# INTERNATIONAL REAL ESTATE SOCIETY CONFERENCE 1999

**Co-sponsors:** **Pacific Rim Real Estate Society (PPRES)**
**Asian Real Estate Society (AsRES)**

## Kuala Lumpur, 26 - 30 January 1999

# PERFORMANCE INDICATORS

# FOR THE MALAYSIAN RESIDENTIAL MARKET

## LAU WAI SEANG

**Valuation and Property Services Programme,
National Institute of Valuation (INSPEN),
Valuation and Property Services Department,
Ministry of Finance Malaysia.**

**Telephone: 603-8259377      Fascimile:  603-8258100
E-mail:      inspen1@po.jaring.my**

**Keywords:  Housing market, Correlation Analysis,
performance indicators, future performance.**

# LIST OF CONTENTS

## 1.0    INTRODUCTION

In terms of the total volume or number of transactions, the residential sector takes up between 62.29% to 64.60% of the national volume of transactions between 1994 and 1997[1].    Despite its major share of the property industry, attempts to show the performances of this sector in Malaysia are few.

Some sporadic efforts were undertaken by private valuation and consultancy firms and news agencies to gauge the performance of residential properties of major towns.  However, these are usually average prices or ranges of selling prices.   These simple indicators are therefore good for a certain locality and house type only.   A further setback is the irregularity in the publications of these indicators.

However, of recent years, more sophisticated analyses have produced housing indicators such as the Malaysian House Price Index[2].   This Index describes the historical performance of the Malaysian housing sector quantitatively.   There have been attempts to produce some house price projections based on Neural Networks too.

In this paper, the author will develop some performance indicators quantitatively. The end results will display the indicators as lead or lagged indicators or coincidents. These indicators will be suitable for describing the future performance of the broad housing sector in Malaysia and will be therefore of great assistance to property practitioners, academicians and researchers as a projection tool.

## 2.0    FRAMEWORK

### 2.1    The Variables

- *Dependent Variable*
  The total unit of residential transactions for the whole country (excluding Sarawak state) is the dependent variable, *RT*.  It is chosen as it affords a continuous annual series of data starting from 1990.  By comparison to the total value of residential transactions, the total unit of residential transactions is preferred as it consists of absolute figures and does not require conversion to real values.

---

[1]      Pp. xix, *Property Market Report 1996* and Pp. xxxvii, *Property Market Report 1997*, Treasury, Ministry of Finance Malaysia.

[2]      The Malaysian House Price Index was published and sold for the first time in February 1997. This Index covers both conventional and high-rise housing throughout Malaysia.   It covers the period beginning 1988 to 1998.

- *Independent Variables*

Independent variables are chosen from those related to the housing industry only.  Of the 10 independent variables, 3 are economic indicators and 7 are financial indicators.  These indicators are:

*Economic Indicators*
⇒ Malaysian Overall Consumer Price Index, *CPI*, indicating the inflationary rate of the country,
⇒ Gross Domestic Product from the Construction Sector, *GDPC*, showing the growth rate of the country attributed to the construction sector,
⇒ Exchange Rate of the Ringgit Malaysia per US Dollar, *USX*, showing the value of the Ringgit Malaysia as against the greenback,

*Financial Indicators*
⇒ Average Mode Base Lending Rate from commercial banks, *BLR*, indicating the costs of lending from commercial banks,
⇒ Loans for residential constructions given by commercial banks, *CLB*,
⇒ Loans for residential constructions given by financial companies, *CLF*,
⇒ Loans for the purchase of residential properties given by commercial banks, *RLB*,
⇒ Loans for the purchase of residential properties given by financial companies, *RLF*,
⇒ Fixed Deposits of individuals in both the commercial banks and financial companies, *FD*,
⇒ Saving Deposits of individuals in both the commercial banks and financial companies, *SD*.

## 2.2    The Data and Data Sources

Data are obtained from publications of the Ministry of Finance Malaysia. These publications, of national and international acceptances, include:

- *Property Market Report* (1993 to 1997 editions) of the Treasury, for the dependent variable

The dependent variable, *RT,* is the total units of residential transactions throughout   Malaysia (excluding Sarawak state).    These transactions include transactions on all types of residential property, irrespective of attributes.
As these data are annual time series data, they were extrapolated into quarterly data[3] before analyses.  Published data are only available from 1990 onwards.

---

[3]    Paragraph 3.2, pp. 27 - 29, *Purpose-built Offices in the Klang Valley - Performance Indicators and Performance Cycle,* MBA (Real Estate) Dissertation, 1997, University of Western Sydney, Australia.

- *Quarterly Bulletin* (First Quarter 1990 to Third Quarter 1998 editions) of Bank Negara Malaysia, for all the 10 independent variables

All data are available on a quarterly year basis for the whole of the study period. For data involving nominal values, conversions into real values were carried out based on the Malaysian Overall Consumer Price Index.

