Investigating The Characteristics of Problematic Residential Properties at Public Auction Sales Using Multiple Regression Analysis (MRA)

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ABSTRACT

In line with the increase non-performing loan for the purchased of residential properties, an increasing number of residential properties go on auction in the market. The properties which are held as collaterals, are being auctioned off by financial institutions to recover the loans given to the purchasers. Typically, prices of properties offered for auction by financial institutions will be reduced by 10% after unsuccessful auction. However, many properties remained unsold despite being auctioned at a substantial discount from their market value.

Unsuccessful auction sales of properties even after substantial price reductions are attributed to poor demand for the properties. The question is why. Poor location, poor neighbourhood condition and poor building condition have been cited as possible explanations. Nonetheless, the actual causes have remained poorly understood. For the purpose of this study, properties that remained unsold after a number of auctions are known as problematic properties.

This study aims to improve the understanding on this issue. Based on the literature review and focus group meeting with the stakeholders and experts, the characteristics of problematic properties had been identified and thereafter adopted as variables for these studies. Data on problematic properties within the study area from September 2005 and December 2007 have been collected and analysed. The characteristics of these problematic properties have been identified through site inspections and title searches. These data were then used to create the Multiple Regression Model (MRA) and Geographical Information System (GIS) Analysis.

The analyses done in this study have proven that the phenomenon of the problematic residential properties at auction can be statistically modeled and estimated. In line with the scope of works of this research projects, four regression models have been generated and are deemed to be the most appropriate and fit to explain and estimate the problematic residential properties in auction sale.

Keywords: problematic residential properties, public auction, multiple regression analysis

1.0 BACKGROUND OF THE RESEARCH

In line with the increased non-performing loans for the purchase of residential properties, an increasing number of residential properties go on auction in the market. The properties, which are held as collateral, are being auctioned off by financial institutions to recover the loans given to the purchasers / borrowers. Typically, prices of properties offered for auction by financial institutions will be reduced by about 10% after each unsuccessful auction sale. Although financial institutions have successfully disposed some of the properties via public auction, the number of sales that are not successful is still significant.

According to one source, the auction reserve price of a flatted property has dropped to as low as RM9,000, a reduction of up to 40% from the initial reserve price (The Star on 6th September 2006). Unsuccessful auction sales of properties even after substantial price reductions are attributed to poor demand for the properties. The question is why. Poor location, poor neighbourhood condition and poor building condition have been cited as possible explanations. Nonetheless, the actual causes have remained poorly understood. For the purpose of this study, properties that remained unsold after a number of auctions are known as problematic properties.

In view of the increasing magnitude of the problem, it is imperative that a study be undertaken to improve understanding of the issues. This research is therefore proposed with that aim in mind. The Multiple Regression Analysis (MRA) will be employed to analyse the characteristics of unsold auction properties in the market. By using MRA, large samples of data can be analysed objectively to identify the prominent characteristics of the unsold auction properties.

2.0 OBJECTIVES OF THE RESEARCH

The objectives of this research are as follows:

1. To analyse the characteristics of problematic residential properties at public auctions

2. To generate an appropriate multiple regression model for predicting properties that will be problematic at auctions

3. To determine the spatial / locational behaviours of problematic auction properties

3.0 SCOPE OF RESEARCH

The following describes the scopes within which this research is undertaken:

1. The geographical coverage of this research is confined to residential properties located within Kuala Lumpur and Selangor

2. A property is considered problematic auction property only if it has remained unsold after appearances of more than three (3) times at public auction

3. The data used for the purpose of analysis in this research comprises properties that have been put up for auction in the market from September 2005 to December 2007

4.0 RESEARCH APPROACH

As the first approach, the research team review on the literature phenomenon of problematic residential properties at public auction sales.

After that a Focus Group Meeting (FGM) was held to obtain feedbacks from related parties that frequently handle the properties put up for auctions in order to understand and address various issues related to this research project, which are as follows:

- Understanding the problematic residential properties
- Understanding the characteristics of problematic residential properties
- Understanding the research methodology
- Understanding the current credit policy and marketing process to dispose auction properties
- Understanding how this research project will benefit the organizations

The next step was questionnaire exercise. The aim of the questionnaire exercise is to enhance the understanding of the research topic from the perspectives of the relevant parties involved i.e. the financial institutions representatives, auctioneers, real estate agents, bidders or potential bidders, public members and occupiers of the problematic properties. The questionnaire is crucial to ensure all aspects of the research topic are investigated before proceeding to the next phase of the research methodology, which is site inspection of the problematic auction properties. Full understanding of the research topic will ensure all the issues associated with the problematic auction properties are investigated during the site inspections.

The following section analyses the data that is used for the purpose of this study i.e. data to create the Multiple Regression Model (MRA) and Geographical Information System (GIS) Analysis. Overall, there are 23,562 auction data used for the purpose of this analysis. The data was extracted from the advertisements in major newspapers in

the country from September 2005 to December 2007, particularly The Star and New Straits Times. All the information is kept in a specially created Access Database Program. Site inspections and title searches on some of the properties were done in order to identify their characteristics as well as their GPS location.

The use of GIS had enabled the analysis of locational patterns on auctioned housing properties. The next stage is developing MRA models to predict the phenomenon of problematic residential properties at public auction sales. Separate MRA models are developed for the landed and non-landed residential properties since they have different attributes.

5.0 OVERVIEW OF RESIDENTIAL PROPERTY MARKET IN KUALA LUMPUR AND SELANGOR

Kuala Lumpur and Selangor, being the most developed states in the country, attract the highest number of real estate activities in the country. In 2007 and 2008, the residential property transactions within the two (2) states including Putrajaya commanded 38.4% of the total residential property transactions (Property Market Reports 2007 & 2008).

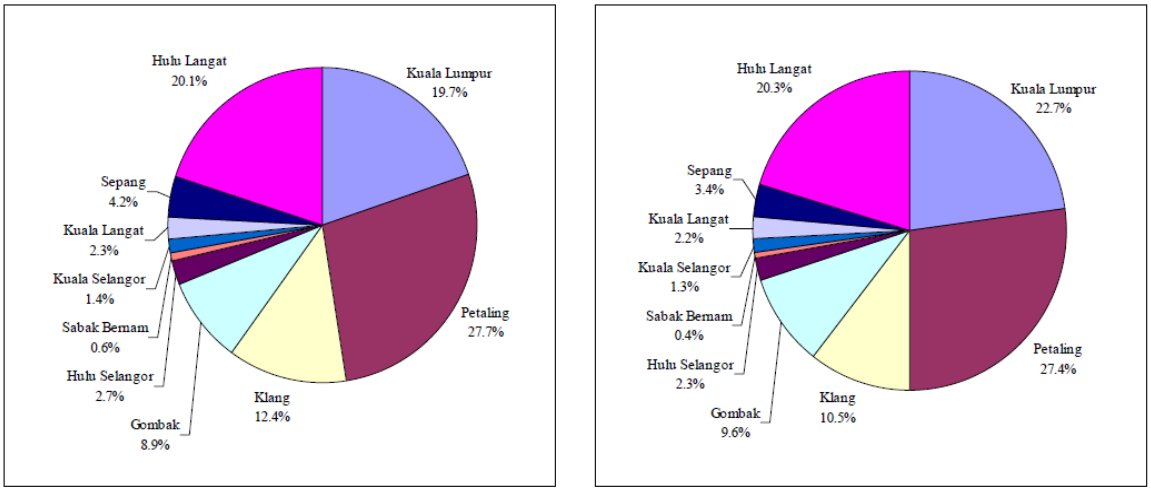
The residential property market development depends greatly on the country economic performance as well as policies implemented by the relevant authorities. Generally, during the strong economic growth period of 1988 to 1997, the property market had expanded vigorously. In the early 1990s, the property development activities were generally concentrated in developed areas, such as Petaling, Klang and Hulu Langat Districts as well as Kuala Lumpur.

The strong economic growths during 1994 to 1995 coupled with the mega infrastructure projects proposed, such as Putrajaya and Kuala Lumpur International Airport (KLIA) and Proton City, to name a few, have encouraged the developments within Sepang, Hulu Selangor and Gombak Districts. The North South Expressway (NSE) has also shortened the traveling time to these districts from Kuala Lumpur city centre (Source: Property Market Reports 1994 to 1995).

Residential property transactions depend greatly on the population in the areas. Generally, locations with high population, such as Kuala Lumpur, Petaling District, Hulu Langat District, Klang District and Gombak District. All these districts have population higher than 600,000 persons.

The following chart shows the breakdown of residential property transactions in Kuala Lumpur and Selangor according to districts in 2007.

BREAKDOWN OF RESIDENTIAL PROPERTY TRANSACTIONS IN KUALA LUMPUR AND SELANGOR BY DISTRICTS IN 2007 AND 2008



Source: Property Market Reports 2007 and 2008

Based on the above, Petaling District recorded the highest number of residential property transactions, followed by Hulu Langat, Kuala Lumpur, Klang and Gombak. Petaling District, Hulu Langat District and Kuala Lumpur have the highest number of transactions, each with more than 20% of the overall residential property transactions.

Other districts with low population bases, such as Sepang, Hulu Selangor, Kuala Langat, Kuala Selangor and Sabak Bernam recorded less than 5% of the overall residential property transactions in the two states in 2007 and 2008.

6.0 HOUSING LOANS AND NON PERFORMING LOANS (NPL)

Before a property is being put up for public auction sales, the bank needs to classify the banking loan account, which the property is held as collateral, as Non Performing Loans (NPL). Hence, the higher the NPL indicates the higher the number of properties put up for auction sales.

