At some stage in every household’s family life cycle, the household is likely to make certain decisions with regard to its housing environment. Although the household’s housing decisions essentially comprise the decision to move, and the selection of a new residence, the process from which these decisions are derived is very complex because varying circumstances could produce a multitude of different housing decisions. Due to the sheer complexity of the household’s housing decision-making process, researchers have generally focused on individual decision-making stages rather than on the process as a whole. This paper therefore attempts to conceptualize the entire household housing decision-making process using theoretical concepts from the economic perspective, and then tests the conceptual model with empirical evidence drawn from the moving population within the multi-racial society in Singapore.

I. Introduction

The acquisition of a home is often the household’s single largest investment in its family life cycle. How the household arrives at its housing decisions, why it makes certain decisions and behaves in particular ways, and what its decision-making and thought processes are like are all of tremendous complexity and importance. In this area of study, different disciplines tend to examine and interpret the household’s housing decision-making process in different ways according to their own field of expertise and emphasis. Economists generally focus on the process by which the household rationalizes its housing needs and constraints before finally arriving at its decision. On the other hand, sociologists tend to stress the reasons why the household behaves in a particular way, while geographers usually concentrate on the final outcomes of housing decisions, which are generated from the relationships between the structure and growth of the city, as well as the household’s housing decision-making process.

At different stages within a household’s family life cycle, the household is likely to encounter certain decisions with regard to its housing environment, such as satisfaction with its current home, decision to move, choice of a new residence, and the search process. Under varying circumstances, both on the demand-side and supply-side, the spectrum of housing decisions that could arise is very wide, thus emphasizing the sheer complexity of the household’s housing decision-making process. However, researchers have tended to focus on individual decision-making stages rather than on the household’s housing decision-making process as a whole. As such, the main objective of this paper is to encapsulate the various aspects
and stages of the housing decision-making process into a conceptual model based on economic concepts and theories derived from the established literature. The theoretical considerations of utility, satisfaction, demand-side and supply-side constraints, residential location, housing choice as well as the decision tree concept have been incorporated into the conceptual model. Through the application of a detailed decision tree that conceptualizes the different decisions likely to be experienced by a household with regard to its residential environment, this paper augments the existing literature on the household’s decision-making process.

Section 2 reviews the different concepts and studies relating to the household’s decision-making process with regard to its residential environment. Based on this literature review, Section 3 formulates a conceptual model to illustrate the various stages and decisions within the household’s housing decision-making process using the decision tree approach. In Section 4, the conceptual model is tested with empirical evidence drawn from the moving population within the multi-racial society in Singapore. Section 5 concludes.

2. Review of earlier studies

From the vast amount of housing economics literature available, many of which are summarized in the work by Smith, Rosen and Fallis (1998), it is observed that the principal types of housing decisions undertaken by a household tend to be decisions concerning household formation, the level of housing consumption as well as residential movement and location. In most microeconomic studies of the household’s housing decision-making process, the decision to form a household is usually assumed to have occurred. Thus, with this assumption as an underlying condition, microeconomic studies in general tend to focus on the level of housing consumption as well as residential movement and location.

Although microeconomic studies discussing the household’s housing consumption decisions have suggested concepts such as the comparative static model, the notion of consumption as well as the utility maximizing theory, the fundamental concept is Lancaster’s (1966/1991) theory of consumer behavior, which relates back to Marshall’s (1890/1949) seminal notion of consumption. Lancaster’s (1966/1991) consumer theory emphasizes the attributes of goods, and illustrates the relationships between consumers and goods, based on the following assumptions:

1. The good, per se, does not give utility to the consumer; it possesses characteristics, and these characteristics give rise to utility;
2. In general, a good will possess more than one characteristic, and many characteristics will be shared by more than one good; and
3. Goods in combination may possess characteristics different from those pertaining to the goods separately.

(Lancaster, 1991:13)

The above assumptions have been directly applied to housing whereby the heterogeneous housing environment is similarly regarded as comprising a bundle of characteristics, and it is from these housing characteristics that utility or demand is derived (for instance, Awan et al., 1982; Boehm and Ihlfeldt, 1986; Murie et al., 1998). Following the application of Lancaster’s (1966/1991) theory of consumer behavior as well as Rosen’s (1974) model of product
differentiation to housing, the microeconomic literature has further aggregated the housing characteristics into three main categories, namely the structure of the dwelling (Hoang and Wakely, 2000), neighborhood environment or quality (Lee et al., 1994), and location or accessibility (Balchin et al., 1995). The bundle of housing characteristics is therefore depicted as:

\[ H_i = H(D_i, N_i, L_i) \]

where 
- \( H_i \) = bundle of housing characteristics;
- \( D_i \) = dwelling attributes;
- \( N_i \) = neighbourhood quality; and
- \( L_i \) = location or accessibility.

