

ANALYSING THE RISK AND RETURN PROFILE OF CHINESE RESIDENTIAL PROPERTY MARKETS

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ABSTRACT

This research examines the performance and diversification benefits of five leading Chinese residential property markets. On six years of reliable quarterly data, the low income returns were relatively stable compared to the considerable variations overtime and across markets in capital growth. The marked variations between the performance profiles suggested that speculative Chinese residential property markets appeared to operate independently and are influenced by local factors.

Based on an efficient frontier model, residential property risk profiles can be lowered considerably with a well diversified residential property portfolio. On the available data, the optimum allocation is a residential portfolio anchored by a Beijing residential property with exposure to all markets. This achieved a 40% improvement in risk adjusted returns to that of a single location residential property portfolio. Similarly, for Chinese high net worth investors, the benefits of diversification, by combining an investor's primary location with an additional residential property in an alternative location, lead to at least a 16% improvement in the risk adjusted returns. For an astute Chinese investor, this diversified portfolio approach provides superior stable long term returns than short term risky speculative residential property investments.

Keywords: Chinese residential property markets, investment measurements, diversification analysis

INTRODUCTION

As China moves along the path of strong economic development, many Chinese entrepreneurs have become financially wealthy. There are now over 500,000 high net wealth (HNW) Chinese investors with more than RMB 10 million (US \$1.6m) in investable assets, double the number of three years ago. These HNW Chinese investors (nearly all self-made millionaires) have an average RMB 30 million (US \$4.7m) investment portfolio, across a range of investment asset classes which includes an average allocation of RMB 4.1million (US\$645,000) to property (Bain and Co 2011).

With this property allocation level, HNW individuals are attracted to residential investment property as it offers an affordable physical asset that can provide opportunities for capital growth with a stable cash flow. The determinants are provided by the demands of urbanisation alongside a dynamic residential property development market with strong capital flows and investment volumes. In detailing the benefits of residential property as an investment, performance can be driven by local factors and government policies. This can lead to a range of returns across the different Chinese residential property markets.

To better understand the performance of Chinese residential property markets, this research examines high end residential property markets in five leading Chinese cities; Beijing, Shanghai, Guangzhou, Tianjin and Chengdu. Table 1 lists the characteristics of these major Chinese cities.

	Size* (sq km)	Location	Population (million)	Economic Activity (GDP 2010, CNY billion,)	Key Industry Activities
Beijing	16,801	Northern China	19.6	1,377	Central and local government, regional headquarters for State Owned Enterprises, culture (media and communication), information technology
Shanghai	6,340	Eastern China	23.0	1,687	Finance, regional headquarters for multi-nationals, exporters/importers, local government
Guangzhou	7,434	Southern China	12.7	1,060	Manufacturing, transportation, biotechnology, local government
Tianjin	11,760	Northern China	12.9	911	Manufacturing, electronics, aerospace, petroleum, maritime industry
Chengdu	12,132	South West China	14.0	555	Information technology, finance, food, medicine, aerospace, local government

*Under administration of the city

Leading Chinese Cities
Source: Authors Compiled From Various Sources Including City Websites
Table 1

Table 1 shows the Chinese cities of the selected residential property markets. The cities vary in size and population with the economy actively being linked to the key local industries. Being a vast country, China is separated into regions. The three primary growth regions: Bohai (Beijing and Tianjin), Yangtze (Shanghai) and Pearl River Delta (Guangzhou), have all experienced active residential real estate markets (Lynn and Wang 2010).

The residential property data, from DTZ Property Consultants, represents high-end residential properties which would attract HNW individuals, both as prospective investors and occupiers. The six years of reliable quarterly gross rent and capital growth data has been converted to total returns. This will allow comparison across the residential markets and over time, especially with the recent economic challenges from the global financial crisis (GFC).

