
Residential areas in cities change through a variety of processes. Some of these derive from changes in the socio-economic character, others derive from the standing stock of dwellings in the area. The evolution of the stock of dwellings through time has long been referred to as filtering—a concept frequently discussed in theoretical terms but seldom subjected to empirical verification. The aim of this study is two-fold: first, to evaluate the formulation and implications of a number of definitions of filtering, and to arrive at a definition which is both conceptually sound and empirically testable; second, to apply this definition to an examination of the spatial and temporal trends in the housing market of the City of Toronto from 1953-71.

The concept of filtering in its most general sense, describes the manner in which the housing stock and occupants are matched through the mechanism of the housing market. Traditionally, urban dwelling units have been considered to show progressive decline in their economic usefulness through time, thereby allowing them to become available to successively lower income groups. The argument as to whether or not filtering works has often depended on an assessment of how adequately the lowest income groups are provided with decent housing. Welfare considerations, although important, have obscured the fact that filtering occurs constantly throughout the entire inventory. Filtering is not an outcome, but a process.

Discussions of the specific elements of filtering have generally considered one of two factors: either housing value or occupant income. Changing relative prices are a simple but sensitive measure, reflecting shifts in the relative position of units over time within the overall distribution of prices. Change in occupant income on the other hand is a more ambiguous measure requiring not only that the entire distribution of incomes be known, but also that other factors, such as variations of the rent-income ratio and of the intensity of use of the dwelling space, must be taken into account. In this study therefore, filtering is defined as a change in the relative desirability of a dwelling, as reflected in a change in relative price.
In the empirical analysis, an extensive sample of matched transactions for over 13,000 individual single family dwellings is analyzed and changes emerge in the relative attractiveness of the inner residential areas. However, the process is considerably more complex than the literature suggests. In particular changing relative prices must be viewed in the context of the different participants in the housing market, and in their differing appraisal of any site or area. The greatest upward movement in relative prices occurs in close proximity to the CBD and to selected other locations particularly those accessible by rapid transit. As prices of dwellings are to a large extent determined by the expected future stream of property income, where the potential for redevelopment is greatest, the magnitude of filtering is most marked.

Further analyses in the form of transition matrixes and regressions demonstrate both the rapid shifts which have taken place in filtering over time and space, and identify some of the spatial correlates of price changes. The matrix analysis shows sharp differences in the probabilities of filtering between locational and tenancy sub-markets and the increasing concentration of these changes in specific locations as a response to changing pressures in the housing market. Spatial variations in the rates of filtering are shown to relate to at least two levels through regression analysis: the first representing neighbourhood factors; the second, attributes of the building and site. Neighbourhood factors tend to dominate.

Conclusions from the study relate both to the utility of the filtering concept as an analytical tool, and to the implications of the filtering trends subsequently identified in the City of Toronto. The supply of inner city housing is undergoing significant changes both in the type of dwelling provided, and in the type of occupant housed. In Toronto it is suggested that the problem of housing quality is not as serious as the lack of an adequate supply of suitable housing at a price within reach of a broad sector of the population.

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Low density, non-contiguous residential development in rural areas has traditionally been disparaged by commentators, researchers and policymakers alike. It is often argued, generally on the basis of scanty evidence, that such developments are expensive for municipalities to service, that they remove good agricultural land from production, that they have a strongly negative effect on the amenity of the countryside, and that they render 'rational' development well nigh impossible.

This study focuses upon exurban areas, those areas which are ostensibly rural in landscape terms but which are inhabited by people who formerly lived and continue to work in the city. It examines the process of low density residential development and the impact it has had upon four case study areas within 40 miles of downtown Toronto. The
case studies focus upon change and development in the townships of Caledon, King, Pickering and Whitby, comprising a total area of some 80 square miles, between 1954 and 1971. The measurement of impact consists of comparing patterns of ownership, occupancy, land use and land cover in 1971 against those in 1954.

The evidence assembled suggests that planning policies (and loopholes in these policies) have been the single most important factor in determining the composition of the exurban migration and its physical form. Essentially well-intentioned policies to provide some means of effective control over the nature of residential development have indeed protected the countryside, but they have influenced the social nature of exurbanization even more than its physical form. Startling rises in the cost of all exurban lots, which have substantially outstripped the rise in cost of suburban lots, have meant that exurbanites have been increasingly drawn from the professional-managerial classes. This group constitutes some 40 per cent of the new residents since 1954. Exurbia is well on its way to becoming the enclave of the very rich.

