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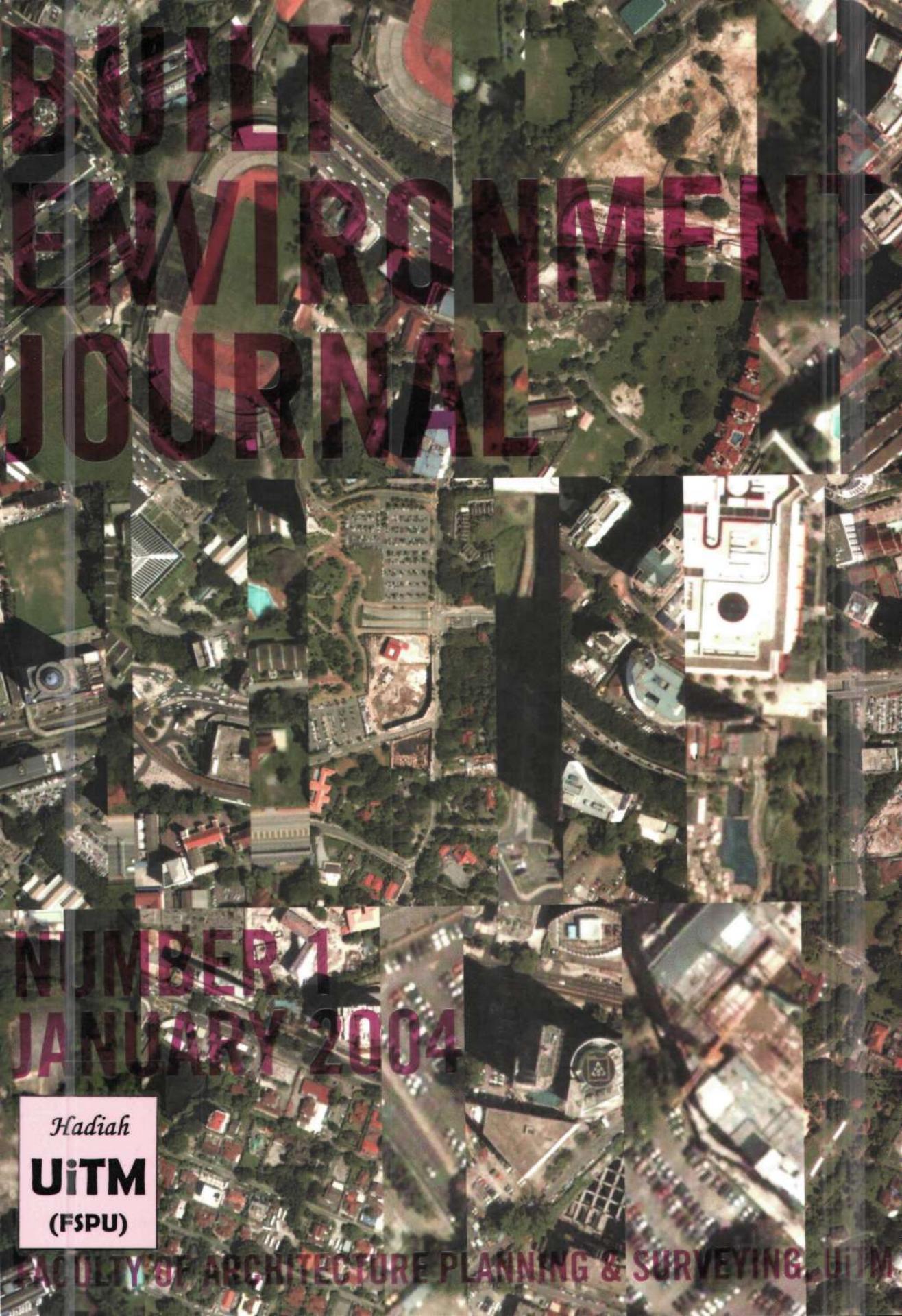

NUMBER 1
JANUARY 2004

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Bowen, P.A., Hindle, R.D. & Pearl, R.G. (1997) *The effectiveness of building procurement systems in the attainment of client objectives. In Proceedings of W-92 Conference on Procurement Systems*, C.I.B. Publication No. 203.

Government of Malaysia, Total Planning and Development Guidelines, Department of Town and Country Planning, Peninsular Malaysia, Kuala Lumpur, (2nd Printed), 2001.

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Built Environment Journal

NUMBER 1 JANUARY 2004

UHG. JURNAL & PANGKALAN DATA
PTTA, UITM, SHAH ALAM
14 FEB 2006
DITERIMA

Contents

Editorial 1

Preface 2

Built Environment & Crime Prevention: Development & Issues 3
MOHAMED YUSOFF ABBAS

Prevention of Crime in Housing Through Environmental Planning 7
IDA NOORJULIANTI SUGIJANTO

Therapeutic Outdoor Design For Mental Patients 14
ABD HARIS SHAMSUDDIN

New Towns in Peninsular Malaysia: Planning and Development 22
DASIMAH OMAR

Risk-Return Analysis of The Malaysian Residential Property Sector 32
TING KIEN HWA & MOHD SALIM JASIMAN

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Risk-Return Analysis of Sector
The Malaysian Residential Property Sector

TING KIEN HWA & MOHD SALIM JASIMAN

ABSTRACT

This paper examines the performance of Malaysian residential property sectors between 1989 - 2001, focusing on risk-return, comparison of residential risk-adjusted performance with equity investments, and identification of risk reduction benefits through portfolio diversification.

Performance of residential properties is compared on a risk-adjusted basis with shares. In addition a further analysis is carried out to identify the risk reduction benefits of adding properties to an investment portfolio through diversification.

