

## FERTILITY DECLINE IN THREE ONTARIO CITIES, 1861-1881

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*Résumé* — Pendant que le déclin des taux de fécondité matrimoniale au Canada durant la deuxième moitié du 19<sup>ème</sup> siècle est bien documenté, le rôle explicite des variables sociodémographiques dans un système urbain évoluant n'est pas bien connu. En utilisant les données micro-analytiques des manuscrits de recensement de 1861 et de 1881 pour Toronto, London et Kingston, le rôle principal de l'affiliation religieuse dans la diminuation de la fécondité a été démontré, le lieu de naissance n'ayant qu'une influence mineure. En plus, on a constaté que la composition différentielle des populations locales, et l'emplacement relatif en dedans de l'hierarchie urbaine, influencent la direction du déclin de la fécondité matrimoniale pendant cette époque.

*Abstract* — While the decline in marital fertility rates in the latter half of the nineteenth century is well documented, the explicit role played by sociodemographic variables in an evolving urban system is less apparent. Using micro-level data from the 1861 and 1881 manuscript censuses for Toronto, London and Kingston, the central role of religious affiliation in fertility reduction is demonstrated, with birth-place exerting only minor influence. In addition, both the differential composition of local populations and relative location within the urban hierarchy are shown to influence the path of marital fertility decline during this period.

### *Introduction*

As in Europe, fertility declined in North America during the nineteenth century. In Canada, the decline became most noticeable after 1861; estimates from census returns for 1861 to 1891 showed a rapid fall in birth rates, with

the largest component of this fall attributable to declines in marital fertility (Gee, 1979: Figure 1). However, national figures fail to indicate whether different subgroups of the population responded differently to changing economic and social conditions. A more critical analysis of fertility should provide insights into the evolving social and spatial fabric of society at a time of rapid change. The latter part of the nineteenth century was a period in which population was both growing apace through natural increase and undergoing a redistribution from rural to urban places (Kalbach and McVey, 1979). Religious values were strong and religious contrasts marked, particularly at the level of the local community (Akenson, 1984). Economic growth was highly differentiated, particularly among the cities of Ontario, where Toronto surged ahead of its rivals (Goheen, 1970). Each of these factors affected the path of fertility during this period.

In a previous paper (Moore and Osborne, 1987), the impacts of religion, birthplace and occupation on changes in marital fertility between 1861 and 1881 were explored for the city of Kingston, Ontario. While significant declines of the order of 20 per cent were detected for all subgroups, the role played by religion dominated the effects of the other two variables, with Catholics exhibiting the smallest decreases and Methodists the largest. In this paper, the analysis is extended to two other cities in Ontario — Toronto and London. In part, the extension serves to test the generality of the earlier findings. Equally importantly, it permits an examination of the relation between fertility decline and the growth of an urban system. While the general relation has received some theoretical attention in North America, little empirical analysis has been undertaken.

The exploration of detailed social and spatial variations in fertility behaviour in the nineteenth century raises questions of appropriate data sources and analytical perspectives. One strategy is to use the aggregate data from the decennial censuses within an ecological framework (Woods, 1979; Marr, 1986; McInnis, 1987). While this approach allows a broad range of communities to be studied, it is impossible to analyze the effects of interactions between sociodemographic variables on individual behaviour. An alternative strategy is to build a database using the individual records from the manuscript censuses; this allows the relations between variables to be analyzed although the resources needed for such a study means that the number of communities that can be considered must be reduced. In this paper, individual records from the manuscript censuses for the cities of Toronto, London and Kingston for the years 1861 and 1881 are used to analyze the pattern of decline in marital fertility across urban places with varying growth experiences and with different sociodemographic characteristics.

*Theoretical Background*

Two major themes have evolved in the extensive writings on fertility over the last 20 years. First, the incentive to limit childbearing depends on the evaluation of the costs and returns of having children, with this evaluation having both economic and social components (Becker and Lewis, 1973; Easterlin, 1975; Caldwell, 1982). Second, the desire to exert control over fertility and the knowledge of how to exercise control are prerequisites for fertility decline (Aries, 1959; Coale, 1973). The essential debate is over the relative importance of these economic and cultural influences on the regulation of fertility.

The central idea in economic arguments regarding fertility is that parents make childbearing decisions in the light of perceived costs and benefits of having children. In particular, as costs increase, either through increases in the real costs of raising children or through the opportunity costs of spouse's loss of earnings, fertility would be expected to decline. Although it is difficult to measure these effects directly in the nineteenth century, this argument leads to several expectations. First, as the importance of education received increasing public attention in Ontario during the latter half of the nineteenth century (Lawr and Gidney, 1978), we would expect an overall decline in fertility as the demand for education increased. Second, since those with higher incomes and those belonging to higher social classes would place a greater value on education, it is likely that these groups would be the first to reduce their fertility (Becker, 1960). Unfortunately, income and education information are not available in the manuscript censuses, and we must turn to a more contentious variable — occupation — for an indicator of socioeconomic status.

