

Micro to Macro: Analysing economic impacts on Kuala Lumpur's shop Property Price Index

Intan Faiqah Hamizah Mohd Firazan¹, Junainah Mohamad^{1*}, Njo Anastasia²

**Corresponding Author*

¹ Department of Built Environment Studies and Technology, Faculty of Built Environment, Universiti Teknologi MARA, Perak Branch, Seri Iskandar Campus, Malaysia

² Program Finance & Investment, School of Business & Management, Petra Christian University, Surabaya, Indonesia

intanfaiahhamizah@gmail.com, mjunainah@uitm.edu.my, njoanas@yahoo.com
Tel: +601127570145

Abstract

This study constructs the Kuala Lumpur Shop Property Price Index (SH-PI) using a Laspeyres hedonic regression model, addressing the absence of a dedicated index for shop properties in Malaysia. By adjusting for structural, legal and locational attributes, the SH-PI captures quality-consistent price trends from 2013 to 2023. Regional indices are aggregated to form a city-wide benchmark, which is then compared against macroeconomic indicators (GDP, inflation, interest rate, unemployment). Findings show the SH-PI outperforms unadjusted averages in stability and interpretability, offering a transparent, evidence-based tool for policymakers, investors, and developers navigating the urban commercial property market.

Keywords: Shop Property Price Index; Hedonic Pricing; Microeconomic Determinants; Macroeconomic Factors

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1.0 Introduction

Property price indices are essential tools for tracking market trends, assessing risks, and guiding investment decisions in urban environments (UN-HABITAT, 2020). In Malaysia, the National Property Information Centre (NAPIC) publishes indices such as the Malaysia Property price indices are essential tools for monitoring market trends, managing risks, and informing investment decisions in urban environments, making them highly relevant for research on urban behavior and the built environment, especially concerning mobility, land-use mix, and economic activity (Eurostat, 2021). In Malaysia, the National Property Information Centre (NAPIC) publishes indices for various property types, such as the Malaysia House Price Index (MHPI) and Serviced Apartment Price Index (SAPI). However, there remains a significant gap in the availability of a dedicated index for shop properties, despite their crucial role in driving retail activity, supporting economic growth, and influencing urban vitality (UN-HABITAT, 2020).

Shop property prices offer valuable insights into local economic conditions, land-use patterns, and human behavior, making them vital indicators for urban planning and policy (Mora & Formoso, 2022). The traditional use of average-based indices, however, is inadequate as it fails to account for the diverse factors influencing shop property prices, such as structural differences and regional variations (Duca et al., 2021). This limitation hampers the ability to track trends accurately, evaluate market stability, and assess affordability (OECD, 2023). The lack of a dedicated shop property index impedes transparency, making it challenging for policymakers, investors, and developers to identify market bubbles or assess the impact of planning policies effectively.

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The aim of this study is to construct the Kuala Lumpur Shop Property Price Index (SHPI) using a Laspeyres hedonic regression model, based on transaction data from 2013 to 2023. The SHPI will adjust for quality differences and provide citywide and regional benchmarks for Central, North, and South Kuala Lumpur. The study will further explore the relationship between shop property prices and macroeconomic indicators, such as GDP, inflation, interest rates, and unemployment, to reveal how these prices reflect broader economic and urban dynamics.

1.1 Aim of study

The aim of this study is to develop a quality-adjusted SHPI for Kuala Lumpur and examine SHPI relationship with macroeconomic indicators.

1.2 Objective of study

The objective of the study is to construct citywide and regional Structural House Price Indices (SHPI) that account for structural, locational, and legal factors, compare the SHPI with simple average price trends to show the effect of quality adjustments and analyse the relationship between the SHPI and key macroeconomic indicators.

2.0 Literature Review

2.1 The Role of Property Price Indices in Real Estate Analysis

Property price indices are crucial tools for assessing real estate markets, evaluating price movements, and guiding investment decisions (Eurostat, 2021). These indices, especially when adjusted for quality, offer more reliable insights into market trends compared to simple average prices, which fail to account for variations in property characteristics (Davino et al., 2021). Hedonic price models, widely adopted for their ability to adjust for structural, locational, and legal factors, enhance the accuracy of property price indices by isolating pure price changes. In particular, Laspeyres hedonic models have become increasingly favoured due to their transparency, fixed base-year weights, and global applicability in real estate economics (OECD, 2023).