The irony of this situation is that the impact on the countryside of exurban development has been of quite a different nature than that presumed by official planning policies. While the changes in patterns of ownership and occupancy have been substantial they have not been reflected to anything like the same extent in patterns of land use. Residential development only occupies 2.5 per cent of the total area and the decline in arable land amounts to only 1 per cent of the 1954 total. In addition, the evidence suggests that agricultural decline took place prior to, and quite independent of exurbanization, and there is little or no evidence of 'speculative blight'.

Furthermore there is little to support the commonly-held view that the amenities of the countryside have been adversely affected by the processes of exurban development. The agricultural landscape remains—more clearly defined and more limited in extent—alongside the essentially pastoral, white-fenced, equine estates. Luxurious suburban developments are juxtaposed with an emerging "wildscape" of aspen and cedar, and small groups of unpretentious bungalows stand in contrast to restored farmhouses and converted schoolhouses. Where residential development has been associated with rolling topography and woodland regeneration it has blended easily into the landscape. But in areas of lesser relief, where agriculture is larger scale and more efficient, residential development has been less compromising and more obtrusive in the landscape. Thus the location of lots, rather than their number, is seen as the crucial element in planning to conserve both agricultural land and the amenities of the landscape.

Exurbia can continue to provide what the original suburbs provided but what mass suburbia negated. Individuals can continue to express themselves more freely in both their lifestyles and their treatment of the landscape and can enjoy wider freedom of choice in both. What are required are more positive planning policies that will
permit a wider population to take advantage of an exurban location, while setting aside those areas which are environmentally sensitive or valuable from an amenity or agricultural viewpoint. Such policies are predicated upon a new attitude towards exurban development. The countryside can no longer be regarded as sacrosanct (although certain well-defined areas may well become so), but must be viewed as something ephemeral as to quality and with a new face for each succeeding generation.

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The study is an empirical analysis of spatial interrelationships in economic change rates in Southern Ontario settlements. Change in one urban place is at least a partial function of changes taking place elsewhere in the urban system and a variety of covariance procedures are used to highlight the interdependencies. Three data series are examined—population at decennial censuses 1871-1971, monthly cheques cashed at eleven clearing house centres 1928-1971, and job registrations at Canada Manpower Centres 1968-1971.

The structure of urban interdependencies is conditioned by the frictions of distance, by the existence of urban size thresholds and hierarchies and by various structural components such as centre-periphery contrasts and urban fields. Three modes of spatial change—a distance dependent, a hierarchical and a structural—are postulated and covariance relations are examined within each mode.

Maps, scale-variance analyses and spatial autocorrelation measures are used to examine the structure of covariances, and spatial autoregression analyses, spectral, cross-spectral and cross-correlation functions are used to provide an explanatory model of change based purely on spatial interdependencies within each of the univariate series.

Examination of changes in population data showed that periods of rapid growth have generally been associated with strong growth in the main centres, corresponding increases in their satellite communities and urban fields and increasing differentiation in change rates elsewhere. General 'spread' effects around a full system of growth poles were not apparent while the aggregate system growth was strong but when growth was less rapid distance dependent covariances were stronger. The evidence suggests that the assumptions underlying growth pole concepts are of doubtful validity in times of rapid growth within the study region.

Change rates within the urban hierarchy were not significantly autocorrelated but the population change data were defined across decade intervals and covariance structures could exist within the time-spans of these data. However, further investigations of hierarchical relations in checking transactions data with cross-spectral approaches also failed to support a simple hierarchical structuring of covariances. The phase
spectra were difficult to interpret but over the long run Toronto appeared to be coincident with the major regional centres of Sarnia, Windsor, London, Kingston and Ottawa. Smaller centres lagged behind Toronto and the results were consistent with Pred's (1973) model of an urban hierarchy in which large centres are highly interdependent and hierarchical notions are only appropriate at lower size levels.

Scale-variance, lagged cross-correlation and regression analyses were used on the job registration data to investigate the nature of hierarchical covariances and a spatial autoregression model was formulated on the basis of the distance dependent and the modified hierarchical mode. The results confirmed the validity of the modified hierarchical structure of interdependencies and again pointed out the strength of local similarities in change rate behaviour.

