Unaffordable Taiwan: An Economic Analysis of High Housing Prices and Low Wages

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ABSTRACTS

This paper examines the issue of housing unaffordability in Taiwan, with the high rising housing price and stagnated salaries. The paper first analyzes the current situation of Taiwan's housing market and salary, showing the issue that presents in the system. Moreover, by comparing to countries of similar economic condition, this paper further identifies this prolonged issue that is present in Taiwan's housing market. Through the usage of housing index, median wage and housing price to income ratio from the Taiwanese government database, this paper further creates machine learning models to analyze the situation of the housing market and how severe the problem is. Finally, the paper uses a regression model to predict the housing price to income ratio in the future, showing the emergence of the issue, and how it requires government interventions to the housing market to resolve the issue.

Introduction

Housing is undeniably one of the most essential commodities within any economy, as it serves as a fundamental necessity upon which individuals rely in their daily lives. Nevertheless, the housing market in Taiwan is currently grappling with a multitude of significant challenges that demand attention and resolution. According to data from Numbeo, Taiwan ranks 10th in terms of housing prices worldwide, with an average price of approximately 150,000 per square meter. (Numbeo) This positions Taiwan just behind countries like France and Germany. However, despite the comparably high housing prices, our wages are considerably lower when compared to these nations. In fact, Taiwan's wage levels are among the lowest among developed countries, with the minimum wage being only around ⅓ of countries with similar economic status.(Ngerng) As a result, citizens face a significant mortgage burden, as this essential need becomes increasingly unaffordable for them.

Furthermore, the situation is worsening over time. Between 2003 and 2021, the median housing price in Taiwan has nearly doubled, while the median wage has only experienced a growth of approximately 20%. (EBC News, 2022) As a result, the housing price-wage ratio, which indicates the proportion between the median housing price and the median wage, has experienced a substantial increase, making the housing market increasingly unaffordable for the majority of people. For example, the housing price-income ratio in Taipei in 2021 is approximately 15.8. In other words, for a citizen with the median income in Taipei city, they would need to use all their wages for 15 years in order to purchase a median-priced house.

As a result, this unaffordability of housing has led to significant social unrest in Taiwan, such as the Generation Rent movement in the 1980s, which remains one of the most pressing issues in the country today. Many Taiwanese citizens are having a housing mortgage that takes up 38% of their disposable income, which leads to very high mortgage burdens, and creates many social issues.

In this essay, I will be analyzing how the future trend of the housing dependency will become even worse then the current situation, and propose some potential solutions to resolve the issue.

High Housing Prices

Taiwan's housing price is among one of the highest in the entire world. As mentioned in the introduction, according to data from Numbeo, Taiwan's housing price for apartments outside the city center ranks as the 10th most expensive out of the 103 countries in the world, with the price of about 150,000 NTD per square meter. This price is comparatively high with countries of similar economic status, for example, the housing price per square meter is only about 105,000 for Japan, which is 30% lower compared to Taiwan.

The problem is even more severe in the city center. Out of the same 103 countries, Taipei ranks 7th in terms of price per square meter, with the price about 255,000 NTD. This clearly shows how housing in Taiwan is significantly overpriced and unaffordable for the majority of people.

Rank	Country	Price per Square Meter to Buy Apartment in City Centre
1	Hong Kong (China)	929368.63
2	Singapore	613624.76
3	Switzerland	468421.45
4	South Korea	363044.05
5	Luxembourg	350597.39
6	China	275182.38
7	Taiwan	255943.99
8	Israel	248047.09
9	Australia	221809.81
10	Germany	216132.04
11	Canada	202847.98
12	Austria	198122.57
13	Kuwait	190923.17
14	Japan	190568.84
15	France	187179.65
16	Norway	186675.30
17	New Zealand	186404.41
18	Sweden	181230.44
19	Finland	171740.43
20	Denmark	168808.06

Figure 1. Price per Square Meter in City Center Ranking in 2023 (Numbeo)

Moreover, the growth of the housing price is also very high in Taiwan. The XinYi housing price index(Calculated based on actual transacted cases by XinYi Realty using pooling model along with the Hedonic Price Method) grew from 110.36 to 144.58 over the course of 2020 to 2022, which is an increase of around 31%. This represents a yearly growth rate of around 15%, causing the housing to be greatly unaffordable.

Furthermore, due to the ineffectiveness of government policies, the problem associated with unaffordable housing prices have become even more severe. Taiwan's housing market is more market-driven than other East Asian economies, due to this reason, the government plays a less dominant role in the market. This results in the housing shortage for low income groups, as houses are heavily involved with special groups, such as servicemen or civil servants. (Yip and Chang, 2008) In addition, due to how the subsidy program overly concentrated on promoting home ownership, only very little subsidizes the renters and resulting in inefficient and inequality in the rental market

(Chang and Chen, 2015).

