

THE ROLE OF RESIDENTIAL PROPERTY IN PERSONAL INVESTMENT PORTFOLIOS: THE CASE OF MALAYSIA

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ABSTRACT

Residential property has long been recognised as an important component in a household's overall wealth. The sheer magnitude of purchasing a house has compelled households to commit a disproportionate amount of their funds to own a house, leaving little capital for other kinds of investment. The findings of this Malaysian study show that an allocation between 50% to 65% of the available capital to residential property, particularly in terraced houses, in any of the 5 main regions, and with the balance invested in bonds will produce a superior personal investment portfolio, in terms of enhanced risk-adjusted return and significant reduction in the overall risk. Holding a non-diversified portfolio not only produces sub-optimal returns, but also exposes households to greater risk which can easily be minimised through mixed-asset portfolio diversification.

Keywords: Residential property, housing, personal investment portfolio, portfolio diversification, personal financial planning.

INTRODUCTION

Housing has long been perceived by the general public as a form of basic necessity and often represents the one single largest investment in their personal investment portfolio. According to a study in the US, residential properties represent roughly two-thirds of the household's overall assets (Tracy et al, 1999).

Besides fulfilling basic needs, owning a house also provides a sense of security and achievement. However, unlike shares, bonds and other financial assets which are often included in the personal investment portfolio and the allocations to these asset classes are methodically determined, residential property has always been singled out and has not been assessed in efficient portfolio allocations, even though it

accounts for a substantial portion of total wealth (Geltner et al, 1995). The segregation of residential property from the personal investment portfolio is inconsistent with modern portfolio theory and the notion of asset integration in standard finance.

In Malaysia, at September 2003, of over 200 managed funds listed in the Unit Trust section (The Star, 2003), none of these funds offer exposure to residential property. Apart from certain specialty funds (i.e. bond funds and cash management funds), most of the managed funds offer investors exposure to various allocation mixes between the two major financial asset classes, namely shares and bonds. It is not uncommon for financial planners in Malaysia to formulate and recommend a personal financial plan by matching one's risk tolerance level and return objectives with a portfolio of managed funds which stage a spectrum of risk-return tradeoffs (through the variations of the allocation between equity and fixed income components). Although housing, be it investment or owner-occupied property, is recognised as an important component in overall personal wealth, the effect and contribution of the residential property to the overall personal asset portfolio is not explicitly acknowledged. Hence the allocation to residential property issue has not been systematically addressed.

Thus, the purpose of this paper is to examine the effects and diversification benefits of including residential property in a personal investment portfolio in Malaysia. The findings will provide evidence of whether residential property is a worthwhile investment within a portfolio perspective and how much should be allocated to it. The effect of property type and location will also be examined to determine which property types and regions contribute more towards the improvement of the overall portfolio performance.

LITERATURE REVIEW

Tracy et al (1999) found that in 1995, a typical household in the US had 66% of its total assets in property and only a small portion of the overall assets were in equities (which included indirect equity ownership through pension funds and managed funds). However, the portion of equities rose in the upper half of the wealth distribution, especially the top few percentiles. An earlier but similar study in Japan also reported the same findings where the largest allocation of Japanese household saving was in residential property (in both land and residential structure). The very high cost of housing in Japan was attributed to this high allocation to residential properties (Norland, 1988).

In the same report, Tracy et al (1999) also reported a slight increase in the equity share over time, rising 3.5% from the 25-year old homeowner to the 55-year old homeowner. The persistence of the high property share during this life span was attributed to the trading up process. The higher mortgage payments have cancelled

out the income gains that might reduce the property share of a homeowner's portfolio during the prime working years.

The two most significant benefits of owning a house as compared to renting were protection against rental risk and potential capital gain from the sale of a house. On the other hand, the cost of the benefits of homeownership was a higher initial outlay on housing, which reduces the funds available for other investments (Boch et al, 1986). Housing differs in its characteristics from other types of investment. Most homeowners are neither diversified by property type nor region. They are obliged by personal and family constraints, including employment opportunities, to hold one house in one market; thus are vulnerable to downturns in that specific market (Chinloy and Cho, 1997). The financing options which do not allow partial ownership, combined with the high leverage used to finance house purchase, had compelled households to commit a disproportionate amount of their funds to the purchase of a house, leaving little capital for other kinds of investment and therefore, leaves the household with a non-diversified portfolio that is highly exposed to regional house price declines (Goetzmann, 1993; Tracy et al, 1999).

However, unlike financial assets, owner-occupied housing provides significant consumption benefits. The decision of purchasing a house is driven by both consumption and investment motives (Boch et al, 1986). When the investment constraint of huge housing consumption was taken into account, Brueckner (1997) found that the homeowner's optimal portfolio was inefficient. However, this inefficiency was not attributed to the homeowner's irrationality in making financial decisions, but as a result of a rational balancing of consumption benefits against portfolio distortions associated with housing investment. Not only the portfolio choice, the decision to own or rent housing was also affected by both consumption and investment considerations (Ioannidas and Rosenthal, 1994).

Several proposals have been put forward to ease the burden on the homebuyers. Shiller and Weiss (1999) recommended that metropolitan house price indices be established, allowing households to hedge the risk associated with local housing market declines. Caplin et al (1997) and Caplin and Joye (2002) proposed the formation of "housing partnerships", a financing arrangement that allows a household to share ownership of its home with outside investors. Such partnerships should significantly reduce the up-front costs and the monthly carrying costs of owning a house, enabling families to devote more of their income to other investments.

