

IMPACT OF MACRO-ECONOMIC FACTORS ON HOUSE PRICES PERFORMANCE

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Abstract

This paper examines the impact of macro economic factors on house price. To capture the effect of house price movement and to examine the impact of macro economic factors on house prices, the researcher has identified six macro economic factors. The factors are Per Capita Income, Gross Domestic Product, Consumer Price Index, Base Lending Rate, Population Growth Rate, and Unemployment Rate. The findings showed that only two factors have strong impact on Malaysia house price performance which ie. Per Capita Income and Base Lending Rate.

Keywords: House prices index, macro economic factors, predictive model of house price performance

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1.0 INTRODUCTION

In the property sector, housing is considered as an integral part of a national output. There is a possibility that expansion of housing activity is preceded by an increase in economic output, with the initial effect felt largely within the housing sector and only subsequently on the aggregate economy. If markets are interdependent, disturbance in one market will be transmitted to other markets. Therefore any changes in the economic factors or other market factors would eventually affects demand and pricing of a house.

2.0 OBJECTIVE OF THIS STUDY

The objective of this study is to examine the impact of macro economic factor on house prices.

3.0 LITERATURE REVIEW

Previous studies using data in United State (US), New Zealand (NZ), Australia, Hong Kong and Malaysia have identified the macro economic factors which influence house prices.

In US, Jacob and Higgins (1999) reviewed several literatures and found that previous researches have mainly focused on linking property performance to a variety of measured

economic factors. Arbitrage Pricing Theory has been the general framework which was initiated by Chen, Roll and Ross (1983). Their research suggested that underlying economic forces can primarily influence the US stock market. Using similar framework, Maginn and Tuttle (1990) analysed systematic risk and returns in the US property market and other asset classes with risk inherent in various economic scenarios. Other studies on real estate returns as well as studies on residential house prices variation have identified specific variable as representative of change in macro-economic conditions over time.

The behaviour of house prices varies from market to market. Key findings in USA as noted by Malpezzi et. al. (1998) are that house prices levels relate to physical constraints, population, income and demographic variables. The modelling of UK house price however identified real interest rates and income expectations (Muellbauer et al 1997) as the main factors.

Hoag (1980) build regional and national economic concomitants into value indices for industrial property by considering the microeconomic and macroeconomic variables (such as location, property type, size and age), economic and demographic variable (such as business inventories, construction costs, transportation access and population, transaction prices and cash flows) which affect property value. Subsequently Chan et.al., 1990 and Dokko et al., 1991 have identified a number of key economic factors that influenced US property performance such as inflation, interest rate term structures, 90-day bills and 10-year bonds. Jones Lang Wootton (1992) identified inflation, 10-year bonds, interest rate differentials and stock market dividend yields as key economic factors for Australian office property yields.

Studies undertaken in Australia indicate that house price are linked to several inter-related variables with those relating to demand exerting greater influence upon housing prices than supply (Waxman and Lenard, 1997).

Jacob and Higgins (1999), found that there is a positive relationship between aggregated House Prices in Australian Capital Cities (ACC) with Household Net Income (NI) and to a lesser extent Employment level (EP). The study implies that financial market rates affects household net income and both these variables may determine house price in capital cities. It therefore highlights the importance of financial markets as determinants of house prices across Australia.

In New Zealand, Mitchell (1993) studied the price of residential property and found that there is a strong relationship between the prices of residential property and at least six economic indicators, ie. population size, consumer price index, number of building permits, business confidence, M3 money supply and capital appreciation. These are the main variables with a strong relationship to New Zealand price of residential property between March 1970 and June 1991.

Field (1994) found that the Hong Kong's residential property demand was highly correlated to the increase in the household income.

Aminah (2004) quoted that, L.B Smith (1974) developed an explanatory model of house price on a function of permanent income house hold, price of goods and services, the stock occupied homes per house hold, the stock of vacant homes per household, the cost of home mortgage credit relative to other credit and a measure of consumer inflationary expectations.

