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THE IMPACT OF MACROECONOMIC VARIABLES ON PROPERTY PRICES IN MALAYSIA DURING THE COVID-19 PANDEMIC

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ABSTRACT

The housing market is a critical driver of economic growth and a source of financial stability. In Malaysia, residential property prices are influenced by a range of macroeconomic factors, including Gross Domestic Product (GDP), exchange rates, unemployment rates, and wage levels. The COVID-19 pandemic introduced significant disruption and volatility to the Malaysian economy, making it essential to understand the relationships between these factors and property prices. The pandemic's economic challenges, coupled with rising property prices, have exacerbated housing affordability issues. While previous studies focused on long-term trends (1991–2019), there is a gap in understanding the high-frequency (monthly) volatility specifically during the COVID-19 shock. As such, this study aims to investigate the short- and long-term effects of GDP, exchange rates, unemployment, and wages on Malaysian residential property prices from January 2020 to March 2023 (a period of 39 months). Using the Autoregressive Distributed Lag (ARDL) model, monthly data are analyzed to examine how these variables have influenced the housing market. The results indicate that in the long term, GDP growth has no significant effect on property prices, while exchange rates and wages show significant negative impacts. Short-term findings reveal a positive influence of unemployment, potentially reflecting government interventions during the crisis. A robust adjustment mechanism toward equilibrium is confirmed by the error correction term. The study concludes that macroeconomic variables play a significant role in determining property prices during periods of crisis, with exchange rate depreciation and wage disparities intensifying affordability challenges. The positive short-term impact of unemployment likely stems from government stimulus and loan moratoriums, which temporarily buoyed the market.

Keywords: *The ARDL, Macroeconomic Variables, Property Prices*

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1. Introduction

The housing market is a cornerstone of a nation's economy, serving both as an essential asset and a provider of shelter. In Malaysia, residential property prices are a crucial measure of

housing affordability. The affordability of housing, which is the ability of individuals and families to purchase homes, directly impacts market demand.

According to the National Property Information Centre (2024), the Malaysian housing market has demonstrated steady and resilient growth, with the house price index more than doubling between 2010 and 2023. However, this growth was disrupted by the COVID-19 pandemic, which began in the fourth quarter of 2019. The implementation of the Movement Control Order (MCO) severely slowed economic growth and negatively impacted various industries, firms, and households. By the fourth quarter of 2020, Malaysia's GDP had experienced a significant downturn, further worsening the economic forecast. A study by Khairudin and Shariff (2023) also found evidence for the impact on COVID-19 on stock market returns. The pandemic-induced economic volatility resulted in significant labor market contraction and led to severe financial difficulties that made it challenging to meet rent or mortgage payments.

Residential property prices are influenced by a range of macroeconomic variables, including GDP, unemployment rates, exchange rates, and wages. Following economic shock of the pandemic, the Malaysian economy began to recover in 2022, surpassing initial growth forecasts (Nambiar, 2023). The study employs time-series regression and monthly data from 2020 to 2023 to analyze the impact of these macroeconomic factors on real residential property prices.

The increasing disparity between housing prices and income levels has made housing less affordable. When property prices rise faster than people's incomes, the ability to purchase a home diminishes. As Musaddad *et al.* (2022) noted, the increasing cost of housing and rent, combined with housing's large share of a household's budget, has raised public concern about affordability. Affordable housing, as defined by Cheah *et al*. (2017), refers to high-quality homes in suitable locations that are priced to allow residents to afford other essential living expenses. Rapid urbanization and population growth have also driven up property prices, particularly in urban areas (Mohd Ezanee *et al*., 2023).

Understanding the relationship between macroeconomic factors and real estate prices is crucial for policymakers and developers. This knowledge is essential for creating effective policies that support a stable and affordable housing market. Given this context, this study has two primary objectives: Firstly, to examine the relationship between key macroeconomic variables (GDP, exchange rates, unemployment, and wages) and residential property prices during the COVID-19 period in Malaysia, and to explore how these macroeconomic variables have affected housing prices in both the short-run and long-run. The findings of this study can help policymakers design effective housing policies to ensure accessibility and affordability. It also contributes to the academic literature by providing a foundation for future research on the macroeconomic impacts on housing economics.

2. Literature Review

The following sections outline the factors influencing property prices by distinguishing between established historical trends and the unique disruptions introduced by the global health crisis.

