Statistics Project Competition for Secondary School Students
(Senior Section)

Winners' Sharing

Ethan Choi, Lucas Chiu
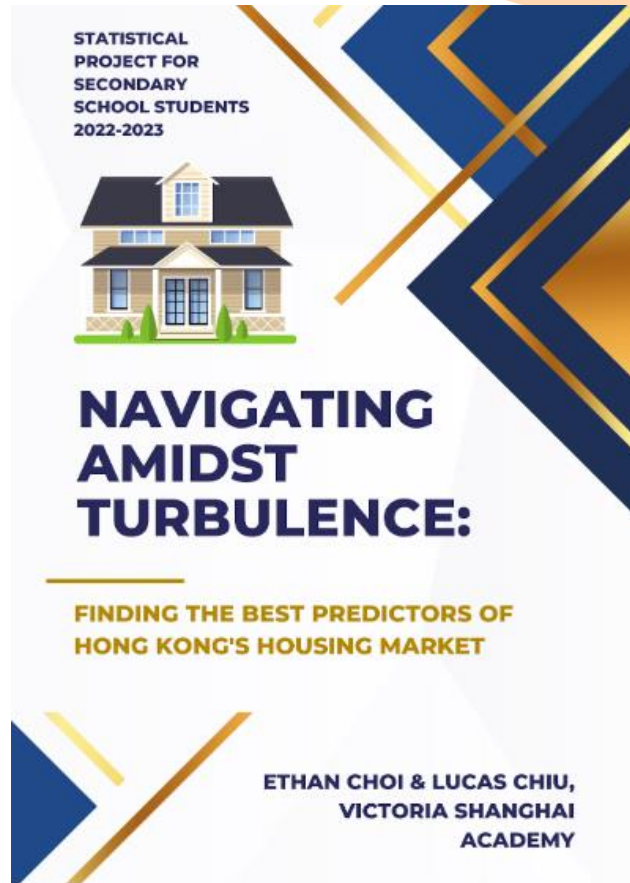Victoria Shanghai Academy

Who are we?

Project overview

- There has been great uncertainty in our economy and financial markets in recent years.
- Aim: investigate related financial data Find any connections to the housing market - whether they are worthy predictors.

STATISTICAL PROJECT FOR SECONDARY SCHOOL STUDENTS 2022-2023

NAVIGATING AMIDST TURBULENCE:

FINDING THE BEST PREDICTORS OF HONG KONG'S HOUSING MARKET

ETHAN CHOI & LUCAS CHIU, VICTORIA SHANGHAI ACADEMY

Research process

Brainstorming

- Acute problems
- Prediction
- Large dataset
- Many factors

Analysis

- Stock market
- Rates
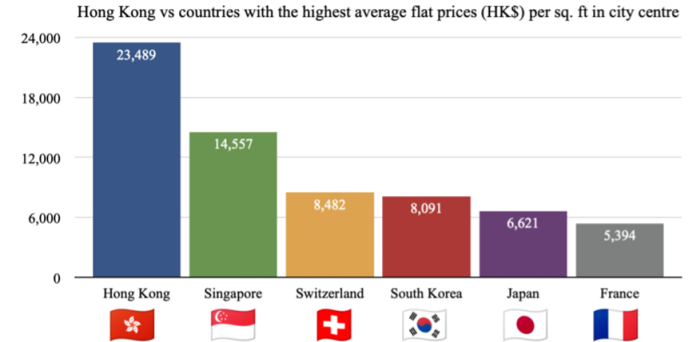- Housing supply
- Statistical tools