The relationship between occupation and fertility depends, in part, on the way in which occupation is classified. Depending on the classification scheme used, occupations can be shown to bear different relations to local demands for child labour, to demands for labour force participation of women and to differing restructuring of local production. Empirical evidence links each of these factors to fertility behaviour in Europe and the United States (Haines, 1979). In the present study, occupation is a surrogate for socioeconomic status and is measured using the well-known Armstrong scale (Armstrong, 1968); this scale is aggregated into three categories — upper, middle and lower status (Table 2).<sup>1</sup> If this aggregation is appropriate, the degree of reduction in fertility should be greater for those of higher occupational status.

The second theme in the literature on fertility takes the position that economic rationality does not provide the sole basis for childbearing decisions. Prerequisites for fertility decline include the willingness of individuals to take responsibility for their own childbearing and a knowledge of methods of

fertility control (Coale, 1973). An important factor in establishing these prerequisites lies in the adherence of parents to traditional values of the cultural groups to which they belong; cultural group membership may be defined in terms of birthplace or ethnic origin, religious affiliation, or attachment to local community.

In North America, with its high levels of immigration, the importance of cultural context has led to a strong emphasis on the role of birthplace and ethnic status. Some support has emerged for the traditional view that foreign-born women in America had higher levels of fertility than their native-born counterparts (Glasco, 1975), although others claim that there were few differences in fertility between women from different ethnic backgrounds (Katz, 1975). The difficulty with much of the analysis of ethnicity, particularly in the United States, is that it is undertaken in the absence of comparable data on religion, a variable which is not permitted to be collected in the U.S. census. Interpretation of the meaning of the "ethnic effect" is therefore confused, since its measurement confounds the effects of both ethnic origin and religion.

In terms of specifying the theoretical basis for fertility reduction, religion occupies a central role. Although the 1861-1881 period predates overt religious sanctions against birth control, a more subtle argument stresses the relation between religious affiliation and individual choice (Vinovskis, 1981). During a period in which secularization becomes progressively more important (Lesthaeghe, 1977; Wells, 1982), we would expect strong differentials to emerge between different religious groups. Past research has emphasized the dichotomy between Catholics and non-Catholics (Lesthaeghe, 1977), although we can also expect differences among the non-Catholic groups, particularly the Methodists (Akenson, 1984). We would expect Catholics to be much slower in controlling their fertility, while Methodists can be expected to be far more progressive in this regard.

The above discussion suggests that we should observe differentials in fertility adjustment for subgroups defined in terms of occupational status and religion, with possible additional variations attributable to birthplace or ethnic origin. However, the discussion also implies that the age structure of the female married population will have a major effect on the patterns of implementation of fertility control. The primary debate has been over whether control was exercised through "stopping" or "spacing" (Sanderson, 1984). If fertility is reduced by increasing the spacing between children, then the proportionate decline in fertility should not be strongly age-dependent. If, however, women stop having children after attaining some "desired number," then a progressively more marked decline should be observed at higher ages, particularly as higher parity children are likely to be valued less than lower parity children

(Leibenstein, 1975). As the actual behaviour is likely to be a mixture of the two processes, we would expect the dominant empirical effect to be the reduction in large families and the more substantial age-specific reductions to be observed at higher ages.

Each of the factors identified above refers to societal change in fertility. We might also expect, however, that differences occur between communities. Lesthaeghe (1980) pointed to the emerging differentials between urban and rural communities in Belgium in the nineteenth century, while McInnis (1977) showed that frontier fertility was substantially higher than in more established areas in Ontario, reflecting differential demand for child labour. However, within the urban hierarchy, different influences come to the fore. First, populations in different communities are likely to vary in terms of their composition over variables which affect fertility (age-structure, ethnic origin, religious affiliation and socioeconomic status). Some part of observed fertility change over a given period will be attributable to differences in these compositional variables.

A second source of variation lies in the economic arguments concerning fertility control. Certain industries, particularly textiles, generate high demands for female labour. In such communities, the opportunity cost of loss of wife's labour will be higher than in other communities and the fertility rate lower (Haines, 1979). However, while there is no evidence that there were significant differences between Toronto, London and Kingston in regard to demands for female labour between 1861 and 1881, a more general point can be made. In the largest cities, the transformation of forms of production was most advanced and changes in the use of child labour, the enforcement of the education laws and the growth of female labour force participation were most marked. In addition, the largest cities tended to be the locus of most innovations, the focus for the development of secular ideas and the origin of new technical information (Pred, 1977). On these grounds, it would be anticipated that the larger cities would be first to experience declines in fertility, but that the declines would then diffuse throughout the larger urban system. Thus we would expect to see declines in fertility occurring first in Toronto and then following at a later date in the smaller cities of the province. The gap in fertility rates would first grow and then decline as the smaller cities catch up. The timing of this process in Ontario is not known, and therefore the behaviour of the rates for the three cities for the fixed window 1861 to 1881 is not predictable *a priori*.

A question arises as to the expected nature of interaction effects. Although relationships among religion, nativity and social class are well documented (Katz, 1975; Akenson, 1984; Levine, 1984), their mutual effects on marital fertility are unclear. If religious influences become more important over time, we might anticipate that contrasts between religious groups are stronger for

younger than older mothers (a religion-by-age interaction). Further, if local community conditions are more important than regional or national factors, then a number of city-by-variable interactions should be statistically significant; on the other hand, if larger-scale societal shifts predominate, then the city-by-variable interactions would be expected to disappear over time.