To further illustrate the heterogeneity of housing as a commodity and that it is generally valued for its utility-bearing characteristics, the hedonic pricing model (for example, Freeman, 1979; Blomquist and Worley, 1981; Follain and Jimenez, 1985) is commonly employed in microeconomic literature to show the functional relationship between the market-clearing price of the housing unit and the characteristics that are contained within it. The seminal paper by Rosen (1974) and the work by Lancaster (1966) have considerable influence on the development of the hedonic pricing function, which is usually reflected as follows:

\[ P(H) = f(h_1, h_2, \ldots, h_k) \]

where 
- \( P(H) \) = market-clearing housing price;
- \( H = (h_1, h_2, \ldots, h_k) \) = vector of housing characteristics; and
- \( h_1, h_2, \ldots, h_k \) = individual housing characteristics.

In the case of consumption of housing, the consumer is the household whose housing decision-making process is likely to involve assessing the utility provided by individual housing characteristics as well as that supplied by other non-housing goods and services, where both housing and non-housing characteristics may either yield utility on their own or may be combined with other inputs such as household time to yield utility (Becker, 1965; Lancaster, 1966; Muth, 1966; Boehm and Ihlanfeldt, 1986; Murie et al., 1998). Reflecting these considerations, the household’s overall utility function could be expressed as follows:

\[ U = U(H_i, X) \]

where 
- \( U \) = overall utility derived by household;
- \( H_i \) = bundle of housing characteristics; and
- \( X \) = composite commodity, that is, all non-housing consumption and savings.

In view of the above overall utility function, economists have generally employed the utility maximization framework to analyze the outcomes of the household’s housing consumption decisions (for instance, Jones, 1981; Boehm and Ihlanfeldt, 1986; Potepan, 1989; Montgomery, 1992). According to the utility maximization model, the household is assumed to have a well-organized system of preferences as well as considerable knowledge and skill with which it could evaluate the set of alternatives and finally selects the alternative which yields the highest utility (Simon, 1978/82). In the process of maximizing utility, the household additionally determines its level of housing consumption in relation to other non-housing goods and services as well as in relation to constraints. In traditional microeconomic models
of utility maximization (Alonso, 1964; Muth, 1969), the single constraining factor is that of income which could simply be illustrated as follows:

\[ Y = P_H H + P_X X \]

where

- \( Y \) = real permanent income;
- \( P_H \) = price of housing services;
- \( P_X \) = price of \( X \);
- \( H \) = bundle of housing services;
- \( X \) = composite commodity, that is, all non-housing consumption and savings.

Over the years, the set of constraints within the utility maximization model has been modified to include a host of factors such as the household’s own resources, preferences and structure (Green, 1995; Jarvis, 1999), the operation of the housing market and availability of supply (Aufhauser et al., 1991; Özüekren and van Kempen, 1997; Giffinger, 1998), institutional policies and subsidies (Balchin, 1996) as well as financial and mortgage loan factors (Saltman, 1991; Harloe et al., 1992). This wide range of constraints could be divided into supply-side and demand-side constraints where demand-side constraints comprise the household’s own socio-economic attributes, resources, preferences and priorities, and supply-side constraints relate to policies on housing supply, access, allocation and pricing (Muth and Goodman, 1989). Although traditionally, supply-side constraints like national and local government policies are important in influencing housing decisions, with rapid globalization, certain exogenous factors such as economic growth, urban development and household migration are found to be more significant (Strassmann, 2000). As for demand-side constraints, van Weesep and van Kempen (1992) find that changes in household age and household composition, as well as how these changes expand or reduce the household size are more important than changes in income when determining the level of housing consumption.

In earlier utility maximization models of household consumption of housing (for example, Muth, 1969; Evans, 1973), the emphasis has been on the long term or fully adjusted equilibrium position of the household, that is, the household is deemed to make its housing decisions under conditions which have fully adjusted to the constraints within the environment (Jones, 1981). Potepan (1989), Montgomery (1992) as well as Littlewood and Munro (1997) however suggest that individual households do adjust and improve their housing situation from time to time, according to the set of constraints prevailing at those points in time, that is, they may adjust their level of housing consumption several times before ultimately achieving their housing goal. Such short term or interim housing adjustments and improvements made by individual households are usually studied using the comparative static approach which analyses the effects of change by comparing the positions of static equilibrium before and after the occurrence of that change.