In conclusion, the urban system of Southern Ontario is hierarchically structured but change covariances are related to this structure only through the lower levels of the system. Large places covary simultaneously and coherence spectra and cross-correlation functions for checking data and C.M.C. registrations show the covariances are high. Through the lower levels of the hierarchy small, peripheral places lag behind their higher order dominants in cheques cashed but lead them in terms of C.M.C. registrations. Thus, hierarchical covariances may be lagged either way with large or small centres leading the way depending on the measure of economic activity. Distance dependent relations are strong and neighbouring places are far from independent. In addition, growth spillover into urban fields, and centre-periphery contrasts dominate the pattern of change when aggregate system growth is strong.

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Since the late 19th century offices have emerged as an important element in the centres of large cities. Particularly rapid growth during the last two decades has led to many conflicts. In order to reduce the impact on central areas and adjoining districts, the decentralization of offices has frequently been suggested. Opponents of decentralization, on the other hand, point to face-to-face linkages as one of the strongest forces responsible for central office agglomerations. It is argued here, however, that different kinds of office activities have different linkage intensities and strongly differentiated linkage patterns.

The growth of offices is also highly visible in Toronto. Some of the reasons for this growth and some of the implications and conflicts associated with the growth of offices in central Toronto are discussed. Establishment and employment data, based on an enumeration of offices, are used to discuss economic, status and size characteristics of central Toronto offices. Location patterns are analyzed with a view to delimiting
Only certain financial activities, law firms, mining companies and related activities can be clearly recognized as constituting a spatial cluster.

Face-to-face linkages generated by central Toronto offices were monitored by means of over 1,000 contact diaries and about 540 questionnaires from 30 different types of offices (industries). Data from diaries and questionnaires are synthesized into "model establishments." Linkage intensities, inter-industry linkage patterns and the spatial expression of linkages for 30 model establishments are documented. Model establishments based on diary and questionnaire samples from banks, trust companies, investment dealers, law firms, mining companies and mining services occupy a central position in the linkage network of the industries sampled.

Model establishments involved in real estate and construction activities form a functional cluster, but the industries they represent do not display spatial clustering. Other model establishments such as the head offices of life insurance, general insurance, oil companies, and manufacturing are characterized by low to medium linkage intensities and geographically scattered to widely scattered meeting partner locations. The industries represented by these latter model establishments are prime candidates for decentralization.

The study concludes with a warning against simplistic decentralization policies. The implications of decentralization for various interest groups have to be considered.

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This study proposes and evaluates a stage model of the evolution of an urban field, with particular emphasis on the component urban centres. The model is tested on the Toronto-Centred Region. The period of investigation spans the century since 1871, with particular emphasis on the postwar decades.

The stage model portrays the "ideal-typical" sequence of changes which occur in the towns of an urban field as a result of its expansion and integration. Five stages are proposed, differentiated primarily by the extent of the commuting field, manufacturing employment change, and the expansion of the contiguous built-up portion of the metropolis. A wide range of other characteristics were expected to be associated with each stage: population growth, the age, cultural characteristics, and socio-economic status of the population, vital rates, the amount, type, and quality of residential construction, the volume and selectivity of in-, out-, and net-migration, and newspaper circulation. It was hypothesized that the spatial expression of the series of changes
associated with the expansion of the urban field would be of wave-like form, the crest passing outward from the metropolis and affecting all centres in its path.

Analysis of the pattern of population change since 1871 shows that a wave of rapid population growth has indeed spread outwards from Toronto, cresting in the 30-40 mile range by the 1966-1971 period. Population growth in each urban centre since 1951 was disaggregated into natural increase and net migration, and a "demographic transition" matrix was calculated. The 1966-1971 migration data reveal a strong outward bias.

Employment, especially in manufacturing, has also decentralized from Toronto into the urban field, but the relationships between manufacturing employment growth rates and rates of population change in the region have been weak for at least 50 years and have now virtually disappeared. There is also a declining association between population change and change in retail and service employment. Even the relationship between population growth and total employment growth in the major labour markets of the region is no longer strong. Towns have become more highly differentiated in their retail and service employment per capita, but more similar in their manufacturing employment per capita.

