordability deterioration in the more than three preceding decades in Toronto.

Vancouver is least affordable in Canada and the third least affordable of the 94 markets, at a median multiple of 12.0, more unaffordable than all markets but Hong Kong and Sydney. The median multiple has slightly deteriorated from the pre-pandemic 11.9 in 2019.

Severely unaffordable housing has spread from Vancouver to smaller markets, as metro Vancouver has shed domestic migration to smaller markets in British Columbia, such as Chilliwack, the Fraser Valley, and Kelowna and markets on Vancouver Island. From 2015 to 2022, housing affordability has worsened by the equivalent of 2.7 years of median household income in these smaller markets (Figure 5).

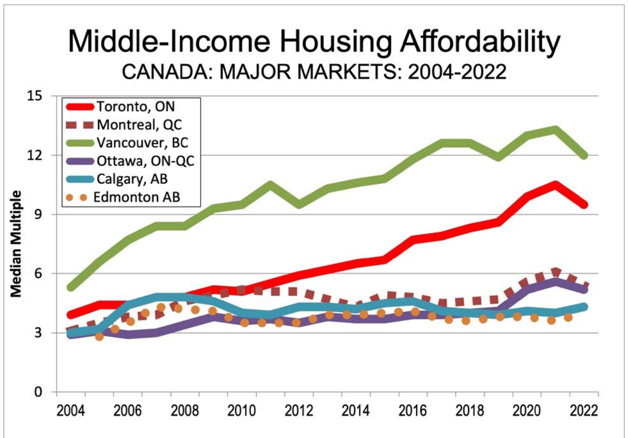


Figure 4

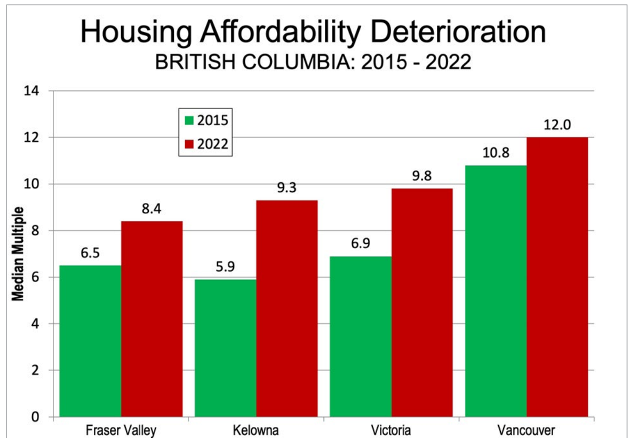


Figure 5

Toronto is the second least affordable market in Canada and ranks 85th out of 94 markets in international affordability, with a median multiple of 9.5, still above its pre-pandemic (2019) 8.6. This indicates that the median house price has increased the equivalent of 0.9 years of median household income.

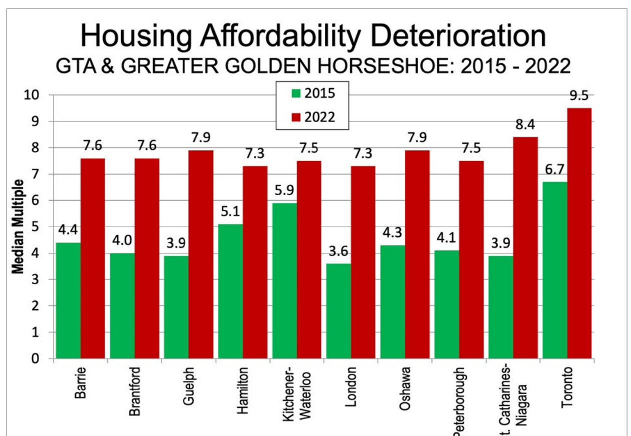


Figure 6

Severely unaffordable housing has spread to smaller, less unaffordable markets in Ontario, such as Kitchener-Cambridge-Waterloo, Brantford, London and Guelph, as residents of metro Toronto seek lower costs of living outside the Toronto market. From 2015 to 2022, housing affordability has worsened by the equivalent of 3.3 years of median household income in smaller markets outside Toronto, an even greater loss than that of the Toronto market, at 2.8 years of median household income (Figure 6).