The above discussion identifies a number of expectations with regard to the subsequent analysis of fertility decline in Toronto, London and Kingston:

- i) that religious affiliation will play as central a role in fertility decline in Toronto and London as in the earlier study in Kingston;
- ii) that age will be a primary differentiator of change as fertility control is exercised more effectively at higher ages through reduction in the number of high parity children;
- iii) that fertility reduction will be greater for women in higher occupational status than lower occupational status households; and
- iv) that, when controls are exerted for differences in the composition of local populations with respect to age, religion, ethnic origin and occupation, then rates of change in fertility will vary between communities at different levels of the urban hierarchy.

### *Data and Method*

The discussion in the previous section calls for the control of interactions between several variables in assessing their effects on fertility. This requires the use of data on individuals rather than aggregate ecological measures available from conventional census tables. Further, there is a need for comparability and full coverage across both social groups and urban places. The only reasonable candidates at this time are the manuscript censuses for 1851, 1861, 1871, 1881 and, recently, 1891. 1861 and 1881 were chosen as the reference years for this study primarily on the basis of Gee's (1979) results which indicated that this period contained the first significant decline in Canadian fertility and was therefore most likely to yield interesting results from a detailed analysis of individual experience.

The empirical foundation for this study is a database constructed for the cities of Kingston, London and Toronto from the manuscript censuses of 1861 and 1881. An earlier study (Moore and Osborne, 1987) had focussed on Kingston alone; Toronto and London were added to represent other major centres of urban growth in Ontario. For each of the three cities, data were compiled for samples of women between the ages of 15 and 49; the forms of the samples in each city are set out in Table 1. Given the focus on marital fertility,

TABLE 1. STRUCTURE OF THE SAMPLES

CITY	SAMPLE FORM	SAMPLE SIZE	
		1861	1881
Toronto	50% sample of women 15-49 in 4 wards	2171	3129
London	50% sample women 15-49 in all wards	920	1493
Kingston	All women 15-49 all wards	1834	1957
Sub-totals		4925	6579
TOTAL		11504	

a separate record was constructed for each woman between the ages of 15 and 49 for which the presence of a spouse or of own children (or both) could be determined. A count was generated of other women aged 15-49 and their marital status (single, married or widowed), but no separate records were created.

The list of variables used in the analysis is given in Table 2. Some collapsing of categories was necessary to prevent problems of small numbers arising in the analysis. The four dominant religious groups — Catholic, Anglican, Presbyterian and Methodist — formed the central focus of the analysis of the religious variable since the residual category "other" had both small numbers and did not differ significantly from the Anglican and Presbyterian groups.

TABLE 2. VARIABLES USED IN THE ANALYSIS

VARIABLE	SHORT FORM	DESCRIPTION
Number of children 0-4	NCHIL	Surviving children under 5 recorded in Census
Religion of Mother	MRELIG	Original Religious Groups collapsed to Catholic, Anglican, Presbyterian, Methodist and Other
Birthplace/Origin of Mother	IRISH	Coding collapsed to Irish, Canadian Irish, Canadian and Other
Age of Mother	MGP	Coded by Five Year Age Groups 15-19, . . . , 44-49
Occupation	OCUPAT	Armstrong scale collapsed to Upper, Middle, Lower
Sample Cities	REGION	Toronto, London, Kingston

The occupational coding was based on the Armstrong classification (Armstrong, 1968). However, since the nine original categories are too numerous for analytical purposes, they were grouped into three status categories: upper, middle and lower. These groupings, which follow the breakdown suggested by Harevan and Vinovskis (1975), stress the differences between professionals/managers, skilled workers, and semi-skilled or unskilled workers.

A problem faced at the outset was the measurement of fertility. The direct measure of fertility is clearly problematic using the manuscript census. It is well known that births in the prior 12 months are underrecorded in the census (Emery, 1983), although the systematic biases in such underrecording by social groups are unknown. One strategy for addressing this problem is to use the "child/women ratio" (Harevan and Vinovskis, 1975) which measures the relation between number of surviving children aged 0-4 to the number of married women in specified categories (defined by age, religion and other socioeconomic variables). This strategy smooths out the effects of underrecording of

those aged 0-1, although it is possible that the clumping of responses for reported age 5 might impose additional problems. However, separate analyses were run for all models using the variable "number of children aged 2-6" (with corresponding adjustments to the age of mother), and all structural effects remained the same. The primary difficulty with child/women ratio methods, however, is that they ignore the effects of infant mortality (Haines, 1979). Certainly, they provide an indicator of *effective fertility* (Haines, 1979), but interpretation of change is difficult in as far as mortality and fertility effects are confounded. If different religious, occupational or locational groups experienced differential rates of reduction in infant mortality over the period 1861 to 1881, then the estimates of fertility decline from child/women ratios would be biased. However, this author believes that such biases are likely to be small. The most recent estimates of infant mortality for Ontario in this period (McQuillan, 1985) suggest that such rates fell by between 15 and 20 per 1,000 live births between 1861 and 1881; this would lead to an overestimate of fertility decline of the order of two to three births per 1,000 married women (or an overestimate of one to two per cent in the rates in Figure 6). Variations between subgroups are likely to have an even smaller impact on the relations between child/women ratios and the actual fertility behaviour.