In the local context, Aminah (2004) noted that the determination of house prices especially regionally has been debated in economic research for quite sometime. A number of works have addressed and analysed house price variations as influenced or explained by market-wide macro factors. Demand factors such as degree of employment, disposable income and demographic characteristics as well as supply factor such as housing stock have been used widely in the analysis. Her findings showed that income and GDP for macro factors and physical,

locational and neighbourhood attributes for micro factors, significantly affects house price in Malaysia. In line with that, Rahah (1998) noted the local real estate commentators suggest that the growing population and the increasing disposable income coupled with easy access to finance have led to a high demand for housing. This in turn will give impacts to the house price movements.

The above discussed are some of the typical example of macro price determinants.

Based on the above literature, six macro economic indicators identified will be analysed and tested for the significance in affecting house price in Malaysia for the period from 1990 to 2006. These are Per Capita Income, Gross Domestic Product, Consumer Prices Index, Base Lending Rate, Population Growth Rate, and Unemployment Rate.

4.0 METHODOLOGY

This paper examines the impact of macro economic factors on house price. In order to capture price variation and to examine the impact, a hedonic function derived from MRA (multiple regression analysis) will be used to enable the estimation of changes in house price from one period to another. The output of the regression will provide information on how much a change in a macro factors would affect the price of a property and, estimate the predictive capability of pricing model incorporated in these factors.

4.1 Data Collection

Six macro economic indicators identified from the literature review will be examined. The economic factors are Per Capita Income, Gross Domestic Product, Consumer Price Index, Base Lending Rate, Population Growth Rate, and Unemployment Rate. The period of the analysis is on a yearly basis from 1990 to 2006.

4.1.1 Dependent Variables

For the purpose of this research, the dependent variable is the overall Malaysian residential house prices, which is represented by the Malaysia House Price Index (MHPI), published by the National Property Information Centre. MHPI are derived from the property transactions receive by JPPH for Stamp Duty valuations. More than 10,000 sales data for each year/period were collected from the branches in the whole country for the computation of indices.²

4.1.2 Independent Variable

Six independent variables used to examine the impact of economic factors on house price are:

i. Per Capita Income

Per capita income refers to the amount each individual receives, in monetary terms yearly, generated in the country through productive activities. It measure the average income of an individual household in a country. The income level and purchasing power will affect individual household decision in buying house. Per capita income is believed to have a positive correlation with the house price.

ii. Gross Domestic Product (GDP)

GDP is defined as the market value of all final goods and services produced within a nation's borders during a fixed period of time. The gross domestic product (GDP) is the most important economic indicator. It represents a broad measure of economic activity and signals the direction of overall aggregate economic activity (Bureau of Economic Analysis).

² Source – *The Malaysian House Price Index, (Jan – Jun 1997); Valuation & Property Services Department*

iii. Consumer Price Index (CPI)

CPI is a price index calculated as the current cost of a fixed basket of consumer goods divided by the cost of the basket in the base period. Malaysian Overall Consumer Prices Index or the inflation rate is calculated from the prices of a basket of goods and services, which include essential daily food and goods as well as non-durable goods. In this study, CPI is used to calculate real value of nominal per capita income.

there is not enough labour force in the market and would drive up wage to a level not proportionate to the productivity.

If unemployment rate is high, it indicates that a greater amount of people are not able to generate stable income to purchase houses or service housing loans. Therefore, house price would have a negative correlation with the unemployment rate.

iv. Population Growth Rate (POP)

Population growth rate (POP) is the increase in a country's population during a period of time, usually one year, expressed as a percentage of the population at the start of that period. It reflects the number of births and deaths during a period and the number of people migrating to and from a country.

vi. Base Lending Rate (BLR)

Base Lending Rate (BLR) is the minimum rate of loan. Which is set by Bank Negara for lending to other banks. Usually for a house mortgage loan, a premium of 2.5% to 4% will be added on top of the BLR by the commercial banks and financial institutions.

Population growth is normally associated with the demand pressure for properties especially residential, commercial and industrial sector. Growth, in turn, is related to size. As population size increases, demand for properties also increases (Hamid, 1998).

v. Unemployment Rate (UNEMP)

Unemployment is the number of people who are available and actively seeking for work but unable to secure jobs. The unemployment rate represents the fraction of the labour force that is unemployed. It increases or falls following a change in economy activity. A high unemployment rate or very low unemployment rate (less than 4%) is not unhealthy for economy. High unemployment rate indicates low purchasing power, while very low unemployment rate shows that

4.2 Source of Data

Secondary data from various sources would be used in this research. Data on Per Capita Income, Gross Domestic Product and Consumer Price Index are sourced from Bank Negara Bulletin. Population Growth Rate and Unemployment Rate are sourced from Statistical Bulletin Malaysia. Base Lending Rate are sourced from Malaysia Economic Report. Malaysia House Price Index (MHPI) are sourced from Malaysia House Price Index and Property Market Report.