Under the assumptions of the comparative static approach, it is deemed that at equilibrium, the household would not adjust its existing pattern of housing consumption under unchanged conditions. However, when circumstances or the given set of constraints change and cause the household to fall into disequilibrium with its housing environment, the assumption is that the household would adjust instantaneously to such changes and seek equilibrium again, that is, it would attempt to maximize its overall utility against the new set of constraints. Empirical evidence (Venti and Wise, 1984; Edin and Englund, 1991; Littlewood and Munro,
1997) however only partially supports this postulate. First, the household has been observed to adjust its level of housing consumption or move when constraints change but its decision is usually subject to a certain threshold level, that is, the household would only adjust its housing consumption or move when this threshold level is reached or exceeded. Secondly, some households may even choose not to move or adjust their level of housing consumption but instead remain in a state of disequilibrium. Such inertia to move or to adjust the housing disequilibrium situation is suggested to be due to social factors such as neighborliness and community ties (Lee et al., 1994) and/or financial aspects like high transaction, information and upheaval costs (Edin and Englund, 1991; Goodman, 1995). According to the mobility theory, the high costs of moving tend to impede residential mobility such that when households eventually decide to move, they do so in quantum leaps in housing consumption (Littlewood and Munro, 1997). Thus, the probability of the household adjusting its housing disequilibrium situation through residential movement is a function of the changes in factors affecting housing demand, housing environment and costs of moving:

\[ P(M) = f(\Delta Y, \Delta P_H, \Delta T, \Delta C, \Delta N, \Delta A, \Delta Z) \]

where \( P(M) \) = probability of the household moving;
\( Y \) = real permanent income;
\( P_H \) = price of housing services;
\( T \) = household’s preferences for housing vis-à-vis other types of consumption;
\( C \) = condition of dwelling;
\( N \) = neighborhood quality;
\( A \) = accessibility; and
\( Z \) = expected moving costs.

(Adapted from Boehm and Ihlanfeldt, 1986; Littlewood and Munro, 1997)

As the assumptions within the utility maximization model are usually unattainable in reality due to uncertainty of events, imperfect information and human limitations, economists such as Simon (1978/82) as well as Cyert and March (1992) have suggested an alternative known as “the utility satisficing model.” Although “the utility satisficing model” has traditionally been implemented in the context of the firm, it is also relevant to the household because its central concept of bounded rationality is of relevance to any actual decision-making environment.

Within the notion of bounded rationality, the two fundamental concepts are search and “satisficing” (Simon, 1978/82). First, the concept of search arises primarily because of incomplete knowledge on the part of the decision-maker. As decision alternatives are usually not given but have to be sought, the search for alternatives is therefore an important component of the decision-making process. Following from the search for alternatives is the “concept of satisficing” (Simon, 1978/82). In other words, instead of searching for the best alternative that could be time-consuming or even impossible in view of imperfect information and uncertainty of events, the decision-maker is usually concerned with finding an alternative that satisfies his preferences. This heuristic search for alternatives basically illustrates the essence of “the utility satisficing model.”

The decision-making process incorporating the concepts of bounded rationality, search and “satisficing” has been illustrated by Cyert and March (1992) into the form of a decision tree. Essentially, the decision tree shows the different decision stages including the
consideration and ranking of goals, search for alternatives, evaluation of alternatives and “satisficing” preferences as well as feedback. Although these decision stages basically pertain to an organization, the general framework is also applicable to the household’s housing decision-making process. For example, the household’s decision-making process to adjust its level of housing consumption may be divided into various stages. These stages are likely to involve establishing or ranking of housing preferences; searching for alternatives such as moving to a new home or improving the existing home; evaluating alternatives that have been found; selecting an alternative if it satisfies the household’s preferences; and finally providing feedback whether to continue or terminate the search.

Thus far, the paper has been discussing how the household decides on its level of housing consumption, in other words, its bundle of housing characteristics. Although individual households generally adopt the same housing decision-making process detailed above, they tend to choose different levels of housing consumption or bundles of housing characteristics because of their different household attributes and preferences. From the economic perspective, household attributes are found to be important determinants of housing consumption, for example, income (Apgar, 1993; Rothenberg et al., 1991), race (Wong, 1995; Farley, 1996; Owusu, 1999), religion (McPeake, 1998) as well as household structure and gender employment trends (Breugel, 1996; Jarvis, 1999).