Each of the variables in the analysis can be treated as a categorical variable (age of mother is combined into the standard five-year age groups: 20-24, ..., 45-49; there are too few married women aged 15-19 to be included). The strategy employed is to treat the problem as one of an unbalanced analysis of variance, with number of children under five as the dependent variable and the independent variables specified as a series of main effects and interactions.<sup>2</sup> The dependent variable is *NFIVE* (number of children aged 0-4 for each married woman) with the factors being defined by the categorical variables *MGP* (5-year age groups), *RELIGION*, *IRISH*, *CITY* and *YEAR* and their interactions. For example, the model

$$NFIVE = [CITY\ YEAR\ MGP\ RELIGION\ MGP*RELIGION\ YEAR*RELIGION]$$

signifies that *NFIVE* is a linear function of the main effects *CITY*, *YEAR*, *MGP* and *RELIGION* and the interactions between *MGP* and *RELIGION* and between *YEAR* and *RELIGION*. If the *MGP\*RELIGION* and *YEAR\*RELIGION* interactions were significant, it would mean that the *relative C-W* ratios were different across the religious categories both for different ages and for the two time-periods. The lack of *CITY* by other variable interactions also would suggest that the fertility behaviour in the various cities differed in *level* but not in *structure* in relation to the included variables.

The procedure was first to find best-fit models for 1861 and 1881 separately; the data for the two years then were combined with time being explicitly referenced by the dummy variable *YEAR* and a best-fit model for this dataset estimated. The models were then used to estimate the impacts of each sociodemographic and locational variable on decline in fertility while controlling for the remaining variables.

### Analysis

The three cities showed clear contrasts in size, rate of growth and ethnic/religious composition over the period 1861 to 1881 (Figures 1 to 3). Yet there were also commonalities. The significance of the Irish declined in all cities and with it the size of the Catholic component of the population, although "Irish" and "Catholic" were by no means synonymous (Akenson, 1984). In Kingston, for example, nearly half the married women who were born in Ireland reported themselves as being Protestant in both censuses. The average age of foreign-born married women aged 15-49 was consistently higher than the Canadian-born in all cities. Nevertheless, it is clear from the descriptive profiles of the