2.2 Malaysian Context and Research Gap

In Malaysia, the absence of a dedicated shop property price index represents a significant gap in the real estate market, despite the pivotal role of shop properties in the economy (Shayuti et al., 2023). Existing indices such as the Malaysia House Price Index (MHPI) and Serviced Apartment Price Index (SAPI) focus primarily on residential properties, leaving a void in the commercial property sector. This study addresses this gap by constructing the Kuala Lumpur Shop Property Price Index (SH-PI), which accounts for factors such as location, structural attributes, and legal characteristics, ensuring a more accurate reflection of shop property price trends.

2.3 Issues and Research Expectations

Three key issues emerge from the literature. First, unadjusted indices fail to capture true market movements, creating a need for quality-adjusted hedonic indices (OECD, 2023). Second, a lack of spatial segmentation conceals submarket differences within diverse urban areas (Mora & Formoso, 2022). Third, limited integration of macroeconomic variables such as GDP, inflation, and unemployment reduces the explanatory strength of property indices (Duca et al., 2021).

2.4 Contribution to Literature

This research contributes by developing a Kuala Lumpur SHPI that integrates detailed property attributes with macroeconomic context, responding to calls for comprehensive, evidence-based urban market indicators (OECD, 2023; UN-HABITAT, 2020). The framework offers a replicable model for other cities and advances hedonic pricing applications in commercial property research.

3.0 Research Methodology

3.1 Research Design Overview

A quantitative design was applied to construct the Kuala Lumpur Shop Property Price Index (SH-PI) using secondary transaction data from the National Property Information Centre (NAPIC) for 2013–2023. The index captures constant-quality price movements across three submarkets: Central, North, and South Kuala Lumpur. Pearson correlation analysis was performed to assess relationships between SH-PI and macroeconomic factors such as GDP growth, inflation, interest rates, and unemployment. The Laspeyres hedonic method was selected for transparency, fixed base-year weighting, and global acceptance in real estate economics, allowing accurate measurement of pure price changes while accounting for structural and locational variations (Eurostat, 2021; OECD, 2023).

3.2 Data Collection

The dataset consisted of verified arm's-length transactions of non-stratified terraced shop lots within the three submarkets. Each transaction contained structural, locational, and legal attributes essential for hedonic modelling.

Table 1 presents annual transactions by region. Central Kuala Lumpur consistently recorded the highest volumes, peaking in 2018 and 2023. North and South regions showed greater fluctuation, with sharp declines during 2020–2021 due to pandemic restrictions,

followed by subsequent recovery. This trend reflects Central Kuala Lumpur's dominance as a commercial hub and the market's responsiveness to external shocks.

Table 1. Annual shop property transactions by region (2013–2023)

Year	KL Centre	KL North	KL South	Kuala Lumpur
2013	59	58	43	160
2014	104	104	81	289
2015	95	74	89	258
2016	65	77	39	181
2017	63	61	53	177
2018	113	99	112	324
2019	69	63	59	191
2020	74	48	53	175
2021	88	69	72	229
2022	90	93	68	251
2023	107	80	58	245

(Source: NAPIC)

Table 2 presents the number of transactions by shop lot floor count, ranging from one to four storeys. The majority of transacted units were either two or three storey properties. Four-storey shops saw an upward trend toward the later years, particularly in 2023 indicating evolving demand for larger commercial spaces.

Table 2. Shop transaction by number of floors (2013-2023)

Year	1	2	3	4
2013	1	41	78	40
2014	10	90	106	83
2015	6	93	109	50
2016	3	65	71	42
2017	6	58	88	25
2018	5	95	138	86
2019	2	46	93	50
2020	7	48	82	38
2021	4	72	105	48
2022	10	77	109	55
2023	13	65	90	77

(Source: NAPIC)

Price segmentation is shown in Table 3. The majority of transacted properties fell within the RM1,000,001 to RM3,000,000 range, followed by those in the RM3,000,001 to RM6,000,000 bracket. Very few transactions occurred in the RM500,000 range, highlighting the premium nature of commercial shop properties in urban Kuala Lumpur. A small but persistent number of high-value transactions exceeding RM6 million also occurred annually, suggesting a niche but active upper-tier market.