4.3 Timeframe

A period timeframe from 1990 to 2006 was selected as it includes various phases of the economic cycle in Malaysia thus ensuring that all economic scenarios can be assessed. 1990 is taken as the base year for data analysis.

4.4 Statistical Test**4.4.1 Correlation Analysis**

From previous property-related studies, we know that many of the economics as

well as financial indicators have leading and lagging effect on the property market. In order to understand the direction and relationship of the co-movements of the dependent and independent variables, correlation analysis will be carried out. It should be noted that correlation between two variables may not be a causal relationship. The result of correlation analysis, r -value, indicates the direction and strength of co-movement of the two variables.

If the correlation coefficient is positive, the increase in independent variable value will result in an increase in the dependent variable value. If the correlation coefficient is negative, the co-movement of the two variables will be in opposite direction. The magnitude of co-movement is measured by the value of correlation coefficient. If the number is 1.00, then we can conclude that perfect relationship exists between the two variables. When the result is 0, there is no correlation between the dependent and independent variable.

By shifting the time reference of the independent factors forward (lead) and backward (lag) against the dependent variable, and examine the correlation coefficient of independent variables (the highest of each variable) on a yearly basis, the result would indicate which variable is a lead or lag indicator and the lead or lag period.

4.4.2 Multiple Regression Analysis

MRA has been widely used as a tool for mass appraisal of residential properties since the 1970's.

In this research paper, the objective is to examine the impact of macro economic factors on house prices performance. Hence, the dependent variable (y) is Malaysian House Price Index and the independent variables ($x_1, \dots, x_6$) are the macro economic factors.

Multiple Regression Analysis (MRA) is an extension of a linear regression to more than one independent variable. Multiple regression analysis is used to measure the relationship between one interval dependent variable (y) and several independent (or predictor) variables in (x). By using more than one independent variable, we could better explain the variation in y and hence provide more accurate predictions.

The MRA will incorporate the results from the correlation analysis and the effect of lead will be built into the model. The mathematical expression of the relationship between the dependent variable and the independent variable is as follows:

$$Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \epsilon$$

where

y = Malaysian House Price Index

x_1 = Per Capita Income

x_2 = Gross Domestic Product

x_3 = Consumer Price Index

x_4 = Base Lending Rate

x_5 = Population Growth rate

x_6 = Unemployment Rate

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 = coefficient of each independent predictors respectively

ϵ = Error term

Assumptions of the multiple linear regression model:

- i. The random errors term ϵ has an expected value of zero and a constant variance. That is $E(\epsilon) = 0$ and $\sigma_\epsilon^2 = \sigma^2$ for each recorded value of the dependent variable y .
- ii. The error components are uncorrelated with one another.
- iii. The regression coefficients, $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ and β_6 are parameters.

iv. The independent variables x_1, x_2, x_3, x_4, x_5 and x_6 are known constants.

v. The inferential procedures given in this text require that the random errors ϵ be normally distributed.

4.4.3 T-test

The t-test of the individual coefficients allow us to determine whether the regression coefficients $\beta \neq 0$ (for $i = 1, 2, 3, 4, 5$ and 6), which tells us whether a linear relationship exist between (x_1, x_2, x_3, x_4, x_5 and x_6) and y . A t-test will be carried out for each independent variable. If the t-value is more than 2.042, at 95% confident level (two tailed for more than 30 observations), we can conclude that there is a significant linear relationship between the dependent and independent variables.

4.4.4 F-test

The F-test in the analysis of variance combines this t-test into a single test. That is, we test all the β at one time to determine if at least one of them is not equal to zero. The F-test is performed only once which can reduce the erroneous conclusion when multiple t-tests are likely to show significant level when even there is no linear relationship between each of the independent variables and dependent variables.

4.4.5 Multicollinearity

Multicollinearity is an undesirable situation where the correlations among the independent variables are strong.