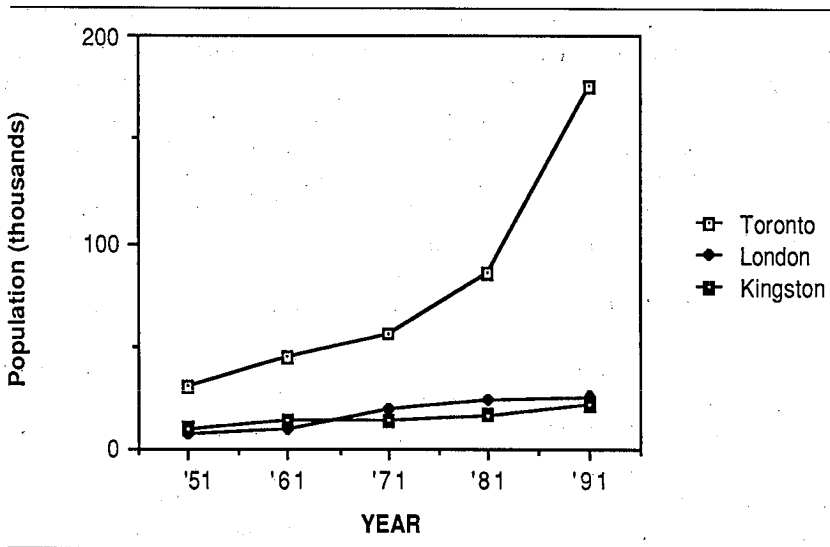


FIGURE 1. POPULATION GROWTH 1851-1891

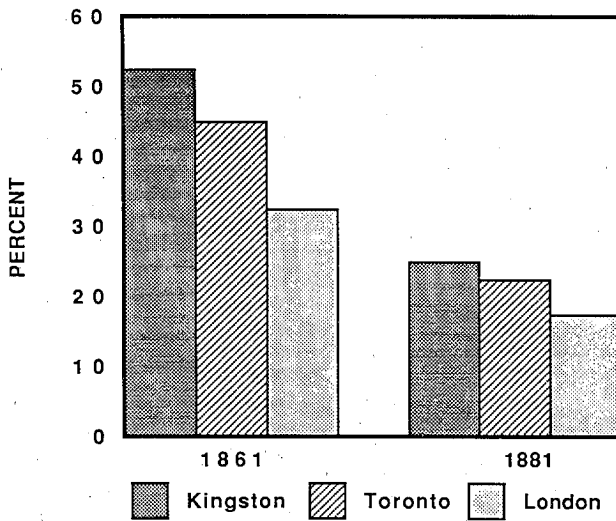


FIGURE 2. PERCENT OF MARRIED WOMEN BORN IN IRELAND 1861 AND 1881

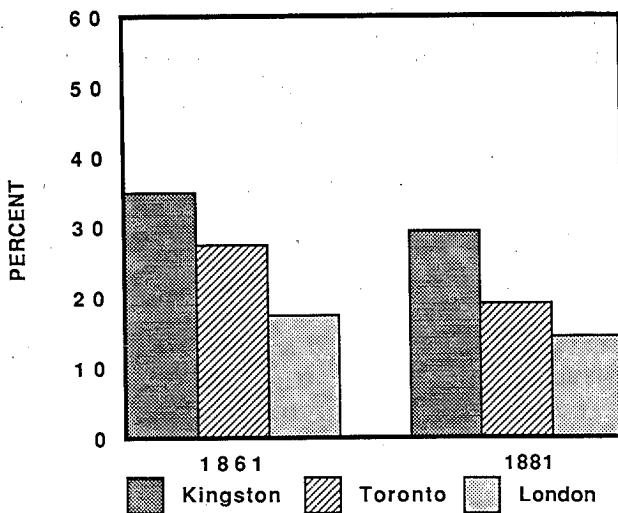


FIGURE 3. PERCENT OF MARRIED WOMEN WHO WERE CATHOLIC 1861 AND 1881

three cities that some attempt must be made to control for the different socio-demographic make-up of each sample area.

At the most basic level, we can control for age by constructing the profiles of age-specific child/women ratios and their relative changes for each city (Figures 4 and 5). The pattern here is clear: in each city, the decline is significant and structured so that the largest declines are in the lowest and highest age-groups. In fact, if we standardize the child/women ratios on the 1861 population of Toronto, the overall pattern of decline is quite evident (Table 3) and compatible with the results obtained by Gee (1979: Figure 1). This analysis can be extended to construct measures of changes in age-standardized measures over other categories. With respect to religion, for example, the relative changes over the sample cities can be constructed illustrating both the general decline in rates and the city-specific declines for different religious groups (Table 4). However, this strategy has limitations, as other variables (such as occupation and ethnic origin) are still uncontrolled and we have insufficient data to estimate measures for higher dimensional tables directly.

Further analysis requires that we take advantage of the modelling strategy outlined in the previous section. As indicated, the analysis was undertaken in three stages: (a) the fitting of a model for 1861; (b) fitting a model for 1881, and (c) fitting a model to the combined data for 1861 and 1881, which includes both *YEAR* (1 = 1861; 2 = 1881) and *YEAR*  $\times$  *VARIABLE* interaction effects. The somewhat complex output of these activities is summarized in Table 4 and the salient points are presented here. The model for 1861 indicates a substantially more complex structure than in 1881. In the earlier year, there are a large number of higher-order interactions which have largely disappeared by 1881, suggesting a more coherent set of societal responses to demographic