Figure 2. XinYi Price Index History Trend from 2002 to 2022

Finally, we can visualize the significance of this problem through the GDP per Capita to housing price ratio. According to the Global Property Guide, Taiwan ranks number 5 in terms of its GDP per Capita to housing price ratio, even higher than Hong Kong which is infamous for its high housing prices. This clearly shows how significant the issue is in Taiwan. (Global Property Guide)
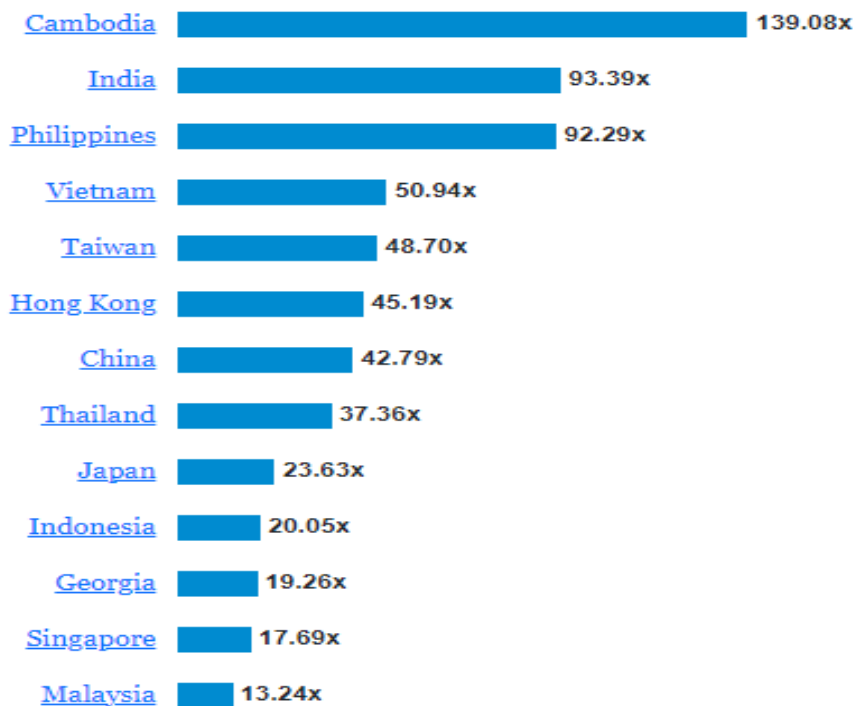
Figure 3. House Prices/GDP per Capita in Asia in 2023 (Global Property Guide)

Low Wage

Despite the exorbitant housing prices in Taiwan, the wages remain significantly disproportionate to them, ranking among the lowest in developed countries, resulting in the housing to be even more unaffordable.