The results show that in terms of residential property type, detached houses provide higher capital appreciation compared to other forms of housing. But the higher returns are associated with higher risks.

The best states to invest in residential properties are Kuala Lumpur, Penang and Johor. In terms of regions, investment performance is highest in Johor Bahru followed by Penang Island and Klang Valley.

On an inter-asset comparison basis, the best risk-adjusted performance comes from detached and semi-detached houses in Kuala Lumpur which have outperformed shares represented by the Kuala Lumpur Composite Index.

For individual investors, the better direct residential property performance over shares clearly identifies the residential property sector as a comparatively attractive investment option.

In conclusion, Malaysian residential properties in selected states and by types have performed well and individual investors could enjoy considerable risk reduction by incorporating residential properties in their investment portfolios.

INTRODUCTION

A potential investor, before making an investment decision for a particular type of investment, would like to know its past performance and related risk-return characteristics. Similarly, an investor who has made an investment would like to know how the investment has performed in comparison with similar assets and with different types of investment options. In this regard, a comparative performance analysis of investment options is necessary.

Residential property investment is a popular form of investment among Malaysians apart from fixed deposits (FD), unit trusts and equities. The launching of the Malaysian House Price Index (MHPI) in February 1997, provides an opportunity to measure the investment performance of residential properties in Malaysia.

Prior to the publication of the MHPI, it was difficult to measure and compare the performance of residential properties. The heterogeneous nature of residential properties prevented direct comparison of performance, even with the same type of property in the same locality.

TYPE OF INDICES	Sub-indices/Composition
National indices	Malaysian House Price Index Malaysian Terrace House Price Index Malaysian Semi-detached House Price Index Malaysian Detached House Price Index Malaysian High-rise Unit Price Index
State Indices	One index each for the Federal Territory of Kuala Lumpur and the 13 states in Malaysia. Kuala Lumpur, Selangor, Johor and Penang have four other sub-indices based on housing types i.e. terrace, semi-detached, detached and high-rise residential units. The remaining states have three other sub-indices based on terrace, semi-detached and detached houses.
Regional Indices	Klang Valley House Price Index Penang Island House Price Index Johor Bahru House Price Index Seremban-Sepang House Price Index Ipoh-Kinta House Price Index

Table 1.

Composition of the Malaysian House Price Index

HOUSE PRICE INDICES IN MALAYSIA

House price indices are relatively new in Malaysia. Interest in setting up house price indices arose after the sharp real property asset inflation in 1995. Factors that have fuelled the investment and speculative demand is the availability of easy credit, low interest rate for housing loans and the increasing wealth per capita as evidenced by higher deposits in financial institutions, savings in provident funds and stock market investment.

Among the efforts to produce a house price index is the Maybank-RAM Property Index. It is an index based on the average actual transaction values of three types of houses in housing estates in Kuala Lumpur, Petaling Jaya and Shah Alam covering single storey terrace house, double storey terrace and semi-detached houses.

The overall Maybank-RAM Property Index is computed using the aggregated value of houses in each district weighted by the district's share of the total housing stock. The base of the index is the second quarter of 1992. This index was not continued after being launched.

The MHPI is a national house price index initially prepared and published by the National Institute of Valuation (INSPEN). Thereafter, with the establishment of the National Property Information Centre (NAPIC) the index is now produced by NAPIC.

The MHPI employs the Passche method of index construction. Technical details on the construction of the index can be referred to in "The Malaysian House Price Index : A Technical Summary" published by INSPEN.

The objective of the MHPI is to monitor the movement of house prices in Malaysia. The MHPI can be used to monitor the trend of house prices and as a barometer for measuring the general performance of the residential property market. The MHPI has more than 60 sub-indices, apart from the national and state house price indices. The composition of the MHPI is shown in **Table 1**.

Apart from price indices, the MHPI also contains related data and information on various aspects of the residential property sector:

a) the total number of residential property transactions, based on states;
b) the total number of residential property transactions, based on price range;
c) the total number of residential property transactions, based on year for each state;
d) the value of property transactions;
e) the value per transaction; and
f) descriptive statistics (i.e. lowest, highest and mean of prices) on each type of housing types by districts/mukims in each state.

OBJECTIVES OF STUDY

This study examines the performance of the Malaysian residential property sectors between 1989 - 2001 focusing on:

a) risk-return;
b) comparison between the risk-adjusted performance of residential property, FD and equity investments; and
c) the diversification benefits of incorporating residential properties in investment portfolios.

RESEARCH DESIGN

The annual returns for the performance of each of the residential property types are calculated based on the following formula:

$$Rt = (Pt - Pt\text{-}1) / Pt\text{-}1$$

where Rt = return for the period t
Pt = value of house price index at period t
$Pt\text{-}1$ = value of house price index at previous period

The returns of a residential property type will be the average of its annual returns. The risk of a property investment is the standard deviation of its annual returns.

Total return is not used in this study as rental returns of residential properties are not available. Thus the analysis will be based on capital returns calculated from the respective house price indices.

