

# COVID vs Taiwan Real Estate Data Analysis

From raw data to Tableau dashboard  
by Michael Tsai

START





# Quick View - From Data on Website

Our World in Data

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## Coronavirus (COVID-19) Deaths

Home > Coronavirus > Deaths

Research and data: Edouard Mathieu, Hannah Ritchie, Lucas Rodés-Guirao, Cameron Appel, Daniel Gavrilov, Charlie Giattino, Joe Hasell, Bobbie Macdonald, Saloni Dattani, Diana Beltekian, Esteban Ortiz-Ospina, and Max Roser

We are grateful to everyone whose editorial review and expert feedback on this work helps us to continuously improve our work on the pandemic. Thank you. [Here](#) you find the acknowledgements.

The data on the coronavirus pandemic is updated daily. Last update: 5 minutes ago. [Reuse our work freely](#) [Cite this research](#)

內政部不動產交易實價查詢服務網

買賣查詢 租賃查詢 預售屋查詢 預售屋建案查詢

臺北市 内湖區 房地 建物 土地 社區名稱 交易期間：111 年 1 至 112 年 1 止 搜尋

地點位置或門牌 社區簡稱 總價(萬元) 交易日期 單價(元/坪) 總面積(坪) 主建物佔比(%) 型態 屋齡 樓別/樓高 主要用途 交易權的 建物格局 單位總價(萬元) 管理組織 電梯 交易/歷次轉移 功能