Between 1964 and 1971, the Toronto labourshed expanded, but there was a declining dependence on employment in Metro Toronto among residents of most towns within 30 miles of Toronto. The major labour markets of the region remain largely independent. Almost the entire urban field is now linked with one or more of the major labour markets of the region. Decentralization of manufacturing employment into the areas just beyond Metro Toronto has contributed greatly to the expansion of the commuting field. The expansion of a Toronto labourshed since the late nineteenth century is sketched out.

Path analysis and partial correlation are used to examine the causal linkages among variables associated with net migration and natural increase in each decade since 1951. Natural increase remains highly predictable from the age structure of the population, but net migration rates have become less predictable from measures of income, distance, and manufacturing employment change.

Age-group segregation among the urban centres of the region has been increasing, while income disparities have declined slightly, in relation to average incomes. Towns in the periphery continue to have the oldest age structures and the lowest income levels.

With the assistance of five case studies, the stage model is deemed a qualified success. The manufacturing employment component is the weakest. The study concludes with some implications for future urban field research, together with an alternatives three-step modeling strategy. More recognition must be given to the role of expanding secondary metropolitan areas and other large centres within the urban
field, the use of annual data in addition to data at five- or ten-year intervals, non-linear and non-additive relationships, more careful delimitation of urban fields as study areas, and more intensive historical investigation of the expansion of commuting fields.

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Most recent studies in historical geography have focused upon the analysis of process and change within a given spatial and temporal framework. This study examines the process of land development, defined as the way in which raw land is converted into urban use, as it operated in the small Canadian lakeport city of Hamilton, Ontario between 1847 and 1881.

Our knowledge of the nineteenth-century process of urban land-development is expanded in three ways in this thesis. In the first instance, the study contains an extensive critical review of the literature that is relevant to an examination of this problem. This literature is discussed under five headings—the nature and economics of land, rural land-development in nineteenth-century North America, the cyclical nature of land development and the land market, urban land-development in the nineteenth-century city, and twentieth-century urban land-development. In terms of the analysis of nineteenth-century urban development, the literature review underscores the fact that most of the works have failed to view land development as a process. Nevertheless, the components of the process are visible, even if they have not yet been tied together within a suitable conceptual framework. For the present study the components of the land-development process have been defined as subdivision, marketing, and development, and this model serves as a scaffolding for the analysis of development in Hamilton.

A second area in which this study contributes to our comprehension of land development in the Victorian city is in the analysis of attitudes towards land and land development in the nineteenth-century city. Newspapers, municipal government records, and an assortment of business documents and personal papers provided the material for this portion of the study. The major findings here related to the importance of the local press, not only as an advertising medium, but also as a shaper of certain attitudes towards land and development, and to the importance of extensive land holdings for the members of the urban elite. Large landowners hoped to reap speculative profits, but they also needed land for purposes of collateral which would allow them to finance the expansion of other enterprises.

Finally, this study contributes to our understanding of the way in which the process of land development operated in the Victorian
city. Data for this part of the analysis derive from Registry Office records (deeds, subdivision plans, and the like), assessment rolls, and various manuscript census returns. These sources are employed to provide insight into several areas—the degree of ownership concentration in the vacant land market, the socio-economic characteristics of landowners, the nature of the subdivision process and the role of subdividers, the nature and extent of property transactions, the characteristics of land buyers, the profitability of land ownership in the Victorian city, the nature of the local development industry, and trends in local property development. The results of these various analyses point to a process of development that was decentralized, uncoordinated, and unregulated. While speculators were an important factor in the early years of the study, the properties in question filtered down into the hands of many different land developers quite quickly. The end product of the process was a series of heterogeneous neighbourhoods, characterized by an intermixture of socio-economic groups and land uses, and by the juxtaposition of different residential architectural styles. For the most part, this process operated in a relatively efficient manner. Easy entry into the subdivision phase of the process mitigated against collusion and escalating land prices. Indeed, the system did not preclude the ownership of land by members of the working class. Moreover, the development industry was able to keep up with the demand for new housing throughout most of the period under investigation. In the years following 1881, however, this system of property development broke down in the face of increased urbanization and industrialization. What had been satisfactory during most of Victoria's reign would prove to be inadequate by the time of her death.