Returns are adjusted for risk by using the Sharpe index :

$$\text{Sharpe index} = \frac{R - Rf}{s}$$

where R = average return for the investment option
Rf = average risk free return
s = risk for the investment option

The Markowitz portfolio theory is used in the study of diversification benefits of including residential property in an investment portfolio. In this study, the portfolio will comprise three investment assets; namely, KLCI shares, 12-month fixed deposit and residential property represented by MHPI. The portfolio mean return of these three assets i.e. shares (R1), fixed deposit (R2) and residential property (R3) is given by :

$$E(Rp) = E[w1R1 + w2R2 + w3R3]$$

The portfolio mean return can be simplified as:

$$E(R_p) = \sum_{i=1}^{3} w_i E(R_i)$$

The portfolio variance is a weighted sum of variance and covariance terms of the three assets which can be written as:

$$VAR(R_p) = \sum_{i=1}^{3}\sum_{j=1}^{3} w_i w_j \sigma_{ij}$$

DATA SOURCES

Data on annual capital values of the residential property sector is represented by the MHPI Series which is published by the NAPIC. Capital values of residential properties are obtained from the various MHPI Reports for the study period from 1989 to 2001. The beginning period for the year 1989 is chosen as the earliest period the MHPI is available is from 1988.

The year-end closing values of the KLCI are used as a proxy for the performance of the Kuala Lumpur Stock Exchange. Annual data of the KLCI are obtained from the Investors Digest, a publication of the Kuala Lumpur Stock Exchange.

RISK-RETURN ANALYSIS

Different investment options (e.g. government securities, property, FD etc.) exhibit different risk-return characteristics. Investments that have high liquidity, e.g. shares, would exhibit a high risk-high return profile. On the other hand, safe investments, e.g. cash and FD, would have a low risk - low return profile.

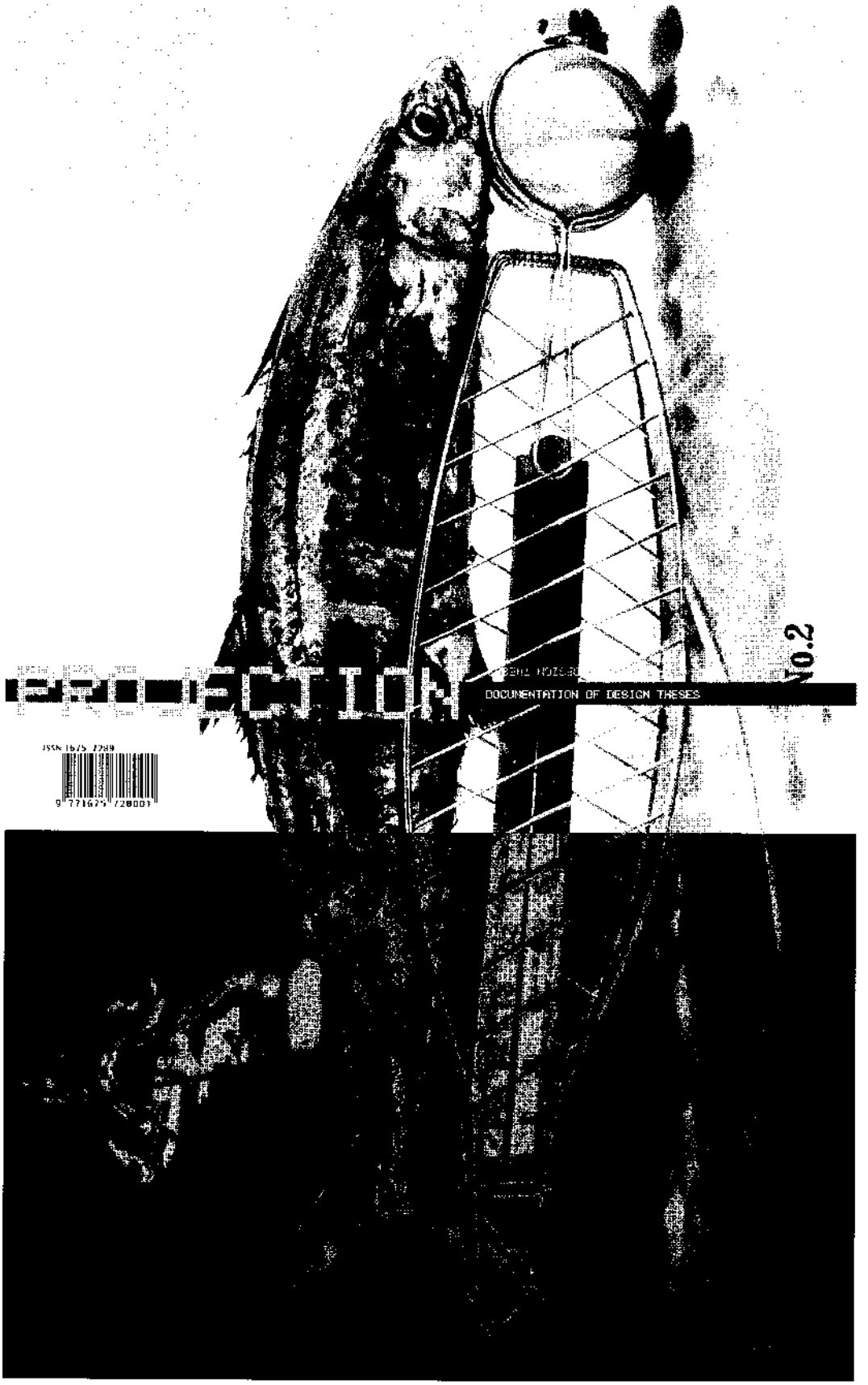
The most desirable investment choice is an investment which has high return and low risk profile. Thus investments located on the "high return/low risk" quadrant of a risk-return diagram would be the ideal investment choice, while the least desirable is the "low return/high risk" quadrant.

For the risk-return analysis, the annual returns are computed based on the year-end values of the MHPI and stock indices. The returns are capital returns and not total returns as rental income data on the MHPI is not available. Risk is measured by the standard deviation of the annual returns.