Holding a non-diversified portfolio will expose individuals to unnecessary non-systematic risk, which can be mitigated through simple portfolio diversification. In standard (or traditional) finance, investors are assumed to construct portfolios consistent with asset integration principles. The focus should not only be on an individual asset's risk/return characteristics, but how that asset interacts with other

portfolio positions. Prospective assets should be chosen by comparing the income distribution resulting from integrating these prospects with the rest of the assets in the portfolio.

Every investment decision should be framed within a portfolio perspective. It is not enough to know the characteristics of a potential investment itself; one must be aware of how an investment impacts the risk and return characteristics of the overall portfolio. Assets are evaluated as to how they might fit into a portfolio that meets the objectives and constraints of the investors (Maginn et al, 2004; Bronson et al, 2004).

In contrast to standard finance, behavioural finance assumes investors construct portfolios via asset segregation. Instead of evaluating an investment's impact on the overall portfolio position, investors focus on an asset's distinct characteristics. Investors tend to evaluate investment options one at a time and not as a part of an aggregate portfolio (Tversky, 1990). Investors build portfolios as pyramids of assets. Each layer carries different attitudes towards risk and are staged to form an investment portfolio (Statman, 1999). This approach is in direct contrast to the Markowitz model.

To be consistent with standard finance theory, residential property as an asset class should be evaluated in the light of how it interacts with other assets (i.e. shares and bonds) within the portfolio perspective and how it impacts the overall portfolio performance. Several empirical studies in the US have demonstrated performance improvement when housing was added into the mixed-asset portfolio and the allocations to the housing increases when moving down the portfolio risk spectrum (Goetzmann, 1993; Goodman, 2003).

DATA AND METHODOLOGY

Data sources

Monthly indices of Kuala Lumpur Composite Index (KLCI) from January 1988 to December 2001 were obtained from KLSE Daily Diary, while monthly Malaysian Government Securities (MGS) Index (January 1994¹ – December 2001) was collected from the Rating Agency Malaysia. The annual index of the Malaysian House Price Index (MHPI) for the period of 1988 to 2001² were provided by the Valuation & Property Services Department.

¹ The MGS data series only goes back to January 1994; hence, the performance figures for MGS over the full 1994-2001 period is used to proxy the long-term return for Malaysian bonds.

² The available figures for MHPI were 1988-2001 annual indices at the time this analysis was carried out, which has limited the study period to 2001.

Due to the limitations of the MHPI, annual returns were used in this paper. The monthly rates of return and risk for KLCI (as proxy for shares) and MGS (as proxy for bonds) were annualised to match the annual rates of return and risk for MHPI (as proxy for residential properties). Both KLCI and MGS indices were adjusted to match the cut-off date of MHPI in October each year. Transaction cost was not incorporated in the total return computation and the omission of transaction cost is expected to create an upward bias to the residential property's return. However, as the holding period of an asset increases, the impact of the transaction cost is expected to diminish over time as the cost is spread over a long time span, and the investment in residential property, especially owner-occupied house, is long-term in nature.

The Malaysian house price index

The Malaysian House Price Index is a transaction-based national house price index published by the Valuation & Property Services Department, and is often used to measure the general performance of the Malaysian residential property market. The MHPI has more than 60 sub-indices apart from the national and state house price indices. Among these 60 sub-indices, 5 house type sub-indices and 5 region sub-indices were used in the analysis. The house type sub-indices were Terraced, Semi-detached, Detached, High-rise unit and All Houses, whilst the 5 main regions were Klang Valley, Johor Baru, Penang Island, Seremban-Sepang and Ipoh-Kinta. Due to the fact that MHPI is transaction based, appraisal smoothing is not an issue. However, MHPI traces only the changes in house price, whilst the income component of residential property was not captured by this index. Two studies (Case and Shiller, 1990; Chinloy and Cho, 1997) have estimated the total return of owner-occupied housing by combining the change in house price with the rental return. Hence, for total return analysis, the rental return component is derived from the gross rental return in Property Market Report (1988 - 2001) (see Table 1).

Table 1: Rental return for residential property: by property type and region

Property Type	Average Rental	Region	Average Rental
All houses	4.0%	Klang Valley	4.0%
Terraced	5.0%	Johor Baru	3.5%
Semi-detached	4.0%	Penang Island	5.0%
Detached	3.0%	Seremban-Sepang	3.0%
High-rise unit	7.0%	Ipoh-Kinta	2.0%

Source: Authors' compilation from Property Market Report (1988 – 2001)

Portfolio evaluation methodology

According to the asset integration principle, assets should not only be evaluated on an individual basis, but how that asset interacts with other portfolio positions and how the addition of the asset impacts the risk and return characteristics of the overall portfolio. Hence, residential property will be integrated with the financial

assets to form a mixed-asset portfolio that corresponds to an average household investment portfolio. Residential property, by property type and by region, will be added to the conventional financial assets' portfolio to form a risky portfolio and the diversification gains will be evaluated. Often, due to work and family commitments, it is more sensible for a potential house buyer to consider a certain house type within a region rather than between regions; thus, the effect of integrating residential property by type into the personal investment portfolio is perceived to be more relevant to an average household.

The first stage of the analysis involves the evaluation of portfolio risk and return performance before and after the addition of various residential properties to the financial assets' portfolio. In the second stage, efficient frontiers of various portfolio mixes will be developed and the optimal allocation of each asset will be presented in diagrams. Quadratic programming algorithms (the Solver function in Excel) will be applied to optimise the asset allocation mix to obtain the optimal mixed-asset portfolio that is mean-variance efficient. Risk-adjusted return ratios will be used to determine the mixed-asset portfolio performance.