2.1 Historical Determinants of Property Prices (Pre-COVID Era)

In Malaysia, residential property prices, when adjusted for inflation, are a key indicator of housing affordability and a reflection of true purchasing power. These prices are influenced by various macroeconomic and demographic factors. Olanrewaju *et al.* (2018) noted that much of

the existing research on Malaysian housing prices tends to focus on macroeconomic and demand-side factors rather than supply-side issues.

Prior to the pandemic, residential property prices in Malaysia were primarily driven by fundamental macroeconomic growth and demand-side factors. A comprehensive study by Zulkarnain and Nawi (2024), covering the period from 1991 to 2019, established that Gross Domestic Product (GDP) had a significant positive impact on real estate prices, suggesting that economic expansion naturally bolsters housing demand.

During this pre-crisis period, the exchange rate typically showed no significant impact on prices, despite maintaining a positive correlation. Furthermore, the results indicated a negative correlation between unemployment rates and property values, as higher employment levels generally enhance the population's purchasing power and ability to service mortgages. However, even before the pandemic, Malaysia faced structural issues, such as a significant housing glut where over 33,000 properties remained unsold in 2019, particularly in the RM201,000 to RM300,000 price range (Khadim *et al.*, 2021).

2.2 Pandemic-Specific Disruptions (COVID-Era)

The COVID-19 pandemic introduced structural breaks in global and local economies, necessitating a re-evaluation of how traditional macroeconomic indicators behaved during this period of high volatility (2020–2023).

Real Gross Domestic Product (GDP) Volatility

While GDP is a standard measure of economic performance (Dynan & Sheiner, 2018), its relationship with property prices became non-linear during the pandemic. In Malaysia, the GDP index plummeted from 4.3% in 2019 to -5.6% in 2020. While Mokhtar *et al.* (2021) argue that GDP growth typically drives housing demand and prices in Malaysia, the pandemic era mirrors findings by Duja and Supriyanto (2019), who suggested that GDP's impact may only manifest in the long term. This disconnect implies that during the pandemic, residential real estate values may have been insulated from short-term economic shocks or driven by non-GDP factors such as speculative shifts or government intervention.

Exchange Rate and Supply Chain Shocks

The value of the Malaysian Ringgit (MYR) became a critical determinant of construction costs during the COVID-19 era. As noted by Salisu *et al.* (2024) and the OECD, exchange rate fluctuations directly impact housing affordability in import-dependent nations. During the pandemic, global supply chain disruptions led to severe shortages and inflated costs for building materials (Musella, 2023). A weaker MYR exacerbated these issues, as higher prices for imported raw materials were passed on to consumers. This contradicts Sumer & Özhoron's (2020) long-term view of exchange rate neutrality, highlighting that in crisis periods, the currency's impact on supply-side costs becomes a dominant driver of property inflation.

The Unemployment-Price Paradox

Malaysia's unemployment rate rose significantly from 3.3% in 2019 to 4.5% in 2020 (Lim, 2024). Traditionally, unemployment is expected to have a significant negative influence on property prices (Isyanto *et al*., 2022) as it erodes consumer confidence and purchasing power. However, the pandemic created a unique statistical anomaly, while Sun (2022) found short-term negative correlations in other markets, the Malaysian context requires examination of whether government stimulus and mortgage moratoriums temporarily inverted this relationship, allowing property prices to remain stable despite labor market contraction.

The Widening Wage-Affordability Gap

Housing affordability is intrinsically linked to income levels (Kumar, 2020). While a positive relationship between wages and housing demand is standard (Duja & Supriyanto, 2019), the COVID-era was characterized by a severe dissociation of these variables. Pinjaman *et al.* (2023) highlighted that between 2014 and 2020, Malaysian house prices rose by 4.1% while income grew by only 2.1%. This growing affordability gap suggests that during the 2020–2023 period, the relationship between wages and property prices may have turned negative or insignificant, as the average worker was increasingly priced out of the market regardless of marginal wage increases.

2.3 Theoretical Expectations

To provide a baseline for the empirical analysis, Table 1 summarizes the expected relationship between each macroeconomic variable and residential property prices based on established economic theories and previous literature.

Table 1: Theoretical Expectations of Explanatory Variables

Variable	Symbol	Expected Relationship	Theoretical Justification
Real GDP	ln GDP	Positive	Higher economic growth increases household wealth and aggregate demand for housing.
Exchange Rate	ln REER	Positive or Negative	A stronger currency can lower import costs for materials (positive), but may reduce foreign investment attractiveness (negative).
Wages	ln WAGE	Positive	Increases in disposable income typically enhance purchasing power and mortgage eligibility.
Unemployment	ln UNEMP	Negative	Higher unemployment reduces financial stability and consumer confidence, lowering demand.

