1984

House Price Change, Residential Mobility And Filtering: Metropolitan Toronto, 1970 - 1979

Joseph Henry Springer

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HOUSE PRICE CHANGE, RESIDENTIAL MOBILITY AND FILTERING: METROPOLITAN TORONTO , 1970 - 1979

by

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Submitted in partial fulfillment

of the requirements for the degree of

Doctor of Philosophy

Faculty of Graduate Studies

The University of Western Ontario

London, Canada

September, 1984

ABSTRACT

Studies of residential mobility and filtering have focussed on the physical and causal aspects of movement, and the variations in the cost and quality of housing services that accompany these changes. Sharp fluctuation in house prices, especially the kind produced by a speculative bubble, can affect the timing and quantity of housing purchased. This theme is developed in this study by examining the impact of house price change on patterns of residential mobility and filtering in Metropolitan Toronto during the period 1970 - 1979.

The examination of the manner in which price changes affected the accumulation of capital gains reveals that during periods of sharp price increase, capital gains accrued to existing home owners at a rate greatly in excess of the rate of growth in real incomes. This increased the amount of equity available to homeowners, thus reducing the level of financial constraint associated with the decision to move.

The increases in price that benefited homeowners had the opposite effect on prospective purchasers. This group was faced with higher overall prices, as well as higher initial downpayments during the period of increase. Thus, the price increases favoured homeowners and those without serious financial constraints and discriminated against first-time buyers. This pattern reversed itself during the

real price declines that accompanied the period of housing market adjustment.

House price change created a set of equity conditions that segregated purchaser groups based on the extent of financial constraint which housing market conditions imposed. This produced a wave-like pattern of mobility that generally followed the pattern of price change with the wealthy relocating at the peaks and the new entrants in the valleys.

Studies of residential mobility in Geography have depended heavily on the composite indices of Socio-economic Status and Stage in the Life Cycle for explanations of mobility. However, there are substantial problems associated with the use of these indices for explanatory purposes. These problems derive from: the broad variation in definition of the indices; the difficulty of defining which stage or stages of the life cycle are addressed, and the highly subjective interpretations that make comparison of the results of different studies difficult. In addition, the use of composite indices has changed the emphasis from the relatively weak individual relationships among the variables that comprise the index to the stronger factor loadings.

One misconception that has resulted from the use of composite indices is the belief that wage income is stongly related to house purchase price. The analyses show that income measures are only weakly related to house price, and that sharp increases in price tend to weaken this relationship further. A much stronger relationship results from the use of equity, a measure that combines elements of both income and capital gains and is affected by house price change.

TO MY FATHER

EDMOND

FOR ALL THE LOVE, GUIDANCE AND ENCOURAGEMENT

HE HAS PROVIDED ALL OF MY LIFE

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CHAPTER 1

INTRODUCTION

The access of the consumer to safe, sound, and sanitary accommodation at reasonable cost has been central to the study of housing in Canada. Of the broad range of research that has addressed this topic of housing affordability two major streams are especially pertinent to this study. The first comes under the general heading of filtering and has its foundation in the economics literature. Research approaches have included:

> analysis of the change in the position of a unit's price, relative to changes in the overall structure of prices and rents within a defined housing market area (Fisher, E.M., and Winnick, L.; 1951);
>
> examination of the rate and direction of price change versus changes in the quality of the housing stock (Ratcliff, R.U.; 1945);
>
> analysis of the impact of price change on the pattern of maintenance or improvement of the existing stock of housing (Margolis, S.E.; 1977);
>
> assessment of the success of the filtering process in improving the quality of housing to which lower income groups have access (Kristof, F.S.; 1972);
>
> comparison of the relative success of alternative methods of providing housing subsidies (Sweeney, J.L.; 1974).

The second major stream of research - intraurban mobility - derives mainly from the disciplines of Sociology and Geography, and focusses on who moves, where they move, and the reasons for moving. Studies in this subject area have covered the physical, causal and theoretical aspects of moving. The physical aspects include factors such as the distance, direction, length and cost of movement, while the causal and theoretical aspects examine the reasons for movement, economic, demographic, psychological and the statistical techniques

used for measuring this movement.

Within Geography, the major emphasis has been the study of the spatial patterns, especially socio-demographic, produced by residential change. The focus on the product of change is accompanied by the widespread acceptance of concepts outlining processes borrowed from other disciplines. Thus, Geography draws heavily on Rossi's 1955 study of Why Families Move for explanations of mobility and on work done between 1930 and 1960 in Economics (Hoyt, 1939; Grebler, 1952; Fisher and Winnick, 1951; Lowry 1960) for much of its conceptual formulation of the processes of movement. Contributing to the difficulty of coordinating research on the process of residential change and the patterns that result from these changes has been the fact that these concepts can involve several separate and analytically quite distinct phenomena, a situation which is further complicated by the lack of appropriate data for comprehensive analyses.

1.1 RATIONALE FOR THE STUDY

During the 1970-79 period, and especially between 1972 and 1974, severe house price changes occurred across most of urban Canada. While there was an intuitive understanding that these price changes would ultimately affect patterns of residential change, there was no serious attempt in Geography to assess the ability of the traditional socio-demographic variables to explain these changes adequately, or further, to evaluate the implications that this type of price change might have on residential mobility and filtering.

One nontraditional variable introduced by economists (Markusen 1978; Scheffman 1977) was a speculative demand for housing. Possible impacts of a speculative demand for housing included a change in the timing and quality of housing purchased by consumers, and an

associated change in the composition of the consumer groups under various market conditions. These changes are related to:

- the change in the equity position of the potential purchaser created by the speculative bubble;
- the expectations about the rate and direction of future house price changes;
- the actual pattern of price change subsequent to purchase; and
- the availability of other sources of funds that can be used in the purchase.

The relatively recent introduction of speculative demand as an explanatory variable has meant that very little research exists in Geography on the possible impacts of this new variable on patterns of price change and the consequent effects on residential change and filtering. This thesis attempts to address this need by examining and analysing the price changes that occurred between 1970 and 1979 and assessing the possible conceptual implications of this type of house price change on patterns of filtering and residential mobility.

1.2 GOALS OF THE RESEARCH

This study specifically addresses the effect of speculation on the pattern of house purchase, the response of the supply system to price changes in terms of the composition and spatial distribution of the new stock, and the effects of government policy, especially subsidy programmes, on a housing market. However, the focus is ultimately on how all of these elements affect the processes of filtering and residential mobility.

1.3 STATEMENT OF THE PROBLEM

The specific research question is, therefore:

> How did the price changes of the period 1970 to 1979 affect the pattern of filtering and residential mobility in Metropolitan Toronto?

The conceptual issues addressed are:

1. Changes in the timing and quantity of housing purchased by consumers as they affect the pattern of filtering and residential mobility in a market area;

2. The sharp price increases generated by the 'speculative bubble' may produce substantial equity accumulation among the homeowning group, while at the same time, it could weaken the purchasing power of groups at the entry level;

3. The equity held in owned accommodation may affect the purchase decision and should be included in permanent income computations;

4. Inclusion of equity in permanent income could change the affordability relationships by broadening the range of choice and quantity of housing purchased at the top end of the market while producing the opposite effect at the entry level;

5. The changes in equity produced by the speculative bubble may affect the pattern and timing of purchases and the composition of purchaser groups and;

6. The timing and focus of government assistance to homebuyers could increase further the differences in the timing of purchase and composition of purchasers.

The study is empirical. It is an ex post facto attempt to analyse a set of events to draw out critical elements. The data used are 1970 to 1979 house prices and socio-demographic characteristics of residents, and the analysis focusses on the factors that affect price. The underlying assumption of this study is that price change

has a major effect on the availability of housing at all levels. A corollary to this is the belief that a significant variation in the pattern of price change would affect both availability and access and, by extension, the pattern of residential mobility.

1.4 THE STUDY AREA

The period 1970-1979 has been broadly accepted as one which produced extreme house price changes across urban Canada. The area in which these changes first became apparent is the Municipality of Metropolitan Toronto. The dramatic natute of house price change in Metro, 1972-1974, accompanied by the occurrence of similar types of changes in the 1967-1969 period, the availability of adequate housing data, the existence of a reasonably cohesive housing market, and, general familiarity with the area made it an attractive choice for a study of this type.

1.5 OUTLINE OF THE STUDY

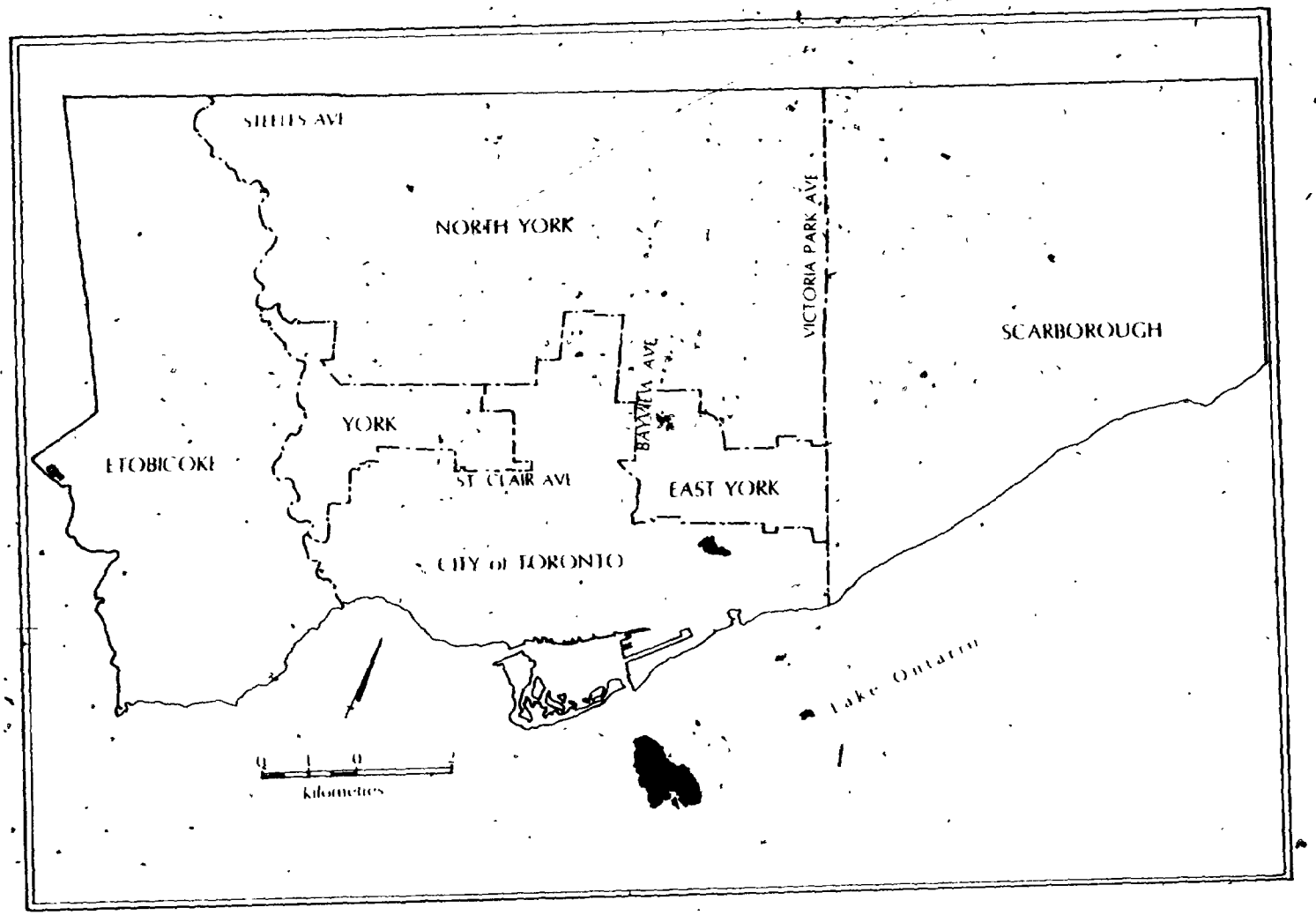
The remaining section of Chapter 1 reviews the general socioeconomic conditions prevailing in Metro Toronto during 1970-1979 and provides the context within which subsequent analyses of residential mobility and filtering are evaluated.

- Chapter 2 examines the various ways in which the terms 'filtering' and 'residential mobility' have been used in the literature and reviews some of the methods of measurement associated with these definitions, as they relate to this study.

- Chapter 3 introduces the data used in the study with a discussion of the sources, the rationale for choice, the completeness of coverage, and the overall strengths and weaknesses of each of the data sources used.

- Chapter 4 examines, in detail, the structure of the 1970 to 1979 price changes.

Fig. 1.1 The Municipality of Metropolitan Toronto



Chapter 5 is concerned with analysing a set of variables drawn from: the 1971 Public Use Sample Tapes, the Census Tract Tables of Population and Housing Characteristics (1971), and the 1974 Survey of Housing Units. The method used is Principal Axis Factor Analysis rotated to a Varimax solution. The objectives are: first, to determine the pattern of association which the chosen variables demonstrate; and second, to measure the changes that occur when the same, or similar, variables are analysed using data compiled at different levels of aggregation.

In the second part of this chapter, the correlation matrices produced by the data sets are subjected to Multi-Dimensional Scaling. This is a class of techniques which uses proximities, in this case correlation coefficients, among any kind of objects as input. The chief output is a spatial representation, consisting of a geometric configuration of points on a map. The method is, therefore, a clustering-type technique and is used here to test the stability of association between the variables which are subjected to factor analysis in Chapter 5.

The goal is to examine the empirical relationships between the demographic variables traditionally used in analyses of filtering and residential mobility.

In Chapters 6 and 7 the findings of the analyses carried out in Chapters 3 to 5 are related to the processes of 'filtering' and 'residential mobility'. The suggestion is that intraurban migration is increasingly subject to factors traditionally considered to be the realm of the economist. Thus, global factors like national interest rates, inflation, alternative investment opportunities, affect house prices and through this medium, the purchase decision. Thus, these factors must be examined as carefully as the traditional socio-demographic variables. The study concludes with a summary of findings and some suggestions for future research.

1.6 SOCIOECONOMIC AND DEMOGRAPHIC CONDITIONS AFFECTING THE HOUSING MARKET IN METROPOLITAN TORONTO 1970-1979

Between the years 1972 and 1974, Metropolitan Toronto experienced a period of rapidly increasing house prices. This increase, like others which occurred earlier, was the result of a temporary demand/supply imbalance in the housing market. However, the severity of this imbalance and the composition of the factors underlying it caused much concern and generated a large amount of research interest. Research into the causes of the price increase (Markusen 1978; Scheffman 1977) suggested that the demand/supply imbalance was the result of short-term inelasticity in the supply sector caused partly by: the extent of restrictive regulation to which the construction industry is subjected; the structure of the industry; and, the time-consuming nature of residential construction in a climate that allows only eight or nine months of outdoor construction time each year. It is argued that when this inelastic supply was subjected to a period of accelerated demand (generated partly by increased household formation, higher disposable income, inflationary expectations, declines in the attractiveness of alternative investments, and speculation) the net result was a price response that was so intense in the short run that a phenomenon described as 'price overshooting' occurred.

Price overshooting is a concept borrowed from the literature on international currency exchange. It tends to result from a belief that prices of the commodity purchased are on the increase; a potential purchaser is therefore willing to bid the price upward in the expectation of even higher future prices. This pattern of

behaviour is consistent with the development of the kind of short-term demand surge labelled as a 'speculative bubble'.

In a development industry that is as fragmented as the residential construction industry in Ontario, the rational response of each individual producer results in a total supply that is excessive at the speculative price levels. Thus, the market moves from a period of disequilibrium caused by excess demand to one caused by excess supply at existing price levels. Of special importance to this study is the effect that changes in the equity position of consumers has on the purchase decision. It is important, therefore, to examine the factors underlying the supply/demand relationship during the period under study.

1.6.1 The Supply Side

The contribution to increased cost produced by the supply elements involves the size and timing of changes in the cost of five basic factors of new housing production. These are:

- residential building material cost;
- residential construction labour cost;
- mortgage interest rates;
- land costs; and
- land conversion process

1.6.1.1 Residential Building Material Cost

Data obtained for Ontario from Statistics Canada's Indexes of Construction Cost (1971 to 1979) (summarized in Table 1-1) show that changes in the cost of residential building materials increased an average of 8.8 percent between 1971 and 1979. Column (iii) of Table 1-1 shows that the changes of 8.9 percent between 1973 and 1974 and 5.27 percent between 1974 and 1975 are at or below this average.

1.6.1.2 Residential Construction Labour Changes

Examination of the wage rate composite index (columns iv and v, Table 1-1) and the all-Canada residential construction labour cost index (columns vi and vii, Table 1-1) shows that changes in the wage rate vary between 4 and 14 percent. It should be noted also, that the 1974 to 1975 period shows some of the highest rates of change in all indices (10.45, 14.3 and 13.98 percent).

TABLE 1-1

INDICES OF CONSTRUCTION COST, 1971 - 1979

YEAR	RESIDENTIAL BUILDING MATERIAL			UNION WAGE RATE COMPOSITE INDEX FOR 16 MAJOR CONSTRUCTION TRADES		RESIDENTIAL CONSTRUCTION LABOUR COSTS	
	All Canada (i)	Ontario (ii)	% Change (iii)	All Canada (iv)	% Change (v)	All Canada (vi)	% Change (vii)
1971	100.0	100.0	-	100.0	10.1	100.0	10.6
1972	109.8	N/A	-	110.1	10.8	110.6	10.12
1973	124.0	123.5	8.90	121.2	9.5	121.8	9.85
1974	135.2	134.5	5.27	132.8	14.0	133.8	13.3
1975	139.7	141.6	10.45	151.4	14.3	151.6	13.98
1976	153.6	156.4	8.63	173.1	11.1	172.8	12.21
1977	165.2	169.9	8.94	192.3	6.4	193.9	6.34
1978	184.1	185.1	10.8	204.7	6.2	206.2	6.45
1979	206.8	205.1	N/A	217.4	N/A	219.5	N/A

Source: Canadian Housing Statistics, 1979, Tables 112, 113, and 115. Ottawa: Canada Mortgage and Housing Corporation.

1.6.1.3 Mortgage Interest Rates

The conventional mortgage rate is a measure of the cost of borrowing money for residential construction. Table 1-2 provides data on conventional mortgage rates for 1970 to 1979. Column ii shows the nominal rates, unadjusted for inflation, column iii the changes in the Consumer Price Index and column iv the real interest rates computed by subtracting column iii from column ii. Examination of column iv shows that the cost of borrowing money, as measured by the real (deflated) interest rates, dropped steadily from 6.56 percent in 1971 to 0.55 percent in 1975 and climbed back to 4.36 percent in 1976. Even the nominal figures for the years 1971 to 1973 show values of 9.46, 9.51, and 9.71 percent respectively. These rates are the lowest for the entire 10-year period (1970 to 1979).

1.6.1.4 Land Costs.

The increases in the cost of land were considered by some (Lorimer, J., 1980) to have been a major contributor to house price increases in the 1972 to 1974 period. Table 1-3, column iv shows land costs as a percentage of total house price for National Housing Act (N.H.A.)-insured purchases. Between 1970 and 1973, the values fluctuated within a narrow range of 35 to 37 percent (the 1974 value of 31.47 percent is presented with reservation because it is based on a total of 26 units sold under N.H.A. insurance in 1974). In 1975, the proportion of cost absorbed by land increased to 42.69 percent and these values continued to increase until 1978.

Examination of the pattern of change in the cost of land, labour, capital, and building materials shows that in all cases the cost increases that occurred in these variables neither preceded nor coincided with, the increase in house prices. Thus, based on the

TABLE 1-2

CHANGES IN INTEREST RATES ON CONVENTIONAL MORTGAGE LOANS
1970 - 1979

YEAR (i)	NOMINAL (ii)	CHANGE IN C.P.I. (iii)	REAL INTEREST RATE (iv)
1970	10.38		
1971	9.46	2.9	6.56
1972	9.41	4.8	4.61
1973	9.71	7.5	2.21
1974	11.60	10.9	0.70
1975	11.35	10.8	0.55
1976	11.86	7.5	4.36
1977	10.40	7.99	2.41
1978	10.31	8.95	1.36
1979	11.20	9.13	2.07

Source: Canadian Housing Statistics, 1979, 1980.
Ottawa: Canada Mortgage and Housing Corporation.

TABLE 1-3

LAND COST AS A PERCENTAGE OF
AVERAGE HOUSE PRICE - 1970 TO 1979

YEAR (i)	TOTAL COST (ii)	LAND COST (iii)	LAND COST/ TOTAL COST (iv)
1970	29,914	10,639	35.56
1971	32,646	12,107	37.08
1972	32,035	11,507	35.92
1973	36,218	13,261	36.61
1974*	62,254	19,596	31.47
1975	57,098	24,377	42.69
1976	48,246	23,114	47.9
1977	47,510	22,799	47.98
1978	63,866	29,595	46.33
1979	73,092	30,324	41.48

Source: Canadian Housing Statistics, 1979, 1980.
Ottawa: Canada Mortgage and Housing Corporation.

* Land and housing cost are based on a total of only 26 units.

reasoning that events which occurred later in time cannot be advanced as causes of earlier occurrences, the increases in house prices 1972 to 1974 cannot be attributed to these production cost changes.

This conclusion, however, does not imply that the supply side had no effect on house price increases, only that the variations observed in the cost of major factors of production, land, labour and capital did not provide a sufficient basis for the size and speed of house price change. One weakness of the supply mechanism that did create problems, however, was the land conversion process.

1.6.1.5 The Land Conversion Process

Land conversion in this context refers to the process by which previously undeveloped land is taken through the stages of physical improvement and regulatory authorization which prepare the land for more intensive development, in this case housing. Most regulations come in the form of land-use planning controls. Ideally, these controls are aimed at reducing or removing those costs which developers and their clients would transfer to the host community if housing could be located freely.

Harrison (1977) states that there is no inherent reason why a more regulated system should not achieve a better phasing of investment than a completely free market. However, he writes "for the benefits of greater control to outweigh its potential costs would require an accurate monitoring and management of the development process", (Harrison 1977, p. 174). This is clearly not the case in Ontario at the present time. Instead the system is so heavily regulated and constrained that the supply of housing resulting from the land conversion process responds only slowly to changes in market conditions. Watson (1979) writes:

> . . . land and house prices escalated . . . as a consequence of insufficient supply of land, and equally a land conversion process so replete with delays, that the ability of the private sector to successfully meet demand requirements was severely constrained. (Watson, 1979; p. 276).

This opinion is shared by land economists including Derkowski (1973, 1975), Scheffman (1977), and Markusen (1978). Derkowski (1973) postulates that the length and complexity of the process derives from its negative orientation. This is because many agencies having oversight powers have only the right of veto. Most agencies, therefore, can slow or halt the progress of an application, but few can advance it. Thus, although supply curves for housing are generally inelastic in the short term, in Ontario this sluggishness is exacerbated by the slowness of the land conversion process. This makes the housing market in Ontario especially susceptible to sudden changes in demand. In the next section, changes in demand conditions, and the impact of these changes on the inelastic supply curve are analysed.

1.6.2 The Demand Factors

This analysis of demand factors covers the areas of demographic change, economic conditions, and government policy, providing an emphasis on socioeconomic and demographic variables that is consistent with the study of filtering and residential mobility and is the focus of this thesis.

1.6.2.1. Demographic Change

Demographic change is considered here to consist primarily of natural increase plus net change in migration. As Beaujot (1978, p. 17) explains:

> . . . For Canada, as in the U.S., the overriding feature of recent demographic history, is the bulge introduced into the country's population age structure, by the extra-large generations born after 1939 and especially after World War II. For both countries, this has created problems that change only in kind as the bulge moves upwards in years. But, in Canada, the baby boom's impact came as an even greater distortion of earlier patterns.

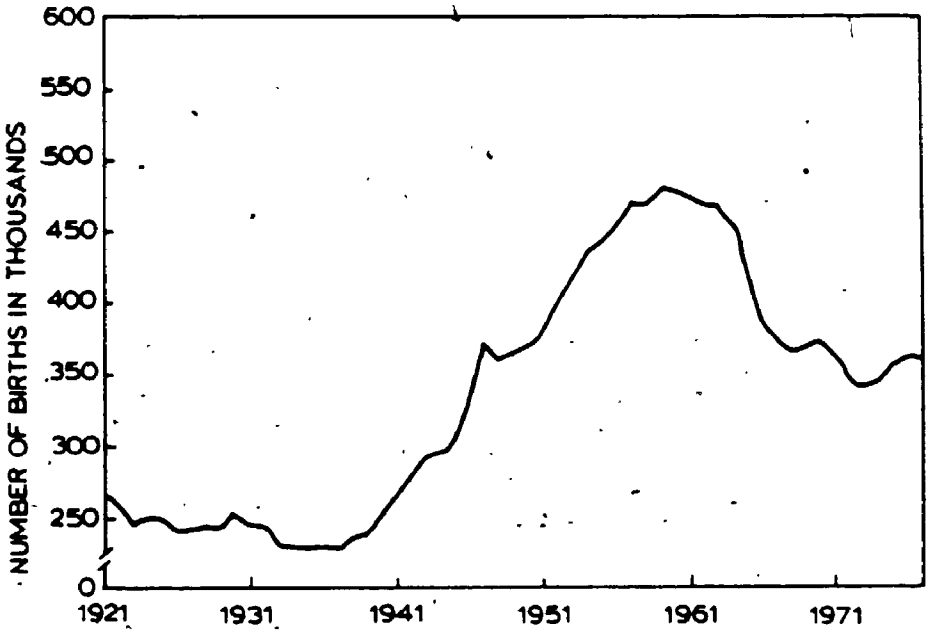
Figures 1-2 and 1-3, taken from Population Bulletin: Canada's Population Growth and Dualism (Beaujot, 1978), indicate that after an essentially static period between 1921 and 1939, births in Canada more than doubled from 238,000 in 1929 to 479,000 in 1959 with the period of greatest increase occurring between 1951 and 1959. This population surge, labelled the baby boom, changed the age structure of the population. It was the impact of the baby boom cohorts reaching the age for marriage and household formation, (23 to 33), together with increased divorce rates, changes in lifestyle and economic conditions that contributed to the increase demand for housing during the early 1970s. Beaujot's work (1978) shows that total household formation increased by 32 percent between 1961 and 1971 and he projected an increase of 34 percent for the 1971 to 1980 period.

1.6.2.2 Migration

The other major component of overall population growth is net migration. Two major sources of migration data which provide some insight are international and interprovincial migration figures.

> . . . from 1961 to 1971 net migration accounted for 50 percent of the total population growth of Metropolitan Toronto. However, the economic slowdown of the 1970s put pressure to bear on the government. The response was a new and tougher immigration policy which was passed by Parliament in 1977 and implemented in April 1978. (Beaujot, 1978; p. 19).

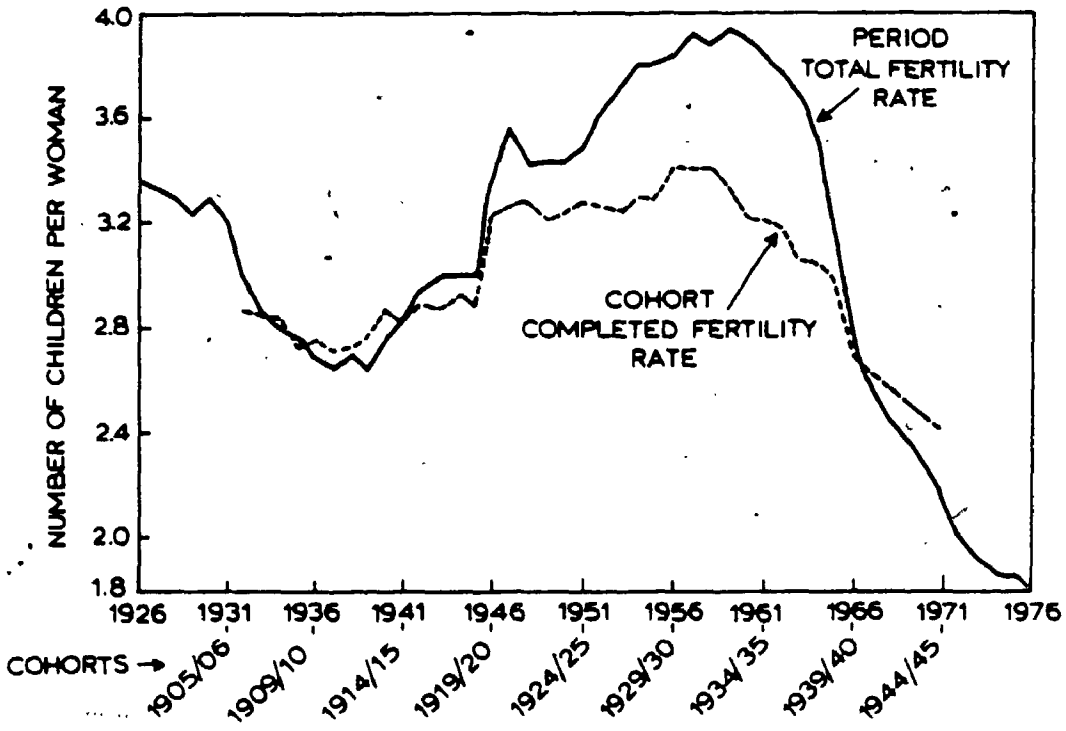
Fig. 1.2 Annual Births in Canada 1921-1977



Source R P Beaujot Population Bulletin "Canada's Population Growth and Dualism Population Reference Bureau Inc Vol 33 #2 April 1978

Fig. 1.3 Total Fertility Rate and Cohort Completed Fertility Rate

Canada, 1926-1976



Source: R.P. Beaujot : Population Bulletin, Canada's Population Growth and Dualism, Population Reference Bureau Inc., Vol. 33, #2, April 1978

The slowdown in international migration which occurred in the 1970s was coupled in Ontario with a change in the pattern of interprovincial migration. Statistics Canada (1978) reported that:

> . . . In terms of exchanges with other provinces, traditionally Ontario has experienced net migration gains. However, in 1973-74 and subsequently, this pattern has been reversed, for Ontario has experienced net migration losses from its exchanges with most other provinces during the last three years. In 1973-74, the estimated number of outmigrants from Ontario exceeded 100,000 for the first time and reached almost 115,000 in 1974-75. Ontario's net loss is due not only to the sudden increase in outmigrants, but also to the fact that the number of immigrants received from all other provinces fell to approximately 80,000 a year. (Statistics Canada, International and Interprovincial Migrations in Canada, 1978, p. 35).

In fact, interprovincial migration figures for Ontario for the period 1971 to 1976 show a net loss of 38,559 persons for the 5-year period. (Statistics Canada, Table 3.19, Components of International and Interprovincial Migration 1961 to 1976).

These figures indicate that migration as a source of population growth was declining in importance in Ontario. Thus Metro Toronto should be affected by the general decline in international and interprovincial migration, albeit to a smaller degree.

1.6.2.3 Economic Conditions

The increases in household formation caused by the baby boom, the pattern of migration, and the change in lifestyles provide only part of the basis for the demand surge of the 1972 to 1975 period in Metropolitan Toronto. Major impetus was provided by the set of economic conditions which included inflation, changes in disposable income, declines in mortgage rates, and changes in government policies that affected the availability of money.

1.6.2.4. Inflation

One commonly used measure of inflation has been the Consumer Price Index which measures change over time in the purchasing power of the currency. Table 1-4, the all-items C.P.I. and the shelter component of the C.P.I. indicate that prices increased by 7.5 percent between 1972-1973 and by 10.9 and 10.8 percent in 1974-1975 and 1975-1976 respectively. Within the shelter component, specifically, the largest increases in the cost of owning a home appear between 1974 and 1976, and vary from 8.8 to 10.4 percent. Thus, during the 1970-74 period, inflation varied between 8 and 10 percent.

1.6.2.5. Changes in Real Disposable Income

In a period of high inflation disposable incomes must keep up with or exceed inflation to sustain demand. Column iv of Table 1-5 measuring percentage change in real disposable income (1970 to 1976) indicates that during the 1971 to 1976 period real incomes grew faster than inflation by amounts varying from the high of 5.2 percent in 1972 to 2.0 percent in 1976. This provided support for sustained demand of goods and services including housing.

1.6.2.6 The Effect of Government Policy on Mortgage Money

Between 1967 and 1972, several important changes in government policy occurred which affected the housing market:

i) In 1967, the Bank Act was amended allowing chartered banks to engage in conventional mortgage lending;

ii) In 1969, changes in N.H.A. regulations allowed the rate on N.H.A. housing to be market determined;

iii) Private mortgage insurance companies were allowed in 1970 to extend their coverage past the previous 75 percent limit; and

TABLE 1-4

CONSUMER PRICE INDICES
FOR TORONTO AND CANADA 1971 - 1979
(Base Year 1971)

	TORONTO HOUSING COMPONENTS			CANADA ALL ITEMS		
YEAR		Change in Index	% Change		Change in Index	% Change
1971	100	N/A	N/A	100	N/A	
1972	102.1	2.1	2.1	104.8	4.8	4.8
1973	112.2	10.1	9.89	112.7	7.9	7.5
1974	121.7	9.5	8.46	125.0	12.3	10.9
1975	133.6	11.9	9.77	138.5	13.5	10.8
1976	147.7	14.1	10.55	148.9	10.4	7.5
1977	160.8	13.1	8.86	160.8	11.9	7.99
1978	173.0	12.2	7.58	175.2	14.4	8.95
1979	184.7	11.7	6.76	191.2	16.0	9.13

Source: Canadian Housing Statistics, 1979, Tables 110 - 111.
Ottawa: Canada Mortgage and Housing Coporation.

TABLE 1-5

CHANGES IN REAL DISPOSABLE INCOME - 1970 to 1978

YEAR	C.P.I. (1971=100)	% CHANGE IN C.P.I.	% CHANGE IN REAL DISPOSABLE INCOME PER HOUSEHOLD
1970	97.3	2.7	.0
1971	100.0	-	4.7
1972	104.8	4.8	5.2
1973	112.8	7.5	4.9
1974	125.0	10.9	2.2
1975	138.5	10.8	2.2
1976	148.9	7.5	2.0

Source: Report of the Federal Provincial Task Force on the Supply and Price of Serviced Residential Land. Volum II, 1978.

iv) In 1972, the Income Tax Act was amended to exclude capital gains made on the principal residence from taxation.

In addition, in 1970 and 1971, a series of assisted home ownership programs were created to provide subsidies to homebuyers. This was followed by later versions of the Assisted Home Ownership Program (AHOP) from 1974 to 1978 and several other subsidy or supply incentive programs.

1.6.2.7 Asset Revaluation and the Formation of a Speculative Bubble

During the 1971 to 1974 period a set of conditions existed which allowed the coalescence of high real-disposable incomes, abundant credit at low cost, tax incentives to home ownership, inflation, and low returns on other assets compared to housing (Table 1-6). The net result was a process that Markusen (1978, p. 34) has labelled asset revaluation. He writes:

> . . . What happened during this period of booming prices was that housing and land were revalued relative to other assets in the market. Expectations of even higher future prices fuelled a speculative bubble, while depressed rates of return on other assets cranked up demand for residential real estate. Demand factors, which had been working away in Canada for a number of years, underwrote the wide-spread expectation that housing prices were going even higher, while world-wide inflation served, at least temporarily, to reduce the attractiveness of alternative forms of investment.

The increased demand was translated into a price effect because of the inability of the supply system to respond in the short term. These price increases coming at a time when the general rate of inflation was high fed a set of inflationary expectations about the direction of future price change. This expectation of future price increases and the real economic benefits that home ownership offered under these conditions generated an additional demand element that was

TABLE 1-6

ANNUAL REAL RATES OF RETURN ON VARIOUS ASSETS, 1957 - 1976
(July Annual Yields)

YEAR	FEDERAL GOVERNMENT BONDS	CORPORATE BONDS	COMMON SHARES (TSE)	CONVENTIONAL MORTGAGE RATE	
				Nominal	Real
1957	.6	1.84	- 7.21	6.85	3.65
1958	1.92	2.84	- 9.89	6.75	4.05
1959	4.39	4.99	12.60	6.85	5.75
1960	4.11	4.33	- 6.92	7.15	5.95
1961	4.06	4.49	11.22	7.00	6.1
1962	4.24	5.56	- 4.73	7.00	5.8
1963	3.42	3.77	5.46	6.91	5.21
1964	3.48	3.73	19.82	6.88	5.08
1965	2.88	3.34	8.71	7.02	4.62
1966	2.04	2.72	- 8.65	7.68	3.98
1967	2.28	3.41	2.05	8.02	4.42
1968	2.49	3.92	- 1.59	9.14	5.14
1969	2.92	4.27	5.12	9.90	5.3
1970	4.61	5.88	-11.04	10.38	7.08
1971	4.59	5.78	- 1.79	9.46	6.56
1972	2.69	3.58	14.00	9.41	4.61
1973	.23	1.06	5.38	9.71	2.21
1974	-1.39	- .07	-27.68	11.59	0.7
1975	-1.46	.12	-17.43	11.35	0.55
1976	1.87	3.05		11.86	4.36

Source: Canada Housing Statistics 1971 - 1979
Ottawa: Canada Mortgage and Housing Corporation.

mainly speculative, and created what Markusen (1978) described as the speculative bubble.

Of critical importance to this study, is the fact that although all the demand elements discussed earlier are important as individual contributory factors, it was the coalescence of these elements to form a 'speculative bubble' that produced the sharp increase in demand during 1973 and 1974. Furthermore, it was mainly that short period of intense demand associated with the bubble, lasting from mid-1973 to April 1974, that interacted with the sluggish supply system discussed earlier (Section 1.5) to produce the 25 to 30 percent increases in house prices recorded in Metropolitan Toronto.