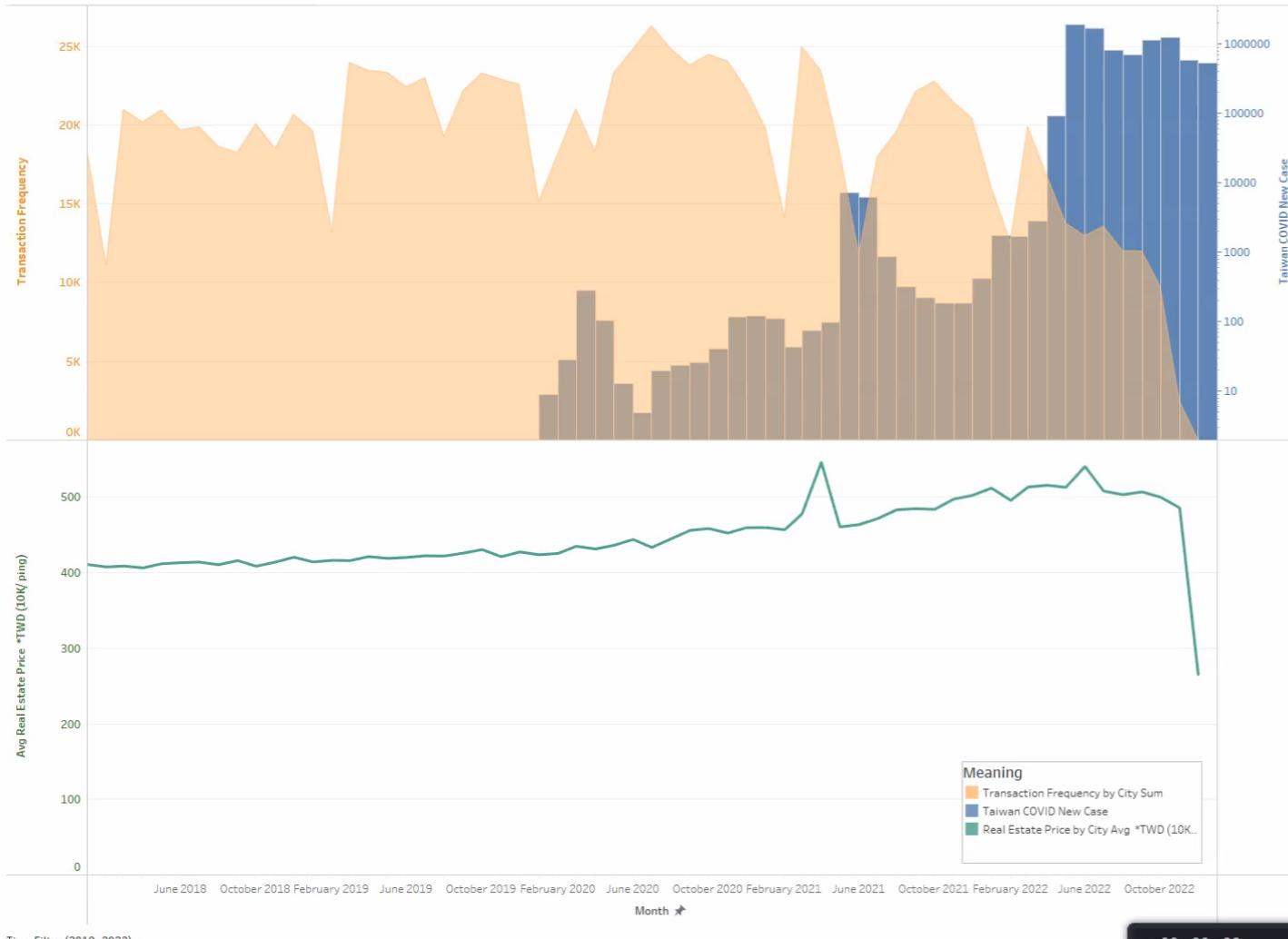
地點位置或門牌	社區簡稱	總價(萬元)	交易日期	單價(元/坪)	總面積(坪)	主建物佔比(%)	型態	屋齡	樓別/樓高	主要用途	交易權的	建物格局	單位總價(萬元)	管理組織	電梯	交易/歷次轉移	功能
1 量富街 26 號五樓		1,424	112/01/10	45.5	31.31	87.82	屋	39	五層/五層	住家用	土1建1固0	3房2廳2衛		無		層次 明細 加入比較	<a href="#">列印</a>
2 文湖街 21 巷 8 2 弄 5 號五樓	大直歐洲華廈	1,895	111/12/23	73.8	27.64	49.68	屋		五層/七層	住家用	土1建1固1		170	有	有	層次 明細 加入比較	<a href="#">列印</a>
3 石潭路 27 號十一樓之 5	遠雄藝朗	3,208	111/12/21	71.8	50.99	54.36	樓	13	十一層/十四層	辦公用	土1建1固1	2房1廳1衛	250	有	有	層次 明細 加入比較	<a href="#">列印</a>
4 南京東路六段 350 之 5 號十一樓	i-come	2,155	111/12/21	47.5	45.35	60.68	樓	15	十一層/十二層	商業用	土1建1固1	2房2廳2衛		有	有	層次 明細 加入比較	<a href="#">列印</a>
5 內湖路二段 466 號十樓		340	111/12/20	20.8	16.37	54.16	樓	19	十層/十一層	住家用	土1建1固4	3房2廳2衛		有	有	層次 明細 加入比較	<a href="#">列印</a>
6 內湖路二段 466 號十樓		340	111/12/20	20.8	16.37	54.16	樓	19	十層/十一層	住家用	土1建1固4	3房2廳2衛		有	有	層次 明細 加入比較	<a href="#">列印</a>
7 港華街 9 9 號七樓之 1	MORE123	1,700	111/12/19	82.9	25.43	72.85	屋	11	七層/十層	住家用	土1建1固1	2房1廳1衛	180	有	有	層次 明細 加入比較	<a href="#">列印</a>
8 內湖路三段 238 號九樓	湖山妍	4,758	111/12/19	58.8	80.89	40.43	樓	9	九層/十四層	住家用	土1建1固2	2房2廳2衛		有	有	層次 明細 加入比較	<a href="#">列印</a>
9 成功路二段 498 巷 6 號二樓		1,236	111/12/17	39.7	31.17	86.69	屋	42	二層/五層	住家用	土2建1固0	3房2廳2衛		無		層次 明細 加入比較	<a href="#">列印</a>
10 成功路四段 30 巷 28 弄 5 號五樓	宏泰新象	1,828	111/12/16	82.6	22.13	71.23	樓	28	五層/十二層	商業用	土1建1固0	2房2廳1衛		有	有	層次 明細 加入比較	<a href="#">列印</a>
11 內湖路一段 285 巷 69 弄 100 號二樓		700	111/12/16	30.2	23.17	85.59	屋	39	二層/五層	住家用	土2建1固0	3房1廳1衛		有		層次 明細 加入比較	<a href="#">列印</a>
12 康寧路三段 265 巷 6 號五樓		1,400	111/12/15	45.9	30.48	78.79	屋	38	五層/五層	住家用	土1建1固0	4房2廳2衛		無		層次 明細 加入比較	<a href="#">列印</a>
13 文湖街 21 巷 12 弄 12 號三樓	大直新貴	1,620	111/12/14	63	25.73	63.26	屋	20	三層/八層	住家用	土1建1固1	2房2廳1衛		有	有	層次 明細 加入比較	<a href="#">列印</a>
14 量富街 21 巷 3 號三樓		670	111/12/14	23.1	29.01	81.43	屋	39	三層/五層	住家用	土1建1固0	3房2廳2衛		無		層次 明細 加入比較	<a href="#">列印</a>
15 蘭光街 321 巷 26 號八樓之 7	藏金閣	3,100	111/12/13	57.5	53.91	56.62	屋	14	八層/八層	辦公用	土1建1固1	2房2廳2衛		有	有	層次 明細 加入比較	<a href="#">列印</a>