3. Data and Methodology

3.1 Data Acquisition

Data were acquisite from the Department of Statistics Malaysia (DOSM), the World Bank, and the Federal Reserve Bank of St. Louis (FRED). The dataset spans from January 2020 to March 2023, covering 39 months. The variables include real residential property prices (RP) and wages (WAGE), both sourced from the World Bank; real gross domestic product (GDP) and the unemployment rate (UNEMP), obtained from DOSM; and the real broad effective exchange rate (REER) for Malaysia, obtained from FRED. Because GDP is typically reported on a quarterly basis, a Cubic Spline interpolation method was employed to disaggregate the quarterly figures into monthly observations. This computational technique was selected to ensure a smooth transition between data points, preserving the underlying trend and cyclicality of Malaysia's economic output during the volatile COVID-19 period. All variables were subsequently transformed into their logarithmic forms (ln) to stabilize variance and meet the assumptions of the ARDL framework.

3.2 Methodology

This study aims to determine the impact of macroeconomic factors on Malaysian house prices during the COVID-19 pandemic. Several analyses are conducted in this study. There are

descriptive statistics, the unit root tests, and the methodology involves constructing a multiple regression model using the Autoregressive Distributed Lag (ARDL) framework.

3.2.1 Descriptive statistics

Descriptive analysis was performed to summarize and interpret the data. Key features such as the mean, median, standard deviation, skewness, and kurtosis were calculated to provide insights into the data's distribution and characteristics.

3.2.1 Unit Root Test - Augmented Dickey-Fuller (ADF) test

To ensure the reliability of the analysis, the time-series data were tested for stationarity using the Augmented Dickey-Fuller (ADF) test. Non-stationary data can lead to spurious results. The ADF test's null hypothesis is the presence of a unit root, which indicates non-stationarity. If the null hypothesis is rejected at the 5% significance level, the data is considered stationary.

3.2.2 The Autoregressive Distributed Lag (ARDL) Framework

Before constructing the ARDL model, the optimal lag length was determined using various information criteria to ensure the model captures the underlying temporal dynamics of the data. Specifically, the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and Hannan-Quinn Criterion (HQIC) were evaluated. Following computational best practices, the lag length that minimized these criterion values was selected as the optimal lag. The ARDL framework developed by Pesaran and Shin (1998) was employed, as it provides a robust econometric approach for analyzing both long-run and short-run relationships between the variables defined in Table 1. This method is particularly advantageous as it accommodates variables with mixed integration orders, specifically (I(0) and I(1)), and remains statistically efficient even with smaller datasets.

ARDL Bounds Testing for Cointegration

To determine the existence of a long-run equilibrium relationship, the ARDL bounds testing approach was applied. The model tests the null hypothesis of no cointegration. If the calculated F-statistic exceeds the upper bound critical value I(1)), the null hypothesis is rejected, confirming a stable long-run relationship.

The long-run relationship is modeled as follows:

$$\ln RP_t = \beta_0 + \beta_1 \ln GDP_t + \beta_2 \ln REER_t + \beta_3 \ln WAGE_t + \beta_4 \ln UNEMP_t + \mu_t$$

To analyze both the short-term and long-term dynamics simultaneously, use the following Unrestricted Error Correction Model (UECM):

$$\begin{aligned}\Delta \ln RP_t = \ & \beta_0 + \sum_{i=1}^{p} \theta_{1i} \Delta \ln RP_{t-1} + \sum_{i=0}^{q1} \theta_{2i} \Delta \ln GDP_{t-1} \\ & + \sum_{i=0}^{q2} \theta_{3i} \Delta \ln REER_{t-1} + \sum_{i=0}^{q3} \theta_{4i} \Delta \ln WAGE_{t-1} \\ & + \sum_{i=0}^{q4} \theta_{5i} \Delta \ln UNEMP_{t-1} + \gamma_1 \ln RP_{t-1} + \gamma_2 lnGDP_{t-1} + \gamma_3 \ln REER_{t-1} \\ & + \gamma_4 \ln WAGE_{t-1} + \gamma_5 \ln UNEMP_{t-1} + \mu_t\end{aligned}$$

Where

Δ : the first-difference operator

β_0 : intercept

p, q : ihe optimal lag lengths selected via AIC/BIC criteria

$\theta_{1i}\ to\ \theta_{5i}$: short-run coefficient

$\gamma_1\ to\ \gamma_5$: long-run coefficient

μ_t : white noise error term

The p-values are utilized to determine the statistical weight of each macroeconomic variable's impact on residential property prices.