1.6.3 The Post-boom Period - 1976 to 1979

The demand/supply conditions that existed during the 1976-79 period, though equally interesting, have received much less attention than the period of increase. In this section, conditions associated with the disappearance of the 'speculative bubble' and the market adjustments that resulted are discussed.

1.6.3.1 Demand Conditions - 1974 to 1979

One of the strongest arguments for the importance of speculation in the 1972 to 1974 demand surge is provided by a careful examination of conditions in 1974. It can be argued that except for the expectations of increased prices the pre-conditions existed by 1974 for substantial reduction in demand.

In Section (1.6.2.2) (Migration) it was noted that Ontario recorded a net loss of over 38,000 people between 1971 and 1976. In addition, Beaujot (1978) reports that by 1975 a decline in the rate of natural increase to 1.3 percent had become apparent. These events combined to reduce the demand pressure produced by changing

demographic conditions. The year 1974 also marked the end of the extended period of decline in the attractiveness of alternative investment opportunities. Federal Government bonds, and T.S.E. common shares in particular, which had declined to the lowest period in twenty years (Table 1-6) began to rebound. At the same time, mortgage rates increased in both nominal and real terms.

The addition by 1974 of close to 36,000 new units to the housing stock from starts of 18,122 in 1972 and 17,823 in 1973 (Table 1-7) along with the supply of existing units which high 1972 to 1974 prices brought on the market produced a supply adequate for the high levels of demand. This removed much of the price effect that previous mismatched supply/demand conditions had created. As well, the introduction of rent controls slowed the rate of increase of rents in Ontario and provided a kind of subsidy to tenants. This improved the attractiveness of rental housing in a period when home ownership was increasingly expensive, thus reducing demand. Finally, as the rate of inflation increased, real disposable incomes began to decline. In much the same way that a coalescence of conditions favourable to increased demand produced the short-lived boom of 1973 to 1974, the impact of the demand-reducing factors just listed combined to bring the period of speculative demand to an end in 1974.

Changes in demand factors like fertility rates, migration, and incomes are generally slow in developing and quite predictable. The demand surge generated by the coalescence of these separate elements with a speculative boom was quite sudden and unexpected. Between 1971 and 1974, Metropolitan Toronto experienced the highest level of housing starts for that decade, with the total of 45,000 starts in 1971 being the high point. In addition the perception that

TABLE 1-7

METRO TORONTO HOUSING STARTS, 1970 - 1979
(Apartments Excluded)

YEAR	SFD	SEMI/ DUPLEX	ROW	TOTAL
1970	3,566	3,250	2,689	8,505
1971	6,972	3,670	2,577	13,219
1972	9,101	5,484	3,537	18,122
1973	8,039	3,857	5,927	17,823
1974	6,110	2,552	4,071	12,733
1975	7,338	3,598	4,744	15,680
1976	6,216	3,205	7,462	16,883
1977	5,472	4,086	6,081	15,639
1978	6,257	2,900	4,401	13,558
1979	7,420	4,867	3,070	15,357

Source: Statistics Canada, Canada Housing Statistics, 1970 to 1980. Ottawa: Canada Housing and Mortgage Corporation.

the means of the lower income population had encouraged the Federal Government to spend $200 million in 1970 and an additional $100 million in 1971 to increase demand in the lower income groups. (Interim Report on the special $200 Million Low Cost Housing Program, C.M.H.C., 1970.)

The analysis of the 1973 to 1974 house price boom indicates two kinds of demand for housing. One is a consumption demand, based on the pattern of population growth and household formation and the other is an asset demand for housing based on the rate of return on housing as an asset compared with the return on alternative assets. The consumption demand for housing is generally slow in developing and predictable. This consumption demand can be mismatched with supply at any single period producing a price effect. However, less predictable and more dramatic changes in price can be generated when a substantial asset or speculative demand for housing, created by conditions in the overall economy exogenous to the housing market, is superimposed on the more predictable consumption-related demand to form speculative bubbles.

Speculative bubbles are important: first because they are not easily predictable; second, they are capable of generating their own momentum; third because they have a short response time, but most important because they can affect profoundly the pattern of residential mobility and filtering by the dramatic changes they produce in housing market conditions. One obvious change is in price, which in turn affects the timing of the decision to enter the housing market initially and the quantity of housing purchased both by new and previous homeowners. Both of these effects alter the pattern of

residential mobility and filtering.

Simmons (1968) noted that in the social science literature the broader factors of economic opportunity that are the bases of migration theory at the interstate and international levels have been considered irrelevant to movement within a commuting area, or to patterns of gross migration. Thus, the investigation of intraurban mobility has been primarily the realm of the sociologist rather than the economist. The basic questions of who moves, why they move, and where they move to have been answered, therefore, by the analysis of socio-demographic variables. This study draws attention to the fact that at any given time, the economic conditions both within and external to the local housing market are given for the individual. Thus, all moves, voluntary or involuntary, must respond to these conditions. The specific tradeoffs which each family makes is reflected in the purchase of a particular structure in some defined location at a specific price. The study of residential mobility and filtering should include, then, an appreciation of the economic environment within which these individual decisions are made and the manner in which factors other than the purely socio-demographic, influence individual purchase decisions. The examination of price changes should provide an understanding of some of these factors and improve the understanding of the process of residential mobility and the patterns of urban structure that result.

CHAPTER 2

SURVEY OF THE LITERATURE

The major goal of this study is to understand the impact of price changes on the pattern of filtering and residential mobility in Metropolitan Toronto. When the terms 'filtering' and 'residential mobility' are used, however, they bring with them the variety implied by the many differences in definition and use that have evolved over the years. It is thus of particular importance to this study to review the literature on filtering and residential mobility. The intent is: to understand the terms as they have been used in the past; to examine some of the conceptual limitations that specific definitions have produced; to derive from these various uses that set of socio-demographic variables common to most treatments; to understand the way in which these variables have been analysed; to review the relationships among the variables used; and finally, to discover how the relationships among these variables have responded to changes in the social or economic environment.

2.1 THE RESIDENTIAL MOBILITY LITERATURE

The term residential mobility has been used for more than fifty years to describe a broad range of topics associated with residential change. These have included the physical and causal aspects of movement such as mobility rate measurement, and the length and direction of intra-urban and inter-urban moves.

2.1.1 Mobility Rates

Mobility rate studies generally examine the number and frequency of movers. However, the bases of measurement, the scale of the study, and the time period covered produce substantial differences in the results. For example, Boyce (1969) examined the number of

moves per household, while Simmons and Baker (1972) used per capita moves and compared the rates produced in various sectors of a single city. In addition there seems to be a clear difference between the results discovered by Quinn (1950) in his review of the early mobility literature and those results produced by Simmons, (1968, 1971). Foley and Abu Lughood, (1960), and Simmons and Baker, (1973). Quinn (1950) found that higher ratios occurred in central city locations while Simmons, (1968, 1973) and others found that higher rates occur in both the central city and outer suburbs of metropolitan areas with lower rates occurring in between. Simmons (1968) and Johnston (1968) relate these differences in ratios to stage in the life cycle and socio-economic status of the populations measured. However, as mentioned earlier, it is difficult to compare these results adequately because of differences in the scale, in data and in the analytical techniques used.

2.1.2 Direction of Movement

Much of the work on direction can be traced back to the Concentric Ring theory of urban structure described by Burgess (1929). Burgess described rings of inereased socio-economic status and improved residential accommodation. This work was followed by Hoyt's (1939) Sectoral Theory of Movement which described much the same concept but noted a greater tendency for homogeneity within sectors than within complete rings as Burgess described. Subsequent studies have confirmed that residential change designed to improve dwelling characteristics is generally outwards from the centre to the periphery (Albig, 1932, Rossi, 1955, Simmons, 1974), and furthermore, this overall outward trend tends to consist of a series

of short distance moves (Clark, 1970; Johnston, 1968, Adams, 1969).

2.1.3 Causal Aspects of Movement

The examination of causal aspects of movement produced two dominant explanations. These were changes in the life cycle and in socio-economic status.

2.1.3.1 Stage in the Life Cycle

One of the most frequently cited studies on residential change is Rossi's (1955) examination of Philadelphia, "Why Families Move". This study found "the major function of mobility to be the process by which families adjust their housing to the housing needs generated by shifts in the family composition that accompany life cycle change." Subsequent work has tended to support Rossi's findings that residential movement is related to changes in life cycle (Simmons, 1968, Lansing, 1966, Johnston, 1968, Speare, 1970).

2.1.3.2 Socio-economic Status

In addition to the focus on life cycle changes, several authors (Grigg, 1958, Morgan, 1973, and Clark, 1976) have concluded that changes in the socio-economic conditions affecting the family have been neglected as possible explanatory variables in discussing the impetus to move. In fact, Clark in a (1976) study of Philadelphia found evidence that economic reasons explained as much as twenty-five percent of moves in his sample population.

2.1.4 Destination of Movers

By far, the least specific area of mobility literature is the section that attempts to discuss the destination of movers. Maps of intra-urban migration provide little in the way of clear or definitive patterns. Simmons saw this as the result of the multi-

stage nature of the process:

> . . . Once the decision to move has been made, the family takes another set of factors into consideration. The selection of a new home depends not only on demand conditions (the priorities the family assigns to different types of housing characteristics) but also on supply constraints (the cost and quantity of different types of housing in different parts of the city). Then, too, the search procedure used by a family to examine and evaluate alternative locations is significant. (Simmons, 1968, p. 637)

The major weakness of the 'where' literature lies in its generality. Without a data set which allows accurate analysis of destination patterns, research in this area has attempted to substitute broad patterns based on the length of move, the direction of move, and the preferred pattern of movement between origin and destination. Thus, the conclusions reached suggest that in general: most moves tend to be short (within the local area) reflecting possible cultural constraints or imperfections in the housing market. Higher social classes tend to move farther. Their evaluation procedures are more thorough and embrace a more complex set of constraints. Finally, the characteristics of the dwelling unit itself are critical. In all this, however, the demand for and supply of housing are treated as exogenous factors which simply add constraints to the analytical system.

Throughout most of the mobility literature, the price or cost of the structure is alluded to but seldom enters the analysis in

any important manner. For example, based on a study of Toronto, Gad, Peddie and Punter state:

> The certainty and emphasis of response to certain questions indicate that the movers had very definite, and often quite inflexible, ideas about some features of the dwelling, neighbourhood, and location. The number of bedrooms and the approximate cost of the dwelling are clearly defined. (Gad, Peddie, and Punter, 1973, p. 173).

However, in spite of this statement, no other information about price of structure is discussed. Later in the same article, they comment that many young Jews were impressed with the quality of the housing, the spaciousness of both house and lot, the "soundness of the investment", and the "prestige" location (op cit., emphasis mine) but here again there is no analysis of price effects. As is typical, Simmons also mentions cost and talks about demand/supply relationships without including prices in his analysis (Simmons, 1968). Thus price and house price change have not been used as variables in most socio-demographic analyses of residential mobility.

2.1.5 Theoretical Aspects of Movement

The third major approach in mobility research focussed on the more theoretical aspects of movement and is reflected in the work of authors like Wolpert (1965, 1966), Michaelson (1969), and Bourne (1970). This line of inquiry examines elements of an individual's search process and the level of 'place utility' produced by existing accommodation.

Other theoretical work, not specific to mobility done by Rushton (1967, 1969) and Goodchild and Ross (1971) is especially valuable because it begins to focus on the individual, to examine the range of alternatives and to derive some sort of preference structure that reflects individual choice.

The literature on intra-urban mobility has been produced mainly by the disciplines of Sociology, Psychology, and Geography. As a result, the variables analysed are predominantly socio-demographic and the concepts applied reflect a similar orientation. The most extensively used of these concepts seems to be that of 'stage in the life cycle' followed closely by the associated index of socio-economic status. Although there is clear recognition of the complexity of the housing market, the impact of price effects on mobility has been the subject of little empirical attention in the mobility literature. This lack of a fundamental underpinning of mobility led Quigley (1977) to comment that the conceptual basis for the residential mobility literature is either non-existent or tautological.

2.2 THE FILTERING LITERATURE

While the mobility literature examined many of the physical, causal, and theoretical aspects of residential change from a socio-economic and demographic perspective, the issue of affordability, and particularly those aspects associated with price changes, were not specifically addressed. Analysis of affordability issues and price changes occurred mainly within the context of discussion of the concept of filtering.

Over the past fifty years, the term filtering, like mobility, has been applied to a broad range of issues. These include discussion of:

i) the capacity of the private housing market to provide adequate quantities of safe, sound, and sanitary housing for all income groups;

ii) the most efficient form of subsidy that could be used when assistance to the private market mechanism is desirable; and

iii) the methods of measuring the ability of the filtering mechanism to achieve specified goals or objectives.

2.2.1 The Historical Background to Filtering Studies

One of the first specific appearances of the term 'filtering' in the housing-related literature occurs in a British Special committee report in 1929. The statement was:

> . . . When post-war building began, it was hoped that there would be a gradual movement of the working class population out of the slums into better housing. This might occur in two ways. Either the slum dweller might go directly into a new house or a process of 'filtering up' might occur under which the slum dweller would move from the slum into a better pre-war house, the tenant of which would, in his turn, move into a new house. (British Special Committee Report, 1929)

This statement, viewed critically, is essentially a statement of goals. However, the point of departure is supply (post-war building) and the movement expected is in response to this supply factor. Throughout much of the subsequent discussion of this concept the supply orientation has remained dominant.

In the book The City, Park and Burgess (1928) described a model of urban structure based on their observations of the City of Chicago. In 1939, Hoyt, in a much more detailed and systematic study, described a process of urban growth and developed further the intuitive Park/Burgess model by providing a theory of movement and an 'explanation' of its spatial expression. The sector theory of urban residential development, as it came to be called, contains as its dynamic element, the movement of people through homes of progressively higher desirability as the 'rich' vacate the once expensive structures which have declined due to age, obsolescence, or other factors. The term filtering, as Hoyt used it, referred to this upward movement of families and downward progression of structures through time (Hoyt, 1939, pp. 117-122).

Much of the criticism originally directed at Hoyt's model came because the additional empirical evidence collected contained information on factors such as:

- the rate of growth and change in a community;
- the quality level of new construction; and
- the spatial distribution of new construction as it related to socio-economic groups.

These factors, together with the purpose for which the study was done - government policy making - brought forth much discussion of the value-laden nature of these findings and clouded the use of the term filtering.

2.2.2 The Theoretical Models

In 1936, Fisher and Ratcliff attempted to measure the effectiveness of filtering as a mechanism for improving housing standards. Their conclusion was:

> . . . that no evidence has been adduced that dependence can be placed on this procedure for substantial improvement in the housing condition of the lower income group. Cures of a more positive nature are demanded (quoted in Smith, 1970, p. 7).

Between 1939 and 1949, the term filtering came to be commonly used in the literature. However, without a consistent or generally accepted definition, the term, as used, meant different things to different people. In 1949, Ratcliff attempted to examine one of the more frequently used definitions and discussed what he considered to be the conceptual and practical weaknesses of that definition. He writes:

> . . . It is a common argument that the needs for additional housing on the part of low-income groups can be met by the production of new housing for higher income groups. Thus, used houses will be released to be passed down to successively lower levels until the effect has reached the bottom of the market. This process is popularly referred to as filtering down, and is described most simply as the changing of occupancy as the housing occupied by one income group becomes available to the next lower income group as a result of a decline in the market price, i.e., in sales price or rent value. (Ratcliffe, 1945, p. 322)

Ratcliffe maintains that there are two major prerequisites for successful filtering:

> i) there is the need for an initial surplus which must be passed down to each successive level; and
>
> ii) the price decline must exceed the quality decline so that the housing passed on would be of better quality than that presently occupied.

In his discussion of these requirements, Ratcliffe pointed out that the kind of surplus required to provide filtering would also have the effect of severely curtailing new construction, and, would be short-lived. Similarly, if an accelerated price decline occurred, then the economic decision would lead to net cutbacks on maintenance expenditure, such that the initial price decline would be followed shortly by accelerated quality declines. His conclusion regarding the filtering process is that:

> . . . as a short-run remedy for the acute housing problem posed by substandard accommodations, it is not an easily controlled device nor is it likely to be effective. (Ratcliffe, 1945, p. 328)

In 1951, Fisher and Winnick set out "to re-examine the filtering concept and to reconsider its meaning as a guide to the empirical researcher" (Fisher and Winnick, 1951). In their paper, they used, and placed a lot of reliance on, a concurrent study done by Grebler on the lower east side of Manhattan (Housing Market Behaviour in a Declining Area). A major question posed by Fisher and Winnick is: in measuring filtering "are we to infer a decline in the occupant's income from knowledge of the rent behaviour, or are we to infer a decline in rents from knowledge of the occupant's income?" They go on to say:

> . . . the weakness in some of the current discussions of the filtering concept . . . may be summarized as follows: i) There is some confusion between the process of filtering (lower rents and prices) and its effects (succession of occupancy by low-income classes); ii) they give no satisfactory indication of how to detect and measure lower prices, rents and incomes; iii) the explanation of how filtering is produced is less than complete. (Fisher and Winnick, 1951, pp. 47-58)

The empirical pitfalls discussed by Fisher and Winnick include: the problems involved in deflating current dollar values into constant dollars and also the interpretation of the results produced. They argue that:

> . . . deflation of two current dollar rentals of price for two different periods in time can measure only a single change, namely the change in the real value of the rent expenditure. . . which is not at all synonymous with filtering. . . Deflation of rents cannot measure filtering. (1951; p. 51)

Fisher and Winnick contended, further, that changes in the rent-to-income ratios are potentially misleading as these changes may reflect adjustments in other basic factors such as a change in the position of housing in consumer scales of preference, or possibly a change in income.

Fisher and Winnick conclude that most other definitions fail to recognise

> . . . that the physical decline in housing quality and the concomitant decline in rents or price constitute a movement relative, not to all other prices, but rather to the quality structure of housing in general, as measured by rents and prices. (Fisher, E.M., and Winnick, 1951, p. 51)

The definition of filtering they propose is:

> . . . a change over time in the position of a given dwelling unit or group of dwelling units within the distribution of housing rents and prices in the community as a whole. Filtering can be depicted as the change of a given dwelling unit's place in the frequency distribution of rents or prices. (Fisher, E.M., and Winnick, L., Journal of Social Issues, 1951; pp. 47 - 58)

In this formulation filtering is measured by assessing, in standard deviational units, the extent of price displacement of a unit's position in one time period as compared to other periods measured. The advantage of this method seems to be that no transformation into constant dollars is necessary, since the movement is related to the housing standard for each period. Fisher and Winnick do admit, however, that major structural changes weaken the validity of the test and that maintenance and repair decisions may also affect outcome. The final caveat proposed by Fisher and Winnick is that:

> . . . for filtering to be objectively assessed, the market must be left free to express itself in terms of dollar rents, and prices. Rent control interferes with the operation of the market mechanism. It reduces the strength of the implication that relatively lower rents will be followed by low-income occupancy. (1951, p. 57)

A major critique of the Fisher/Winnick model was done by Lowry. Lowry's (1960) model assumed that units decline in quality with the passage of time. The demand for better quality among the higher socio-economic groups leads to new construction for these groups, allowing the vacated quarters to be 'passed down' to the less affluent at lower prices. Because movement only occurs when housing quality becomes unsatisfactory, actual improvement in quality would require increased incomes. Furthermore, if prices fall faster than quality allowing a real improvement in quality to low-income groups, then the landlords would recoup their losses by reducing maintenance making the supply of 'good-quality', low-cost housing short-lived. Lowry's model is one of the few early theoretical models that specifically addresses the problems of maintenance expenditures and price change.

In an attempt to ascertain the requirements for effective functioning of the filtering process, Kristof (1974, p. 317) developed from the existing literature some parameters that were acceptable to most analysts. These parameters are:

i) New construction must be greater than the rate necessary to house normal growth; i.e., an excess of housing supply over demand at the point from which filtering is to originate.

ii) New construction exerts a downward pressure on rents and prices of existing housing, permitting lower income families to obtain better housing bargains relative to their existing quarters.

iii) Exogenous factors are held constant, including the general level of incomes and rent to income ratios.

iv) Decline in quality is not necessarily forced by reduction in maintenance and repair expenditures to the extent that rents and prices are forced downwards.

v) A mechanism must exist to remove the worst housing from the market without adversely affecting rents and prices of housing at the lowest level.

These parameters summarize, basically, the views of Ratcliffe, Grebler, Fisher, and Winnick, and to a limited extent, Lowry and Grigsby. The clear emphasis on supply elements is indicative of the overall approach found in early theoretical expositions. In fact, as Kristof's summary shows, major demand elements are considered to be exogenous, and are held constant.

2.2.3 Grigsby's Matrix Approach

Another major piece of scholarly research done on the topic of filtering was put together by Grigsby (1963). In his book, Housing Markets and Public Policy (1963, p. 57), Grigsby provides a thorough examination of the literature up to the time of his writing. He discusses the work of Lowry, Fisher and Winnick, Ratcliffe, and other authors, then develops his own approach to the problem.

Grigsby's 1963 work is, essentially a refinement of earlier work done in the Philadelphia area housing market in which he subdivided the study area into submarkets based on location, tenure, value and race of occupants, and attempted to trace the effects of aggregate changes in population, income, and employment location on each submarket. (Grigsby, W., 1960)

Grigsby said of this initial attempt:

> . . . this model, however had no automatic feedback mechanism which would correct for improbable results. Moreover, it was incapable of illuminating a number of important policy questions regarding construction and maintenance of the existing stock. (Grigsby, 1963, p. 31)

He, therefore, attempted to refine his approach. He focussed on the movement of the household, for as he wrote, "the dwelling unit is immobile, so the family must move." Thus, he used a matrix approach to examine movement within and between submarkets.

Grigsby defined a housing submarket as:

> . . . an area where substitutability is sufficiently great to produce palpable and observable cross-relationships in respect of occupancy sales, prices and rents, or in other words, whether the units compete with one another as alternatives for demands of housing space. Grigsby, 1963, p. 34.

These submarkets are viewed as a series of discernably disparate entities joined by linkages into a total market continuum. These linkages are not necessarily symmetrical (i.e., equal in both directions) but they do serve to diffuse the effect of changes in any single submarket through the rest of the system. His goal was the creation of a matrix of housing submarkets which could help to predict the impact of economic and social trends, and particularly governmental actions, on various sections of the supply. Two approaches were used:

i) an examination of change patterns; and

ii) a historical analysis of the absolute and relative value shifts among various submarkets.

To achieve this purpose Grigsby set up an hypothetical community. His initial assumptions were:

- a demographically stable, residentially mobile society;
- the community contained ten families adequately housed and stable with respect to total number and also with respect to age, sex, race, family size, family composition, and income;
- all families moved every five years to quarters suitable to their new needs and income position;
- at any moment in time, only one family had sufficient income to buy a new house;
- housing was owner-occupied and did not suffer from deterioration or technical, site, or locational obsolescence; and
- all housing was standard (Grigsby, 1963, p. 110-111)

Grigsby then relaxed each one of these assumptions in turn and provided a conceptual analysis, but no empirical examination, of the results. The actual matrix analysis is very simple. Davies describes it as "no more than a simple cross tabulation. It relates the characteristics of recent home purchasers to the characteristics of homes which were purchased" (Davies, 1977; XIII-7). However, the thought processes that contribute to his model and which are discussed at length in early chapters of his book provide an important contribution to the work on the subject.

2.2.4 The Assignment Problem

Following Grigsby (1963), another attempt was made to utilize a matrix approach to shed light on the filtering concept. Smith (1970) used a version of the assignment problem approach. Like Grigsby, he set up an hypothetical community. A set of clearly defined assumptions was laid out specifying the limits of the model. At this point, Smith asks questions of his model.

One of the important elements of this formulation is the creation of a "market demand matrix" (Table 2-1). This consists of the bids (reflecting elasticity) made by each family (one to five on Table 2-1) on each house (Units A to E on Table 2-1). The issue then becomes simply the solution of a linear maximization problem. Since the problem remains linear in nature, the optimal assignment (that is, the one that provides the highest total economic value) lies on the principal diagonal. This produces the result that the families and houses are matched in the same order, i.e., the highest income family occupies the most desirable house. As each new question is posed to the model, the structure of the market demand matrix changes appropriately.

TABLE 2-1

SMITH'S MARKET DEMAND MATRIX

UNITS

FAMILIES	A	B	C	D	E
1	L	+ 5	+ 9	+12	+14
2	+10	+16	+21	+25	+28
3	+20	+27	+33	+38	+42
4	+30	+38	+45	+51	+56
5	+40	+49	+57	+64	+70

Source: Smith, 1970, p. 19.

One of the interesting concepts introduced is the attempt to simulate the response of the hypothetical community to new construction. Smith describes an Economic Value (EV) curve. This is obtained by inserting a new house at each quality level and measuring its impact on the aggregate rent offer. The net results are then plotted to form an EV curve. Using Smith's assumption of a constant positive demand elasticity, this EV curve is convex. The implication is that unless the cost curve for construction is linear or concave, then new construction, which occurs where the EV curve touches the cost curve, only occurs at high-income (cost) levels.

Edel (1972) and Davies (1977), in separate studies, criticised Smith's, 1970 model, especially the assumption of a centralised, decision-making system controlling housing construction. They assert that in the real world, it is not the total welfare (Smith's maximand), that is important to the developer. Edel also questioned Smith's concept of welfare impact. He suggested that a larger volume of construction would result in greater consumer surpluses, a higher level of housing, and thus, a greater aggregate welfare.

Davies attacked Smith's assumption of constant increasing income elasticity of demand. He suggested that it is most reasonable to expect incremental bids which are positive but decrease as the quality level increases. Thus, the shape of the Economic Value Curve which is, in fact, based upon the assumption of increasing demand elasticity for quality, is changed. It follows that, given the same cost function, the level at which new construction occurs will also change.

In both the matrix approaches discussed, the demand effect is negated. Grigsby does this by fixing the demographic response and by assuming that at any specific time only one family has sufficient income to buy a home. Since even the long-term trend is predetermined, demand is, therefore, fixed at some rigidly specified level. Smith includes the concept of demand but negates its impact by using a constant demand elasticity. This allows his linear solution but precludes any supply/demand imbalance. His major interest in this study is the reponse of the community to new construction. Thus, the matrix approaches, like the models that preceded them, maintained the supply orientation.

Margolis (1977, p. 14) in a critique of early filtering models, wrote:

> In general, the early filtering models (Ratcliffe, 1949), Grigsby (1963), Lowry (1960), Smith (1964) tended to stress the mechanics of transactions and the resulting shifts in occupancy. The fault of these models is that they give little or no attention to prices.

2.2.5 The Commodity Hierarchy Model

In the mid-seventies, the work of Sweeney (1974) introduced mathematical rigour to the study of housing dynamics. Sweeney used a commodity hierarchy approach, utilising the mathematics of set theory. The rental housing market is conceptually partitioned into a number of discrete quality levels based on consumer preference. These discrete quality levels are formalised into a hierarchy with each level characterised by a market rental price which could vary independently of other prices. The levels of the hierarchy were numbered from one to 'N' with one being the lowest order of preference.

Three equilibrium states were analysed in this formulation:

i) short run (temporary);

ii) stationary; and

iii) long run (normal).

To provide internal consistency, the concept of quality was very rigorously defined, and all features of the housing market which could not be subsumed under the concept of quality (e.g., location) were omitted from the model. The remaining considerations allowed housing units of different quality levels to be considered as distinct substitute commodities.

Short-run equilibrium is defined as the situation where supply equals demand for each level at which rental price is greater than zero. In this short-run situation, the stock of housing is fixed and independent of price. However, in the longer-run situations, the supply vector is modified by new construction, by demolition, or by deterioration over time through progressively lower levels, until houses are demolished or their price is reduced to zero.

In the system, a maintenance function is derived which expresses the decisions by landlords to maximize the present value of profit. It is this function that determines the rate of deterioration. New construction is dependent upon profit which, in turn, depends upon the rental prices in each quality level below the level from which any unit deteriorates.

In stationary equilibrium (defined as 'a state of temporary equilibrium where prices are constant over time'), the prices at each quality level will depend upon stocks at every level and upon incomes

and preferences reflected in demand functions expected to influence the supplies of units at all levels. This formulation is reminiscent of Grigsby's concept of linkages which tie the different submarkets together in a continuous system and disperse the effect of changes in any submarket through the entire system.

The model goes on to specify short- and long-run construction rates and demand functions. Some of the underlying assumptions for the demand function specification are important. In addition to the normal assumptions of rationality and maximization of utility, Sweeney allows families to relocate outside the market or to double up within it in response to price increases. However, he does not allow occupancy of more than one unit at any given time.

One notable feature is Sweeney's use of the term filtering. He utilises the concept of the structure moving into successively lower quality levels even during equilibrium but carefully avoids the population movement, or welfare problem, inherent in the Ratcliffe definition. Thus, by setting up a preference function of rent bids, there is a population at each quality level which has established a bid structure irrespective of previous occupancy. This system also avoids Smith's unrealistic assumption of having each family bid on each house in the hypothetical community, as it does the problem of vacancy creation. According to Margolis (1977), the major departure from previous models of filtering is the specific consideration of the effect of relative price on supply and demand for housing by quality category. The model depends heavily on the assumptions about the aging process and the effects of maintenance on the value of housing services provided.

The use of equilibrium conditions produces a type of problem similar to those discussed earlier. Here again, there is no allowance for a demand/supply imbalance. This assumption allows for more precise mathematical modelling of the hypothetical situation, but completely removes the possiblity of price overshooting due to an inelastic supply or a demand surge. However, both these conditions are endemic to the housing market and thus the use of equilibrium models is a limitation even within Sweeney's model.

2.2.6 The Simulation Models

An approach complementary to Sweeney's analytical investigation of housing market dynamics is provided by Ohls (1975, p. 144). Ohls uses computer simulation techniques to operationalise a filtering model which can analyse "the possible effects of alternative government policies aimed at increasing the housing consumption of the poor."

The housing market is divided into sixty discrete quality levels, each rigorously defined to preclude overlap. Thus, unlike the Grigsby formulation, the market does not approximate a continuum. Ohls specifies eight assumptions and twelve equilibrium conditions. The basic assumptions are:

i) no housing is owner occupied (i.e., total rental market);

ii) the output of housing services is characterised by the single variable SERV;

iii) the levels of housing services are finite (i.e., values of SERV are discrete and bounded;

iv) new construction can occur at any level and the cost is proportional;

v) buildings depreciate over time at a rate determined by the maintenance expenditures;

vi) buildings are owned by profit maximizing entrepreneurs;

vii) housing consumers are utility maximizers; and

viii) all markets are competitive.

The model takes as exogenous:

a) consumer preferences;

b) the income distribution of the population; and

c) housing market technology.

It then solves for equilibrium levels of such endogenous variables as the allocation of families to dwelling units, rental and asset prices of dwelling units, construction rates at various quality classes and maintenance rates (Ohls, 1976, p. 145-149).

The simulation is run on 8,100 hypothetical families which occupy positions between the first and 92nd income percentiles in a lognormal distribution. The solution of the model involves an algorithm which searches out and matches the highest income with the greatest quantity of housing services.

Each successively lower level of income is matched against the quality level until a family is picked up whose income is so low that it chooses to live in substandard housing. Building on this knowledge of the cut-off point, the algorithm solves for all other endogenous variables. In general, the results are based on a long-run equilibrium model, although the dynamics involved in moving from one long-run equilibrium state to another are not specified. Families are

expected to spend 20 percent of income on housing services. This assumption of an expenditure of 20 percent of income is fixed for all income levels.

The model is used to assess the impact of the rent voucher subsidy plan. In this simulation, no housing is constructed by government, but the bottom 20 percent of the population is given a subsidy of half their monthly rental bill, up to a maximum of $91 per month. No restrictions are placed on the housing that can be purchased. The results of this simulation show that the voucher programme increased the consumption of housing by three quality classes. This makes the construction of housing at higher levels more attractive, stimulating construction and increasing the rate of filtering. Ohls writes (1975, p. 161):

> The simulation results suggest that, even if the market does not respond by producing new dwelling units for the poor, there may still be the possibility of considerable improvement in poor people's housing conditions through increased building of homes which eventually filter down to the poor, and through better maintenance of existing buildings.

The next programme analysed involved government intervention resulting in the new construction directly for the poor. The method used to simulate this is to remove the bottom 20 percent of families from the population. The results show that the amount of new construction in the regular market decreases and the lowest quality level at which construction takes place is changed from level 34 to level 38. This causes the weakening of the used housing market as the demand for this type of housing is lessened. Thus, the bottom level of homes moves up from level 5 to level 8. Middle-income families

suffer from the weakening of the market, but the price of housing in the lower quality ranges is lowered. The two approaches are compared on a cost efficiency basis and Ohls concludes that the rent voucher plan is "considerably more efficient than the new construction programme in terms of minimizing costs for a given amount of improvement in poor people's housing." Ohls (1975, p. 165) concludes that:

> It may well be the case that government policy can more efficiently (in terms of cost to the government) achieve the objective of increasing poor people's housing consumption by employing programmes - like rent vouchers - which work through existing markets rather than by using programmes which involve new construction directly for the poor.

The gap between those studies which are predominantly theoretical, like Sweeney's, and those which are entirely empirical is bridged by the filtering submodel of the NBER Urban Simulation Model (Ingram et al. 1972). The Detroit Prototype uses 27 dwelling and 44 residence types providing 1,188 possible demand equations. The problem of assigning households to quality classes of housing is handled by using problemistic demand functions based on the relative gross prices of different housing types. These average gross prices are generated by a two-part weighting scheme which considers among other factors, the distribution of the housing stock and the distribution of work trips.

Filtering is represented in the model by a change in the physical quality of units. Unlike the two models discussed earlier, the NBER formulation allows units to filter up because of rehabilitation or maintenance, in addition to filtering down due to

reduced investment. Thus, quality in this system stems from the maintenance and rehabilitation experience of the dwelling unit over time.

Time is represented by market periods of one year and the amount of maintenance is calculated by determining the value of the house at the end of the period, if there is no maintenance, and comparing it with the value due to differing quantities of maintenance. The difference in value that results is the maintenance value. Thus, a unit may decline in value despite some level of maintenance investment. In the model it is assumed that landlords invest in maintenance until their marginal costs are equal to their marginal returns.

The filtering submodel operates on the basis of vacancies produced by the supply sector (i.e., vacant units produced during the previous time period as well as vacancies produced during the existing period). This comprises approximately 25 percent of the standing stock in each period. Each dwelling unit type is described by a vector of characteristics which are rigorously associated with price differences or quality premiums. The cost of upgrading a unit from a lower to higher class is supplied exogenously to the submodel. By dividing the upgrading cost by the quality premium for that type a profitablity measure is created. The direction and extent of quality change is determined "by the interaction of the quality premium - upgrading cost ratio with the response function termed FILTER. This function operates on the profitability ratio and alters the quality level of available units."

In this model, only the net effect of movement is considered as the model does not consider every unit. The filtering rate is further limited to plus or minus ten percent in any period to prevent instability and artificial price cycles within the model. The model is applied separately to each of the 44 residence zones, because of differences in price levels and filterings rates that vary by zone. The authors concede, however, that:

> . . . It is very difficult to test the hypotheses in the filtering submodel and compare them with alternative formulations because time series observations of dwelling unit quality and value are virtually nonexistent (Ingram et al. 1972, p. 113).

2.3 SUMMARY

The literature on intra-urban mobility reviewed in this section reflects a strongly empirical but weakly theoretical approach, with much attention focussing on the broad composite indices of 'stage in the life cycle' and socio-economic status. In general, this literature acknowledges, but does not examine, price effects on housing market conditions. The filtering literature, on the other hand, does treat prices and market conditions, but here the emphasis is predominantly theoretical. The reigning paradigm in economics favours the deductive approach, especially the formulation and application of equilibrium models. This approach, while mathematically more rigorous, is limiting in an area of study where equilibrium conditions are the exception rather than the rule.

The approaches taken, in the literature reviewed, have tended to treat mobility or filtering separately and have not addressed, directly, the obvious relationship between the two elements. However, the relationship between mobility and the housing market has long been recognised. Rossi (1955, p. 17) wrote:

> Residential mobility was finally interpreted as a phenomenon of the housing market, driven by autochthonous changes that take place as families and households form, grow, decline in size and eventually dissolve, and conditioned by income and the housing opportunities presented by the local housing market.

A similar line of thought was expressed by Grigsby (1963, p. 77) when he described residential mobility as the joining of supply and demand. He wrote:

> For potential value shifts to become realized there must be transactions in the market, and, in most instances, movement of families into or out of a particular dwelling unit. . . Thus while it is fruitful to approach the question of price or rent change through examination of supply and demand factors in general, there may be some merit in focussing specifically on the demand implications of the movement process.

Thus, the failure to address the relationship between mobility and filtering directly can be attributed both to the lack of appropriate data and to differences in the analytical approaches favoured by each discipline. As a result, one valuable data set, price data, have not been fully utilized.

In assessing filtering this study uses an empirical approach focussed on prices. The goal is to analyse how changes in the pattern and rate of increases in the decade of the 1970s affected the timing and quantity of residential purchases in Metro Toronto, and to assess how these changes affected the pattern of filtering and residential mobility in the study area.

CHAPTER 3

THE DATA

In a research endeavour, the choice of a sample design and variables depends on the problem, the type of analysis to which the data are to be subjected, and the logistical constraints of data collection. An analysis of the impacts of price changes on the pattern of filtering and residential mobility required, ideally, time-series data covering the price and physical elements of the structures sold, and the socio-economic characteristics of the purchasers. However, in a study area the size of Metropolitan Toronto even a small representative sample would result in a large number of cases. Thus, the time constraints and the expense associated with collecting primary data (administering a questionnaire survey of the size necessary for this study), required that published data sources be used wherever they were available.

