

ACRC Asia Case Research Centre 亞洲案例研究中心

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VALUATION OF HONG KONG RESIDENTIAL PROPERTY

Hong Kong was the world's most unaffordable real estate market. In 2021, median home prices were 20.7 times the gross annual income of households.¹ The percentage of Hong Kong residents owning private permanent properties was 52.9% [see **Exhibit 1**]. Property ownership had become a lifelong goal for many Hong Kong people. To keep track of property prices, Hong Kong residents typically used free, online, property valuation tools² that retail banks provided.

A bank was entering the Hong Kong retail banking market. Jane, the head of the bank's data analytics team, was instructed to develop an online property valuation tool to drive traffic to the bank's website and help establish its residential mortgage business. To develop the tool, the data analytics team needed to train a valuation model using past property transaction data.

Hong Kong Residential Property Market

Overview

Hong Kong SAR was a major international trade and finance hub, often functioning as a bridge between mainland China and the rest of the world. With a population of 7.41 million living in 2.67 million domestic households, the demand for housing was high.³ Roughly 77 square kilometers of Hong Kong's land was zoned for residential use, making Hong Kong one of the most densely populated areas in the world. To address the community's housing needs, high-rise buildings dotted the landscape.

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¹ "Global Living 2020," CBRE Research, 2020, <u>https://www.cbreresidential.com/uk/sites/uk-residential/files/CBRE-Global%20Living 2020 Final.pdf</u>, accessed 23 September 2022.

² Online property valuation tools provide immediate property valuation services for most Hong Kong real estate by simply entering the address in the web-based valuation tool. Access the following link for the Bank of China valuation tool: <u>https://www.bochk.com/en/mortgage/expert/expert2.html</u>

³ "2021 Population Census," Government of the Hong Kong SAR, 2021, <u>https://www.censtatd.gov.hk/en/scode600.html</u>, accessed 23 September 2022.

Churong Wang prepared this case under the supervision of Dr. Xi Li and Prof. Kelvin S.K. Wong for class discussion. This case is not intended to show effective or ineffective handling of decision or business processes. The authors might have disguised certain information to protect confidentiality. Cases are written in the past tense, this is not meant to imply that all practices, organizations, people, places or fact mentioned in the case no longer occur, exist or apply.

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The high demand made Hong Kong one of the world's most active and pricey real estate markets. According to Centaline's Centa-City Index, Hong Kong property prices had doubled and reached record highs from 2012 to 2022 [see **Exhibit 2**]. As reported by real estate consultancy CBRE Global Living, average property prices reached around USD1.25mn, while Hong Kong residents working full-time earned an average annual salary of USD61,022.⁴ Neither the social unrest in 2019 nor the COVID-19 pandemic significantly impacted property prices.

Hong Kong's record-high property prices were attributed to a combination of geological, financial, and social factors. Land for residential use occupied only 7% of the total area, as 75% of Hong Kong was protected or covered with mountains.⁵ All land in Hong Kong belonged to the government. With one of the lowest tax rates in the world, the Hong Kong SAR government earned most of its financial income by leasing Hong Kong land to the highest bidder.

Several large waves of cross-border migrations from mainland China had occurred over the last two centuries. Many multinational corporations' expatriate employees who had large budgets for housing relocated to Hong Kong for work. Along with Hong Kong's low tax rate, luxury property prices continued to rise and attracted wealthy buyers from mainland China and other parts of the world.⁶

As real estate values in Hong Kong were among the highest in the world, real estate contributed significantly to the systematic risk of Hong Kong market portfolios. Not only did it account for a sizable portion of the economy in terms of wealth, but its value also had a considerable impact on other industries and sectors, such as the financial market and government budgets.