The original data and their corresponding extrapolated or converted values are in Tables I and II, respectively, at the end of this paper.

## 2.3    The Study Period

The study period straddled between the first quarter of 1991 and the last quarter of 1997 as data for the dependent variable are limited to this time span only.

Hence, the total number of observations, n, is 28.

## 2.4    The Methodology

This research employs the Pearson Correlational Analysis (CA) in deriving the performance indicators. For subject purpose, the relationship between the dependent variable and each independent variable are matched across time. The Pearson Correlational Analysis does not need the relationship to be a causal relationship[4], and in this particular case, it is not necessary so.

### 2.4.1    Strengths and Directions of Performance Indicators

The Pearson Correlational Analysis results in a single number called the Pearson  r correlation coefficient. This coefficient calibrates the degree or strength and the direction of the relationship between two variables[5]. The  r  values vary between -1.00 and +1.00[6]. These coefficients are read as follows:

---

[4]      According to Freund and Williams 1982, pp. 472, correlation coefficient measures only the strength of linear relationships and it is also possible to find high degree of correlation where there is no relationship.

[5]      Cass 1983, pp. 126, states that the correlation coefficient consists of two parts, namely the sign indicating the direction of association and the magnitude measuring the strength of association.

[6]      Besag and Besag 1984, pp. 265.

*Table 1:      Interpretation of r Value*

| r Value | Strength of Relationship | Direction of Relationship |
|---------|--------------------------|---------------------------|
| + 1.00 | Perfect Positive | Same |
| + 0.75 | High Positive | Same |
| 0.00 | No Relationship | Nil |
| - 0.75 | High Negative | Opposite |
| - 1.00 | Perfect Negative | Opposite |

In this research, high to strong relationships, be they positive or negative, will indicate that the independent variables explain the movements of the dependent variable well.

### 2.4.2   Types of Performance Indicators

Analyses of the  r  values will be on a quarterly basis using data from the independent variables which lead by one year and lagged by a year[7].  The resultant indicators will therefore not only exhibit the strength and direction of the co-movements of the variables but will also tell which of the independent variables are lead or lagged indicators or coincidents.

Lead indicators provide the dependent variable with measures of anticipation of future changes based on the changes occurring to the independent variables. Moore 1983 (pp. 67), described lead indicators to have a 'look-ahead' quality. Conversely, lagged indicators will have a 'deferred' quality as any changes to the dependent variable precede the changes to the independent variables[8].  Independent variables experiencing changes at the same time as the dependent variable are therefore termed coincidents, which will then  possess a 'current' quality.

---

[7]      One year lead variables are created by shifting the time reference of the independent variable forward by 4 quarters while one year lagged variables are created by shifting the time reference of the dependent variable forward by 4 quarters (Makridakis and Wheelwright 1989, pp. 208).

[8]      In a cyclical analysis, lagged indicators very often provide early signals to the future performance of the dependent variable.

## 3.0 TEST RESULTS AND DISCUSSIONS

### 3.1 The Test Results

Correlation analyses of the dependent variable with the 10 independent variables for the period between Quarter 1 of 1991 and Quarter 4 of 1997 yield the results shown in Table III at the end of this paper. These results are summarised as follows:

*Table 2:* *Correlation Coefficients, r Values for RT, the Total Units of Residential Transactions throughout Malaysia (excluding Sarawak state) (n = 28)*

| INDICATOR | LEAD (Quarters) | | | | COINCIDENT (Quarter) | LAGGED (Quarters) | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 4Q | 3Q | 2Q | 1Q | 0Q | 1Q | 2Q | 3Q | 4Q |
| CPI | *-.5060* | -.5010 | -.4532 | -.3685 | -.1825 | -.1741 | -.1155 | -.0364 | .0686 |
| CLB | .9383 | .9493 | .9557 | .9581 | .9517 | .9483 | .9514 | .9648 | *.9776* |
| CLF | .9511 | .9587 | .9733 | *.9760* | .9645 | .9472 | .9507 | .9695 | .9758 |
| RLB | .8972 | .9201 | .9368 | .9538 | *.9800* | .9754 | .9466 | .9428 | .9521 |
| RLF | .9414 | *.9528* | .9514 | .9488 | .9265 | .9118 | .8566 | .8194 | .7499 |
| BLR | -.1435 | -.1099 | -.0778 | -.0218 | .0455 | .1119 | .2420 | .4009 | *.5362* |
| GDPC | .9507 | .9564 | .9606 | .9709 | *.9768* | .9491 | .9392 | .8689 | .8019 |
| FD | .9252 | .9405 | .9509 | .9606 | .9680 | .9738 | .9735 | .9725 | *.9781* |
| SD | .9701 | *.9727* | .9651 | .9488 | .9344 | .9185 | .8762 | .8098 | .7305 |
| USX | *-.6984* | -.6633 | -.6543 | -.6636 | -.6344 | -.0720 | .2724 | .4539 | .6093 |