The minimum wage in Taiwan is one of the lowest in the world, and significantly lower compared to countries of similar economic status. According to the article "Taiwan's Minimum Wage is One of the Lowest In Its League", the minimum wage in Taiwan in 2022 is only NT$25,250 a month, which is only around ⅓ compared to many of the developed western countries, this can be shown through the following diagram.
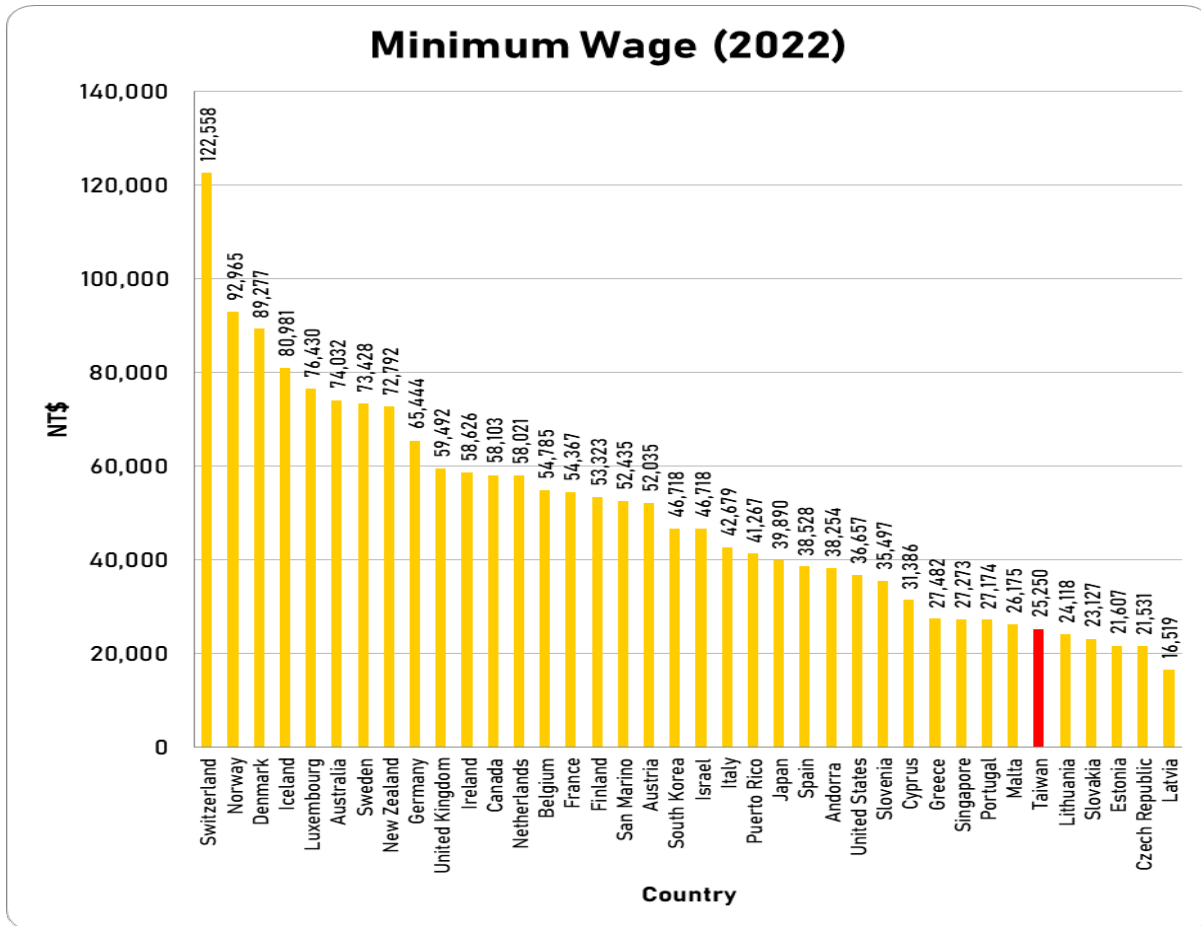

Figure 4. Minimum wage of different countriesin 2022 (Ngerng)

In this graph, we can clearly see how despite ranking 20th in terms of GDP, which is higher than many of the countries on the diagram, Taiwan's minimum wage is significantly lower than them, hence showing how there is indeed a requirement to solve this issue.

Similarly, Taiwan's median wage is also unproportionate to its GDP and cost of living. Taiwan's median wage is again very low compared to other developed countries, which is way too few considering its rather high price level.
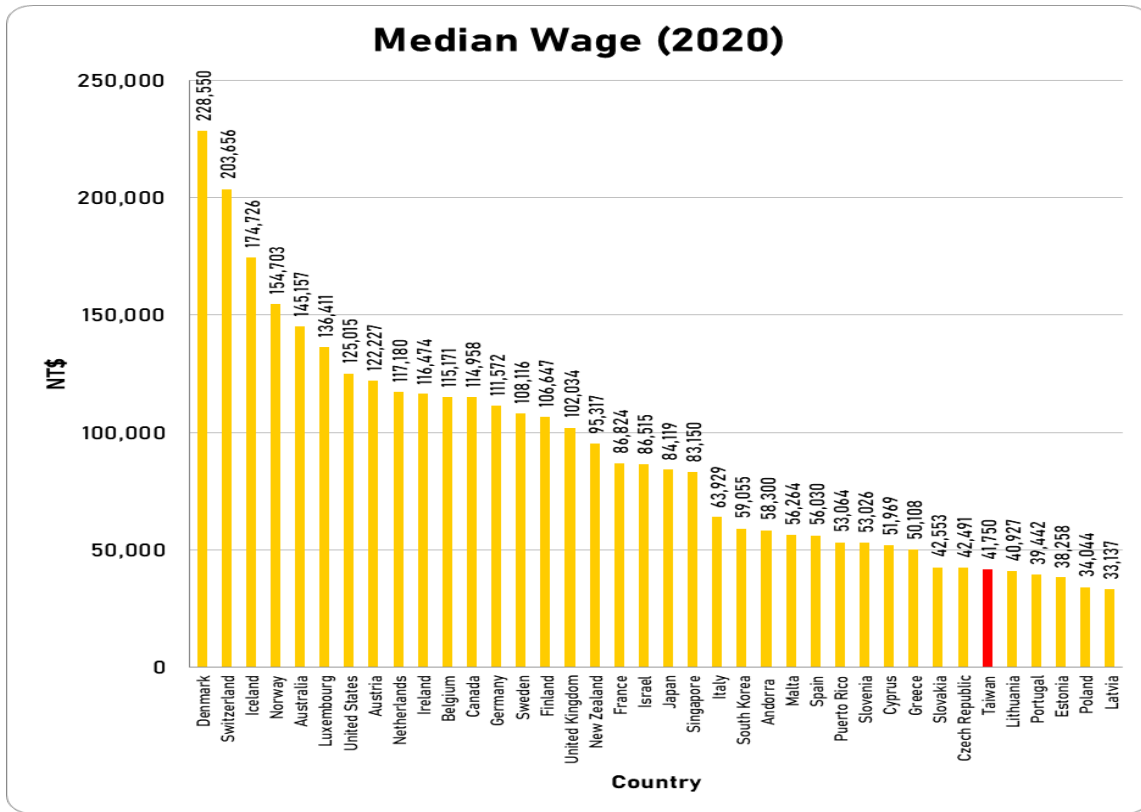
Figure 5. Median wage of different countries in 2020 (Ngerng)