One of the outcomes arising from the household’s housing disequilibrium situation is its decision to move (Littlewood and Munro, 1997), and such moves usually involve further decisions that concern residential location. Evans (1985) has divided the large amount of residential location literature into supply-side and demand-side theories. The classical supply-side theory is the filter-down concept (Burgess, 1925; Hoyt, 1939), which emphasizes the importance of supply-side constraints such as existing patterns of urban development and institutional factors in determining residential location. On the other hand, the traditional demand-side theory essentially comprises the trade-off notion (Wingo, 1961; Alonso, 1964; Muth, 1969; Evans, 1973), which has often been employed to explain the trade-offs executed by the household in its selection of a new residential location. Pozdena (1988) suggests that there are two principal types of trade-offs. The first type of trade-off is income effect, which involves shifts in both the budget line and the preference curve. For instance, when household income rises, additional consumption of housing is traded-off against additional consumption of other goods and services. The second type of trade-off is price effect. This, however, does not entail shifts in the budget line. It is the trade-off between price of housing and price of other goods and services such as commuting costs. This is also commonly known as “access-space trade-off” and has been examined in most microeconomic models of residential location.

One major shortcoming in most access-space trade-off models is the assumption of a monocentric city, access to which is valued by all households. This assumption is however invalidated with the emergence of polycentric and non-centric urban structures (Dubin and Sung, 1987; Gordon et al., 1991; Suarez-Villa, 1992; Bailey, 1999), which alter the traditional concept of monocentric cities. It is highlighted that the evolving land-use and land value configurations are undermining the importance of access to the CBD, and that the CBD fails to exert an overall influence on the rent gradient, which is distorted by peaks at employment and amenity centers. In a recent contribution to this area of study, Hoang and Wakely (2000) suggest that housing status and dwelling quality rather than accessibility to the CBD are more salient determinants of the existing patterns of residential location such as dispersion, gentrification and abandonment.
3. Framework of the analysis

Drawing from Cyert’s and March’s (1992) research, the notion of a decision tree could be applied as an efficient means of illustrating the household’s housing decision-making process (Figure 1). The household’s housing decision tree basically consists of two major stages, which reflect the main housing decisions confronting the household, that is, the decision to move and the selection of a new residence. These two major stages of the housing decision tree are likely to be interdependent and linked.

The first stage of the household’s housing decision tree concerns its decision to adjust its housing environment, of which one option is to move. This decision-making process may be initiated by two scenarios that are similar to Pozdena’s (1988) notions of income effect and price effect. Although both scenarios relate to the household’s level of housing consumption as against other goods and services, they illustrate different conditions under which the household may be motivated to move or to adjust its housing environment. From traditional micro-economic theories, it has been established that the household generally decides how much housing to consume as against other goods and services under a given set of constraints. While the first scenario assumes changes in this given set of constraints, which in turn shift the budget line, the second scenario assumes changes in only the household’s preferences and priorities, which therefore do not shift the budget line but instead adjust the household’s preference curve.

In the first scenario, the household’s decision-making process commences with changes in the given set of constraints and determinants, which basically comprise the household’s own attributes, housing characteristics as well as market and institutional factors (Aufhauser et al., 1991; Saltman, 1991; Harloe et al., 1992; van Weesep and van Kempen, 1992; Green, 1995; Balchin, 1996; Özüekren and van Kempen, 1997; Giffinger, 1998; Jarvis, 1999). Changes in these constraints and determinants directly affect the budget line, which in turn influences the household’s level of housing consumption as well as its consumption of other goods and services. As a result of such changes in the household’s level of housing consumption, it may decide to move.

Although changes in the household’s housing preferences, priorities and aspirations could lead directly to the second scenario, adjustments in the given set of constraints may also operate through the former to initiate the second scenario. From the microeconomic perspective, the household’s tastes, preferences, priorities and aspirations are also observed to be important in influencing the level and pattern of housing consumption (Farley, 1996; Breugel, 1996; McPeake, 1998; Jarvis, 1999). Therefore, even if the given set of constraints that is represented by the budget line remains unchanged, when presented with different priorities and preferences, the household’s set of preference curves may be affected such that it would decide to consume either more or less housing relative to other goods and services. In such an event, the household may decide to move as one of the options to adjust its level and pattern of housing consumption. Thus, in terms of a general functional relationship, the household’s decision to move may be expressed as:

$$ \text{Household’s decision to move} = f(\text{household’s socio-economic attributes, preferences, priorities and aspirations;}$$
$$ \text{current housing characteristics; market and institutional factors})$$

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Figure 1: A conceptual model of the household’s housing decision-making process

Decision to Move

Changes in Household’s Socio-Economic Attributes, Current Housing Characteristics, Market & Institutional Factors

Affecting Household’s Satisfaction with Current Residence

Dissatisfied

Dissatisfaction Affecting Household’s Stress Threshold Level

Exceed Stress Threshold Level

Not Exceeding Stress Threshold Level

Adjust Level of Housing Consumption

Not Moving or Adjusting Housing Consumption

Establish Housing Preferences

Search for Alternatives

Available Supply

Evaluate Alternatives

Move

Improve Current Residence

Selection of a New Residence

Demand-Side Determinants & Constraints

Establish Range of Preferred Housing Characteristics

Range of Preferred Housing Characteristics

Search for Alternative Dwellings & Determine Range of Probable Housing Characteristics