RESULTS AND FINDINGS

The performance of three principal asset classes (bonds, shares and residential properties) and nine residential property sub-classes is presented in Table 2. Bonds have the highest mean return and the best risk-adjusted performance among the principal asset classes. Not surprisingly, shares are the most risky asset class, but the low return is not commensurate with the high risk, which sees shares the least preferred investment options on the risk-return basis. The lacklustre performance of shares may be attributed to the relatively short study period in this paper (1988-2001), and the last few years of the study period were clouded by the 1997 Asian financial crisis.

One study found that during stock market decline (crisis), individuals might move into housing, or other durable goods as a replacement for shares (Runkle, 1988). However, Knapp and Nourzad (1994) found the contrary. They found no substitutability between shares and other financial assets, and no evidence that asset holders were willing to substitute between stocks and housing. In fact, it appeared that individuals considered equities to be a requirement in their portfolio, and were not willing to use other assets as substitutes.

In Table 2, among the residential property sub-classes, Terraced Houses outperform all other assets in terms of both absolute return as well as risk-adjusted return. Penang Island is the highest return housing region, but the best risk-adjusted performing residential property is in the Ipoh-Kinta region.

Table 2: Performance of various asset classes and sub-classes: 1988 - 2001

	Annual Return	Annual Risk	Return-Risk Ratio ³
Bonds	10.68% ¹	8.58% ¹	1.24
Shares	4.33%	35.28%	0.12
All Houses	10.13%*	9.11%	1.11
Sub-classes (Houses by Type)			
Terraced	10.90% ²	6.07%	1.79
Semi-detached	7.87% ²	5.66%	1.39
Detached	7.86% ²	8.67%	0.91
High-rise Unit	9.41% ²	7.22%	1.30
Sub-classes (Houses by Region)			
Klang Valley	9.11% ²	8.42%	1.08
Johor Baru (JB)	9.29% ²	12.05%	0.77
Penang Island	9.81% ²	8.09%	1.21
Seremban-Sepang	7.26% ²	5.73%	1.27
Ipoh-Kinta	5.27% ²	3.16%	1.67

¹ For the period from 1994 to 2001.

² Total annual return derived by summing capital return (MHPI) and rental return.

³ Defined as return per unit of risk. Higher ratio denotes higher return per unit of risk.

Table 3: Correlation matrix of various asset classes and property types: 1988 - 2001

	Bonds	Shares	All houses	Terraced	Semi-detached	Detached	High-rise unit
Bonds	1.000						
Shares	0.165	1.000					
All houses	-0.507	0.082	1.000				
Terraced	-0.631	-0.201	0.837	1.000			
Semi-detached	-0.338	-0.049	0.837	0.943	1.000		
Detached	-0.476	0.047	0.890	0.933	0.958	1.000	
High-rise unit	-0.079	0.197	0.365	0.318	0.419	0.348	1.000

Tables 3 and 4 present the correlation matrix between the returns of the financial assets and residential property by type and by region. The highest correlation is between Semi-detached Houses and Detached Houses (0.958), and the correlations between Terraced, Semi-detached and Detached are very high; all above 0.93.

However, the correlations between financial assets and residential properties, either by type or by region, are much lower, especially the correlations between bonds and residential properties. The average correlation between bonds and residential property by type is -0.406 , and -0.462 for residential property by regions. The average correlations between shares and residential property by type and by region are 0.015 and 0.223 respectively. The negative to very low correlations between financial assets and residential properties suggest the existence of possible diversification benefits by integrating these assets to form a mixed-asset portfolio.

Table 4: Correlation matrix of various asset classes and property regions: 1988 – 2001

	Bonds	Shares	Klang Valley	JB	Penang Island	Srbn-Sepang	Ipoh-Kinta
Bonds	1.000						
Shares	0.165	1.000					
Klang Valley	-0.444	0.087	1.000				
JB	-0.459	0.414	0.810	1.000			
Penang Island	-0.588	0.147	0.791	0.895	1.000		
Seremban-Sepang	-0.494	0.028	0.673	0.459	0.253	1.000	
Ipoh-Kinta	-0.323	0.440	0.455	0.559	0.239	0.694	1.000

Table 5 presents the performance analysis of two scenarios. The first scenario corresponds to a pure financial assets portfolio and the second scenario blends both residential property and financial assets to develop a mixed-asset portfolio. The asset allocations for both scenarios are arbitrarily determined with reference to the Tracy et al (1999) research.

As depicted in Table 5, when residential property, either by type or by region, is added to the mixed-asset portfolio, the overall portfolio performance is enhanced significantly. The most noticeable improvement is seen in the inclusion of Terraced property, whilst most residential property sub-classes also see improvement of over 120%. These findings clearly demonstrate the significance of diversification gain when residential property and financial assets are merged into a portfolio.

Figure 1 presents the efficient frontiers of five mixed-asset portfolios (by property type). The efficient frontiers, depicting the mixing of residential properties and a financial asset portfolio, has resulted in significant diversification improvement, predominantly in the reduction of overall portfolio risk, with the most significant reduction in portfolio risk achieved through inclusion of Semi-detached property. Among the five efficient frontiers, the share-bond-terraced portfolio lies above the other efficient portfolios, and hence dominates the other four portfolios.