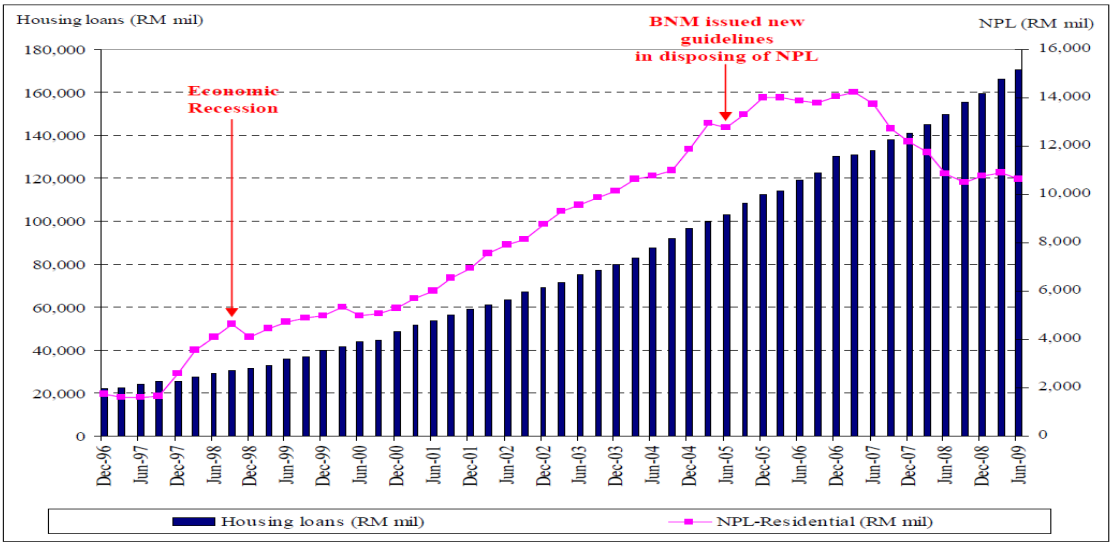
According to Bank Negara Malaysia (BNM), NPL refers to the outstanding amount of loans (principal and interest) classified as non-performing when principal or interest is six months or more in arrears. Interests on these loans are subsequently suspended. With effect from financial year beginning 1st January 1998, loans are classified as non performing when they are six (6) months or more in arrears (Monthly Statistical Bulletin, Bank Negara Malaysia).

During the economic recession or slowdown, NPL of the banking system is expected to increase as a result of reduced spending power or loss of income due to company

closure or retrenchments, which are very common during the economic downturn. During the regional currency crisis, NPL for purchase of residential properties increased by 54.3% in December 1997 and 39.8% in March 1998.

The following graph shows the housing loan trend and the Non Performing Loans (NPL) involving the housing loans.

HOUSING LOANS AND NON PERFORMING LOAN (NPL) FOR PURCHASE OF RESIDENTIAL PROPERTIES (DEC-1996 TO DEC-2007)



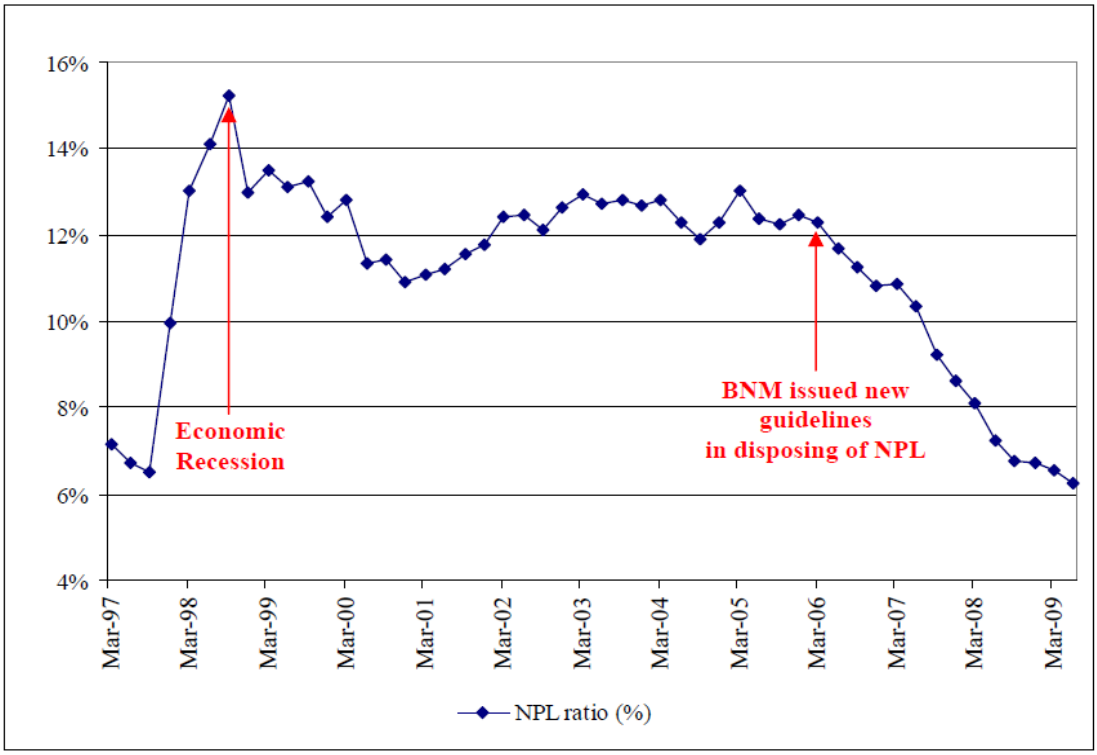
Source: Bank Negara Malaysia (BNM)

The NPL for purchase of residential properties increased in tandem with the housing loan growth in the banking system. From December 1996 to March 2008, the average annual growth rates for NPL and housing loans during this period of time are about 18% and 17.7%, respectively.

In December 2005, Bank Negara Malaysia (BNM) issued new guidelines to the financial institutions in disposing of Non Performing Loans (NPL), which had resulted many financial institutions starting to dispose of NPL to third parties. Amongst the financial institutions that have disposed of their NPL include Malayan Banking Berhad, Ambank Berhad and Standard Chartered Bank, to name a few. More financial institutions are expected to dispose of their NPL in the future. As a result, the NPL has reduced since 2007 (The Star on 28th July 2007, 2nd October 2007 and 9th January, 2008).

The following graph shows the NPL ratio for the purchase of residential properties from December 2006 to June 2009.

NPL RATIO – LOANS FOR PURCHASE OF RESIDENTIAL PROPERTIES (MARCH 1997 TO JUNE 2009)



Source: Banking Negara Malaysia (BNM)

At the height of the economic recession, the NPL ratio for housing loans stood at 15.23% as at September 1998. The ratios had been hovering around 10% to 13% prior to the announcement of the new guidelines in disposing of NPL by Bank Negara Malaysia (BNM). The NPL ratio had reduced to about 6.24% as in June 2009.

Generally, the reduction of the NPL ratio augurs well for the banking system as a whole, however, it should be noted that the reduction does not reflect the overall market improvement. It merely indicates that large proportions of the NPL have been withdrawn from the banking system. Purchasers of the NPL will continue to recover the loans from purchasers, which include auctioning the properties held as collateral.

7.0 IMPLICATIONS OF THE ECONOMY ON MALAYSIAN PROPERTY MARKET AND NON PERFORMING LOANS (NPL)

The country's economic performance has direct implications on the performance of the property market as well as the Non Performing Loans (NPL). Policies introduced by the government are also expected to affect the property market progression.

During the economic downturn, demand for residential properties will slowdown whilst the NPL is expected to increase, hence, contributing to higher number of properties being put up for auctions. Typically, the NPL ratio reduces when the country's economy recovers. Despite achieving economic growths of between 5.3% and 6.78% during 2002 to 2007, the NPL had been on the increasing trend. The increasing NPL, however, was supported by the increase in the housing loans.

The huge increase in housing loans was attributed to the government policies in encouraging loan growth to stimulate the economy since the consolidation of the banking system in 1999. The government through the Budget 2000 has required financial institutions to achieve 8% loan growth in order to qualify for tax incentives. Such measure by the government has encouraged financial institutions to aggressively promote loan growth, particularly in housing loans by offering various attractive mortgage loan packages (Source: Budget 2000).

When the economy was growing strongly during the 1988 to 1996 period and economic recovery in 1999 to 2000 (supported by government incentives to promote loan growth), many property development projects located further away from the traditional growth areas were introduced in the market, particularly in Hulu Selangor, Kuala Langat and Sepang districts.

These districts house a number of problematic residential properties, the prominent ones include Bukit Beruntung, Bukit Sentosa, Lembah Beringin and Putra Perdana, to name a few. Although most of these projects were well in demand during the economic growth, many properties in these districts have turned problematic when the market declined.

Generally, based on the above analysis, the country's economic performance as well as government's policy has direct impact on the Malaysian property market. Economic slowdown or recession will trigger an increase in the NPL for the housing loans, which will directly contribute to the increase in the number of problematic residential properties at public auction sales.

8.0 AUCTION PROCEDURES

Disposal of properties by financial institutions to recover the loan is subject to various legal requirements in the country. Under the National Land Code (NLC), financial institutions could apply for order for sale (OS) at High Court or Land Administrator, subject to where the land is held under.

Under Section 256 (1), National Land Code, financial institutions are required to apply to the High Court for order for sale if the land is held under:

- Registry title
- The form of qualified title corresponding to Registry title
- Subsidiary title

and to the whole of any divided share in, or any lease of any such land.

Under Section 260 (1), National Land Code, financial institutions are required to apply to Land Administrator for order for sale if the land is held under:

- Land Office title
- The form of qualified title corresponding to Land Office title
- Subsidiary title

and to the whole of any divided share in, or any lease of any such land.

For properties that do not fall under the High Court or Land Office, e.g. without individual titles, the properties will be auctioned by the financial institutions by way of Loan Agreement Cum Assignment (LACA). Based on LACA, the auction does not need to go through high court or land office.

Based on the above, there are three (3) key ways of auctioning a property by the financial institutions, which are via High Court, Land Office and public auction via LACA.

Auction/Foreclosure Procedure In High Court

Auction procedure in High Court involves a number of processes and parties. The key obstacles of the auction procedure in High Court include serving the Originating Summons, obtaining the Order for Sales, arranging Summons In Chamber, to name a few in some instances, the financial institutions may be compelled to submit an appeal at the Federal Court if the case is incessantly rejected by the High Court.

Auction / Foreclosure procedure in Land Office

Although the auction in Land Office is less complicated compared with the High Court, it involves close participation from the Land Office to proceed with the auction process. As an example, every auction needs to obtain consent from the Land Office through a formal enquiry. Hence, it could delay the auction process significantly, especially in fixing the date of enquiry to obtain Order for Sale and to fix the auction date.