Evaluation

- Implications
- Relationships
- **Best predictors**
- Final conclusion

Premise of the Report

- Compared to the rest of the world, Hong Kong's housing prices are extremely high.
- While mostly having an uptrend, prices tend to fluctuate, and is the concern of citizens.
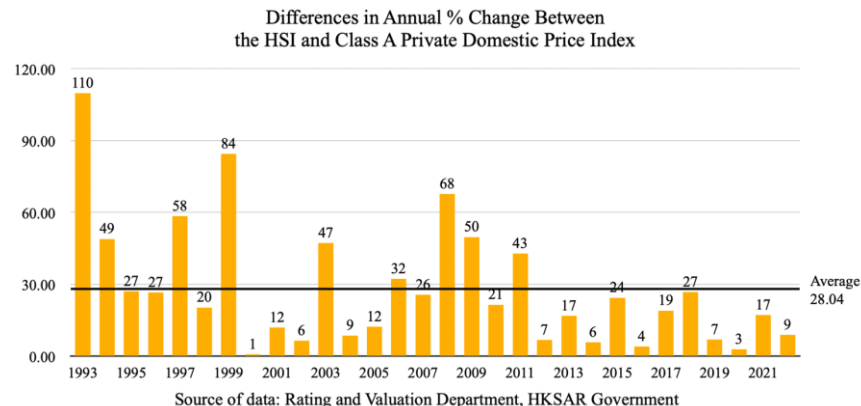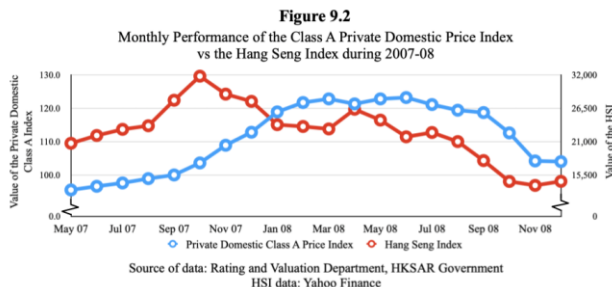- Imbalance in terms of the population requiring housing support public housing supply

Figure 3.1

Hong Kong vs countries with the highest average flat prices (HK$) per sq. ft in city centre

Country	Price
Hong Kong	23,489
Singapore	14,557
Switzerland	8,482
South Korea	8,091
Japan	6,621
France	5,394

Stock market performance

Main findings:

- Little correlation in the short term. High percentage change difference between the two markets.

Differences in Annual % Change Between the HSI and Class A Private Domestic Price Index

Source of data: Rating and Valuation Department, HKSAR Government

Figure 9.2
Monthly Performance of the Class A Private Domestic Price Index vs the Hang Seng Index during 2007-08

Source of data: Rating and Valuation Department, HKSAR Government
HSI data: Yahoo Finance

- Long term: Close trends are formed, the housing market follows HSI with a few month time lag.

Interest and unemployment rates

- Inverse relationship between interest rates and % change in private DPI
- Causation vs correlation

A comparison of inflation rates in HK and US and interest rates in HK
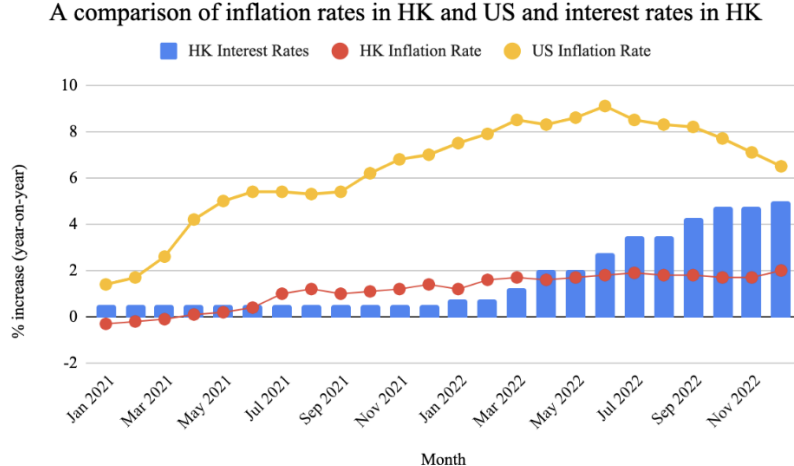
- Negative correlation between unemployment rate and change in housing prices
- Exogenous variables suggest poor predictor

Land and public housing supply

- Our prediction was that a higher land supply for residential purposes would help relieve demand and lower prices.