The Residential Mortgage Process

After reading about Hong Kong's real estate market, Jane studied the residential mortgage process in Hong Kong. As part of this process, an independent valuer usually performed a property valuation on behalf of the bank issuing the mortgage, estimating the approximate value of the property. All major banks in Hong Kong provided property valuation services. Each bank came up with its own valuation, and valuation between banks might fluctuate by up to 20%, given the differences in internal policies and risk tolerance. In general, competition between banks, together with regulation by the Hong Kong Monetary Authority (HKMA)⁷ and the code of conduct of the Hong Kong Institute of Surveyors, ensured a fair valuation process.

After the valuation, the bank calculated the loan-to-value ratio (LTV).⁸ The HKMA set a maximum LTV ratio of 50% to 60% for permanent residents in Hong Kong, depending on the price of the property. The exception was first-time homebuyers with regular income, who could obtain a mortgage with an LTV up to 90% at the maximum loan cap of HKD8mn [see **Exhibit 3** for the details of the regulation].

To help first-time buyers afford larger homes, the Hong Kong SAR government increased the value of mortgages available in 2022. According to the plan, first-time homebuyers eligible for the higher LTV of 90% could borrow up to HKD10mn in mortgage financing, an increase from

⁴ "Global Living 2020," CBRE Research, 2020, <u>https://www.cbreresidential.com/uk/sites/uk-residential/files/CBRE-Global%20Living_2020_Final.pdf</u>, accessed 23 September 2022.

⁵ "Planning Department - Land Utilization in Hong Kong," Planning Department of the government of the Hong Kong SAR, 9 September 2021, <u>https://www.pland.gov.hk/pland_en/info_serv/statistic/landu.html</u>, accessed 23 September 2022.

⁶ Mukul Munish, "5 Top Areas in Hong Kong Where Investors Love to Buy Properties," *South China Morning Post*, 24 October 2018, <u>https://www.scmp.com/magazines/style/news-trends/article/2169792/5-top-areas-hong-kong-where-investors-love-buy</u>, accessed 22 May 2022.

⁷ Hong Kong SAR's de facto central bank.

⁸ LTV = (Loan Amount / Asset Value) * 100%.

the previous ceiling of HKD8mn. This policy was expected to speed home-buying decisions and increase the number of buyers by 20% to 30%. It would also help eliminate so-called nano-flats, tiny apartments smaller than 200 square feet (18.6 square meters), as the only property type within many residents' financial reach.⁹

In addition to property valuation, banks also assessed the borrower's ability to repay a mortgage using a debt servicing ratio,¹⁰ plus a stress test in case the interest rate rose.

Property Valuation

Essential Factors

In building the prediction model, learning from past transaction records was essential. Jane got Hong Kong's property transaction data in 2018–2021 from Centaline Surveyors, part of Hong Kong's largest residential property agency, Centaline Group. With many variables in the given data set, Jane looked closely at how each variable would influence property valuation.

General location and zoning

"Location, location, location" was a well-known adage that emphasized the importance of a building's geographic location in property selection and pricing. Hong Kong had three main regions: Hong Kong Island, Kowloon, and the New Territories. In the three regions, there were 18 districts [see **Exhibit 4** for the map of Hong Kong]. Within each district, there were subdistricts called Housing Market Areas (HMAs).

Hong Kong Island was the priciest region, where most business and entertainment areas were located. The region contained some of the most exclusive HMAs. Examples were the Peak, the most affluent residential area in Hong Kong, with the average sale price reaching 70,000 HKD/square foot (about 89,744 USD/square meter),¹¹ and Deep Water Bay, where many of the city's wealthiest billionaires lived. Kowloon was one of the most densely populated places. Properties in Kowloon were generally more affordable than those in Hong Kong Island. The New Territories had the lowest property prices, with more space and views of greenery, but residents in the region had to suffer long commute times traveling to work in the business areas in the Central & Western District [see **Exhibit 4** for the map of Hong Kong]. Located in the Central & Western District, Central was Hong Kong's Central Business District (CBD) and home to many soaring skyscrapers of offices.

School network

The Hong Kong SAR government used the School Places Allocation Systems that allocated students to schools in their residential district. The Primary One Admission System used a zoning system called School Net, which divided Hong Kong's primary schools into 36 zones. Secondary schools also used a zoning system based on the 18 districts in Hong Kong.