In some cases, multiple regression results may seem paradoxical. For instance, the model may fit the data well (high F-Test), even though none of the X variables has a statistically significant impact on explaining Y. How is this possible? When two X variables are highly correlated, they both convey essentially the same information. When this happens, the X variables

are *collinear* and the results show *multicollinearity*.

Multicollinearity increases the standard errors of the coefficients. Increased standard errors in turn means that coefficients for some independent variables may be found not to be significantly different from 0, whereas without multicollinearity and with lower standard errors, these same coefficients might have been found to be significant and the researcher may not have come to null findings in the first place. In other words, multicollinearity misleadingly inflates the standard errors. Thus, it makes some variables statistically insignificant while they should be otherwise significant.

4.4.6 Variance Inflation Factors (VIF)

Variance Inflation Factors (VIF) are measures that can be used to detect multicollinearity among the X's in a regression model on the precision of estimation. Understanding multicollinearity should go hand in hand with understanding variation inflation. Variation inflation is the consequence of multi-collinearity. We may say multi-collinearity is the symptom while variance inflation is the disease. In a regression model we expect a high variance explained (R-square). The higher the variance explained is, the better the model is. However, if collinearity exists, probably the variance, standard error, parameter estimates are all inflated. In other words, the high variance is not a result of good independent predictors, but a mis-specified model that carries mutually dependent and thus redundant predictors. So Variance Inflation Factor (VIF) is common way for detecting multicollinearity.

General rule, if $VIF > 10$ (or equivalently tolerance < 0.10) for predictor it's an indication of potential multicollinearity problems (Neter, Wasserman and Kutner, 1990).

5.0 DATA ANALYSIS

Dependent and independent variables data are as tabulated below.

Table 1: Dependent and Independent variable by year (1990 – 2006)

YEAR	Dependant Variable	Independent Variables					
	MHPI Annual Change (%)	Per capita Income (RM/year) Annual Change (%)	GDP Annual Change (%)	CPI Annual Change (%)	BLR Annual Change (%)	POPULATION (million) Annual Change (%)	UNEMPLOYMENT Annual Change (%)
1990	4.10	12.76	11.36	3.0	7.14	2.8	-29.11
1991	25.50	9.80	-11.22	4.4	20.00	3.9	-3.57
1992	12.20	11.18	-10.34	3.9	5.56	2.7	-27.78
1993	4.90	10.76	6.41	3.6	-10.53	3.2	-23.08
1994	8.00	7.52	10.84	3.7	-17.06	2.6	-10.00
1995	18.40	12.14	1.09	3.4	16.31	3.0	3.70
1996	12.90	11.63	-9.68	3.6	11.95	2.4	-10.71
1997	1.90	7.68	-10.71	2.7	12.53	2.4	0.00
1998	-9.40	0.27	-200.00	5.2	-22.17	2.3	36.00
1999	-2.30	1.40	-181.33	2.8	-15.55	2.3	-11.76
2000	6.00	4.78	36.07	1.6	0.00	2.6	3.33
2001	1.10	4.45	-95.18	1.4	-5.89	3.0	16.13
2002	2.50	1.89	925.00	1.8	0.00	3.3	-2.78
2003	4.00	8.37	26.83	1.1	-6.10	2.4	-8.57
2004	4.80	11.74	36.54	1.4	-0.33	0.7	9.38
2005	2.40	8.57	-29.58	3.0	3.68	2.2	0.00
2006	1.90	9.56	18.00	3.6	8.39	1.8	0.00

Source: The Malaysia House Price Index/Economic Reports/Property Market Report

5.1 Sample Characteristics

Below are graphs of dependent variable and independent variable used in this study:

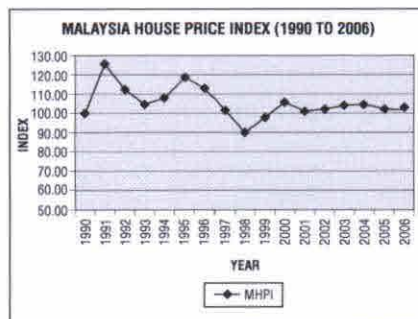


Figure 1: Malaysia House Price Index from 1990 to 2006

Figure 1 shows the trend of annually MHPI movement from 1990 to 2006. The MHPI trend was moving upward indicating the