After several unsuccessful auctions, e.g. three (3) to four (4) times and subject to the discretion of the Land Administrator, the auction needs to be transferred to the High Court. When the auction process is transferred to High Court, the financial institution will need to start by filing the Originating Summons (OS). Consequently, sales of the property via auction will be prolonged.

Based on the above, auction of a large proportion of problematic residential properties are expected to be transferred to the High Court as most of these problematic properties take more than 3 times to be sold via auction. This will inevitably make it more difficult to dispose of problematic auction properties as majority bidders interviewed indicated unwillingness to wait for the next auction.

Public auction procedure for Loan Agreement Cum Assignment (LACA)

In the absence of High Court and Land Office, public auction for LACA cases is largely controlled by the financial institutions, e.g. from the appointment of auctioneer to determining the date of auction. Although there may be delay in obtaining consent from the developer, the delay is insignificant compared to the long and bureaucratic procedures in Land Office and High Court.

9.0 CHARACTERISTICS OF PROBLEMATIC RESIDENTIAL PROPERTIES AT PUBLIC AUCTION SALES

Friedman E.J. (1978) defined residential property as property consisting of a vacant or improved parcel of land devoted to or available for use primarily as a place of abode. Generally, there are many factors that affect the values or marketability of a residential property, such as follows:

Location factors

- Zoning
- Restrictive or protective covenants
- Character of neighbourhood buildings
- Adverse influences
- Special hazards
- Neighbourhood planning and design
- Architectural attractiveness of neighbourhood buildings
- Social factors
- Schools, shopping centers, recreational areas, places of worship
- Transportation
- Utilities and services
- Special assessments
- Taxes
- Neighbourhood trends
- Vacancy percentages
- Owner occupancy percentages
- Rental occupancy percentages
- Physical features

Site factors

- Size and shape of lot
- Topography
- Landscaping
- Utilities and street improvements
- View
- Drainage conditions

Building factors

- Size and shape of building
- Architectural style
- Functional utility
- Type of construction
- Quality of construction
- Floor plan

Cost factors

- Construction costs of buildings
- Land costs
- Land improvement costs

Depreciation factors

- Physical deterioration
- Functional obsolescence
- Economic obsolescence

A problematic residential property at public auction possesses inadequacy in any of the above aspects, e.g. poor location and neighbourhood, not well maintained building condition, etc. The inadequacy associated to the problematic residential property has made it unattractive despite being put up for auctions for a number of times and at significant discount rates.

For the purpose of this research project, problematic residential properties at public auctions refer to residential property that has remained unsold after being put up for auction sales for more than three (3) times or at more than 19% discount from the Market Value.

Following are some key inadequacies identified that are constantly being associated with a problematic residential property at public auction sales.

1) Location

Distance away from Kuala Lumpur city centre and major towns

City centre

Kuala Lumpur city centre is regarded as the core economic centre of Kuala Lumpur and Selangor, which offer plentiful employment opportunities, commercial and residential activities and many others. Hence, properties that are located relatively far from the Kuala Lumpur city centre is deemed less attractive to the buyers.

Major towns

Although some properties are located far from the Kuala Lumpur city centre, it could still attract buyers if they are located near major towns, such as Klang, Kuala Selangor, Banting and Rawang, to name a few. This is especially for the buyers that work in major

towns. The acceptable distances of the residential property to the major towns could be nearer compared to the distance to the Kuala Lumpur city centre.

2) Accessibility

Distance away from highways or main roads (not accessible)

With no easy to access to the highways or main roads, it is relatively difficult for the property owners to travel to other towns or major development areas within Kuala Lumpur and Selangor.

Poor access roads, narrow and poor conditions

The neighbourhood service roads leading to the property are of poor conditions, such as improperly constructed roads (laterite or gravel roads), roads with loopholes, narrow and winding roads, etc.

Poor public transportation

The property is located far away from bus stop or not covered by the public bus services.

3) Building condition

Heavily vandalized / dilapidated condition

The building is not in livable condition.

Unwanted events had taken place in the property

Unwanted events such as murders, spiritually haunted and drug addicts hang out areas and many others had taken place in the property. Such negative news has been widely circulated in the market.

4) Neighbourhood

Crime prone neighbourhood

The property is located within or near well publicized crime prone neighbourhood. Frequent occurrences of crimes will scare away potential buyers.

Exposure to natural calamity

Generally, potential buyers would not buy properties that are located near natural calamities such as floods, landslides, etc.

Poorly managed / planned developments

The property is located within a neighbourhood that is not properly managed, such as poor public amenities, poorly maintained and hazardous play ground, poorly maintained neighbourhood roads, dirty neighbourhood and many others that could disgust the potential buyers. This also includes residential properties that are surrounded by non residential friendly developments, such as industrial developments, quarry, etc.

The neighbourhood is occupied by primarily immigrants
The neighbourhood is exposed to large number of low-income immigrants. This is especially crucial if the immigrants enter the country illegally.

5) Legal issues associated with the property
Bumiputra reserved units
Auction bidders for the property are confined to bumiputra purchasers only. Such limitation will reduce the marketability of the property.

Malay Reserve Land (MRL)
Auction bidders for the property are confined to Malay purchasers only. Such limitation will reduce the marketability of the property.

Private title charged with caveats
Auction bidders of property that is charged with caveats may face difficulties in securing loans from financial institutions. It would also take reasonable times and efforts to remove the caveats.

10.0 MULTIPLE REGRESSION ANALYSIS (MRA)

In real estate studies, the relevance of MRA derives from the fact that the value of a property itself is an embodiment of the many influences the property attracts, both internally and externally. Husin (1990) provides an in-depth treatment of the methodological issues of this approach. As a statistical technique, Multiple Regression Analysis (MRA) can be used to analyse the relationship between a single dependent (criterion) variable and several independent (predictor) variables. MRA is an extension of the single regression methodology to more than one independent variable. With more independent variables, we could better explain the variation in the dependent variable and provide more accurate predictions.

The Multiple Regression Analysis (MRA) will be employed to analyse the characteristics of unsold auction properties in the market. By using MRA, large samples of data can be analysed to identify the prominent characteristics of the unsold auction properties. Besides that, MRA also can be used to generate an appropriate multiple regression model for predicting properties that will be unsold at the auctions and to determine the spatial behaviours of unsold auction properties.

MRA relies on a large quantity of data to produce a mathematical equation that can be used to predict property value (Wyatt, 1994). MRA is capable of undertaking mass appraisal quickly. Another virtue of this technique is its objectivity and impartiality, which makes it useful as an instrument in the assessment of value for tax purposes where the tax is based on property value. MRA is regarded as a statistically sound valuation technique provided that data is adequate (Gloudemans, 1991)

MRA is able to reconcile a large number of value factors and handle the selection of the factors statistically. This represents a more objective and consistent approach to factor

selection as opposed to judgmental selection performed by the human valuer. It is inevitable that no two valuers will choose an identical set of comparables or apply identical steps of action towards on an opinion on a property value; such a problem is not encountered with MRA though (Daud, 1999). Nonetheless, this does not mean that MRA is entirely free of criticisms. In particular, MRA is criticised for its inflexibility in dealing with the subjective elements in property value.

MRA is considered a classical and primary technique for explaining and predicting values whereby locational factors can be taken into account. In particular, MRA has been used to estimate residential properties values in the U.S since 1950s and in the U.K since 1980s (Adair and McGreal (1987)). It was also applied in other countries such as Australia, New Zealand and Singapore.

11.0 ANALYSIS AND FINDINGS

11.1 ANALYSIS OF THE QUESTIONNAIRE

The following section summarises the findings from the questionnaire exercise.

To enhance the understanding of the research issues (problematic residential properties put up for auction)

Most of the respondents interviewed concur that there are problematic auction properties in the market, e.g. being unsold for more than 3 times. This phenomenon could be attributed to various reasons, ranging from the change of market condition, lack of researches, inefficiency of the developers and poor conditions of the properties, to name a few.

About 58% of the respondents are of the opinion that the increasing problematic auction properties could be a threat to the country's banking system if no precautionary steps are taken now. Steps that could be undertaken include effective methods to identify the problematic auction properties and to ensure that no new projects that could be problematic auction properties being introduced in the market until the market recovers.

To understand general market perception and level of acceptance towards sales of properties via auction

Although the market awareness towards sales of properties via auction is relatively high, e.g. about 86% of the randomly selected public members are aware of property auction, participation from the public members is relatively low. Based on the questionnaire analysis, only 3% of the respondents have attempted to buy properties via auction and only 1.3% has successfully bought a property through auction.

Participation from the public has been low albeit 51% of the respondents expressed willingness to buy properties via auction. This could be attributed to the hassle (including financial cost) a bidder has to go through if he is to bid a property via auction, e.g. title searches, site inspections, obtaining details from auctioneers, etc. This could prove significantly more inconvenient compared to buying properties from developers or in the secondary market. More importantly, the risk of buying properties through auction is also higher.
There are also other weaknesses in the auction sales, which include no vacant possession, unforeseen bills, no internal viewing and many others. In some cases, successful bidders may be challenged by the borrowers, which could prolong sales of the property. As a result, about 49% of the respondents will not buy properties through auction.

Low pricing of the properties put up for auction is one of the main motivations for public member to bid at auction. Most would expect low price to compensate the risk they have to endure if they have successfully bid for the property. Some bidders may opt to wait for the price to drop further before they bid for the property. Majority of the public members are willing to wait for 1 to 3 months to purchase the property. Based on the survey and under normal circumstances, most bidders would expect between 30% to 40% discounts from the market value.

Majority of the bidders found out about the auctions via flyers sent to them, real estate agents and newspapers. Most of the bidders will only go to the auction place to bid after they have identified the property they want to bid.

To determine overall market acceptance of problematic auction properties

Overall, the market awareness towards problematic auction properties is relatively low. Out of the 190 public members and bidders interviewed, only 28% are aware there are properties put up for auction at substantially low price. Some respondents are unaware because they do not know the Market Value of the properties, which usually are not included in the advertisements.

Although the prices of problematic properties have declined substantially, 84% of the respondents are reluctant to buy as they do not want to take the risks associated with the properties. More importantly, most of these properties may not meet their requirements.