TABLE 3. AGE-STANDARDIZED CHILD/WOMEN RATIOS, 1861-1881

	1861	1881	%DECLINE
TORONTO	1.046	.900	13.95
LONDON	1.075	.836	22.28
KINGSTON	1.264	.947	25.12

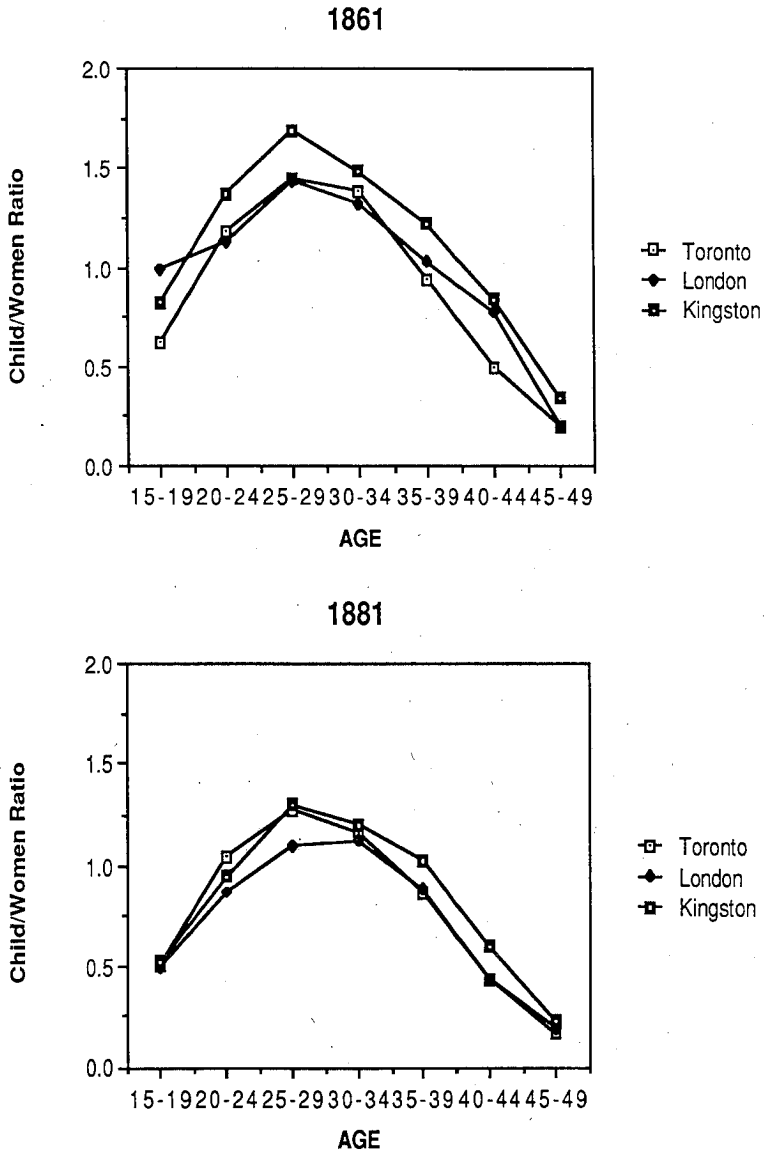


FIGURE 4. AGE-SPECIFIC CHILD/WOMEN RATIOS 1861 AND 1881

TABLE 4. AGE-STANDARDIZED CHILD/WOMEN RATIOS, BY RELIGION AND CITY, 1861-1881

CITY	RELIGION	1861	1881	%DECLINE
Kingston	Catholic	1.155	1.042	9.8
	Anglican	1.230	0.865	29.7
	Presbyt'n	1.226	0.881	28.1
	Methodist	1.035	0.794	40.2
London	Catholic	1.114	0.930	16.5
	Anglican	1.013	0.797	21.3
	Presbyt'n	1.073	0.784	26.9
	Methodist	0.905	0.744	19.2
Toronto	Catholic	1.035	0.902	12.9
	Anglican	0.984	0.880	10.6
	Presbyt'n	0.971	0.808	16.8
	Methodist	0.998	0.790	20.9

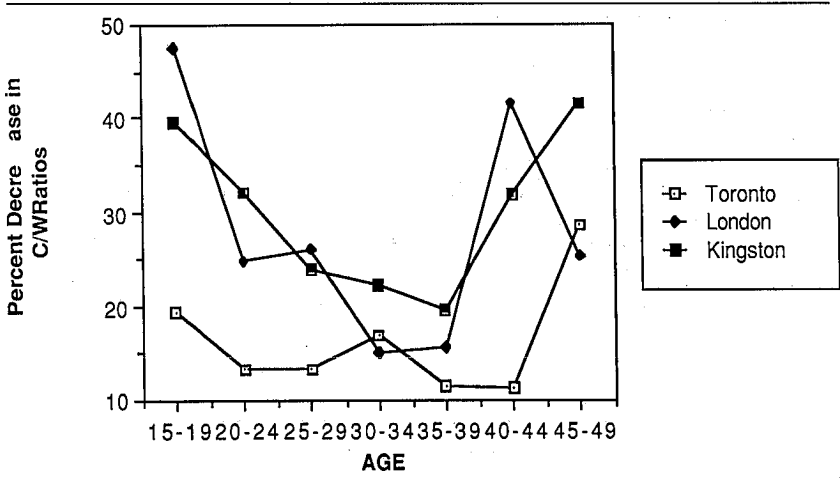


FIGURE 5. PERCENT REDUCTION IN CHILD/WOMEN RATIOS BY 1861-1881

TABLE 5. SIGNIFICANT TERMS IN UNBALANCED ANALYSIS  
OF VARIANCE MODELS

	1861	1881	COMBINED YEARS
AT .001 LEVEL	MGP MGP*IRISH	MGP MRELIG	MGP YEAR IRISH REGION
AT .01 LEVEL			YEAR*MRELIG
AT .05 LEVEL	REGION MGP*IRISH * REGION	OCUPAT IRISH	YEAR*MGP YEAR*IRISH
AT .10 LEVEL	IRISH*REGION MGP*OCUPAT * REGION OCUPAT*MRELIG * REGION		OCUPAT YEAR*REGION

concerns as the foundation of the society becomes more strongly and explicitly Canadian.

In 1861, the primary differentials in fertility behaviour, apart from age, are those associated with nativity and locality. The differentials associated with nativity involve the contrasts between those who were born in Ireland and those born in Canada; those aged 25-34 who were born in Ireland had significantly higher fertility experience than either those born in Canada or elsewhere or than older Irish-born women. The strongest differentials are those associated with locality in that fertility was significantly higher in Kingston than in London, which itself had higher levels of marital fertility than Toronto. These differentials exist even after other sociodemographic compositional effects are taken into account, and their ordering is consistent with their relative status in the emerging urban hierarchy in Ontario.

By 1881, not only has the overall structure of fertility differentials simplified, but the primary correlates have changed. The city effects have disappeared and the higher-order interactions, notably those involving age, have

disappeared. The strongest differentials are found with respect to religion and somewhat weaker linkages with the constructed "occupational class" variable and with the indicator of Irish origin. The direction of the religious and occupational effects are consistent with current theory. The religious groups are arrayed along a scale from Catholic to Methodist, with Anglican and Presbyterian occupying the middle ground. In the occupation classification, those in the high status group (Armstrong scale 1-3) have significantly lower child/women ratios than those in the low and middle status groups, a finding which is consistent with a view that sees higher status families placing greater emphasis on the "quality of children" and being more sensitive to the increasing costs of raising children in an urban environment. In the case of the "Irish" effect, the main differential occurred not so much with respect to Irish or other foreign-born women, but for Canadian-born women of Irish descent, who had significantly higher child/women ratios than other Canadian-born, Irish or foreign-born women.