Table 3. Shop transactions by price range (2013-2023)

Year	RM0- RM50,000	RM50,001- RM200,000	RM200,001- RM500,000	RM500,001- RM1,000,000	RM1,000,001- RM3,000,000	RM3,000,001- RM6,000,000	RM6,000,001- RM10,000,000
2013	0	0	6	7	112	34	1
2014	0	0	3	33	177	72	4
2015	0	1	2	21	183	45	6
2016	0	0	3	14	133	28	3
2017	0	0	1	16	108	48	4
2018	1	0	2	16	216	82	7
2019	0	0	1	11	131	42	6
2020	0	0	2	8	122	40	3
2021	0	0	0	7	147	70	5
2022	0	0	1	16	168	61	5
2023	0	0	1	6	155	68	15

(Source: NAPIC)

Table 4 summarizes 24 key variables used to model price variation. These include structural factors such as land area, main floor area, and number of floors, locational factors like distance to the nearest city, and legal factors such as tenure type and purchaser status. The detailed variables ensure robust modelling of property value determinants.

Table 4. Descriptions of variables used in construction of SH-PI

Variable	No.	Variable	Description of variable
Structural	1	Land Area	The total size of the land on which the shop is located.
	2	Main floor area (MFA)	The total floor area of the main floor of the shop.

Variable	No.	Variable	Description of variable
Location	3	Ancillary floor area (AFA)	The floor area of the additional or supporting spaces of the shop such as walkways.
	5	Position	Position of the shop.
	6	Condition of shop	The overall physical state of the shop.
	7	Shop Construction	The classification of the shop's construction based on its durability and materials.
	8	Number of Floor	The total number of floors in the shop or building.
	9	Terrain	The characteristics or classification of the land surface on which a property is built or located.
	10	Region	The region of Kuala Lumpur
	11	Mukim	The sub district or division within a district where the property is located.
	12	Scheme	The specific development scheme under which the shop is located.
	13	Street layer	The type or classification of the road layer the shop is situated.
	14	Classification of location	The broader classification of the location, such as primary city centre and secondary city centre.
	15	Condition of location	The overall condition or state of the location, such as good, average, and poor.
	16	Land use	The designated use of the land such as building, industrial, agriculture and no category.
	17	Distance to nearest city	The distance of the shop to the nearest city benchmark is usually the main post office.
	18	Type of Lot	The legal classification or designation of the land based on ownership rights or registration details
	19	Tenure	The type of property tenure, indicating whether the shop is freehold or leasehold property,
Legal	20	Purchaser Status	The citizenship or type of entity purchasing the shop.
	21	First Transfer	Indicates whether the shop is being transferred for the first time or sub-sale.
Transaction price	22	Price	The price stated in the agreement for the purchase of the shop.
	24	Price Log	Price convert to log transformation.

(Source: NAPIC)

Macroeconomic indicators were collected to contextualize SH-PI trends and examine economic sensitivity. Table 5 and 6 outline GDP growth, inflation, interest rates, and unemployment from 2013–2023. GDP growth trends reflect overall economic performance, while interest rates capture borrowing costs influencing property demand.

Table 5. Description and purpose of macroeconomic variables utilized in SH-PI

Variable	Variable Measurement	Variable purpose	Source
Gross Domestic Product (GDP)	GDP growth rate (%)	Indication for national economic performance and business confidence	DOSM
Inflation Rate	Consumer Price Index (CPI) (%)	Reflection of living cost and purchasing power.	DOSM
Interest Rate	Overnight Policy Rate (OPR)	Representation of borrowing cost that influence financial activity.	BNM
Unemployment Rate	Interest Rate	Signal of labour market health and consumer spending capacity.	DOSM

(Source: Researcher)