When ask about the expected discounts if the public members and bidders are to purchase the problematic auction properties, most of them expect discounts of higher than 50%. A number of the respondents expect discounts up to 80% or even higher. Many have justified that the discount is to compensate for the risks they will be taking if they buy the properties.

Based on the feedbacks from auctioneers and real estate agents, bidders of problematic auction properties comprise mixture of investors and occupiers.

To understand the effectiveness and market impression of auction processes

A property that has its own individual title will be auctioned at either high court or land office, depending on which jurisdiction the property falls under. On the other hand, properties that do not have individual titles will be auctioned by the auctioneers appointed by the banks, which is commonly known as Loan Agreement Cum Assignment (LACA) cases.

Most of the respondents interviewed have rated the auctions at high court and land office as average and poor, while auctions for LACA cases receive rating of between good to average. Some respondents have commented that auction at land office is slightly better than high court.

Auctions of LACA cases have received commendable grading largely due to the frequency of the auctions and less bureaucracy compared to high court and land office. Auction of LACA cases are controlled by the financial institutions, from the appointment of the auctioneers to fixing the auction dates. Auctions at land office and high court will require lengthy documentation works and hearing schedule may be postponed for months.

We were made to understand that usually it will take about 3 months for high court or land office to conduct the next auction. Based on the questionnaire, most bidders or public members are willing to wait between 1 to 3 months. Hence, most interested bidders may opt to buy other properties instead of waiting for the next auction at high court or land offices, which in some cases could be delayed up to a year.

Overall, overage to poor rating is noted for auctions held at high court and land office while auctions for LACA cases are generally acceptable.

To identify the marketing strategies adopted by financial institutions, auctioneers and real estate agents to dispose the properties put up for auction

During auctions of properties, financial institutions work closely with auctioneers and real estate agents to ensure that there are bidders attending the auctions. While the auctions in high court and land office are beyond the control of the financial institutions, financial institutions have undertaken aggressive marketing strategies for auctions of LACA cases.

Amongst the strategies undertaken by financial institutions are appointing auctioneers that have good track records, panel real estate agents, conducting road shows & mega sales, promotions through web sites and many others. Presently, various gifts are also given to successful bidders during the mega auction sales. Some financial institutions also absorb all outstanding bills to entice bidders.

To identify the characteristics of problematic auction properties

Although the reserve price of some properties have reduced significantly, many have remained unsold due to the poor characteristics of these properties, which range from poor location, building condition, neighbourhood area, crime rates and many others. The feedbacks obtained from this exercise will be investigated further in the following phase of this research project.

To understand the adequacy of the current credit policy in handling problematic auction properties

Although most financial institutions have implemented measures to identify problematic auction properties, in general, these measures are insufficient to avoid financing these properties. 68% of the respondents from financial institutions (from credit and collection departments) are of the opinion that the existing measures are insufficient to avoid financing problematic auction properties.

Summary

Based on the above findings, sales of properties via auctions are more challenging compared to sales in the primary and secondary property markets. Although the prices of auction properties will reduce after every unsuccessful auction, various disadvantages of the auction process have turned many potential bidders away. This has contributed to a low participation rate in auctions among public members.

Based on the current auction process and market practices, it would be an uphill task to expedite the disposal of problematic auction properties. Hence, it would be more efficient to avoid financing these properties and stop introducing projects that could become problematic auction properties by identifying and estimating problematic auction properties.

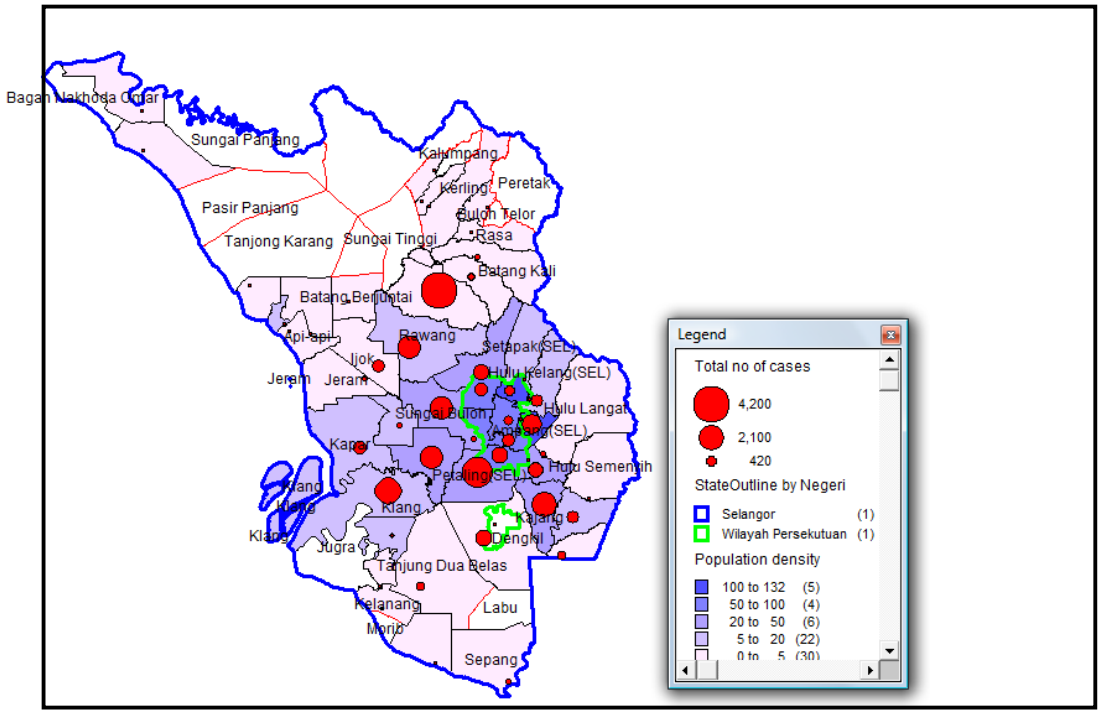
11.2 GEOGRAPICAL INFORMATION SYSTEM (GIS) ANALYSIS

A total of 23,562 cases were recorded of auction housing properties within the two states of Selangor and Federal Territories over the period of September 2005 – December 2007. Of this, landed properties account for 3,571 cases (or 15.2%) while highrise properties account for 19,991 (or 84.8%). Thus in these two states, highrise properties make up an overwhelming majority of auction properties such that there were 5.6 auctions on highrise properties for every such landed property.

In terms of the geography, auctioned properties come mainly from the more densely populated areas such as Petaling. An exception is Serendah. In fact, Serendah has generated the highest number of auction properties which, at 2,980 cases, contributes to 12.6% of the all auction cases recorded for the study region. Serendah's population density of only 4.43 per person per hectare (pph) is in sharp contrast to Petaling's

which, with a comparable number of auction cases recorded, has a much higher population density of 41.1 pph.

DISTRIBUTION OF ALL AUCTION CASES



STATISTICS ON AUCTION CASES

Mukim	Overall		Landed		Highrise	
	Total Cases	%	Total Cases	%	Total Cases	%
Serendah	2,980 (1)	12.6	377 (2)	10.6	2,603 (1)	13.0
Petaling(SEL)	2,643 (2)	11.2	461 (1)	12.9	2,182 (2)	10.9
Sungai Buloh	1,773 (3)	7.5	161 (7)	4.5	1,612 (3)	8.1
Klang	1,770 (4)	7.5	225 (5)	6.3	1,545 (4)	7.7
Kajang	1,631 (5)	6.9	100 (11)	2.8	1,531 (5)	7.7
Damansara	1,603 (6)	6.8	325 (4)	9.1	1,278 (6)	6.4
Rawang	1,468 (7)	6.2	340 (3)	9.5	1,128 (8)	5.6

Figures in parentheses are for the ranks

Problematic Properties

As defined earlier, a problematic property is one that has remained unsold after the third auction. This definition means that not every auction property actually ends up problematic since some would find buyers by the third auction or, more significantly, that they have not yet reached the threshold number to be considered problematic.

Table below reveals that problematic properties comprise 36.1% of overall auction cases. Going by the property segment, however, the percentage on problematic properties is slightly lower for landed properties at 33.4% as compared to the highrise segment at 36.6%. It is thus conceivable that a highrise property has, on average, a higher chance of becoming problematic compared to its landed 'counterpart'.

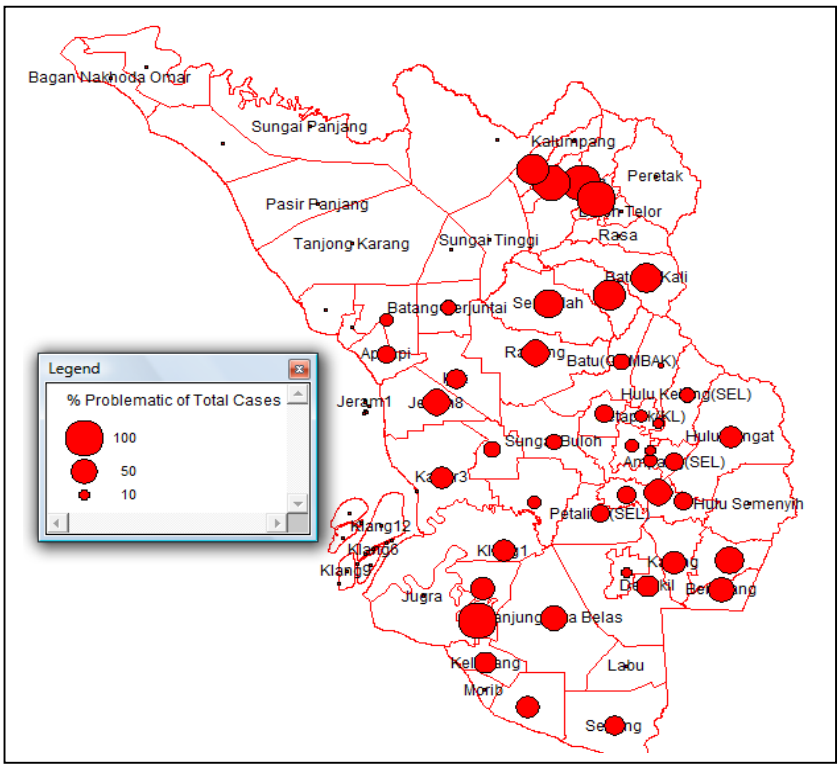
PERCENTAGES OF PROBLEMATIC RESIDENTIAL PROPERTIES

Type	% Problematic	% Non-problematic
All	36.1	63.9
Landed	33.4	66.6
Highrise	36.6	63.4