The perceived quality¹² of primary and secondary schools could vary widely by School Net or district, with older, more upscale residential areas having some of the most highly demanded schools. Therefore, property buyers with future or current school-age children valued properties

⁹ Ka-sing Lam, "Hong Kong Opens Tap for More Mortgage Loans to First-Home Buyers." *South China Morning Post*, 23 February 2022. <u>https://www.scmp.com/business/article/3168092/budget-2022-2023-hong-kong-opens-funding-tap-make-moremortgage-loans?module=perpetual_scroll_0&pgtype=article&campaign=3168092, accessed 22 May 2022.</u>

¹⁰ Debt Servicing Ratio = (Mortgage Payment / Borrower's Income) * 100%.

¹¹"The Peak," Midland Realty, <u>https://www.midland.com.hk/zh-cn/district/%E5%B1%B1%E9%A1%B6-</u> %E5%B1%B1%E9%A1%B6-130ND10007, accessed 22 September 2022.

¹² Based on the Hong Kong Diploma of Secondary Education examination results for secondary schools, and the ability to get into a top scoring HKDSE secondary school for primary schools.

in districts with top schools. These properties generally had higher transaction rates, more space for appreciation, and higher rents, compared to similar properties in other districts.

Distance to MTR stations

In Hong Kong, the Mass Transit Railway (MTR) was the most popular mode of transport because of its high convenience (9 local lines and 99 stations as of May 2022)¹³ and low cost. Of the working population with a fixed place of work in Hong Kong, 43.2% would choose the MTR to travel to work, followed by 25.0% and 10.5% who traveled by bus and on foot.¹⁴ Therefore, a property's distance to an MTR station was considered significant when buying a property.

Estates

Housing estates were mass housing that private developers established. The estates usually comprised a cluster of high-rise buildings with markets or shopping malls. Private housing estates provided integrated management throughout, attracting more-affluent residents.

In the Hong Kong secondary property market, 10 estates were recognized as the most representative, as they were large (more than 4,000 units), established by reputable developers, and of average age (20–30 years), meaning they had experienced several financial cycles in Hong Kong.

These 10 estates had relatively stable property prices and high liquidity. The top 10 housing estates' weekly and monthly transaction volumes and prices were indicators for assessing the property market's performance.

Age of the property

Twenty-eight percent of private residential flats were built between 1960 and 1980; 41.7% of private apartments were built during 1980–2000; 29% of flats were built after 2000 [see **Exhibit 5**]. Most new property developments were in Kowloon and the New Territories. In 2021, Kowloon and the New Territories contributed 48% and 46% of the completions of private residences, respectively, while Hong Kong Island accounted for 6% of the total.¹⁵ Older properties usually had lower prices than newer ones, but homebuyers had to pay extra fees for maintenance and renovation.

The problem of aging buildings in Hong Kong was becoming increasingly severe, and the living environment of residents in old areas had deteriorated accordingly. By 2021, the number of private buildings over age 50 was 8,600.¹⁶ These buildings had reached a maximum design life and often lacked maintenance. To provide more housing supply for the market and improve the living environment for the residents in the area, private property developers and the Urban Renewal Authority acquired and demolished these old buildings in disrepair and built high-rise buildings through redevelopment projects. As buildings aged, they could have an option value for redevelopment. Age could thus have a nonlinear effect on property value.

¹³ "Transport Department – Railways," Government of the Hong Kong SAR, 13 May 2022,

 <u>https://www.td.gov.hk/en/transport_in_hong_kong/public_transport/railways/index.html</u>, accessed 25 May 2022.
¹⁴ "2021 Population Census," Government of the Hong Kong SAR, 2021, <u>https://www.censtatd.gov.hk/en/scode600.html</u>, accessed 23 September 2022.

¹⁵ "Rating and Valuation Department Hong Kong Property Review 2022 Preliminary Findings,"

https://www.rvd.gov.hk/doc/en/HKPR2022_Preliminary_Findings_Eng.pdf, accessed 22 September 2022.