Table 5: Mixed-asset portfolio performance - financial assets and residential properties (by type and region)

Scenario 1: 50% Bonds, 50% Shares				
Portfolio Return		Portfolio Risk		Return-Risk Ratio
7.50%		18.87%		0.40
Scenario 2: 60% Residential Property, 20% Bonds, 20% Shares				
Property Type / Property Region	Portfolio Return	Portfolio Risk	Return-Risk Ratio	Percentage Improvement*
All houses	9.08%	9.18%	0.99	149%
Terraced	9.54%	7.23%	1.32	232%
Semi-detached	7.72%	7.88%	0.98	147%
Detached	7.72%	8.83%	0.87	120%
High-rise unit	8.65%	9.28%	0.93	135%
Klang Valley	8.47%	8.91%	0.95	139%
JB	8.57%	11.70%	0.73	84%
Penang Island	8.89%	9.00%	0.99	148%
Seremban- Sepang	7.36%	7.97%	0.92	132%
Ipoh-Kinta	6.16%	8.31%	0.74	87%

* Improvement of the return-risk ratio in Scenario 2 compared to the return-risk ratio in Scenario 1.

The optimal asset allocations of these efficient frontiers and risk-adjusted performance are depicted in Figures 2 to 6. With the exception to Figure 3 which shows an increased allocation to Terraced property when moving up the portfolio risk spectrum, all other optimal mixed-asset allocations show diminishing allocations to residential property towards the higher risk end. An important finding of this paper is the substantial improvement of risk-adjusted performance in accord to the increase in the residential property allocations, with only one exception of Terraced property.

Figure 1: Efficient Frontiers of Various Mixed-asset Portfolios (by Property Type)

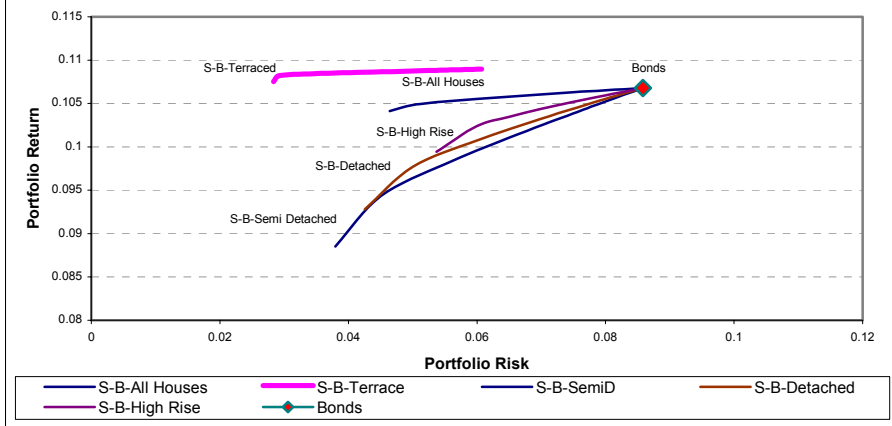
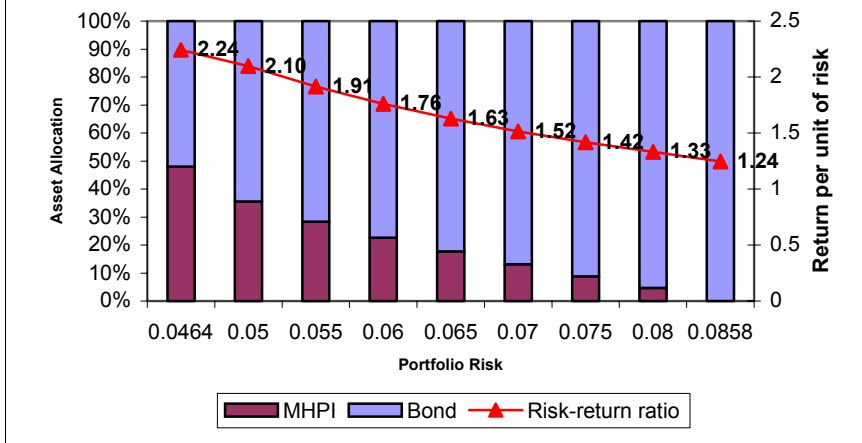


Figure 2: Optimal Mixed-asset Allocations (All Houses)