In selecting the data used in this study, three principles were applied. The selection attempted: to provide the most comprehensive coverage for the study period 1970 to 1979; to select variables that would allow the results of this study to be compared to other work done on this topic; and to ensure that the data were compatible with the type of multivariate analyses performed. These criteria resulted in the use of price data from three sources and socio-economic and demographic data from two additional sources. These can be listed as follows:

- The price data:

  - Teela Market Surveys;
  - Canada Mortgage and Housing files; and
  - Toronto Real Estate Board Publications (House Price Trends)

. The socio-economic/demographic data:
- The Census of Canada; and
- The Survey of Housing Units 1974.

The results of any analysis depend heavily on the quality of the data used, therefore, a brief discussion of each of the sources used and the manner in which the data were collected is provided in the following pages.

3.1 THE PRICE DATA

As noted earlier, three sources of price data were used:

. Teela Market Surveys;

. Canada Mortgage and Housing Corporation; and

. The Toronto Real Estate Board

3.1.1 Teela Market Surveys Data

The legal requirement that any modification in ownership or the conditions of ownership be reflected in the land title documents provides, at land registry offices, a quantity of information relating to each property sold. This includes address, previous owner, new owner, sale price, cash paid to vendor at time of purchase, date of sale, and the number and size of outstanding mortgages. Much of this information is collected for the Metropolitan Toronto area by a commercial statistical service called Teela Market Surveys (Teela). The data, presently available on microfiche or hard copy, are organized with an alphabetical listing of addresses by municipal sub-components of Metropolitan Toronto. In addition, Teela separates the purely residential sales from commercial and industrial transfers.

A one percent systematic sample was drawn from Teela records for each of the years from 1972 to 1978. This produced a total useable sample of 2,984 cases for the seven-year period, with the

total number of cases in each year varying with the number of residential sales for that particular year. These data have the advantage of covering the full price spectrum of sales of both new and existing houses. Further, they are individual-level data and include addresses.

Some personal judgement was used in the sampling process to eliminate transfers of title that were not bona fide sales. Thus, any transaction of property in which the total price (downpayment plus mortgages) was less than $5,000 has been eliminated from the sample. The sampling process involved the selection of the middle unit on each microfiche 'page' of approximately one hundred listings, although some minor modification had to be made in years where the format was different. Teela data are generally accurate, however the hard-copy and microfiche formats make data collection time consuming and legal access to these records may be expensive.

3.1.2 The Canada Mortgage and Housing Corporation Data

The Statistical Section of the Canada Mortgage and Housing Corporation (CMHC) allowed limited access to unpublished data on N.H.A.-insured houses purchased during 1970 to 1979. The data set included all N.H.A. purchases, but provided only four items of information on each unit, namely:

- purchase price;
- down payment;
- previous tenure; and
- age status of each unit (new unit or resale of an existing unit).

Although this data set has the advantage of including all the

N.H.A.-insured, non-condominium purchases, it has the weakness of over-representing the lower-cost end of the housing market in Metropolitan Toronto.

This weakness is related to a former CMHC policy of limiting the maximum loan amount on N.H.A.-insured houses. This policy continued until June 1974, when the previously prescribed maximum loan of $30,000 was eliminated to permit CMHC to establish loan maxima on national, regional, and local bases from time to time. The change allowed loans of up to $40,000 after mid-1974. However, the average house price in Metropolitan Toronto at that time was $56,000. Table 3-1 shows the average prices of N.H.A.-insured houses during the period 1970 to 1979. In 1974, this average was $42,000, $10,000 less than the average price of the Teela sample, and $14,000 less than the Multiple Listing Service figure of $56,000. This illustrates the lower-end bias in the N.H.A. data.

3.1.3 The Multiple Listing Service (M.L.S.) Data

The Toronto Real Estate Board publishes an annual summary of sales and listings called House Price Trends. The figures are based on the sales of existing units made through use of the Multiple Listing Service (M.L.S.). As a result, these data includes few examples of new house sales. Between 1970 and 1978, M.L.S. house sales represented a minimum of 31 percent, and a maximum of 63 percent of all residential sales in the area.

In addition to the poor representation of new houses in the data, the M.L.S. data are aggregated on the basis of real estate districts. These districts are different from census tracts or enumeration areas, making comparisons with other published data

TABLE 3-1

MEAN PRICE OF HOUSING FOR METROPOLITAN TORONTO - 1970-1979

YEAR	TEELA	M.L.S.	N.H.A.
1970	N/A	29,492	28,786
1971	N/A	30,426	31,042
1972	33,842	32,513	31,987
1973	41,017	40,605	34,640
1974	52,004	52,806	42,296
1975	60,563	57,581	51,838
1976	64,092	61,389	56,491
1977	69,386	64,559	57,840
1978	71,117	67,333	59,005
1979	N/A	-	64,238

Source: Teela Market surveys Microfiche Records 1970 - 1979
Toronto Real Estate Board House Price Trends 1970 - 1980
Statistics Canada Unpublished Data, Statistical Services Division, 1980

sources difficult. However, the data cover the full price spectrum, are easily accessible, and represent a substantial portion of the market.

The three sets of price data, taken together, cover the full range of prices for both new and existing units sold in Metropolitan Toronto during the study period. As Table 3-2 shows, the areas of weakness in any single set is partly compensated for by data from one of the other samples.

3.2 THE SOCIO-ECONOMIC/DEMOGRAPHIC DATA

The major sources of socio-economic and demographic data were the Census of Canada and the 1974 Survey of Housing Units (S.H.U.). Because much has been written on the danger of ecological correlation (Robinson, 1950; Menzel, 1959) special emphasis was placed on the choice of individual-level data where it was available. This led to the use of the Public Use Sample Tapes (P.U.S.T.). In addition, the summary tables of population and housing characteristics Series 'A' and 'B' provide additional coverage at the aggregate level.

3.2.1 The Public Use Sample Tape (P.U.S.T.) Data

The 1971 P.U.S.T. data were the result of the first attempt made by Statistics Canada to present population and household characteristics at the level of the original reporting unit, the household. The data are based on a one percent stratifed sample of individual records drawn from the 1971 Census Master File (derived from the census long-form questionnaire, representing a one-third sample of the original population), and are available for individuals, households, and families at two geographic levels, the province and the C.M.A. However, to prevent linkage of records from one file to

TABLE 3-2

AREAS OF THE PRICE SPECTRUM COVERED BY THE DATA

	HIGH	MEDIUM	LOW
New	Teela	Teela N.H.A.	Teela N.H.A.
Old	M.L.S. Teela	Teela M.L.S. N.H.A.	Teela M.L.S. N.H.A.

Teela 6 Cells
N.H.A. 4 Cells
M.L.S. 3 Cells

another, a separate one percent sample was created for each of the six files produced. The Social Science Computing Laboratory of the University of Western Ontario used the identical census sampling technique to produce a 1/100 sample of the P.U.S.T. C.M.A records which were made available on S.P.S.S. system files. Thus, the version of the P.U.S.T. tapes used in this study is a 1/100 sample of the original household data for the Toronto C.M.A. From this sub-sample, a system file containing 18 variables was created and used in the analysis.

3.2.2 The Survey of Housing Units Data

In the fall of 1974, the Canada Mortgage and Housing Corporation commissioned Statistics Canada to conduct a survey on its behalf. The objectives of the survey were:

1. to delineate housing needs in specific urban markets;
2. to identify the reasons why households change their consumption of dwelling units;
3. to give an indication of the process of deterioration and revitalization of units; and
4. to present a view of constantly changing market values and carrying charges.

Because the data required to accomplish these objectives were not available from any then existing source, a survey was designed and conducted to provide this information. Approximately 74,000 dwellings were selected in 23 urban areas.

The sample design was based upon the following three requirements:

1. Data were to be collected on household and dwelling characteristics which would be statistically reliable at the level of specific urban housing markets, and would be amenable to inter-cycle, cross-sectional analysis.

2. The sample would be so designed that more detailed analysis could be done of low-income households than of middle- or upper-income households.

3. Specific subsets of the data would provide for inter-cycle longitudinal analysis. This was drawn from the 1971 Census.

The final sample design displayed the following features:

1. A household survey was to be conducted three times, the first cycle having been undertaken in the fall of 1974. Each subsequent cycle would collect information on the same set of variables for a common set of households, while fulfilling the requirement that sampling be heaviest at the low end of the household income scale.

2. At each cycle after the first, the sample of dwellings would be updated by a supplementary sample of dwellings constructed since the time of the previous cycle. This was to ensure that for each cycle the total sample would be representative of the dwellings in existence at the time of sampling.

3. The data required for longitudinal analysis would be produced by linking the household and dwelling characteristics measured in the fall of 1974 (the time of the first cycle) with the dwelling characteristics measured by the 1971 Census for the same set of dwellings selected.

The target population for the survey was the set of private dwellings which were in existence during the reference period (September 30, 1974 to December 6, 1974) for the 23 designated areas. Since no one sampling frame of the population existed, it was necessary to divide this one population into three subpopulations

for which such frames were available. These populations and their corresponding frames were:

1. All private dwellings in the designated areas which had been constructed prior to June 1, 1971 and which were occupied on June 1, 1971. Units were selected from this subpopulation through the 1971 Census of Canada file of occupied private dwellings. It should be noted that private dwellings, and not individuals, were the ultimate sampling units selected from this census frame.

2. All private dwellings in the designated areas which had been constructed prior to June 1, 1971 and which were vacant on June 1, 1971. Units were selected from this subpopulation through the 1971 Census of Canada records of vacant private dwellings.

3. All private dwellings in the designated areas which had been constructed since June 1, 1971. Units for this subpopulation were selected through Statistics Canada's records of issued building permits.

The basic survey taken in 1974 and based on the three frames listed above was the Survey of Housing Units (S.H.U.). For units in the sample of census-occupied units, the information from S.H.U. was linked back to the corresponding record from the Census. This link is by dwelling unit not by household. This data set was called the Linked Survey Data and formed the basis of longitudinal inter-cyclical analysis.

Since it was considered useful by CMHC to have information on the previous dwelling units occupied by all households that appear in the 1974 sample, those households which entered dwelling units in the sample after 1971 (and, therefore, are not included in the 1971

census link) were asked to complete a so-called "Recall and Mobility" questionnaire. This questionnaire, as the name suggests, includes detailed information on the characteristics of the dwelling unit occupied by these households in 1971.

The final data set included, therefore, individual and aggregate-level data on both the prices of the houses sold and the characteristics of the purchasing group for the period 1970 to 1979. Table 3-3 provides a brief summary of the strengths and weaknesses of these data. The data set used is less than perfect; however, given the logistical constraints it provides a fair representation of data available on this topic for this study area at the present time.

TABLE 3-3

SUMMARY EVALUATION OF DATA

	STRENGTHS	WEAKNESSES
CENSUS	Scope of coverage on population characteristics, dwelling characteristics, ease of access. Reliable.	No longitudinal coverage. Summary data.
P.U.S.T.	Same as Census.	No longitudinal coverage. Areal units of C.M.A. level or Provincial level.
S.H.U. et al.	Scope of coverage on population and dwelling characteristics. Some longitudinal element.	Not easily accessible. Limited longitudinal potential. Unreliable coverage in critical areas.
N.H.A.	Large number of cases. Highly reliable coverage of elements provided.	Not easily accessible. Limited coverage due to confidentiality. All geographic data suppressed. No coverage of the upper end of the market.
M.L.S.	Good coverage of prices. Some longitudinal coverage. Easily accessible.	No population data. Geographic data useless for this study.
TEELA	Excellent price data. Complete price spectrum covered. Good geographic information. Easily accessible.	1 percent sample. Gaps in coverage for some years. No population characteristics: Transfers may not always be bona fide sales.

CHAPTER 4

ANALYSIS OF THE PRICE STRUCTURE

The major hypothesis of this study that severe fluctuations in the rate and direction of house price change affected the timing and quantity of housing purchased and consequently the pattern of filtering and residential mobility requires clear demonstration that significant changes did occur in house prices within the study area in the years 1970 to 1979. The pattern of house price change revealed by this analysis is discussed and the conceptual implications for filtering and residential mobility analysed in later chapters.

4.1 DEFINITIONS

During this study the terms house price, price structure and market area are used frequently. To avoid confusion in interpretation, these terms, as they are used througout the study are defined as follows:

> House Price is defined here as the figure that results from a bona fide, arms-length agreement to purchase a house. This figure reflects the amount that a house purchaser, willing and able to buy, would pay to a seller, willing and able to sell and represents the value to both parties of land and structure at time of purchase. By definition this excludes the figures that result from transfers within a family or corporation or any similar transaction which produces a total that does not represent reasonable market value at time of sale or purchase.
>
> Price Structure is defined as the distribution of prices occurring within varying sectors of the market. Specifically it refers to differences in the rate price of change between years, and the rate and pattern of price increase or decrease within individual years. No attempt is made here to create any form of hedonic price index which disaggregates price changes and can apportion elements of the change to specific component variables.

The Study Area is Metropolitan Toronto, or Metro. This includes only the municipalities of North York, Scarborough, York, Etobicoke, East York and Toronto.

The Market or Market Area is considered here to be synonymous with the study area. While it can be argued that several other definitions would be superior, the need to limit the area of study to a manageable unit was given preeminence.

4.2 ANALYSIS OF PRICE STRUCTURE

The data analysed in this chapter are the N.H.A. data set representing N.H.A. insured purchases of non-condominium units, 1970 - 1979; a sample of Teela records, described in Chapter 3 and summary data taken from various Toronto Real Estate Board (T.R.E.B.) publications covering the 1970 - 1979 period. The analysis focusses on the rate of house price change between years over the ten-year period, as well as the differences in the extent and timing of price change at various points along the price spectrum for each year.

4.2.1 Analysis of the N.H.A. Data

The N.H.A. data set represents the total number of N.H.A.-insured purchases for all residential ownership types, excluding condominiums, for the period 1970 to 1979. These data are broken down into categories of 'new' or 'existing' at time of purchase. Initial examination of the N.H.A. data set revealed a wide fluctuation in the total number of houses insured annually over the study period. The figures vary from a low of 212 in 1974 to a high of 3,205 in 1979. Table 4-1 shows that between 1970 and 1972, total sales increased from 522 to 1,454. In 1973 and 1974 sales drop sharply to the low of 212 then increase again to a high of 3,205 in 1979. When the total sales figures are disaggregated into categories of new and existing, a definite change is observed in the composition of units sold. From

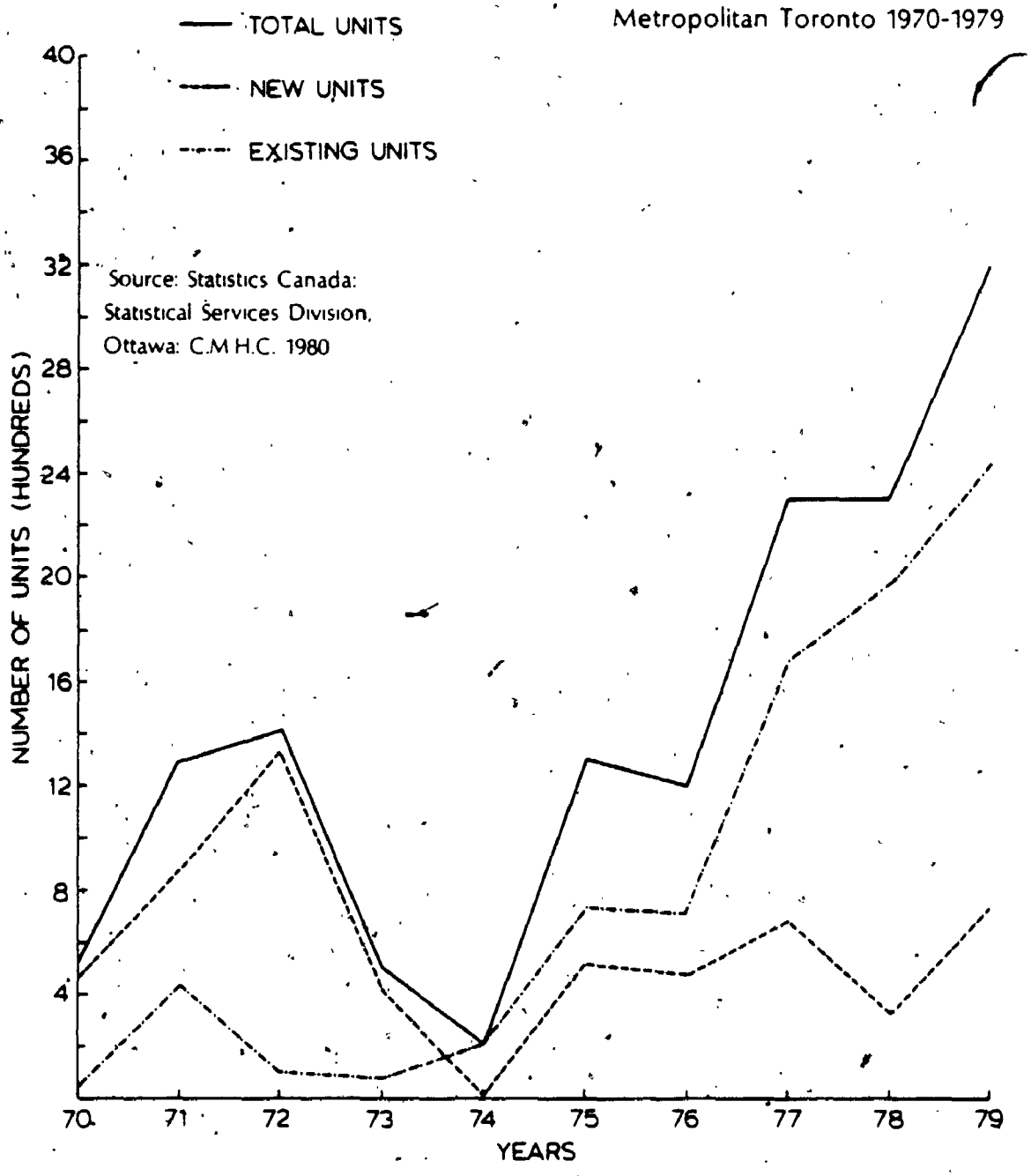
TABLE 4-1

N.H.A.-INSURED PURCHASES OF NON-CONDOMINIUM OWNERSHIP UNITS
METROPOLITAN TORONTO 1970 - 1979

YEAR	NEW	%	EXISTING	%	TOTAL
1970	464	88.9	50	11.1	522
1971	871	93.5	454	6.5	1,325
1972	1,342	92.3	112	7.7	1,454
1973	432	85.7	72	14.3	504
1974	7	3.3	205	96.7	212
1975	557	42.4	757	57.6	1,364
1976	488	40.1	730	59.9	1,218
1977	683	28.9	1,678	71.1	2,361
1978	346	14.8	1,984	85.2	2,330
1979	769	24.0	2,436	76.0	3,209

Source: CMHC listing of N.H.A.-insured purchases obtained from the Statistical Services Division of CMHC (unpublished in this form, but available in aggregated tables in the publication, Canadian Housing Statistics: Statistical Servcices Division, Canada Mortgage and Housing Corporation, Ottawa.

Fig. 4.1 N.H.A. Insured Sales of Residential Units Showing Total, New and Existing Units Metropolitan Toronto 1970-1979



1970 to 1973, 'new' houses dominate, representing over 85 percent of the totals in each year. In 1974, this changes dramatically and the proportion of new houses drops to three percent. In the following period, the proportion of new houses remains below 50 percent, with values as low as 14.8 percent and 24 percent in 1978 and 1979.

The most pronounced decline in the purchases of N.H.A.-insured houses coincided with the period of sharpest increase in house prices, 1973 to 1974. As mentioned, during this same period, the total number of N.H.A.-insured houses declined from 1,454 in 1972 to 212 in 1974. Two possible explanations are offered. The first is that the maximum loan amount covered by N.H.A. insurance did not keep pace with the price increases. Thus, if the proportion of equity available to the purchaser remained relatively stable, then the available N.H.A. loan would be insufficient to cover the remainder of the increased purchase price. In effect, this priced buyers dependent upon N.H.A. loans out of the market. Second, as house prices increased faster than incomes, those purchasers whose equity came mainly from earned incomes, i.e., first-time purchasers, found that their accumulated equity was not sufficient to satisfy the downpayment requirements of lenders. Thus, the group most likely to use N.H.A. insurance was limited by the price increases. The net effect of these two factors was the drop in N.H.A.-insured purchases during 1973 and 1974.

In addition to the variation in total numbers of houses insured, and the mix of new and existing units that these sales represented, the proportion of the total market that was N.H.A.-insured was examined. Table 4-2 shows that when overall house sales

TABLE 4-2

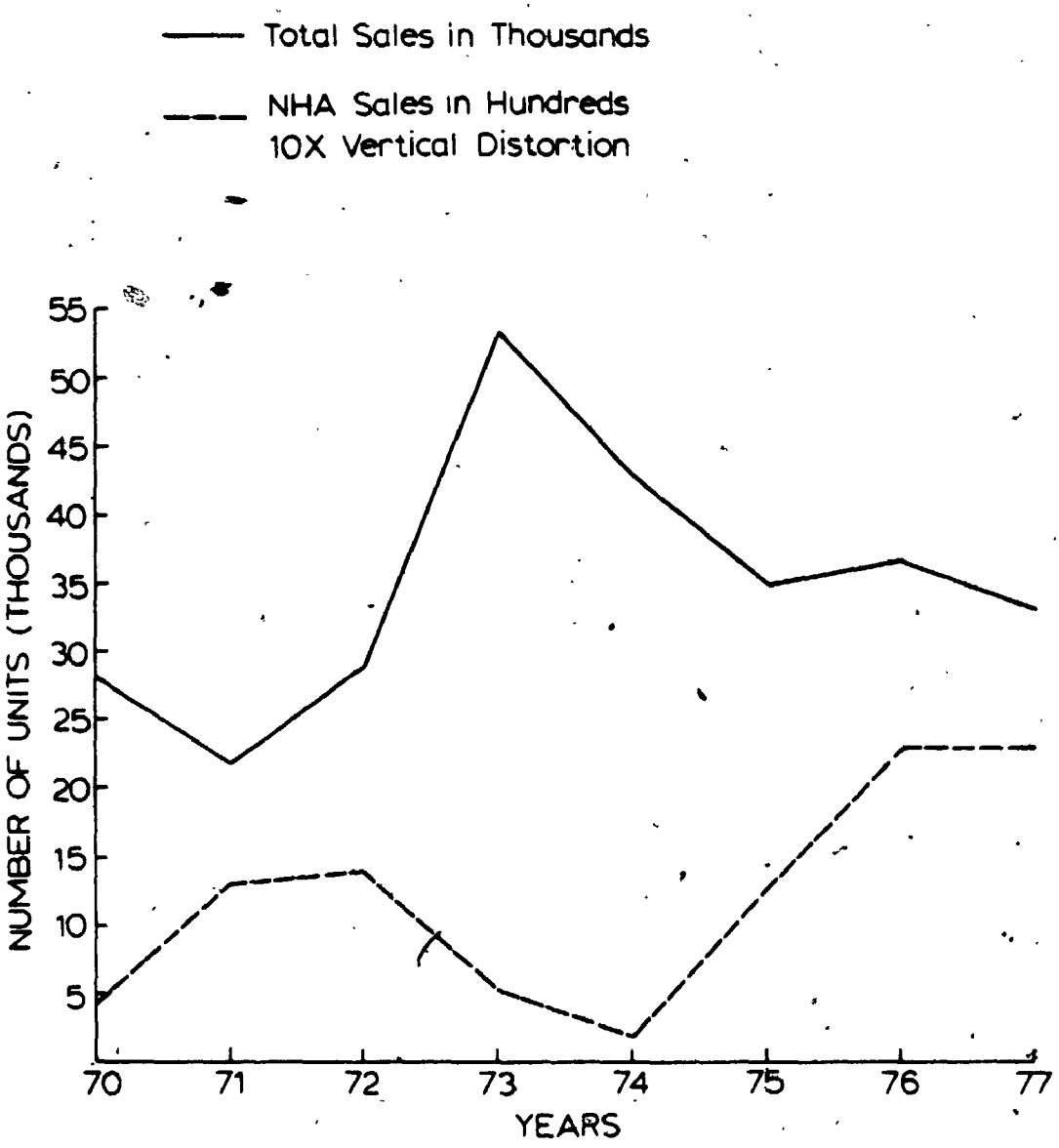
COMPARISON OF N.H.A-INSURED SALES TO TOTAL SALES:
METROPOLITAN TORONTO 1970-1979

YEAR	ALL SALES	N.H.A. SALES	% OF TOTAL
1970	28,401	522	1.83
1971	22,265	1,325	5.95
1972	29,873	1,454	4.86
1973	53,597	504	0.94
1974	42,614	212	0.497
1975	35,411	1,364	3.85
1976	36,359	1,218	3.3
1977	32,747	2,361	7.1
1978	33,851	2,330	6.88
1979	-	3,205	N/A

Source: The data in column 2 (all sales are drawn from the T.R.E.B. publication House Price Trends 1978 to 1981 prepared by the research department of the Toronto Real Estate Board. N.H.A. sales totals were obtained from the Statistical Divison of CMHC.

Fig. 4.2 Total Sales of N.H.A. Insured Ownership Units and Total Residential Sales Metropolitan Toronto 1970-1979

Source: Statistics Canada: Statistical Services Division, Ottawa: C.M.H.C. 1980



increased, the N.H.A. sales declined both absolutely and porportionately. Thus, when all sales in Metropolitan Toronto peaked in 1974 and 1975, N.H.A. sales dropped to their lowest levels (under 1.0 percent). Conversely, when total sales declined to 32,747 units in 1977 from the high of 53,597, the N.H.A. sales reached their highest level at 7.1 percent. Thus, the N.H.A. data, in spite of the actual proportion of the market represented, provides a data source that is closely associated with the overall conditions of the housing market, albeit in an inverse relationship.

4.2.2 The N.H.A. Price Structure (1970 to 1979)

Figure 4-3 illustrates the pattern of price change, in nominal dollars, for the period 1970 to 1979 by plotting the average price of properties in the Teela sample, the N.H.A. universe and those sold by the Toronto Real Estate Board.

All three curves show a pattern of price increase for the period 1970 to 1978. Although the N.H.A. curve shows the lowest mean values, the pattern of increase is similar to the other two. The M.L.S. mean values are highest until 1974, when they are surpassed by Teela. However, the three curves show that price increased from an average of approximately $30,000 in 1970 to close to $70,000 by 1978.

The basic similarity in the shape of the curves suggests that the factors which caused price increases affected all sections of the price spectrum. However, the position of N.H.A. curve relative to the other two indicates that the timing of impact varied. In addition, the step-like shape of the curves suggests that the price increases varied in intensity and in duration over the study period. Examination of column 3 of Table 4-3 shows that in the N.H.A. data the

Fig. 4.3 Average Prices in the M.L.S., N.H.A. and Teela Samples 1970-1979

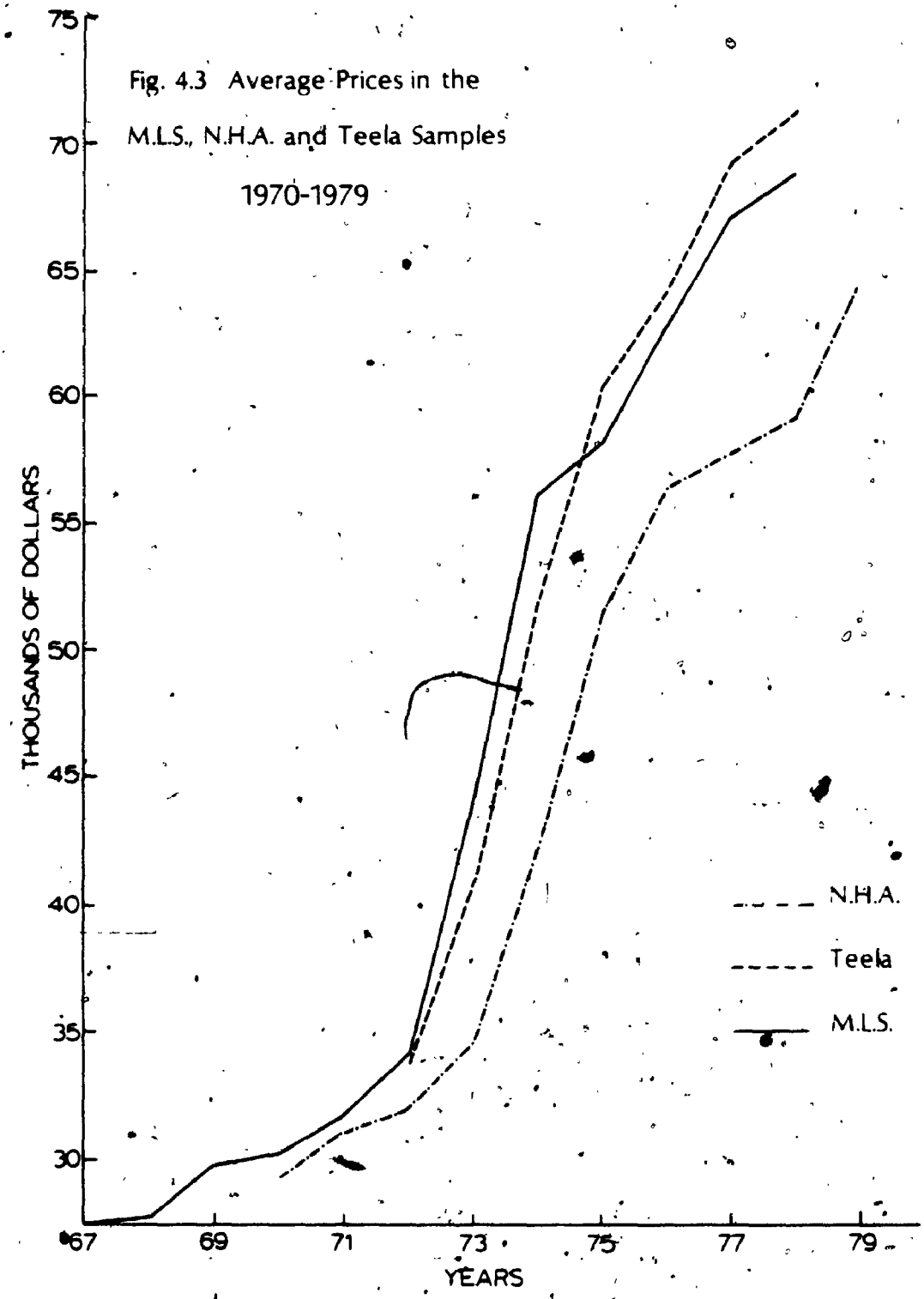


TABLE 4-3

THE PATTERN OF PRICE CHANGE IN N.H.A.-INSURED UNITS
1970 to 1979

YEAR	MEAN	PRICE % CHANGE	MEDIAN PRICE	MINIMUM PRICE	MAXIMUM PRICE	TOTAL # NHA SALES
1970	28,787		28,944	14,820	50,680	522
		7.8				
1971	31,043		31,450	11,449	71,990	1,325
		3.0				
1972	31,988		32,490	13,239	55,750	1,454
		8.29				
1973	34,640		35,444	18,810	53,500	504
		22.1				
1974	42,297		41,210	12,510	79,700	213
		22.5				
1975	51,838		49,995	15,630	99,990	1,314
		8.9				
1976	56,491		55,542	21,710	99,990	1,218
		2.38				
1977	57,841		56,030	11,690	99,990	2,361
		2.0				
1978	59,005		58,916	13,810	99,990	2,330
		8.86				
1979	64,238		64,350	18,447	99,990	3,207

Source: Statistics Canada, Division of Statistical Services, C.M.H.C. 1981. (All Computations are made by the author.)

mean price increased by 7.8 percent from 1970 to 1971, by 3 percent during 1971 to 1972, and by 8.3 percent during 1972 to 1973. The 1973 to 1975 period produced increases of 22 percent each year. The rate of increase slowed to 8 percent in 1975 to 1976 and to 2 percent in 1976 to 1977 and 1977 to 1978 with some rebound to 8.9 percent in 1978 to 1979. Thus, in the N.H.A. data, the price surge occurs between 1974 and 1975 and the sharpest decline between 1976 and 1978.

4.2.3 The Change Within Each Year

In addition to the changes between years, the behaviour of prices at different levels within each year are examined. The analysis involves a comparison of the rate of change in price between units at the 5th, 20th, 40th, 60th, 80th, and 95th percentile levels in each study year. The 5th and 95th percentiles are chosen as lower and upper limits to minimize the distorting effect of the lowest and highest price observed in each year. By using quintiles, the total transactions for each year are divided into five approximately equal groups. For example, it is possible to measure the extent of the price differential that occurs, on the average, between a sale at the 20th percentile and one at the 40th or 60th percentile point.

The assumption underlying this analysis is that the difference in price between the upper and lower end of a percentile group, for example the 5th and the 20th, is related first to the variations in the quality characteristics of unit offerings and second, to the demand for these characteristics relative to their supply. Thus, change in the size of the price differentiation within percentiles generally can be attributed to one or both of these variables. However, if it is assumed further, that changes in the

quality characteristics of unit offerings were minimal within any single year, then the changes in price differential were related mainly to variations in the demand/supply relationship within each percentile group.

The results, summarized in Tables 4-4 and 4-5, show that prior to 1974, the changes in price between the 5th and 20th percentiles, which average 19.28 percent, are substantially larger than those which occurred between the 20th, 40th, 60th, 80th, and 95th which average between 5 and 9 percent, and are quite similar in size. For example, in Table 4-4 figures for 1972 show that houses at the 20th percentile cost on an average $5,090 more than houses at the 5th percentile. However, in the same year, average house prices at the 40th percentile were $2,490 higher than those at the 20th. After 1974, the relationships between the 5th and 20th percentile remained substantially similar to the 1970 to 1973 period at 21 percent. However, the difference between 20th and 40th increased from 8.5 to 13.2, the 40th to 60th from 5.9 to 8.4, the 60th to 80th from 5.2 to 12.3, and the 80th to 95th from 8.0 to 21 percent. The largest changes occur between the 60th and 80th and the 80th and 95th percentiles.

Three points are important here. First, the increases in price which occur after 1973 had little impact on the relationship between the 5th and the 20th percentile. Between 1971 and 1979, the difference in price varies within a very small percentage range (20 to 23 percent). Second, houses that occupy positions between the 40th and 80th percentiles are most similar in price, sharing the smallest

TABLE 4-4

NOMINAL DOLLAR DIFFERENCES IN THE PRICES OF N.H.A.-INSURED NON-CONDOMINIUM UNITS BASED ON PERCENTILE DIVISIONS, 1970-1979

	PERCENTILES				
YEAR	5-20	20-40	40-60	60-80	80-95
1970	3,202	1,784	2,060	1,500	2,498
1971	5,089	2,351	1,579	1,815	2,596
1972	5,090	2,490	1,809	1,711	2,950
1973	5,120	3,270	1,879	1,891	3,110
1974	5,570	4,850	4,150	6,030	13,520
1975	7,430	5,140	3,650	8,650	10,150
1976	7,816	6,343	3,989	6,181	12,820
1977	9,640	4,510	4,030	7,040	15,000
1978	8,820	6,730	5,140	5,730	13,550
1979	9,430	9,180	5,480	7,862	14,058

Source: Based on N.H.A. house prices 1970 to 1979, produced by the Statistical Section of the Canada Housing and Mortgage Corporation; Unpublished, 1980.

TABLE 4-5

PERCENT CHANGE WITHIN YEARS FOR SELECTED PERCENTILES
REFLECTING NOMINAL DOLLAR DIFFERENCES
IN PRICES OF N.H.A. NON-CONDOMINIUM UNITS - 1970 to 1979

	PERCENTILES				
YEAR	5-20	20-40	40-60	60-80	80-95
1970	13.95	6.82	7.37	5.0	7.93
1971	22.06	8.35	5.17	5.6	7.65
1972	21.29	8.58	5.74	5.13	8.42
1973	19.82	10.48	5.57	5.23	8.18
X 70-73	(19.28)	(8.55)	(5.96)	(5.24)	(8.045)
1974	19.38	14.13	10.60	13.92	27.40
1975	20.67	11.85	7.52	16.58	16.69
1976	19.63	13.31	7.39	10.67	20.0
1977	23.9	9.02	7.39	12.03	22.88
1978	21.76	13.63	9.16	9.27	20.23
1979	22.0	17.56	8.9	11.76	18.79
X 74-79	(21.22)	(13.25)	(8.4)	(12.37)	(20.99)
X 70-79	(20.44)	(11.37)	(7.48)	(9.519)	(15.817)

Source: Based on N.H.A. House Prices 1970-1979 produced by the Statistical Services Divison of C.M.H.C., Unpublished, 1980

increment in all years. Finally, after 1974 the units in the top end of the range, between 60th and 95th percentiles exhibit the widest price differential, when this is expressed either as an absolute dollar value or a percentage.

Based on the assumptions just described, the fact that price differentials varied substantially between percentile groups indicates that demand/supply relationships differed at various points along the price spectrum. In the post-1973 period when prices rose there was little change in relationships at the entry level, 5th to 20th percentile. However, between the 60th and 95th and especially from the 80th to the 95th percentiles, there was a well-defined change in price ranges. This suggests that in the short term, the supply at the top end of the N.H.A. price range was less elastic than at other points lower down the scale. Thus, the increase in demand at that level caused greater price effects leading to a faster increase in prices at the top end of the market than at lower percentile ranges.

One implication of this type of supply distribution is that during periods of sharp overall demand pressure the free market supply response probably will be aimed at the areas of greatest price increase, that is the upper end of the price spectrum. Further, the speed of this response and its effectiveness will determine the amount of price pressure that is exerted on the units above the 60th percentile price range. Thus, where this supply distribution exists filtering up, defined as gradual movement up some price and quality scale, may require increased financial effort as the purchaser moves up the price spectrum. In addition, the amount of economic difficulty which faces the purchaser is likely to increase at an increasing rate

as the upper end of the price spectrum is approached. Filtering in this case is a more discontinuous process with easier moves at the lower end, the 40th and 60th percentiles, and much more expensive and difficult moves above this point.