To provide a meaningful assessment of the returns and risks profiles of the various investment options, the Sharpe Index has been used as an index of performance. A risk free return of 6.75% is adopted, based on the average coupon rate of the Malaysian Government Securities for the same period.

The results on the returns, risks and risk-adjusted returns by housing types are tabulated in **Table 2.** (terrace), **Table 3.** (semi-detached), **Table 4.** (detached) and **Table 5.** (High-rise Units).

FORTHCOMING PUBLICATION



i) Risk-adjusted returns By Housing Types

a) Terraced houses (**Table 2.**)

The Terraced House Indices represent the capital values of townhouses, low and medium-cost for one, one and a half, two to three storey terraced houses in each states. On a risk-adjusted basis, Kuala Lumpur ranked number one followed by Penang and Selangor. The worst performing state is Perlis. Kuala Lumpur has the highest return volatility (9.00%) whilst Perlis has the least volatility in return (1.51%).

The results are expected for the three leading states as these states are the most urbanised states in Malaysia and there is always high demand for landed properties. Being urban centres of population and employment, there is always high demand for terrace houses in these states. **Appendix 1.** shows the risk-return diagram of the terrace house sector by states.

(b) Semi-detached Houses (**Table 3.**)

The Semi-Detached House Price Indices represent the capital values of one storey, one and a half storey and two to three storey semi-detached houses in each states.

Kuala Lumpur ranked number one followed by Negeri Sembilan and Penang. Kuala Lumpur, being the capital city of Malaysia, is the major urban center of population and employment. Demand from high concentrations of population coupled with high income have bring about high capital appreciation of semi-detached houses in Kuala Lumpur.

Semi-detached houses in Negeri Sembilan, on the other hand, have benefited from the spill-over effects of the Kuala Lumpur International Airport development. Prices of semi-detached houses have performed poorly in the states of Kedah and Perak due to a lower level of urbanisation in these states.

There are no reported values for certain years in the MHPI for the states of Sarawak, Kelantan and Perlis, hence there are no comparable risk-return values for the study period for these states. **Appendix 2.** shows the risk-return diagram of the semi-detached house sector by states.

c) Detached Houses (**Table 4.**)

The Detached House Price Indices represent the capital values of one and two storey detached houses in each states.

Again Kuala Lumpur ranked number one followed by Penang and Negeri Sembilan. The results are expected as demand for detached houses are from the high income group which are concentrated in these states. Prices of detached houses have not performed well in the states of Kedah, Terengganu and Kelantan. **Appendix 3.** shows the risk-return diagram of the detached house sector by states.

d) High-rise Residential Sector (**Table 5.**)

The High-rise Units Price Indices represent the capital values of low-cost flats, medium to high-cost apartments and condominiums in each states.

Penang ranked first followed by Johor and Kuala Lumpur. Penang being an island has a limited supply of land suitable for housing development. Housing needs in Penang are met mainly by developing high-rise flats, apartments and condominiums. As prices of landed properties in Penang are high, housing demand is focused on high-rise units. Thus it is not surprising to find that the High-rise Units Price Index for Penang shows the highest level of capital appreciation during the study period. Strata properties are less popular in other states due to the availability of choice in landed properties. **Appendix 4.** shows the risk-return diagram of the high-rise residential sector by states.

States	Average Annual returns (%)	Annual Risks (%)	Risk-return Ratio	Sharpe Ratio
K. Lumpur	13.8	22.84	1.655	0.309
Penang	7.52	10.84	1.441	0.071
N. Sembilan	5.46	11.28	2.066	-0.114
Melaka	4.82	12.42	2.577	-0.155
Johor	4.90	10.09	2.059	-0.183
Selangor	4.11	12.84	3.124	-0.206
Perak	3.21	7.51	2.340	-0.471
Kelantan	4.06	3.99	0.983	-0.674
Terengganu	2.67	3.97	1.487	-1.028
Kedah	1.96	4.59	2.342	-1.044

Table 4.

Risk-return analysis of the detached house sector by states in Malaysia (1989 - 2001)

States	Average Annual returns (%)	Annual Risks (%)	Risk-return Ratio	Sharpe Ratio
Penang	5.47	7.98	1.459	-0.160
Johor	4.61	11.07	2.401	-0.193
K. Lumpur	3.3	10.75	3.258	-0.321
Selangor	2.96	7.9	2.669	-0.480

Table 5.

Risk-return analysis of the high-rise residential sector by states in Malaysia (1989 - 2001)

States	Average Annual returns (%)	Annual Risks (%)	Risk-return Ratio	Sharpe Ratio
K. Lumpur	7.34	10.04	1.368	0.059
Penang	5.74	5.22	0.909	-0.193
Selangor	5.16	6.65	1.289	-0.239
Johor	4.92	5.35	1.087	-0.342
N. Sembilan	4.58	5.1	1.114	-0.425
Melaka	4.21	5.98	1.420	-0.425
Pahang	3.47	4.56	1.314	-0.719
Terengganu	3.47	4.38	1.262	-0.749
Perak	3.31	3.45	1.042	-0.997
Sarawak	3.18	3.45	1.085	-1.035
Sabah	3.18	3.25	1.022	-1.098
Kelantan	3.23	2.89	0.895	-1.218
Kedah	2.84	2.75	0.968	-1.422
Perlis	1.53	1.66	1.085	-3.145

Table 6.

Risk-return analysis of the detached house sector by states in Malaysia (1989 - 2001)

Risk-adjusted returns of the Malaysian Residential Property Sector by States and Regions

Performance by State

The state indices represent the performance of the overall residential sector in the respective states. Based on the respective House Price Indices for each states, the Sharpe Index shows that Kuala Lumpur ranked first followed by Penang and Selangor. The worst performing state is Perlis (**Table 6.**).