顯示 1 至 15 筆 (查詢結果 : 1,847 筆)

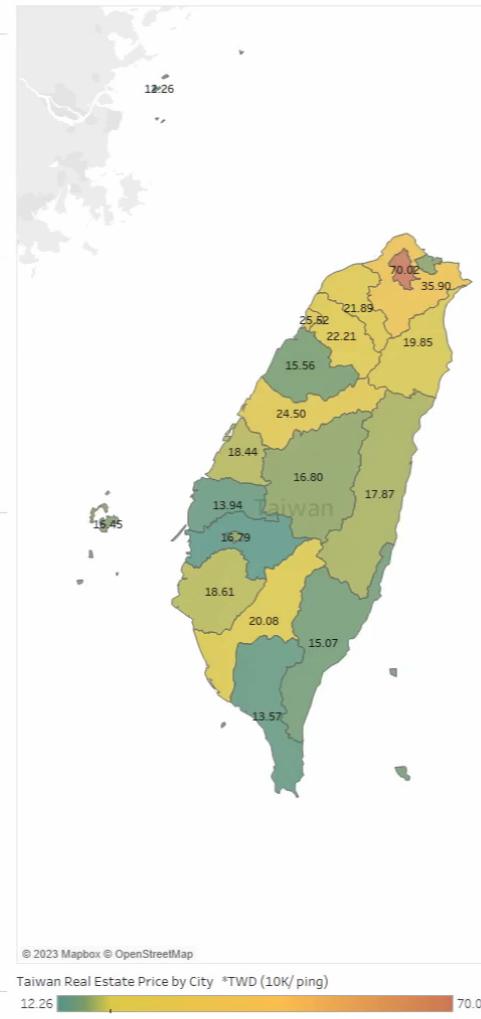


# Quick View - To Interactive Dashboard(View [Video](#))

## Taiwan COVID New Case vs Real Estate Transaction Frequency by city Taiwan City Real Estate Price by city



Taiwan Real Estate Average Price Map



Taiwan map Taiwan Real Estate Price by City Taiwan COVID New Case vs Real Estate Summary

# Summary



# Data Analysis Project: Taiwan Real Estate Impact by COVID-19

Summary 

- Purpose: After COVID pandemic, I would like to review the impact of Taiwan real estate by COVID. Furthermore, to see if now is the good time to buy the real estate.
- Questions(tasks):
  - Does COVID-19 impact Taiwan real estate market?
  - Is it the right time to buy real estate? Or should we wait a little more?
  - Which city in Taiwan have less impact by COVID?



## Tool Used :



## Skills :

- Python Requests, Pandas
- SQL Server, Window Function, CTE, JOIN
- Tableau Dashboard Visualization

# Data Preparation





# Date Sources

- Data Name: Real Estate Transaction Price
- Source: Taiwan Ministry of The Interior
- Data Range: 2018/Q1~2022/Q4
- Data Size: 1.9M rows data

The screenshot shows the homepage of Our World in Data. It features a search bar with 'Search...' and a dropdown menu 'Articles by topic'. Below the search bar are links for 'Latest', 'About', and 'Donate'. On the right side, there are logos for OXFORD MARTIN SCHOOL, UNIVERSITY OF OXFORD, and GC DL.

## Coronavirus (COVID-19) Cases

This screenshot shows the 'Cases' section of the COVID-19 page on Our World in Data. It includes a breadcrumb navigation 'Home > Coronavirus > Cases'. Below it, a paragraph credits researchers and data sources. A note at the bottom states: 'We are grateful to everyone whose editorial review and expert feedback on this work helps us to continuously improve our work on the pandemic. Thank you. [Here](#) you find the acknowledgements.' There is also a link to reuse the work.