This indicates that the dollar value required to produce significant change in the price position of a housing unit within the distribution of prices for the Toronto market area is contingent on: the initial position of the unit along the price spectrum, the specific type of demand supply imbalance that occurs in that housing market and the type of price pressure that occurs in response to that imbalance.

4.2.4 The Cumulative Frequency Curve Analysis

The results of the analysis of N.H.A. prices suggest that the period under study can be divided clearly into the 1970 to 1973 period and the 1974 to 1979 period. Further, it seems that the pattern of price increases and the distribution of prices within each year changed noticeably after 1973. If this is in fact the case, then a plot of cumulative frequencies for the N.H.A. price data should illustrate this pattern graphically. It is expected that:

- a sudden increase in price level would result in a sharp increase in the horizontal distance between curves plotted at the same scale;
- a change in the rate of price increase would result in a change in the overall shape of the curve; and
- finally, if the rate of change is sufficiently distinct, these sudden changes may be observed as clear changes in the direction of sections of the curve which would result, also, in an overall change in shape.

The plot of cumulative frequencies appears as Figure 4-4. The most obvious element is the sudden increase in horizontal distance

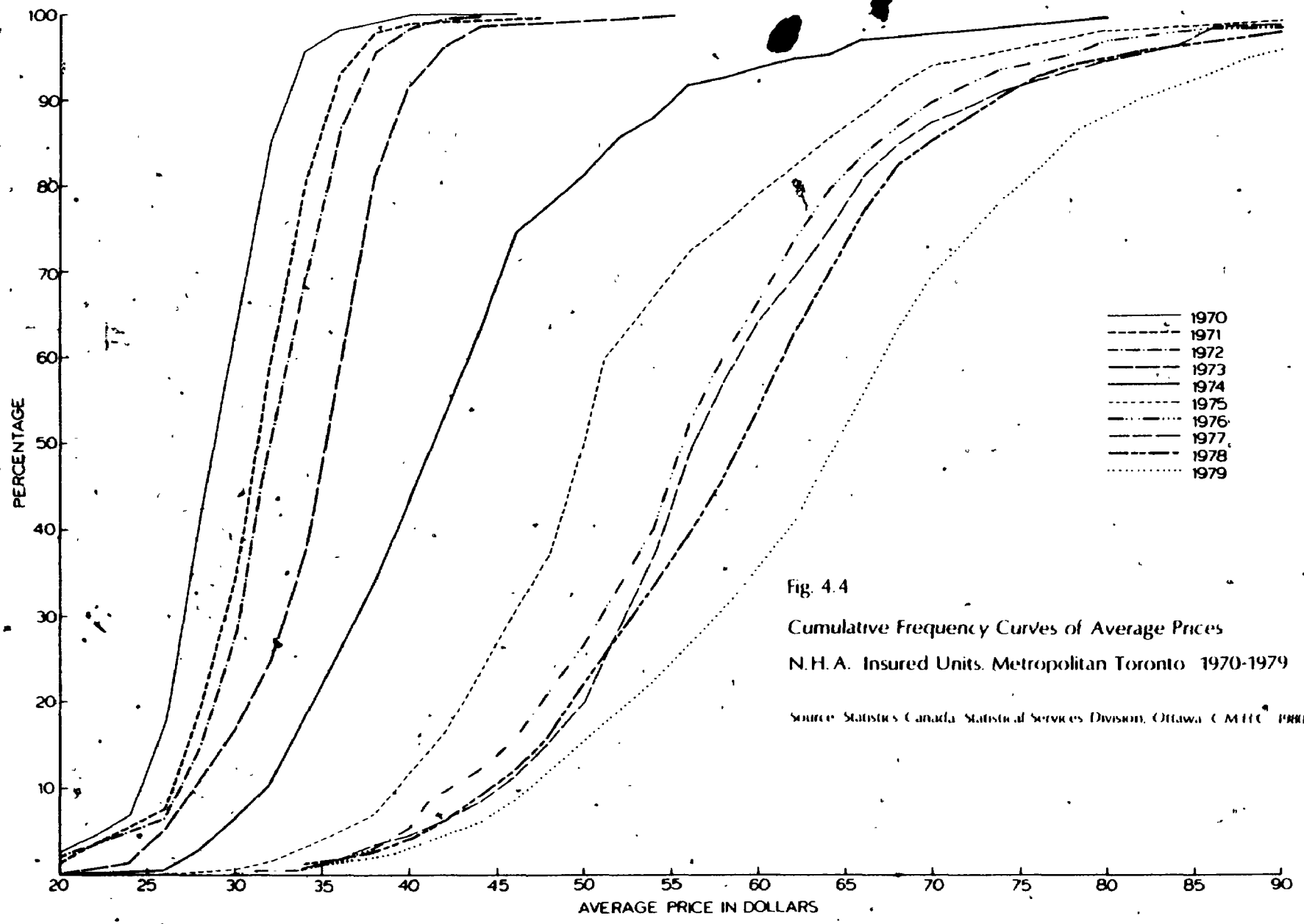


Fig. 4.4

Cumulative Frequency Curves of Average Prices

N.H.A. Insured Units, Metropolitan Toronto 1970-1979

Source: Statistics Canada, Statistical Services Division, Ottawa, CMHC, 1980

between the 1973 and 1974 curves and the 1974 and 1975 curve. This is consistent with the observations relating to price increases described earlier. Equally clear, is the similarity of the 1971 to 1973 curves. They appear not only as similar in shape, but are separated also by quite small horizontal intervals. A similar comment is applicable to the curves for 1976, 1977 and 1978.

In addition to the horizontal distance produced by sudden price increases in 1973 to 1975, the change in shape of the curves is noteworthy. The 1974 curve is similar to the 1970 to 1973 set of curves up to the 75th percentile but then the direction changes quite significantly, producing a distinctly different overall shape. In the 1975 curve, the pattern is similar except that the change in direction occurs just around the 60th percentile. In the 1976 to 1978 curves, this change in direction is much more gradual and occurs between the 60th and 80th percentile points. In 1979, however, it is again visible at the 70th percentile.

Thus, the cumulative frequency curves tend to substantiate the claim that a significant change occurred in both price level between the years and in the structure of prices within the years. This reiterates the findings of the previous section and supports the belief that filtering, because of its association with house price change, cannot be regarded as a smooth process of movement up some quality or income scale. Rather it tends to be an uneven process requiring differing financial effort and resources depending on existing housing market conditions and the position of the unit along the price spectrum.

4.2.5 The Teela Data

This data set was obtained by drawing a one percent sample from the listing of registered deeds of ownership produced by Teela market Surveys. The information collected included:

- price at time of purchase;
- cash downpayment;
- date of sale;
- number of mortgages;
- instrument number;
- date of most recent previous sale (when available)
- price obtained at the most recent previous sale (when available); and
- complete street address (including borough and postal code)

In this section the data collected on purchase price, year of sale, and the instrument number are used. The period covered extends from 1972 to 1978; the years previous to 1972 not being covered because data was so fragmented that it was considered unreliable for this exercise. Further, since data collection was carried out in 1979, the 1979 data was then unavailable. However, the period for which data were available was considered adequate. It should be reiterated that some subjective judgement was used in the choice of data retained for analysis. As was described earlier, only arms-length purchases of land and structure were included. Thus, an arbitrary lower limit of $10,000 was set. The S.P.S.S. program through which the data are analysed was directed to reject all units in the sample which showed prices of less than $10,000. This resulted in the elimination of about 25 units over the 8 year period. Table 4-6 following shows the size of the Teela sample in relation to the total number of residential sales in Metropolitan Toronto in addition average price of both the units sampled, and all units included in the Teela records are provided for the 1972 to 1978 period.

TABLE 4-6

SUMMARY OF UNITS SOLD, AND THE AVERAGE PRICES OF TEELA SALES COMPARED TO THOSE IN STUDY SAMPLE

YEAR	TOTAL # OF UNIT SALES METRO	NO. OF UNITS IN SAMPLE	MEAN DOLLAR VALUE OF SAMPLE UNITS	MEAN DOLLAR VALUE OF ALL TEELA SALES BY YEAR
1972	29,873	480	33,842	32,794
1973	53,597	370	41,017	37,758
1974	42,614	517	52,004	50,381
1975	35,411	433	60,563	56,105
1976	36,359	404	64,092	59,060
1977	32,747	364	69,386	63,748
1978	33,851	282	71,117	N/A

Source: Teela Market Surveys Microfiche Records, 1972 - 1979.

4.2.5.1 The Pattern of Change in the Teela Sample

The Teela data were subjected to the same type of analysis as the N.H.A. data. Table 4-7 presents the average price for units within the sample selected, and for the total population from which that sample was drawn. In addition, the N.H.A. and M.L.S. averages are presented for comparison. The data show that in the period 1970 to 1977, prices in the Teela data increase from an average of $31,122 to $63,748; in the M.L.S. data from $30,141 to $64,559, and in the N.H.A. data from $28,787 to $57,841. The result of an examination of these changes on a year-to-year basis (Table 4-8) shows that the largest year-to-year increase occurs in the 1973 to 1974 period in the Teela and M.L.S. data and in the 1974 to 1975 period in the N.H.A. data. Thus, Tables 4-7 and 4-8 show that the N.H.A. prices are the lowest in every year examined, that the peak year-to-year increases are smaller (22.5 percent compared with 26.8 percent Teela sample, and 33.4 percent Teela population) and occur later than in the other samples, 1974 to 1975 as compared with 1973 to 1974.

In the analysis of the structure of N.H.A. price increases (Section 4.2.3), a tendency for prices in the upper end of the spectrum to increase faster than those in the lower end was observed. Both the Teela and M.L.S. data include N.H.A. units. It is with great interest that the structure of prices for each year is analysed for the Teela data.

4.2.5.2 The Within-Year Structure of the Teela Data

When the structure of price change within each year is examined (Table 4-9) from the Teela Data, some similarities to the N.H.A. pattern are visible. Here (as in the N.H.A. sample) the

TABLE 4-7

COMPARATIVE CHANGE IN PRICES OF HOUSES
IN METROPOLITAN TORONTO
(Using Nominal Dollar Values)

YEAR	MEAN TEELA (S)	MEAN TEELA (P)	MEAN N.H.A.	MEAN M.L.S.
1970	-	31,122	28,787	30,141
1971	-	31,406	31,043	31,822
1972	33,842	32,794	31,988	32,513
1973	41,017	37,758	34,640	40,605
1974	52,004	50,381	42,297	52,806
1975	60,563	56,105	51,838	57,581
1976	64,092	59,060	56,491	61,389
1977	69,386	63,748	57,841	64,559
1978	74,117	N/A	59,005	67,333
1979	N/A	N/A	64,238	N/A

Source: Statistics Canada: Statistical Services Division, Ottawa, C.M.H.C. 1980. Teela Market Surveys Microfiche Records 1979. Toronto Real Estate Board, House Price Trends, 1970 - 1979.

TABLE 4-8

COMPARATIVE % CHANGE IN PRICE OF HOUSES
IN METROPOLITAN TORONTO

YEAR	MEAN TEELA (S)	MEAN TEELA (P)	MEAN N.H.A.	MEAN M.L.S.
1970-1971	-	0.09	7.8	3.16
1971-1972	-	4.4	3.0	6.85
1972-1973	21.2	15.1	8.29	24.88
1973-1974	26.78	33.4	22.1	30.0
1974-1975	16.4	11.3	22.5	9.04
1975-1976	5.82	5.26	8.9	6.61
1976-1977	8.26	7.9	2.38	5.16
1977-1979	2.49	-	2.0	3.0

Source: Statistics Canada: Statistical Services Division.
Ottawa: C.M.H.C., 1980.
Teela Market Surveys Microfiche Records 1971-1979
Toronto Real Estate Board, House Price Trends 1970-1979.

TABLE 4-9

TEELA SAMPLE

NOMINAL DOLLAR DIFFERENCES IN PRICE PERCENTILES
AND EQUIVALENT PERCENTAGE CHANGE

YEARS	5-20	20-40	40-60	60-80	80-95
1971-1972					
- $ Difference	5,450	5,550	5,000	9,000	17,000
- % Differrence	30.05	24.72	17.85	27.27	40.47
1972-1973					
- $ Difference	6,000	6,900	8,000	12,000	21,000
- % Difference	30.0	26.53	24.62	29.26	40.56
1973-1974					
- $ Difference	9,000	9,750	9,745	13,105	25,300
- % Difference	36.0	28.67	22.27	24.49	37.98
1974-1975					
- $ Difference	8,700	10,000	9,900	11,100	42,000
- % Difference	26,93	24,39	19.41	18.22	58.33
1975-1976					
- $ Difference	11,100	9,100	7,800	13,100	41,000
- % Difference	31.89	19.82	14.18	20.85	54.15
1976-1977					
- $ Difference	10,350	9,500	11,500	18,300	44,200
- % Difference	29.44	20.87	20.9	27.51	52.12
1977-1978					
- $ Difference	10,500	11,500	10,200	19,300	44,700
- % Difference	28.76	24.46	17.43	28.09	50.79

Source: Teela Market Surveys: Microfiche Records, 1970-1978.

largest changes occur at the tails of the distribution 5th to the 20th and 80th to 95th. In fact, the impact of changing the denominator in computing each percentage value is dramatically evident in 1972 to 1974. In 1972, for example, there is a $5,450 difference between the 5th and 20th percentiles. This translates into a 30 percent difference. However, a $5,550 difference between the 20th and 40th produces only a 24.7 percent difference. In 1973, the differences are $6,000, $6,900 and $8,000, but the percentage values decline from 30 to 24.6. This serves to highlight the changes between the 60th and 80th and 80th and 95th percentiles. These values increase both in absolute dollars and percentages.

Two elements are significant. First, in the Teela sample, the dollar differences between the 60th and 80th percentiles are always larger than those recorded between the 5th and 60th. This is quite different from the N.H.A. example in which this area frequently records the lowest dollar and percentage changes. The second element is the rate of increase in the 80th to 95th percentile range. The differences both in dollar and percentage values are extremely large. The lowest value recorded is 37.98 percent in 1974 and differences as high as 58 percent are found in 1975. This difference in structure between Teela and N.H.A. is logical when the composition of the two data sets are considered. The N.H.A. set, though comprising a total population, represents only a limited portion of the market spectrum. Teela, on the other hand, is a representative sample of a broader population of which N.H.A. is only a small part. Thus, if the population sampled is as highly skewed positively as this one is, then a limited segment (taken from the low end) should indeed demonstrate less skewness than the whole.

Another factor found in the N.H.A. set which is not evident in Teela is the sharp distinction in the internal price structure between the pre-boom and post-boom periods. It will be remembered that the degree and pattern of internal price structure in the N.H.A. data changed drastically in 1973. Thus, given the one-year lead discussed earlier, it was expected that this change would have occurred after 1972 in the Teela sample. This is not found to be the case, in spite of the fact that the Teela data did exemplify even larger between-year changes than N.H.A. data. Finally, it should be noted that in the period 1975 to 1978, an overall pattern of stability in percentage-change values is visible. Though the 80th to 95th percentile records its highest values, it can be seen that even here the magnitude of change is consistent, ranging from $42,000 in 1975 to $44,700 in 1978. Thus, from 1975 to 1978, the price structure, observed in the Teela data, remained remarkably stable both within and between years.

4.2.5.3 The Cumulative Frequency Curves for Teela Data

The plot of cumulative frequency curves (Figure 4-5) produced results consistent with the results described up to this point. The distances along the horizontal axis, indicating percentage change over time, show the greatest changes between 1972 and 1974, rather than between 1973 and 1975 as occurs in the N.H.A. plot. The shape of the 1976 to 1977 curves are replicated in the N.H.A. curves in 1977 to 1978 and the flattened portion of the curves, indicating slowing of the rate of increase, occurs earlier in the Teela plot and is more extensive. Finally, by 1978, the Teela and N.H.A. cumulative frequency curves have become quite similar in shape, suggesting that

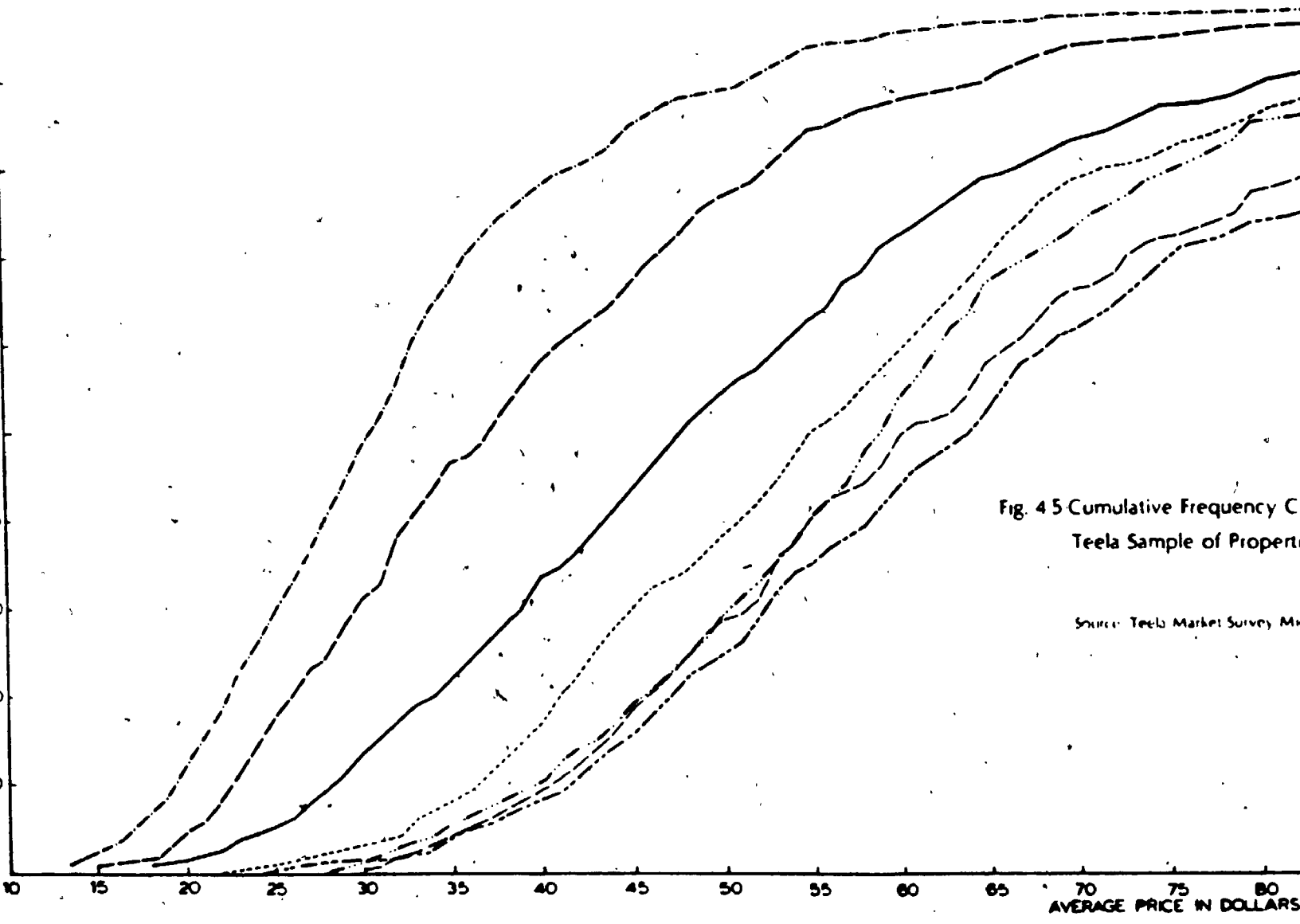


Fig. 4 5 Cumulative Frequency C
Teela Sample of Propert

Source: Teela Market Survey M

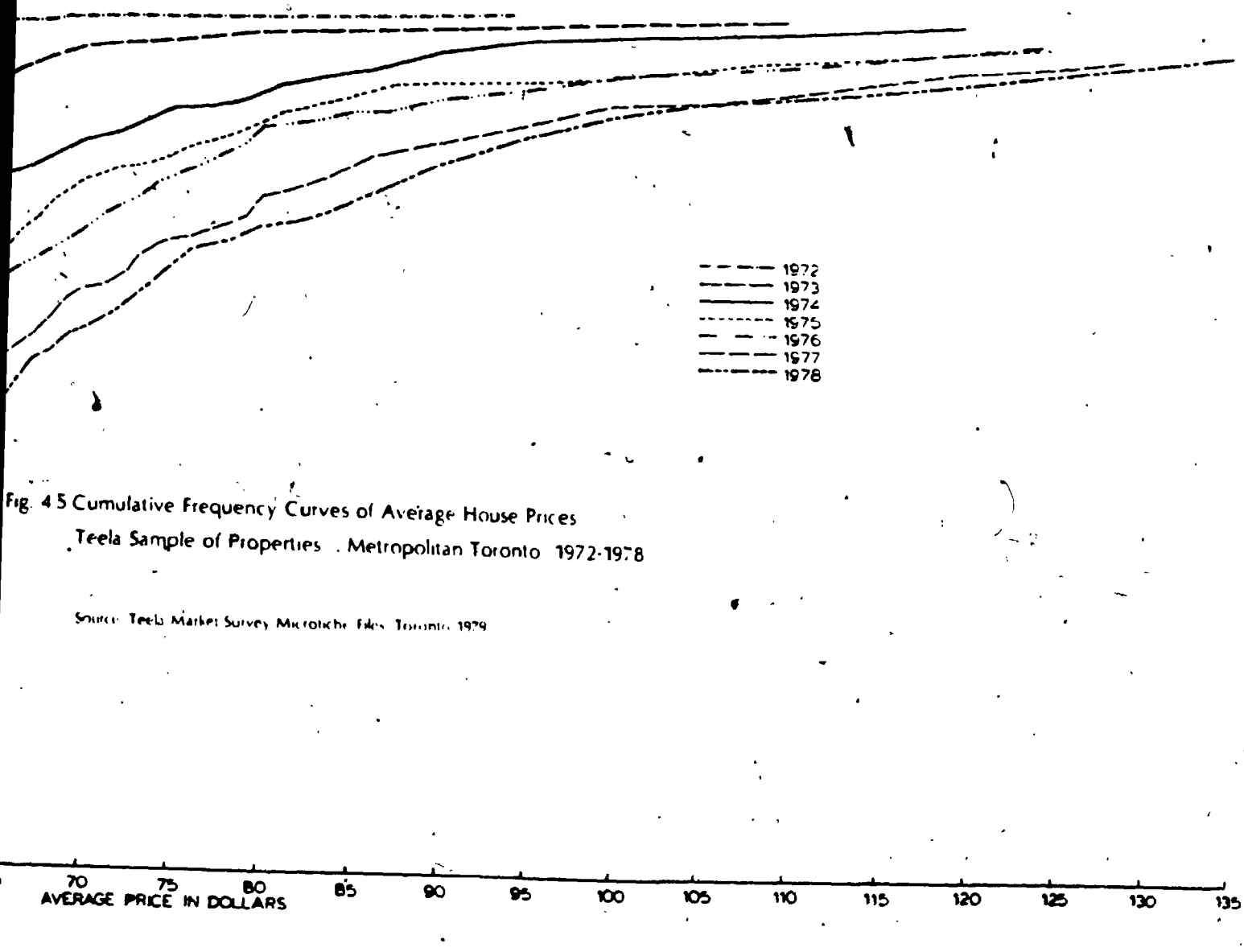


Fig. 4 5 Cumulative Frequency Curves of Average House Prices
. Teela Sample of Properties . Metropolitan Toronto 1972-1978

Source: Teela Market Survey Microfiche Files, Toronto, 1979

1 2 of 2

the pattern of price change in the entire market had achieved some stability in terms of price. An ex post facto examination of price change suggests, therefore, that owners of N.H.A. units, especially those in the lower price ranges, were placed at a double disadvantage in terms of their ability to trade up in the housing market, first because the absolute level of increase in property value was smaller, and second, because it occurred later when the price-level was generally high, but the pattern of continued increase which would have produced significant capital gains for owners, had slowed significantly.

4.3 COMPARING REAL PRICES: ANALYSIS OF THE INDEXED DATA

The price data analysed have been the actual dollar values paid at time of purchase. However, when a longitudinal price study is attempted one problem which must be faced is the derivation of a measure which would correctly reflect the purchasing power of the dollars in one year relative to another.

The traditional measure used for this purpose has been a Consumer Price Index. This is defined as "the percentage change through time in the cost of a constant 'basket' of goods and services representing the purchases made by a particular population group in a specified time period (Statistics Canada, 62-546; p. 37)." As applied to most products, this concept as defined here is adequate. However, housing produces a number of additional problems. The purchase of a house usually implies much more than the ownership of specific structural elements. It includes, normally, other elements like the neighbourhood composition, accessibility to work or recreation, and other intangibles like 'trendiness.' Thus, the price paid for

identical structures situated in differing environments can vary substantially. Furthermore, the offerings of houses, or product mix, can itself be affected by price changes. Thus, over time pure price effects become increasingly difficult to segregate. Statistics Canada regards "the treatment of owned accommodation as one of the difficult problems in the area of consumer price indices." They suggest, further, that there is probably no other component of these indices that is treated in so many totally different ways by statistical agencies of different countries (Statistics Canada 62-546).

One example of the many 'other' methods is discussed by Grebler and Mittelbach (1980) in their study of price escalation in the California area. In this study, when Grebler used the concept of the "standard house", it was introduced in the following fashion:

> . . . The ideal basis for price measurement may be a standard house. We shall present data for new homes approximating this ideal. Even so, homebuyers' preferences change quite rapidly from period to period, and the standard house of, say 1967, may become quite unimportant in the market mix of 1976. In any event, the standard house concept is difficult to apply to existing residences which constitute a market far exceeding the number and dollar volume of new houses." (Grebler, L. and Mittelbach, F.; 1980, pp. 11)

There should be no misunderstanding, therefore, about the clear limitations of price indices when applied to housing data. However, there remains a need to segregate, at least partially, those elements of price change that are common to all goods and services irrespective of value. Thus, the decision was made to minimize the purely inflationary effects of price changes as they affected ownership housing. For this purpose all prices are standardized using the all-items consumer price index with the base year 1971.

Given the well-known problems associated with indices and indexing, it is important to ask: What does the process hope to achieve? In this study, the major focus was whether the changes in price which occurred in the housing sector were created by factors other than the general rate of inflation. If the house price changes recorded were predominantly attributable to inflation, then an accurate price index, properly applied, would result in mean values for all years which strongly resembled that of the base year 1971. Similarly, the cumulative frequency curves plotted for each year should collapse towards a single curve or a set of curves that are similar to each other. However, if the mean values and the frequency curves retain individual (though altered) shapes, then the argument can be made that the phenomenon observed is something more than simple inflationary change affecting all prices.

4.3.1 The Indexed Data

Table 4-10, following, provides the values of the C.P.I. used in this study. These values are derived from the 1980 C.P.I. bulletin (the base year is 1971). Tables 4-11 and 4-12 illustrate the changes in value produced by indexing the means of the data samples discussed earlier.

The most outstanding feature of Table 4-12 is the clear difference in the pattern of price changes between the period 1972 to 1975 and 1976 to 1978. Examination of the adjusted and unadjusted values in mean cost of a house between years shows that even accounting for inflation the prices in the 1972 to 1974 period rise dramatically. Here also, the 1973 to 1974 increases are largest varying from a high of 23 percent to a low of 12 percent. Over the

TABLE 4-10

ALL ITEMS CONSUMER PRICE INDEX - BASE YEAR 1971

1970	0.957
1971	1.0
1972	1.047
1973	1.122
1974	1.217
1975	1.336
1976	1.477
1977	1.608
1978	1.730
1979	1.847

Source: Canadian Housing Statistics, Ottawa, C.M.H.C., 1980.

TABLE 4-11

AVERAGE PRICES OF RESIDENTAL UNITS ADJUSTED USING C.P.I.
BASE YEAR 1971

YEAR	MEAN TEELA SAMPLE	MEAN TEELA POPULATION	MEAN N.H.A.	MEAN M.L.S.
1971	-	31,406	31,043	30,426
1972	32,323	31,279	30,552	31,052
1973	36,557	33,652	30,873	36,190
1974	42,732	41,397	34,755	43,390
1975	45,332	41,995	38,801	43,099
1976	43,393	39,986	38,247	41,563
1977	43,141	39,644	35,948	40,149
1978	41,108	N/A	34,107	N/A
1979	N/A	N/A	34,779	N/A

Source: C.M.H.C. Statistical Services Division, 1980.
Teela Market Surveys Microfiche Files, 1970-1979.
Toronto Real Estate Board: House Price Trends, 1970-19??.

TABLE 4-12

COMPARATIVE PERCENTAGE CHANGE IN AVERAGE PRICES OF RESIDENTIAL UNITS BEFORE AND AFTER INDEXING METRO TORONTO 1970 - 1979

	MEAN TEELA SAMPLE		MEAN TEELA POPULATION		MEAN N.H.A.		MEAN M.L.S.	
YEAR	N*	A**	N	A	N	A	N	A
1970-1971	-		2.09	-	7.80		3.16	
1971-1972	-		4.40	-0.40	3.00	-1.60	6.85	2.06
1972-1973	21.20	13.09	15.10	7.58	8.29	1.05	24.88	16.50
1973-1974	26.78	16.88	33.40	23.01	22.10	12.50	30.0	19.89
1974-1975	16.40	6.08	11.30	1.44	22.50	11.64	9.04	0.67
1975-1976	5.82	-4.46	5.26	-5.02	8.90	-1.44	6.61	-3.69
1976-1977	8.26	-0.56	7.90	0.86	2.38	-6.39	5.16	-3.52
1977-1978	2.49	-4.96	-	-	2.00	-5.39	-	-
1978-1979	-	-	-	-	8.86	1.96	-	-

* N means non-adjusted
** A means adjusted

Source: C.M.H.C. Statistical Services Divison (1980 Unpublished)
Teela Market Surveys, Microfiche Records, 1970-1979.
Toronto Real Estate Board, House Price Trends, 1970-1979.

period 1974 and 1975, the level of change in constant dollars drops dramatically in all samples except the N.H.A. sample. This was anticipated because earlier analysis had provided evidence of a lag period of about one year in the reaction of N.H.A. prices to overall market change. By 1976, however, the rates of change have all dropped below the rate of inflation. Thus, although a nominal dollar increase is registered, the real price change is negative. This period of negative change extends to 1978 in all samples. In 1979, the N.H.A. mean shows a modest increase. This increase brings the N.H.A. mean back to its 1974 level.

4.3.2 Cumulative Frequency Curves of Indexed Data

The indexed cumulative frequency curves (Figures 4-6 and 4-7) tell much the same story. The Teela data show that the 1975 curve is the "highest" in that it is furthest from the origin. In many sections it overlaps the 1974 curve, and occupies the area between the 1973 and 1974 curves. Thus, two periods can be defined. The first is a period of rapidly advancing prices. This is illustrated by curves for 1972, 1973, and 1974 which are distinct through most of their length and which demonstrate clear horizontal progression across the graph. By 1975, the period of increase has ceased; the 1975 curve coincides with 1974 in several sections. Between 1976 and 1978, decline is visible in the retreat of the curves towards the origin.

In the N.H.A. data, the pattern is similar. There is the lag of one year as described before. Thus, it is the 1975 to 1976 curves which overlap here as the period of increase and decline started one year later. In fact, the pattern is clearer. There was a

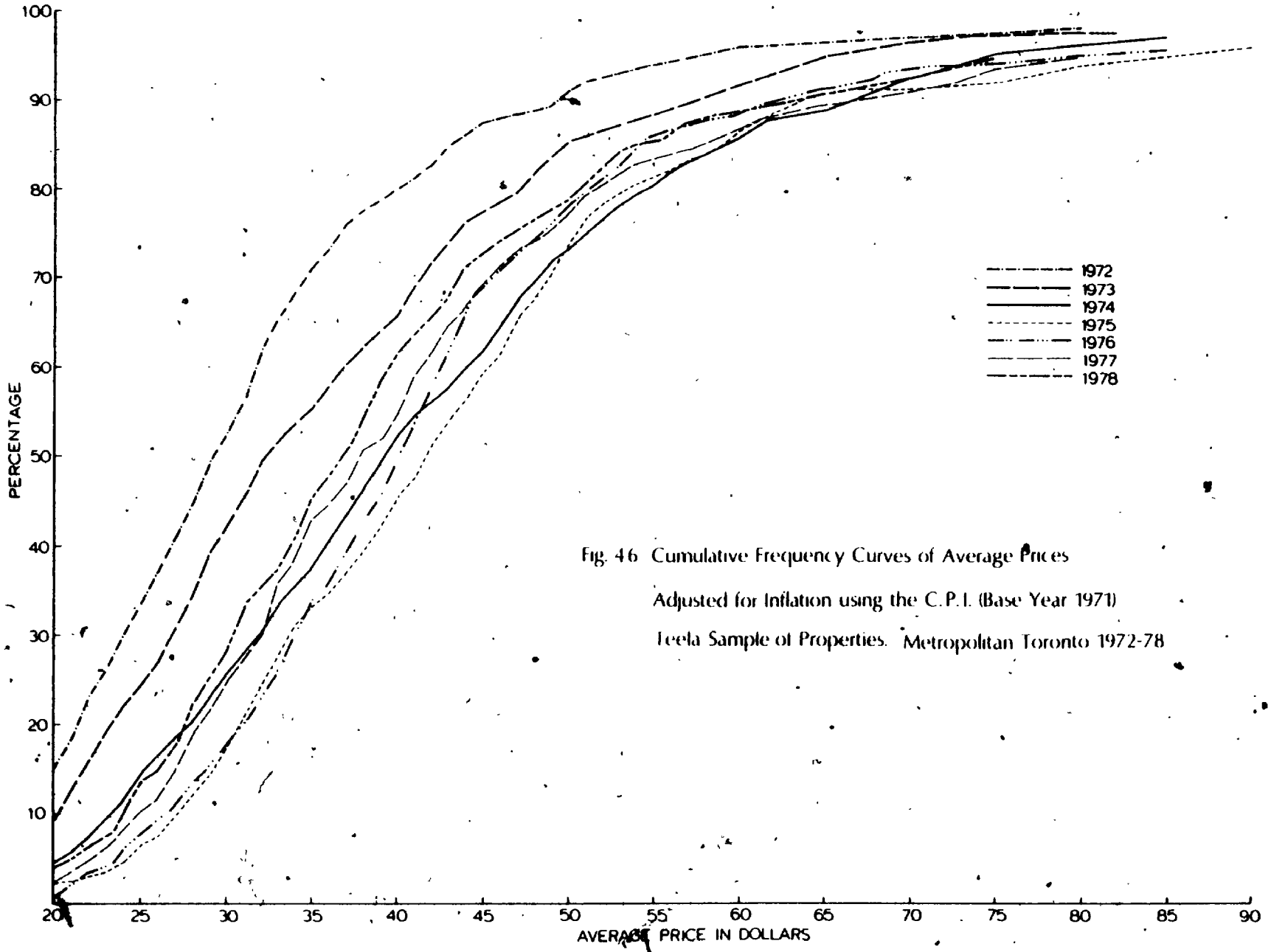


Fig. 46 Cumulative Frequency Curves of Average Prices
Adjusted for Inflation using the C.P.I. (Base Year 1971)
Teela Sample of Properties. Metropolitan Toronto 1972-78

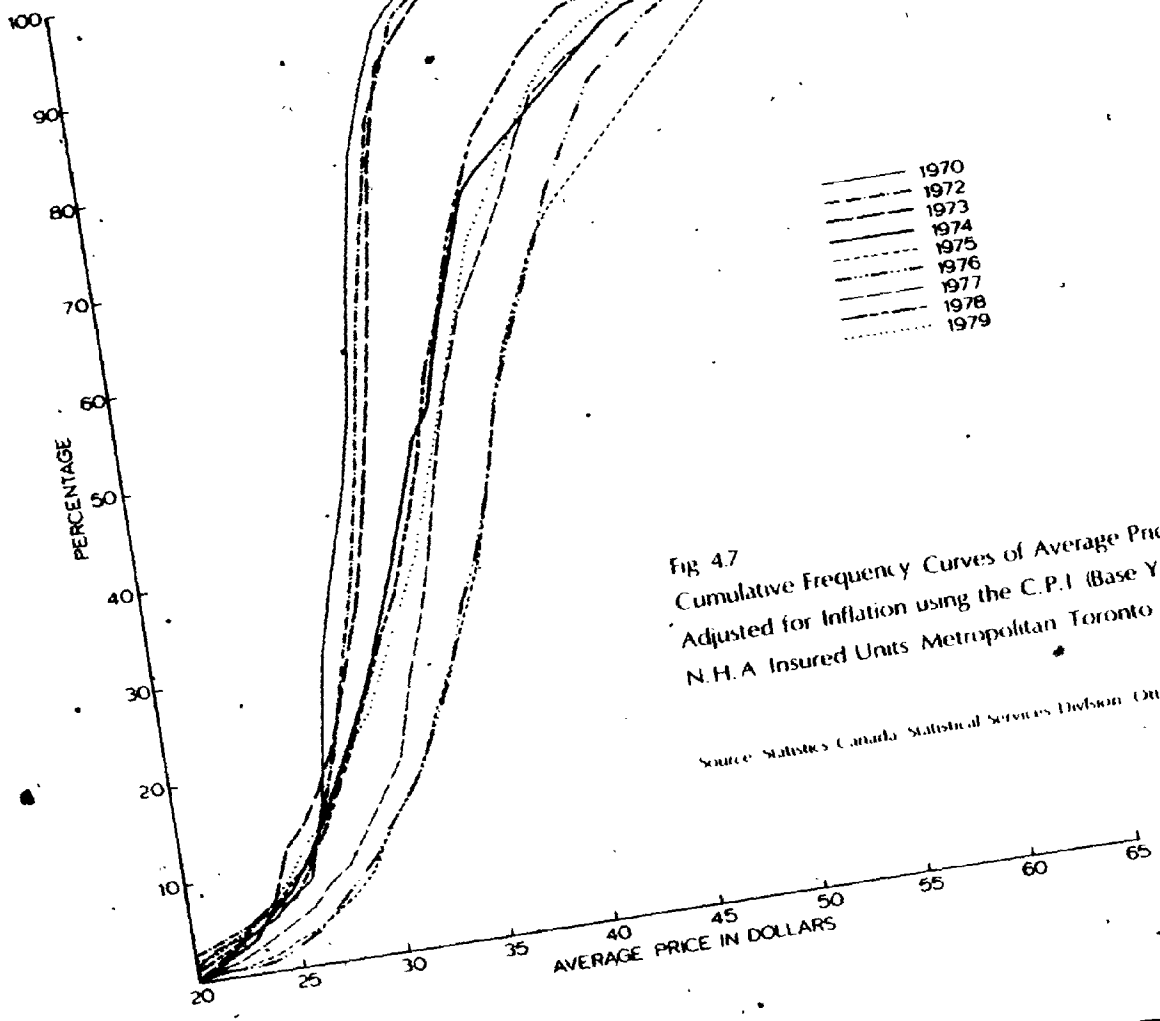


Fig 4.7
Cumulative Frequency Curves of Average Prices
Adjusted for Inflation using the C.P.I (Base Year 1971)
N.H.A Insured Units Metropolitan Toronto 1970-79

Source: Statistics Canada Statistical Services Division Ottawa C.M.H.C. 1980

period of stagnation and even slight decline that preceded the 1974 to 1975 surge. This is visible in the relative positions occupied by the 1970 to 1973 curves and the small negative value which shows up in the percentage change table.