Finally, another major issue in the wages in Taiwan is how it is unevenly distributed among the people. For example, the GDP per Capita in Taiwan for the year 2022 is US$32,811, which is around 1,000,000 NTD. This is more than 20 times the median wage, which clearly shows how wages are unevenly distributed in Taiwan. Moreover, Taiwan's Gini coefficient, which is a measure of equality in distribution of income, is around 33.6 in the year of 2023, and has the ranking of 111th globally, showing how the wage distribution in Taiwan is very uneven.

	Gini Coefficient by Country 2023	
106	Luxembourg	34.2
107	Sudan	34.2
108	Tajikistan	34
109	Azerbaijan	33.7
110	Jordan	33.7
111	Taiwan	33.6
112	Canada	33.3
113	Greece	33.1
114	Switzerland	33.1
115	Bosnia and Herzegovina	33
116	Japan	32.9
117	Nepal	32.8
118	Portugal	32.8

Figure 6. Gini Index Rankings in 2023("Gini Coefficient by Country 2023 - Wisevoter")

Uneven Growth Rates

As mentioned earlier, Taiwan's housing market is currently experiencing severe issues characterized by exorbitant and unaffordable housing prices alongside low and insufficient wages. This imbalance has led to a distorted market condition. Unfortunately, rather than showing signs of improvement, this problem is very likely to worsen in the future.

Over the course of 2002 to 2022, the Xinyi housing price index of housings in Taipei has risen from 34.72 to 127.50, representing a growth of more than 360%, which averaged to the increase of around 6.72% per year, clearly showing how intense the price growth is.

Figure 7. Xinyi Housing Price Index of Taipei City from 2002 to 2022 ("Taiwan - XinYi Housing Price Index")

In comparison, the growth of wages is significantly lower than the growth of housing prices. The minimum wage has increased from 15840 NTD in 2002 to 25250 in 2022, which is a nominal growth of 9410 NTD, representing an increase of 59.4%, which is roughly 2.3% per year.
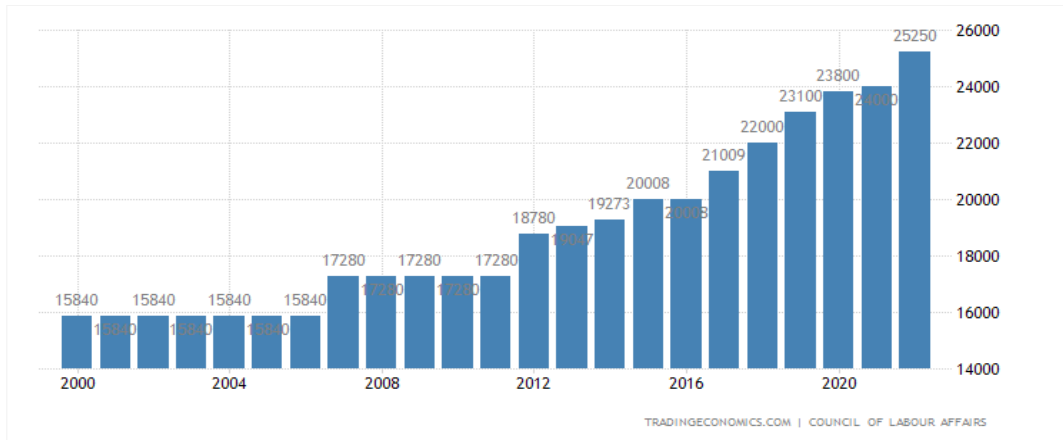
Figure 8. Taiwan's Minimum Wage from 2000 to 2022. ("Taiwan Minimum Monthly Wage - 2022 Data - 2023 Forecast - 1978-2021 Historical - Chart")