Malaysia house price has increased with strong performance from 1990 to 1991. After 1991 the property market dropped from 1991 to 1993 than picked up towards 1995 but decreased again for the period of 1995 until 1998 when the country was affected by economic turmoil. The property market fared better from 1999

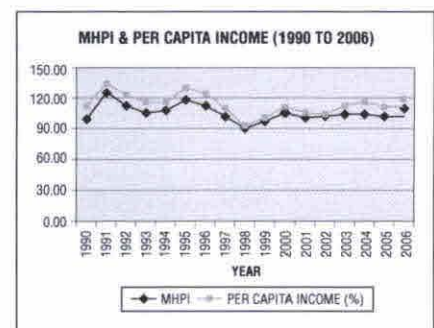


Figure 2: MHPI & Per Capita Income From 1990 to 2006

to 2000 with a slight decrease in 2001 but moved on quite stable growth up to 2006.

The graph shown in Figure 2 showed that the statistics of per capita income has grown up from 1990 to 1991. This increasing and decreasing trends are in tandem with house price movement from 1990 to 2006. House price performance is quite stable from 2000 until 2006 but per capita income was slightly on the increase during this period.

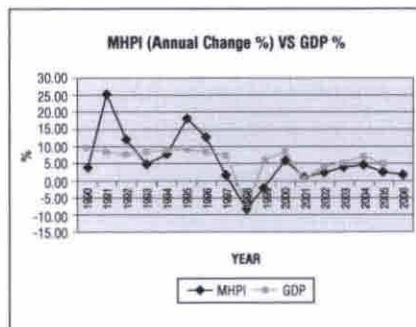


Figure 3: MHPI (Annual Change % VS. Gross Domestic Product (GDP) From 1990 to 2006

Figure 3 shows that from 1997 to 1998, GDP and MHPI have decreased to -ve 7.50% and -ve 10% respectively. This scenario happened during the economic downturn. After 2001, MHPI and GDP were moving in tandem and moving up until 2004 during which our national

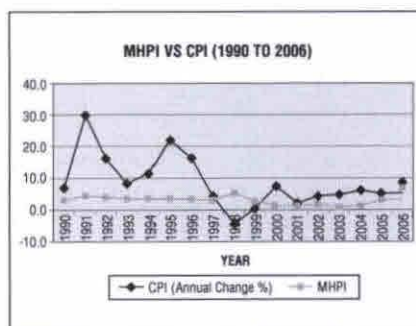


Figure 4: Consumer Price Index (CPI) From 1990 to 2006

economic have already recovered from the recession.

Figure 4 shows the trend line of CPI is stable in range of 1.0% to 5.2%. In year 1997 to 1999 the property market performance was decreased but the CPI was going up to 5.2%.

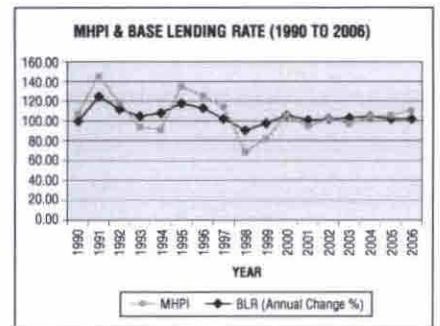


Figure 5: Average Base Lending Rate From 1990 to 2006

Figure 5, the average Base Lending Rate fluctuates within narrow range from 6% to 10% over a period of the year 1990 to 2006. This shows the interest rate is stable over the period, which is important to economic growth. The trend of base lending rate matches the MHPI trend, indicating that both are moving closely with each other.

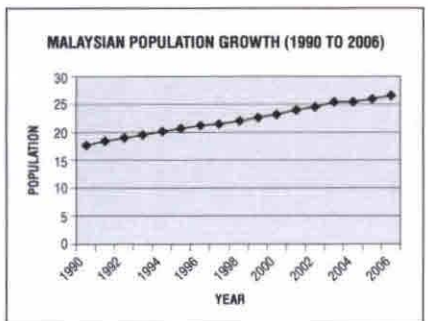


Figure 6: Population Growth From 1990 to 2006

The population growth increase progressively 1990 to 2006. For year 1990, our total population was 17.8

millions and 26.6 million for year 2006. It has increased to about 49% in 17 years. The larger the population size, the larger is the market coverage and the greater, say the house price. This will give some impact to demand of property in the market.