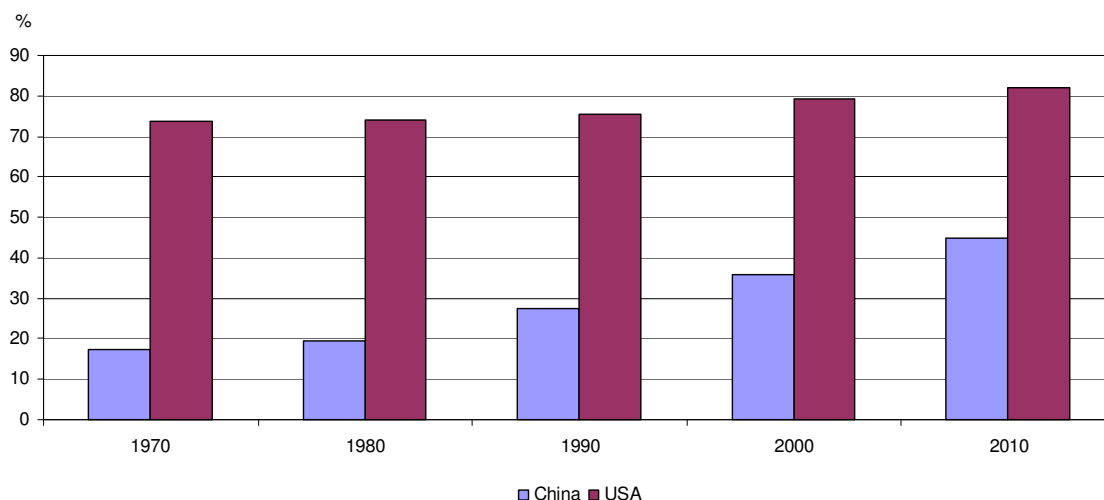
Additionally, the research highlights the significance of diversification, as the performance across residential property markets may vary. Detailed portfolio analysis can show the added value of an asset allocation strategy to outperform a selected single residential property market. This approach is particularly relevant to HNW individuals, who traditionally have strong local exposure to a specific residential property investment market.

In undertaking this research, it should be noted that the analysis is based on past performance and of selected residential property markets. In recognising future performance is separate from past returns, historical property performance and an asset allocation approach can highlight how important a portfolio strategy is when making investment decisions for an illiquid asset.

Following this introduction, section two provides a literature review on the Chinese residential property market. Section three details the selected property data and associated methodology. Section four provides the empirical findings and the implications for HNW individuals. The last section provides the concluding comments.

LITERATURE REVIEW

The extraordinary growth in the Chinese economy over the past 30 years has been driven by rapid urbanisation. The traditionally large Chinese rural population has provided a migrant labour force flowing from the countryside to cities. The level of Chinese urbanisation is shown in Figure 1. For a comparison, USA urban population data is shown.



China's Urban Population as a % of Total
Source: World Bank 2011
Figure 1

Figure 1 shows that in the last 30 years, China's urban population has doubled, and is now approximately 44% of the total 1,330 million population. This population movement is forecast to continue with a prediction that China's urbanisation rate in 2015 would reach 52% of the total population. As a comparison, the USA 312 million population, predominantly live in cities, with over 80% in an urban location (Liu 2011, World Bank 2011).

The rapid growth in the Chinese urban population has led to a supply of motivated low cost labour. This, with strong capital support has created several successful high value-added industries. As the workforce becomes skilled, improved wages create an emerging middle class, with strong demand for residential apartments. This is evident in major Chinese cities, where strong economic activity provides well paid employment opportunities (Li 2007).

New supply across the Chinese residential property development market appears fragmented, where even the largest developer does not command a market share of 10% in any given city. Well connected local developers appear to provide the majority of new Chinese residential property supply. Depending on economic conditions and development finance, this can lead to waves of new