The growth of the mean wage is very similar to the minimum wage, having the growth of around 45%, from about 41000 to 59000 over the course of 2002 to 2022, representing the growth of around 1.8% per year. This can be shown in the following graph.
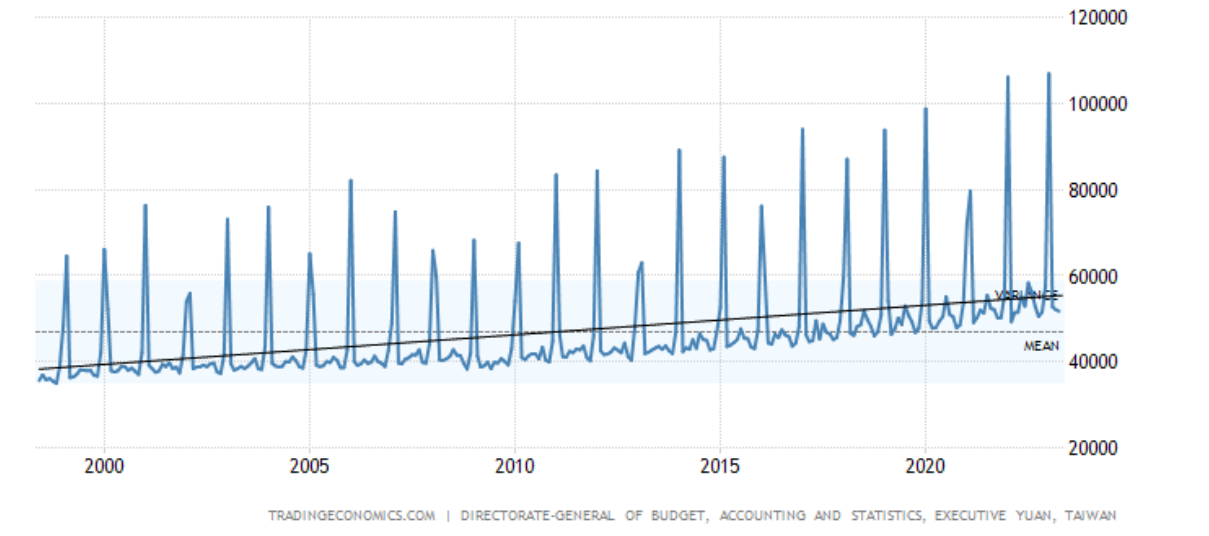
Figure 9. Taiwan's Mean Wage from 2000 to 2022 ("Taiwan Average Monthly Wage in Industry and Services - May 2023 Data")

This uneven growth rate between the housing price and wages causes the gap between houses and wages even further, making housing even more unaffordable for people. As an example, for many first-time home buyers, they have to spend an equivalent of 29 years of their earnings to only purchase an average-sized pre-sale house. (Yip and Chang, 2008) This results in a very unhealthy housing market, and causes many problems in the society.

Issue Caused

By combining the two factors, we are then able to see how unaffordable the housing in Taiwan is. The housing price to income ratio of Taipei is 6.01 in the year of 2002 (EBCNews), but in the year of 2023, it to the ratio of 20.1, meaning that it requires more than 20 years of median wage to purchase a house. ("Property Prices Index by Country 2023") This is way higher than most of the countries in the world, and places a heavy burden on many people in the country.

This results in bubbles forming up in the housing market, making it more difficult for people to own a house. (Tsai and Peng, 2010). Moreover, on top of the four volatile housing bubbles that occurred over the past 40 years, the current boom, which started since 2004, has caused the housing price to rise continuously until now, even during the financial crisis in 2007. This causes the price to income ratio to increase to a new high in Taipei area, and results in severe housing burdens among the people. (Chang and Chen, 2015)