The parameters for the combined model for the two years can be used to estimate the reduction in fertility associated with each of the major factors in turn, while controlling for the compositional effects of the remaining factors. Figure 6 provides a summary for the four main variables *MGP*, *RELIGION*, *OCCUPATION* and *CITY*. The values presented in the figures estimate the reduction which would have occurred in each category if the distribution of the observations over the other variables were the same for each category.

The relationship between age of mother and fertility decline is informative. While the average reduction over the age-groups 20-39 is around 18 to 20 per cent, the over-40 married women reduced their fertility by 35 to 40 per cent. The inference is that both spacing and stopping were important. The evidence obtained from this analysis suggests that more emphasis should be given to estimation of parity progression models for the Ontario data — analyses which would provide more critical insights into the structure of changes in spacing (Feeney, 1983).

Locationally, there is a strong ordering of levels of fertility reduction between the three cities which at least is suggestive of the closing of the gap between different levels of the urban hierarchy. Toronto and London were already experiencing lower fertility in 1861 than Kingston, but while they continued on the downward path during the next 20 years, Kingston experienced an accelerating rate of decline. Comparison of Table 3 and Figure 6 also suggests that the effects of ethnic and religious composition in London serve to further reduce fertility in that city; if such compositional effects are ignored, it would serve to overestimate the impact of London itself. Table 7 further clarifies this issue. The total difference in the percentage reduction in fertility

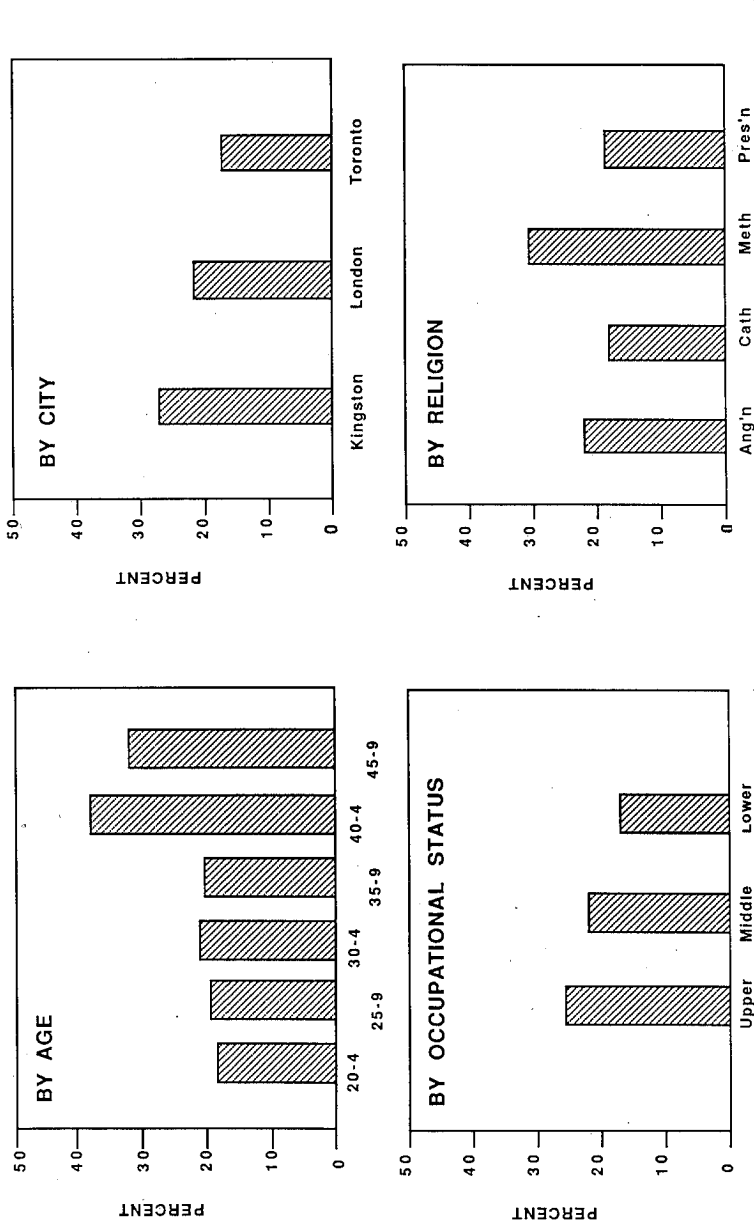


FIGURE 6. PERCENT DECREASE IN MEAN NUMBER OF CHILDREN AGED 0-4 PER MARRIED WOMAN 1861-1881 BY SELECTED CHARACTERISTICS

between Toronto and London over the 20-year period is 8.33; of this, 4.43 per cent is attributable to the differences between London and Toronto in composition over the other sociodemographic variables, while 3.9 per cent is a function of other "locational" characteristics. For Kingston, virtually all the difference from Toronto is assigned to the "other" category, with the relative population compositions of the two cities being quite similar. As Figure 4 illustrates, the net effect is for the gaps between the age-specific marital fertility profiles to narrow over the two decades.