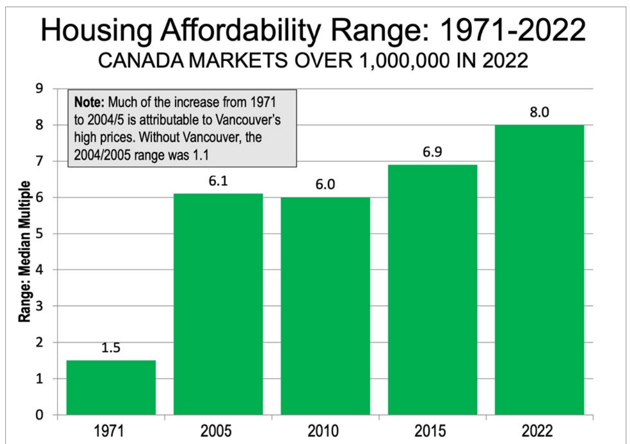
Montreal (5.4) and Ottawa-Gatineau (5.2) are also severely unaffordable. The most affordable market is Edmonton, with a moderately unaffordable median multiple of 4.0. Calgary, with a median multiple of 4.3, was seriously unaffordable.

Housing Affordability and Net Domestic Migration: In Canada, severely unaffordable housing has been a major factor in driving net domestic migration (net internal migration) from the most expensive markets to less expensive markets. For example, in the last five years:[12]

- Approximately 325,000 net domestic migrants have left the Toronto market (metropolitan area), 94% of which have moved to less expensive areas within the province of Ontario. This compares to a smaller 185,000 Toronto loss in the previous five years.
- The Montreal market has lost 145,000 net domestic migrants, with many relocating to less expensive markets in other parts of Quebec. In the previous five years the Montreal loss was much lower, at 85,000.
- The Vancouver market has lost 65,000 net domestic migrants to less expensive markets in British Columbia, compared to a much lower 40,000 loss in the previous five years.

In Canada, the affordability range among the six major markets was 1.5 median multiple points in 1971, rising to 6.1 in the mid-2000s and has now risen to 8.0, more than five times that of 1971 (Figure 7).

The variation in house construction costs and land related costs is illustrated using data from Canada (Vancouver, Toronto and Winnipeg) in Figure 13 in the Appendix: Urban Containment.



Source: Statistics Canada and *Demographia*. **Figure 7**

China: Hong Kong is the least affordable market in *Demographia International Housing Affordability*, with a median multiple of 18.8. This is the most substantial improvement in the 19 years of the *Demographia International Housing Affordability* series. However, Hong Kong's current housing affordability remains more severe than that of any other market over its period of coverage by *Demographia* (12 years).

Hong Kong has been given a clear responsibility by the central government to improve housing affordability, and increase house sizes.

Ireland: Dublin, Ireland's single major metropolitan area, had a severely unaffordable median multiple of 5.2.

12 Calculated from Statistics Canada data.

New Zealand: Auckland has a severely unaffordable median multiple of 10.8. This is a modest improvement from last year, but still up the equivalent of two years in median household income from pre-pandemic 2019. Auckland ranks 88th in affordability out of 94 markets.

Singapore: In the early 1960s Singapore had a desperate housing situation, which has been characterized as "unhygienic slums and crowded squatter settlements."[13] To address the issue, Singapore established the Housing and Development Board (HDB), which in its Report expressed the intention to ...*encourage a property-owning democracy in Singapore and to enable Singapore citizens in the lower middle-income group to own their own homes*. This objective has been achieved, with an 88% home ownership rate in 2020. Moreover, this formal housing affordability objective is unique among the markets covered by *Demographia International Housing Affordability*. The 2019 edition includes a description of Singapore housing policy ("Focus on Singapore").

Singapore has a severely unaffordable median multiple of 5.3, ranking 47th in affordability out of the 94 markets (tied with Nottingham and Nashville).

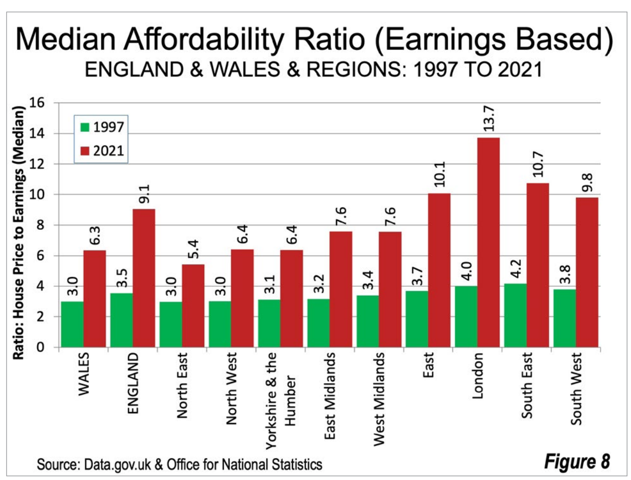
Affordability may be comparatively more favorable based on unique elements of Singapore's Housing and Development Board. For example, all new HDB houses are heavily subsidized, which makes houses more affordable to first time buyers. In addition, some buyers can qualify for grants from the Central Provident Fund (social security system). There is insufficient data to compare these issues with the other markets.