Computation Lag Selection and ARDL Modeling

The selection of the optimal lag structure is a computationally intensive process that involves evaluating the trade-offs between model complexity and information loss. For this study, an automated grid search algorithm was utilized to minimize the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) across all possible lag combinations for the five variables. The AIC is particularly efficient in smaller samples, such as this 39-month dataset, as it prioritizes model fit while applying a penalty for the number of parameters to prevent overfitting. Furthermore, the ARDL bounds test offers significant computational advantages over traditional cointegration methods, like the Johansen test, because it avoids the need for a system of equations. By utilizing a single-equation framework, the ARDL model reduces the dimensionality of the parameter space, thereby enhancing the numerical stability of the estimation and ensuring faster convergence of the Ordinary Least Squares (OLS) estimators. This efficiency is critical when analyzing high-frequency monthly data during periods of extreme economic volatility, such as the COVID-19 pandemic.

4. Results and Discussion

4.1 Descriptive Statistics Result

Table 2 displays the descriptive statistics providing an overview of the key variables used in analysing the impact of macroeconomic factors on residential property prices during the pandemic.

Table 2: Descriptive Statistics Summary

	RP	GDP	REER	UNEMP	WAGE
Mean	5.1005	5.8659	4.5912	1.4364	4.3198
Median	5.0978	5.8831	4.5886	1.5212	4.3201
Maximum	5.1236	6.5702	4.6319	1.6459	4.3218
Minimum	5.0892	5.9844	4.5770	1.2527	4.3168
Std, Dev.	0.0091	0.0780	0.0120	0.1242	0.0017
Skewness	0.9731	-0.7111	1.1369	-0.3948	-0.3364
Kurtosis	3.2390	3.1555	4.4778	1.6810	1.6900

The mean and median values are close for most variables, suggesting a symmetrical distribution. The low standard deviation for RP (0.0091) and WAGE (0.0017) indicates that property prices and wages were relatively stable during the pandemic. However, the positive skewness in property prices (0.9731) and REER (1.1369) hints at occasional spikes in these values. The negative skewness observed in the unemployment data can be attributed to the combined effects of aggressive fiscal intervention and structural shifts in the labor market

during the pandemic. This statistical anomaly is further expanded by the high-frequency monthly data, which captures a concentrated peak of joblessness followed by a protracted, steady decline as the economy reopened in 2022. Moreover, because the DOSM figures prioritize active job seekers, the data likely excludes individuals who moved into informal gig work or exited the labor force entirely (underemployment), thereby masking the full extent of labor market distress and contributing to the observed skewness.

4.2 Unit Root Test - Augmented Dickey-Fuller (ADF) test Result

The results in Table 3 show mixed orders of integration, which confirms that the ARDL approach is the appropriate method for this analysis. Specifically, RP and WAGE are stationary at the level (I(0)), while GDP becomes stationary only after first differencing (I(1)). Furthermore, REER and UNEMP are stationary at the level form under the without constant and trend and with trend and constant specifications, respectively. This mixed stationarity further validates the use of the ARDL model.

Table 3: ADF Test Results

Time Series	Level (p-value)			First differences (p-value)		
	with constant	with trend and constant	without constant and trend	with constant	with trend and constant	without constant and trend
RP	0.0350*	0.8677	0.3404	0.0043	0.0453	0.0003
GDP	0.9138	0.5200	0.9630	0.1428	0.3341	0.0075*
REER	0.8677	0.0318	0.0046*	0.0009	0.0062	0.0082
UNEMP	0.9845	0.7639	0.0009*	0.1032	0.4076	0.0995
WAGE	0.0376*	0.9988	0.7508	0.8701	0.1916	0.1483

*The values are significant at the 5% level.

4.3 ARDL Result

Based on the result of lag selection criteria, the optimal lag length for the ARDL model is determined as Lag 1, as it minimizes the values of the AIC, BIC (SC), and HQIC criteria. This selection is crucial for capturing both the short-term and long-term dynamics between the variables. Table 4 presents the F-statistic results used to test the existence of a long-run relationship among the variables. It highlights the outcomes of the cointegration test conducted through the bound testing approach.