- We were shocked to find out the opposite has occurred.
  - Extenuating pandemic
  - Time needed for land to be developed

Figure 12: Table of area of land sold by the government yearly from 2015-2020			
Year	Sale of government land for residential purposes (sq. m)	Total sale of government land (sq. m)	% of total used for residential purpose
2015	311,539.0	342,647.9	90.9
2016	215,049.0	233,216.1	92.2
2017	258,864.0	323,805.2	79.9
2018	72,856.0	117,971.9	61.8
2019	123,999.0	199,589.8	62.1
2020	72,569.0	149,611.6	48.5

Source: Lands Department, The HKSAR Government
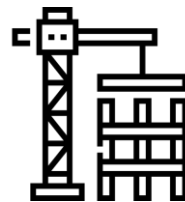
Policy suggestions

- Loosen usage of cooling measures
  - Home prices expected to plummet sharply in 2023
  - Housing "ice age"

- Increase land supply
  - Cooperation between private and public sectors
  - Social optimum

- Address substandard housing
  - Transitional housing
  - Vacant spaces

Statistical techniques

● Low level ≠ inadequate

● Pie charts, bar graphs, integrated graphs

● Regression analysis (which type?), presentation style

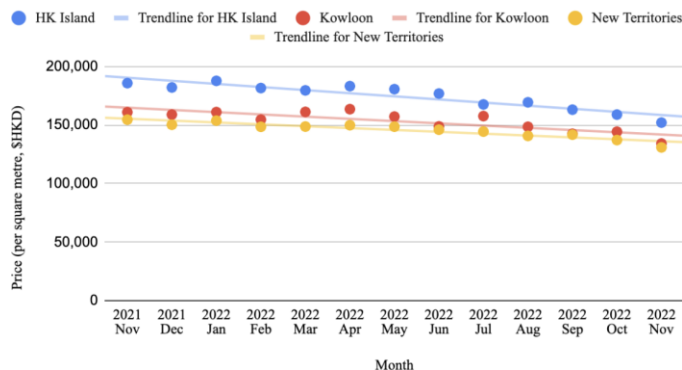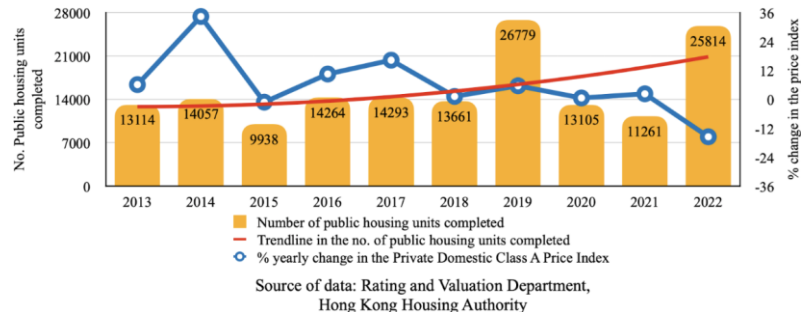Rental prices per square metre of houses smaller than 430 square feet

Figure 14
Number of public housing units completed yearly vs the % yearly change in the Private Domestic Class A Price Index, 2013-2022

Source of data: Rating and Valuation Department, Hong Kong Housing Authority

Challenges and limitations

- Lack of professional tools (such as computing software, graphing programme)

- Locating useful data in such a big pool of information in the government websites.

- Presenting data in a meaningful way to help us reach useful conclusions.

Potential extensions (qualitative)

- When visually representing data in a graph, percentage changes should be favoured to show the most accurate view.

- Further evaluate what the data tells us about the housing situation in a real-life context and consider the factors (direct and indirect) that have shaped this result.

- Experiment with time shifts/delays in trends of graphs to see how close our predictions regarding time lag of indicator trends are.

Potential extensions (quantitative)

- "Predict" = use model?

- Time series analysis

- Existing literature, heteroskedasticity / outlier analysis, ACF / PACF

- SARIMA (seasonal ARIMA), information criteria (AIC, BIC etc.), goodness-of-fit tests (e.g. two-sample Kolmogorov-Smirnov)

- Time series = accurate?

Takeaways (Ethan)

- Do we need complex tools to make predictions?
  - Rigour vs heuristics
  - Prior maths knowledge + evaluative ability

- Critical thinking and evaluation
  - Considering arguments for both sides
  - **Best** predictors - evaluate good/bad

- Clear structure and strong arguments
  - "So what?"
  - "Then what?"
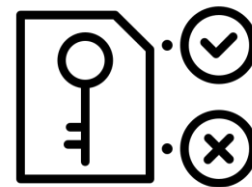
Takeaways (Lucas)

- Great experience on how to create your own report strictly based on one source and your own ability and understanding.

- Strengthened evaluation technique and critical thinking. Less reliance on research.

- Sparked interest to explore more advanced statistical techniques.

Thank you!

Ethan Choi, Lucas Chiu
Victoria Shanghai Academy