The Housing and Development Board suggests that inclusion of these issues could improve Singapore's housing affordability by 0.9 median multiple points.

These policies exhibit a public policy focus on housing affordability that has been translated into positive outcomes for Singapore households.

United Kingdom: The United Kingdom had a 5.3 median multiple in 2022. There are 13 severely unaffordable markets and the other 10 markets are severely unaffordable.

London is the least affordable market in the United Kingdom, with median multiple of 8.7, ranking 83rd out of 94 in affordability. Bournemouth & Dorset has a median multiple of 8.0, ranked 80th least affordable, Bristol-Bath was at 7.5 (79th), and the London Exurbs (outside the greenbelt) is at median multiple of 7.3, ranking 77th in affordability.



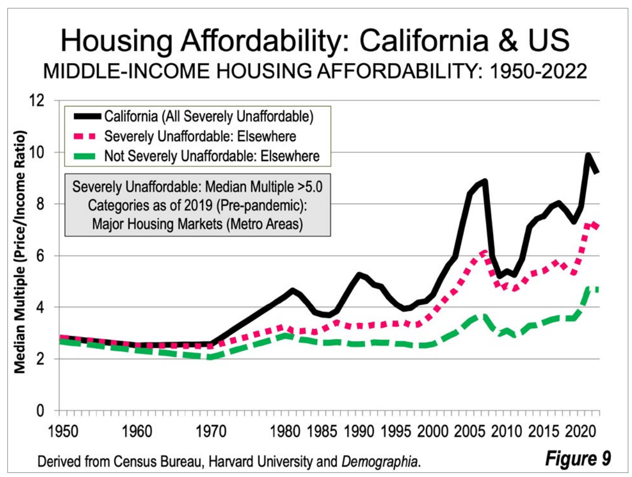
13 Parts of this discussion are based on "Focus on Singapore," the introduction to last year's *16th Annual Demographia Housing Affordability Survey.*

The most affordable market was Glasgow, with a median multiple of 4.2 ranking 19th in affordability out of 94. Blackpool and Lancashire had a median multiple of 4.3, while Newcastle and Sheffield were at 4.4.

The United Kingdom has the longest experience with urban containment policy, and house price increases have raced ahead of incomes. This is illustrated in Figure 8 (above), indicating the change in the Office of National Statistics Median Affordability Ratio (median house price divided by median earnings). On average, in England and Wales, the Median Affordability Ratio indicates that median house prices have risen at 2.6 times the rate of median full-time earnings. The largest increase has occurred in Greater London, where house prices increased at 3.4 times the rate of earnings between 1997 and 2021. The smallest increase was in the Northeast region, with house prices rising 1.8 times earnings. The current cost-of-living crisis in the United Kingdom has been driven by these enormous house price increases.

These increases began at about the same time that the Labour Government imposed a planning target for 60% of new housing to be infill (brownfield development). This further market distortion may have contributed to these house price increases, making regulation even more restricted than under the existing urban containment environment.

United States: The US median multiple is 5.0. This is up from 3.9 in 2019, an increase of 1.1 years of median household income. There were 26 severely unaffordable markets in 2022, compared to 14 in 2019.



Honolulu was the least affordable major US housing market in 2022, with a median multiple of 11.8. Honolulu (HI) has routinely been among the severely unaffordable markets in the annual *Demographia* reports, though this is the first time that it has been the least affordable.

California has the largest concentration of severely unaffordable markets, with four of the nation's five least affordable (Figure 9). San Jose (CA) is the second least affordable in the US, with a median multiple of 11.5, ranking 90th least affordable out of 94. Los Angeles (CA) has a median multiple of 11.3 (89th), followed by San Francisco (CA) at 10.7 (87th), and San Diego (CA) at 9.4 (83rd).