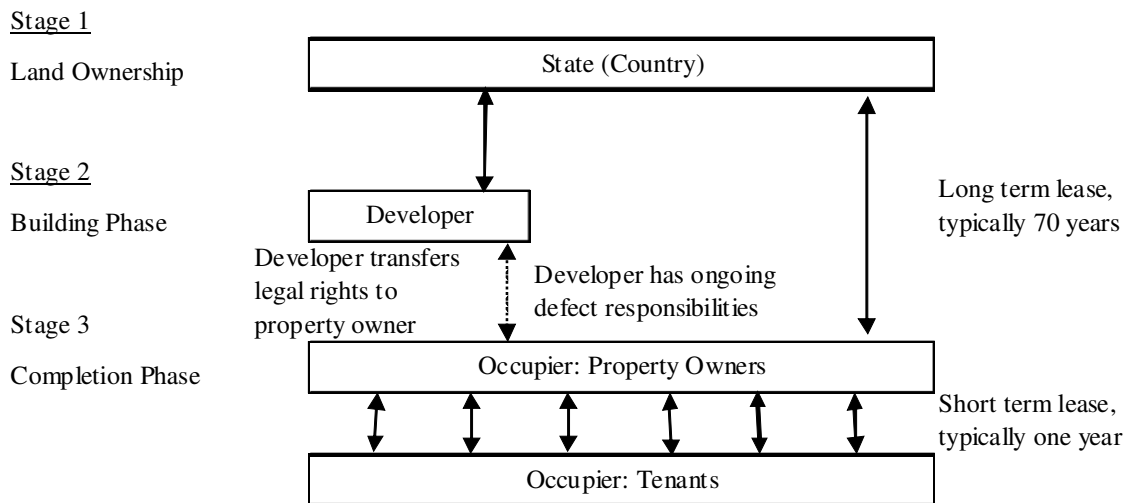
residential developments in specific locations with spectacular property cycle booms and subsequent declines (Lynn and Wang 2010).

Investors can be drawn to Chinese residential property based on location, with strong fundamental demand, known new supply and the development of surrounding public infrastructure. Compared to alternative asset classes, residential property in China is an attractive investment, with the following characteristics:

- i) Historically sound stable income returns;
- ii) Generally an easily understood asset class;
- iii) Physical tangible asset unlike shares;
- iv) Limited alternative investment channels;
- v) Scarcity of land, provides locational value; and
- vi) Availability of bank loans for residential property. (Zhang 2008)

In detailing the investment benefits, the risks associated with property needs to be understood. According to Baum (2009) and Rowland (2010), these can relate to physical deterioration with obsolescence, property market inefficiency, illiquidity and the requirement for leverage in the vast majority of property investments.

Furthermore, the Chinese legal and regulatory environment is an important consideration. Under the current system, the Chinese Government have legislated that the State retains the title of ownership, but sells the marketable and renewable land use rights to residential developers under a long lease of up to 70 years. This can then be transferred to the property purchaser (Kahn 2007). The Chinese residential property legal ownership structure is shown in Figure 2.



Chinese Residential Property: Legal Structure

Source: Authors

Figure 2

Figure 2 provides the legal structure associated with Chinese residential property development. The Chinese Government terms and arrangements provide the stakeholders with an ownership framework, although legal and regulatory risk is still a key factor when considering the Chinese residential property market (Lynn and Wang 2010, Wei et al 2009).

In addition, Government policies, both directly and indirectly, can impact (positively and negatively) on Chinese residential property markets. On a broad level, a positive impact was the Chinese Government response to the GFC through a stimulus package of RMB 4 trillion in 2009 and 2010. For example, through grants and loans there was a substantial boost to both the construction industry and the residential development market. Meanwhile, at a specific residential property investment level, the Chinese Government has enacted real estate market policies aimed at curbing soaring house prices in specific locations. For example, in January 2011, the General Office of the State Council issued a policy which raised the down payment minimum to 60% for a second apartment in defined cities (Bain and Co 2011, Zhang 2009).

DATA AND METHODOLOGY

Data

According to the National Bureau of Statistics of China (2010), the Chinese property market has expanded rapidly, from less than 4 billion sqm in 1990 to over 18 billion sqm in 2009.

Location	Series	Type/Grade	Measure
Beijing	Capital Value	Luxury Apartment	RMB / sqm
	Gross Rent	Luxury Apartment	RMB / sqm / mth
Shanghai	Capital Value	High-end (>RMB 30,000)	RMB / sqm
	Gross Rent	Non Serviced Apartment, high-end	RMB / sqm / mth
Guangzhou	Capital Value	Mid high-end	RMB / sqm
	Gross Rent	Mid high	RMB / sqm / mth
Tianjin	Capital Value	Heping, mass market	RMB / sqm
	Gross Rent	Service Apartment (adjusted to deduct service component)	RMB / sqm / mth
Chengdu	Capital Value	Central, mid high-end	RMB / sqm
	Gross Rent	Mid high-end	RMB / sqm / mth

Selected Chinese Residential Property Markets

Source: DTZ Research 2011

Table 2

This growth has changed the landscape of many cities and created difficulties in providing reliable current national property data. In the 1990's, the arrival of global property consultants led to substantial coverage of both premium commercial and residential property markets. These markets attracted both the local and global property funds alongside HNW Chinese investors.