Although the variable *IRISH* was significant in 1881, the comparison between 1861 and 1881 is somewhat complicated by the fact that the categories recorded were different in each year. The variable *IRISH* did not enter as a significant variable in 1861; it was marginally significant at the 0.02 level in 1881, although the only significant individual parameter was for the category "Canadian-born Irish," a category which was not defined in 1861. The evidence from this analysis is that the Canadian-born women of Irish origin had higher fertility than any of the other three groups, even after controlling for variations in age and religious composition of the different ethnic groups. The standardized child/women ratios by ethnic group are given in Table 6.

TABLE 6. AGE-STANDARDIZED CHILD/WOMEN RATIOS,  
BY ETHNIC GROUP, 1861-1881

ETHNIC GROUP	1861	1881	%DECLINE
Canadian Born	1.103 <sup>+</sup>	0.785	28.8
Canadian Born Irish	*	0.887	*
Irish Born	1.091	0.809	25.9
Other Foreign Born	0.984	0.804	18.4

+ values assume that distributions over other socio-demographic variables are constant

\* category was not recorded in 1861

*Discussion*

The evidence from this analysis strongly supports the proposition that fertility decline is structured in terms of both the social and spatial organization of Ontario society in the period 1861 to 1881. As in the case of the earlier Kingston study, the role of religion as a major differentiator of fertility behaviour by 1881 suggests that the motivating force deriving from social and personal values regarding the desirability of limiting family size is critical. Although the nativity effects so evident in the American literature are present in 1861, by 1881 they are dominated by religious effects in the sense that only the latter are significant when both religious and nativity variables are considered simultaneously in the analysis. The ordering of the religious effects are also notable. In 1861, Catholic child/women ratios were only modestly higher than for the other three groups which exhibited similar behaviour. By 1881, however, a dramatic change had occurred. The largest reduction was for Methodists (even after allowing for the fact that Methodists also had the highest average occupational status). Anglicans had reductions in the middle range, and Presbyterians and Catholics showed the lowest rates (although the standardized reductions for these groups were between 17 and 18 per cent).

The role of "social class" is somewhat more difficult to assess. While the empirical evidence presented here is consistent with arguments regarding changing assessments of the costs of children and the desire for higher quality children, the theoretical links between the aggregations of the Armstrong scale and their social meaning are still unclear. Although the declines in child/women ratios are strictly ordered by our occupational status measure, other studies have indicated a primacy for the role of education; at best, the social class constructs used here are poor surrogates. However, there are real difficulties in obtaining relevant micro-level data which could be used to expand the current measurements either along educational or income dimensions.

The evidence for a spatial organization of declines in fertility is strong. There is significant closing of the gaps in fertility levels between Toronto and the other two cities over the two decades (Table 7). Furthermore, much of this shift cannot be accounted for by differences in composition over those variables which are associated with the largest changes in fertility over the system as a whole. The possibility arises that there are still compositional effects which have not been included in the analysis, particularly with regard to labour force participation, although little evidence exists to suggest this is important for these cities. Even in 1891, the number of females employed in Ontario was only 15 per cent of the size of the male labour force, and almost half of the women were employed in personal services (Drummond, 1987:

TABLE 7. DECOMPOSITION OF INTER-CITY DIFFERENTIALS  
IN FERTILITY DECLINE, 1861-1881

PERCENT DIFFERENCE IN DECLINE BETWEEN TORONTO AND OTHER CITIES			
CITY	Total Difference	Difference Due to Composition	Difference Controlling for Composition
London	8.33	3.90	4.43
Kingston	11.17	11.50	0.33

Table 2.2). Despite this caveat, the results are consistent with the thesis that ideas regarding fertility control first gain credence in the major centres and then diffuse down the urban hierarchy.

Diffusion through the urban hierarchy has the effects of reducing the overall levels of spatial differentiation and emphasizing the role of primary structural and behavioural variables (Woods and Smith, 1983). Indirect support for this view also stems from Table 4, in which we see the disappearance of the variable *REGION* as a significant contributor to fertility differentials in 1881, suggesting an increasing coherence of fertility responses. Of course, with evidence for only three cities, the generality of the proposition is hardly established, but the results provide considerable encouragement to pursue the question further.

Overall, however, the evidence presented here suggests that the manuscript census is an important source for examining detailed changes in the social and spatial structure of demographic events in the latter part of the nineteenth century. While better data on differential infant mortality would improve estimates of fertility, the results presented here are considered to be quite robust. The primary thrust should be to extend the analysis over both time and space to provide a better understanding of the role of the evolving urban system and of urban-rural contrasts in the changing demographic behaviour of this period.

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*Footnotes*

1. Separate analyses were undertaken using alternate groupings of the Armstrong scale. The division used here generated the greatest inter-group differentials in child/women ratios.
2. The analysis was undertaken using the program GLM in the Statistical Analysis System (1985). In the modelling, the last category for each of the categorical variables in Table 4 is used as the reference category by GLM. Its parameter value is set to zero, and the parameter values for the other categories measure the differences between those categories and the reference category. A separate analysis of part of the data was undertaken using non-parametric procedures and the structure of the results remained the same.

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