Outside of California and Hawaii, Miami (FL) is the least affordable, at a median multiple of 8.5, followed by a 7.1 median multiple in New York (NY-NJ-PA). Denver (CO) has a median multiple of 7.0, as does Riverside-San Bernardino (CA), which has recently overtaken San Francisco as California's second largest metropolitan area. Seattle (WA) and Las Vegas (NV) have a median multiple of 6.9, followed by Portland (OR-WA) at 6.7, along with Boston (MA-NH) and Salt Lake City (UT), at 6.6.

The most affordable market was Pittsburgh (PA), with median multiple of 3.1, which was also the most affordable internationally. Pittsburgh slipped into moderate unaffordability, after having been the only affordable market last year. The changing demand of the pandemic pushed nine other markets from affordable rankings in 2019 to moderately unaffordable ratings in 2022., Rochester (NY) follows Pittsburgh at 3.2, Cleveland (OH) and St. Louis (MO-IL), at 3.5, Cincinnati (OH-KY-IN) and Oklahoma City (OK), at 3.6, Buffalo (NY) at 3.7, Detroit (MI) at 3.8, Louisville (KY-IN) and Tulsa (OK) at 3.9, with Kansas City (MO-KS) and Indianapolis (IN) at 4.0.

The range between the least affordable and most affordable markets in the US rose by 2.2 years of household income from 2019 to 2022 by more nearly seven years income 1970, from 1.9 to 8.7 (Figure 10).[14]

Housing Affordability and Net Domestic Migration: In the United States, California has long been losing net domestic migrants, with a 2,000,000 loss from 2000 to 2021.[15]

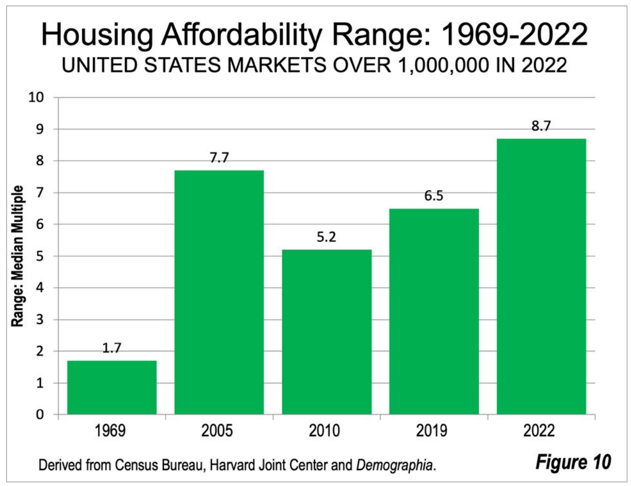


Figure 10

Seattle, Portland and Denver drew many of these migrants, but have now begun to lose net domestic migration (above). In 2021:[16]

- The Seattle market lost 31,000 net domestic migrants, while other less expensive markets in the state of Washington gained 20,000.
- The Denver market lost 7,000 net domestic migrants, while other less expensive markets in the state of Colorado gained 27,000.
- The Portland, market lost 13,000 net domestic migrants, while other less expensive markets in the state gained 19,000.

4: UNAFFORDABLE HOUSING INTENSIFIES INEQUALITY

There is a broad view that deteriorating housing affordability is an existential threat to the middle-class.

In *Under Pressure: The Squeezed Middle-Class*, the OECD: “finds that the middle-class faces ever rising costs relative to incomes and that its survival is threatened.” Further that “…, the cost

14 Figure 9 reflects the large gap that had developed by the mid-2000s in the California-centric housing bubble that resulted from overly loose mortgage qualification policies.
15 Calculated from US Census Bureau data.
16 Calculated from US Census Bureau data.

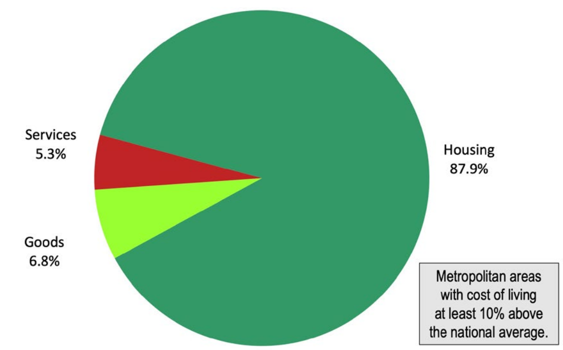
of essential parts of the middle-class lifestyle have increased faster than inflation; house prices have been growing three times faster than household median income over the last two decades." Further OECD found that "Housing has been the main driver of rising middle-class expenditure," with the largest increases in the costs of ownership (or housing affordability), rather than rents.