For this research, DTZ Property Consultants provided their residential gross rent and yield database for five leading Chinese cities: Beijing, Shanghai, Guangzhou, Tianjin and Chengdu, covering the 2005 – 2011 period. On available data, Table 2 details the selected submarkets in these locations which match HNW Chinese investor criteria.

Table 2 illustrates the five selected residential property markets. DTZ Property Consultants gather the property sales data from external and internal sources. Gross rental evidence is from a large basket of monitored properties. The data is reviewed by a management committee comprising senior DTZ personnel to ensure it is representative of current property market conditions.

In determining the market rent, the operating expenses associated with the residential apartments needs to be defined and the associated costs deducted.

Type	Comments	Change / period covered
Rental Income Tax	Cost directed at the owner. Charge varies with location	5% - 10%
Leasing Agent Fees	A leasing agent earns a commission for finding tenants and handling all aspects of lease negotiations.	Generally each party pays 35% of 1 st month's rental
Management Fee (inc. Strata Title Fee)	Common practice for Chinese property managers to combine individual management of premises and building (strata title) management. This includes collecting rent and dealing with tenant queries alongside, property services (inc maintenance and security) for a residential apartment complex.	5-10% of gross rent pa
Maintenance Fee	Decorations and replacement of the residential dwelling property fixtures and fittings ie A/C system.	Less than 1% of the property value pa
Vacancy Factor	Leasing up period	Allow 2-6 weeks gross rent

Residential Property Operating Charges
Source: Authors, Zhang 2008 and DTZ Research 2011
Table 3

Table 3 details a range of costs that can be incurred when owning a Chinese residential investment property. The level of outgoings will vary depending on the type of residential property, level of building services and the agreement with the tenant. For the purpose of this research, the owners'

outgoings have been determined at 18% of the gross rent. In addition, owner's income has been annually smoothed, as leasing agents' lease documentation normally provide for a one year lease term.

Methodology

The property return for the investor is the gross income less the operating charges plus the capital growth, as shown in Equation 1. For the income, a simple 12 months moving average is applied to the gross rent to reflect the annual lease term.

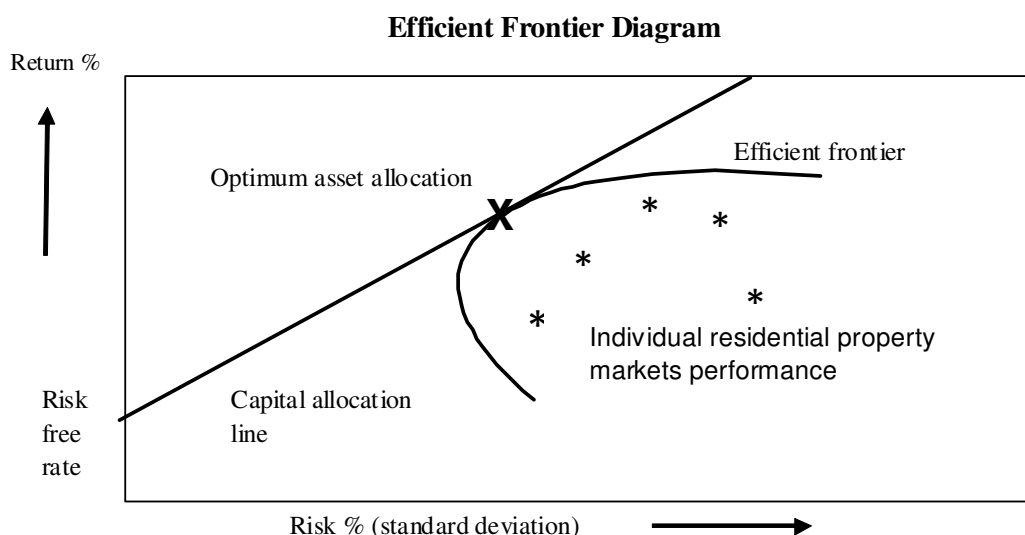
$$TR = \frac{(SGR - OP) * 12}{CV_{t-1}} + \frac{CV_t - CV_{t-1}}{CV_{t-1}} \quad (1)$$

where:

- TR = total return on property
- CV = capital value
- SGR = smoothed monthly gross rental
- OP = monthly operating changes

By separating capital and income returns, comparisons can be made between income returns (initial yield), capital growth rates and total returns. In providing the total returns, analysis can be undertaken over time and across residential property markets.