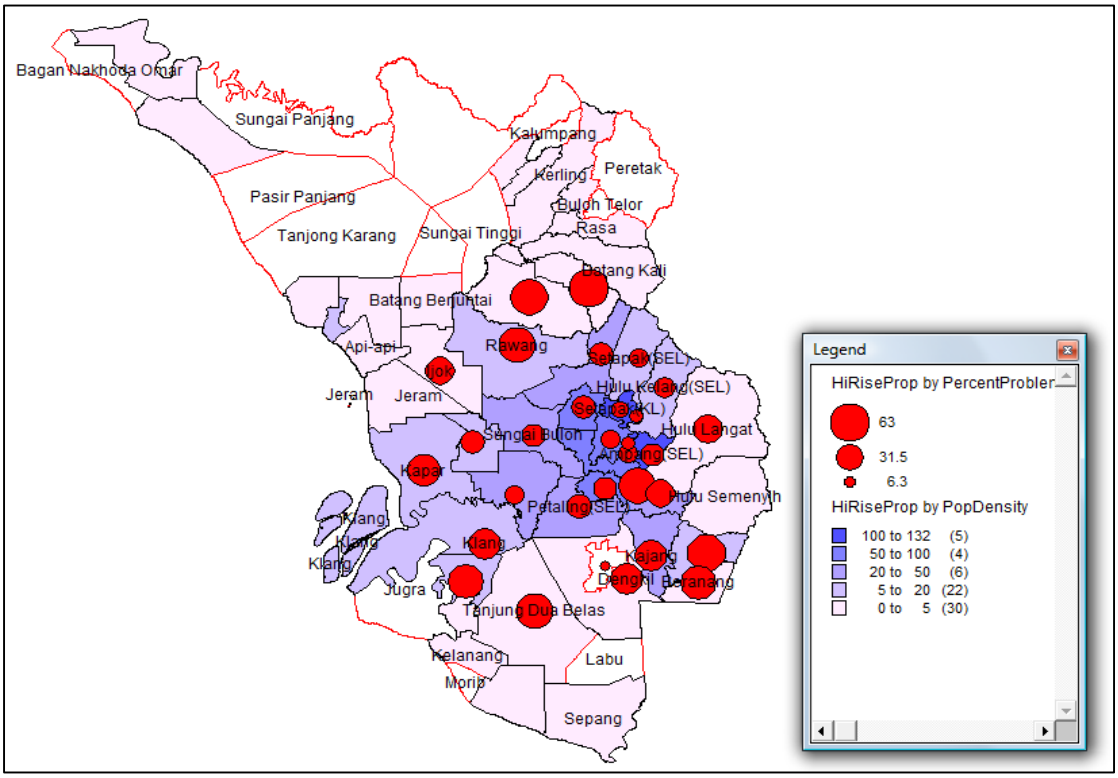
At 1,861 problematic cases, Serendah has by far the highest number of problematic properties; the next highest at only 806 was Rawang followed by Klang and Kajang at 770 and 717 respectively. In terms of the percentage problematic, however, at 62.4% Serendah is eclipsed by other mukims that have much lesser number of problematic cases. Figure below shows that the percentage of problematic auction properties is generally larger in outer areas. If this is any indication, it is reasonable to surmise that problematic properties tends to be more likely away from the city centre and less likely in the city centre.

The analysis on landed and highrise segments yield very similar results to the overall.

PROBLEMATIC PROPERTIES AS A PERCENTAGE OF LANDED CASES



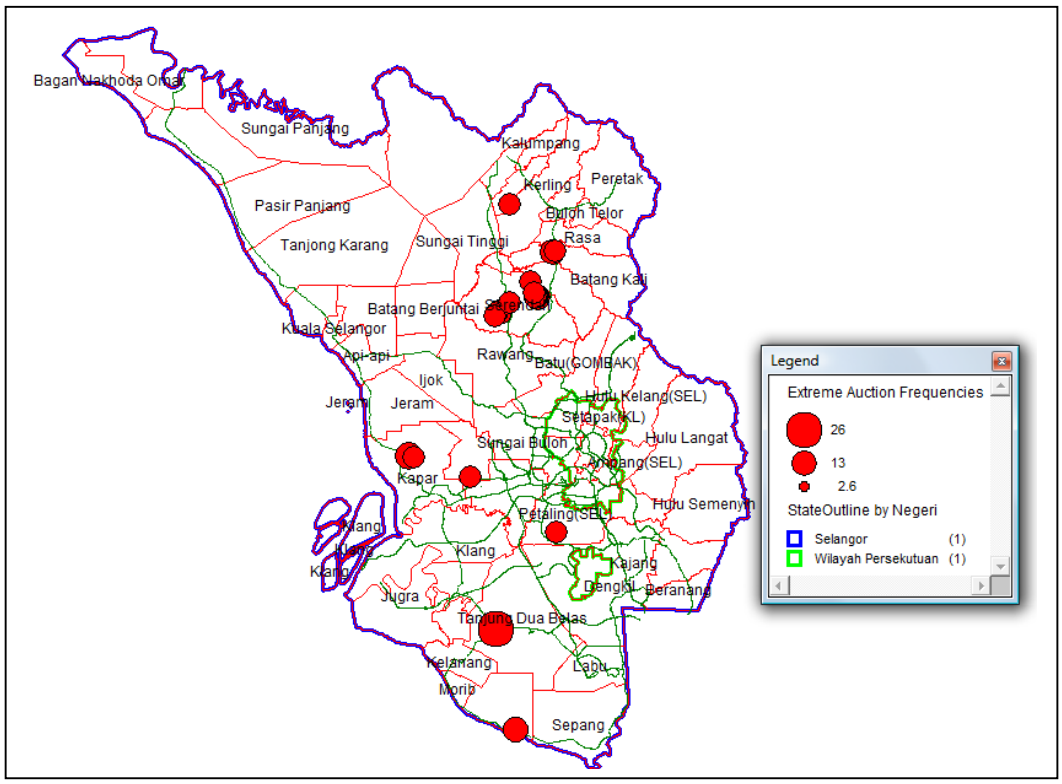
PROBLEMATIC PROPERTIES AS A PERCENTAGE OF HIGHRISE CASES



Extreme Problematic Properties
Extreme problematic properties refer to those that have remained unsold after the tenth auction.

Landed

LOCATION AND MAGNITUDE OF EXTREMELY PROBLEMATIC LANDED RESIDENTIAL PROPERTIES



At the most extreme is a terraced property in Kapar that has remained unsold after 16 auctions. The existence of no less than 30 problematic properties within 9 km from this property portends locational failure as a possible reason. The properties are predominantly terraced and lie within the various housing estates, with original market values pegged at RM64,000 – RM145,000. Of interest is that the ownership to a vast majority of problematic properties in this area appears to be race-biased. On this score, we foresee the potential of a separate inquiry to examine the possible linkage between race of owners and problematic housing properties in this area. A similar situation rules in the case of Batu (LANGAT) although for reasons that are not obvious from the database.

In Serendah, the number of extremely problematic properties is very high. In fact, more than half (12 out of 19) of the extreme properties come from this mukim alone.

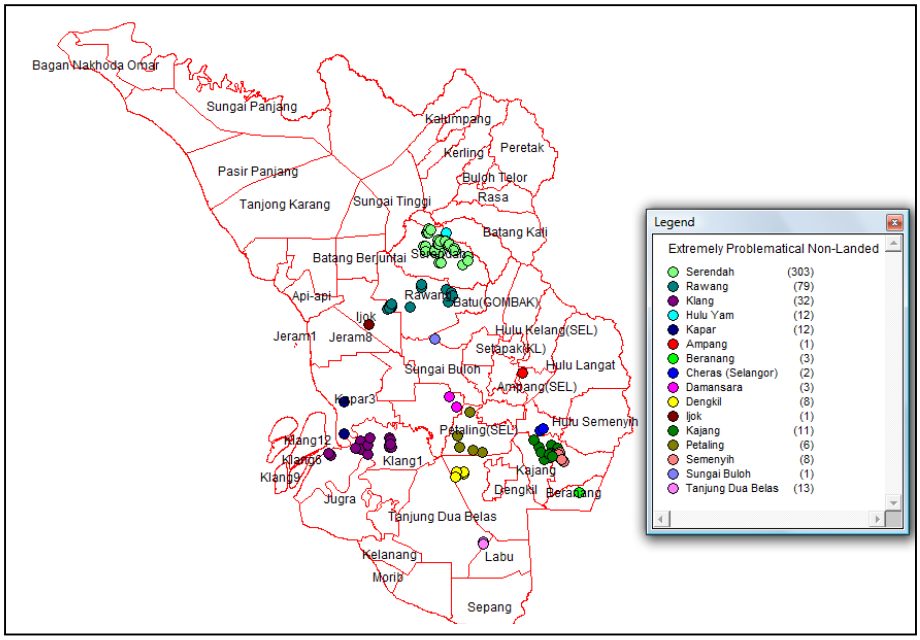
Serendah is a case of an exercise in public investment that has unfortunately failed to materialise according to plan. It is not unreasonable to associate the proliferation of problematic properties in this area with the prevailing general depression of the local economy.

The above analysis shows that it is possible to identify areas that have turned into red areas's viewed from the number of problematic auction properties that they have spawned. Where that is the case, it is conceivable that the underlying reason has more to do with the circumstances peculiar to those locations. In other cases, the reason would be less clear and could arise from causes peculiar to the particular properties involved.

Highrise

The most visible clusters of extreme properties are in Mukim Serendah, Rawang and Klang as evident from the figure below:

DISTRIBUTION OF EXTREME PROPERTIES IN HIGHRISE CATEGORY



Serendah tribute to 61% of these extreme properties while Rawang and Klang take 16% and 6% respectively.