Urban Reform Institute Executive Director Joel Kotkin's book ***The Coming of Neo-Feudalism: A Warning to the Global Middle Class*** provides a similar perspective.

In the United States more than 85% of cost of living differences between metropolitan areas (Figure 11) are explained by excessive housing costs. Similarly, Bloomberg reports that nearly all of London's higher cost of living is associated with higher housing costs. Indeed, a growing body of research indicates a strong association between the declining fertility rates that afflict so many nations and the housing affordability and cost of living crises.[17]

Housing Share of Excess Costs of Living

MOST EXPENSIVE UNITED STATES MARKETS: 2018



Source: Standard of Living Index 2020 (URI)

Figure 11

French economist Thomas Piketty has described the recent growth wealth inequality around the world.[18] Matthew Rognlie, now at Northwestern University has shown that much of this inequality is traceable to inordinately rising house values,[19] which results in worsening housing affordability.

Indeed, a considerable body of research associates the deterioration of housing affordability of recent decades with stronger land use regulation.[20]

Giani La Cava of the Bank for International Settlements found that rising inequality in the United States was largely associated with increased housing values in markets with more severe housing supply constraints.

17 See for example, Lindsay Flynn (2013): "Housing costs and family formation: Empirical evidence," LIS Working Paper Series, No. 585, Luxembourg Income Study (LIS), Luxembourg, https://www.econstor.eu/bitstream/10419/95429/1/737808942.pdf; KidjieSaguin (2021), "No flat, no child, cointegration analysis of housing, income and security," Asian Development Bank Institute; and Lisa J. Dettling and Melissa Schettini Kearney, "House prices and birth rates: The impact of the real estate market on the decision to have a baby" National Bureau of Economic Research.

18 Thomas Piketty, (2014). *Capital in the Twenty-First Century*.

19 Matthew Rognlie, "A note on Piketty and diminishing returns to capital," June 15, 2014. Available online at: http://mattrognlie.com/piketty_diminishing_returns.pdf.

20 See for example, G. LaCava (2016), "Housing Prices, Mortgage Interest Rates and the Rising Share of Capital Income in the United States," Bank for International Settlements, K. Herkenhoff, L. Ohanian, and E. Prescott (2018); "Tarnishing the Golden and Empire States: Land-Use Restrictions and the U.S. Economic Slowdown", Journal of Monetary Economics, Edward Glaeser and Joseph Gyourko, 2018; "The Economic Implications of Housing Supply" Journal of Economic Perspectives, Chang-Tai Hsieh and Enrico Moretti. 2019; "Housing Constraints and Spatial Misallocation" American Economic Journal: Macroeconomics; Wendell Cox (2015). "A Question of Values: Middle-Income Housing, Affordability and Urban Containment Policy", Frontier Centre for Public Policy.

This is not surprising, since the dominant form of land use regulation around the world has become urban containment[21], with its far higher housing costs relative to incomes in large measure because land values have become disproportionately high.

Where land use policy contributes to deteriorating housing affordability, the resulting increase in inequality can be viewed as an ***outcome of public policy***. Solving the housing affordability problem requires reforms that restore the competitive market for land in highly regulated markets and avoiding land use policies that worsen affordability where competitive land markets continue to exist (Appendix: Urban Containment).

Moreover, as housing becomes more unaffordable, households migrate to more affordable markets. This is illustrated by the substantial net movement occurring from housing markets in the United States and Canada (especially California markets, along with Toronto and Vancouver) (Section 3).

Rognlie (above) suggests that "A natural first step to combat the increasing role of housing wealth would be to re-examine these regulations and expand the housing supply."[22] This is not just a question for builders and communities; it goes to the very fundamental of dispersed property ownership, critical to the health of modern democracies.

5: APPENDIX – URBAN CONTAINMENT

The largest housing affordability differences between major metropolitan areas have developed as urban containment policies have been implemented. These measures are also referred to as "growth management" and "compact city" policies. A principal purpose of urban containment is to curb the physical expansion of urban areas – that is, conversion of rural land to urban land ("urban sprawl" [23]). Whatever its advantages, urban containment has been associated with huge housing cost escalation relative to incomes --- worsened housing affordability. This creates an important social cost to the many in society already challenged to maintain their standards of living.