The application of complicated mathematical portfolio models has traditionally focused on the public equity (share) market. Brown and Matysiak (2000) recognised that portfolio modelling has a wider audience as concepts of diversification and portfolio theory can be applied to recognised property investment markets. By defining a portfolio of assets in terms of their risk, return and covariance, the Markowitz (1959) efficient frontier model can provide the best possible returns for defined risk levels, based on a calculated weighted combination of portfolio assets. In addition, where the line from the risk free rate crosses the efficient frontier, the optimal asset allocation can be revealed. These statistical equations are extensive and are illustrated in Figure 3.



Efficient Frontier Diagram
Source: Authors
Figure 3

Figure 3 illustrates the Markowitz (1959) efficient frontier model. As this research covers residential property markets which are illiquid and indivisible (although residential property markets are generally considered more liquid and divisible in principle than other property markets), the physical allocation may be difficult to implement across the five Chinese residential property markets. Therefore, the analysis also includes an allocation limited to two residential property markets, that of the investor's prime residential location and best residential property investment location. This information would be beneficial for the HNW investor with an average property allocation of RMB 4.1 million.

EMPIRICAL FINDINGS

The first step is to examine the income and capital performance of the selected residential property markets. Table 4 details the residential property markets quarterly risk and return results for income and capital growth.

Income Returns	Mean (Return)	Median	Risk	Min Value	Max Value	Range
Beijing	4.42%	4.18%	1.64%	2.19%	7.36%	5.17%
Shanghai	3.08%	3.21%	0.72%	1.84%	4.06%	2.22%
Guangzhou	5.24%	4.64%	2.27%	2.63%	10.60%	7.97%
Tianjin	1.76%	1.69%	0.70%	0.94%	3.40%	2.45%
Chengdu	3.95%	3.93%	0.55%	2.96%	5.42%	2.45%

Capital Growth	Mean (Return)	Median	Risk	Min Value	Max Value	Range
Beijing	4.62%	5.59%	6.02%	-12.13%	14.46%	26.59%
Shanghai	1.88%	1.87%	11.97%	-19.71%	31.18%	50.89%
Guangzhou	5.97%	4.91%	12.68%	-22.34%	39.11%	61.44%
Tianjin	6.30%	6.79%	9.32%	-16.52%	23.40%	39.92%
Chengdu	4.58%	3.37%	9.55%	-14.83%	36.34%	51.17%

Chinese Residential Property Markets: 2005-2011 Quarterly Income Returns and Capital Growth

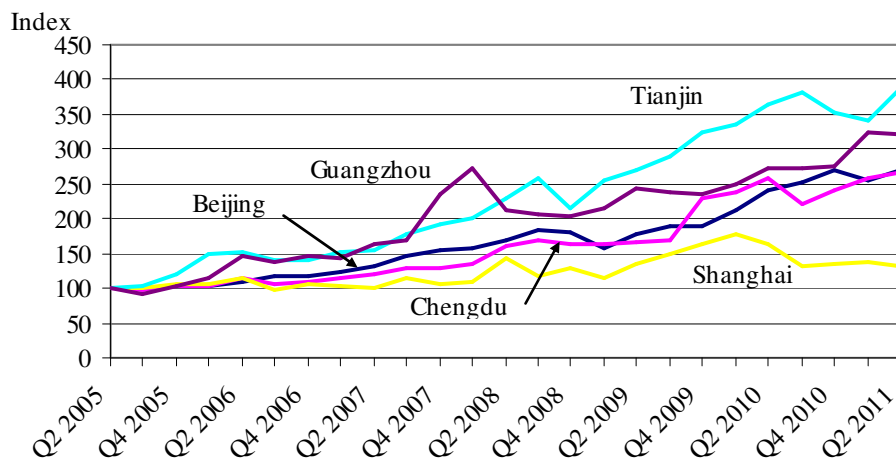
Source: Authors

Table 4

Table 4 details the performance of the Chinese residential property markets. The income returns appear relatively constant. Although, returns appear slightly higher at above 3.9%, in Beijing, Chengdu and Guangzhou, compared to below 3.1% in Shanghai and Tianjin. The Guangzhou residential property market appeared to experience the highest quarterly income return, at above 10%, although this was experienced in 2005, in a falling residential property market.