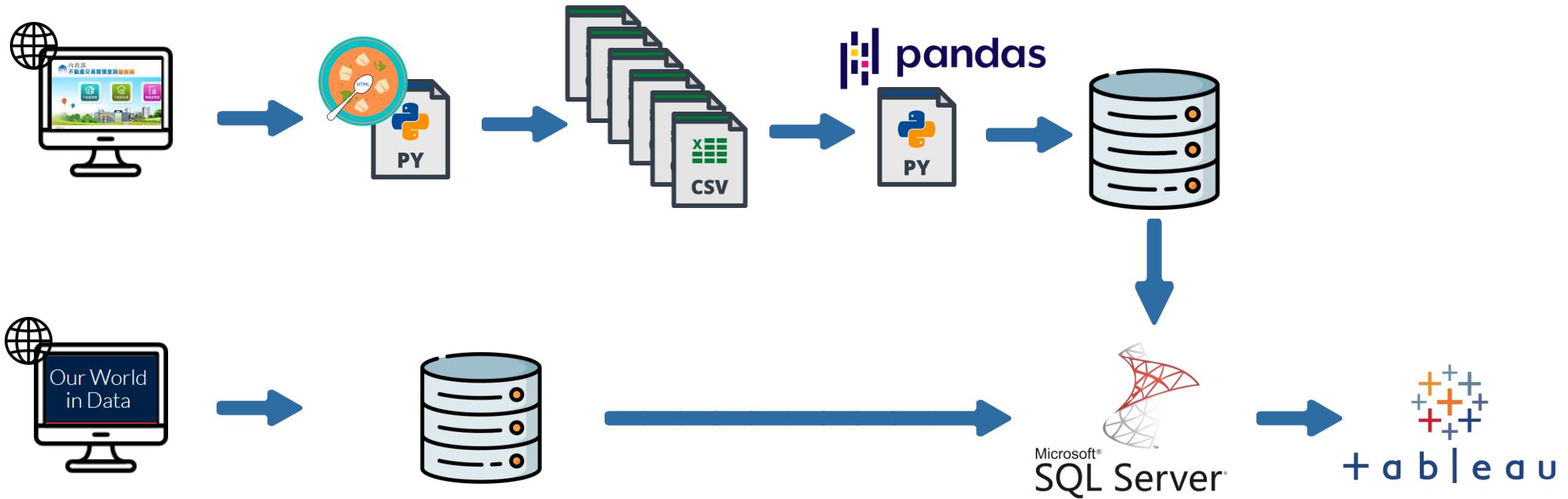
Our work belongs to everyone  
[Download the complete Our World in Data COVID-19 dataset](#)  
xlsx .csv json (daily updated)  
All our code is open-source  
All our research and visualizations are free for everyone to use for all purposes

This screenshot shows a database interface for real estate transaction prices in Taiwan. The top navigation bar includes links for '首頁', '資料下載及申請', '舊版網站', '相關連結', '支援服務', and '線上客服'. The main area has three tabs: '買賣查詢', '租賃查詢', and '預售屋查詢'. The '買賣查詢' tab is active. It displays a grid of transaction records with columns such as '地點位置或門牌', '社區簡稱', '總價(萬元)', '交易日期', '單價(萬元坪)', '格局(坪)', '主建物佔比(%)', '型態', '屋齡', '樓層別/棟高', '主要用途', '交易標的', '建物格局', '單價倍率(萬元)', '管理組織', '電梯', '交易/面次轉移', and '功能'. Each record includes a small thumbnail image of the property and various buttons for viewing details or sharing on social media.

- Data Name: Global Coronavirus(COVID-19) Cases
- Source: Our World in Data
- Data Range: 2019/1/1 ~ 2022/12/31
- Data Size: 0.23M rows data



# Data Process





# Web Scraping

```
import requests
import os
import zipfile
import time

def real_estate_crawler(year, season):
    if year > 1000:
        year -= 1911

    # download real estate zip file
    res = requests.get("https://plvr.land.moi.gov.tw//DownloadSeason?season="
                        + str(year) + "S" + str(season) +
                        "&type=zip&fileName=lvr_landesv.zip")

    # save content to file
    fname = str(year)+str(season)+'.zip'
    open(fname, 'wb').write(res.content)

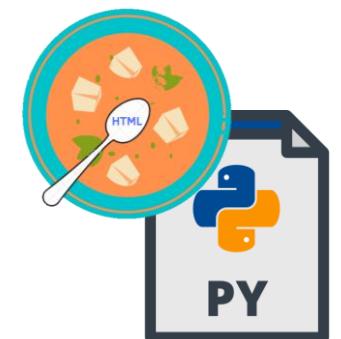
    # make additional folder for files to extract
    folder = 'real_estate' + str(year) + str(season)
    if not os.path.isdir(folder):
        os.mkdir(folder)

    # extract files to the folder
    with zipfile.ZipFile(fname, 'r') as zip_ref:
        zip_ref.extractall(folder)

    time.sleep(10)

def main():
    for year in range(107, 112):
        for season in range(1, 5):
            print(year, season)
            real_estate_crawler(year, season)
```

- Target: To scrap the data with the target time range from government website
- Python Code([Link](#)):
  1. Set for loop to create urls within the assign time range.
  2. Using Requests to get in the download URLs.
  3. **OS.mkdir** to create a folder for the download file
  4. Use **zipfile.ZipFile()** to unzip the downloaded zip file.