11.3 MULTIPLE REGRESSION ANALYSIS (MRA) MODEL

This section aims to develop MRA models to predict the phenomenon of problematic residential properties at public auction sales. Two (2) separate MRA models have been developed for the landed and non-landed residential properties.

Following table shows the creation of the MRA models for landed and non-landed residential properties.

CREATION OF THE MRA MODELS

Items	Landed Residential Property	Non Landed Residential Property
Data	3,571 properties	1,319 projects
Validation data	339 (9.5%)	134 (10%)
Data for modeling	3,232 (90.5%)	1,185 (90%)
Dependent variable	Value 1 for problematic property Value 0 for non problematic property	Value 1 for problematic property Value 0 for non problematic property
Independent variables	<u>Location</u> Straight line distance from Kuala Lumpur city center (KLSL) Traveling distance from Kuala Lumpur city center (KLTD) Average between KLSL and KLTD (KLAV) Straight line distance from the nearest commercial center (TWSL) Traveling distance from the nearest main commercial center (TWTD) Average between TWSL and TWTD (TWAV) <u>Population density</u> The number of population per acre according to Mukim (POPD) <u>Neighbourhood areas</u> Neighbourhood conditions (NECO) Occupancy rates (OCCR)	<u>Location</u> Straight line distance from Kuala Lumpur city center (KLSL) Traveling distance from Kuala Lumpur city center (KLTD) Average between KLSL and KLTD (KLAV) Straight line distance from the nearest commercial center (TWSL) Traveling distance from the nearest main commercial center (TWTD) Average between TWSL and TWTD (TWAV) <u>Population density</u> The number of population per acre according to Mukim (POPD) <u>Neighbourhood areas</u> Neighbourhood conditions (NECO) Occupancy rates (OCCR) <u>Legal details</u> Tenure (TENU) Unexpired lease term (UNTE)

	Legal details Tenure (TENU) Unexpired lease term (UNTE) Consent from the relevant authorities (CONS) Restrictions – bumiputra units, Malay reserved units or units registered with caveats (REST) Building attributes Building condition (BCON) Influences from surrounding auctions Number of properties put up for auction in the same project (AUCT)	Building attributes Building condition (BCON) With lift(s) or not (LIFT) No of storey (STRY) Common facilities (FACI) Influences from surrounding auctions Number of properties put up for auction in the same project (AUCT) Level of auction exposure (AUEX)
Proposed models	Problematic residential properties (Y) = a + B1 (Location) + B2 (Population Density) + B3 (Neighbourhood areas) + B4 (Legal details) + B5 (Building attributes) + B6 (Auction influences)	Problematic residential properties (Y) = a + B1 (Location) + B2 (Population Density) + B3 (Neighbourhood areas) + B4 (Legal details) + B5 (Building attributes) + B6 (Auction influences)
Selection of the independent variables	Normality tests Pearson correlation analysis T-statistics The relationship between the dependent and independent variables must be in line with market trend Collinearity statistics - VIF Stepwise method	Normality tests Pearson correlation analysis T-statistics The relationship between the dependent and independent variables must be in line with market trend Collinearity statistics - VIF Stepwise method

The following shows the proposed MRA models for the landed and non-landed residential properties.

MRA MODEL – LANDED RESIDENTIAL PROPERTIES

Based on the findings from the earlier section, the following is the proposed MRA model for landed residential properties.

MULTIPLE REGRESSION ANALYSIS (MRA) - RESULTS

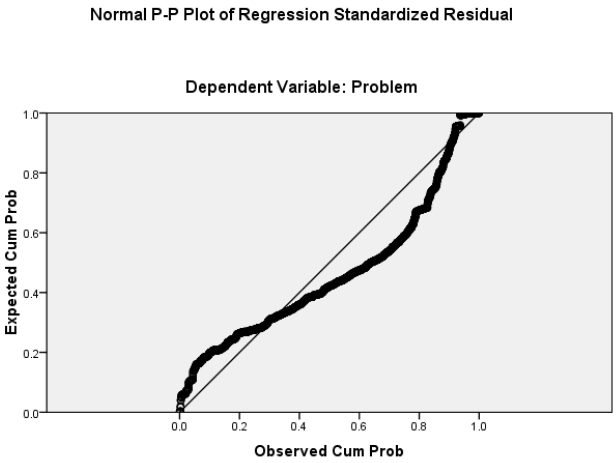
Model	Items	Const	KLSL	TWSL	POPD	NECO	UNTE	REST	BCON	AUCT
Model 1 R^2-72.6% AR^2-72.5% SEE-0.247 F-1,219.17	B	2.0778	0.0049	0.0068	-	-0.0502	-0.0015	0.0471	-0.6365	0.0018
	t-value	31.660	11.880	4.918	-	-5.323	-3.138	4.481	-55.910	26.713
	VIF	-	1.341	1.697	-	1.513	1.716	1.365	1.255	1.875
Model 2 R^2-72.6% AR^2-72.5% SEE-0.247 F-1,006.99	B	2.1013	0.0046	0.0065	-0.0008	-0.0502	-0.0015	0.0458	-0.6361	0.0018
	t-value	30.433	9.587	4.695	-1.093	-5.335	-3.283	4.334	-55.83	26.038
	VIF	-	1.836	1.737	1.909	1.513	1.774	1.382	1.257	1.943

Note:

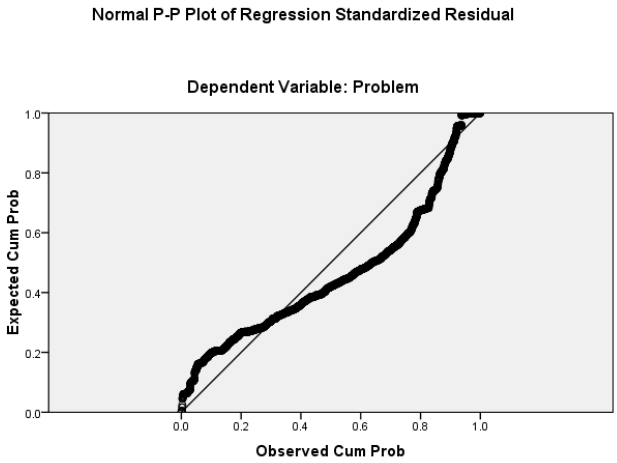
R^2 - R Square
AR^2 - Adjusted R Square
SEE - Standard Error of Estimate
F - F Statistics
KLSL - Straight line distance from Kuala Lumpur city center
TWSL - Straight line distance from the nearest town center or main commercial center
NECO - Neighbourhood conditions
UNTE - Unexpired lease term
REST - Restrictions – bumiputra units, Malay reserved units or units registered with caveats
BCON - Building condition
AUCT - Number of properties put up for auction in the same project
POPD - Population density

The following graphs show Normal P-P plots of Regression Standardized Residual for Models 1 and 2.

NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL FOR MODELS 1 AND 2



Model 1



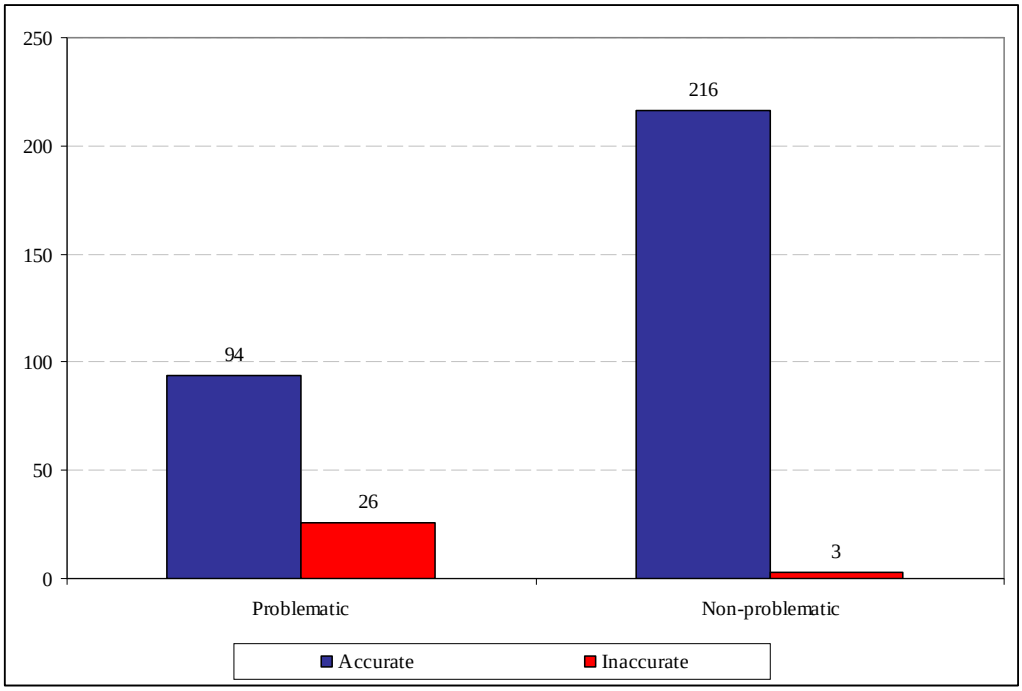
Model 2

Validation process

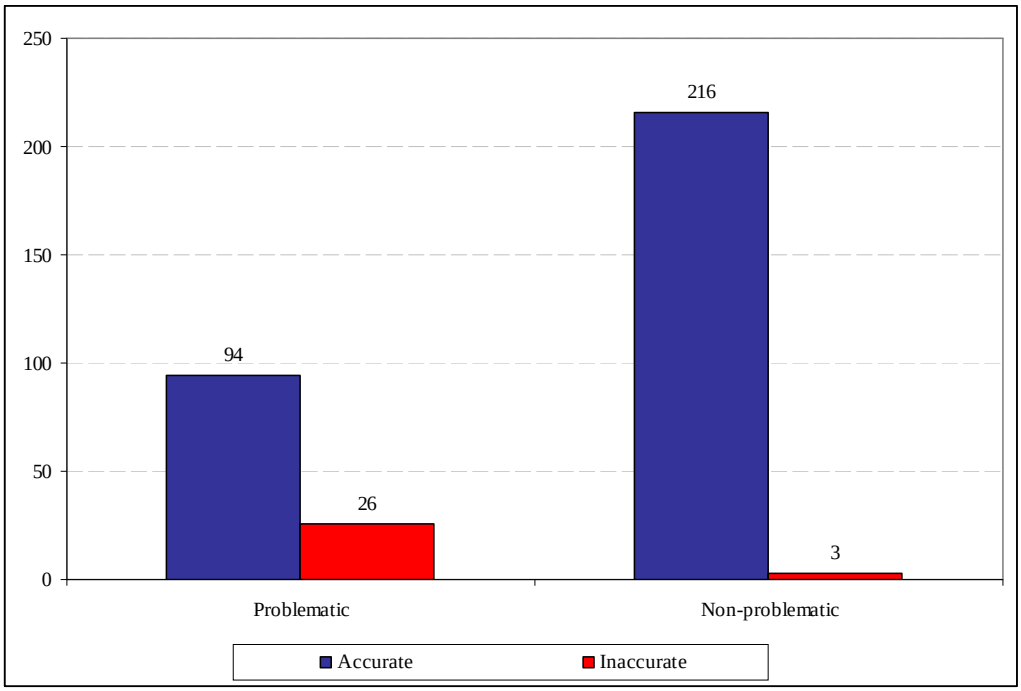
As highlighted earlier, 339 samples, which did not form part of the model generation process, will be used for validation purposes to test the accuracy level of the above proposed MRA Models 1 and 2.