Table 6. Macroeconomic variables utilized in SH-PI

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
GDP Growth (%)	4.7	6.0	5.0	4.2	5.9	4.7	4.3	-5.6	3.1	8.9	3.6
Inflation (%)	2.1	3.2	2.1	2.1	3.8	1.0	0.7	-1.1	2.5	3.4	2.5
Interest (%)	3.0	3.25	3.25	3.25	3.0	3.25	3.0	1.75	1.75	2.75	3.0
Unemployment (%)	3.1	2.9	3.3	3.5	3.4	3.3	3.3	4.5	4.6	3.8	3.4

(Source: Researcher)

3.3 Data Cleaning and Pre-processing

A structured cleaning process was applied to ensure data accuracy. Records with missing key variables, such as land area and construction type, were removed. Outliers with Z-scores above three were excluded to reduce bias. Categorical variables were encoded, and continuous variables standardized. The final dataset contained 2,480 validated transactions, split 80:20 for training and validation. Table 7 summarizes the cleaning stages.

Table 7. Record of data cleaning process

No.	Notes	Total deleted records	Number of records left
1.	Original data from 2013-2023 for commercial shop property (1-4 story shop)	-	2980
2.	Missing land area	2	2978
3.	Missing MFA	2	2976
4.	Missing shop type of construction	64	2912
5.	Missing terrain	80	2832
6.	Missing street layer	180	2652
7.	Missing condition of location	121	2531
8.	Outliers	51	2480

(Source: Researcher)

3.4 Construction of the Hedonic Index

The SH-PI was developed using a Laspeyres hedonic model, which is widely recognized for producing consistent and interpretable property price indices. This approach was selected due to its ability to isolate pure price changes while maintaining fixed base-year weights, ensuring comparability over time and reducing compositional bias in the data (Eurostat, 2021). The base year was set as 2018, as transaction volumes during this period were balanced across all regions.

The model applies a time-dummy variable regression, where separate hedonic regressions are performed for each year to estimate price determinants. This method allows for the clear identification of changes in property values that are independent of variations in the types of properties transacted annually.

The Laspeyres index is then derived using the estimated regression coefficients. Fixed weights are applied, based on the average characteristics and proportional distribution of attributes in the base year. This structure ensures that changes in the index reflect pure market price variations rather than shifts in the composition of transactions. Separate indices were calculated for Central, North, and South Kuala Lumpur before being geometrically averaged to form the overall SH-PI.

As shown in Table 8, the Central region maintained stable growth throughout the study period, while the South region exhibited higher volatility, particularly between 2015 and 2021. These results illustrate regional market dynamics and confirm the suitability of the Laspeyres hedonic model for tracking urban property price movements presented in Figure 1.

Table 8. SH-PI index point using Laspeyres hedonic formulation

Year	Kuala Lumpur Central Index	Kuala Lumpur North Index	Kuala Lumpur South Index	Kuala Lumpur Index
2013	100	98.6	105.9	100.4
2014	99.3	99.1	101.4	99.2
2015	100.6	99.5	115.4	102.1
2016	99.8	99.8	109.7	99.9
2017	100.5	99.3	100.4	100.1
2018	100	100	100	100
2019	100.9	99.4	98.9	100
2020	100.8	99.4	98.9	99.8
2021	101	100	113.1	100.3
2022	101.2	99.9	100.5	100.8
2023	101	100.4	107.8	100.7

(Source: Researcher)