# File Organization



- Target :
  1. To merge the downloaded file which be separated by quarters and city.
  2. Add additional information during merge. Ex: city name, quarter#.
- Python Code([Link](#)):
  1. Using **OS.path.join()** & **read\_csv** to open multiple files and assign as pandas Dataframe.
  2. Using the city code in the file name to add correspond city name in the file.
  3. Merging all dataframe into one dataframe by **pd.concat()**
  4. Save as CSV file. (remember to encoding )

```
import os
import pandas as pd
import time
# 歷年資料夾
dirs = [d for d in os.listdir() if d[:4] == 'real']

dfs = []
city_list = "abcdefghijklmnopqrstuvwxyz"
cities = {"a": "台北市", "b": "臺中市", "c": "基隆市",
          "d": "臺南市", "e": "高雄市", "f": "新北市",
          "g": "宜蘭縣", "h": "桃園市", "j": "新竹縣",
          "k": "苗栗縣", "l": "臺中縣", "m": "南投縣",
          "n": "彰化縣", "p": "雲林縣", "q": "嘉義縣",
          "r": "臺南縣", "s": "高雄縣", "t": "屏東縣",
          "u": "花蓮縣", "v": "臺東縣", "x": "澎湖縣",
          "y": "台北市", "w": "金門縣", "z": "連江縣",
          "i": "嘉義市", "o": "新竹市"}
```

```
for d in dirs:
    for city_code in city_list:
        df = pd.read_csv(
            os.path.join(d,
                         f'{city_code}_lvr_land_a.csv'), index_col=False)
        print(d)
        df['Q'] = d[-1]
        df['city'] = cities[city_code]
        dfs.append(df.iloc[1:])
        print("extracting", city_code, "in", d)
df = pd.concat(dfs, sort=True)
file_name = "Taiwan_Real_State_Dataset_v4.csv"
print(df)
df.to_csv(file_name, encoding='utf_8_sig', index=False)
```



# SQL Data Cleaning and Data Processing



Microsoft®  
SQL Server®

- Target :
  1. Unify the time format. From ROC era year to AD year
  2. Drop incomplete or incorrect data
  3. Change square meters to ping( Taiwan common unit of area)
  4. Extract property type from string.
  5. Join related tables for more information
  6. Create temp table for visualization
    - Monthly real estate transaction frequency
    - Monthly real estate group by city
- SQL Script ([covid new cases](#), [taiwan real estate price](#))

```
-- 6. Real State Market Metrics
-- 6-1. District Monthly Average Realstate Price.
SELECT district AS district, transaction_year, transaction_month, avg_price_per_ping_10k
FROM (SELECT 鄉鎮市區 AS district, transaction_year, transaction_month,
            AVG(CAST(twd_per_ping AS float) /10000) AS avg_price_per_ping_10k
      FROM taiwanrealstate2
     WHERE transaction_year > 2017 and transaction_month is not null and 鄉鎮市區 is not null and twd_per_ping is not null
       group by 鄉鎮市區, transaction_year, transaction_month) AS ya
ORDER BY AVG(avg_price_per_ping_10k) OVER(partition by district) DESC, 1, 2, 3

-- 6-2. Monthly Transaction frequency. *Show district time change
SELECT district AS district, transaction_year, transaction_month, transaction_time
FROM (SELECT 鄉鎮市區 AS district, transaction_year, transaction_month,
            COUNT(twd_per_ping) AS transaction_time
      FROM taiwanrealstate2
     WHERE transaction_year > 2017 and transaction_month is not null and 鄉鎮市區 is not null and twd_per_ping is not null
       GROUP BY 鄉鎮市區, transaction_year, transaction_month) AS ya
ORDER BY AVG(transaction_time) OVER(partition by district) DESC, 1, 2, 3

-- 6-3. City Monthly Average Realstate Price.
SELECT city, transaction_year, transaction_month, avg_price_per_ping_10k
FROM (SELECT city, transaction_year, transaction_month,
            AVG(CAST(twd_per_ping AS float) /10000) AS avg_price_per_ping_10k
      FROM taiwanrealstate2
     WHERE twd_per_ping is not null and transaction_year >= 2018
       group by city, transaction_year, transaction_month) AS ya
ORDER BY AVG(avg_price_per_ping_10k) OVER(partition by city) DESC, 1, 2, 3

-- 6-4. Monthly Realestate Transaction Frequency. *Use CTE
WITH MonthlyFrequency (city, transaction_year, transaction_month, trans_frequency) as
(
  SELECT city, transaction_year, transaction_month,
         COUNT(CAST(twd_per_ping AS float) /10000)
    FROM taiwanrealstate2
   WHERE twd_per_ping is not null and transaction_year >= 2018
     group by city, transaction_year, transaction_month
)
select *
  from MonthlyFrequency
 order by SUM(trans_frequency) OVER (PARTITION BY city) DESC, 2, 3
```