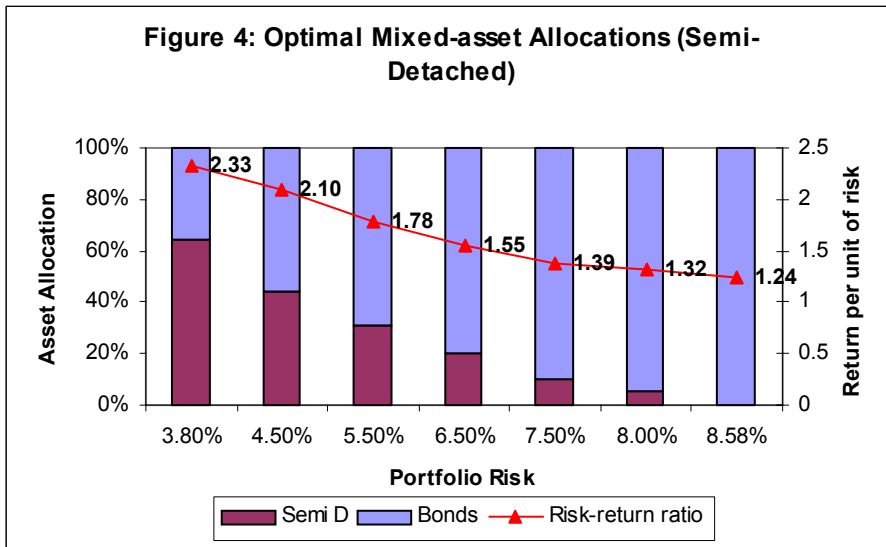
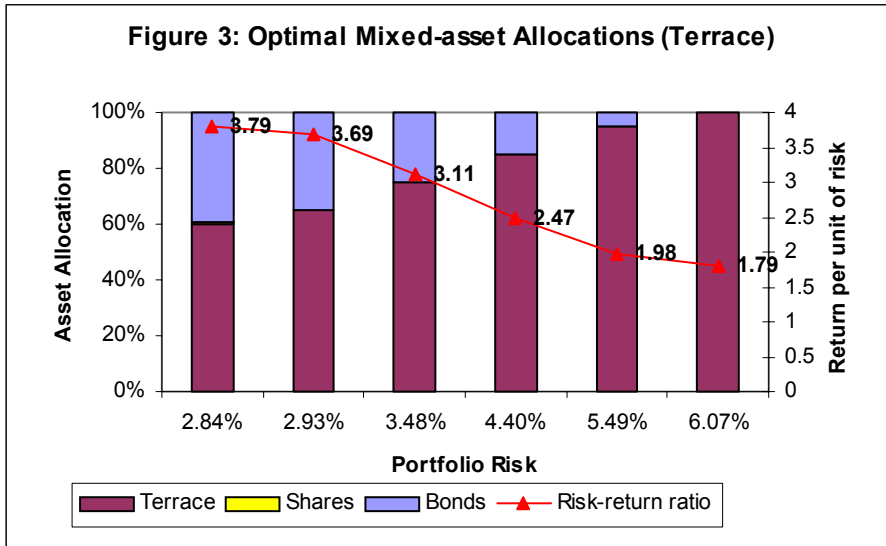


Figure 5: Optimal Mixed-asset Allocations (Detached)

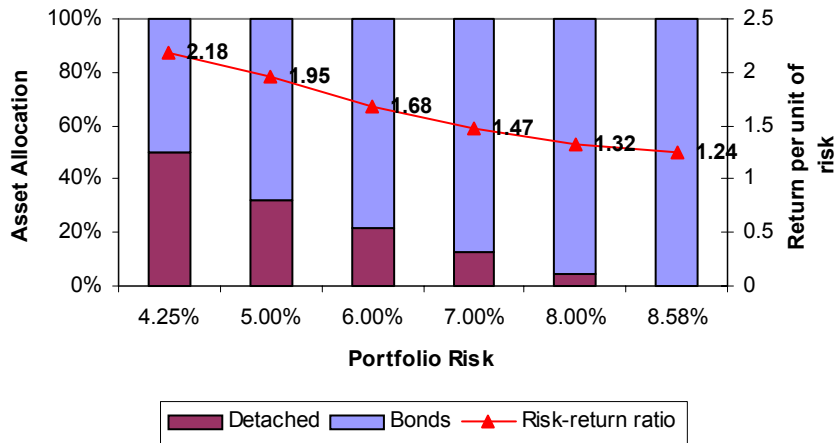
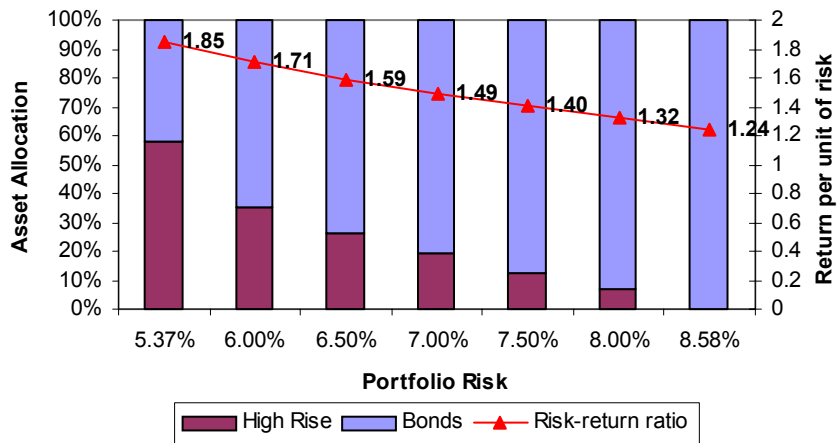


Figure 6: Optimal Mixed-asset Allocations (High Rise)



The best risk-adjusted performance is found at the minimum-variance-portfolio³ of each mixed-asset portfolio (by property type), where the allocations to residential property are between 50% to 65%. This high allocation to residential property is consistent to the norm that housing makes up a large portion of the personal investment portfolio for an average household, and in line with the findings of Goetzmann (1993) and Goodman (2003).

Among the residential property types, Terraced House is the best property type to be included in the mixed-asset portfolio, followed by Semi-detached, Detached and, High-rise unit. Shares have no allocation in most of the efficient portfolios, due to their lower performance compared to bonds and residential properties.

Another significant finding of this study is that all minimum-variance portfolios (by property type) outperform the best performing asset, Terraced house, with some of the mixed-asset portfolios outperforming by as much as 200% in terms of risk-adjusted return. This finding clearly evidences that by combining residential property and financial assets, the diversification gain is substantial. Thus, holding a single asset class portfolio, be it financial asset or residential property, not only induces unnecessary non-systematic risk, but also results in sub-optimal investment performance.

Figure 7 presents the efficient frontiers of five mixed-asset portfolios by property region. The optimal asset allocations for these efficient mixed-asset portfolios (residential property by region) as well as the risk-adjusted performance of each optimal portfolio are depicted in Figures 8 to 12. Similar results are observed when residential property by regions, are included in the mixed-asset portfolio. The addition of residential property in Klang Valley, Johor Baru, Penang Island, Seremban-Sepang and Ipoh-Kinta regions has resulted in substantial portfolio risk reduction and enhances portfolio risk-adjusted performance, when the allocation to residential property is increased in the optimal portfolio. Again, all the minimum-variance portfolios outperform the best individual asset (i.e. Terraced), which warrants the merger of residential property and financial assets to form a more diversified portfolio.