¹⁶ "The Chief Executive's 2021 Policy Address - Policy Address," 2022, <u>https://www.policyaddress.gov.hk/2021/eng/p103.html</u>, accessed 5 Oct 2022.

Size

As land was costly, most properties in Hong Kong were much smaller than in other parts of the world. By 2021, the average domestic household size was 2.7.¹⁷ According to the 2021 Population Census, 43.7% of domestic households were in a property of 40 to 70 square meters, while 38.5% of households were in a property of 20 to 40 square meters. The median floor area of a Hong Kong residential property was 40 square meters [see **Exhibit 6**]. The average number of rooms, including living/dining room, bedroom, and other rooms, but not kitchens and bathrooms/toilets, in private property was 3.6, while the corresponding number in public rental property was 2.4.¹⁸

The primary and secondary transaction

Primary sales were defined as sales by developers, whereas secondary sales were defined as sales by those other than developers, according to the Hong Kong government's Land Registry.¹⁹ Primary sales included completed properties and so-called off-plan properties—properties that had not yet been completed.

In 2022, secondary sales surpassed primary sales by a slight margin, except for sales completed under the Home Ownership Scheme, the Private Sector Participation Scheme,²⁰ and the Tenants Purchase Scheme.²¹ All property purchasers in Hong Kong SAR had to pay a stamp duty²² equal to 15% of the property price, but first-time buyers were exempted from this duty. First-time buyers were required to pay the First Home Buyer's Stamp Duty equal to 1.5%–4.25% of the property price. The amount of stamp duty due increased with the property price. Nonlocal residents needed to pay a stamp duty of 30% of the property price. In 2018, a nonlocal buyer paid a stamp duty of around HKD324mn (USD41.5mn) for an HKD1.08bn (USD138.5mn) property in Mount Nicholson.

Reasons for buying a property in the primary market included the building was newly decorated; there were better facilities for residents, including clubs, gyms, and swimming pools; and there were various financial incentives. Examples of financial incentives were stamp duty rebates and mortgages²³ from developers and waived 1% real estate agent commission (only the developer needed to pay the commission to the real estate agent). In addition, many developers provided buyers with furniture discounts or waived the management fee for a certain period.

With the volume advantage of the secondary market, buyers had more choices on the secondary market. But buyers who bought a property on the secondary market did not have access to the primary market's financial incentives and loans offered by developers.

Views and orientation

Regarding the view from a property, most people preferred natural over built environments. Consumer home-buying behaviors in the residential housing market frequently reflected this

¹⁷ "Table 5: Statistics on Domestic Households," Census and Statistics Department, Government of the Hong Kong SAR, 2021, https://www.censtatd.gov.hk/en/web_table.html?id=5, accessed 29 September 2022.

¹⁸ Ibid.

¹⁹ "Statistics of Agreements for Sale and Purchase of Building Units," Government of the Hong Kong SAR, 2022, https://www.landreg.gov.hk/en/monthly/agt-primary.htm, accessed 23 September 2022.

²⁰ The Home Ownership Scheme (HOS) and the supplementary Private Sector Participation Scheme (PSPS) were subsidized-sale public housing programs managed by the Hong Kong Housing Authority. They were established in the late 1970s to offer public housing residents and families with monthly earnings under HKD26,000 flats for sale at costs far below market value.

²¹ The Tenants Purchase Scheme (TPS) allowed residents renting public housing estates to buy the flats they were living in.

²² Tax levied on single property purchases.

²³ Developers worked with designated financial organizations to announce mortgage programs for new property buyers, hoping to increase sales. The approval of bank mortgages was rigorous under the regulation of the Hong Kong Monetary Authority. Contrarily, mortgages offered by developers through designated financial institutions were less restricted and no stress test was needed.

preference for nature. People were willing to pay a higher price for beautiful views. The greater the distance between an apartment and a desired natural landscape, the lower the transaction price.