Performance by Region

On a regional basis, Johor Bahru ranked first and Klang Valley second. The worst performing region is the Ipoh-Kinta region (refer to **Table 7.**). The Johor Bahru residential property market has performed better than the Klang Valley Region due to demand by foreign investors from Singapore. The Ipoh-Kinta region is less active and less developed compared to the other three regions due to its geographical location and fewer economic activities in the region.

Risk-adjusted Returns by Investment Options

To compare other investment options with the residential property sector, equities and fixed deposit rate have been included in the analysis. A final table (Table 8) is prepared compares these two investment options with the best performing states in the terrace, semi-detached, detached and high-rise unit sectors.

Table 8. shows that the best performing investment options are all the three landed properties in Kuala Lumpur i.e. Kuala Lumpur Detached, Semi-detached followed by Terrace House Sectors.

States	Average Annual returns (%)	Annual Risks (%)	Risk-return Ratio	Sharpe Ratio
Johor Bahru	6.5	12.05	1.854	-0.021
Klang Valley	5.44	8.42	1.548	-0.156
Penang Island	5.12	8.09	1.580	-0.201
Seremban - Sepang	4.4	5.73	1.302	-0.410
Ipoh - Kinta	3.32	3.16	0.952	-1.085

Table 7.

Risk-return analysis of the Malaysian residential sector by regions in West Malaysia (1989 - 2001)

States	Average Annual returns (%)	Annual Risks (%)	Risk-return Ratio	Sharpe Ratio
Kuala Lumpur Detached	13.80	22.84	1.655	0.309
Kuala Lumpur Semi-detached	11.37	17.02	1.497	0.271
Kuala Lumpur Terrace	7.94	9.00	1.134	0.132
KLCI	11.18	38.03	3.402	0.116
Penang Detached	7.52	10.84	1.441	0.071
Kuala Lumpur State	7.34	10.04	1.368	0.059
Johor Bahru Region	6.50	12.05	1.854	-0.021
N. Sembilan Semi-detached	6.47	10.09	1.560	-0.028
Penang Semi-detached	6.57	6.23	0.948	-0.029
Selangor Semi-detached	6.07	15.39	2.535	-0.044
FD	6.31	1.72	0.27	-0.256
Johor Terrace	5.22	5.13	0.983	-0.298

Table 8.

Risk-adjusted returns by investment options (1989 - 2001)

Risk (%)	Return (%)	Share (KLCI)	12 month FD rate (Commercial bank)	MHPI
8.25	6.46	0.0	0.1	0.9
7.08	6.93	0.1	0.1	0.8
8.20	7.40	0.2	0.1	0.7
7.78	7.39	0.2	0.2	0.6
10.77	7.86	0.3	0.2	0.5
10.69	7.84	0.3	0.3	0.4
11.89	7.98	0.333	0.333	0.333
14.42	8.31	0.4	0.3	0.3
18.22	8.80	0.5	0.2	0.3
22.04	9.28	0.6	0.1	0.3
26.04	9.75	0.7	0.1	0.2
30.09	10.22	0.8	0.1	0.1
34.17	10.69	0.9	0.1	0.0
38.03	11.18	1.0	0.0	0.0

Table 9.

Risk and return of asset mixes with residential property included

PORTFOLIO DIVERSIFICATION BENEFITS OF MALAYSIAN RESIDENTIAL PROPERTY

Share investment is a popular investment option among Malaysian individual investors. Direct property investment particularly in the residential sector is equally popular.

Theoretically, adding property into an investment portfolio will provide diversification benefit by reducing the level of overall risk. The reduction is achieved due to the negative correlation of property with shares.

Correlation analyses are carried out on residential properties, shares and fixed deposit rates. Residential properties are represented by the MHPI, shares by year-end values of KLSE Composite Index and FD by 12-month fixed-deposit rates of commercial banks. Correlation analyses on the three investment options are carried out and the resulting correlation factors (r) are:

KLCI and MHPI $r = 0.023$
KLCI and FD $r = -0.268$
MHPI and FD $r = 0.506$

Appendix 5. shows the efficient frontier of the Malaysian share/FD/residential property portfolio. The efficient frontier shows the risk-return trade-off of the three investment options and demonstrates the potential of residential property for providing diversification benefits when combined in a mixed asset portfolio of shares, property and fixed deposits.

Table 9. shows the asset mixes incorporating residential property investment. A high percentage of property is found to form the optimal portfolio mix (Residential/share/FD : 80%/10%/10%). The reason could be due to serial correlation of the house price indices as the index construction is based on market values of stamp duty valuations on transacted residential properties. The percentage of residential property in the optimal portfolio mix is expected to be lower when adjustments are made for valuation smoothing.

Districts	1980 - 91	1991 - 2000
Gombak	6.85	5.01
Petaling	5.13	6.93
Sepang	1.56	6.47
Ulu Langat	7.68	8.20

Table 10.
Population growth rates (% pa) of major districts in Selangor

DRIVERS OF RESIDENTIAL PROPERTY RETURNS

Kuala Lumpur is found to dominate higher returns of the Malaysian landed residential property sectors. The drivers behind the higher returns are due to the higher growth rate of population in Kuala Lumpur in the 1970s (refer **Appendix 6.**). Residential properties in good locations and accessibility in Kuala Lumpur have turned into prime residential areas in the 1980s and 1990s. Taman Tun Dr. Ismail, Bangsar, Bukit Tunku, and Damansara Heights are examples of such housing estates which are much sought after by the high income group of the population. Capital appreciation of landed properties in these areas has contributed significantly to the capital return for residential properties in Kuala Lumpur.