The following graphs summarise the accuracy of the MRA Models 1 and 2.

MODEL 1 – VALIDATION RESULTS



MODEL 2 – VALIDATION RESULTS



The validation process, Models 1 and 2 have shown similar capabilities, both recording overall accuracy of 91.4%. Both models have also accurately estimated the same samples and failed to estimate the same samples.

Models 1 and 2 have recorded higher accuracy rate when estimating non-problematic landed residential properties as compared to non-problematic landed residential properties. The accuracy rate for non-problematic residential properties are estimated to be about 98.6% while the accuracy rate for problematic landed residential properties is estimated to be about 78.3%.

MRA MODEL – NON LANDED RESIDENTIAL PROPERTIES

Based on the findings from the earlier section, the following is the proposed MRA model for non-landed residential properties.

MULTIPLE REGRESSION ANALYSIS (MRA) - RESULTS

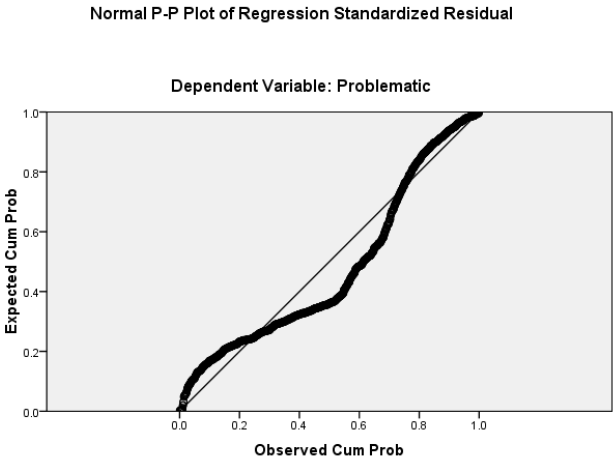
Model	Items	Const	KLSL	UNTE	POPD	NECO	OCCR	FACI	BCON	AUEX
Model 1 R^2-58.5% AR^2-58.4% SEE-0.316 F-322.824	B	1.1643	0.0137	-	-	-0.0862	-0.1321	-	-0.1425	0.2315
	t-value	11.178	11.482	-	-	-4.427	-6.771	-	-7.254	12.608
	VIF	-	1.3390	-	-	1.3005	2.2847	-	1.9592	1.5219
Model 2 R^2-58.7% AR^2-58.4% SEE-0.316 F-208.944	B	1.3209	0.0123	-0.0010	-0.0013	-0.0880	-0.1355	-0.0162	-0.1314	0.2290
	t-value	9.1584	8.0464	-0.941	-1.493	-4.510	-6.865	-1.365	-6.205	12.430
	VIF	-	2.2213	1.1387	1.7857	1.3080	2.3439	1.2981	2.2796	1.5344

Note:

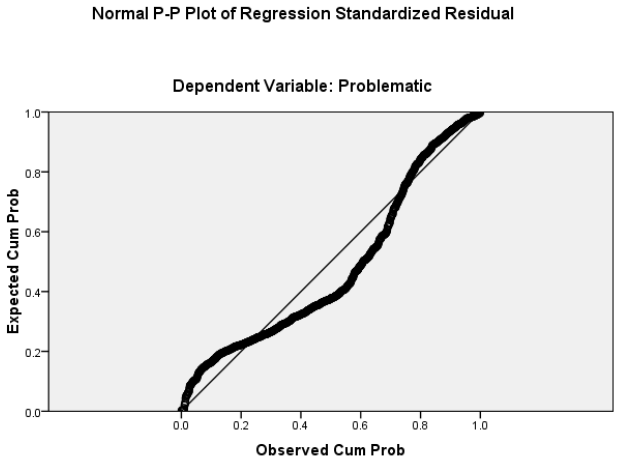
R^2 - R Square
AR^2 - Adjusted R Square
SEE - Standard Error of Estimate
F - F Statistics
KLSL - Straight line distance from Kuala Lumpur city center
UNTE - Unexpired lease term
POPD - Population density
NECO - Neighbourhood conditions
OCCR - Occupancy rates
FACI - Common facilities offered within the project
BCON - Building condition
AUEX - Level of auction exposure

The following graphs show Normal P-P plots of Regression Standardized Residual for Models 1 and 2.

NORMAL P-P PLOT OF REGRESSION STANDARDIZED RESIDUAL FOR MODELS 1 AND 2



Model 1



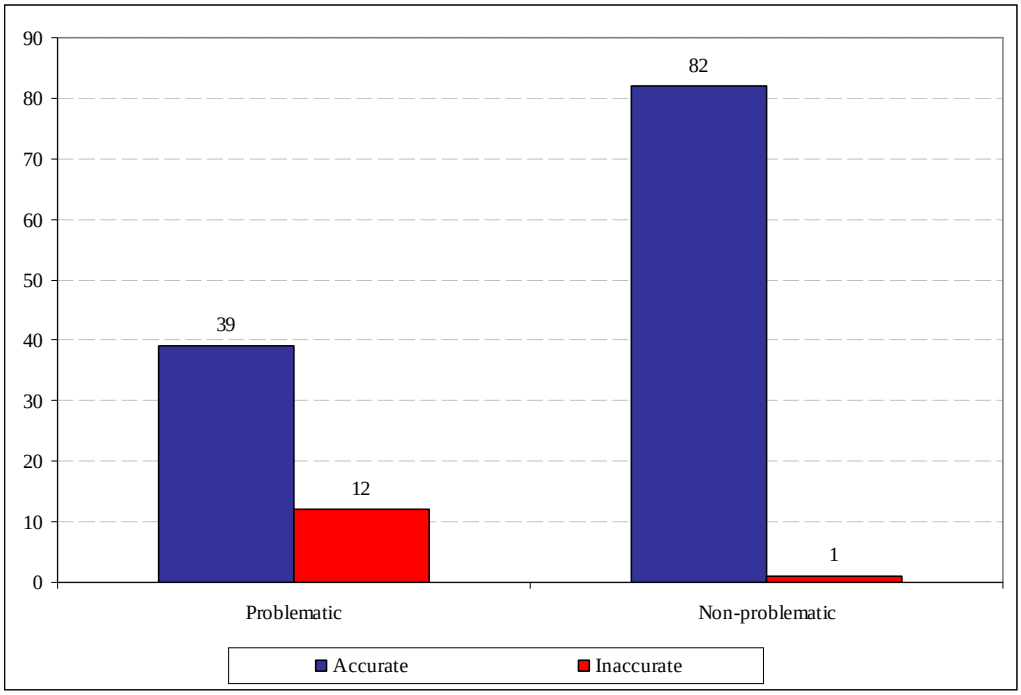
Model 2

Validation process

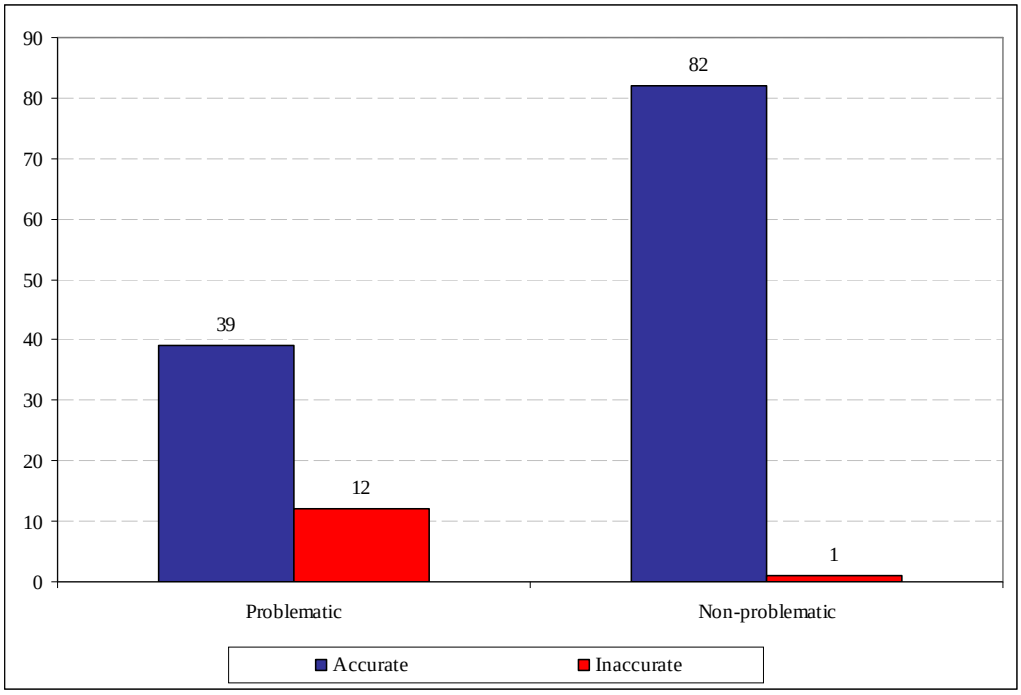
As highlighted earlier, 134 projects, which did not form part of the model generation process, will be used for validation purposes to test the accuracy level of the above proposed MRA Models 1 and 2.