Urban containment's prototypical strategy is urban growth boundaries (or greenbelts) that encircle urban areas. New housing development is severely limited on the urban fringe, or even banned. Along with other strategies, urban containment can make it impossible to profitably build tracts of housing affordable to middle-income households due to much higher land prices. According to urban planning literature: "Urban development is steered to the area inside the line and discouraged (if not prevented) outside it." Urban containment is contrasted with "...traditional

21 Shlomo Angel, Alejandro M. Blei, Jason Parent, Patrick Lamson-Hall, and Nicolás Galarza Sánchez, with Daniel L. Civco, Rachel Qian Lei, and Kevin Thom, *Atlas of Urban Expansion: 2016 Edition*.

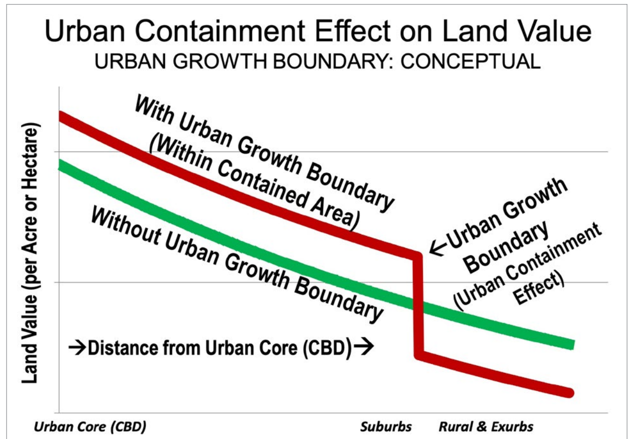
22 Matthew Rognlie, "A note on Piketty and diminishing returns to capital," June 15, 2014. Available online at: http://mattrognlie.com/piketty_diminishing_returns.pdf.

23 Judge Glock, "Sprawl is Good: The Environmental Case for Suburbs"

approaches to land use regulation by the presence of policies that are explicitly designed to limit the development of land outside a defined urban area..."[24]

Harvard University's William Alonso showed that the value of land tends to rise from the low agricultural values outside the built-up urban area to the center. [25] Normally, without urban containment, land values tend to rise gradually, as distances increase from the center. As noted above, with urban containment, it is expected that there will be abrupt land value increases, such as at urban growth boundaries. Land values (and house prices) tend to be higher throughout the entire area of urban containment (Figure 12)[26].

Indeed, higher land prices are both an expected and intended result.[27] Planners anticipated that the higher land prices would be counterbalanced by more dense development within the contained area. Yet, sufficient densification has not occurred and may not have even been feasible.



Adapted from Fischel (2015) and Nelson & Dawkins (2004) **Figure 12**

The OECD described how this can happen. In *Rethinking Urban Sprawl: Moving Toward Sustainable Cities*, the OECD cautions that housing affordability can deteriorate if sufficient developable land is not kept available within urban growth boundaries.[28] This urban expansion land must be large enough to retain the competitive market for land, the preservation of which was stressed by Anthony Downs of the Brookings Institution.[29]

Otherwise, land and in consequence house prices are likely to escalate disproportionately to incomes, as has occurred in many markets. According to Alain Bertaud, former principal urban

24 Arthur C. Nelson and Casey J. Dawkins (2004), "Urban Containment in the United States: History, Models and Techniques for Regional and Metropolitan Growth Management," American Planning Association Planning Advisory Service

25 William Alonso (1964), *Location and Land Use: Toward a General Theory of Land Rent* (Cambridge, Massachusetts, Harvard University Press).

26 Figure is adapted from other works dealing urban growth boundaries. Other graphical representations of this relationship can be found in Gerrit Knaap and Arthur C. Nelson, The Regulated Landscape: Lessons on State Land Use Planning from Oregon, Cambridge, Massachusetts: Lincoln Institute of Land Policy, 1992; William A. Fischel, Zoning Rules! The Economics of Land-use Regulation, Lincoln Institute of Land Policy, 2015; Gerard Mildner, "Public Policy & Portland's Real Estate Market," Quarterly and Urban Development Journal, 4th Quarterly 2009: 1-16, and others. Under traditional land use regulation, where there is no urban containment boundary, the land price gradient would be smooth (the green line labeled "Before Urban Growth Boundary"). On the other hand, an abrupt increase occurs at the urban boundary in an environment with an urban containment boundary (the red line labeled "After Urban Growth Boundary").