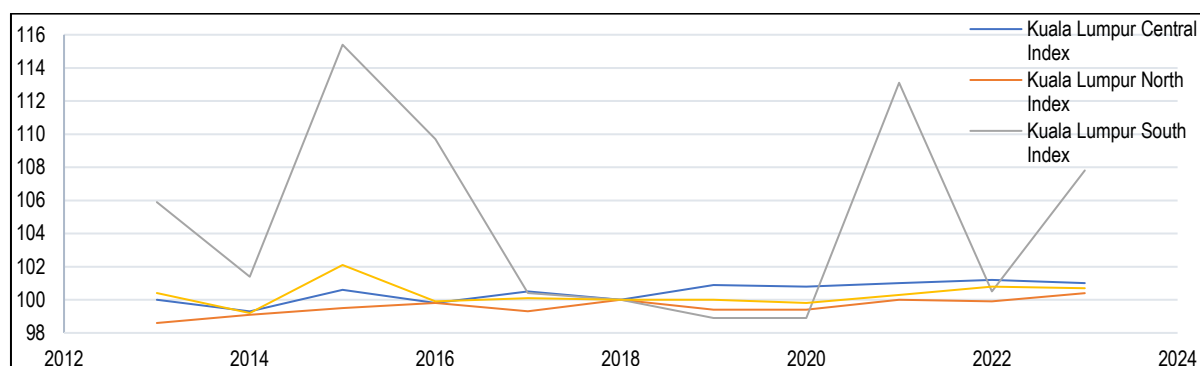


Figure 1. Correlation matrix of the dataset

(Source: Researcher)

This approach is consistent with international guidelines for property price index construction and is particularly effective in emerging urban markets where structural and locational differences significantly affect transaction values (OECD, 2023; UN-HABITAT, 2020). By controlling for these variations, the SH-PI provides a reliable and policy-relevant measure of commercial property market performance.

3.5 Correlation with Macroeconomic Indicators

Pearson correlation analysis was conducted to evaluate the relationship between the Kuala Lumpur Shop Property Price Index (SH-PI) and key macroeconomic indicators from 2013 to 2023. This method identifies the responsiveness of shop property prices to broader economic conditions, following the approach of Duca et al. (2021).

As shown in Table 9, SH-PI has a strong positive correlation with GDP growth ($r = 0.73$), indicating that property prices rise during periods of economic expansion. A moderate positive correlation was observed with inflation ($r = 0.55$), reflecting sensitivity to changes in the cost of living. In contrast, interest rates ($r = -0.48$) and unemployment ($r = -0.62$) demonstrated negative correlations, showing that higher borrowing costs and weaker labour markets suppress property values. These results highlight the SH-PI's effectiveness as a macro-sensitive indicator for monitoring market trends and supporting policy decisions.

Table 9. SH-PI index point using Laspeyres hedonic formulation

Variable	Index	GDP Growth (%)	Inflation (%)	Interest (%)	Unemployment (%)
Index	1	0.227199	0.155615	0.119952	0.002492
GDP Growth (%)	0.227199	1	0.82268	0.649644	-0.581
Inflation (%)	0.155615	0.82268	1	0.38869	-0.35724
Interest (%)	0.119952	0.649644	0.38869	1	-0.93869
Unemployment (%)	0.002492	-0.581	-0.35724	-0.93869	1

(Source: Researcher)

3.6 Comparison with Average Price Index

To benchmark the Laspeyres Hedonic Shop Property Price Index (SH-PI), a traditional unadjusted average price index was constructed by calculating the annual mean transaction price of shop properties in Kuala Lumpur from 2013 to 2023 and normalizing each year to the 2018 base year (Index = 100).

Table 10 and Figure 2 compare the unadjusted index with the SH-PI. Although both indices display an overall upward trend, the unadjusted index shows sharp fluctuations, particularly in 2016 and 2022, reflecting sensitivity to transaction mix rather than true market changes. The SH-PI demonstrates smoother, more stable trends by controlling for structural, locational, and legal variations, making it a more accurate measure of actual price movements. The comparison confirms the SH-PI as a more robust and reliable measure of market performance, reducing volatility caused by compositional changes and providing a clearer, policy-relevant indicator of commercial property price trends in Kuala Lumpur.