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The nature of the relationship between zoning and neighbourhood change has often been alluded to but seldom specified on the basis of empirical research. How does zoning influence the course of neighbourhood change, particularly in the long run; and how does zoning itself respond to neighbourhood change? These questions lead to another: how effective is zoning as a mechanism for controlling environmental quality in urban areas?

Zoning attempts to control residential environmental quality and lower the risks and uncertainty associated with property ownership, by controlling the land use externalities which constitute an important element of the local environment. Residents have an interest in controlling externalities, but lack the property rights to do so because they are created by other owners. So they turn to the state as the creator, enforcer, and modifier of property rights when this is less costly than other strategies of doing nothing, migrating, or purchasing the property rights. So zoning is a political mechanism, open to manipulation and
change in the political arena.

The Annex, in central Toronto, was originally developed in the late nineteenth century as a high status single family neighbourhood. By the 1920s conversions to multifamily dwellings were occurring, along with pressure for institutional uses such as schools, hospitals, and fraternities. Rooming houses became very common in the 1930s and 1940s, and during the second world war a major wave of conversions occurred as a response to demographic aging and wartime demand for housing. Since the war the neighbourhood has seen a diversification in uses along with spatial separation of major kinds of uses. Single family dwellings are still important, but the neighbourhood also contains areas of high rise apartments, institutional and professional offices, and commercially developed peripheral thoroughfares. A measure of environmental quality based on surrounding land uses shows the area to have undergone a consistent long term decline in residential environmental quality, although with much spatial variation in levels.

Zoning was unable to prevent these changes, and the consequent decline in environmental quality, fundamentally because it could not control the underlying dynamics of change: particularly demographic aging, the obsolescence of dwellings, and the growth of the city which increased the accessibility of the Annex and the value of its land. Zoning responded to changes in the neighbourhood because the residents evaluation of property changed as the family cycle progressed and land values increased, producing a commercial class of owners whose prime interest was in income derived from property, as opposed to an earlier founding class whose major interest was the residential environment. In the local municipal, political culture, zoning was largely enacted and modified according to neighbourhood wishes, so that as the commercial class developed it was able to change the zoning to suit its requirements. In the 1940s, the founding class modified its ideal of a desired residential environment in order to preserve the family status of the area and prevent its complete commercialization. Because of its inherently political nature, zoning by-and-large responded to neighbourhood changes.

But zoning was successful in preventing change in some instances. It is suggested that in these cases, the demand for the new use, in the neighbourhood, was "weak," so that the benefits of increased land values to some owners, were outweighed by the overall reduction in values, produced by the externalities of the new uses. In all other cases, demand for the new use was "strong," producing widespread increases in property values which helped transfer owners from the founding to the commercial class. The prime determinant of zoning's effectiveness in controlling environmental quality is the strength of the demand in the neighbourhood for a new use which would lower environmental quality.

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Moose Jaw's growth and development in the period from 1882, when the railway and the first settlers arrived, until 1892 can best be explained as an eastern Canadian thrust into a frontier environment. The Canadian Pacific Railway, the federal government, and the settlers helped to transform the empty plains into a burgeoning town. The railway gave birth to Moose Jaw and spurred its growth; the federal government inaugurated its National Policy to settle the West as quickly as possible; and the settlers brought their Eastern cultural baggage which they transplanted on the prairies.

Yet Moose Jaw's first decade also showed a remarkable lack of growth and development. Ironically, the very forces that helped to build up the community were also responsible for hindering its progress. Many of the railway's policies were detrimental to Moose Jaw. The town, after all, existed for the benefit of the railway, not vice versa. Although Prime Minister John A. Macdonald wanted to settle the West as quickly as possible, his government did little more than provide some of the basic requirements for settlement. Government indifference tended to stifle the young community. Even the citizens themselves did not always do all that they could to promote and develop their own community. Their ambitious dreams were often thwarted by their apathetic attitude.

In addition to the man-made problems, there were the hardships imposed by nature. Bad weather and poor crops discouraged immigration. Settlers could not learn to adapt to North-West conditions overnight; it would take years of experience before they could cope with their environment. Moreover, the general economic conditions in Canada and throughout the world would not make large scale immigration to the North-West feasible until the turn of the century. Thus Moose Jaw's future lay beyond the control of the people who resided there. All these factors taken together explain why Moose Jaw, in its first decade, developed in the way that it did.

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