Figure 7: Efficient Frontiers of Various Mixed-asset Portfolios (by Property Region)

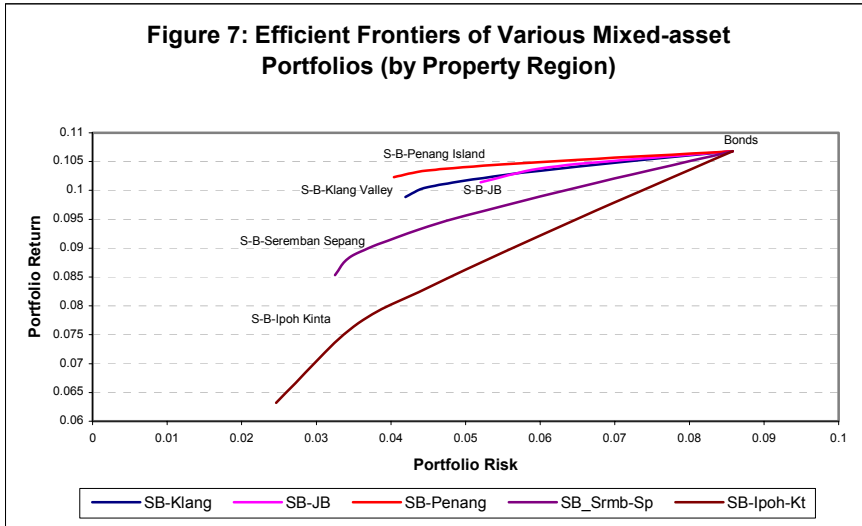
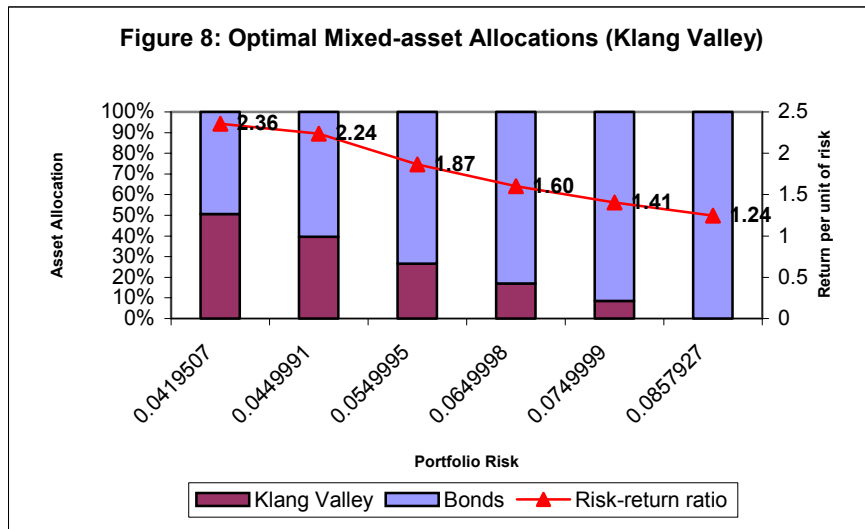
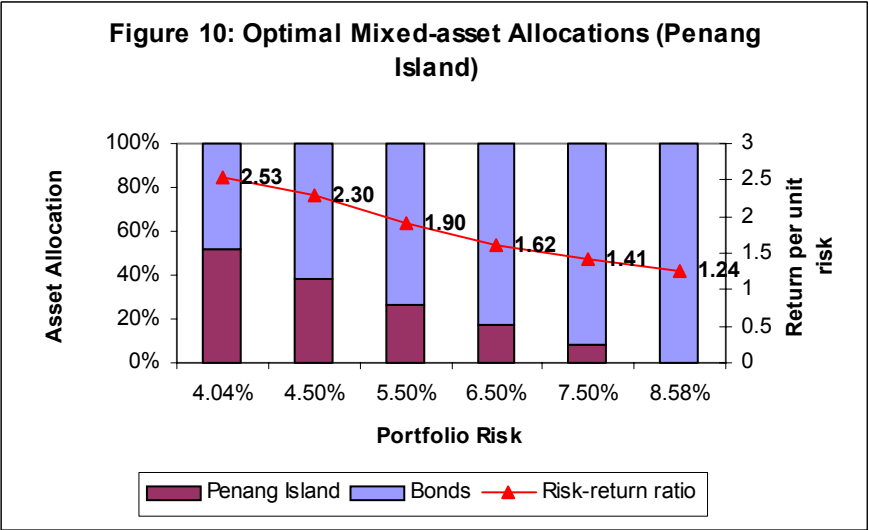
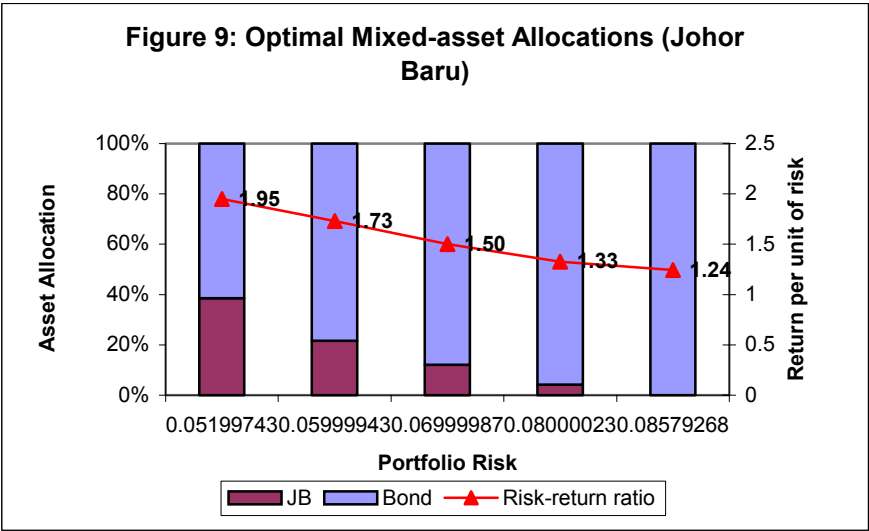
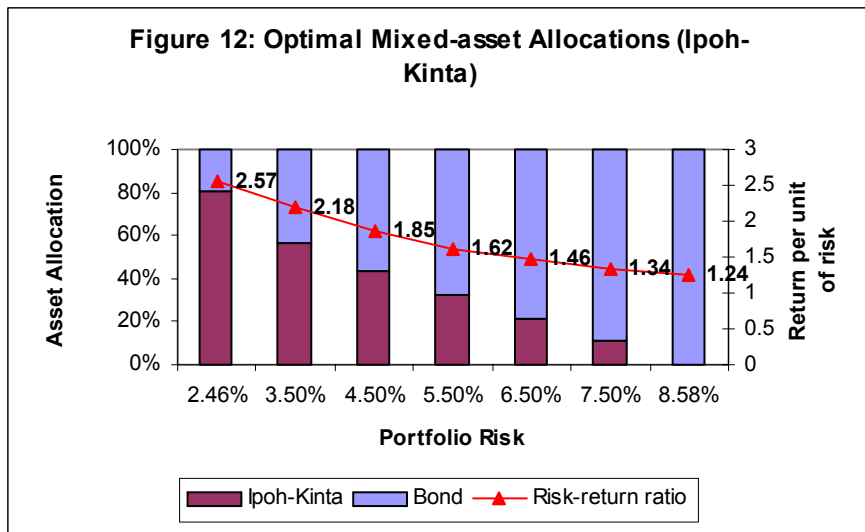
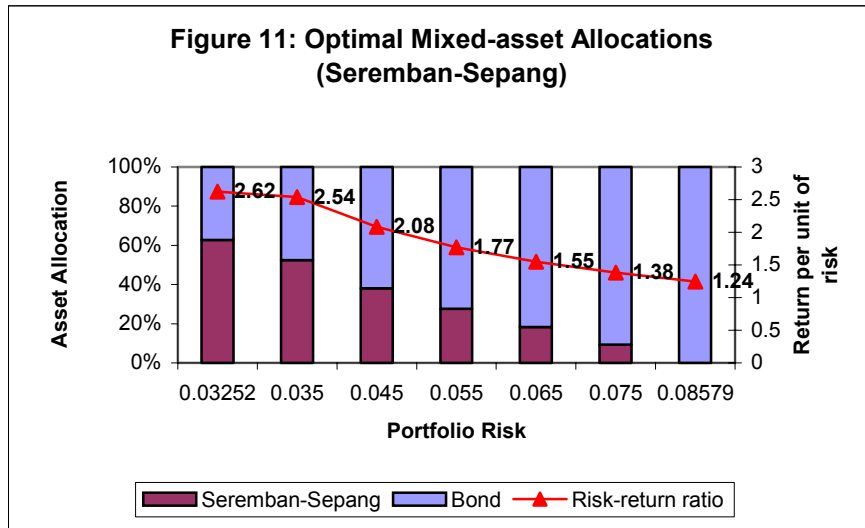