Table 4: ARDL Co-integration Bounds Test Result

Test statistic	Value	Significant level	Lower bound I (0)	Upper bound I (1)	Long-run relationship
		10%	2.20	3.09	
F-statistic	5.5809	5%	2.56	3.49	Present
k	4	2.5%	2.88	3.87	
		1%	3.29	4.37	

The results of the ARDL bounds indicate that the calculated F-statistic exceeds the upper bound critical value, providing strong empirical evidence that residential property prices are cointegrated with the selected macroeconomic variables in the long run. This confirmed cointegration relationship justifies the use of the ARDL framework to capture both the transient short-run fluctuations and the stable long-run equilibrium. Following this confirmation, the conditional ARDL long-run model was estimated to quantify the specific impacts of each variable. The subsequent sections will detail the interpretation of these dynamics, specifically focusing on the speed of adjustment and the magnitudes of the long-run multipliers.

Table 5: Long-Run Coefficient of the ARDL Model

Variable	Coefficient	Standard Error	*t*-statistics	*p*-value
Constant	50.0452	10.2254	4.8943	0.0000*
GDP	0.0609	0.0517	1.1784	0.2476
REER	-1.1256	0.3121	-3.6070	0.0011*
UNEMP	-0.0236	0.0367	-0.6403	0.5267
WAGE	-9.2826	2.2684	-4.0921	0.0003*

*The values are significant at the 5% level.

The ARDL model results in Table 5 indicate that GDP growth had no significant long-term effect on property prices during the review period. This may reflect the economic uncertainties caused by the pandemic, which deteriorated the relationship between economic output and property market dynamics. Conversely, the real effective exchange rate (REER) exhibited a significant negative long-term impact. This suggests that a depreciation of the Malaysian Ringgit leads to a decline in property prices, likely because of the increased costs of imported building materials. Similarly, wages also demonstrated a significant negative long-term impact on property prices.

The long-run negative impact of wages and the role of exchange rates during the pandemic reflect a significant departure from conventional economic equilibrium. The inverse relationship between wages and property prices suggests that property prices continued to appreciate due to supply-side constraints and speculative investment while average worker wages remained stagnant, creating a severe decoupling that priced the majority of the labor force out of the market. Concurrently, the exchange rate functioned through a process where a weaker Ringgit directly increased the cost of imported raw materials like steel and machinery, costs which developers passed on to buyers to preserve profit margins despite the weakened domestic purchasing power. This indicates that during the 2020–2023 crisis, the Malaysian housing market was driven more by external supply costs and structural affordability gaps than by internal household income growth.

Table 6: Short Run Coefficient Result

Variable	Coefficient	Std. Error	*t*-Statistic	p-value
UNEMP	0.0773	0.0084	9.1827	0.0000*
Error Correction Term	-0.2666	0.0428	-6.2359	0.0000*

*The values are significant at the 5% level.

Regarding the short-term dynamics (see Table 6), the results indicate that among the selected macroeconomic variables, only the unemployment rate exerts a statistically significant positive influence on property prices. This counterintuitive finding is likely a result of the extensive government interventions deployed during the pandemic. These measures artificially maintained the housing market by providing temporary financial liquidity and preventing distressed sales, thereby maintaining price stability despite rising joblessness. Furthermore, the error correction term is negative and highly significant at the 5% level. This confirms a robust adjustment mechanism, indicating that approximately 26.7% of the disequilibrium from the previous month is corrected in the current period. This result provides computational evidence of a stable convergence toward the long-run equilibrium relationship following external economic shocks.

5. Conclusion and Recommendation

In conclusion, this study reveals that Malaysian residential property prices during the COVID-19 pandemic were primarily driven by supply-side pressures and structural economic imbalances rather than traditional domestic demand. The significant long-term impact of the exchange rate suggests that the housing market is highly vulnerable to currency fluctuations, which directly inflate the cost of imported construction materials. To mitigate this, it is

recommended that the government provide targeted fiscal incentives and subsidies for the local production of building materials. By strengthening the domestic supply chain and reducing import dependency, the construction industry can become more resilient to external currency shocks, ultimately stabilizing house prices for the end-consumer.

Furthermore, the anomalous relationship between wage levels and property prices highlights a growing structural gap where housing appreciation has fundamentally decoupled from the earning capacity of the average household. To address this affordability crisis, policymakers should move beyond traditional mortgage-based solutions and implement more robust, widespread rent-to-own schemes that protect genuine homebuyers from speculative market shifts. Additionally, stricter regulatory oversight on property speculation and the introduction of tiered stamp duty exemptions for first-time local buyers could help realign the housing market with actual domestic affordability. Such integrated strategies are essential to ensure that housing remains a social right rather than a speculative asset in the post-pandemic era.

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Author Contribution

Author 1 prepared the first draft of the manuscript. Author 2 served as the editor and revised the entire paper. Author 3 performed the final revision of the entire paper.

Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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