Properties with attractive sea views typically had higher values, whereas unappealing views resulted in lower property prices.²⁴ For example, a cemetery view depressed a property's value, as traditional Chinese culture associated cemeteries with ill fortune.²⁵ A negative perception of street or building views reduced the price as an unavoidable feature of the compact and vertical city.

The high-rise and high-density blocks were typical of the city's middle-income housing. Higher floors typically had better views, so apartments on these floors were more expensive than similar properties on lower floors.²⁶

Property orientation was an essential factor that affected property value. Properties on higher floors facing the southeast were valued more than properties in other orientations. The reason was that southeast-facing properties typically had better ventilation and natural sunlight, thus making the property "warm in winter, cool in summer." Meanwhile, according to traditional Chinese fengshui, properties facing the southeast brought fortune and luck to the household.

Developers

Property development in Hong Kong was very capital-intensive, and a few developers dominated the industry. These included the big four families: Sun Hung Kai Properties (the Kwok Tak-sheng family), Henderson Land Development (the Lee Shau-kee family), Cheung Kong Holdings (the Li Ka-shing family), and New World Development (the Cheng Yu-tung family) as well as several other major developers such as Swire Properties, Wheelock Properties, and the Chinachem Group.

These developers had been building properties for decades and, over the years, had built a particular reputation based on the quality of their properties and property management, among others. Certain developers commanded a price premium over others.

In addition to the points mentioned above, some economic factors (e.g., interest rate, GDP growth, unemployment rate, stock market performance, etc.) also impacted property valuations. These factors were usually captured by a set of time dummies²⁷ or a property price index²⁸ developed by professional institutions such as the Rating and Valuation Department, Centaline Property, and The University of Hong Kong.

Building the Model

Direct Comparison with Similar Properties

To determine a valuation, the property could be directly compared to recently sold, comparable properties.²⁹ This approach was effective in a city with a vibrant real estate market like Hong

²⁴ C. Y. JIM and Wendy Y. Chen, "Value of Scenic Views: Hedonic Assessment of Private Housing in Hong Kong," *Landscape and Urban Planning* 91, no.4 (2009): 226–34.

²⁵ Raymond Y. C. Tse and Peter E. D. Love, "Measuring Residential Property Values in Hong Kong," *Property Management* 18, no. 5 (2000): 366–74.

²⁶ S. K. Wong, K. W. Chau, Y. Yau, and K. Cheung, "Floor-Level Premiums in High-Rise and Low-Rise Buildings," *The 12th Annual Conference of the Pacific Rim Real Estate Society.* Auckland, New Zealand, 22-25 January 2006. Available at: http://prres.net/papers/wong-floor-level-premiums-low-high-rise.pdf, accessed 23 September 2022.

²⁷ A variable which controlled time-specific fixed effects.

²⁸ A property price index measured the weighted average of transaction records of residential properties over time.

²⁹ Interview by Authors conducted in November 2021.

Kong where all real estate transaction data were publicly available. The ideal method for evaluating uniform units in housing estates was such a direct comparison, which was both quick and straightforward when performing an individual property valuation. A valuer would inevitably turn to the comparison process even if employing other techniques.³⁰

Hedonic Pricing Model

The direct comparison method was labor intensive, which was not suitable for mass valuation. Academics commonly used statistical approaches or hedonic pricing models for mass real estate valuation. In a hedonic pricing model, regression analysis was applied to estimate the impact of various factors on the price of a product, or sometimes the demand for a product. The dependent variable was the price (or demand) of the good, and the independent variables were the attributes of the product believed to influence usage for the buyer or consumer of the product. The subsequently estimated coefficients on the independent variables could be interpreted as the implicit prices that buyers placed on the various qualities of the good.³¹

Jane's Next Step

Jane better understood the Hong Kong property market, and the factors influencing property prices. As Hong Kong was a relatively homogeneous and active property market, Jane expected property valuation to be relatively accurate compared to that in other parts of the world. Her next step was to build a prediction model to value properties in Hong Kong.