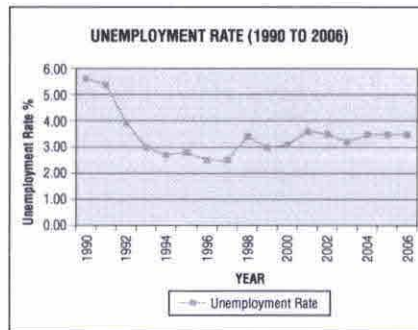


Figure 7: Unemployment Rate From 1990 to 2006

We can see from Figure 7, the unemployment rate has decreased from 1990 to 1997. From 1993 onwards, the unemployment rate was below the 4%. This implies that during that period, Malaysia is actually having a labour shortage problem, which is a problem to get a labour to work in this sector. So this situation will increase labour costs.

5.2 Correlation Analysis

To examine the impact of macro economic factors on house price, it is necessary to assess the rate at which this economic information is impounded or assimilated into house price performance. This can be determined by examining the correlation between MHPI and the percentage changes in each of the economic factors from 1990 to 2006. These resulting correlations give the magnitude of the positive or negative co-movements between these economic factors and the house price market.

Statistical test have been carried out using the dependent variable and six independent predictors. The results of each test are shown below. All statistical tests are performed using SPSS.

Table 2: Summary Output Of Correlation Analysis

Economic Factor (Annual Change)	Period of Lead (Year)			
	Same Year	One Year	Two Year	Three Year
Per Capita Income	.623(**)	.629(**)	.171	-.077
Gross Domestic Product	.050	-.059	-.024	-.339
Consumer Price Index	.181	.294	.557*	.656*
Base Lending Rate	.704(**)	.401	-.133	-.380
Population Growth Rate	.446	.120	.189	-.046
Unemployment Rate	-.363	-.413	-.195	-.023

Notation: 1. largest correlation for each economic factor is given in **bold**.

2. ** =significant at 5% level

5.3 Analysis Findings

Table 2 presents the correlation coefficient of the six leading economic factors and Malaysia House Price Index for a period up to three years.

From the correlation, it is clear that economic factors will lead the property market at different degrees, reflecting both short-term (up to 1 year) and longer term impact. The Base Lending Rate and Population Growth Rate have a correlation with MHPI within in the same year. Per Capita Income, Gross Domestic Product and Unemployment Rate are leading factor of MHPI by 1 year. While Consumer Price Index took 3 years to give an impact to MHPI.

As indicated above, three factors are highly correlated with MHPI. The factors are Base Lending Rate ($r = 0.704$), Per Capita Income ($r = 0.629$) and Consumer Price Index ($r = 0.656$) these three indicators will be further tested using MRA.

The maximum Base Lending Rate (BLR) correlation ($r = 0.704$) was achieved within the same year indicating a short-term impact, with these correlation being significantly less at the other lead periods in excess of a year. It shows that the BLR will give a strong impact to house price performance.

The maximum correlation for Per Capita Income ($r = 0.629$) was achieved at a lead of 1 year to indicate a short-term impact. This indicates that house price index and per capita income have a strong co-movement about 62.9%.

The maximum correlation for Consumer Price Index ($r = 0.656$) was achieved at a lead of 3 year to indicate a long-term impact. This indicates that house price index and Consumer Price Index have a strong co-movement about 65.6%.

From the above we can see that income is a very important determinant of house demand which in turn affect house price. When people receive higher income, their purchasing power increases which include purchase of houses. However, the analysis also indicates that the have price change lagged by one year. As for Gross Domestic Product, the negative effect is shown at ($r = -0.59$) which explain that the price decrease after one year.

Unemployment Rate has a negative coefficient correlation of -0.413 at lead one year. Unemployment Rate is the inverse measurement of stable income generation power, which will indirectly affect the purchasing power. The high negative r-value reveals that the lower the unemployment rate, the higher the house price index. This is understandable. When the unemployment rate was very low (less than 4%) it shows that people can find jobs with a secured income and have purchasing power. One of their options is to buy a house. This will increase the demand and house price will increase.

From 1993 onwards, the unemployment rate was below the 4.0%. This implies that during the period, Malaysia is facing has a labour shortage, which is a problem in getting workforce in this sector. So this situation will increase labour costs and indirectly will increase the house price in the long term. MHPI is correlated with

Consumer Price Index with moderate r-value (0.656) which was achieved at a lead of 3 years indicating a long-term impact.