27 Arthur C. Nelson and Casey J. Dawkins, Urban Containment in the United States: History, Models and Techniques for Regional and Metropolitan Growth Management, American Planning Association Planning Advisory Service. https://www.researchgate.net/publication/288101674_Urban_containment.

28 Organization for Economic Cooperation and Development (OEDC), *Rethinking Urban Sprawl: Moving Towards Sustainable Cities*, 2018.

29 Anthony Downs, New Visions for Metropolitan America, (1994),

planner at the World Bank, urban growth boundaries and greenbelts put "arbitrary limits on city expansion" and that "the result is predictably higher prices."[30]

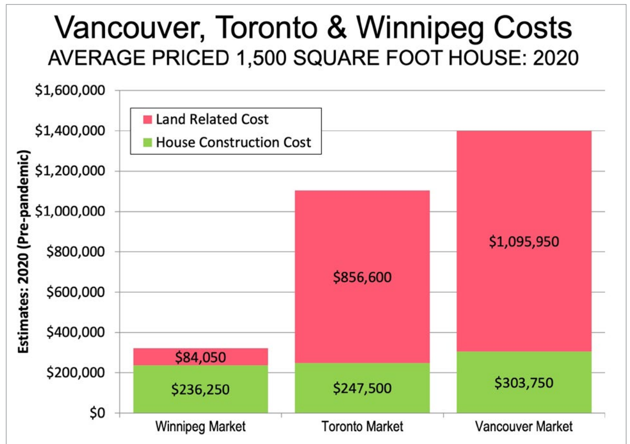


Figure 13

The extent to which land prices drive the final cost of houses is illustrated in Figure 13, which compares the urban containment housing markets of Vancouver and Toronto to the generally liberally regulated market of Winnipeg. The estimated construction costs for a 1,500 square foot house in Toronto were less than five percent more than that of Winnipeg, compared to a more than nine times (900 percent) difference in land and related costs. In Vancouver, the construction costs for the 1,500 square foot house were less than 30 percent more than that of Winnipeg, compared to a more than 12 times (1,200 percent) difference in land and related costs. Much of the land cost difference is attributable to the urban containment effect (above).

The largest housing affordability losses have been in markets with urban containment. Before the pandemic demand shock (2019), *all* severely unaffordable markets in *Demographia International Housing Affordability* were subject to urban containment.

Long-time Reserve Bank of New Zealand Governor Donald Brash[31] commented on the continuing failure of public policy to restore housing affordability, despite political promises: "One thing I can say with confidence, however, is that house prices will not return to more affordable levels until land becomes available at more reasonable prices.

30 Alain Bertaud, *Order without Design: How Markets Shape Cities*, MIT Press (2018).
31 Governor Brash contributed the Introduction to the *4th Annual Demographia International Housing Affordability Survey* (2008).

Table 4
ALL HOUSING MARKETS BY NATION
Median Multiple (Median House Price/Median Household Income): 2022: Third Quarter