The major result produced by analysis of the real dollar values was a realization that prices in real dollars reached their peak in 1974 in the general market, in 1975 for N.H.A.-insured homes, and declined from that period. The 1970 to 1979 period is, therefore, characterized by price stability in its earliest section (1970 to 1972), sharp increase in 1972 to 1974, and clear decline during 1976 to 1978.

In the light of that discovery, the pattern of N.H.A.-insured sales becomes more interesting. It was noted earlier that N.H.A. sales seemed to increase when the total sales declined. This finding is strengthened by the discovery that not only number of sales but also real price of housing declined during the period. It is clear, therefore, that N.H.A.-insured purchases increased in response to a decline in real market price of housing, while the rest of the market failed to respond in similar fashion.

The government response to the price increase provides a partial explanation of the response in the lower-priced N.H.A. sector of the market. As Fallis (1981, 9) writes:

> . . . in the past, the criteria of economic analysis - that resources should be efficiently allocated and that output be fairly distributed - have not been applied in the development and design of housing programs. For example, most housing programs have reflected the implicit assumption that we need more houses.

In the period immediately following the sharp price increase, therefore, the generally held belief was that the ability of first-time purchasers to enter the housing market had been severely constrained by price increases. Thus, the need to provide assistance for this group was urgent. With this in mind, both federal and provincial governments provided a series of tax and other financial incentives that were aimed at removing or alleviating the constraints to entry into the ownership housing market.

The creation of a provincial Ministry of Housing and the extension of subsidy programs like the Assisted Home Ownership Program (AHOP) and the Home Ownership Made Easy (HOME) in 1974, served to boost demand at the entry level, i.e., the group most likely to use N.H.A. insurance. However, as the analysis of year-to-year increases (Section 4.2) shows, by 1974, the rate of increase in the broader market had slowed. Thus, the net result is an increase in N.H.A.-insured sales generated by the subsidies available, and the increase in the maximum loan ceiling. In addition, the incentives offered to developers to 'correct' what was considered to be a supply shortage generated substantial increases in starts, especially of AHOP units. Much of the construction produced for the lower-priced end of the market developed into massive inventories of unsold units which further depressed prices from 1976 to 1979.

4.4 SUMMARY

This chapter set out to analyse the changes in the level, and structure of prices in Metropolitan Toronto during the 1970 to 1979 period. The results of this analysis show that the ten-year span included a period of rapidly escalating prices which ended in 1974 in

the Teela and M.L.S. data and in 1975 in the N.H.A. data; a period of stability that extended into 1976, followed by a slowdown which continued until 1978. In real dollars, this translated into a period of fast increase (1972 to 1974), a short levelling off period (1975), and an absolute decline in prices which lasted from 1976 to 1978. Biernacki has estimated that in the Metropolitan Toronto area the decline was in the order of $70 per month for the 1976 period, (Biernacki, 1979, p. 47).

In addition to the changes between years, there are clear differences in the pattern of change within each year, especially in the N.H.A. data. The differences in the size and rate of price increase in the lower, middle, and upper sections of the price spectrum suggest that the demand/supply relationship is not consistent throughout the entire price spectrum. The greatest price pressure occurs at the top end above the 80th percentile. This difference in the size and speed of price increase is compatible with the suggestion that the factors underlying demand in different price ranges varied. Thus, at the entry level, demand, defined as the ability to enter the housing market, will be strongest when prices are stable or declining, mainly because of the shortage of financial resources at this entry level. However, at higher levels where resources are ample, the expectation of increasing prices, with associated increases in capital gains, provides impetus for increased demand. In Chapter I reference was made to two types of demand; a consumption demand and an investment demand for housing. The pattern of change described in this chapter is consistent with this notion and indicates, further, that despite the difficulty of separating these two demand elements,

the consumption demand is generally associated with the lower ends of the price spectrum, the entry level, while investment demand is more consistent with units above the 60th percentile level.

Overall, four major conclusions can be drawn from the analysis to this point:

1. The demand for housing varies with overall economic conditions with consumption demand being more important during periods of stable prices and below the 60th percentile level, while investment demand is more important during periods of increasing prices and especially for purchases of units above the 60th percentile level.

2. Changes in the pattern and composition of demand can have substantial short term price effects which affect the extent, timing and structure of house prices change.

3. Changes in the structure of house prices affect units at different positions along the price spectrum differently. Specifically the dollar value of increments needed to move up the quality scale may vary depending on the initial price position of a unit.

4. The pattern of filtering that results during periods of significant price change, such as occurred in 1970 -1979 is unlikely to approximate a smooth, continuous process because of the increased difficulty of moving up the quality scale produced by market conditions.

CHAPTER 5

A REVIEW OF SOCIO-ECONOMIC STATUS AND STAGE IN THE LIFE CYCLE AS EXPLANATIONS OF RESIDENTIAL MOBILITY

This chapter sets out to evaluate the derivation, interpretation and application of the composite indices of Stage in the Life Cycle and Socio-economic Status as they apply to the study of residential mobility and filtering. The approach used is:

> to examine the historical development of the indices;
>
> to review the way these indices have been interpreted and used in mobility studies;
>
> to test the relationship that exists among individual variables using a variety of data sources and techniques;
>
> and finally to evaluate the ability of composite indices to explain adequately the processes and patterns of residential mobility in Metro Toronto 1970 - 1979.

5.1 THE HISTORICAL BACKGROUND TO THE COMPOSITE INDICES OF SOCIO-ECONOMIC STATUS AND STAGE IN THE LIFE CYCLE

The composite indices 'Socio-economic Status' and 'Stage in the Life Cycle' derive from the literature on Social Area Analysis developed and published by Shevky and Bell in the 1950s. In the original form they were: Social Rank, which became Economic Status or Socio-economic Status; Urbanization, Family Status or Stage in the Life Cycle; and Segregation or Ethnic Status. Some of the variables associated with the constructs are:

. Social Rank (Economic Status)

- years of schooling;
- employment status;
- class of worker;
- major occupational group;
- value of home;
- rent by dwelling unit;
- plumbing and repair;
- persons per room; and
- heating and refrigeration.

. Urbanization Construct (Family Status)

- age and sex of head;
- tenure;
- house structure;
- persons per household;
- # women at work; and
- single family dwelling units.

. Segregation (Ethnic Status)

- race;
- country of origin; and
- citizenship.

5.2 INTERPRETATION AND COMPARABILITY OF STUDIES

The variables used by Shevky and Bell, and those used by some of the later ecologists - although similar - were far from identical. For example, in computing the index of Social Rank, Shevky and Bell used six variables including and "occupation ratio", defined as, "the total number of craftsmen, operatives and labourers per 1,000 persons 25-years old and over" (Carter, 1974; p. 267). In response to the severe criticism voiced by Duncan (1957, pp. 337 to 345) and other sociologists, subsequent users of the concept broadened the list of variables analysed. Murdie (1969, pp. 33 to 38) in his study of Metropolitan Toronto provides a summary of the number and scope of variables used in some of these studies and the factors delineated.

Murdie's summary showed that between 1949 and 1966, at least 22 major studies using socio-demographic data produced factors that included the three initial indices: Economic Status, Family Status, and Ethnic Status. Further, he showed that the list of variables included in these separate analyses vary from 60 in one of the Gittus studies to the 6 originally used by Shevky and Bell (1964, pp. 5 to 20).

In one of the studies discussed by Murdie (1969), Schmidt and Tagashira do four parallel factor analyses, using 1960 U.S. census data, starting with 42 variables and reducing the number included on each subsequent run to 21, 12 and 10 respectively. In all of these analyses the Socio-economic Status, Family Status and Ethnic Status dimensions are identified (Schmidt and Tagashira, 1964).

Berry in 1969 wrote:

> . . . it is impressive. . . that studies of American cities, have by and large succeeded in isolating the three social area constructs originally proposed by Shevky: Socio-economic Status, Family Status, and Ethnic Status. . . and in a general sense each of these factors has tended to display a spatial pattern corresponding to the classical models of urban structure, (Berry, 1969, 459).

The issue which this summary raises is that although the terms Socio-economic Status, Family Status, and Ethnic Status have been used widely in the literature, and there is some broad agreement as to general meaning, the dimensions have included a wide range of variables collected in different ways, and for different purposes. This allows the kind of broad latitude in definition and interpretation that Rossi describes as "definitional anarchy" (Rossi, 1955; pp. 185 to 195). This lack of precision in defining the

indices and what they include or should, ideally, exclude raises a second problem of comparing the labelled factors in separate studies.*

Questions of interpretability and comparability become more critical when any one of these indices is used as an explanatory variable. For example, Rossi (1955, pp. 185 to 195) suggested that:

> . . . the urbanization, or life-cycle factor, is the most powerful inducement to people to change their residence.

Similarly Simmons states:

> . . . housing needs generated by life-cycle changes cause the majority of moves and produce high rates of outmovements in all parts of the city, but the reasons for changing residence within the city vary with the characteristics of the mover. (Simmons, 1968, p. 627).

5.3 USE OF "SOCIO-ECONOMIC STATUS" AND "STAGE OF LIFE CYCLE" IN THE MOBILITY LITERATURE

The work of Park and Burgess (1925) and Hoyt (1939), on which many of the filtering and mobility studies were based, proposed models of residential change which identified some spatial implications of social mobility. These models, and much of the subsequent work that used them, were premised upon a number of implicit, but critical, assumptions. These included assumptions about:

* Palm, R. and Caruso, D., "Factor Labelling in Factorial Ecology," Urban Studies, March, 1972, pp. 122 to 133, discuss at length the problems associated with factor labelling in the literature.

- the rate of family formation and the composition of the family;
- the relationship between education and earned income, and between earned income and wealth;
- the absence of government intervention in the housing markets;
- the cost and availability of mortgage financing;
- the physical structure of the built city;
- the cost of transportation; and
- the relationship between age, quality and desirability of housing and the ability of the older housing stock to meet the needs of the upwardly mobile.

These assumptions influenced subsequent research into filtering and intra-urban mobility, and affected both the choice of variables used for analysis and the interpretation of the results. That the analyses of intra-urban mobility have focussed on socio-economic and demographic variables and have consistently produced versions of the composite indices of stage in the life cycle and socio-economic status is evident in the works of Albig (1932); Davey, (1948); Rossi, (1955); Belle, (1956); Simmons, (1968); and Clark, (1970). Simmons (1968, p. 629) summarized the approaches used in the study of mobility as focussing on:

> . . . three major clusters of social variables: urbanization, including demographic characteristics and life style; economic status, combining measures of income, occupation and education; and segregation identifying ethnic or racial origin.

This study asserts that over the past two decades the composite indices (Stage in the Life Cycle and Socio-economic Status) and the spatial organization of population they imply (see Yeates and Garner; 1980), have become less than adequate explanations of the pattern of intra-urban residential mobility in Canadian cities generally, and in Metropolitan Toronto in particular. Among the elements which contributed to the present lack of validity have been the changes in economic and demographic conditions (specifically inflation, speculation, increased family formation, and government policy as discussed in Chapter 1, Section 4).

Of major importance to this study is the relationship between income and housing, implied in many studies that produce the socio-economic status and stage in the life cycle factors, which lie at the core of the 'explanations' of residential mobility. This relationship (income and house value) frequently is based on the analysis of income range data and surrogates for house value (like number of bathrooms used exclusively) (Foggin and Polese, 1976). It is asserted here, that if the relationship between wage income and house value is weak using the traditional measures and methodology that produced the socio-economic status and life cycle indices, then the introduciton of additional equity generated by inflation and price increases, can be expected to further weaken the relationship. Furthermore, as the relationship between income and house purchase declines, the usefulness of the life cycle index as an explanatory variable would also decline. Thus, in present day Metropolitan Toronto, given the recent history of housing market behaviour, it is less likely that stage in the life cycle will explain the 60 percent

of intra-urban mobility that Rossi claimed for Philadelphia in 1955 (Rossi, 1955; p. 175).

To test the assertion that the relationship between house value and wage income - existing within a socio-economic index - is weak, this study performs a set of factorial ecologies for Metropolitan Toronto for 1971 and 1974. The goals of the analysis are:

i) test for the existence of the two basic explanatory indices - Stage in the Life Cycle and Socio-economic Status;

ii) examine the relationships among the individual variables forming these indices, with special emphasis on their relationship to house purchase price or house value given the 1973-1974 price changes described earlier;

iii) examine and analyse the changes in association of variables when the data input changes from the aggregate to the individual level; and

iv) test the stability of variable associations and groupings by varying the method of analysis from factor analysis to multidimensional scaling.

In addition, other work, notably Murdie's study on Toronto, are examined and the results of both analyses compared.

In this chapter, therefore, three parallel factorial ecologies are conducted. The results produced by each analysis are compared to the other sets of results. Following this, the pattern of variable association produced by factor analysis is compared with that produced by the non-metric, multi-dimensional scaling technique. The focus here is on the choice of variables, the degree of association revealed, and the changes in the pattern and strength of association

that are exhibited when the level of data aggregation is changed from that of the individual household to the census tract level, and when the time period analysed changes from 1971 to 1974.

5.4 The Variables

After preliminary screening, 34 variables were chosen from the tables of Population and Housing Characteristics, 24 variables from the Survey of Housing and Units and 18 from the Public Use Sample Tapes. In this exercise, every effort was made to choose variables that measure the same or very similar elements in all three samples and to include wherever feasible, the variables traditionally associated with intra-urban mobility. Tables 5-1, 5-2 and 5-3 list the variables by the sources from which they derive.

5.5 The Techniques

Factor analysis has been used extensively in geography to isolate, empirically, the basic dimensions of urban socio-economic structure as an alternative to assuming the dimensions posited by Shevky and Bell (1955). In addition, Clark (1976), Brown and Longbrake (1970), Simmons and Baker (1972), and Brozowski (1977) have used other factor analytic techniques in the analysis of various aspects of intra-urban mobility. The principal axes technique used in this study produces the minimal number of orthogonal dimensions required to linearly reproduce the data. The varimax rotation is then used to delineate distinct clusters of relationships instead of defining the patterns and serves generally to clarify the resulting factors. Excellent detailed discussions of the technique and its mathematical foundations are contained in Harman (1967) and Rummel (1970). The specific computer program used in this analysis was

TABLE 5-1

VARIABLES CHOSEN FROM THE CENSUS OF POPULATION AND HOUSING CHARACTERISTICS 1971 SERIES A AND B

SERSA 40	A	Av. # Rooms per Dwelling
SERSA 51	B	Av. # Persons per Household
SERSA 77	C	Av. # Persons per Family
SERSA 78	D	Av. # Children per Family
SERSB 202	E	Dwelling Value
SERSB 204	F	Av. Cash Rent
SERSB 349	G	Av. Total Income per Household
SERSB 350	H	Median Income
SERSB 362	I	Av. Income per Family
SERSB 363	J	Av. Income per Household Head
PCT 14901	K	Some University and Other Training
PCT 15001	L	Some University Only
PCT 15101	M	% With University Degree
PCT 15201	N	University Plus Other Training
PCT 3534	O	% Owner Occupied
PCT 3734	P	% Single Detached
PCT 3834	Q	% Single Attached
PCT 3934	R	% Apartments
PCTSIN 34	S	% Single Detached and Attached
PCT 5744	T	% Family Households
PCT 7361	U	% Children Under 6
PCT 7461	V	% Children 6-14
PCT 7561	W	% Children 15-18
PCTCHL 61	X	% Children Under 18
PCT 203201	Y	Owner Occ. Reporting Mortgage
PCT 205201	Z	Occupancy Less than 1 Year
PCT 206201	1	Occupancy 1 to 2 Years
PCT 209201	2	Occupancy Greater than 10 Years
PCT 239 OCC	3	Occupation Managerial (Male)
PCT 240 OCC	4	Occupation Teaching Related
PCT 241 OCC	5	Occupation Medicine and Health
PCT 253 OCC	6	Managerial (Female)
PCT 254 OCC	7	Teaching (Male)
PCT 255 OCC	8	Medicine Health (Female)

TABLE 5-2

1974 SURVEY OF HOUSING UNITS VARIABLE LIST

V018	Type of Dwelling
V021	Original Construction of Building
V029	Tenure
V032	Expected Selling Price
V034	# of Mortgages
V035	Principal Outstanding 1st Mortgage
V036	Principal Outstanding 2nd Mortgage
V037	Principal Outstanding 3rd Mortgage
V041	Current Interest Rate 1st Mortgage
V042	Current Interest Rate 2nd Mortgage
V071	# of Bedrooms
V076	Land Use Across the Street
V077	Land Use on One Side
V078	Land Use on Other Side
V083	Household Income
V084	Household Size
V089	Monthly Mortgage Payment 1st Mortgage
V090	Monthly Mortgage Payment 2nd Mortgage
V091	Monthly Mortgage Payment 3rd Mortgage
V097	Age of Head
V098	Sex of Head
V100	Income Head
V102	Income of Spouse
KIDS	# Children Under 18

TABLE 5-3

PUBLIC USE SURVEY TAPES VARIABLE LIST

	Variable Name	Acronym
1	Persons per Household	PERSHH
2	Children less than 6 years	CHILDA
3	Children 6 to 18 years	CHILDD
4	Household Income	HHLDINE
5	Age of Head	AGEHD
6	Income of Head	INCHD
7	Education of Head	EDUHD
8	Tenure	TENURE
9	Type of Dwelling	TYPEDWL
10	Number of Rooms	NOROOMS
11	Number of Bedrooms	BEDROOMS
12	Length of Occupancy	LENGTHR
13	Size of Mortgages	MORTGAGE
14	Dwelling Value	DWLVALUE
15	Previous Tenure Type	PREVDWL
16	Rent Paid	RENT
17	Managerial Occupation	MANG
18	Technical Occupation	TECH

obtained from the Statistical Package for the Social Sciences (S.P.S.S.) (1975). The cutoff point chosen for rotation is Guttman's critical point which excludes all factors with an eigen value of less than 1.0.

In the non-metric multidimensional scaling analysis, the input in each case is a matrix of correlation coefficients produced by the initial factor analysis. These are fed into a "Torsca" program for non-metric multidimensional scaling created by Young and Torgerson (1967).

5.6 RESULTS OF THE CENSUS TRACT DATA ANALYSIS

Thirty-four variables, listed in Table 5-1, are analysed. The 1.0 eigen value cutoff is applied and only loadings $\pm$ 0.3 or higher are listed. This produces 6 factors explaining 88.3 percent of the variance among the 34 variables used (Table 5-4). Factor 1 is characterized by high loadings on owner-occupied dwellings, single-detached and single-attached homes, with mortgages, children of all ages especially the group under 6 years of age, short periods of occupancy (one to two years), university education and more weakly on professional-type occupations. The strong loading on younger children, the short periods of occupancy, and the frequency of occurrence of mortgages suggest a younger age group in the 25- to 44-year range. The low negative loadings on number of rooms and persons per household, and the high loading on single-attached houses provides additional evidence that this is a fairly young group of families probably in their first owner-occupied dwelling.

The second factor produced high loadings on the occupational groups (mangerial, health, and medical). The broad range of academic

TABLE 5-4

VARIMAX ROTATED FACTOR MATRIX CENSUS TRACT DATA

VARIABLE NAME	MDS SYMBOL	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
SERSA 40	A				.917		
SERSA 51	B				.931		
SERSA 77	C					.945	
SERSA 78	D					.949	
SERSB 202	E			.761			
SERSB 204	F			.312			
SERSB 349	G			.925			
SERSB 350	H			.521			
SERSB 362	I			.917			
SERSB 363	J			.956			
PCT 14901	K			.545	.501		
PCT 15001	L		.871				
PCT 15101	M			.672			.430
PCT 15201	N	.769	.559				
PCT 3534	O	.970					
PCT 3734	P	.958					
PCT 3834	Q	.894					
PCT 3934	R						.828
PCTSIN 34	S	.962					
PCT 5744	T	.993					
PCT 7361	U	.992					
PCT 7461	V	.984					
PCT 7561	W	.965					
PCTCHL 61	X	.992					
PCT 203201	Y	.925					
PCT 205201	Z	.934					
PCT 206201	1	.987					
PCT 209201	2				-.340		-0.647
PCT 239 OCC	3		.932				
PCT 240 OCC	4	.535	.815				
PCT 241 OCC	5	.532	.814				
PCT 253 OCC	6	.533	.814				
PCT 254 OCC	7	.550	.801				
PCT 255 OCC	8	.560	.792				
VARIATION							
INDIVIDUAL		45.1	15.7	11.9	0.5	5.1	4.0
CUMULATIVE		45.1	60.8	72.7	79.2	84.3	88.3

Only Loadings up to + 0.3 and - 0.3 are recorded.

training that these groups require is reflected in the strong loading of the variable measuring "some university with no other training" and a weaker loading on the "highest educational category" of "university plus additional training".

In Factor 3, the four income-related variables are associated with variables expressing the value of the occupied dwelling, and the possession of a unversity degree.

The variables which load on Factor 4 are the average number of rooms per dwelling and the number of persons per household. There are weak positive loading on some levels of university education and a weak negative loading - 0.340 - on length of tenure greater than 10 years.

Factor 5 includes two loadings, persons per family and children per family. In many ways, this factor separates the tracts where families are large but living conditions uncrowded from those where families are large but the average house size is not. Factor 6 shows strong loadings on the percentage of apartments, on people with short-term tenure patterns, and on university education.

5.7 COMPARING THE FACTOR STRUCTURE WITH EARLIER STUDIES

Although the point was made earlier that definitional chaos made it difficult to compare factor structures between separate studies, there are some broad similarities between the results produced by this study, and those described by Murdie for the same area using 1951 and 1961 census data. The factor labelled socio-economic status by Murdie which is the strongest dimension in both 1951 and 1961 is similar to Factor 2 of this study in the broad sense that it shows, in Murdie's terms, "close association with

measures of education, occupation, and income. Furthermore, this factor, like Murdie's, includes "no variables measuring variations in housing conditions." In similar fashion, Factor 1 of this study is quite similar to Factor 2 of the earlier study including, as it does, loadings on single-family dwellings, large young families and home ownership. Murdie labelled this factor "family status" or "urbanization".

What seems important here is not so much the labelling of the factors, which is avoided in this study, but rather the ability to reproduce, using different variables, these two dimensions which are generally similar in structure. These dimensions before varimax rotation accounted for 55 percent of the variation in this study, for approximately 38 percent in Murdie's 1951 study and 31 percent in his 1961 study. At the census tract level, therefore, there seems to be clear evidence that variables associated with education, occupation, and income on the one hand and those associated with family size, young children, young heads of household, and home ownership on the other, align themselves into a consistent pattern. Furthermore, the existence of a substantially similar pattern in the 1971 study of Metropolitan Toronto argues strongly for the stability of this pattern over the 30-year span of the studies.

It should be reiterated that this study did not set out to test for the existence of the Shevky-Bell indices, but rather to examine the associative pattern for individual variables. The discovery of the stability of the groupings even when different types of measures of the same variables were used suggests that the pattern of association is neither trivial nor accidental and at the census

tract level is indicative of some underlying structure.

In the present study and in Murdie's 1969 study, the variables that associated with housing-related measures are the age of the head of the household and the number of children in the household. However, both Murdie's study and this one based the analysis on census tract data, while Rossi's (1955) conclusion was based on individual level data collected from interviews. This raised the possibility that there could be a set of variables that associate with each other irrespective of the scale at which the data were collected.

Robinson, in a paper on "Ecological Correlations and the Behaviour of Individuals", concluded that:

> . . . The relation between ecological and individual correlations which is discussed in this paper provides a definite answer as to whether ecological correlations can be used as substitutes for individual correlations. They cannot. While it is theoretically possible for the two to be equal, the conditions under which this can happen are far removed from those ordinarily encountered in data. (Robinson, 1950, pp. 357)

Although other authors have since qualified this position (Menzel, 1950) and others have provided alternative solutions to the problem of ecological correlations (Goodman, 1953; Duncan and Davis, 1953), the danger of committing the ecological fallacy has tended to make researchers careful about reaching conclusions about individual behaviour from the use of aggregate data. The existence of the Public Use Sample Tapes which provide individual level sample data for Metropolitan Toronto allowed further exploration of the pattern of variable association without fear of the ecological fallacy.

5.8 THE RESULTS OF PUBLIC USE DATA ANALYSIS

The data set chosen consisted of eighteen variables covering a sample of 7,735 cases. The cutoff point chosen after some preliminary analysis is an eigen value of 1.14. This produces four factors for rotation and accounted for 61.2 percent of the variation.

Factor 1 includes significant loadings on: home ownership, house size (number of rooms and bedrooms), and length of residency. The lower loading on persons per household and the negative loadings on children under 6 years of age and size of mortgage suggested an older group with grown-up chidren.

In Factor 2, stong positive loadings on the number of children, persons per household, and the amount of mortgage combined with a strong negative loading on the age of head, and a weaker negative loading on length of occupancy. This suggests, therefore, younger families with children of all ages, who have only recently purchased the home and still carry substantial mortgages.

Factor 3, describes a dimension that combines a younger professional group with strong loadings on household income and head's income, and significant positive loadings on dwelling value, managerial occupations and on rent. These loadings define this group as comprising mainly renters. While the small negative loading on age itself tells very little, it does eliminate both extremes of the age spectrum. Finally, the 0.64 loading on managerial occupations, when taken together with the loadings on income, suggested a middle management group.

Factor 4 included significant loadings on education and the technological occupations. Of the weaker loadings, the -0.26 loading

on age and the other low negative loading on children and tenure suggested a younger group which had few children, and included few owners. The pattern seemed to describe a dimension that includes a well-trained technological group in the 25- to 30- age range occupying both homes and apartments but who earn on the average lower range incomes.

The analysis produced four factors. These could be grouped into two broad categories based on tenure. Factors 1 and 2 define the homeowners. Factor 1 was made up of the older group with smaller families and lower levels of earned income. They occupy large houses with small or non-existent mortgages. This dimension commonly includes those at the mature end of the life cycle usually labelled "empty nesters". Factor 2 also describes another owner/occupant dimension. However, this group is much younger, has smaller homes, larger families and are heavily mortgaged. The earned incomes are lower than the group described in Factor 1.

Factors 3 and 4 define dimensions that focus on the renters. The age differences, although apparent are not as severe or clear cut, but the income differences are. Factor 3 defines a relatively young group of white-collar professionals in the managerial occupations. They earn high incomes and live in comfortable, expensive, rental accommodation, but have small families and few children. Factor 4 suggests a mixed group. It includes the very young, well-trained technical people, but the level of earned income, and amount of rent paid is not consistent with the amount of formal education and the job classification. Stepping outside the loadings, therefore, this suggests a group of younger technical people in new

TABLE 5-5

VARIMAX ROTATED FACTOR MATRIX

All Cases - P.U.S.T.

Variable Name	MDS SYMBOL	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
PERSHH	A	.418	.761		
CHILDA	B		.708		
CHILDD	C		.815		
HHLDINE	D			.798	
AGEHD	E	.398	-.639		
INCHD	F			.813	
EDUHD	G				.661
TENURE	H	.846			
TYPEDWL	I	.754			
NOROOMS	J	.741		.346	
BEDROOMS	K	.742	.362		
LENGTHR	L	.664	-.352		
MORTGAGE	M	.635			
DWLVALUE	N			.575	.347
PREVDWL	O	.467			
RENT	P			.616	
MANG	Q			.646	
TECH					.847
% VARIATION EXPLAINED		25.1	15.9	13.5	6.7
CUMULATIVE		25.1	41.0	54.5	61.2

Only Loadings up to + 0.3 and - 0.3 are recorded.

jobs who are living temporarily in what used to be called the 'bohemian'-type accommodation.

It was mentioned, earlier in this section, that the total sample of 7,735 included 4,251 owners, and 3,484 renters. The pattern of results observed in the full sample suggested that a strong basic division existed between these two groups based partly on tenure. It was decided, therefore, to reproduce the analysis using separate samples of renters and owners. The results of these separate analyses are discussed in the sections following.

5.8.1 The Public Use File: Owners

Analysis of the owner/occupants using as a cutoff point the eigen value of 1.0 produced six factors explaining 67.2 percent of the variation in the data. Factor 1 consisted of a dimension of homeowners with large families, many children, young heads, without much formal education who have purchased inexpensive homes and carry small mortgages. The family size loadings coupled with the weak negative loadings on education and the professional occupations, suggests a group of young blue-collar workers.

Factor 2 shows significant loadings on income, dwelling value, the managerial occupation group, and a weak loading on education. This factor includes many of the traditional economic status variables of income, education, occupation and house value.

Factor 3 includes high loadings on house size (number of rooms and bedrooms) and house value, with weaker loadings on previous home ownership and family size. This suggests an older group, possibly in the 44- to 45- age range who have owned homes previously. The houses are large and expensive but the family size is small.

TABLE 5-6

VARIMAX ROTATED FACTOR MATRIX: OWNERS - P.U.S.T. DATA

VARIABLE NAME	MDS SYMBOL	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
PERSHH	A	.854		.305			
CHILDA	B	.644					
CHILDD	C	.872					
HHLDINE	D		.830				
AGEHD	E	-.549			-.594		
INCHD	F		.873				
EDUHD	G		.371			.636	
TENURE	H						
TYPEDWL	I						.860
NOROOMS	J			.803			
BEDROOMS	K			.773			
LENGTHR	L				-.840		
MORTGAGE	M				.730		
DWLVALUE	N		.501	.613			
PREVDWL	O			.497			
RENT	P						
MANG	Q		.658				
TECH	R					.874	
% VARIATION EXPLAINED		23.1	15.5	9.0	6.9	6.6	5.9
CUMULATIVE %		23.1	38.5	47.5	54.5	61.1	67.2

Only Loadings greater than + 0.3 or less than -.03 are recorded.

Thus, children in this group are more likely to be teenagers or older as suggested by the weak positive loading on the 6 to 18 years of age group.

In Factor 4, the pattern of loadings describe a dimension with high mortgages, very short period of tenure in the present home, and young household heads. The weaker loadings add young children (under 6) and education to this dimension. This factor outlines a dimension that groups young households who have only recently purchased their homes, have lower incomes, large mortgages and small families including very young children.

Factor 5 consists of two strong loadings, the first on technological occupations and the other on education. The other loadings are not significant, however, the weak positive loadings on income, make it difficult to determine a definite pattern.

Factor 6 consists of one strong loading on dwelling type and a weaker on one previous dwelling suggesting that previous homeowners tended to be well represented in the sample.

Analysis of the owner-occupier data produced five interpretable dimensions. The most clearly defined dimension consisted of strong positive loadings on number of young children and a significant negative loading on age of head. The second combined strong loadings on income and professional employment with weaker loadings on education and dwelling value. The third grouped the variables measuring larger houses and dwelling value with previous ownership and a weak loading on persons per household. The fourth grouped high mortgages with young household heads and short tenure periods. The fifth dimension grouped technological occupations and

education.

The variable 'dwelling value' loaded on two factors, 0.5 on Factor 2 and 0.6 on Factor 3, despite the varimax rotation. In Factor 2, the income, education, dwelling value grouping is reminiscent of the socio-economic status factor, while Factor 3 simply relates dwelling value to house size.

5.8.2 The Public Use File: The Renters

As was expected, the analysis of data on renters produced a structure similar in some ways to that described earlier for the owners. Four dimensions were defined accounting for 53 percent of the variation. Factor 1 included high loadings on children of all ages, persons per household, and house size. Weaker positive loadings occurred on income, rent, and negatively on the age of head. The high loadings on children and persons per household suggest large families in cramped quarters. The low positive loading on income and the low negative one on age suggest a mixed but relatively young group most likely made up of blue-collar workers.

Factor 2 defines a group of well-educated, well-paid professionals with small families and few children. The strong loadings occur on income, education, rent paid, and weaker but significant loadings on the professional occupations. The high loadings on age and length of residence suggest an older stable group most likely seniors. This is supported by the low loading on young children.

Factor 3 is characterized by a strong loading on age and another on tenure. This was associated with negative loadings on children, particularly those under 6 years of age, on education, and

TABLE 5-7

VARIMAX ROTATED FACTOR MATRIX FOR RENTERS

Variable Name	MDS SYMBOL	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4
PERSHH	A	.849	-.324		
CHILDA	B	.566	-.356		
CHILDD	C	.758	-.426	-.308	
HHLDINE	D	:441	.717		
AGEHD	E	-.323		.745	
INCHD	F	.374	.723		
EDUHD	G		.595	-.422	
TYPEDWL	I				.435
NOROOMS	J			.630	.371
BEDROOMS	K				
LENGTHR	L			.630	
PREVDWL	O			.489	
RENT	P		.593		
MANG	Q		.428		
TECH			.343	-.353	.602
% VARIATION EXPLAINED		20.5	14.7	10.7	6.9
CUMULATIVE		20.5	35.3	46.0	52.9

Only Loadings up to + 0.3 and - 0.3 are recorded.

professional occupations.

Factor 4 is dominated by the loadings on the technological occupations. This group is not as well educated as their home-owning counterparts, but they tend to have similarly small families with few children. This dimension probably consists of technicians rather than the technologists included in the better-educated group discussed in the previous section. The renter data produced, therefore, four factors - the Blue-Collar Group, the Professionals, the Senior Citizens, and the Technicians - and a structure which is quite similar to that produced by the owner-occupier group.

5.9 ANALYSIS OF THE STABILITY OF VARIABLE ASSOCIATION

One specific goal of this analysis is to compare the pattern of variable association that was displayed in the individual-level data with that of the aggregate census tract-level data. Of specific interest is the composition of the life cycle or family status and the socio-economic status dimensions.

The analysis of the total individual-level sample (renters and owners) produced one dimension that included family status-type variables. Factor 2 included loadings on number of children, persons per household, large mortgages, young household heads, and short periods of occupancy of the present dwelling. This dimension seemed to be most similar in composition to Factor 1 of the census tract data which consisted of high positive loadings on:

- percentage of owner-occupied dwellings;
- percentage of single-detached and single-attached houses;
- percentage of houses carrying a mortgage;
- number of children under 6 and 6 to 18; and
- percentage period of occupancy one to two year.

Thus, the pattern of association produced by analysis of the census tract data is replicated in a substantially similar manner at the individual level for this variable group.

Another grouping of variables that is of importance to this study is the composition of the 'Socio-economic Status' dimension. In this study, Factor 3 of the P.U.S.T. file combines loadings on: household income, head's income, and occupations with a weaker but significant loading on dwelling value. The census data produces much the same pattern, with loadings on average total income, median income, average income of head, university education and a stronger loading on median value of the dwelling. Here again, therefore, the pattern of association is substantially similar.

Further disaggregation of the data into owners and renters tended to change the basic pattern in these two dimensions very little. In the 'owners' data, the disaggregation produces two dimensions that seemed to represent different segments of the same life cycle stage. Factor 1 includes large families, young household heads, large mortgages and blue-collar occupations, while Factor 4 combines young heads of household, large mortgages, young families, but higher levels of education. Thus, the major impact of disaggregation is to separate the young homebuyers into two groups based mainly on education and income potential.

In Metropolitan Toronto, therefore, the pattern of association for variables relating to the 'Family Status' and 'Socio-economic Status' dimensions is basically similar at both the census tract and individual household levels. Thus, although an underlying 'order' cannot and should not be asserted from this evidence, a

stability of variables relationships is indicated.

The grouping of variables that seems most consistent throughout the foregoing analyses is the association of the mortgage variable with the lower income group of homeowners which frequently seem to be younger and have large, young families. As a consequence one additional factor analysis is done. The data for this analysis are obtained from a special survey done by Statistics Canada and carried out in 1974. The Survey of Housing Units, unlike the census data, was a special use survey. This sample offers two interesting possibilities. First, it allows the inclusion of detailed mortgage information, and second, it allows the test for variable association to be done on a different set of individual-level data for a period that approximated the house price boom in Metro Toronto. Nine variables covering the number of mortgages, the rate of interest on the first, second, and third mortgages, the monthly payments and the principal outstanding are added to the variables chosen in the other two analyses.