³⁰ 'Part 6: Principles and Practice of Property Valuation,' Estate Agents Authority, <u>https://www.eaa.org.hk/Portals/0/Sections/CC/A_Study_Guide_to_Estate_Agency_Law_and_Practice/Eng/part_6.pdf</u>, accessed 29 September 2022.

³¹ Investopedia, 2021, <u>https://www.investopedia.com/terms/h/hedonic-regression.asp#:~:text=Hedonic%20regression%20is%20the%20use,the%20demand%20for%20a%20good</u>. accessed 31 May 2022.

Туре	Category	Includes	Population
Permanent	Public Rental Housing	Public Rental Housing units (Hong Kong Housing Authority and Hong Kong Housing Society units), Interim Housing units	29.3%
	Subsidized Home Ownership Housing	Tenants Purchase Scheme units with alienation restrictions, Home Ownership Scheme, and other subsidized units with alienation restrictions	15.7%
	Private Permanent Housing	<u>Private residential flats:</u> Formerly subsidized sale flats Ordinary private residential flats <u>Other quarters in private permanent housing:</u> Villas, bungalows, and modern village houses Simple stone houses/Traditional village houses Staff quarters	52.9%
	Non-domestic Housing	Quarters in nonresidential buildings, Collective living quarters	1.2%
Temporary	Temporary Housing	Temporary quarters	0.8%

EXHIBIT 1: BREAKDOWN OF HOUSING BY POPULATION PERCENTAGE, 2021

Source: "2021 Population Census," Government of Hong Kong SAR, <u>https://www.census2021.gov.hk/doc/pub/21c-summary-results.pdf</u>, accessed 25 May 2022.



Source: "Centa-City Sub Index," Centaline Group, https://hk.centanet.com/CCI/en/CCI, accessed 22 May 2022.

9

Property Value#	Maximum LTV Ratio#	
At or below HKD4 million	80% or 90%*	
Above HKD4 million and below HKD4.5 million	80% - 90%* (subject to a loan cap of HKD3.6 million)	
At or above HKD4.5 million and up to HKD6 million	80% (subject to a loan cap of HKD4.8 million)	

EXHIBIT 3: MAXIMUM LOAN-TO-VALUE RATIO OF MORTGAGE INSURANCE PROGRAM (FOR PROPERTY VALUE UP TO HKD19.2MN)

persons (please refer to the requirement of maximum debt-to-income ratio as stated in the relevant Insurance Eligibility Criteria for property value up to HKD6 million)

Source: "The Hong Kong Mortgage Corporation Limited," 2022, The Hong Kong Mortgage Corporation Limited, <u>https://www.hkmc.com.hk/eng/our_business/mortgage_insurance_programme.html</u>, accessed 22 May 2022.



EXHIBIT 4: HONG KONG SAR ADMINISTRATIVE MAP

Source: Wikipedia, 2022, "Districts of Hong Kong," Wikimedia Foundation, https://en.wikipedia.org/wiki/Districts of Hong Kong, accessed 25 May 2022

按樓齡分類的總存量 Stock Distribution by Age



EXHIBIT 5: RESIDENTIAL DOMESTIC STOCK DISTRIBUTION BY AGE

Source: Rating and Valuation Department, The Government of the Hong Kong SAR, "2022 Hong Kong Property Review," 2022, https://www.rvd.gov.hk/doc/en/hkpr22/HKPR2022%20Full%20Book TC.pdf, accessed 25 May 2022.



EXHIBIT 6: FLOOR PLAN OF NANO-FLAT AND AN AVERAGE PROPERTY IN SAI YING PUN, HONG KONG

Source:

(Left) Plan of a nano-flat in Sai Ying Pun, <u>https://hk.centanet.com/findproperty/en/detail/Tak-Lee-Building_LDK102?theme=buy</u>, accessed 23 September 2022. (Right) Plan of an average flat in Sai Ying Pun, <u>https://hk.centanet.com/findproperty/en/detail/The-Nova_LIW922?theme=buy</u>, accessed 23 Septe