Table 10. Comparison of average price index and hedonic SH-PI (2013-2023)

Year	Average Price Index	Hedonic SH-PI
2013	85.0	100.4
2014	87.7	99.2
2015	89.4	102.1
2016	85.9	99.9
2017	99.8	100.1
2018	100.0	100
2019	98.1	100
2020	96.5	99.8
2021	103.5	100.3
2022	93.8	100.8
2023	110.8	100.7

(Source: Researcher)

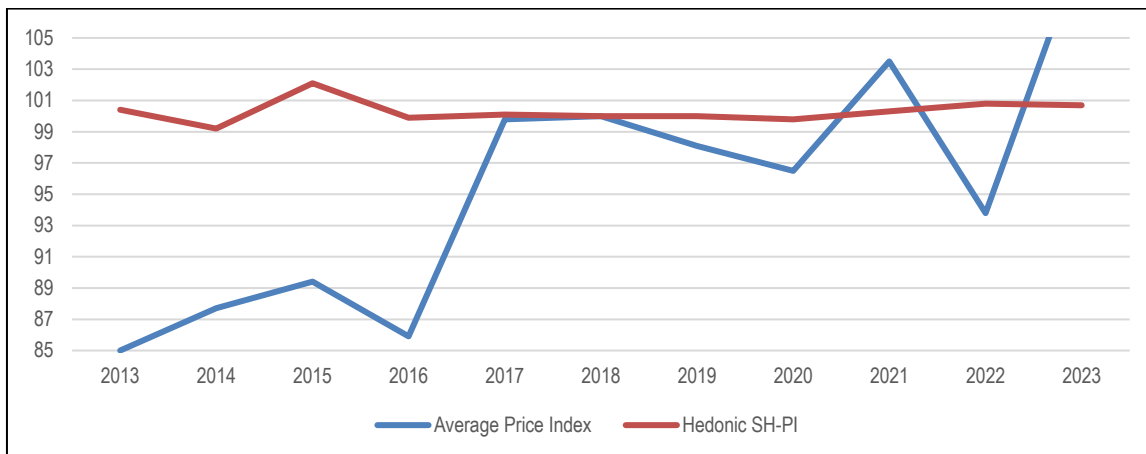


Figure 1. Comparison of SH-PI and Average Price Index
(Source: Researcher)

3.7 Justification for the Hedonic Approach

The hedonic index is empirically preferred due to ability to isolate price changes from structural variation in the property stock. While the average index treats all properties equally, regardless of quality or location, the hedonic model estimates the pure price effect by controlling for observable characteristics. Recent research supports this position. For example, Davino et al. (2021) demonstrated that quality-adjusted housing indices provided significantly more reliable signals for policy planning in volatile markets. Mora and Formoso (2022) emphasized that hedonic models improve price predictability in mixed-use developments, aligning with the functional diversity of shop properties in Malaysia. The OECD (2023) explicitly recommends Laspeyres hedonic indices for emerging economies to minimize compositional bias in national housing indicators. This approach aligns with best practices by Eurostat (2021) and UN-HABITAT (2020), which call for transparent, replicable, and quality-consistent real estate tracking, particularly in developing cities undergoing structural transition.

Table 11. Comparison of average price index and hedonic SH-PI (2013-2023)

Criteria	Average Price Index	Hedonic SH-PI
Adjusts for property quality	No	Yes
Controls for structural, location and legal variation	No	Yes
Volatility due to market mix	High	Low
Base-year weighting	Not fixed	Laspeyres
Policy relevance	Limited	High

(Source: Researcher)

4.0 Research Findings

The Laspeyres hedonic SH-PI for Kuala Lumpur increased steadily from 2013 to 2023, rising from an index value of 84.01 in 2013 to 109.45 in 2023. The index records a clear downturn in 2020 that coincides with the COVID-19 pandemic, followed by a robust rebound in 2021–2023, indicating resilience in the shop-property market once movement restrictions and short-term demand shocks eased. Compared with the unadjusted average price index, the SH-PI displays substantially less year-to-year volatility, demonstrating the benefit of quality adjustment in removing compositional effects produced by changes in the mix of transacted units.

Regional results reveal heterogeneous submarket behaviour. Central Kuala Lumpur shows the most consistent appreciation across the study period, reflecting sustained demand for core commercial locations and a relatively stable mix of shop lot types. North Kuala Lumpur experienced moderate but steady gains, while South Kuala Lumpur exhibited the largest short-term swings and the slowest overall recovery, suggesting higher sensitivity to local economic shocks and transaction mix changes. These spatial differences underscore the importance of computing both submarket and citywide indices rather than relying on a single aggregate measure.