However, with limited land supply for housing in Kuala Lumpur, residential development has spread to the state of Selangor particularly its major towns i.e. Petaling Jaya, Subang Jaya and Shah Alam in the Klang Valley. Appendix 6 shows the higher population growth rate enjoyed by Selangor in the 1980s and 1990s.

Districts of Selangor such as Ulu Langat and Petaling which adjoin Kuala Lumpur have enjoyed high population growth rates. The Sepang District had high population growth rate in the 1990s (refer **Table 10.**) when the development trend in the Klang Valley began to shift southwards toward Putrajaya and KLIA which provided new catalysts for housing development in the district.

Gross per capita income of the Malaysian population has also increased over the study period. Higher demand from the increasing population and higher disposable income has led to the higher returns on the housing sector.

The higher demand for residential properties is depicted in **Appendix 7.** and **Appendix 8.** which shows the increasing number and value of property transactions for the 1988 to 2001 period.

LIMITATIONS OF ANALYSIS

The MHPI is a constant quality price index constructed using the hedonic method. To have a sufficient number of observations for the construction of the indices, the pooling and aggregation of data is necessary so that statistical inferences can be made with confidence. However such aggregations may cause the loss of explanatory power for price changes by property types or by locations/zones within a region/state.

Due to the lack of transactions, a price index created may not have enough data points to test for time trend differences across locations/zones within a region. Similarly, separate regressions for each location are not possible without sufficient data (Guttery and Sirmans, 1998).

The lack of transaction data possibly explains why there is no 1997 index values for the Perlis and Kelantan Semi-detached House Indices and the Pahang, Perlis, Sabah and Sarawak Detached House Indices.

The regional indices provide an useful indicator on price trends of residential properties in regional growth centres. The indices could be made more useful if a series of sub-indices based on property types were produced which could provide further insight into regional residential price movements. Maps should be used to indicate the boundaries of the regions.

The study period (1989-2001) coincide with a full property cycle; thus the performance analyses provide insight into the risk-return characteristics of the various residential property sectors in Malaysia.

It would be useful to include Government Securities/Bonds into the study. However, there is a difficulty in establishing the Government bond capital returns, despite the existence of a RAM-Quant Shop Malaysian Government Securities Index. That Index is an accumulation index and the fact that the Malaysian Government Securities are long-term bonds of varying terms, different years of issue and varying interest rates makes it a difficulty to establish a new bond capital series that would allow risks and returns to be analysed and compared.

Currently there are no commercial property indices being developed in Malaysia. The lack of such property performance measures hampers any analysis that compares the performance of the residential sector with commercial property sectors. However the NAPIC is currently in the process of developing more performance indices.

The analyses of the performance analysis have been constrained by the lack of a higher frequency MHPI (i.e. semi-annual or quarterly data). Semi-annual data are available only from the January-June 1997 period. The results of the analyses could have been biased with a higher volatility on risks and returns due to the use of annual data.

CONCLUSIONS

In terms of housing type, the results show that detached houses provide higher capital appreciation compared to other forms of housing, but the high returns are associated with high risks. Thus, although a detached house provide the highest returns, it has higher variability in its return. In other words, investors in detached houses may enjoy higher capital gains during housing booms but they will suffer from a higher drop in their house prices compared to other forms of housing during recession periods.

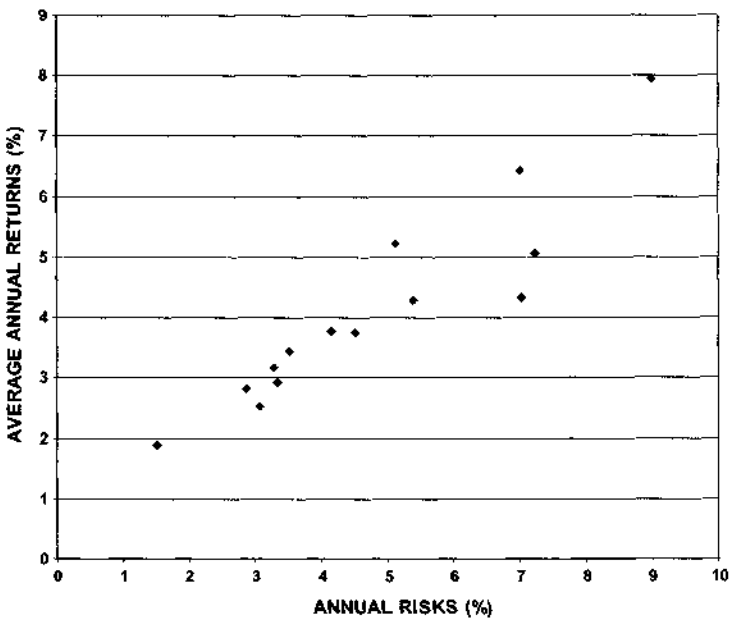
The best states to invest in residential properties are Kuala Lumpur, Penang and Johor. In terms of regions, investors would perform well by investing in Johor Bahru followed by the Klang Valley and Penang Island.

On an inter-asset comparison basis, the best risk-adjusted performance comes from detached and semi-detached houses in Kuala Lumpur which have outperformed shares

represented by the KLCI.