The problem can also be seen in the following graph, which displays the mortgage burden of different cities in the world. In the graph, we can clearly see that the mortgage burden in Taipei is the highest among the world, indicating how the mortgage will be taking up more than 60% of the disposable income in a family, which clearly shows us how severe the problem is.
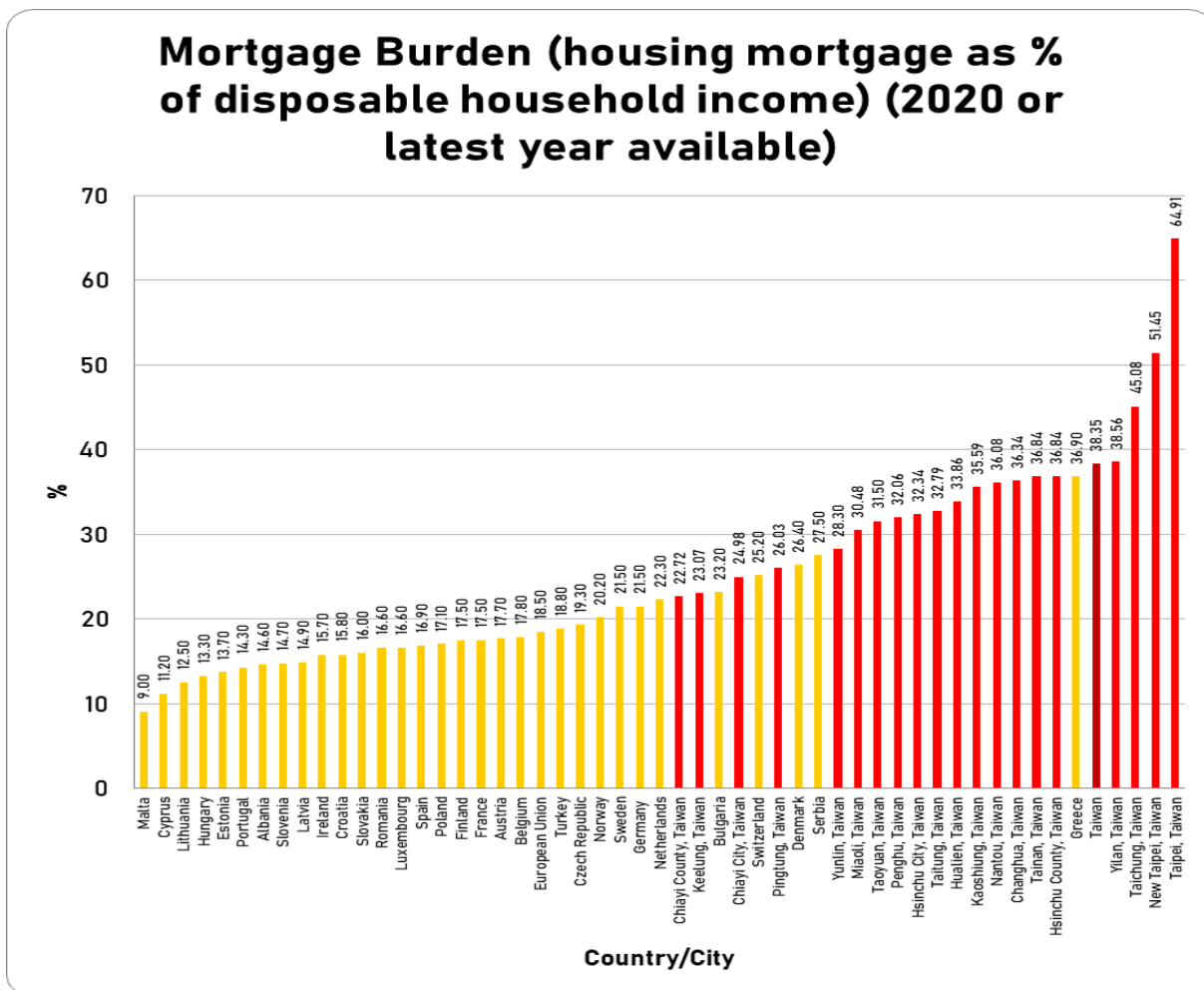
Figure 10. Mortgage Burden of Different Cities in 2020 (Ngerng)

Moreover, the loan to value ratio(LTV), which represents the proportion of the house that is being paid through loan, is also very high in Taiwan, with an average of 70%, and sometimes going up to 80-90%. (Chang and Chen, 2015). This clearly suggests that the housing in Taiwan is highly unaffordable for home buyers, and they are

required to borrow a high amount from the bank to purchase it.

Methodology

Table 1. Source of Data

Data	Source
Median Salary 2012 to 2021	Directorate-General of Budget, Accounting and Statics, Executive Yuan, R.O.C (Taiwan) - Earnings Exploration & Information System
GuoTai Housing Price Index 2000 to 2023	Ministry of the Interior - Real Estate Information Platform
Housing Price to Income Ratio 2000 to 2023	Ministry of the Interior - Real Estate Information Platform

Figure 11. Flowchart of research process

1. Data Gathering from Givernemnt Databases:
   a. The data for the salary of labours are collected from the Taiwanese government's official database using the system Earnings Exploration & Information System. Data from 2012 to 2021 are downloaded to use for the research.