Supply-Side Determinants & Constraints

Range of Probable Housing Characteristics

No Probable Housing Characteristics

Evaluate & Trade-Off amongst Probable Housing Characteristics

Household’s Preferences, Priorities & Aspirations

Select Housing Choice

Source: Author.
As the household’s consumption of housing is dependent on the utility it derives from all characteristics within its current housing environment (Lancaster, 1991), when the level of utility is altered due to changes in household’s socio-economic attributes, preferences, priorities and aspirations; current housing characteristics as well as market and institutional factors, the household’s level of satisfaction with its current residence is also likely to be affected. The measure of this increase or decrease in the household’s level of satisfaction is usually achieved by matching its current housing preferences with the utility provided by the characteristics of its current residence. At this stage of the decision tree, if the household is satisfied, no further activity or move is normally executed. However, if the household is dissatisfied with its current housing environment, the decision-making process proceeds to the next stage where the household’s level of dissatisfaction is evaluated against its stress threshold level.

From the studies by Edin and Englund (1991), Montgomery (1992), Goodman (1995) as well as Littlewood and Munro (1997), it is implied that even though the household is dissatisfied with its current residence, it may not consider adjusting its housing environment if its stress threshold level has not been reached or exceeded. The household’s stress threshold level exists basically because of its inertia, which could be due to high costs of transaction and moving (Edin and Englund, 1991; Goodman, 1995) as well as community and social ties (Lee et al., 1994). Thus, in the event that either the household’s level of dissatisfaction does not reach or exceed its stress threshold level, or the increase in household income is insufficient to pay for the housing adjustment, it is likely that the household would not move or undertake any action to alleviate its dissatisfaction with the current residence. On the other hand, if the stress threshold level is reached or exceeded, or when the rise in income is sufficiently large, the household would usually attempt to raise its satisfaction level again by adjusting its level of housing consumption. This adjustment in the level of housing consumption is usually considerable (Littlewood and Munro, 1997).

At this stage of the decision tree where the household decides to adjust its level of housing consumption, the household is likely to employ some version of Simon’s (1978/82) “utility satisficing model” to raise its level of housing consumption rather than to attempt and maximize its utility which is normally very difficult to achieve in reality. According to “the utility satisficing model,” the household would first of all establish and rank its housing preferences, followed by a heuristic search for alternatives including moving to a new home and improving the existing residence. The range of alternatives is subsequently evaluated by the household against the established range of housing preferences. If the household is not satisfied with the alternatives, it would feedback either to continue searching or to review its housing preferences. The search then continues until the household finds an alternative that satisfies its housing preferences. If the alternative selected by the household is to improve and repair its current housing environment, the decision tree terminates. However, if the household decides to move, it usually needs to select a new residence, which is the next major stage of the housing decision-making process.

The linkage between the two main stages of the housing decision tree is that as a consequence of the decision to move, the household is normally faced with the task of selecting a new residence. In most housing systems, the household’s choice of a new residence is in fact a constrained decision limited by both demand-side and supply-side constraints. Economic studies (Muth and Goodman, 1989; Aufhauser et al., 1991; Saltman, 1991; van Weesep and van Kempen, 1992; Harloe et al., 1992; Green, 1995; Wong, 1995; Balchin, 1996; Özüekren and van Kempen, 1997; Giffinger, 1998; McPeake, 1998; Jarvis, 1999; Strassmann, 2000)
have highlighted that the demand-side constraints consist of the household’s own socio-economic circumstances such as its income, wealth, household size, race, religion, social ties, preferences and tastes while the supply-side constraints are essentially market, mortgage and institutional factors which control the prevailing housing access and allocation policies that ultimately determine supply, pricing, financing and location of available housing.

Applying the economic perspective and elements from Simon’s (1978/82) “utility-satisficing model,” the household’s selection process of a new residence is conceptualized as shown in Figure 1. The housing selection process begins with the household establishing a range of preferred housing characteristics based on its existing demand-side constraints. In other words, the household first decides what it prefers and could afford in view of its own circumstances, that is, its socio-economic situation, tastes, priorities and aspirations.

In the next stage, the household conducts a heuristic search for alternative dwellings where in the course of the search, supply-side constraints are taken into account in the housing selection process. In view of the available housing supply, the household decides which are the probable housing characteristics and then establishes a range of housing options that are likely to be a reduced version of the range of preferred housing characteristics. From this limited range of probable housing options, the household then proceeds to select the bundle of housing characteristics that best satisfies its housing preferences.