The r-value of Population Growth is 0.446 with lead in the same year indicating a moderate positive co-movement between the MHPI and population growth rate. From the property market investment perspective, when the population increases, demand for property especially housing increases as well (positive relationship).

5.4 Multiple Regression Analysis

Summary output of multiple regression analysis for the six independent variables

Table 3: Multiple Regression Analysis

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.399	3.402		-4.11	.689
Per Capita Income	1.007	.342	.480	2.941	.013
Base Lending Rate	.414	.101	.623	4.095	.002
Consumer Price Index	.102	1.259	.014	.081	.937

a. Dependent Variable: Malaysia House Price Index

From the above results, a preliminary multiple regression model is established as below.

MHPI = -1.399 + 1.007 Per Capita Income (lead 1year) + 0.414 Base Lending Rate (same year) + 0.102 Consumer Price Index (lead 3 year)

$R^2 = 0.796$

The multiple 'R' again indicates size of the correlation between the observed outcome variable and the predicted outcome variable (based on the regression equation). R^2 or the coefficient of determination again indicates the amount of variation in

the dependent scores attributable to all independent variables combined. The R-square value is an indicator of how well the model fits the data (*e.g.*, an *R-square* close to 1.0 indicates that we have accounted for almost all of the variability with the variables specified in the model).

From the above analysis, the coefficient of determination $R^2 = 0.796$ indicates that about 79.6% of the MHPI variation is explained by the multiple regression model. The remaining 20.4% is unexplained. Negative coefficient indicates decrease in MPHI and while positive coefficient in the predictors will increase the MHPI. Correlation-coefficient indicates change in MHPI when the independent variable changes by one unit.

Test of significance of the independent variable are carried out in the analysis and the results are shown in the above summary output. From the t-test two independent variables which are Per Capita Income (*t-test* = 2.941) and Base Lending Rate (*t-test* = 4.095) are significant.

5.5 Predictive model of house price performance.

Previous studies attempted to model the relation between economic factors and commercial property performance (Newell and David, 1996) with a range of leading economic indicators on Australian commercial property performance. The study indicated that the performance of Australia commercial property are seen to be closely linked to economic activity, both domestic and international. Most economic factors achieved their maximum impact within one year.

Table 3 present the summary output of multiple regression analysis for the economic factor to develop a model to predict house price performance. The

equation below, present the a model to predict house price performance

$$\text{MHPI} = -1.399 + 1.007 x_1 + 0.414 x_2$$

x_1 = Per Capita Income (lead 1year)

x_2 = Base Lending Rate (same year)

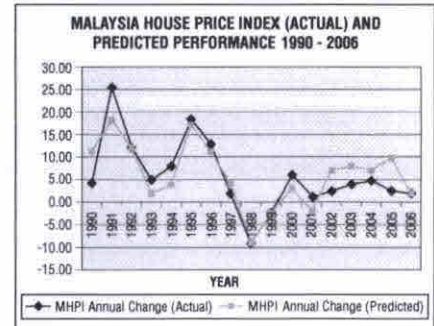


Figure 8: Malaysia House Price Index Actual And Predicted Performance: 1990 - 2006

Figure 8 shows actual and predicted of Malaysia House Price Index, demonstrate the good fit that is evident in these predictive models. The impact of different economic factors at various leads is clearly evident in these predictive models.

6.0 CONCLUSION

The performance of Malaysia house price is closely linked to the economic activity. This paper has clearly demonstrated the timing of the impact of these economic factors on Malaysia house price performance. From the correlation two economic factors which are Base Lending Rate and Population Growth rate achieved their maximum impact within a same year. Three economic indicators which are Per Capita Income, Gross Domestic Product and Unemployment Rate achieved their maximum impact within one year. Finally Consumer Prices Index gives an impact after three year.

From the MRA, there is sufficient evidence to conclude that, not all factors are significantly related to house price, but from all of six

economic indicators, two factors have a strong impact on Malaysia house price performance which are Per Capita Income and Base Lending Rate.

Predictive models of house prices performance can be developed by incorporating these economic factors at identified leads.

Insights concerning the impact of these economic factors and the use of these predictive models should enable this economic information to be used to forecast property market performance.

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