The analysis of the S.H.U. data set is run, therefore, on 24 variables with the cutoff point at the 1.0 eigen value. This produces 7 factors and accounts for 70.6 percent of the variation in the data. Factor 1 consisted of significant positive loadings on age of building, number of mortgages, size of principal outstanding on the first mortgage, interest rate in the first mortgage, monthly mortgage payment on the first mortgage with a negative loading on age of head. Factor 1 outlines a dimension which combines high loadings on older houses, high first mortgages with high outstanding principals and interest rates plus young household heads.

TABLE 5-8

SURVEY OF HOUSING UNITS DATA

VARIMAX ROTATED FACTOR MATRIX: OWNERS

VARIABLE NAME	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6	FACTOR 7
VO18							.522
VO21	.604						
VO29	-						
VO32			.453				.629
VO34	.671	.615					
VO35	.868						
VO36		.929					
VO37					.979		
VO41	.867						
VO42		.876					
VO71				.549			.304
VO76						.760	
VO77						.785	
VO78						.682	
VO83			.921				
VO84				.892			
VO89	.880						
VO90		.889					
VO91					.979		
VO97	-.604						.314
VO98							-.490
V100			.803				
V102			.533				-.344
KIDS				.853			
CUMULATIVE % VARIATION	23.8	35.7	44.5	52.0	59.2	65.3	70.6

Only loadings greater than +0.3 or lower than -0.3 are included.

Factor 2 is basically a second mortgage dimension with significant loadings on the size, monthly payment, rate of interest and principal outstanding on second mortgage. In Factor 3, the three income variables load strongly and combine with a weak positive loading on house value. Factor 4 is mainly a density of occupancy measure with significant loadings on household size, number of children and number of bedrooms. Factor 5, like 1 and 2, is another mortgage factor with significant loadings on the size of the outstanding principal on the third mortgage and the rate of interest on the third mortgage. Factor 6 is a land-use factor defining the three land uses surrounding the dwelling and, weakly, the type of dwelling. The final factor, 7, shows significant loadings on type of dwelling, selling price, size of dwelling, and interestingly, produces weak negative loading on the sex of the head and size of the spouse's income.

As was expected, the introduction of nine new variables changed the factor structure. However, some interesting consistencies were noted: first, the relationship of young household heads with the highest mortgages and lower wage incomes in Factor 1; second, the weak loading of the house value index on the wage income variable; and finally, the grouping in Factor 7 that suggested older, male heads of households with low levels of wage income and few children, who occupied the more expensive single-detached houses.

5.10 THE MULTIDIMENSIONAL SCALING ANALYSIS

The pattern of variable association revealed thus far is logically consistent and stable at both the individual and aggregate levels. However, the results have all been produced by the

application of principal axes factor analysis.

Hunter (1972, 107-112) in a critique of factorial ecology made the following comment on the results produced by factor analyses:

> . . . . since it is known that the results one obtains can vary considerably across factor models, it is possible - even likely - that many of the substantive conclusions which have emerged from their research would not have been reached if different factor models had been used. . . . - it is possible that the consensus which exists among factorial ecologists concerning the nature of differentiation within urban areas is to some degree a function of the fact that they have tended to use the same statistical procedures.

Paying due heed to Hunter's warning that the supposedly substantive findings could be merely artifacts of the technique used, the correlation matrices were subjected to a clustering algorithm different from factor analysis. The technique used is Non-Metric Multidimensional Scaling (M.D.S.) (Kruskal, J.B. and Wish, M., 1978, p. 7).

> . . . Multidimensional scaling refers to a class of techniques. These techniques use proximities among any kind of objects as input. . . The chief output is a spatial representation, consisting of a geometric configuration of points as on a map. Each point in the configuration corresponds to one of the objects. This configuration reflects the "hidden structure" of the data. . . By reflecting the data structure we mean that the larger the dissimilarity (or smaller the similarity) between two objects, as shown by their proximity value, the further apart they should be in the spatial map.

According to Wish and Carroll (1974), the most common ways to derive a profile proximity measure are to compute correlations between variables or squared distances between stimuli. As noted earlier, the input used here resulted from the computation of

correlation matrices. The specific computer algorithm used is called "TORSCA": A Fortran IV Program for Non-Metric Multidimensional Scaling, prepared by Young and Torgerson (1967). The underlying mathematical and statistical principles are quite complex and beyond the scope of this discussion. However, excellent descriptions and reviews are available in Carroll and Wish (1974), Kruskal and Wish (1978).

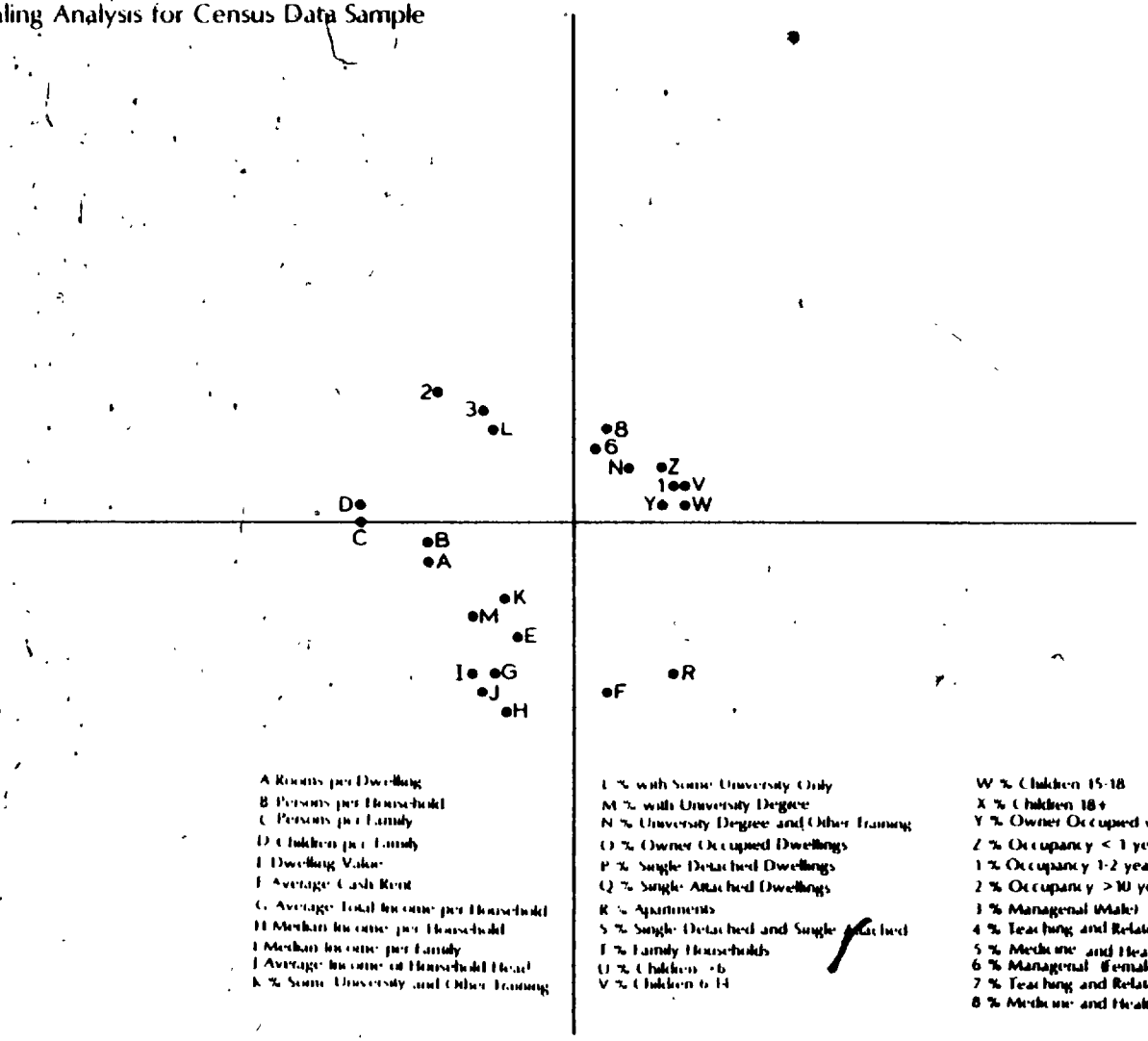
Because the basic structure of the S.H.U. data is different it is not included in the M.D.S. analysis. It includes, therefore, only the aggregate census data and the individual-level Public Use Tape data (P.U.S.T.). The two-dimensional solutions are chosen for interpretation because of the greater difficulty of visualizing the higher dimensional solutions.

5.9.1 The Results: Aggregate Census Data

Figure 5-1 presents the spatial representation of the aggregate level variables. The variables are the same as those used in the factor analysis in the previous section. Each of these is represented by either an alphabetic or numerical symbol (an explanation of these symbols accompanies the space diagram). Because there is no single set of clusters generally implied in any configuration care must be taken to avoid, as much as possible, researcher bias in the definition of clusters.

The configuration of Figure 5-1 (and all the subsequent space figures) is discussed in terms of intuitively acceptable groupings or clusters. Four clusters are defined.

Fig. 5.1 Spatial Representation of the Multidimensional Scaling Analysis for Census Data Sample



A Rooms per Dwelling
B Persons per Household
C Persons per Family
D Children per Family
E Dwelling Value
F Average Cash Rent
G Average Total Income per Household
H Median Income per Household
I Median Income per Family
J Average Income of Household Head
K % Some University and Other Training
L % with Some University Only
M % with University Degree
N % University Degree and Other Training
O % Owner Occupied Dwellings
P % Single Detached Dwellings
Q % Single Attached Dwellings
R % Apartments
S % Single Detached and Single Attached
T % Family Households
U % Children < 6
V % Children 6-14
W % Children 15-18
X % Children 18+
Y % Owner Occupied with Mortgage
Z % Occupancy < 1 year
1 % Occupancy 1-2 years
2 % Occupancy >10 years
3 % Managerial (Male)
4 % Teaching and Related (Male)
5 % Medicine and Health (Male)
6 % Managerial (Female)
7 % Teaching and Related (Female)
8 % Medicine and Health (Female)

Group I (Symbols 1, 4, 5, 6, 7, 8, N, O, P, Q, S, T, U, V, W, X, Y, Z) seems to combine Factors 1 and 2. This is not a surprising result in a two-dimensional solution because even the varimax rotation failed to assign many of the variables that loaded on Factors 1 and 2 exclusively to one or the other factor. Indeed, six of the eight variables that comprise Factor 2 load on Factor 1. In this respect, therefore, the grouping of Factors 1 and 2 into a single spatial cluster is plausible. Group 3 (Symbols A, B, C, D, E, G, H, I, J, K, M) combines Factors 3, 4, and 5. Here some subjectivity in the interpretation of clusters is apparent. Variables C and D and Variables A and B do indeed form subclusters within the larger clustering that was designated Group 3 and could easily have been defined as separate, if an ex post facto attempt was being made to match the factor analytic structure.

Group 2 (Symbols F and R) reflects the association of two variables percentage apartments and average cash rent paid. In the factor analytic structure, the rent variable loaded on none of the factors strongly while the apartment variable loaded on Factor 6. Here again, this association seemed intuitively reasonable.

The final group, Group 4 (Symbols 2, 3, L) comprises three variables, percent occupancy more than 10 years, the managerial occupations, and some university education and nothing else. In the factor analysis, the education and occupational variables loaded on Factor 2, while the occupancy variable loaded on Factor 6 with percent apartment.

In the factor analysis, Factors 1 and 2 accounted for 60 percent of the variation in the data before varimax rotation, these

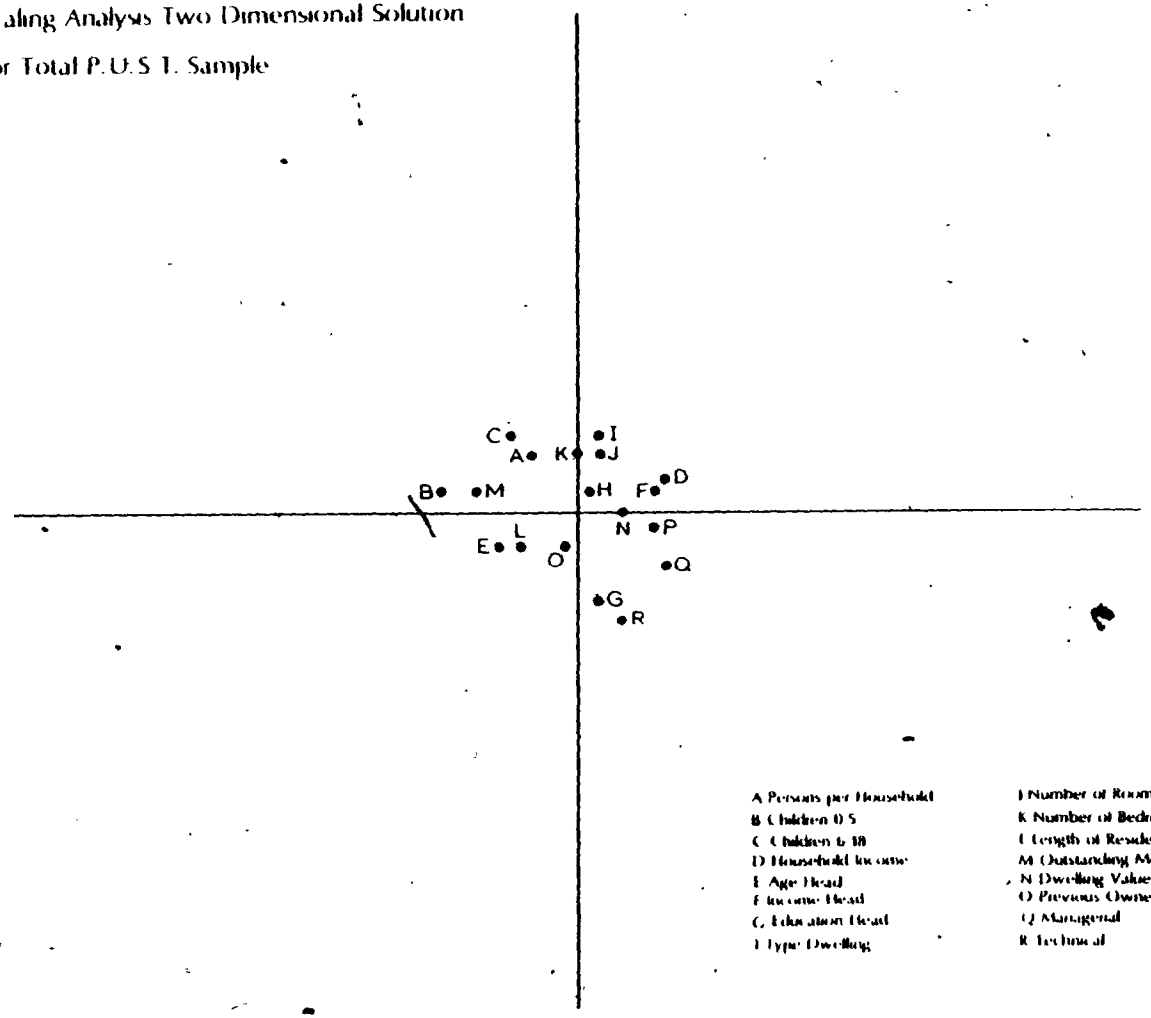
dimensions are strongly related as the partitioning of variation between the two factors shows. Thus, the spatial cluster represented by Group 1 does, in fact, combine the variables in a manner similar to that produced by factor analysis. The similarity of Factor 3 and Group 3 further supports this contention.

5.10.2 Results of the P.U.S.T. Variable Analysis

Analysis of the configuration of P.U.S.T. data for the combined owner/renter sample produced 4 clusters (Figure 5-2). Group 1 (symbols J, H, I, K) combines the house size variables like number of rooms, bedrooms, tenure, with number of children 6 to 18 years of age and person per household. This is identical to Factor 1 except for the length of residence loading which was the weakest of the Factor 1 loadings. Group II (symbols N, F, D, P, Q) group dwelling value, the two income variables (income head and household income), rent paid, and managerial occupations. This group is identical to that produced by Factor 3 of the analysis. Group III (symbols G and R) clustering education and technological occupation is identical to Factor 4.

Group IV was in many ways the most difficult to designate objectively. Because the three other groups had been almost identical to the factor structure, the variables remaining would clearly be those that comprise Factor 2. Group IV (symbols E, L, O, [B, M] [C, A]) separated itself into three subclusters. Symbols E, L, and O (age head, length residency, previous dwelling) cluster. B, and M (children under 6 and size of mortgage) are spatially close while A

Fig. 5.2 Spatial Representation of the Multidimensional Scaling Analysis Two Dimensional Solution for Total P.U.S.T. Sample



and C, persons per household, and children 6 to 18 are related. The question then was should this be considered one group or three. The decision was made that defining three separate but marginally aligned clusters would not increase the understanding of the hidden structure. Group IV was considered, therefore, a kind of residual cluster composed of three subgroups. In spite of the ambivalence of the Group IV configuration, the factor structure exhibited substantial similarity with the spatial configuration produced by the scaling program.

5.10.2.1 The Owners Data

The configuration of the space diagram for owners, Figure 5-3, suggested four clusters. The first (A, B, C, J, K) seems to combine the variables included in Factors 1 and 3. The second group (E and L) is similar to Factor 4, while the third (G, R) is the same as Factor 5. Group IV (F, D, Q) is similar to Factor 2.

5.10.2.2 The Renters Data

The interpretation of the renters data configuration, Figure 5-4, also provided broad scope for subjectivity. The clusters, if they can be so designated, comprise associations of pairs of variables with little relationship between separate pairs. For example, symbols A and C, D and F, or P and Q show clear spatial proximity. It seemed more useful, therefore, to compare the pairs of variables to the factor structure. Factor 1 consisted of two strong loadings on variables A and C and several weaker ones (e.g., B and D). Similarly, Factor 2 loaded well on D and F and weakly on P, G, and Q. Factor 3 showed loadings on E and L plus other barely significant loadings, while Factor 4 showed a 0.6 loading on R and weak loadings in I and J.

Fig. 5.3 Spatial Representation of the Multidimensional Scaling Analysis Two Dimensional Solution for P.U. ST Data on Owners

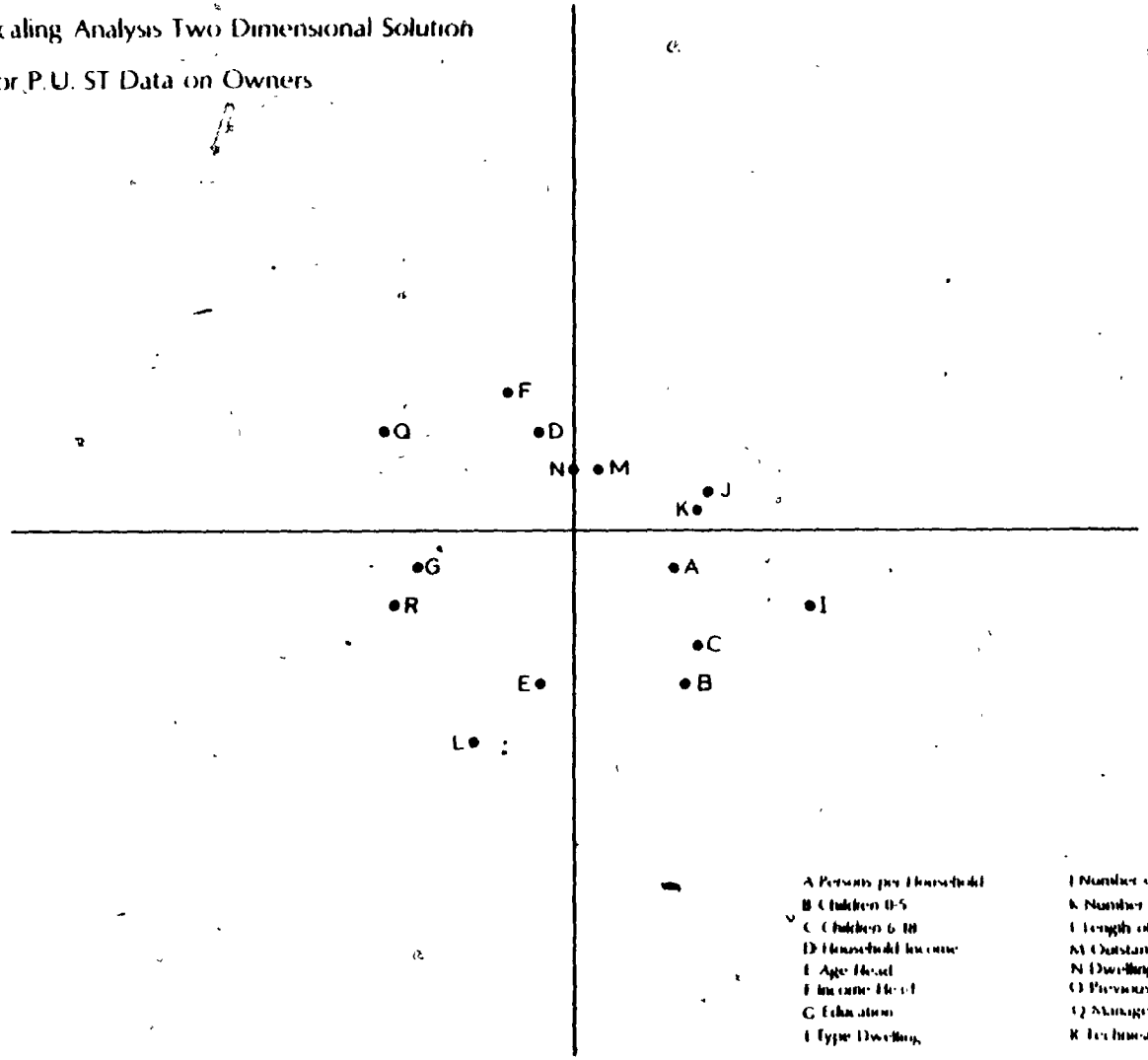
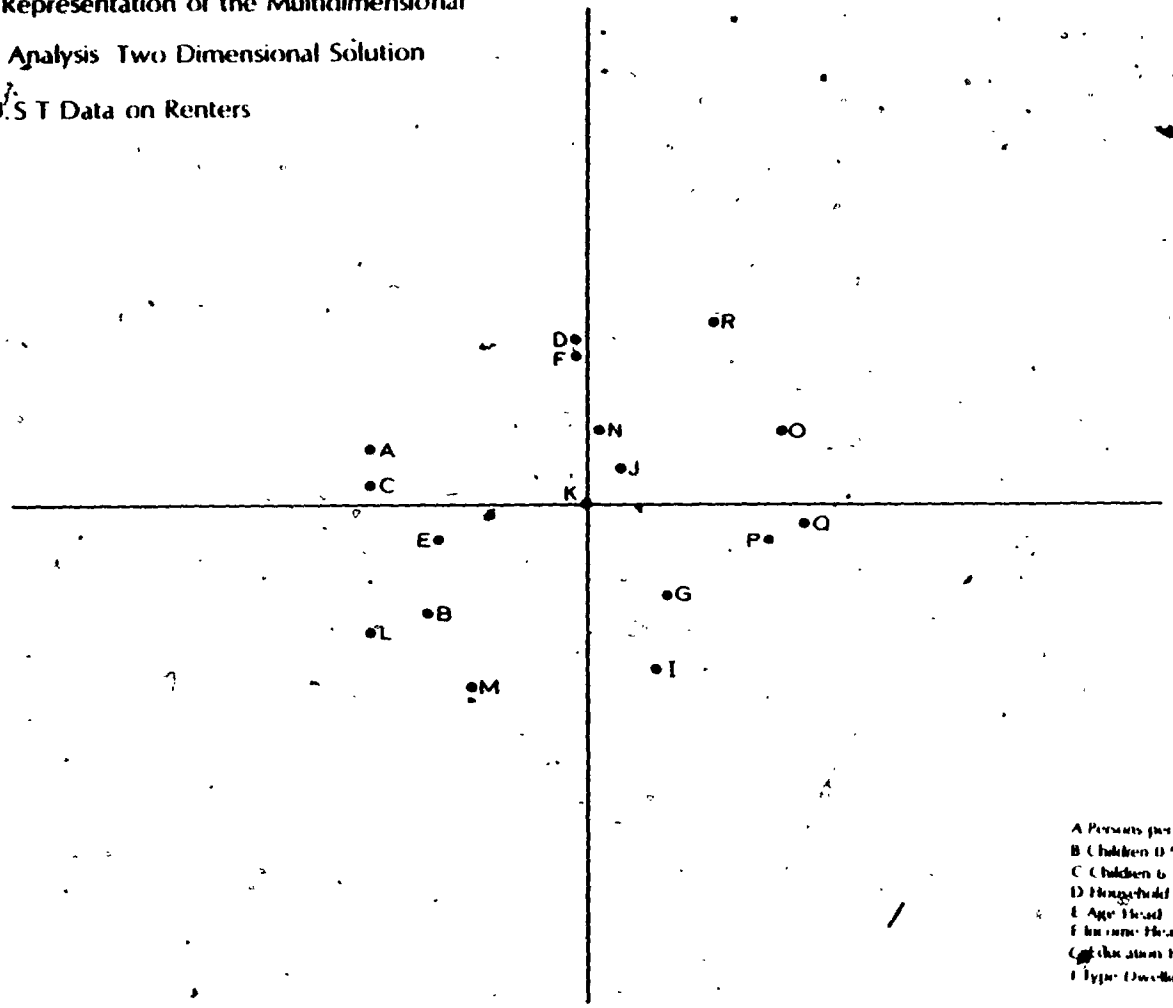


Fig. 5.4 Spatial Representation of the Multidimensional Scaling Analysis Two Dimensional Solution for P.U.S T Data on Renters



A Persons per Household
B Children 0 5
C Children 6 18
D Household Income
E Age Head
F Income Head
G Education Head
H Type Dwelling
I Number of Rooms
K Number of Bedrooms
L Length of Residency
M Outstanding Mortgage
N Dwelling Value
O Persons Ownership
Q Marginal
R Technical

These results indicate that the interrelationships between groups of variables in the renters data, although identifiable, are not really strong (the four factor solution for the renters data explained only 53 percent of the variation). Thus, the lack of simple, well-defined clusters in two-dimensional space is understandable. Of critical importance is the fact that nowhere did the M.D.S. solutions change the pattern of association of strongly related variables. In fact, in some situations (for example Factors 1 and 2 of the Census data) the M.D.S. clusters grouped the two factors into a single cluster that is in some ways more intuitively acceptable. Goodchild (1973) comments on a characteristic of the varimax rotation which is used in both the factor analyses and the M.D.S. configuration. He suggests that the use of varimax rotation on weak factor structures results in the destruction of general tendencies. This tendency is especially evident in the weaker factor structures of the individual-level data.

In this chapter, the goal was to examine the degree and stability of association of selected variables associated with the composite indices of Family Status/Life Cycle and Socio-economic Status. Of specific interest were the changes that occur in the inter-relationships when either the scale of data aggregation, the technique of analysis, or both were varied. At the Census Tract level, substantial agreement was discovered between the associations produced in 1951, and 1961 by Murdie and those exhibited in this study. Further, the individual-level analyses also revealed similar patterns of association. These broad patterns proved to be basically

stable even when the technique was changed to non-metric multidimensional scaling.

The key phrase, however, is substantial similarity. Because the composite indices are defined in such a wide variety of ways, the best that could be expected was broadly similar results. This allowed differing amounts of subjectivity to be imposed on the interpretation of results and frequently made it difficult to translate the indices into operational form. The composite indices cannot easily be used for predictive purposes and must, then, be relegated to the function of producing broad guidelines for further research. Attention should focus, rather, on the interrelationships of individual variables which proved to be stable irrespective of scale or technique used. This conclusion is strongly supported by Rossi (1980). In the initial (1955) version of his monograph, Why Families Move, one of the strongest and most frequently quoted statements about the importance of the Stage in the Life Cycle to residential mobility was made. Rossi wrote:

> . . . The findings of this study indicate the major function of mobility to be the process by which families adjust their housing to the housing needs that are generated by shifts in family composition that accompany life cycle change.

However, in the later (1980) edition, Rossi commented:

> . . . The major difficulty with the concept of family life cycle, as Quigley and Weinberg (1977) point out, is that there is scarcely much agreement from researcher to researcher over the particular stages that are distinguished and it is difficult to consider any operational translation of life cycle into any but nominal variable terms. . . Whatever particular details are used to arrive at stages, all definitions stress heavily the presence or absence of children in a household and the age of the primary couple (husband and wife). Indeed when it came to using family cycle to predict

> residential shifts, Why Families Move abandoned the life cycle stages formulation and simply characterized each household by age of the head of the house and the numbers in the household. Rossi (1980, p. 25)

The point made earlier, and reiterated here, is that it is the variable associations that are critical, rather than the labels. To some extent then, the focus on finding the composite indices of Socio-economic Status and Family Status, rather than on defining the precise variables that seem to be consistently associated with these concepts has worked to lessen the operational usefulness of factorial ecologies.

5.11 THE SUMMARY

This chapter set out to examine the relationships among the variables used to create the composite indices of Socio-economic Status and Stage in the Life Cycle and to review the problems posed in using and interpreting these indices. The analysis indicates that the variables measuring income, education and house value group consistently to produce a socio-economic status type factor. Furthermore the relationship among these groups remained consistent even when the level of data aggregation or grouping technique was varied. However, closer examination of the results of the factor analyses reveals that the loading of the dwelling value variable on this factor varies from .76 in the aggregate data analyses to an indeterminate split loading of +.57 and +.34 in the P.U.S.T. analysis and .45 in the S.H.U. data. Thus if allowance is made for the generally higher correlations that aggregate data produce, then it is fair to say that the loading of the dwelling value variable on the Socio-economic status factor is weak or indeterminate.

In the past most factor ecologies that produced the Socio-economic status index used aggregate data, thus producing results with higher correlations and higher factor loadings. The direct result of the use of this index has been that attention was shifted from the weak correlation between individual variables (which even using aggregate data values are as low as $r^2 = .3$) to the stronger factor loadings of up to .7. This has allowed a widespread acceptance of the belief that a close relationship exists between the variables income, occupation, education and dwelling value which examination of the individual correlation coefficients disproves.

In similar fashion the predictive ability of the Life Cycle index is questionable, especially when applied to housing market phenomena. As shown earlier, Rossi (1980) admitted that Life Cycle proved impossible to operationalize as an index and his conclusions depended rather on analysis of individual variables. The factor analyses performed here produced at lease two clearly identifiable Stages in the Life Cycle which could be disaggregated further on the basis of income or occupational status. Similarly, Brozowski (1977) in his analysis of London, Ontario produced two significant life cycle factors, a mature life cycle factor with:

> . . . high variable loadings on single homes, age grouping for children 5-14, heads of household aged 35-54, bedrooms per dwelling, incomes from all sources. (Brozowski, 1977, 84)

and an older life cycle factor with:

> . . . family heads 45+, single owned homes with attached garages, low loadings on rented dwelling and on age groups less than 34. (Brozowski, 1977, pp. 86)

Furthermore, as Quigley (1978) pointed out the Stage in the Life Cycle dimension provided no sense of what stage or stages in the life cycle are associated with the generally outward movement observed by researchers. He wrote:

> . . . the study of local mobility already includes more than a hundred books and papers reporting a wide variety of empirical results for specialized samples of U.S. households, a review of this literature (Quigley and Weinberg, 1977) indicates that much of this evidence is contradictory or inconsistent and, further that much of the theoretical underpinning is either loosely descriptive or tautological. (Hanushek and Quigley, 1978, p. 52)

An additional problem is that other than the tenure related variable the life cycle index contains few, if any, housing related measures and is composed generally of variables measuring age of head and number and ages of children. There is no evidence in this analysis that indicates that life cycle as an index can predict with any certainty, the essentially market related function of residential mobility.

In addition to the inherent theoretical weakness of the Stage in the Life Cycle and Socio-economic Status indices, there are a number of other factors which function to invalidate the deterministic concept of city structure and change that use of the two composite indices alone produces. Among these are the existing conditions and patterns of change within the local housing market, the spatial distribution of house prices and the preference structure that this distribution reflects, the pattern of government response (at all levels) to housing market conditions, the structure of the residential

construction industry and its response to changes in market conditions, and the basic pattern and historic development of the physical infrastructure (transportation, sewers, etc.) of the area. In the next section, then, the focus returns to some of these variable relationships and specifically an analysis of the relationship between house price change, wage and equity accumulation.

CHAPTER 6

THE IMPACT OF HOUSE PRICE CHANGE ON THE PURCHASE DECISION

This chapter focusses on housing market measures and examines specifically: the impact of house price change on the rate and quantity of equity accumulated in owned accommodation; the relationship of dwelling value to income measures; and the impact of changes in basic equity requirements and the rate of equity accumulation on the pattern of demand for housing in the study area.

The examination of price change in this study represents an attempt to focus on the implications of changes in housing market conditions. Specifically, the likelihood that sharp increases in house prices may have an impact similar to that produced by catastrophic storms on beach development; that is, the effect of the changes occurring during short periods of intense market activity may be of major significance in defining the patterns of residential mobility for extended periods thereafter.

The analysis of house price changes in the 1970 to 1979 period in Metropolitan Toronto (Chapter 4) showed that both sharp increases (1973 to 1974) and significant declines (1976 to 1979) occurred in the study area. As well, examination of the factors associated with the price changes highlighted the importance of the speculative demand that occurred during 1973 and 1974, the period of asset revaluation and house price escalation in Toronto.

Furthermore, an examination of the internal structure of price change for each year of the study period indicated that the rate of price increase was highest above the 80th percentile. This suggested that the imbalance between the supply available and the demand generated was greatest at the highest price levels. One reason

for this differential demand supply response is the manner in which price changes affect the equity position of homeowners and how this change in equity affects the demand for residential services.

Demand, that is the ability to initiate or increase the purchase of owned accommodation, depends on the amount of wealth to which the purchaser has access. Bossons (1977, p. 93, 94) has defined wealth on a scale of increasing strictness of capital constraint from full wealth - including both financial wealth and human capital - through total financial wealth, marketable wealth, to bankable wealth conforming to a banker's definition of collateral available as security for new loans. The concept of wealth used here is closest to Bosson's bankable wealth. Thus, the major sources of wealth are generally, income, consisting of wages and investment income, inherited wealth, and for homeowners, the accrued equity produced by the reduction of outstanding mortgage principal on the one hand, and changes (usually increases) in the value of the property on the other.

At any given time, therefore, changes in market conditions, specifically the rate and direction of price change, can affect the equity position of both existing and potential homeowners by changing the relative value of any of the major composite elements of wealth. To understand how price change can affect equity accumulation and how changes in equity can affect demand, the study examines, briefly, the general pattern of house financing and some of the literature on the income elasticity of demand for housing.

6.1 FINANCING A HOUSE PURCHASE

The large majority of house purchases in Canada are made on

the basis of borrowed money. The usual or conventional financing package consists of an initial cash downpayment, with the rest of the house price being covered, generally, by a fixed payment self-amortizing mortgage running for a term of three to five years at some negotiated interest rate. At the end of each term, the loan and the interest rate paid on the outstanding balance are renegotiated and the process continues until the outstanding balance is fully paid. Government regulations and conservative banking practices require that any loan exceeding 75 percent of house value be insured.

The size of the loan available to a purchaser depends upon the current interest rate, the size of the initial downpayment, and the purchaser's income relative to the level of indebtedness already existing.* Assuming that there are no unexpected inheritances or other windfalls, the range of house price within which a purchaser must look can be calculated using the existing rate of mortgage interest, debt capacity, and period of amortization to determine the maximum loan available, and adding equity from all sources to this total as in the table below:

TABLE 6-1

CALCULATION OF GROSS HOUSE PURCHASE PRICE
FOR GIVEN WEALTH LEVEL
(Using 1971-1974 Rates of Interest)

Available Equity (all sources)	$10,000
Gross Family Income	18,000
Annual Debt Service Capacity @ 30 percent	5,400
Monthly Debt Service	450
Mortgage Interest	12%
Maximum Mortgage 30-Year Amortization	44,700
Maximum Available Funds	54,700
Less-Insurance, Broker's Fee, Lawyer's Fee, etc.	2,700
HOUSE PRICE	$52,000

* In Canada, the gross debt service or ratio of income to total indebtedness is generally computed at 25 to 30 percent of monthly or annual income.

Thus, as the calculations in Table 6-1 show, immediately after the purchase of a house at the price of $52,000, the buyers owe $44,700 and their equity is $7,300, actually less than before the purchase (because of closing and other costs). If the price of the house is held constant, leaving the retirement of outstanding principal as the sole source of equity accumulation, calculations in Table 6-2 show that on a 30-year amortization plan at an interest rate of 12 percent the outstanding loan amounts are reduced as follows:

TABLE 6-2

EQUITY ACCUMULATION BASED ON RETIREMENT OF PRINCIPAL ONLY

# OF YEARS ELAPSED	PORTION OF PRINCIPAL OUTSTANDING
5	.975
10	.931
15	.852
20	.710
25	.455
30	-0-

Thus, after five years, based on retirement of principal alone the purchaser has accumulated $1,117 of equity. However, during the five-year period (1971-1976) the price of housing increased about 100% in Metropolitan Toronto. This changed the total equity position (see Table 6-3) from $7,417 to $60,417 of which $42,000 was capital gain that was tax free if the unit was a principal residence.

TABLE 6-3

EQUITY ACCUMULATION BASED ON PRICE APPRECIATION

House Price	$104,000
Outstanding Mortgage	43,583
Gross Equity	60,417
Retirement of Principal	1,117
Less - Initial Equity	10,000
Less - Brokers Fee @ 7%	7,300
Capital Gains	42,000
Taxes on Principal Residence Gains	0
TOTAL CAPITAL GAIN	$ 42,000

These calculations show not only the critical importance of price changes but also the impact of timing on a purchase. In the example used, the hypothetical purchase took place in 1971 and was held until 1976, a period of increasing prices. If, however, a purchase at the same price level had taken place in 1977 and been held until early 1982, the situation would have been substantially different. During the 1977 to 1982 period prices increased only about 30 percent. Thus, the $52,000 house would have had a value of $67,700 in 1982; the total increase in equity would be $23,000 and the total capital gains less that $13,000. Furthermore, any new purchase or renegotiation of the existing mortgage would have been financed at interest rates, not of 12 percent, but of over 20 percent and would have been available for only one year. Examples of even more discouraging scenarios can be found in British Columbia and Alberta where houses purchased at the peak of the speculative boom (in late 1981 - early 1982) declined in price by as much as 25 percent in two to three months when the speculative bubble burst early in 1982. In fact, the Royal Trust Quarterly Review of House Prices (June 1982) reported an average

decline of prices of over 10 percent in major centres in British Columbia.