The selection process of the bundle of housing characteristics usually involves activities such as ranking, comparing, compensating and trading-off (Simon, 1978/82; Pozdena, 1988; Filion et al., 1999; Hoang and Wakely, 2000). As the utility pertaining to a housing environment is derived from its individual characteristics (Lancaster, 1991), the household’s evaluation and selection of a new residence are therefore in terms of housing characteristics rather than the housing environment as a whole. The salient categories of housing characteristics generally considered by the household include the type of housing, location, neighborhood, dwelling size, and price (Quigley, 1985). As the household’s trade-offs among the housing characteristics of probable housing options are dependent on its own set of preferences, priorities and aspirations, different households are likely to make different trade-off decisions, thus selecting different bundles of housing characteristics (Awan et al., 1982; Murie et al., 1998). The functional representation of the housing choice may therefore be expressed as follows:

\[
\text{Household’s housing choice} = f(\text{demand-side constraints such as income, wealth, household size, race, religion, social ties; supply-side constraints like access, allocation, pricing and supply policies; household preferences, priorities and aspirations})
\]

The paper has detailed the progression from the household’s decision to move to its selection of a new residence. There may, however, be reversals from the stage where the household selects a new residence back to the stage where it decides whether to move. The linkage between these two major stages of the housing decision tree is essentially based on the availability of housing supply. As the selection of a new residence is very much dependent on available housing, in the absence or shortage of the latter, the household may decide either to adjust its preferences and continue searching for alternative dwellings or to abandon its decision to move and instead improve its current residence. On the other hand, an increase in housing supply as well as relaxation of access and allocation criteria in the housing market
may provide the household with opportunities of a better residential environment, and as such motivate it to consider moving. With the availability of housing supply being fundamental to the housing decision, the factors and conditions governing housing provision are likely to be of utmost importance in providing the impetus for residential mobility.

4. Empirical evidence and implications

In order to test the conceptual model, empirical evidence relating to moving households and their housing decision-making process was collected via a survey conducted in Singapore in June 2001. Based on the various decisions and stages of the household’s housing decision-making process, as reflected in the conceptual model, a structured questionnaire was drawn up to collect primary data from a sample of 300 households who are moving into private sector housing in Singapore. The results indicate that the major determinants initiating the households’ move comprise both demand-side and supply-side factors as well as their own preferences and aspirations. 41.8% of the moving households cite changes of housing aspirations as a reason for moving while the supply-side determinants include available supply of private sector housing (22.6%) and favorable housing market conditions (6.7%). Although Singapore is a multi-racial society, it is interesting to note that the households who move do not seem to be differentiated in terms race but rather by household size and income, which are the reasons highlighted by 16.5% and 2.9% of the total moving households, respectively. Thus, besides reinforcing the literature by Aufhauser et al. (1991), Saltman (1991), Harloe et al. (1992), van Weesep and van Kempen (1992), Green (1995), Balchin (1996), Özüekren and van Kempen (1997), Giffinger (1998) as well as Jarvis (1999), which encompass the wide range of constraints and determinants, the findings further highlight the different levels of prevalence among the determinants. When compared with public housing that is provided by the Housing and Development Board, the sole public housing authority in Singapore, it is observed that households who move into private sector housing are generally motivated by the same determinants as those who move into public housing (Housing and Development Board, 2000).

As changes in household size, housing preferences and aspirations as well as job location tend to affect the household’s daily living and travel arrangements directly, these factors are found to be strongly correlated to the household’s level of satisfaction with its current residence (Table 1). On the other hand, changes in household income, available housing supply and market conditions seem to have a lesser impact on the household’s level of satisfaction since these changes do not directly affect the household’s enjoyment of its current home. Although the level of satisfaction for the current residence does have a role to play in the decision to move, the unequal correlations between determinants and levels of satisfaction imply that changes in different determinants are likely to impact on the household’s stress threshold differently. In addition to the studies by Edin and Englund (1991), Montgomery (1992), Goodman (1995) as well as Littleneck and Munro (1997), which discuss the household’s dissatisfaction and stress threshold level in general, the empirical analysis in this paper breaks down the household’s dissatisfaction into parts showing how some determinants are more influential and effective than others in exceeding the household’s stress threshold. The policy implication is that unless policies target at those determinants that significantly impact the household’s level of satisfaction with its current residence, they are unlikely to strongly influence the household’s decision to move.
From the empirical evidence, it is observed that the household’s level of satisfaction with its current residence tends to be affected either positively by its satisfaction or negatively by its dissatisfaction with one or more housing characteristics (Table 2). This finding implies that a household does view its housing environment in terms of housing characteristics, and that some characteristics are more important than others depending on individual households and their circumstances. Lancaster’s (1966/1991) theory of consumer behavior, together with the works by Awan *et al.* (1982), Boehm and Ihlanfeldt (1986), Lee *et al.* (1994), Balchin *et al.* (1995), Murie *et al.* (1998) as well as Hoang and Wakely (2000) are therefore supported.