Rank	Nation	Metropolitan Market	Median Multiple	Rank	Nation	Metropolitan Market	Median Multiple
81	Australia	Adelaide, SA	8.2	3	U.S.	Cleveland, OH	3.5
78	Australia	Brisbane, QLD	7.4	14	U.S.	Columbus, OH	4.1
86	Australia	Melbourne, VIC	9.9	34	U.S.	Dallas-Fort Worth, TX	4.9
50	Australia	Perth, WA	5.4	73	U.S.	Denver, CO	7.0
93	Australia	Sydney, NSW	13.3	8	U.S.	Detroit, MI	3.8
21	Canada	Calgary, AB	4.3	62	U.S.	Fresno, CA	6.1
11	Canada	Edmonton, AB	4.0	14	U.S.	Grand Rapids, MI	4.1
50	Canada	Montreal, QC	5.4	11	U.S.	Hartford, CT	4.0
46	Canada	Ottawa-Gatineau, ON-QC	5.2	91	U.S.	Honolulu, HI	11.8
85	Canada	Toronto, ON	9.5	28	U.S.	Houston, TX	4.7
92	Canada	Vancouver, BC	12.0	14	U.S.	Indianapolis. IN	4.1
94	China	Hong Kong	18.8	54	U.S.	Jacksonville, FL	5.5
43	Ireland	Dublin	5.1	11	U.S.	Kansas City, MO-KS	4.0
88	N.Z.	Auckland	10.8	71	U.S.	Las Vegas, NV	6.9
47	Singapore	Singapore	5.3	89	U.S.	Los Angeles, CA	11.3
21	U.K.	Blackpool & Lancashire	4.3	9	U.S.	Louisville, KY-IN	3.9
80	U.K.	Bournemouth & Dorset	8.0	28	U.S.	Memphis, TN-MS-AR	4.7
79	U.K.	Bristol-Bath	7.5	82	U.S.	Miami, FL	8.5
39	U.K.	Derby & Derbyshire	5.0	39	U.S.	Milwaukee, WI	5.0
34	U.K.	Edinburgh	4.9	14	U.S.	Minneapolis-St. Paul, MN-WI	4.1
19	U.K.	Glasgow	4.2	47	U.S.	Nashville, TN	5.3
83	U.K.	Greater London	8.7	28	U.S.	New Orleans. LA	4.7
54	U.K.	Greater Manchester	5.5	76	U.S.	New York, NY-NJ-PA	7.1
43	U.K.	Hull & Humber	5.1	5	U.S.	Oklahoma City, OK	3.6
39	U.K.	Leeds	5.0	64	U.S.	Orlando, FL	6.2
64	U.K.	Leicester & Leicestershire	6.2	14	U.S.	Philadelphia, PA-NJ-DE-MD	4.1
32	U.K.	Liverpool	4.8	60	U.S.	Phoenix, AZ	6.0
77	U.K.	London Exurbs	7.3	1	U.S.	Pittsburgh, PA	3.1
28	U.K.	Middlesbrough & Durham	4.7	70	U.S.	Portland, OR-WA	6.7
25	U.K.	Newcastle	4.4	57	U.S.	Providence, RI-MA	5.8
66	U.K.	Northampton	6.4	43	U.S.	Raleigh, NC	5.1
47	U.K.	Nottingham	5.3	34	U.S.	Richmond, VA	4.9
73	U.K.	Plymouth & Devon	7.0	73	U.S.	Riverside-San Bernardino, CA	7.0
25	U.K.	Sheffield	4.4	2	U.S.	Rochester, NY	3.2
34	U.K.	Stoke on Trent & Staffordshire	4.9	60	U.S.	Sacramento, CA	6.0
67	U.K.	Swindon	6.5	68	U.S.	Salt Lake City, UT	6.6
50	U.K.	Warrington & Cheshire	*5.4*	34	U.S.	San Antonio, TX	4.9

Table 4, contd. ALL HOUSING MARKETS BY NATION Median Multiple (Median House Price/Median Household Income): 2022: Third Quarter							
Rank	Nation	Metropolitan Market	Median Multiple	Rank	Nation	Metropolitan Market	Median Multiple
56	U.K.	West Midlands	5.7	84	U.S.	San Diego, CA	9.4
27	U.S.	Atlanta, GA	4.5	87	U.S.	San Francisco, CA	10.7
58	U.S.	Austin, TX	5.9	90	U.S.	San Jose, CA	11.5
21	U.S.	Baltimore, MD	4.3	71	U.S.	Seattle, WA	6.9
32	U.S.	Birmingham, AL	4.8	3	U.S.	St. Louis,, MO-IL	3.5
68	U.S.	Boston, MA-NH	6.6	62	U.S.	Tampa-St. Petersburg, FL	6.1
7	U.S.	Buffalo, NY	3.7	58	U.S.	Tucson, AZ	5.9
50	U.S.	Charlotte, NC-SC	5.4	9	U.S.	Tulsa, OK	3.9
19	U.S.	Chicago, IL-IN-WI	4.2	21	U.S.	Virginia Beach-Norfolk, VA-NC	4.3
5	U.S.	Cincinnati, OH-KY-IN	3.6	39	U.S.	Washington, DC-VA-MD-WV	5.0

Sources and Methods

House price data is estimated from sources reporting on housing types representing the majority of existing dwellings in each nation. Official government produced sales registers are used where available (Ireland, Scotland, England and Wales). Other sources include authoritative real estate time series and market reports.

Pre-tax median household incomes for the present year are estimated based on official government data. Income indicators have become more difficult due to pandemic related challenges faced by government statistical agencies.

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