It is clear, therefore, that conditions in the housing market, particularly the pattern of change in house prices, can have dramatic effects on the equity position of purchasers. If the same patterns of behaviour produced by changes in income can be ascribed to changes in equity position, then a review of the literature on the relationship of housing and income could clarify the response that may be expected from changes in equity conditions.

6.2 HOUSING AND INCOME

Research into the relationship of housing to income has produced a variety of results. Until Reid (1962) published Housing and Income, Schwabe's law, stating that the income elasticity of housing was less than one was generally accepted. Reid claimed that:

> . . . the higher the income, the higher tends to be the consumption of housing in terms of space, facilities, their quality and market. (Reid 1962, p. 8)

She concluded, therefore, that the income elasticity of housing was significantly higher than one and indeed was measured as high as 2.1 in the case of owners.

De Leeuw (1971) in a review of previous work reported estimates varying from 0.4 to 2.1 in the literature. His review, like Reid's (1962), found that much of the variation in the results derived from the data that were used, (differences among concepts of housing expense and income, the difference between the sample observations and a representative sample of U.S. households, and differences in the

estimating procedures used. De Leeuw estimated that the elasticity for renters ranged from 0.8 to 1.0 and for owners from 0.7 to 1.5.

Maisel, Burnham and Austin (1971, pp 410 - 412), in a critique of De Leeuw's study, pointed out, however, that the use of grouped data tended to produce estimates of elasticity that were about 50 percent higher than those produced using ungrouped data. They conclude, therefore, that the income elasticity of housing varies from 0.62 to 0.97. This figure of 0.62 is similar to Lee's (1971) estimate of 0.7. Thus "there seems to be some professional consensus that over the long run housing demand is slightly inelastic with respect to income and respect to price. . . with most results falling in the range of 0.7 to 0.9." (Quigley, 1977, p. 61)

Grigsby points out, however, that:

> . . . the evidence is still not totally convincing because the various analyses tend to ignore certain important variables, for example, the number of houses that people own, income on equity, imputed and moving, and ownership transfer costs. They also have typically ignored possible differences in elasticity across income groups and household attributes, even though aggregate elasticity estimates are close to worthless. (Grigsby 1977, p. 47)

Three decades of research into the income elasticity of housing has produced no clear consensus. The major reasons for variation have been associated with the definitions of income or house value used, and the level of aggregation of the data. However, these studies generally seem to assume that the housing services purchased pertain only to the single principal residence of the purchaser. This assumption is not valid for all income levels. For example, in a study of luxury condominium purchasers done for Peter Barnard

Associates in 1981 in Toronto, Boston and New York, this author found that:

i) Only 30 percent of the purchasers of luxury condominiums in Toronto sold their existing dwelling to purchase the condominium.

ii) In over 50 percent of the cases, the most expensive purchases included no mortgage financing.

iii) In New York, the owners of luxury condominiums, averaging in price $1.5 million, each spent three months or less at their units each year.

iv) The purchasers of luxury condominiums generally owned at least one other home or cottage.

Thus, at the highest income levels there was a clear tendency to disaggregate the housing services purchased into more than one location, separating leisure, access, and community into different combinations. Although the behaviour of this group is clearly not representative of the total population, the widespread ownership of cottages or summer homes, condominiums, and time shares in the warmer climates suggests that as incomes increase, there is a general tendency to disaggregate the purchase of housing services into more than one location. This raises the question of definition of housing for the purposes of measuring the income elasticity of demand. The problem of definition is far from trivial when it is noted that C.M.H.C. considers houseboats eligible for insurance as permanent residences. This restructuring of the definition of housing to a "permanent residence" disregards the tendency to disaggregate the purchase of housing services as incomes increase and may produce elasticity estimates that are biased downwards.

In the discussion of house price increases (Chapter 4) it was noted that much of the sharp increase in house prices in 1973-1974 was due to asset revaluation. Thus, during periods of sharp price increase, those in strong equity positions were more capable of, and more inclined to, purchase housing as an asset. This suggests that income elasticity of demand for housing varies not only by income group, but also over time based partly on conditions in the local housing market. This is consistent with the pattern of faster price increase at the higher house price levels observed in the examination of house price changes performed in this study and reported in Chapter 4. Thus, measures of aggregate income elasticity of demand for housing are useful only within the context of a specific income group for a specified time period and housing market area.

Given the limited applicability of aggregate measures of income elasticity and the conceptual weakness of the Stage in the Life Cycle and Socio-economic Status indices, the direct relationship between measures of income, equity, and house prices was examined. Reid's (1962) review of housing and income studies showed that the income measures used in most studies tended to comprise:

> . . . the sum of two income components, a positive, permanent or normal component and a transitory component which can be negative or positive. The normal or permanent component is defined as long-run expected income and is an *ex ante* concept pertaining to the future stream of income, while transitory income represents the difference between current income and permanent income. (Reid 1962, p. 10)

Friedman (1957) in his permanent income theory of consumption postulated that consumption is a function of permanent income but is uncorrelated to transitory income. If this concept is applied to the consumption of housing, and assuming that equity held in owned accommodation is not considered to be permanent income, then the relationship between permanent income measures and house value measures should be significant and stronger than the relationship between equity (which can include significant amounts of transitory income) and house price.

The correlation matrices of individual-level data from the Public Use Sample Tapes and the survey housing units samples were examined and the strength of the relationship between various income measures and house prices measured for both samples. The results show a correlation coefficient of 0.466 between household income and house price and 0.494 between household head income and house price in the P.U.S.T. sample. The S.H.U. data sample produce correlations of 0.303 for household income and 0.386 for head's income. Finally, the aggregate census data for 1971 were examined. This produced expectedly higher coefficients of .657 for median family incomes and 0.674 for income of family head when correlated with house value.

These results show that in both individual data sets, the correlation of current income with house price is positive but weak. In addition, in all cases the coefficient produced by correlating head's income with price is higher than that of family income with house price. This is consistent with another of Reid's conclusions that the income of the head of household is a better measure of permanent income than other composite measures.

Grebler and Mittelbach, in a study done in California, examined housing/income relationships during periods of price change, using ordinary least squares analysis of lagged permanent income measures and house prices. Their results showed only marginally significant relationships between income and house prices. They wrote:

> . . . The analysis of current income, measured in constant dollars, and house price was even less significant in several versions of the model. (Grebler and Mittelbach, 1979; pp 129-152).

The relationship between equity (downpayment paid at purchase) and income was examined using the N.H.A. data which included downpayments and purchase price for both previous tenants and previous owners. The underlying assumptions were:

i) That at initial purchase, the total "bankable wealth" is highly income dependent. (Smith 1972 estimated that it took the average family about 5 years to accumulate the downpayment on a modest house in 1969.) It is expected, therefore, that downpayments of first-time purchasers would tend towards the minimum.

ii) A lending environment that is conservative and competitive will produce, generally, only small variations in financing packages. Thus, minimum downpayments will be similar for similar priced houses of comparable age.

iii) If it is assumed further that, in subsequent home purchases, the equity derived from the sale of the previous unit is applied to the purchase of the "new" unit, then, as discussed in Section 6, the downpayment at purchase after the first entry into the market depends on the period of occupancy, financing conditions, and pattern of price change of the unit sold. In a period of increasing prices, the rate of equity accumulation increases, creating stonger equity positions among existing homeowners. This should be reflected in a stronger relationship between equity and house price among the previous homeowner group.

iv) Finally, if the income elasticity of demand for housing varies over income groups based partly on available wealth and the attractiveness of housing as an asset relative to other assets, then it can be expected that during periods of sharp price increase, the stronger equity positions of existing homeowners would enable them to compete more effectively for the available units.

This led to the formation of three testable hypotheses:

i) The relationship of equity to house price is positive and significant.

ii) During periods of significant price increase (faster than the general level of inflation) ceteris paribus the relationship between equity and price is stronger than during periods of stable or declining prices.

iii) During periods of increasing prices the proportion of equity paid tends to increase at all levels.

The dependent variable equity was regressed on price using the Statistical Package for the Social Sciences program, MULREG. The data used were N.H.A. data by year for previous tenants and previous owners, and the TEELA data for equity/price relationship 1972 to 1978 by year.

6.3 RESULTS OF THE REGRESSION OF EQUITY ON PURCHASE PRICE

Results of the regression of equity on purchase price in the N.H.A. data (Tables 6-4 A and B and 6-5 A and B) show that for both previous tenants and previous owners, the relationship is positive and significant.

TABLE 6-4A

RESULTS OF THE REGRESSION OF EQUITY ON PRICE PAID FOR THE N.H.A. DATA ON PREVIOUS OWNERS 1971 - 1979

YEAR	r	r^2
1971	.65815	.43316
1972	.60577	.36696
1973	.53762	.28904
1974	.83123	.69094
1975	.78377	.61430
1976	.77684	.60348
1977	.77269	.59705
1978	.79377	.63006
1979	.63792	.40694

TABLE 6-4B

RESULTS OF THE REGRESSION OF PROPORTION PAID AT PURCHASE ON PRICE FOR THE N.H.A. DATA ON OWNERS ONLY, 1970 - 1979

YEAR	r	r^2
1970	.38047	.14476
1971	.37164	.13811
1972	.42862	.18372
1973	.37114	.13775
1974	.60938	.37134
1975	.57247	.32772
1976	.60033	.36040
1977	.62709	.39324
1978	.66152	.43761
1979	.39743	.15795

TABLE 6-5A

RESULTS OF THE REGRESSION OF INITIAL EQUITY ON PRICE AT PURCHASE
N.H.A. DATA - 1971 TO 1979 - PREVIOUS TENANTS ONLY

YEAR	r	r^2
1971	0.78259	0.61244
1972	0.71767	0.51505
1973	0.62939	0.39613
1974	0.83390	0.69539
1975	0.70919	0.59295
1976	0.40500	0.16403
1977	0.32957	0.10862
1978	0.71178	0.50664
1979	0.64290	0.41332

TABLE 6-5B

RESULTS OF THE REGRESSION OF PROPORTION OF
HOUSE PRICE ON TOTAL HOUSE PRICE

YEAR	r	r^2
1970	0.36631	0.13418
1971	0.56849	0.32319
1972	0.53924	0.29078
1973	0.43374	0.18813
1974	0.70284	0.49398
1975	0.47728	0.22779
1976	0.21986	0.04834
1977	0.15538	0.02414
1978	0.57596	0.33174
1979	0.46152	0.21300

This is supported by the results of the regression of (PROP) proportion of purchase price paid on total price of unit (Table 6-6 and Table 6-7). These values, though lower than the equity/price values, are also positive and significant. Thus, the results of the regression of equity and proportion of equity on price support the hypotheses that the relationship is positive and significant.

Examination of the regression values in Tables 6-4 A and B and 6-5 A and B shows that, in both the previous tenant and previous owners data, the strongest relationship of equity to price occurs in the 1974, 1975 period, which in the N.H.A. data coincided with the period of greatest price increase. In addition, in the previous tenants data, the relationship declines drastically in the 1976-1977 period. This decline is associated with a similarly pronounced decline in the relationship of porportion of price paid to total price of the unit. Thus, declines in the proportion of price paid at purchase weaken the relationship of equity to price, a tendency which is much more evident among previous tenants than among previous owners. This is consistent with their weaker equity positions at entry into the market, and the overall condition of oversupply that existed during the 1976, 1977 period, when both developers and bankers were using lower downpayments as incentives to attract buyers.

Thus, the higher proportions of equity paid during the period of price increase and the stronger relationship of equity to price that resulted supports the second hypothesis that in periods of increasing price the relationship of equity to price strengthens while the reverse occurs in periods of stable or declining prices. It should be reiterated that the N.H.A. data reflect patterns more

TABLE 6-6

RESULTS OF THE REGRESSION OF EQUITY AND PROPORTION OF EQUITY PAID ON PRICE

REGRESSION OF EQUITY ON PRICE

YEAR	r	r^2
1970	.61530	.37859
1971	.73503	.54027
1972	.68548	.46988
1973	.58637	.34382
1974	.83572	.69843
1975	.78019	.60870
1976	.59434	.35324
1977	.54824	.30057
1978	.76520	.58553
1979	.65680	.43139

TABLE 6-7

PROPORTION OF EQUITY PAID ON PRICE

YEAR	r	r^2
1970	.41131	.16918
1971	.50217	.25218
1972	.51799	.26831
1973	.41857	.17520
1974	.68760	.47280
1975	.59319	.35188
1976	.35253	.12527
1977	.31304	.09800
1978	.64163	.41168
1979	.46555	.21674

representative of the lower end of the house price sprectrum. However, at higher price levels, the equity positions should be stronger. The TEELA data Table 6-8) representing a much broader spectrum of prices show that the relationship of equity to price is strong, positive, and significant. However, the clear increase expected in 1973-1974 is not evident although there is a noticeable drop in the 1975 value to 0.59 from 0.70 in 1974.

In an earlier section of this study examination of the relationship between income and house price was shown to be weak. This analysis indicates that the reasons for this weak relationship are: first because the data used are current income measures that include a transitory component that is unrelated to consumption; second because the rate of equity accumulation after purchase is variable and independent of income; and finally because the strong relationship of equity to house price suggests that available equity rather than income determines the maximum house price constraint. Thus, income is seldom a good explanatory variable of house price and its usefulness is likely to decline severely after the first home purchase.

Table 6-9 shows the changes in disposable income for 1971-1976 along with changes in house prices. Between 1971 and 1976, disposable income changed annually over a range that varied from 5.2 percent to 2.0 percent, during the same period house prices changed between 3.0 percent and 30 percent. Overall, disposable income increased by 49 percent over the 1971-1976 period and house prices by over 100 percent. Similar conditions were observed in the Grebler and

TABLE 6-8

RESULTS OF THE REGRESSIONS OF EQUITY/PRICE
AND PROPORTION OF EQUITY PAID ON PRICE

TEELA DATA - 1972 to 1978

YEAR	r	r^2	F.SCORE	SIGNIFICANCE
1972				
1973	.71736	.51331	396.5	.000
1974	.70421	.49592	496.8	.000
1975	.59325	.35195	183.0	.000
1976	.75903	.57612	550.5	.000
1977	.75259	.56640	498.989	.000
1978	.84767	.71845	679.070	.000

PROP DEP/PRICE IND

YEAR	r	r^2	F.SCORE	SIGNIFICANCE
1973	.22003	.04841	19.0278	.000
1974	.28751	.08266	45.504	.000
1975	.23339	.05447	19.414	.000
1976	.36659	.13439	62.876	.000
1977	.21436	.04595	18.398	.000
1978	.41760	.17439	56.185	.000

Mittelbach (1979) study of California. They reported that owners who used the entire proceeds from property sold as a downpayment on property purchased would have had to experience a doubling of incomes between 1965 and 1971 and an increase of 144 percent between 1971 and 1977 to purchase at the same level (Grebler and Mittelbach, 1979; p. 45).

It is clear, therefore, that positive changes in equity produced by price change can reduce the constraints on the purchase decision. A strong equity position produces at the very least a set of enabling conditions that are necessary, although they may not be sufficient, for determining demand. The Royal Commission on Banking and Finance (1972) reported that of 15 percent of families who purchased a home in 1957 to 1962, 9 percent would have purchased no home and 6 percent a cheaper home if downpayments were 10 percent higher (Smith, 1972; p. 37).

Using an ex ante concept of permanent income, families may be arrayed conceptually along a continuum from those who are both equity and income rich to those who are both equity and income poor. The decisions about residential change can be more correctly defined when the information about Stage in the Life Cycle and Socio-economic Status are used, first to place a family along such a continuum and second to relate the position in the continuum and the pattern of demand generally associated with it to current market conditions in the area studied.

The concern of research on residential mobility has been to increase the understanding of why people move, and the way in which this movement perpetuates or changes socio-demographic patterns within

TABLE 6-9

CHANGE IN DISPOSABLE INCOME VERSUS CHANGE IN HOUSE PRICES
METRO TORONTO - 1971 TO 1976

YEAR	(1971=100)	% CHANGE IN DISPOSABLE INCOME	% PRICE CHANGE		
			N.H.A.	M.L.S.	TEELA
1971	100	4.7	7.8	3.2	N/A
1972	104.8	5.2	3.0	6.8	N/A
1973	112.8	4.9	8.9	24.9	21.2
1974	125.0	2.2	22.1	30.0	26.8
1975	138.5	2.2	22.5	9.1	16.4
1976	148.9	2.0	8.9	5.2	5.8

Source: Canadian Housing Statistics, 1976
C.M.H.C. Statistical Services Division (Unpublished, 1980)
Teela Market Surveys Microfiche Files 1972-76
Toronto Real Estate Board House Price Trends 1970 - 1979

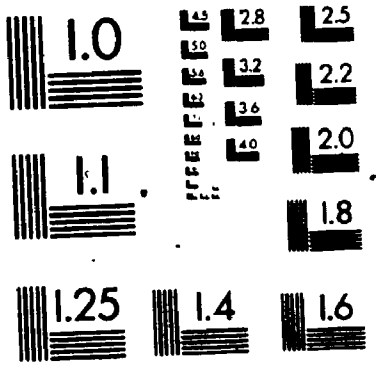
defined social areas. With the notable exceptions of Morgan (1973) and Quigley (1977), there has been widespread acceptance of Rossi's (1955) thesis that residential mobility is the mechanism by which families adjust their housing needs to the requirements produced by changes in the life cycle. Other work beginning as early as Whitney and Grigg (1958) and followed by Leslie and Richardson (1961), Herbert (1973), and Clark (1976) provided evidence that economic factors were useful in explaining as much as 25 percent of mobility (Clark, 1976). Thus, Brozowski (1976) outlined the existing consensus when he wrote:

> . . . A family moves when it reaches a certain stage in the life cycle and has accumulated the necessary economic resources and then tends to seek and area whose residents are already of comparable maturity and socio-economic status. (Brozowski, 1976, p. 144)

6.4 SUMMARY

This chapter examined some of the factors affecting the accumulation of economic resources used in a house purchase. Specifically, the impact of price change or the rate and quantity of equity accumulated is shown to be significant. In addition, the price induced changes in the wealth needed to enter or move upward within the housing market make accumulated equity an important factor during the study period. However, since the concept of income used in most studies in Geography is wage income, which does not include equity, the size and rate of equity accumulated during the study period further weakened the already tenuous relationship between wage income and dwelling value reflected by the socio-economic status index. This lead to the conclusion that:

> "Gross measures of SES may also conceal more than they reveal. For example, the use of composite measures might obscure changes over time in the relationship of the components of SES to some



> dependent variable; for example, income might have been highly related to various types of attitudes or behaviour at early stages of industrialization whereas education might now be more important..." (Coburn and Edwards, 1976, pp. 186).

What is produced by analyses of socio-demographic variables, such as the factorial ecologies, is not an explanation of why people moved, but rather a description of the results of movement, the patterns produced by mobility. Bourne and Hitchcock in describing the concept of a housing market wrote:

> . . . the utility of the concept is that it forces us to attempt to view the complex systems or processes by which housing is produced and consumed in their entirety. Moreover, the concept of a market is dynamic; it stresses the evolving structure of housing opportunities and the everchanging needs of households. The fact is that the relationships of most interest to us are primarily evident, not at one point in time, but in the way demand (consumer) and supply (building industry and financial institutions) respond to changing conditions over time. (Bourne and Hitchcock, 1978; p. 11)

The analysis of the impact of house price change on demand for housing performed in this section is an attempt to shift the focus from the results of changes to the dynamic elements that Bourne suggests may create change. These include the accumulation of equity and the expectations about future changes in the pattern of house prices.

CHAPTER 7

CONCEPTUAL IMPLICATIONS AND CONCLUSIONS

The composite indices of socio-economic status and stage in the life cycle, the foundations upon which explantions of residential mobility were built, have serious conceptual weaknesses. Furthermore, they tend to produce a description of the results of movement rather than an understanding of processes. When the focus of examination is shifted from the patterns produced by change to the market processes affecting change, a series of conceptual implications not emphasized in the traditional mobility literature are raised. This chapter examines three major conceptual areas that emerge from the analysis of the market processes associated with price change. They are:

i) The concept of cyclical residential mobility;

ii) The impact of economic contraint on the composition of mover groups; and

iii) The relationship of government housing policy to mobility.

7.1 CONCEPT OF CYCLICAL RESIDENTIAL MOBILITY

It is widely accepted that the housing market is cyclical.* Bourne (1981) wrote:

> "One of the basic and, it seems, almost inevitable properties of housing supply in market-based economies is that of wide fluctuation over time (Lewis, 1965; Thomas, 1973; Gottlieb, 1976). These wide cycles are important in themselves primarily because of the uncertainty and instability they create for both producers and the labour force, for which consumers pay a premium in housing costs. . . The combination of these rhythms provides the temporal umbrella within which local

* The terms cycle and cyclical are used in this context to outline a recurrent pattern of peaks and troughs of indeterminate duration and extent. This use of the term is consistent with the literature that discusses business cycles or stock market cycles, but departs from the connotation of regularity and predictability that usually is associated with the term cycle in everyday use.

> patterns of residential construction, occupancy turnover, and price shifts take place." (Bourne, 1981, p. 96).

Because the focus of this study is the relationship between price change and residential mobility, the cycles of greatest interest are those in which changes in price have produced significant change in demand. In addressing this question, therefore, the patterns of supply, demand, and price change are examined for evidence of cyclical regularity. The hypothesis is that if residential mobility is associated with house purchase and the patterns of house purchases are discernably cyclical, then residential mobility will also demonstrate a pattern of fluctuation that is cyclical.

7.1.1 Analysis of the Pattern of Supply

The supply of housing units available at any given time consists primarily of the stock of existing units and the supply of new units. To examine the pattern of supply from the existing stock, the units listed for sale on the Multiple Listing Service (M.L.S.) of the Toronto Real Estate Board were plotted monthly for the 1973 to 1978 period. Figure 7-1 shows the well-defined seasonal variation, with total number of listings peaking in the summer months and declining sharply in the winter. In addition, there is a sharp increase in the numbers of listing in 1974 and a steady increase each year to 1978.

Table 7-1 shows the number of starts, excluding apartments, for the period 1965 to 1981. There is a clear peak in total starts in 1972 and 1973, and another in 1981 with a well-defined valley in 1970. There are also significant variations in the composition of starts over the period. For example, in 1965 and 1966, 1972 and 1973,

TABLE 7-1

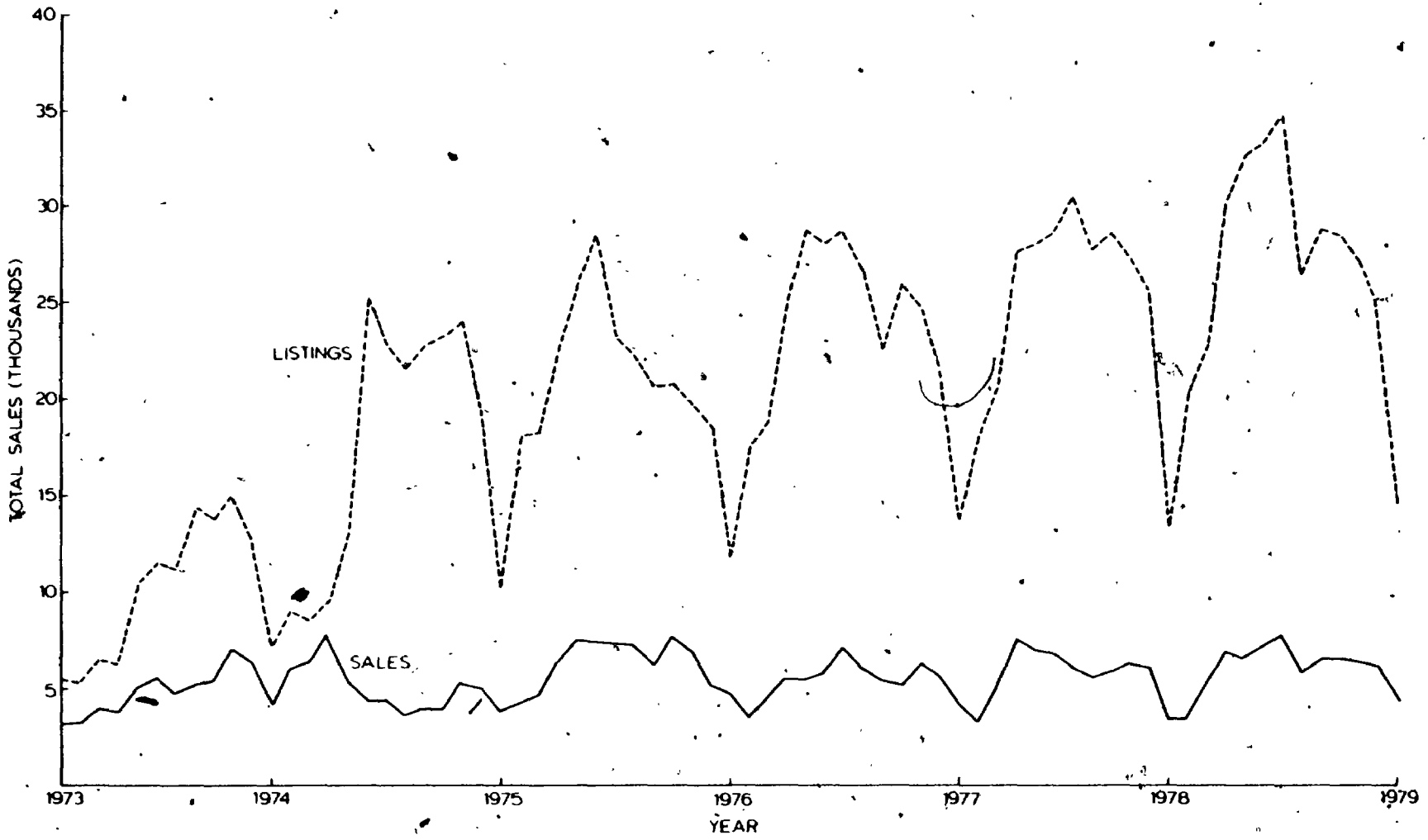
HOUSING STARTS IN METROPOLITAN TORONTO - 1965 to 1981
(Apartments not included)

YEAR	SINGLES	SEMI AND DUPLEX	ROW	TOTAL
1965	7,101	1,985	2,289	11,375
1966	7,246	1,732	1,646	10,804
1967	6,789	2,067	1,970	10,826
1968	6,685	2,379	2,280	11,344
1969	6,005	2,649	1,838	10,492
1970	3,566	2,250	2,689	7,505
1971	6,972	3,670	2,577	13,219
1972	9,101	5,484	3,537	18,122
1973	8,039	3,857	5,927	17,823
1974	6,110	2,552	4,071	12,733
1975	7,338	3,598	4,744	15,680
1976	6,216	3,205	7,462	16,883
1977	5,472	4,086	6,081	15,639
1978	5,763	2,908	5,223	13,894
1979	7,420	4,867	3,070	15,357
1980	7,547	3,194	2,279	13,020
1981	12,543	3,398	2,455	18,396

Source: Canadian Housing Statistics 1962 - 1982
Ottawa: Canada Mortgage and Housing Corporation

Fig. 7.1 The Pattern of Fluctuation in M.L.S. Listings and Sales by Month. Metropolitan Toronto 1979 1970-79

Source: Toronto Real Estate Board, House Price Trends 1971-1979



and again in 1981, single-family units dominate comprising as much as 68 percent of the total in 1981, 62 and 67 percent in 1965 and 1966. However, between 1976 and 1978, row housing rather than singles are the major additions to the stock. Further, periods of increased single-family starts precede or coincide with periods of increased prices while periods of increased row starts occur during periods of price decline. The data display, therefore, a clear pattern of seasonal fluctuation in supply of new and existing units available for purchase, as well as a longer term pattern in which distinct peaks and valleys, not associated with seasonal change, can be defined.

7.1.2 Analyses of the Pattern of Sales

The demand for housing can be approximated by sales of housing units in Metropolitan Toronto over the study period. Units sold through the M.L.S. are plotted on a monthly basis for the 1973 to 1978 period in Figure 7-1 presented earlier. In addition, sales as a proportion of monthly listings are plotted by district for the same period in Figure 7-2. Finally, Table 7-2 lists total sales for all of Metropolitan Toronto while Figure 7-3 plots these totals so that the pattern is more easily illustrated.

The results show the seasonal variation in sales along with clear peaks in 1964 to 1966 and 1973 to 1974 when sales levels reached 42,000 and 53,000 respectively. In addition, the plot of sales as a proportion of listings, Figure 7-2, shows the increase in proportion of units sold in late 1973 and early 1974 and the dramatic decline after April of 1974.

7.1.3 Analyses of the Pattern of Price Change

Finally, the pattern of price change was plotted on a month-to month basis for 1973 to 1978. Here again the plot of monthly data,

Fig. 7.2 The Proportion of MLS Listings Sold by Sales District Metropolitan Toronto 1970-1979

Source: Toronto Real Estate Board, House Price Trends 1971-1979

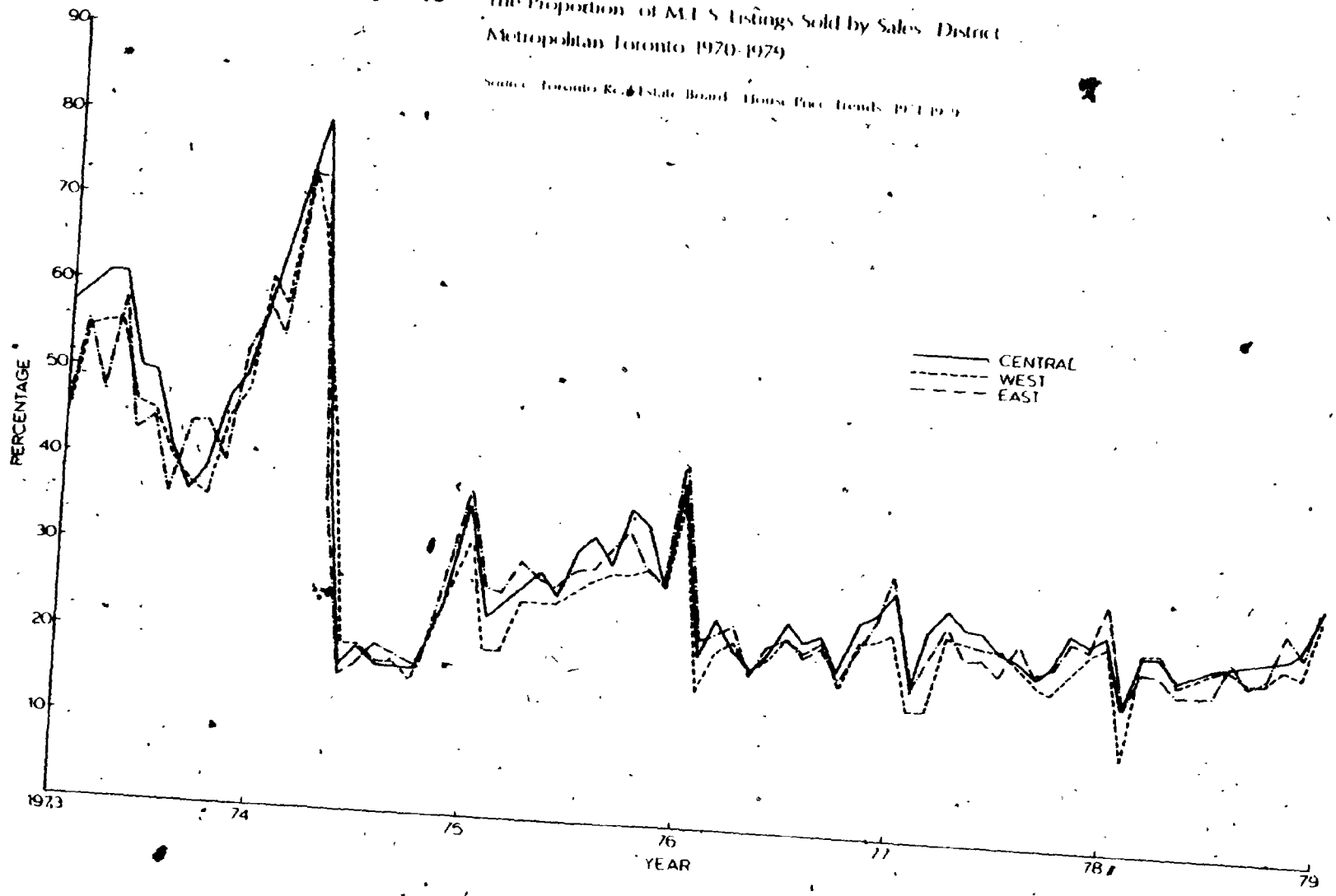


TABLE 7-2

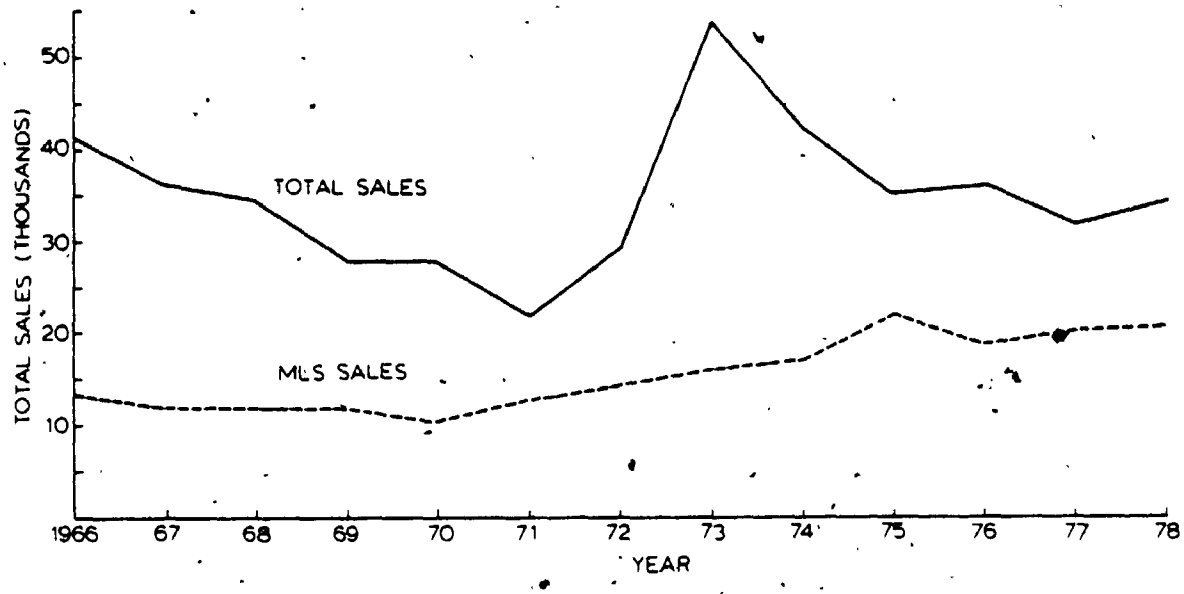
TOTAL HOUSE SALES IN METROPOLITAN TORONTO - 1966 to 1978

YEAR	SALES
1966	41,907
1967	36,870
1968	34,600
1969	28,272
1970	28,401
1971	22,265
1972	29,873
1973	53,597
1974	42,614
1975	35,411
1976	36,359
1977	32,747
1978	33,851

Source: Toronto Real Estate Board, House Price Trends, 1970-1979.