Further to the three main categories of housing characteristics suggested by Hoang and Wakely (2000), Lee *et al.* (1994) and Balchin *et al.* (1995), the empirical analysis indicates that characteristics within the same category tend to be strongly correlated to each other. For example, satisfaction with access to the city is strongly correlated to satisfaction with access to workplace (Table 2). Another interesting observation is that correlations among housing characteristics do occur across categories, albeit less often. For instance, satisfaction with security, privacy and tranquility of the neighborhood is strongly correlated to satisfaction with age of the dwelling (Table 2). Therefore, although the household may consider its home in terms of housing characteristics, it may not necessarily group the latter into specific categories such as dwelling, neighborhood and location. In terms of policy implications, where policies such as urban development and renewal are likely to have spillover effects across the different categories of housing characteristics, the household may eventually experience a greater or lesser level of satisfaction than what is originally intended.

With 69.2% of the moving households having resided in their current homes for at least five years, and 86.7% of them indicating that they have experienced a certain level of dissatisfaction for a period of time before finally making the decision to adjust their housing environment, the notion of a stress threshold as suggested by Edin and Englund (1991), Montgomery (1992), Goodman (1995) as well as Littlewood and Munro (1997) is reinforced.
Table 2. Correlation between household’s levels of satisfaction with housing characteristics

<table>
<thead>
<tr>
<th>Correlation between dissatisfaction with current residence</th>
<th>Pearson Correlation Coefficient</th>
<th>Significance level (5%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Satisfaction with dwelling size</td>
<td>-0.59</td>
<td>0.00</td>
</tr>
<tr>
<td>dwelling price</td>
<td>-0.51</td>
<td>0.00</td>
</tr>
<tr>
<td>age of dwelling</td>
<td>-0.57</td>
<td>0.00</td>
</tr>
<tr>
<td>services, fittings and workmanship</td>
<td>-0.70</td>
<td>0.00</td>
</tr>
<tr>
<td>corridor space</td>
<td>-0.60</td>
<td>0.00</td>
</tr>
<tr>
<td>security, privacy and tranquility of neighborhood</td>
<td>-0.76</td>
<td>0.00</td>
</tr>
<tr>
<td>maintenance and cleanliness</td>
<td>-0.66</td>
<td>0.00</td>
</tr>
<tr>
<td>neighborliness and community</td>
<td>-0.60</td>
<td>0.00</td>
</tr>
<tr>
<td>access to city</td>
<td>-0.58</td>
<td>0.00</td>
</tr>
<tr>
<td>access to work place</td>
<td>-0.58</td>
<td>0.00</td>
</tr>
<tr>
<td>access to relatives and friends</td>
<td>-0.58</td>
<td>0.00</td>
</tr>
<tr>
<td>access to public transportation</td>
<td>-0.60</td>
<td>0.00</td>
</tr>
<tr>
<td>access to schools, shops and recreational areas</td>
<td>-0.75</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Satisfaction with services, fittings and workmanship

| Satisfaction with security, privacy and tranquility of neighborhood | +0.73 | 0.00 |
| age of dwelling                                                  | +0.70 | 0.00 |
| maintenance and cleanliness                                      | +0.68 | 0.00 |

Satisfaction with maintenance and cleanliness

| Satisfaction with neighborliness and community                  | +0.73 | 0.00 |
| security, privacy and tranquility of neighborhood               | +0.75 | 0.00 |

Satisfaction with access to city

| schools, shops and recreational areas                           | +0.69 | 0.00 |
| work place                                                      | +0.67 | 0.00 |
| public transportation                                            | +0.66 | 0.00 |

Source: Author’s survey.

Note: The Pearson Chi-square test was carried out at 5% significance level to determine the correlation between the household’s levels of satisfaction with different housing characteristics. As the number of variables is large (n=13) and when they are tested against each other, the number of coefficients derived is 169, only those coefficients > 0.50 are reflected in this table. Where two variables vary in the same direction, their coefficient is positive; if they vary in the opposite direction, their coefficient is negative.

As for the decision to move rather than to improve the current residence, the results have highlighted a wide range of reasons including spatial and expansion constraints (35.6%), physical and construction problems (18.6%), family-related issues and conflicts (14.6%) as well as financial difficulties (8.8%), amongst others. From these findings, it could be inferred that the household tends to assess the available housing adjustment options in relation to its various constraints before arriving at a decision that best satisfies its needs and preferences.
under the given circumstances. Since, in reality, the household’s housing decisions are likely to be utility satisfying rather than maximising, the “utility satisficing model” postulated by Simon (1978/82) as well as Cyert and March (1992) is supported.