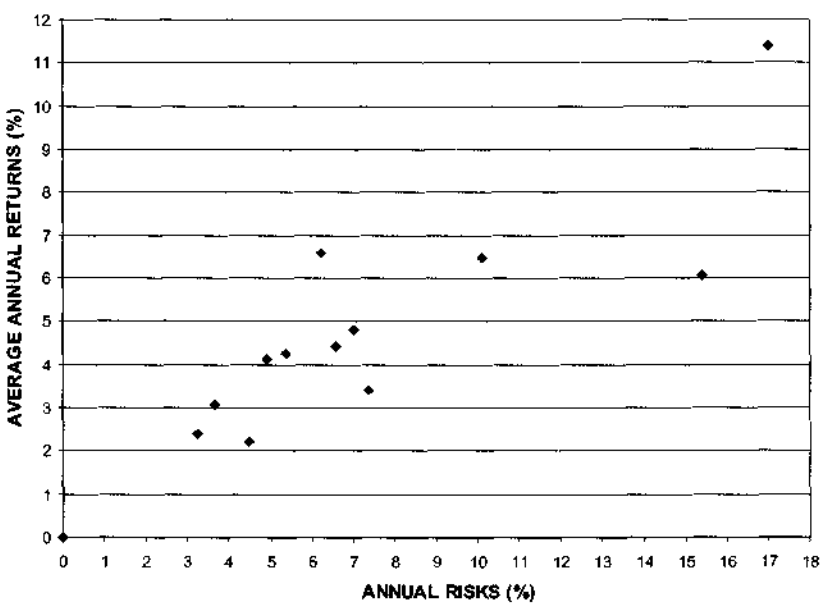
For individual investors, the better direct residential property performance over shares clearly identifies the residential property sector as a comparatively attractive investment option.

In conclusion, Malaysian residential properties in selected states and by types have performed well, and individual investors could enjoy considerable risk reduction by incorporating residential properties in their investment portfolios.



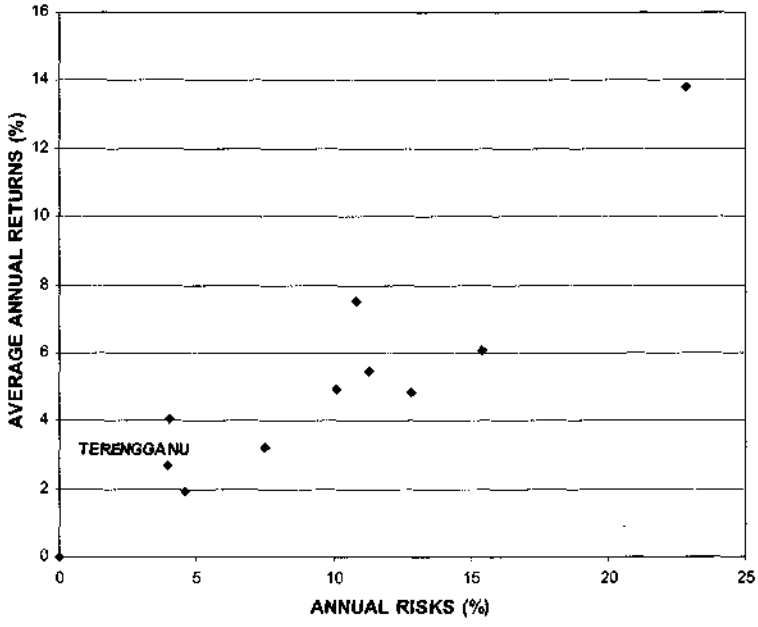
Appendix 1.

Risk-return Diagram of the Terrace House Sector, by States in Malaysia (1989 - 2001)



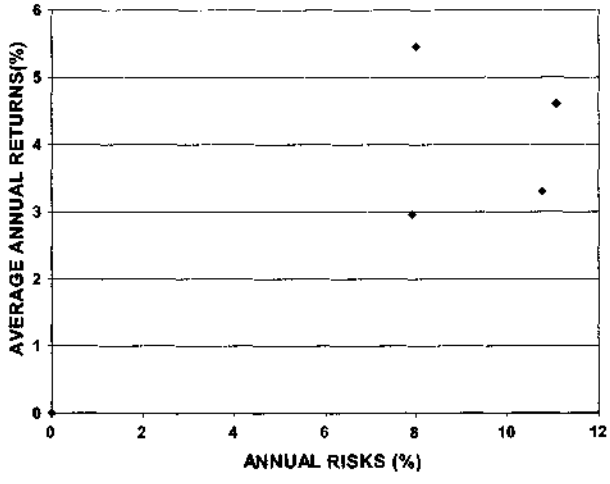
Appendix 2.

Risk- Return Diagram of the Semi-Detached House Sector, by States in Malaysia (1989 - 2001)



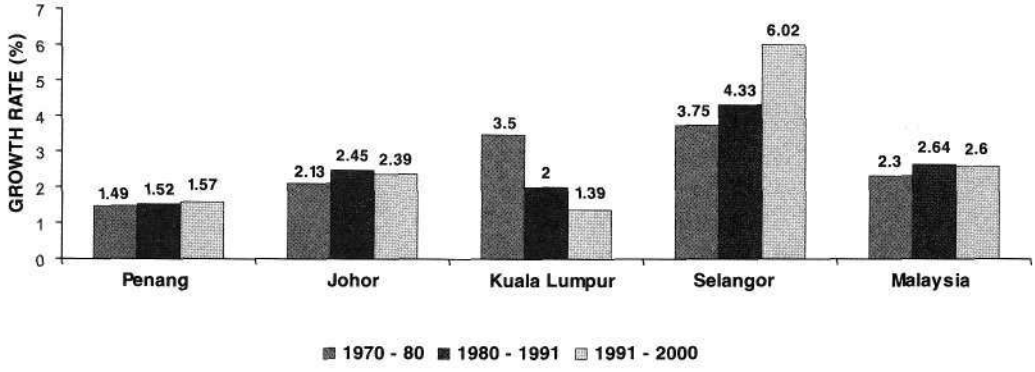
Appendix 3.