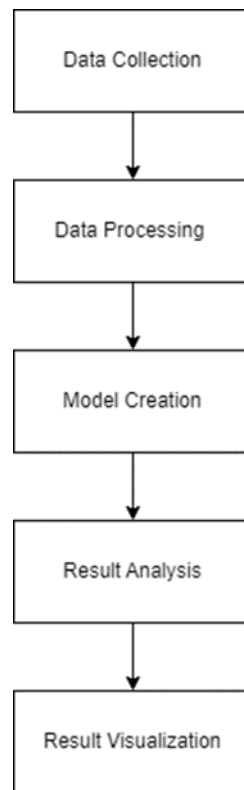b. The data for the housing markets are downloaded from the Real Estate Information Platform from the Taiwanese Ministry of the Interior. Data from the year 2000 to 2023 are downloaded to use for the research.

c. Data for the Housing price to income ratio are downloaded from the Real Estate Information Platform from the Taiwanese Ministry of the Interior. Data from 2000 to 2023 are collected.

2. Data Processing/Cleaning:

a. Chinese characters in the Dataset are first being translated to English for the ease of running the code. This includes the name of the field, building types, building materials etc.

b. Use of the Python Library Pandas and Numpy to preprocess the data. Rows of data with missing features used in the code are removed due to how it is unable to be processed properly. Outlier data are also removed to remain the consistency of the model

3. Model Creation:

a. A linear regression model of the housing price to income ratio will be generated using the data to predict its trend afterwards. This allows us to gain insight into the potential situation of Taiwan's housing market if the current trend is followed.

4. Result Analysis:

a. By using the prediction, the growth rate between the salary and the housing price are able to be understood, allowing us to answer our research question of whether housing in Taiwan will become more unaffordable in the future.

Results
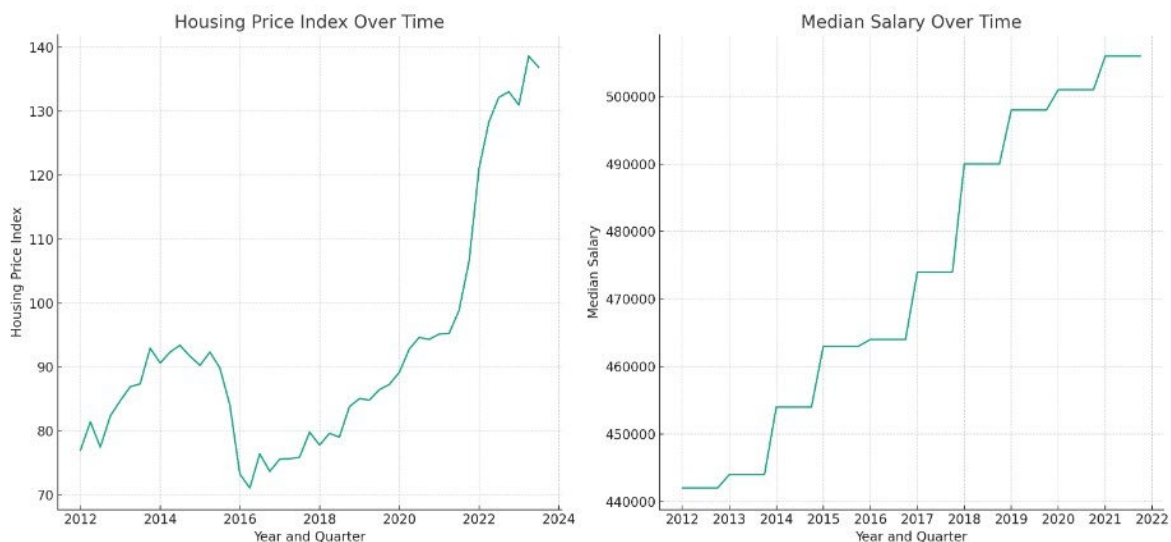
Figure 12. Housing price index and median salary overtime

By running the models for our data, we can see how they perform overtime. For the housing price index, over the course of 2012 to 2023, it overall shows an upward trend, increasing from the value of 77.01 to 136.88, with a growth of around 77%. For the median salary, over the course of 2012 to 2022, it increased from 442000 to 506000, showing a total growth of 14%.

By combining the results of the two models together, we are able to understand the difference between the growth of the two values. As we can see on the following graph, apart from the significant housing price drop in 2016,

the housing price has been growing at a faster pace compared to the median salary, hence making houses increasingly unaffordable overtime.