Compared to income returns, Table 4 highlights the variations in capital growth across the residential property markets. Most noticeable is the Shanghai residential property market with an average growth profile of below 2% compared to the alternative residential property markets which were all above 4% quarterly average growth. The broad range between the maximum and minimum returns appears to suggest that there was speculative buying in the residential property marketplace. However the timing of the maximum increases appears random. The downside maximums appeared to be confined to 2008 and late 2010. This may relate to the impact from the Government policies introduced to curb rising house prices.

Total returns are displayed in an index form in Figure 4.



Chinese Residential Property Markets: Total Returns 2005 - 2011

Source: Authors

Figure 4

Figure 4 illustrates the solid performance of the Chinese residential property markets, particularly Tianjin which provided a 285% return over the reported six year period. In part, the impressive returns could relate to the close proximity to Beijing, with the new one hour high speed rail link, and the ability of the city to attract multi national corporations, leading to strong growth in white collar workers. The repricing of residential property as new demand enters the market forms a key part of locational theory (Ling and Archer 2010).

Furthermore, the residential property market turning points in Figure 4 suggest that the markets operated separately and are influenced by local factors. This can be shown by examining the correlation matrix for the residential property markets in Table 5.

Table 5 illustrates correlation figures which are close to zero. This highlights the different performance profiles across the Chinese residential property markets. The only exception is Shanghai and Chengdu which have a relatively strong correlation of 0.52. This suggests some similarity in past performance.

	Beijing	Shanghai	Guangzhou	Tianjin	Chengdu
Beijing	1.00				
Shanghai	0.08	1.00			
Guangzhou	-0.07	-0.15	1.00		
Tianjin	0.01	0.01	0.02	1.00	
Chengdu	0.03	0.52	-0.06	0.25	1.00

Chinese Residential Property Markets 2005 - 2011
Correlation Matrix
Source: Authors
Table 5

In noting the different turning points across the Chinese residential property markets, Table 6 details the descriptive statistics for the residential property markets.

	Return	Rank	Risk	Rank	Risk Adjusted Returns	Rank
Beijing	4.40%	4	5.80%	1	0.64	2
Shanghai	1.78%	5	11.61%	4	0.15	5
Guangzhou	5.61%	2	12.00%	5	0.47	4
Tianjin	6.18%	1	9.14%	2	0.68	1
Chengdu	4.54%	3	9.20%	3	0.49	3

Chinese Residential Property Markets 2005 - 2011
Quarterly Total Returns
Source: Authors
Table 6

Table 6 illustrates the strong performance of the Tianjin residential property market and the similarities between the residential property total returns and capital growth (see Table 4). In part, this demonstrates the current speculative nature of the residential property markets where total returns are linked to capital growth. This compares to established residential property markets where residential property is traditionally viewed as a mature asset class with a long term investment horizon offering stable income with low capital growth.

Leading investment strategies are universally based on performance measures that accurately capture risk and return profiles. A common single measure of performance is the “*risk adjusted returns*”. This application of the Sharpe (1964) model is where the investment return minus the risk free rate (China short term interest rate) is divided by the investment risk. A high risk adjusted

return is preferred, as demonstrated by the Tianjin residential property market with 0.68 risk adjusted return.

The low correlation matrix readings in Table 5 indicate the diversification benefits that can be achieved by investing in several Chinese residential property markets. This can be shown by the Markowitz efficient frontier optimal allocation model covering the five Chinese residential property markets in Table 7.

		Allocation				
Performance		Beijing	Shanghai	Guangzhou	Tianjin	Chengdu
Return	4.67%	49.95%	8.23%	14.84%	16.53%	10.45%
Risk	4.10%					
Risk Adjusted Return	0.97					

**Chinese Residential Property Markets 2005 - 2011
Efficient Frontier Optimum Allocation
Source: Authors
Table 7**

Table 7 shows the Chinese residential property market optimal allocation has close to 50% exposure to the Beijing residential property market and an 8%-17% range for the remaining Chinese residential property markets. The quarterly returns remain relative strong at 4.67%, while the main benefactor is the substantially lower quarterly risk profile, dropping to 4.10%. This compares to the individual residential property market risk profiles of 5.80% to 12.00%. The low risk profile translates to a high 0.97 risk adjusted return.