# Analysis

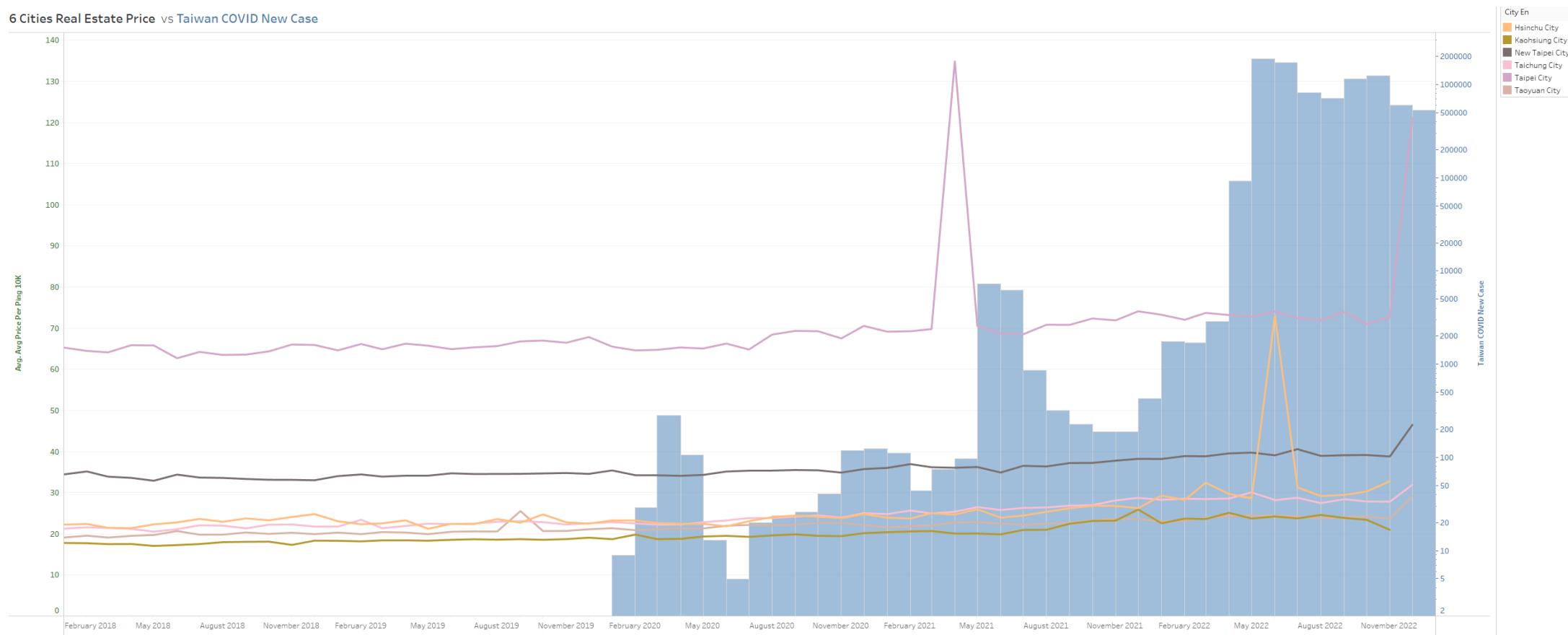




# Insight 1 - Price Vs COVID New Cases

The real estate prices of 6 major cities in Taiwan have remained stable with little fluctuation over the past 5 years.