The following graphs summarise the accuracy of the MRA Models 1 and 2.

MODEL 1 – VALIDATION RESULTS



MODEL 2 – VALIDATION RESULTS



The validation process, Models 1 and 2 have shown similar capabilities, both recording overall accuracy of 90.3%. Both models have also accurately estimated the same samples and failed to estimate the same samples.

Models 1 and 2 have recorded higher accuracy rate when estimating non-problematic landed residential properties as compared to non-problematic landed residential properties. The accuracy rate for non-problematic residential properties are estimated to be about 98.8% while the accuracy rate for problematic landed residential properties is estimated to be about 76.5%.

12.0 CONCLUSIONS

This research project has successfully identified the characteristics of problematic residential properties through literature reviews, focus group meetings, questionnaire surveys on various respondent groups, and analysis on the residential properties put up for auction from September 2005 to December 2007. Site inspections have also been conducted on selected residential properties put up for auction.

Selected characteristics of the residential properties put up for auction has been selected for the creation of the regression models to estimate the problematic auction properties. Four (4) multiple regression models have been created to estimate the problematic residential properties at public auction. These models have tested as the most appropriate models to estimate the phenomenon based on the performance criteria that have been set.

This research project has also relied on the Geographical Information System (GIS) to detect the spatial and locational behaviours of the problematic residential properties. By using the GIS, this research shows the distributions of the residential properties put up for auction, problematic residential properties put up for auction and the extreme problematic residential properties.

Based on the earlier findings, following section concludes the following findings from this research project.

Problematic residential properties at public auction

This research project has categorically validated the existence of problematic residential properties at public auction. A large proportion of the problematic residential properties comprise low-end properties, e.g. below RM200,000, hence, involving low to medium income group. Hence, more borrowers may fall below the poverty line if the issues of problematic residential properties worsen.

Our findings also revealed that owners or borrowers of problematic residential properties put up for auction are often agonized by the auction process, unable to obtain

loans for being blacklisted by all the financial institutions and many others. It creates financial and mental stresses to the affected owners.

Presently, the problematic residential properties do not cause major concern to the country's banking system as the fundamentals of the banking system remain sound. Nevertheless, if no precautionary measures are taken, more problematic residential properties may be introduced in the market, which could contribute to property redundancy and to a certain extent, expose the banking system to potential crisis.

In view of the above, it is imperative that adequate measures are introduced to curb this issue and more importantly to assist the affected borrowers or owners of problematic residential properties.

Characteristics of problematic residential properties at public auction

Overall, most of the problematic residential properties at public auction are unattractive residences, e.g. not in good condition, located far from main commercial areas or located within poorly managed neighbourhoods. Despite the low reserve prices (substantial discounts after several auctions), most bidders continued to shun problematic residential properties.

Auction processes

Overall, it can be concluded that the existing auction processes, particularly the High Court and Land Office, are inefficient and ineffective in auctioning the properties. Amongst the key weaknesses noted include the long auction process, bureaucracy, inconsistent processes, poor auction venues, etc. These weaknesses encourage the presence of syndicates during auctions, prolong the suffering of the borrowers and owners, incurring high-costs for the owners and borrowers and many others.

Our findings revealed that the existing auction processes are not user-friendly and have created more hardship to the borrowers or owners, especially for owners of problematic residential properties. Overall, the existing auction process needs to be improved, particularly when dealing with problematic residential properties at public auction.

Multiple Regression Analysis (MRA)

The MRA analyses in the earlier chapters have proven that the phenomenon of problematic residential properties at public auction can be statistically modelled and estimated. The proposed four (4) regression models are deemed the most adequate and best fitting models to estimate the problematic residential properties at auction based on the performance criteria set.

With these statistical models, the subjectivity in identifying the problematic residential properties at public auction can be reduced. Implementation of the relevant policies aimed at resolving the problematic auction property issues could be more focused and

effective. As an example, incentives could be channelled to properties that meet the criteria of problematic auction properties (based on the statistical models).

Risk managements

Although many financial institutions have undertaken various measures to mitigate the problematic residential properties at public auction, generally, these measures are deemed inadequate to avoid financing problematic residential properties. Overall, there is lack of adequate research papers to educate and create awareness among the financial institutions about this issue.

With the statistical models, the problematic residential properties at public auction can be estimated and could be used as yardstick in approving residential projects by the relevant authorities or by the financial institutions when approving the loans for residential properties.

13.0 RECOMMENDATIONS

It is imperative that various measures be implemented to mitigate and resolve the problematic residential properties at public auction. This research project has shown that many problematic residential properties in public auction have low chances of being disposed through auction and in open market.

Hence, any measures to resolve this issue needs to be pragmatic, taking into consideration the number of times the properties may need to go through to be disposed in auctions as well as the costs involved. Long auction processes may also affect the borrowers financially and mentally.

With the statistical models, problematic residential properties can be identified. This will ensure that the implementation of various measures could directly reach and benefit the affected parties.

Following are some of the recommendations proposed as an outcome of this research:

Financial assistances or incentives for owners of problematic residential properties at public auction

Specific financial assistances or loans guaranteed by the government or incentives could be allocated to the borrowers or owners of problematic residential at public auction. Many borrowers or owners of problematic residential properties are low to medium income group hence such assistances and incentives are crucial to ensure the well being of the affected parties and to assist them to pull through this difficult period.

Improving the building and neighbourhood condition of problematic residential properties

Our research has shown that poor building or neighbourhood conditions have contributed to the problematic residential properties at public auction. The government could improve the conditions of these properties by improving the building condition especially for the high-rise developments, neighbourhood condition and many others.

Improving infrastructures and commercial activities in the surrounding areas could also improve the demand for problematic residential properties. This includes providing affordable public transportation linking the problematic projects to main town or Kuala Lumpur city center or setting up large industrial complexes or free trade zones, university and many others.

The above measures will improve the attractiveness of the problematic residential properties.

Special auction process for problematic residential properties

This research project has shown that problematic residential properties face difficulty to be disposed off in public auction. In view of this, it is recommended that a special auction process be implemented for problematic residential properties. The auction approaches must be able to expedite the disposal process and reflect the actual salability of the problematic residential properties at public auction. Examples are as follows:

1. Dutch auction – to lower down the reserve price after every unsuccessful auction instead of calling off the auction process for the next auction at lower reserve price.

2. Start bidding from low reserve price (lower than the Market Value) and let the bidders bid upward instead of starting the auction at Market Value. Financial institutions have the right to reject the bidding if it does not achieve the minimum reserve price.

3. The government or the financial institutions could also subsidize or absorb the auction costs instead of burdening the borrowers. The financial institutions and the government could also come out with a mechanism to absorb or subsidize the outstanding loans owed by the borrowers.

Improving the auction process

The prevailing auction process needs to be improved to enhance the salability of properties through auction. Amongst the measures that could be adopted to improve the auction process are as follows:

1. Security at the auction venue needs to be improved to prevent the syndicates from sabotaging the auction process.

2. Auctions at high courts and land offices are encouraged to adopt E-Filing to expedite the auction process and to reduce bureaucracy.

3. High court to grant grace period for prospective bidders to enter and view the property. This will reduce the uncertainties associated with auction process.

4. A committee or body should be set up to resolve any issues related to auction, such as developer under receivership, outstanding payments such as maintenance fees and many others.

Improve public perception on buying properties through auction

Based on the findings of this research project, the overall participation rate of public members is low. Aggressive measures need to be undertaken to create market awareness and educate public members on the advantages of buying properties through auction. These measures include conducting free seminar on property auction. Improved market perception will improve the number of bidders at public auction.

Use of GIS

The use of GIS had enabled the analysis of locational patterns on auctioned housing properties which suggests the existence generally of an interdependence between the occurrence of auctioned housing and the population density of a mukim, with the notable exception of Serendah; in fact, Serendah stood out as an extreme reversal of the trend whereby an exceptionally high occurrence of auction cases was recorded for a mukim with a very low density of population.

GIS also made it possible to show that, against the backdrop of the preceding observation, the percentage of problematic auctioned properties is generally higher further away from Kuala Lumpur rather than nearer to suggest that auctioned properties have a greater likelihood to turn problematic in outer mukims. Taken together, it is reasonable to surmise that although housing properties closer to the City have a greater risk of ending up in auction, the risk of these properties turning problematic is smaller.

In looking at the extremely problematic auctioned properties, i.e. those that have remained unsold after the tenth auction, the visualisation with GIS had led to the detection of a concentration of such properties in certain areas. For example, in Kapar, the detection of more than 30 problematic properties within 9 kilometres from an extremely problematic auctioned terraced house (unsold after 16 auctions) points to locational failure as a possible cause. Coupled with the observation that a vast majority of these problematic properties are owned by a particular race, we foresee the value of undertaking of a separate inquiry to investigate possible linkages between race-related factors and problematic housing properties in this area.

Multiple Regression Analysis (MRA)

This research project adopted linear MRA model. Other statistical methods can be used to predict the problematic residential properties at public auction, namely non linear model or logistics regression model, to name a few. It is recommended that this forms the extension of this research project.

Similar studies aimed at creating similar MRA models at other locations outside Klang Valley are also recommended, particularly in Johor Bahru and Penang, Malaysia's main growth centers at the northern and southern parts of the country, respectively.

Continuous researches to monitor the problematic residential properties at public auction

More research papers related to problematic residential properties need to be carried out. This will ensure all the parties related to problematic residential properties are aware of the latest developments on the issues. Parties that will benefit from the research project are as follows:

- Financial institutions to be cautious when financing problematic residential properties.
- Local councils to stop approving problematic residential projects.
- Developers should stop developing problematic residential projects.
- Auctioneers to be able to identify problematic residential properties so that appropriate strategies could be adopted when auctioning problematic residential properties.

Overall, this research project has achieved all the three (3) objectives set out for this project, which are to analyse the characteristics of problematic residential properties at public auction, to generate an appropriate multiple regression model for predicting properties that will be unsold at auctions and to determine the spatial / locational behaviours of unsold auction properties.

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