These 10 independent variables when categorised into lead or lagged indicators or coincidents, then ranked according to the strengths of their correlationships with the dependent variable show:

*Table 3:*    *Lead and Lagged Indicators and Coincidents for the Total Units of Residential Transactions throughout Malaysia (excluding Sarawak state)*

| Indicator | Type of Indicator (Quarter) | r Value | Type of Relationship |
|-----------|-----------------------------|---------|----------------------|
| **USX** | Lead 4Q | -0.6984 | Moderate Negative |
| **CPI** | Lead 4Q | -0.5060 | Moderate Negative |
| **SD** | Lead 3Q | 0.9727 | High Positive |
| **RLF** | Lead 3Q | 0.9528 | High Positive |
| **CLF** | Lead 1Q | 0.9760 | High Positive |
| **RLB** | Coincident | 0.9800 | High Positive |
| **GDPC** | Coincident | 0.9768 | High Positive |
| **FD** | Lagged 4Q | 0.9781 | High Positive |
| **CLB** | Lagged 4Q | 0.9776 | High Positive |
| **BLR** | Lagged 4Q | 0.5362 | Moderate Positive |

## 3.2    Discussion of Results

From Tables 3 and 4 above:

- *The 10 independent variables*

  Seven independent variables exhibit near perfect co-movements (r between 0.9528 and 0.9800) with the dependent variable. These independent variables are therefore able to explain between 95.28% and 98.00% of the changes to the volume of residential transactions. These indicators are SD, RLF, CLF, RLB, GDPC, FD and CLB.  The other three independent variables only show moderate correlationships (r = -0.6984,  -0.5060 and 0.5362) with the dependent variable. These indicators are USX, CPI and BLR, respectively.

- *Economic Indicators*

  The USX and the CPI are at least 4 quarters lead indicators showing opposite co-movements with the dependent variable. This means that when the Malaysian Ringgit weakens at least a year ago, the volume of current year residential transactions may be expected to decrease, and vice versa. It also means that when the inflationary rate increases at least a year ago, the volume of current year residential transactions may also be expected to decrease, and vice versa. However, at 4 quarters lead, these two indicators only have a moderate correlationship (where r = -0.6984 and -0.5060, respectively) with the dependent variable.

The GDPC is a coincident bearing near perfect co-movement (r = 0.9768) with the dependent variable. As such when the current year GDP from the construction sector increases, the volume of current year residential transactions may be expected to increase too. It is to be noted that the GDPC provides a positive co-movement with the dependent variable as early as a year ahead (r = 0.9507) peaking at current time but tapering off thereafter.

- *Financial Indicators*

The financial indicators are between at least 3 quarters lead and at least a year lag. Except for BLR with a moderate positive co-movement with the dependent variable, all the other six financial indicators exhibit strong co-movements with the dependent variable.

SD and RLF are both leading the dependent variable strongly by at least 3 quarters (r = 0.9727 and 0.9528, respectively). Any increase in the saving deposits of individuals or any increase in the amount of loans by finance companies for the purchase of residential properties nine months earlier will also see an increase in the volume of residential transactions now, and vice versa. These strong co-movements are observed till at least a year later where the co-movements begin to moderate (r = 0.7305 and 0.7499, respectively).

CLF leads the dependent variable by at least 3 months. It possesses a near perfect co-movement with the dependent variable (r = 0.9760). Hence, any increase in the amount of loans by finance companies for the constructions of residential properties three months earlier will also see an increase in the volume of residential transactions now, and vice versa.

RLB is a coincident possessing a near perfect co-movement with the dependent variable (r = 0.9800). Any current increase in the amount of loans by commercial banks for the purchase of residential properties will also see an increase in the volume of residential transactions now, and vice versa.

FD, CLB and BLR are all lagging by a year by comparison with the dependent variable. FD and CLB have strong co-movements (r = 0.9781 and 0.9776, respectively) with the dependent variable while BLR only possesses a moderate positive co-movement (r = 0.5362) with the dependent variable. This means any increase in the volume of residential transactions precedes by at least a year any increase in the fixed deposit savings of individuals, or any increase in the loans afforded by the commercial banks to residential constructions or any increase in the cost of borrowing. However, the strong co-movements between FD and CLB with the dependent variable may be observed as early as at least a year before (r = 0.9252 and 0.9383, respectively) but peaking only at 4 quarters lag. FD, CLB and BLR, with their 'deferred' quality though, will provide early signals to the future performance of the volume of residential transactions.