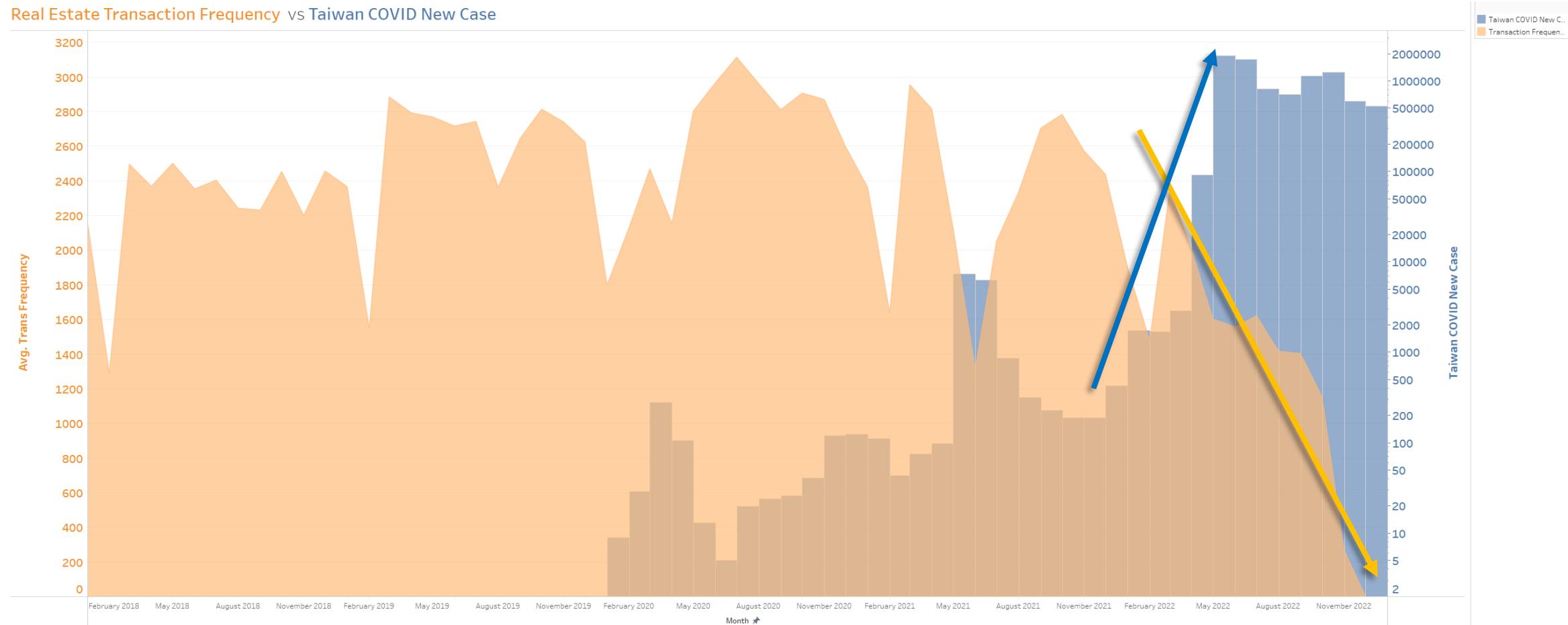
This shows COVID-19 pandemic **did not had a significant impact** on real estate prices in Taiwan.





## Insight 2 - Transaction Frequency Vs COVID New Cases

As COVID-19 cases rapidly increased in 2022, there has been a significant decrease in real estate transaction frequency. This shows people **trade less in the post COVID time.**