Fig. 7.3 M.L.S. Sales and Total Residential Sales
Metropolitan Toronto 1970-1979

Source Toronto Real Estate Board House Price Trends 1971-1979



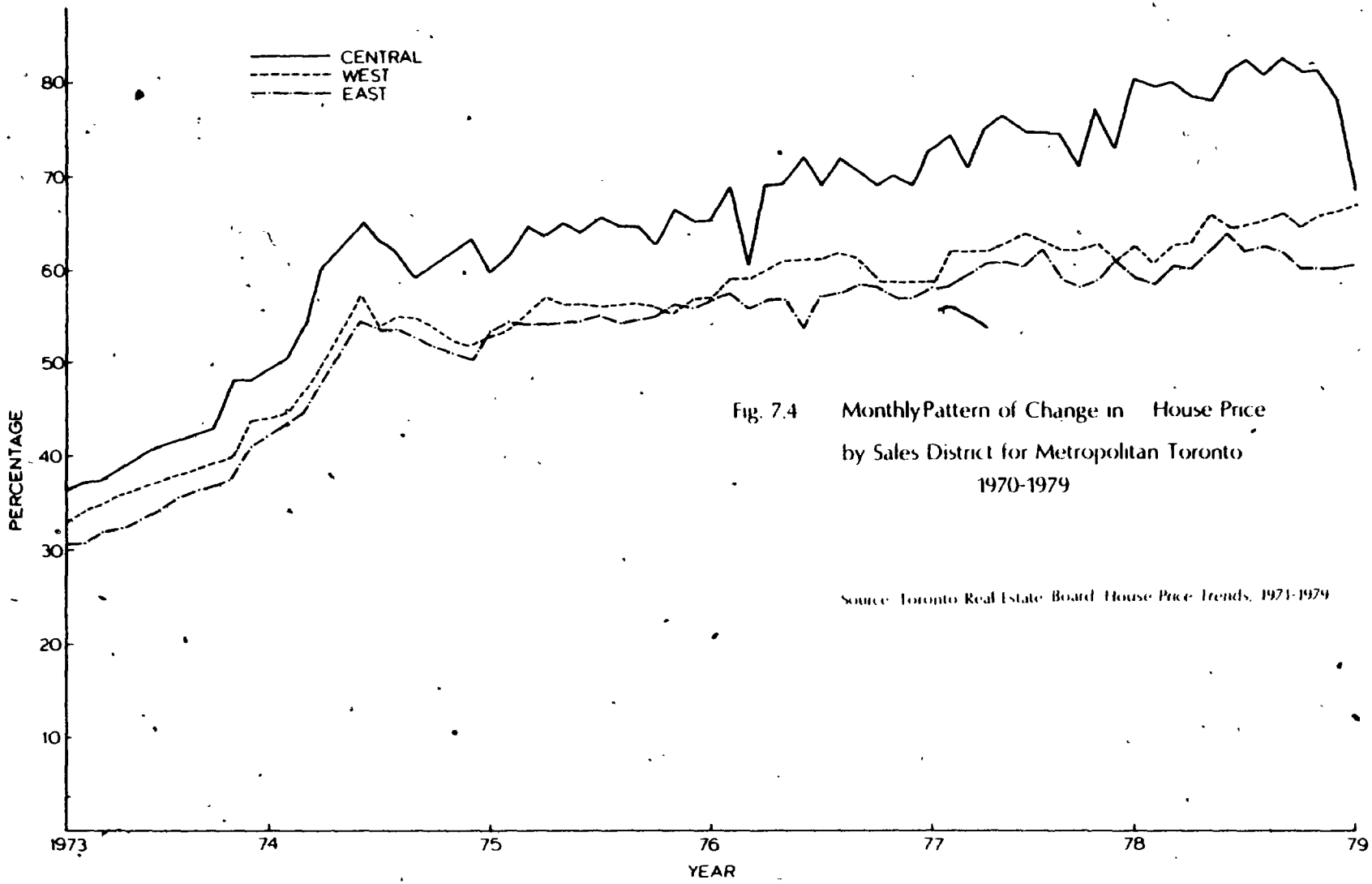


Fig. 7.4 Monthly Pattern of Change in House Price by Sales District for Metropolitan Toronto 1970-1979

Source: Toronto Real Estate Board, House Price Trends, 1971-1979

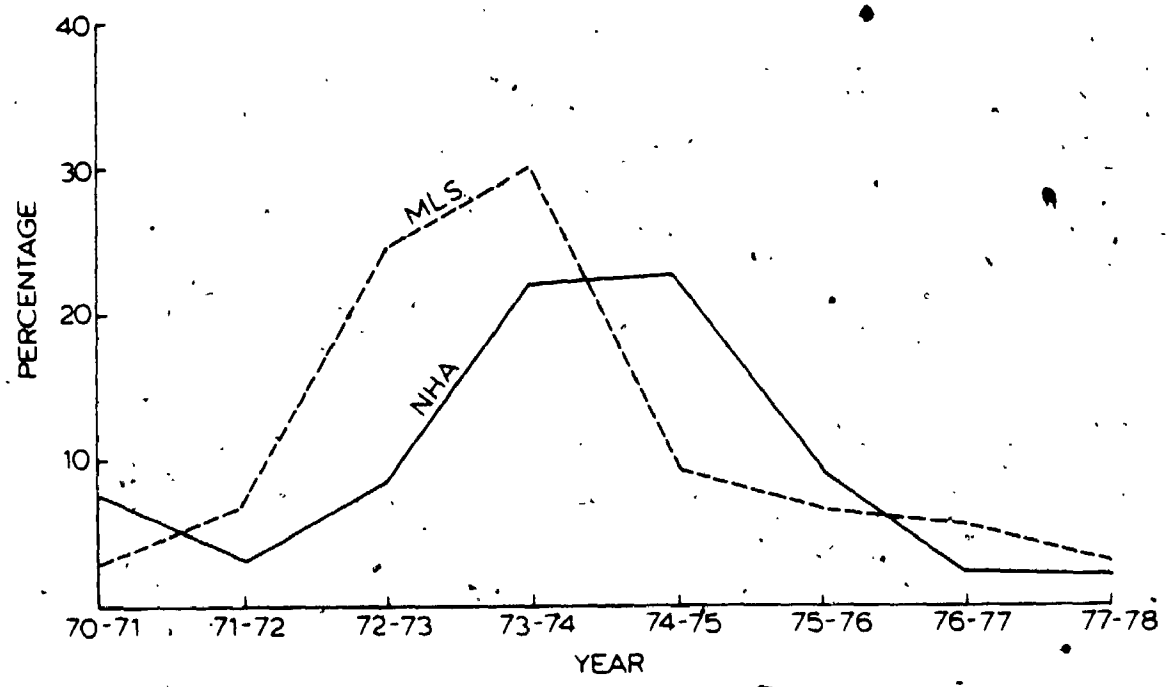
Figure 7-4, shows the distinct seasonal variation with the sharp increase occurring during 1973 and early 1974 and slowing markedly thereafter. The plot of year-to-year change, Figure 7-5, also shows the distinct 1973 to 1974 peak and the dramatic decline in the rate of increase thereafter.

There is, therefore, a cyclical pattern to the supply of, and demand for, housing in Metropolitan Toronto. The data have shown both a pattern of seasonal variation and a longer term pattern, of increased market activity, 1966 to 1977 and 1973 to 1974. These years are characterized by increased demand, increased supply and increased price, and separated by periods of declining sales and prices and increasing unsold inventory. It is reasonable to conclude then, that there was a pattern of residential movement coincident with these fluctuations that was also cyclical.

7.2 CHANGES IN THE COMPOSITION OF MOVERS

The cyclical nature of the housing market suggest not only that residential mobility is cyclical, but also that the composition of participants in the housing market should change in response to the economic conditions that created changes in the housing market. Entry into, or movement within, the ownership market requires access to some minimum amount of wealth. Bossons (1978, pp. 94-96) defined a minimum constraint threshold of $3,000 to $10,000 for his study. Whatever the minimum threshold is for an area, significant changes in house prices will affect this threshold. It is argued then, that house price change can affect the degree of constraint facing families entering or moving within the housing market, facilitating moves in some cases, and constraining moves in others. If these price changes are significant, as occurred during the study period 1970 to 1979,

Fig. 7.5 Year to Year Percentage Change in Average Prices of N.H.A. and M.L.S. Properties Metropolitan Toronto 1970-1978



then the substantial variation in the degree of constraint facing individual families will result in changes in the composition of mover groups, favouring those with least constraints. The net result is a pattern of residential change in which the cycle of movement is characterized by a dominance of movers with fewer wealth constraints during periods of increasing prices, and larger numbers of new entrants and those with greater wealth constraints moving during the downswing of each cycle. Evidence to support this hypothesis is provided by the analysis of price structure, performed earlier, by an examination of the structure of demand, the composition of sales, and the changes in the composition of starts during the study perod.

7.2.1 Implication of the Price Structure

The analysis of the year-to-year structure of price change performed in Section 4-2 showed that over the study period prices in the upper quintile of the price distribution tended to increase faster than those at lower levels and to sustain these increases for longer periods (Table 4-5). In addition, Figure 7-4 showed the pattern of month-to-month change in prices for units sold through the M.L.S. It can be seen that prices in the central area of Toronto were highest initially and that they tended to increase faster during the 1973 to 1974 peak, as indicated by the increasing vertical distance between the line plotting price change in the central area and those for East and West. In addition, the graph shows that between 1974 and 1978 the gap between prices in the central area and other prices increased, indicating that the rate of price decline was greater in the eastern and western areas.

Further support for the differing rate of price increase is provided by examining the pattern of price change in condominium units

for period 1970 to 1977. Figure 7-6 and Table 7-3 show that after 1973 the rate of increase in price of condominiums, especially apartment condominiums was substantially slower than that of traditional ownership housing. These lower cost condominium units tended to be concentrated in Mississauga in the western section and in Scarborough, in the east. Together, these two cities contained about 75 percent of the new units started in Metro before 1978. It can be expected, therefore, that these lower priced units would account for some of the difference in the pattern of average prices illustrated in Figure 7-4.

Over the study period prices of units in the central area of Metropolitan Toronto, generally representing the higher end of the price spectrum, tended to increase faster than those in other areas. This general tendency was exacerbated by changes in the composition of new supply created partly by a significant increase in the number of lower cost condominiums. The poor market performance of these units during the study period further slowed the rate of price increase in the lower end of the price spectrum after 1974.

The data in Tables 7-3 and 7-4 show a marked decline in the rate of price increase after mid-1974, and a significant change in the composition of unit starts with a substantial increase in the production of condominiums. Bossons (1978) indicated that among those families above the upper income threshold (above $80,000) investment was the dominant motive for house purchase. Similarly, Smith (1972) suggested that as the dependence on mortgage financing for house purchases declined, the demand for housing as an asset increases. This suggests that after 1974 the decline in the attractiveness of

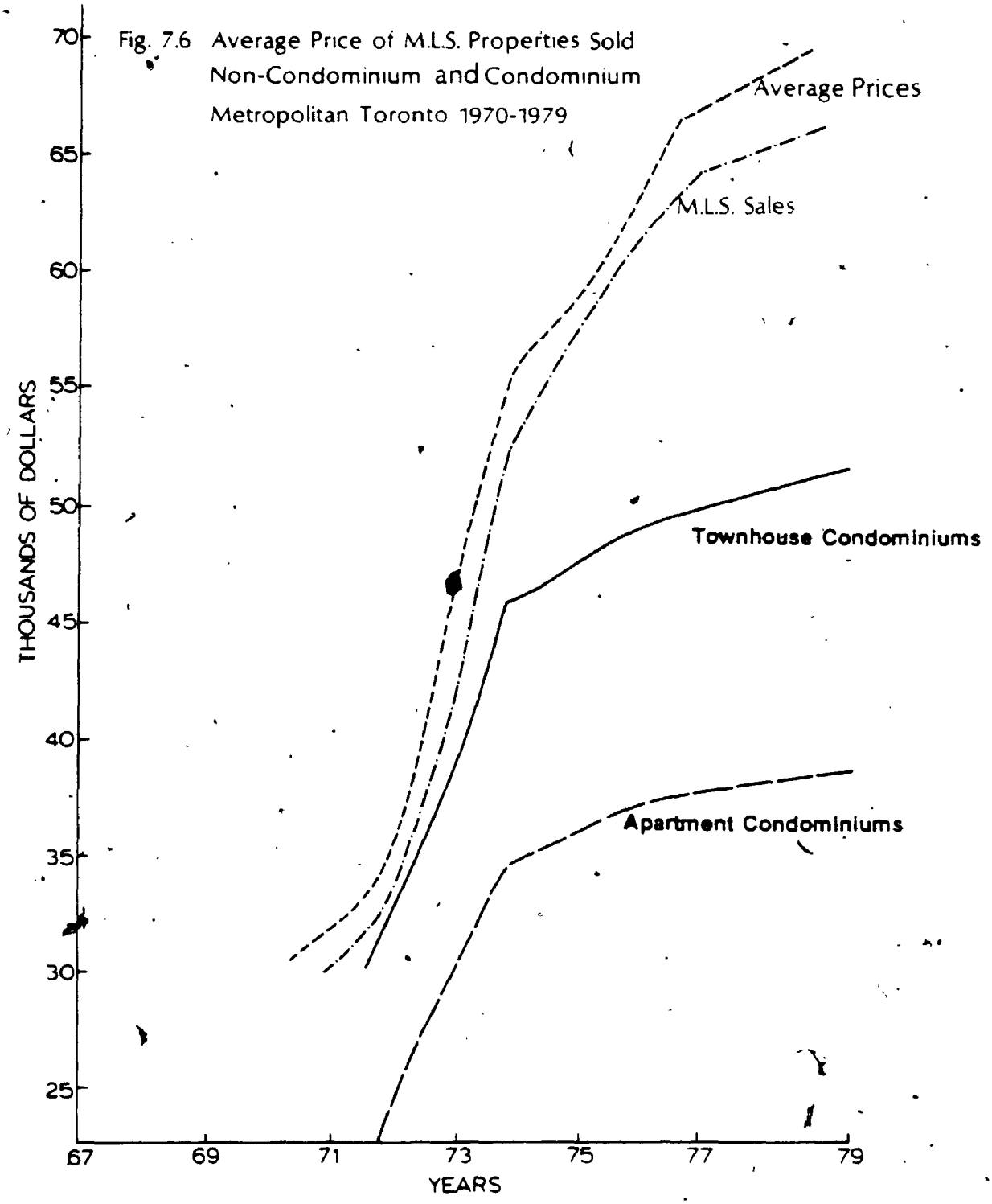
TABLE 7-3

COMPARISON OF CHANGE IN CONDOMINIUM PRICES
VERSUS CHANGE IN OTHER OWNERSHIP UNIT PRICES

YEAR	APARTMENTS	TOWNHOUSES	METRO SALES	M.L.S.
1972	25,487	-	32,794	32,513
1973	31,507	-	37,758	40,605
1974	35,031	46,100	50,381	52,806
1975	35,959	47,745	56,105	57,581
1976	37,027	49,101	59,060	61,389
1977	37,596	49,549	63,748	64,559
1978	38,959	49,823	65,877	67,333

Source: Toronto Real Estate Board: House Price Trends 1970-1979

Fig. 7.6 Average Price of M.L.S. Properties Sold Non-Condominium and Condominium Metropolitan Toronto 1970-1979



housing as an asset would be accompanied by a decline in the participation of those groups for whom the investment demand is important, that is the wealthiest groups. The abrupt decrease in demand and associated decrease in the rate of price change that occurred in 1974 are consistent with this belief.

7.2.2 Composition of Sales

Examination of the composition of sales during the study period (Section 4.2) showed that during 1973 and 1974, when house prices were increasing rapidly, sales of N.H.A.-insured units representing the low end of the price spectrum declined severely. Conversely, during the period 1975 to 1978, when prices declined in real terms and the asset return on housing was not attractive relative to other assets, sales of N.H.A. units reached their maximum. In addition, the increase in N.H.A. sales (1975 to 1979) was accompanied by a decline in downpayments both absolutely and as a proportion of house prices in spite of substantial government subsidies to some buyers.

7.2.3 Composition of Starts

Table 7-1 referred to earlier, shows that beginning in 1973, and especially between 1976 and 1978, the production of row housing increased substantially in Metropolitan Toronto, from about 20 percent in 1965 to about 44 percent in 1976. As noted earlier, a significant proportion of these units were condominiums. Table 7-4 shows that between 1974 and 1979, 31,523 condiminium units were financed by N.H.A. in Metropolitan Toronto, whereas between 1967 and 1973, only 12,530 units were underwritten. As well, in the sample of units chosen from Teela records condominiums formed less than 1 percent of

TABLE 7-4

NUMBERS OF N.H.A.-FINANCED NEW CONDOMINIUM UNITS -
METROPOLITAN TORONTO

1974 to 1979

YEAR	UNITS
1967 - 1974	19,414
1967 - 1975	22,801
1967 - 1976	32,016
1967 - 1977	40,133
1967 - 1978	48,356
1967 - 1979	50,937

CHANGE IN TOTAL UNITS
NUMBERS OF N.H.A. FINANCED CONDOMINIUM UNITS - METRO TORONTO
1974 - 1979

YEAR	UNITS
1974 - 1975	3,387
1975 - 1976	9,215
1976 - 1977	8,117
1977 - 1978	8,223
1978 - 1979	2,581

the resale units prior to 1974 but 20 percent of the sample by 1978.

The analysis of price structure, Chapter 4, indicated two clear periods of significant price change. The two year period, 1973-1974, was characterized by price increases of over 60% while at the same time, the number of lower cost N.H.A.-insured units sold in Metro declined to 212 in 1974 from 1,454 in 1972; and the proportion of price paid at purchase jumped from 23 percent to 48 percent. Conversely, 1975-1978 saw the rate of house price increase drop below the general level of inflation, producing price declines in real dollar terms. However, the number of N.H.A. units insured increased from 3,000 to over 9,000 while downpayments dropped back to the 30 percent level. Taken together, these facts indicate that the 1972-1974 period with its higher downpayment and fewer low priced sales favoured a wealthier group with less financial constraints while the 1976-1978 period favoured the less wealthy groups that depended more on lower downpayments and government subsidies to bolster limited resources. This supports the hypothesis that housing market conditions can and did affect the composition of mover groups in Metropolitan Toronto during the 1970-1979 period, and further that the changes in the composition of mover groups is consistent with the wealth constraints produced by significant price changes.

7.3 THE IMPACT OF GOVERNMENT HOUSING POLICY ON MOBILITY

Between 1970 and 1982, the Provincial and Federal governments funded a broad variety of programs* aimed at stiumulating

* These included the $100 million and $200 million AHOP programs, 1974-1978 AHOP-HOME, ARP, Municipal Assistant Grants, Graduated Payment Mortgages (GPM), the $5,000 Federal Provincial Subsidies, and other tax incentives. See Rose (1980) and Fallis (1980) for detailed discussions of these programs.

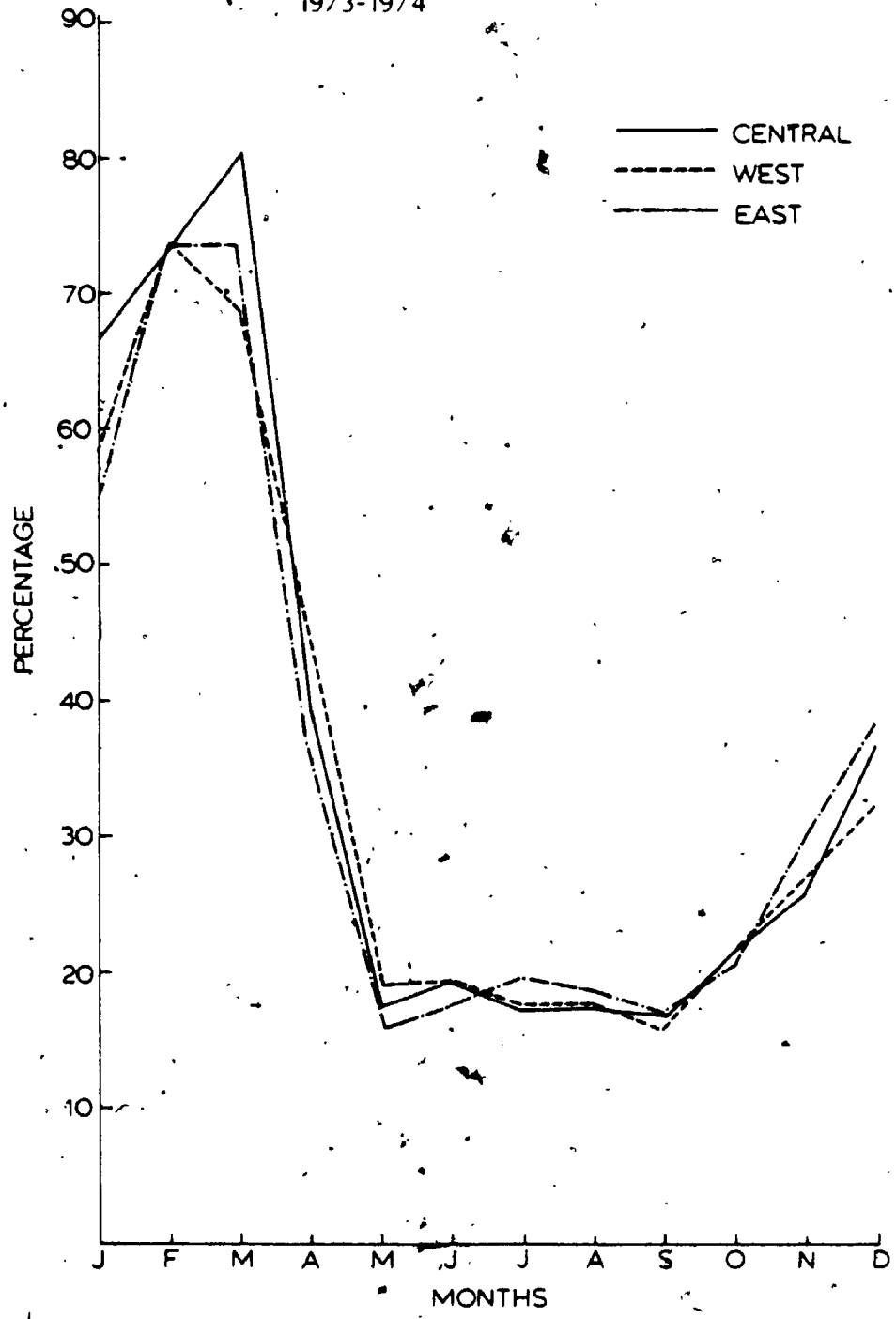
the construction industry on the one hand, and making home ownership more accessible on the other. The underlying assumption in all cases was that the private housing market on its own, either could not or would not provide adequate amounts of safe, sound, and sanitary housing at affordable prices.

The interim report on the Special $200 Million Low Cost Housing Program, wrote:

> "At the beginning of 1970, interest rates and the cost of housing were at their highest in Canadian history. The potential of the housing market had narrowed to the extent that free choice was open only to those with incomes markedly above the national average. . . Hardest hit by the high cost of shelter were those with incomes below the national average, for at the end of the 1960's they simply could not afford new shelter." (Interim Report on $200 Million Program 1970)

The objectives of assistance programs like the $200 million Assisted Home Ownership Program were to stimulate the construction of lower cost housing and to reduce the cost of home ownership by interest subsidies, loans, or outright grants to qualified purchases. The housing "problem", as Dennis and Fish (1972) pointed out, was addressed mainly in terms of supply. The underlying assumption being that when house prices increased, severe supply shortages occurred at the lower price levels causing purchasers to abandon or defer home ownership. Evidence of the inaccuracy of the government philosophy is provided by examining the pattern of listings to sales, the pattern of price increases, and the buildup of unsold, low-cost units over the study period.

Fig. 7.7 Sales as a Percentage of Listing by M.L.S. Sales Districts Metropolitan Toronto 1973-1974



7.3.1 Sale of Units Listed as a Measure of Demand

The interim report on the $200 million program quoted earlier indicated that in 1970, prices and interest rates were at record levels, and economic growth was creating increasing demand especially in metropolitan areas. However, an examination of sales in Metropolitan Toronto for the period prior to 1970 showed that sales of houses had declined from 42,000 units in 1966 to 28,000 in 1970 and further to 22,000 in 1971. Over the same period, sales, as a percentage of units listed on the M.L.S. had declined from over 40 percent in 1967 to about 25 percent in 1970, and starts - excluding apartments - had stayed above the 10,000-unit level for the four years from 1966 to 1969. The decline in starts to the 7,000-unit level, therefore, was clearly a market adjustment produced by declining sales and increasing inventories. A program in 1970 aimed at increasing the supply of units available is difficult to understand.

In 1974, the situation was almost identical. Figure 7-7 shows that by May, 1974, the percentage of sales to listings had declined from a level of about 80 percent down to 17 percent. In response to the accumulation of unsold units, Figure 7-8, starts in 1974 declined from 18,122 in 1973 to 12,733 in 1974 (see Table 7-5). Once again, using the same type of analysis, the government intervened to increase the supply of low cost units. By 1976, supplies had again reached the 17,000-unit level under intense government stimulation. The net result was the buildup, by 1977 of an inventory of some 16,000, unsold, N.H.A.-insured condominium units in the Metropolitan area.

Fig. 7.8 Number of M.L.S. Units Unsold

Metropolitan Toronto 1973-1978

(Includes repeat listing)

Source: Toronto Real Estate Board, House Price Trends 1971-1979

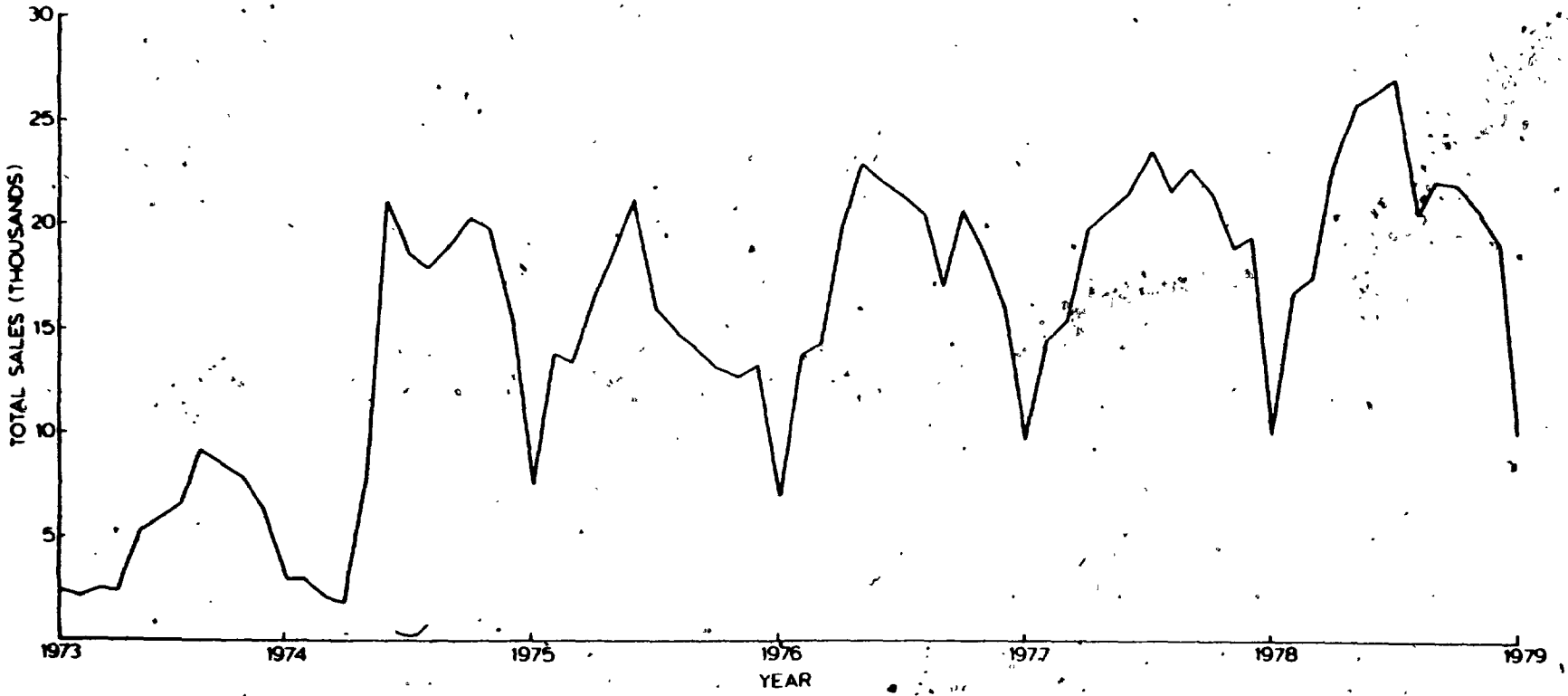


TABLE 7-5

UNIT STARTS, COMPLETIONS, AND UNDER CONSTRUCTION 1960 TO 1967

PROVINCE OF ONTARIO

YEAR	STARTS	COMPLETIONS	UNDER CONSTRUCTION
1960	42,282	46,982	28,335
1961	48,144	43,754	31,936
1962	44,306	47,287	28,932
1963	55,957	43,400	41,401
1964	65,617	57,739	48,835
1965	66,767	56,578	58,172
1966	52,355	68,407	39,478
1967	68,121	58,278	48,816
1968	80,375	68,003	60,035
1969	81,446	80,236	60,615
1970	76,675	69,331	66,912
1971	89,980	74,149	82,465
1972	102,933	96,438	87,958
1973	110,536	98,262	98,566
1974	85,503	104,360	78,517
1975	79,968	81,865	75,690
1976	84,632	80,302	78,359
1977	79,130	80,717	75,518

Source: Canadian Housing Statistics, 1961-1978

7.3.2 The Relation of Price Increases to Supply

As discussed earlier, the sharpest price increase preceding the 1970 to 1971 AHOP program occurred in 1966 to 1967; similarly the 1973-1974 increases led to the 1975 to 1976 AHOP programs. The data in Table 7-6 shows that the increase in price between 1969 and 1970 was less than 2 percent in most areas and negative in others. Similarly, by 1976 the increase in nominal prices had slowed from 30 percent in 1973 to 4 percent by 1976 and the buildup of an unsold inventory of low-cost condominiums had become evident.

Springer (1978) showed that by December, 1977, there was a surplus of about 16,000 condominium units at various stages of completion (roof stage or better) in the Metropolitan Toronto Region. Of these, over 90 percent of N.H.A.-insured condominium units started in 1977 were unsold. This condition persisted in spite of the substantial subsidies (over $5,000) available through the A.H.O.P. - HOME program and the dramatic decrease in down payments required during the 1977 to 1978 period*.

Government intervention in the form of supply-oriented initiatives functioned in 1970 to 1972 and 1976 to 1978 to increase the supply of lower cost housing at a time when the slowdown in demand had produced from the existing stock substantial supply of units at prevailing price levels. These programs, by increasing the supply at a time when prices were already declining, functioned to further depress prices, extending the period of price decline and thereby extending the downswing of the House price cycle.

* During this period, developers were accepting downpayments as low as $1.00 and offering appliances to potential purchasers.

TABLE 7-6

AVERAGE M.L.S. HOUSE PRICE CHANGES IN METRO TORONTO
BETWEEN YEARS 1964 TO 1978

YEAR	% CHANGE
1964 - 1965	8.7
1965 - 1966	16.2
1966 - 1967	12.5
1967 - 1968	11.9
1968 - 1969	8.3
1969 - 1970	0.7
1970 - 1971	5.5
1971 - 1972	7.0
1972 - 1973	29.4
1973 - 1974	27.2
1974 - 1975	3.7
1975 - 1976	7.9
1976 - 1977	6.7
1977 - 1978	2.8

Source: Toronto Real Estate Board; House Price Trends, 1965-1979.

What emerges from the examination of economic conditions, housing market behaviour, and government policy is a concept of residential mobility that is basically cyclical as individual families responded to the constraints produced by market conditions at any given time. Their ability to move voluntarily, irrespective of socio-demographic characteristics, was restricted by these three and possibly other external factors. This indicates that mover self-selection, based on the response to existing constraints, especially wealth, would produce a pattern of mobility that favours moves by wealthier groups during the upswing of the price cycles and, aided by government transfer payments and price declines, moves by larger numbers of the less wealthy during the downswing of each cycle.

This pattern has both temporal and spatial implications. For example, during periods of increasing prices, more residential change can be expected in those areas of Metro Toronto attractive to wealthier groups, while during periods of decline the cheaper subdivisions and less expensive, older, less fashionable areas experience higher sales and more change. Thus, an ex post facto analysis of socio-demographic variables would reflect only the product of mobility and may mask a dynamic wave-like process within which economic conditions may constrain choice not only in time of moving but also in terms of the spatial alternatives available.

7.4 SUMMARY AND CONCLUSIONS

This study set out to examine the impact of price changes on the pattern of filtering and residential mobility in Metropolitan Toronto. The results indicate that house price change itself is complex. Ultimately it reflects the demand supply relationship

existing in a housing market at any specific time. However, the analysis showed that several factors can affect this demand supply relationship. These include the traditional elements that underlie increased household formation and net migration. In addition, however, the 1970-1979 period emphasized the importance of other economic factors and specifically introduced speculation as a major demand element with the ability to produce dramatic short run price increases.

Examination of the structure of prices over the study period showed that the rate of increase varied at different points along the price spectrum. These variations reflected the differing demand supply relationship at points along the price spectrum, as well as the variations in reasons for, and ability to purchase housing at specific times. The changes in the patterns of sales and purchases indicated that wealth was a major factor which facilitated or constrained demand and thus the ability to move to specific areas at specific times.

It was shown also that the variations in supply and demand evidenced a clearly cyclical pattern. This pattern combined with changes in the wealth thresholds that accompanied major house price changes provided major support for a conclusion that the pattern of residential change that accompanied these fluctuations in demand supply relationships would also by cyclical. This produces a wavelike pattern of residential mobility in which mover group composition changes in response to the variations in wealth constraints and the dominant demand factors that determine house purchase. Some of these factors are socio-demographic but in the study period 1970 - 1979

there were important overall economic factors and specific housing market conditions, not linked to the socio-demographic structure of the population that were important.

The traditional emphasis on socio-demographic variables only to explain much of housing market behaviour was shown to be inadequate because of the basic conceptual weakness of the composite indices, the difficulty of interpreting and using the variables and their inability to explain adequately the changes in the patterns of demand and price in the study area. Some of this weakness is inherent in the data used, but much can be attributed to the emphasis on factor loadings, rather than on individual variable relationships that wide-spread use of factorial ecologies produced.

Overall, the findings of this study do not negate the importance of socio-demographic factors in understanding the processes of filtering and residential mobility, rather it draws attention to a number of broader economic factors, specific to the housing market, that also affect these processes. It is these market elements that an examination of house price changes tends to clarify.

Residential mobility is complex; nonetheless at the individual level, it expresses the response to a binary choice, to move or not to move. The option chosen, however, represents the result of a series of decisions which reflect: the family's wealth; its response to general economic conditions and specific housing market behaviour; the shelter needs of the family; the expectations about future housing market behaviour; and the awareness of, and response, to the spatial distribution of housing services.

In the past, research on mobility has focussed on internal changes in the family structure and external changes in the immediate environment (Brown and Moore, 1978). The evidence indicates that this product-oriented approach is inadequate. Mobility is about residential change and that is a housing market phenomenon (Rossi, 1955). The housing market is a part of, and varies with, changes in the broader regional, national, and international economies, through factors like general inflation, interest rate change, and government policy. As well, specific housing market conditions at the local level determine the pattern of house price change and affect equity accumulation. Thus, a study of residential mobility as a process must include consideration of pertinent conditions in the wider economy. Answers to the questions of who moves, when do they move, and where they move should be based on an understanding of how economic conditions affect specific housing markets at any given time, and whether market conditions function to constrain or facilitate a family's ability to move.

This study indicates, further, that the spatial distribution of socio-demographic characteristcs may not have been the result of some gradual process of families filtering up an income scale while structures moved down a quality scale. Rather in Metro Toronto 1970-1979 it was a cyclical process influenced strongly by broader economic conditions and government policies that facilitated the movement of wealthier groups when prices increased (1973-1974) and constrained the mobility of other groups, while the reverse occurred during price declines. Either process would produce an end result that tended to group similar characteristics spatially, however the

processes functioning in each case are significantly different. It is important in the study of residential mobility, therefore, to separate the process and product elements carefully in order to avoid attributing resulting patterns to inappropriate processes. The analysis of price changes performed here is an attempt to move in this direction.

The introductory chapter raised five conceptual issues which, it was hoped, an analysis of price changes would clarify. The major research question posed concerned the impact of price change on the timing and quantity of housing purchased. The analyses performed demonstrated that the quantity of housing purchased did vary in response to changes in demand supply relationships and government policy initiatives. In addition, these changes were shown to have a cyclical pattern that favoured wealthier groups during periods of price increase and the less wealthy at other times.

In Chapter 6 price change was shown to affect the rate and quantity of equity accumulated in a home. Furthermore, the relationship between equity and house price proved to be much stronger than that between income and house price. This supported the argument that equity held in owned accommodation broadened the range of housing to which consumers had access and should be included in calculations of permanent income to improve predictive strength of that variable.

Finally, the examination of the pattern of government assistance to home buyers revealed that the type, quantity and timing of government subsidies were factors in changing demand supply relationships in Metro. In fact, the large increase in the supply created by Assisted Housing Programs tended to extend the downswing in

housing prices thereby increasing the cyclical nature of the market response. In addition, those first time buyers (requiring N.H.A. insurance) seem to concentrate their purchases in the lower cost time periods. This produced a measure of consumer segregation that separated the consumption oriented demand from the investment oriented demand that occurred during price increases. Thus, the examination of house price change was able to accomplish the initial research objectives.

It was noted, however, that the temporal pattern observed had important spatial implications. For example, in large urban areas the existing urban structure changes slowly. In the short term, therefore, the level of housing services offered by a housing unit in a specific location is relatively fixed. Given the unpredictable nature of speculative bubbles, and the shortness of their duration, the higher income purchasers who move during periods of price increase will tend to favour well known, established areas that are compatible with their individual preference structures. The search process may, therefore, be quite thorough because acceptable alternatives are fewer, well known and spatially well defined. Conversely, the longer duration, greater diversity and broader spatial distribution and composition of lower priced housing makes comprehensive evaluation of alternatives more difficult. Thus Simmons (1968) observation that upper classes tended to be more thorough in their search process may be a function of the cyclical nature of the process as well as the differences in the range of alternatives available.

More important, however, is the possibility that a cyclical pattern of mobility generated by price fluctuations would tend to reinforce the established patterns of residential occupancy and urban

structure. For example, if purchasers of lower cost units are constrained during periods of house price increase, what results is wealthier groups being matched with the more expensive structures available. Conversely, during periods of price decline the cost of moving increases for wealthier groups since price decline can be considered a cost. This narrows the price range and spatial distribution of structures available to lower income groups. This pattern is consistent with the finding of most factor ecologies. This analysis suggest, however, that in Metro there was a one year time lag between these movements.

One area that an analysis of price change data cannot illuminate, however, is the set of spatial adjustments that accompany the temporal fluctuations described. For this purpose longitudinal data on origin/destination, preference structure, as well as socio-demographic characteristics are necessary. Brozowski (1977) examined origin destination and preference structure but without the time component. This raises the possibility of future research on the impact of temporal fluctuations in mobility on the distribution of urban populations and the stability of residential neighbourhoods. As well, the existence of clear wealth thresholds (produced by price changes) that require increasing financial effort as consumers move up the quality scale raises the possibility of micro level studies that assess the impact of house price cycles on patterns of filtering.

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