Risk-return Diagram of the Detached House Sector, by States in Malaysia (1989 - 2001)



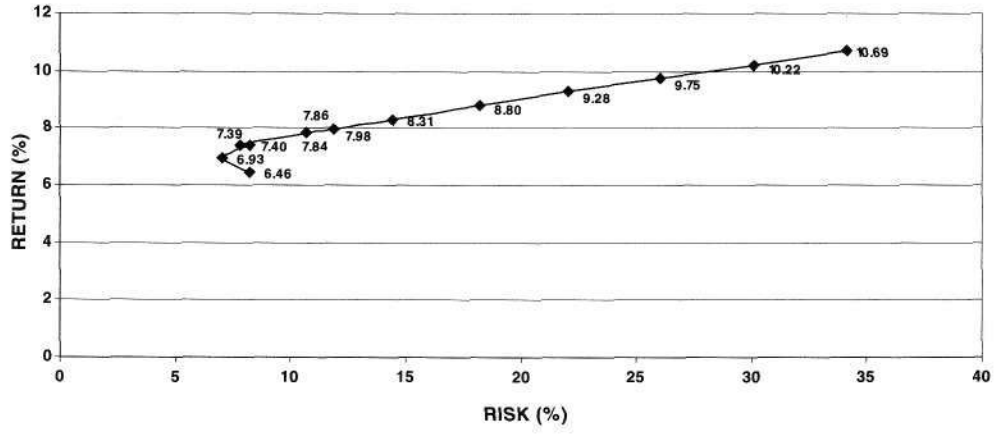
Appendix 4.

Risk-Return Diagram of High-Rise Residential Sector, by States in Malaysia (1989 - 2001)



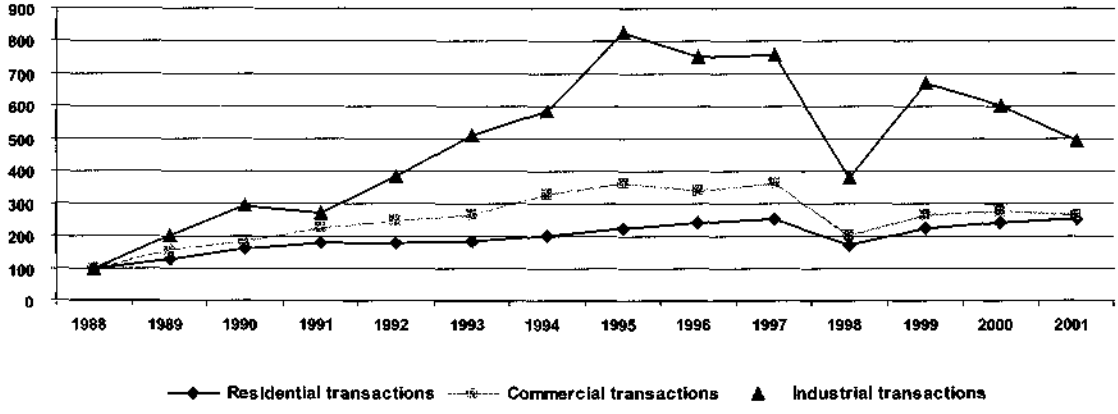
Appendix 5.

Population Growth Rate or Major Regions in Peninsular Malaysia



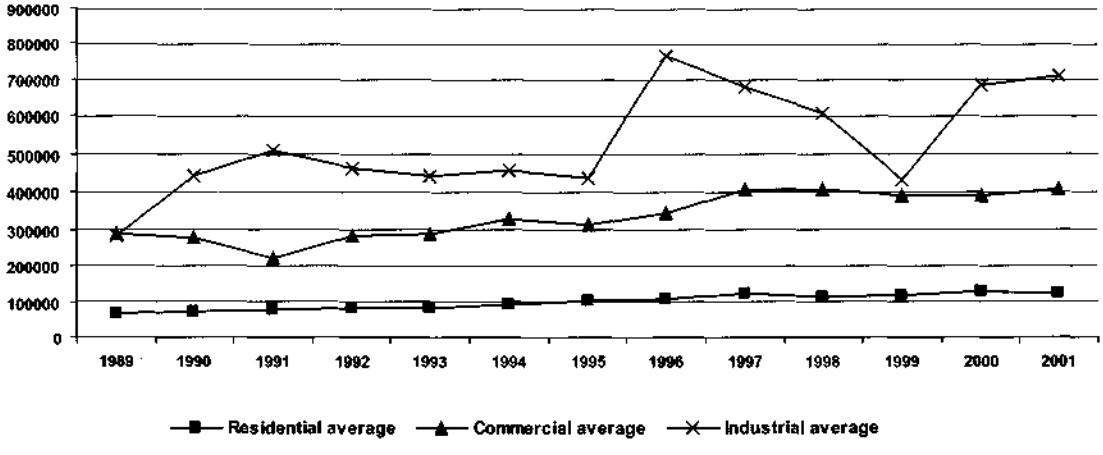
Appendix 6.

Efficient Frontier of Malaysian Residential Property / Shared / Fixed Deposit Portfolio



Appendix 7.

Number of Transactions of Residential, Commercial & Industrial Transactions (1988 - 2001)



Appendix 8.

Total Vlue of Transactions (RMmillion/year) of Residential. Commercial & Industrial Properties (1989 - 2001)

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