Figure 8: Optimal Mixed-asset Allocations (Klang Valley)





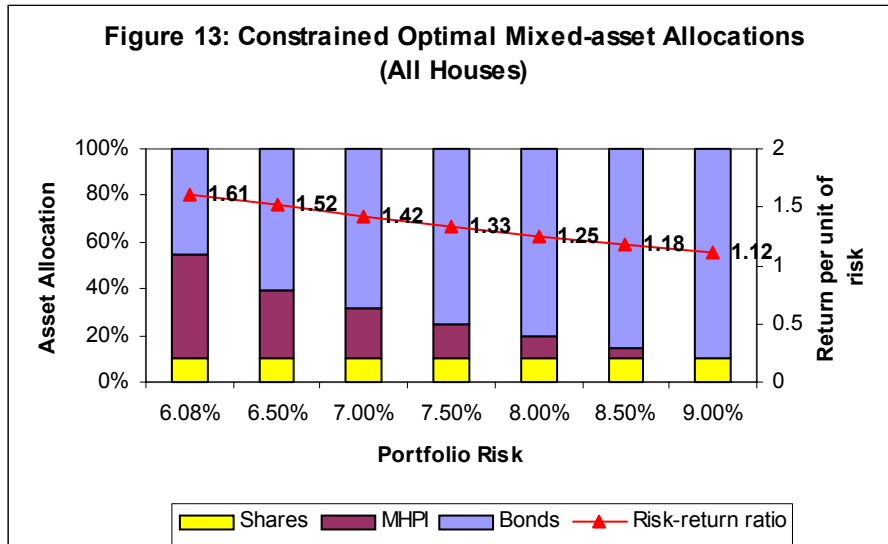


In most regions, except for Johor Baru (JB), the minimum-variance portfolios suggest the optimum allocation to residential property is between 50% to 80%. Among the five residential property regions, the best residential property to be included in the mixed-asset portfolio is in the Seremban-Sepang region, followed closely by Ipoh-Kinta, Penang Island and Klang Valley region. However, due to the huge initial outlay of purchasing a house, coupled with limited personal capital,