## 4.0    CONCLUSIONS AND FURTHER RESEARCHES

### 4.1    Conclusions

In summarising the above test results and result interpretations:

- *Economic Indicators*
  When the costs of living increase, represented by an unfavourable value of the Malaysian Ringgit and an increase in the inflationary index, the demand towards housing may dwindle being substituted by other more necessary commodities of life.
  The response from the residential construction industry is probably inelastic[9] and though detecting changes in demand towards residential sector at least a year ahead, it only sends its strongest signal at the current time.

- *Financial indicators*
  Loans from financial companies, be they for the purchases or constructions of residential properties are lead indicators by comparison to loans from commercial banks.   This could be attributed to the smaller proportion of the former[10] to the latter and therefore the responsiveness of the former to changes.
  Loans for the purchase of residential properties, be they from commercial banks or financial companies, send earlier signals of the changes to the residential demand by comparison to loans from both commercial banks or financial companies for the constructions of residential properties.  The later response of the residential construction industry is probably due to its inelasticity in response to any changes in demand towards the residential sector.
  The costs of borrowing only send late signals to the performance of the residential market.  This could be due to the ability of consumers in absorbing the cost variations in the event of a higher cost of borrowing. It could also mean that the disposal of landed properties is time consuming thereby recording changes at a deferred stage.
  The co-movements of saving deposits and fixed deposits, from both commercial banks and financial companies, indicate that investments in the forms of saving deposits, fixed deposits and purchases of residential properties move in tandem with each other.  However, investment in saving deposit appears to take preference over purchases of residential properties while the purchase of residential properties appears to take preference over investment in fixed deposit.

### 4.2    Further Researches

---

[9]      According to Unger and Karvel 1987, pp. 518, real estate supply is inelastic in responding to economic changes.

[10]      Between Q1, 1990 and Q2, 1998, the ratio of:
RLB : RLF = 69% - 78% : 31% - 22%
CLB : CLF = 71% - 77% : 29% - 23%

Future studies could explore the following:

- *Other indicators* - Analyses of the Malaysian residential market is not limited to the indicators above, but rather could include indicators such as Housing Starts, stock exchange indices, the Malaysian House Price Index and other economic indicators.

- *Data* - When quarterly data are available for the dependent variable, the tests above could be rerun for more realistic results.

- *Investment Portfolio* - The performance of the Malaysian residential market could be viewed from the investment aspect, namely by comparing this form of investment with other forms of investment which may include deposits in financial institutions, shares and other types of landed properties both on the local and international scenes.

- *Sectoral Performance* - Where data may be available, the residential performance according to localities or types may be carried out too. The data for the independent variables should however be from the specific locality or suited to that sub-type of residential property.

## 4.3    Limitations

The test results, interpretations and conclusions above should not be applied to the residential scenarios of the state of Sarawak as the residential transactions adduced in this paper do not include residential transactions in that state.

All possible care has been taken in the preparation of the information in this study, however the author expressly disclaims any liability for the accuracy and sufficiency of the information and under no circumstances shall be either liable in negligence or otherwise in and arising out of the preparation or supply of the information in this report.

**REFERENCES**

- Bank Negara Malaysia, *Quarterly Bulletin*, First Quarter 1990 to Third Quarter 1998 editions, Percetakan Nasional Malaysia Berhad, Kuala Lumpur.

- Besag, Frank P. and Besag, Peter L. 1984, *Statistics for the Helping Professions,* SAGE Publications Beverly Hills, California, United States of America.

- Cass, Tom 1983, *Statistics at Work,* Longman Inc., New York, United States of America.

- Freund, John E. and Williams, Frank J. 1982, *Elementary Business Statistics: The Modern Approach,* 4th edn., Prentice-Hall, Inc., Englewood Cliffs, New Jersey.

- Lau, Wai Seang 1997, *Purpose-built Offices in the Klang Valley - Performance Indicators and Performance Cycle,* MBA (Real Estate) Dissertation, 1997, University of Western Sydney, Australia.

- Makridakis, Spyros G. and Wheelwright, Steven C. 1989, *Forecasting Methods for Management,* 5th edn., John Wiley & Sons, Inc., Republic of Singapore.

- Moore, Geoffrey H. 1983, *Business Cycles, Inflation, and Forecasting,* 2 nd edn., The National Bureau of Economic Research, Inc., United States of America.

- Unger, Maurice A. and Karvel, George R. 1987, *Real Estate Principles and Practices,* 8th edn., South-Western Publishing Co., United States of America.

- Valuation and Property Services Department, Ministry of Finance Malaysia, *Property Market Report,* 1993 and 1997 editions, Percetakan Nasional Malaysia Berhad, Kuala Lumpur.

**LIST OF DATA AND RESULTS**

- Table I     -     Original Data for Dependent and Independent Variables

- Table II    -     Converted Data for Dependent and Independent Variables

- Table III   -     Correlation Coefficients, r, for Residential Transactions
                    in Malaysia (except Sarawak state)