Primary Location	Allocation	Property Investment Location	Allocation	Return	Risk	Risk Adjusted Return
Beijing	61.79%	Guangzhou	38.21%	4.86%	5.62%	0.74
Shanghai	51.44%	Guangzhou	48.56%	3.64%	7.69%	0.38
Guangzhou	51.57%	Chengdu	48.43%	5.05%	7.41%	0.59
Tianjin	56.95%	Chengdu	43.05%	5.46%	7.30%	0.65
Chengdu	55.25%	Guangzhou	44.75%	5.01%	7.13%	0.61

**Chinese Residential Property Markets, Quarterly Total Returns 2005 – 2011
HNW Investors - Property Investment Allocation
Source: Authors
Table 8**

In identifying the benefits of diversifying across the residential property markets, the illiquid and substantial cost of property restricts the allocation to one or two locations. This is evident by the HNW individual allocation to property of RMB 4.1 million. This would suggest that, on average, HNW individuals would have one investment property. The preferred location of the residential investment property, allocation weighting and the level of the combined return is shown in Table 8.

Table 8 illustrates the benefits of diversification by combining the investor's primary location with a residential property in an alternative location, based on the Markowitz efficient frontier model. The risk adjusted returns can further highlight the benefits of a diversified residential property portfolio. All residential property markets benefited from an additional property location with a 16% plus improvement in the risk adjusted return performance. The exception is Tianjin, where an additional property would lower the risk reading but also slightly lower the returns.

To specifically examine the diversification benefits on performance, a Shanghai property investor's second property located in Guangzhou would offer increased quarterly returns of 104% with a 33% lower risk profile. The Guangzhou property would represent approximately 49% of the residential property allocation including the investor's main residence. This is shown in Table 9.

Property Location	Return	Risk	Risk Adjusted Returns
Shanghai property (51%) and Guangzhou property (49%)	3.64%	7.69%	0.38
Shanghai properties (100%)	1.78%	11.61%	0.15
Difference (%)	104.07%	-33.77%	155.33%

Shanghai HNW Investor: Property Investment Allocation
Quarterly Total Returns 2005 – 2011
Source: Authors
Table 9

Table 9 illustrates the changes in Shanghai property investor's quarterly performance by diversifying the property portfolio to a second location: Guangzhou. By annualising the returns, the additional performance would equate to an additional return of 7.63% and a lower risk profile. In providing evidence of the benefits of diversification, it is important to undertake detailed property research to understand current Chinese residential property market conditions.

CONCLUSIONS

This research examines the performance and investment diversification benefits of five leading Chinese residential property markets; Beijing, Shanghai, Guangzhou, Tianjin and Chengdu. DTZ Property Consultants provided six years of reliable quarterly data for high-end residential properties which would attract HNW individuals for property investment purposes.

Compared to the relatively stable income returns, there were considerable variations in capital growth across the Chinese residential property markets. Most noticeable is the Shanghai residential property market, with an average growth profile of below 2%. This is compared to the alternative residential property markets which were all above 4% quarterly average growth. The broad range between the maximum and minimum returns appears to suggest that there was speculative buying

of residential property. Although the maximum increases appear random, the downside appeared to be confined to 2008 and late 2010. This coincides with the introduction of Chinese Government policies to curb rising house prices.

In identifying different performance profiles across the Chinese residential property markets, the risk profile can be lowered considerably with a diversified portfolio of residential properties. Anchored by a Beijing residential property, the optimum allocation provided a risk adjusted return improvement of 40% when compared to a single residential property market investment strategy. Similarly, the benefits of diversification, by combining an investor's primary location with a residential property in an alternative location, leads to a 16% plus improvement in the risk adjusted returns. The exception is Tianjin, where an additional property would slightly lower the risk reading but also lower the returns.

This research demonstrates the benefits of analysing the performance of Chinese residential property markets, as they appear to operate independently and are influenced by local factors. By diversification into just two residential property markets, the investment risk adjusted returns can be substantially superior to a single property market allocation approach. This style of investment analysis can provide valuable additional information for an astute Chinese investor.

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