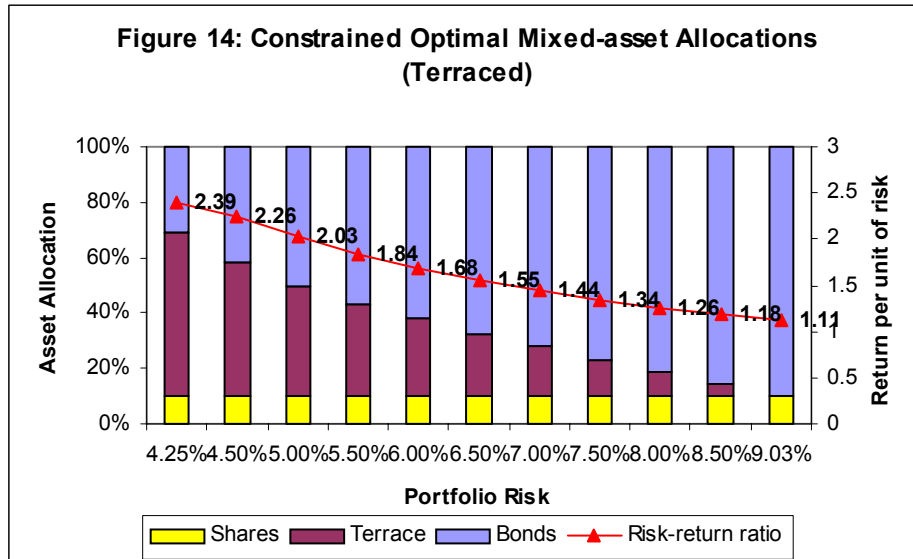
it is very difficult for an individual to build a truly diversified housing portfolio across property types and regions.

Although shares have zero allocation in most of the efficient mixed-asset portfolios, nonetheless, due to its prominence in the investment portfolio and the potential to generate high return in the future, two efficient portfolios are constructed to reflect the mixture of both financial assets (bonds and shares) and residential property. The allocation to shares is arbitrarily set at a minimum of 10%.

Figure 13 illustrates the optimal allocations of the three-asset portfolio. The result is comparable to the other mixed-asset portfolios, but with lower risk-adjusted return. Yet, the minimum-variance portfolio still outperforms the three principal asset classes, passing the best performing asset, bonds, by 30% in terms of risk-return ratio.



Similar results are found in Figure 14 when the best performing property type (Terraced) is added to the financial assets' portfolio. Although the 10% allocation to shares has an adverse effect on the mixed-asset portfolio, the risk-adjusted performance of the portfolio is still superior than other individual assets.



CONCLUSIONS AND RECOMMENDATIONS

Housing, or residential property, has long been recognised as an important component in overall personal wealth. The sheer magnitude of purchasing a house has compelled households to commit a disproportionate amount of their capital to the house, leaving little resources for other kinds of investment. The findings of this study support the view that housing represents a large portion of the household investment portfolio and the ex-post efficient portfolios typically devote a significant proportion to housing, and this proportion increases with the risk aversion of the investor.

Terraced Houses are one of the best performing assets in the study period, but putting all funds in a single asset has resulted in sub-optimal performance. The results show that an allocation between 50% to 65% of a total investable fund to residential property, particularly in a median Terraced House in any of the 5 main regions and the remainder invested in bonds and shares, will create a superior personal investment portfolio, both in terms of higher risk-adjusted return and significant reduction in the overall risks.

Due to indivisibility and large initial outlay of acquiring a house, it is very difficult for individuals to possess a truly diversified residential property portfolio. However, the findings do provide suggestions on the optimal asset allocations between residential property and financial assets, and the preferred house type and regions, which should assist in making personal investment decisions.

The findings of this study have demonstrated the importance of integrating residential property into the personal investment portfolio consideration. Hence, individuals should systematically allocate their limited resources into various asset classes at a targeted proportion to achieve a well-diversified portfolio.

Cash or cash equivalents are not incorporated in this study due to the fact that it is deemed as a risk-free asset, hence not included in the risky asset portfolio analysis. According to the separation theorem, the portfolio choice decisions are separated into two independent tasks; determination of the optimal risky portfolio, and the allocation between risky portfolio and risk-free asset which greatly depends on the personal preference and risk tolerance. Hence, once the optimal risky portfolio is determined, individuals can fine-tune their personal investment portfolios by matching their objectives and constraints along the line between the risk-free asset and the optimal risky portfolio.

The lack of quality data has limited the robustness of this study. The short study period (1988-2001) which is not long enough to cover the complete property cycle; the constraint of shorter performance series for bonds (1994-2001) and small sample (14 data points for MHPI indices) used in the performance analyses may have affected the accuracy as well as the significance level of the results. The use of gross rental returns and the omission of transaction costs in deriving total return for residential properties are expected to create an upward bias to the residential property's return. Nonetheless, taken into consideration these limitations, the finding of a significant allocation in residential property in an average household investment portfolio is intuitive and consistent with other comparable studies (Norland, 1988; Goetzmann, 1993; Tracy et al, 1999; Goodman, 2003) and personal investment risk can be significantly reduced by simultaneously investing in residential property, shares and bonds.

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