When the moving households are surveyed with regards to their housing selection process, 73.8% of them first thought about their own circumstances such as household income, accumulated wealth and savings, household size, and location of work place. This observation infers that a household is likely to take into account the demand-side constraints first, most probably because it is more familiar with its own household and financial situation. Bearing in mind its own housing preferences, needs and constraints, the household would then consider the supply-side determinants such as the location of available housing, price, dwelling size and mortgage details when it starts searching for a new home. These findings reinforce the theoretical discussions by Muth and Goodman (1989), Aufhauser et al. (1991), Saltman (1991), van Weesep and van Kempen (1992), Harloe et al. (1992), Green (1995), Balchin (1996), Özteken and van Kempen (1997), Giffinger (1998), McPeake (1998), Jarvis (1999) as well as Strassmann (2000) who have examined certain aspects of the demand-side and supply-side constraints in their research. In terms of policy implications, housing policies that target at raising the household’s affordability level are likely to have a greater impact on residential mobility and housing choice than those which merely focus on the physical supply aspects. An example could be drawn from the case of Singapore where the rates of homeownership and residential mobility have both increased significantly only after the government allows households to utilize part of their pension funds, known as Central Provident Fund, for home purchase (Department of Statistics, 2001).

Similar to the studies by Awan et al. (1982), Murie et al. (1998) and Wong (1995), this paper highlights that different households are likely to emphasise and select different housing characteristics according to their individual preferences and constraints. For instance, in the multi-racial context of Singapore, both this paper and the research by Wong (1995) show that in terms of location, Chinese households tend to reside in the southern and central areas of Singapore while Malays generally favour the northern and eastern parts, and Indians prefer the western and northern regions. Nevertheless, most of the households tend to have a common underpinning thought that runs through their decision-making process, that is to achieve “the best value for money,” which generally translates into the largest dwelling that is lowest-priced and is located at a most convenient site. In order to reconcile this preference and the fact that available supply of housing is probably limited to certain locations, dwelling sizes, dwelling types and price ranges, a moving household is likely to make a number of trade-off decisions which are not unlike those suggested by Simon (1978/82), Pozdena (1988), Filion et al. (1999) as well as Hoang and Wakely (2000). The most common types of trade-off decisions encountered by the moving households include trade-offs between location and dwelling price (39.5%), dwelling size and price (30.5%), location and dwelling size (18.9%), as well as among all three housing characteristics (11.1%). With the majority (70%) of moving households being constrained by dwelling price, the implication is that policy makers may apply attractive pricing to entice households to locate in less accessible areas or to select less popular dwelling sizes/designs. The outcome of the housing selection process or the household’s housing choice is therefore a product of a series of trade-offs necessitated by both demand-side and supply-side constraints.
5. Conclusion

The household’s housing decision-making process has attracted the attention and interest of many disciplines, of which only the economic perspective is discussed in this paper. Even within the economic approach, the convergent and divergent views relating to this process are many. The formulation of a conceptual model for the household’s housing decision-making process therefore holds significant implications to understanding the household’s rationality and its housing decisions. In this conceptual model, economic reasoning and theories have been applied to rationalize what seems to be a psychological and behavioral decision-making process, which is very complex and is heavily influenced by the social, cultural and geographical contexts. The strength of this model lies in its ability to explain and link the numerous decision steps confronting the household from the time its demand-side and supply-side constraints change to the ultimate decision regarding its choice of a new residence.

The empirical evidence drawn from the multi-racial, multi-cultural society in Singapore has shown considerable support for the conceptual model. In addition to the existing literature, this paper has highlighted some new insights to this area of research. For instance, it is found that there exist different levels of prevalence among the determinants to move, and that these determinants tend to have unequal correlations with the household’s level of satisfaction, leading to the possibility of differential impact on the household’s stress threshold.

Another contribution of this paper is that the nature of the household’s level of satisfaction with its current home could be broken down in terms of individual housing characteristics but the household may not necessarily perceive the characteristics in terms of the specific categories that have been suggested in some economic literature. This could be because of the correlation between some of the housing characteristics within the same category as well as across the different categories.

Last but not least, in its housing decision-making process, a household is likely to entertain an underpinning thought which is to achieve “the best value for money.” Thus, although in practice the household may be bounded by conditions to subscribe to “the utility satisficing model,” its objective to obtain “the best value for money” tends to be more reflective of the concepts found in traditional microeconomic models of utility maximization. It is therefore conceivable that a household’s thoughts and actions with regards to its housing decision-making process may be in conflict because of the constraints faced by the household.

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