Figure 13. Difference in growth rate between Housing Index and Salary
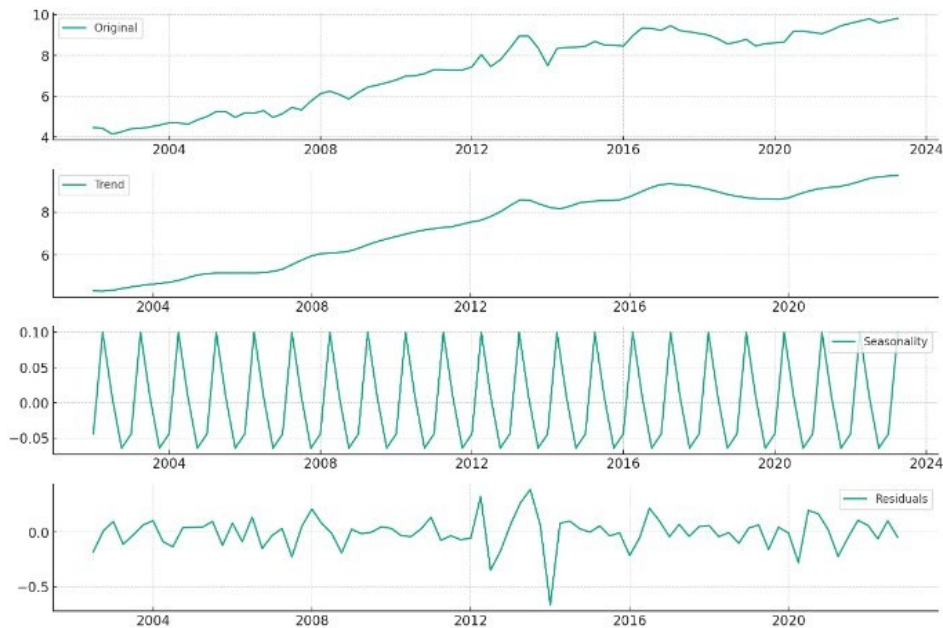
Figure 14. Properties of Housing Price to Income Ratio

Next, for the housing price to income ratio, we can clearly observe from the graph that it is overall trending upward. It shows a significant seasonal fluctuation due to how housing prices are heavily dependent on the time of the year, hence bringing fluctuations to the data. The ratio has increased from 4.87 to 9.82 between the year of 2002 to 2023, with an increase of a shocking 101%, meaning that over this course of 20 years, it becomes twice as hard to purchase a house, proving how this issue of housing unaffordability is becoming more and more significant in Taiwan.

Figure 15. Housing Price to Income Ratio Prediction

Finally, by implementing the regression model, we are able to see the predicted housing price to income ratio in the near future. In the above diagram, after the continuous growth in housing price to income ratio from 2002 to 2023, the ratio is predicted to increase to an even higher number in the future, reaching the ratio of around 13 in 2030, effectively proving how this problem of housing unaffordability will become even more severe given the current trend of housing price and salary growth.

Conclusion

In conclusion, from both the data we have collected and the models created, Taiwan is currently one of the countries with the highest difference between the housing price and salary of workers, hence being one of the most difficult places to afford a house in the entire world. The housing price to income ratio is significantly higher compared to all the other countries with similar economic situations, and housing is clearly unaffordable for citizens with median income.

Moreover, the situation is even worsening overtime. From the data collected from the Taiwanese Ministry of the Interior, we can see that over the course of 2012 to 2023, while the housing price index increased by around 77%, the median salary of workers only increased by a mere 14%, which is a difference of more than 5 times. This difference in the growth rate of the cost of purchasing and the income of people makes the problem more and more severe over time.

Through the regression model of the housing price to income ratio, we can observe this trend occurring and also see the predicted result in the future. From the result, we can observe that throughout the past 30 years, housing has become increasingly unaffordable for people. In the beginning, it only took approximately 4 years of people's salary for them to purchase a house, and it has now doubled and requires nearly 9 years of all salaries from the worker. Furthermore, as mentioned above, the problem is becoming more severe in the future, which we can see through how the predicted required price to income ratio will reach around 12 in 2030, with an increase of around 0.2788 per year.

Some potential solutions that the government can do to the problem include the implementation of tax for holding the houses and not using it, or to directly provide cheaper public housing. These can effectively increase the amount of available housing supplies to the market, hence can lower the housing price in some way.

In short, all of this data shows how under the already unaffordable housing conditions, the situation is likely to get even worse in the future. It is important for the government to take some actions to stop this trend in order to allow young people from the new generation to purchase a house of their own. This is an important issue that should be recognised by as many people as possible, and I hope this essay can serve as a starting point for further research.

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