The SH-PI's macroeconomic correlations are meaningful as shown in Table 12. A strong positive correlation with GDP growth ($r \approx +0.73$) and a moderate positive correlation with inflation ($r \approx +0.55$) imply that shop-property prices tend to rise with broader economic expansion and general price level increases. Negative correlations with interest rates ($r \approx -0.48$) and unemployment ($r \approx -0.62$) indicate expected dampening effects from tighter financing conditions and weaker labour markets on commercial property demand. These relationships confirm that the SH-PI tracks economically sensible signals and can serve as an indicator of market sensitivity to macro shocks.

Table 12. Impact of macroeconomic variable on SH-PI

Macroeconomic Variable	Correlation Coefficient	Interpretation	Explanation
GDP Growth (%)	+0.73	Strongly Positive	Shop property prices generally increase during periods of economic growth.
Inflation Rate (%)	+0.55	Moderately Positive	Higher inflation is associated with a moderate rise in property prices.
Interest Rate (%)	-0.48	Moderately Negative	Increases in interest rates tend to exert downward pressure on prices.
Unemployment Rate (%)	-0.62	Strongly Negative	Rising unemployment is typically linked to declining property prices.

(Source: Researcher)

Robustness checks including hold-out validation on the 20% test sample and year-by-year hedonic regressions using the 2018 base weights showed consistent index behaviour and stability of coefficient signs for the principal structural, locational, and legal variables. Comparison with the unadjusted index highlights episodes, notably 2016 and 2022, where mixed transaction composition produced misleading spikes or dips in the average price series that are absent from the quality-adjusted SH-PI.

These findings confirm the SH-PI's responsiveness to economic conditions and its value as a reliable tool for policymakers, investors, and urban economists. Policymakers can monitor affordability and market stability, investors gain insights for acquisition decisions, and researchers benefit from evidence linking property market cycles to broader economic performance.

5.0 Research Discussion

The study demonstrates that the Laspeyres hedonic model provides a more accurate and stable measure of commercial property price movements in Kuala Lumpur compared to an unadjusted index. By accounting for structural, locational, and legal factors, the SH-PI reflects true market dynamics, supporting hedonic pricing theory. Regional differences in price behavior align with polycentric urban theory (Anas et al., 1998), highlighting the importance of spatial segmentation. Strong correlations with GDP growth and inflation, alongside negative relationships with interest rates and unemployment, confirm the SH-PI's responsiveness to economic conditions, consistent with findings by Duca et al. (2021). The model's robustness was confirmed through validation and sensitivity checks, which showed stable coefficients and consistent index behaviour across samples. These results imply that wider adoption of the SH-PI methodology could improve policy assessment and reduce valuation risk in commercial lending and investment decisions. Beyond the study, the SH-PI offers practical value for policymakers, financial institutions, and developers, providing a reliable tool for monitoring market cycles, guiding investment decisions, and supporting the development of a future national commercial property index aligned with international standards.

6.0 Conclusion and Recommendations

This study developed the first SH-PI using a Laspeyres hedonic model, providing a quality-adjusted measure of commercial property prices from 2013 to 2023. By incorporating structural, locational, and legal attributes, the SH-PI delivers a more accurate and stable reflection of market trends, with regional segmentation revealing distinct submarket dynamics and correlations with key macroeconomic indicators confirming its economic relevance. Policymakers should adopt the SH-PI for monitoring affordability, overhang risks, and market stability, while financial institutions can use it to enhance credit risk assessments, and developers may rely on it for precise valuation and investment planning. Future research should expand the model through spatial econometric techniques, integration of rental and occupancy data, and development of higher-frequency indices, ultimately supporting the creation of a national commercial property index for comprehensive market oversight.

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Paper Contribution to Related Field of Study

This study contributes to the field of property valuation, research and economics by developing a robust, quality-adjusted Shop Property Price Index (SH-PI) for Kuala Lumpur using a Laspeyres-based hedonic regression model. This also furnishes a transferable methodological framework and an empirical series that real estate researchers can use exclusively for benchmarking, spatial segmentation, and advancing valuation and risk-modelling within the real estate discipline.

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