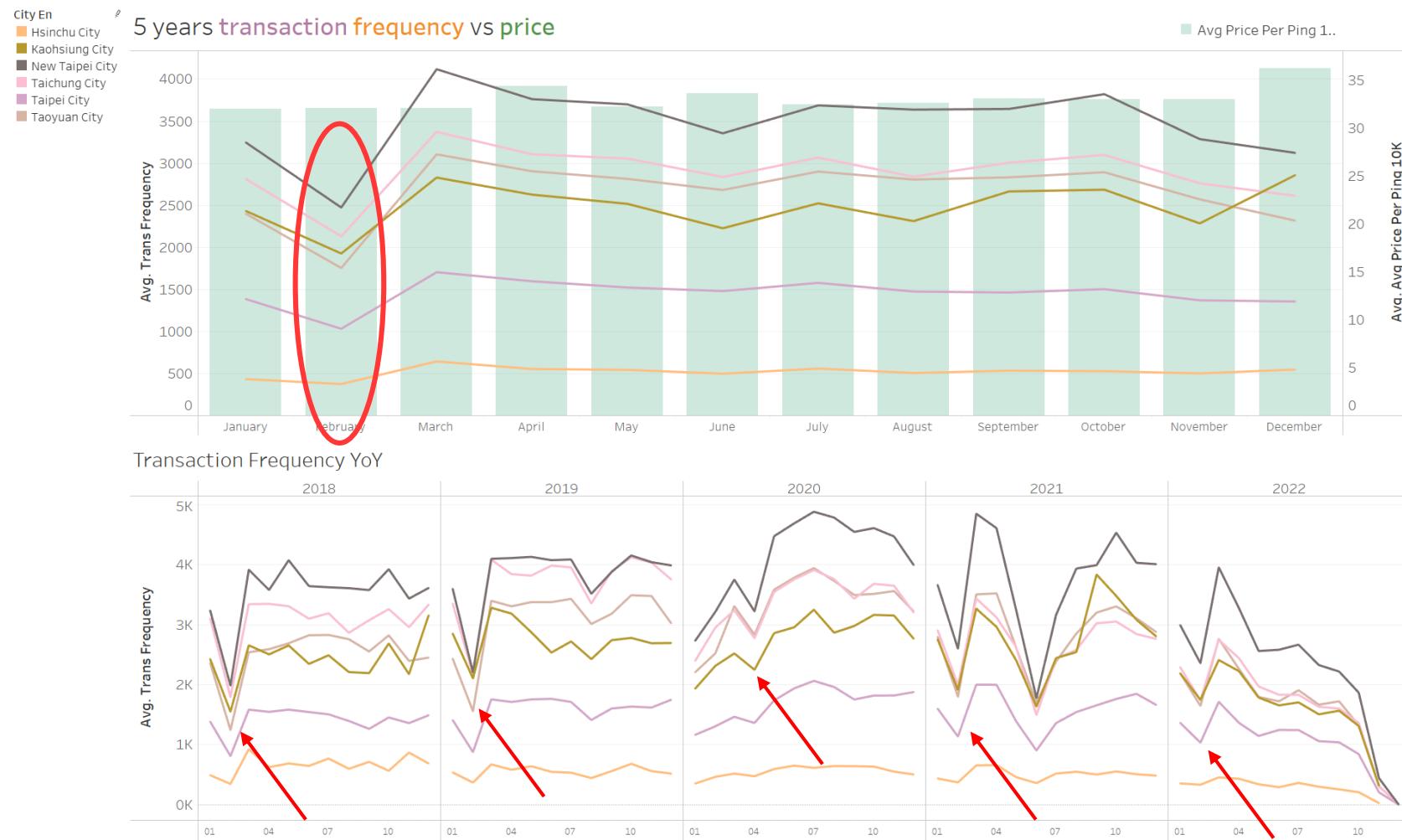




## Insight 3 – Interest Fact

Another interesting finding is that there is a consistent **decrease in transaction volume every February**, but real estate prices did not decrease accordingly.

This may be related to the fact that there are several holidays in February (CNY & 228 Memorial holiday), which results in limited work days for government offices to transfer ownership.



# Conclusion/ Recommendation





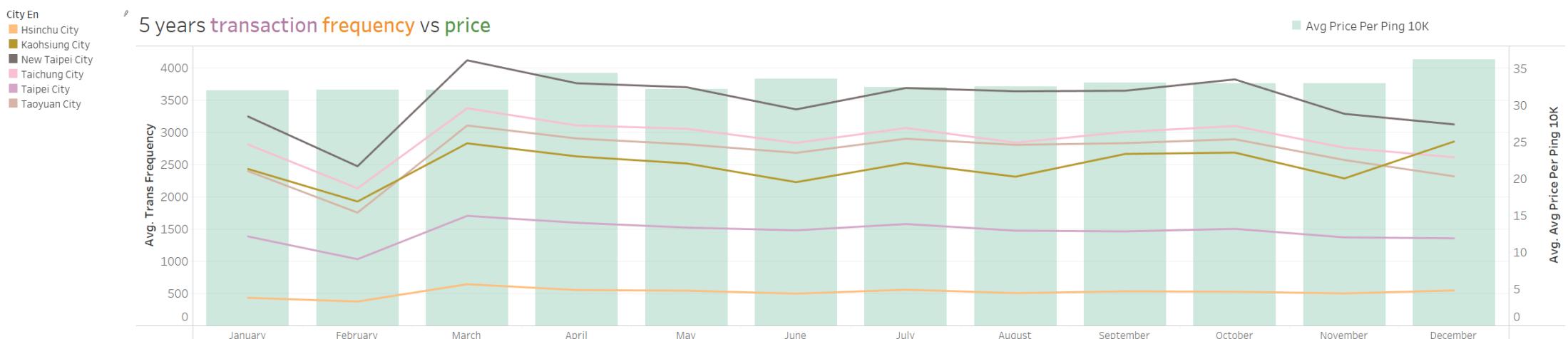
## Conclusion

- Answer to the initial questions(tasks):
  - Does COVID-19 impact Taiwan real estate market?
    - ✓ COVID-19 did not have an impact on real estate prices in Taiwan, but in the later stages of the pandemic, there has been a **significant decrease in transaction frequency**.
  - Is it the right time to buy real estate? Or should we wait a little more?
    - ✓ The pandemic will no longer be one of the main reasons affecting the real estate market. Despite lower transaction frequency, the relatively stable prices demonstrate the stability of the real estate market.  
Therefore, **buyers can follow the same purchasing strategies as before the pandemic.**
  - Which city in Taiwan have less impact by COVID?
    - ✓ There is **no difference** in either transaction frequency or transaction price due to different cities.



## Recommendation

- If you are waiting for the pandemic to ease before purchasing real estate at a lower price, there may be **no need to wait any longer** because the price is not likely to decrease with the improvement of the pandemic situation.
- If you want to **see more transaction cases as a reference** for buying a real estate, it is **recommended to wait after February**.



# Thanks



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