NUPTIALITY, TOTAL FERTILITY AND MARITAL FERTILITY IN UPPER CANADA, 1851: A STUDY OF LAND AVAILABILITY, URBANIZATION AND BIRTHPLACE

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Résumé — Nous étudions les rapports de fécondité et de nuptialité des comtés du Haut Canada en 1851-1852 selon la disponibilité de terres et la place de naissance. Ces facteurs seraient importants dans une société rurale, comme le Haut Canada du milieu du dix-neuvième siècle. Les facteurs d'urbanization et de scolarité sont également étudiés. La disponibilité de terres et la place de naissance expliquent une partie importante de la variation des rapports de fécondité et, à un moindre degré, de ceux de nuptialité. Il se trouve important de diviser l'indice synthétique de fécondité entre la fécondité des mariages et la nuptialité.

Abstract — This paper relates fertility ratios and nuptiality of the counties in Upper Canada in 1851-1852 to the amount of land available for farming and birthplace, respectively. These factors have been suggested as important causal influences in a rural society, which Upper Canada was in the mid-nineteenth century. As well, the explanatory powers of urbanization and schooling are investigated. Land availability and birthplace turn out to be able to explain a significant amount of the variation in fertility ratios and, to a lesser extent, nuptiality. The study highlights the importance of dividing total fertility into its components of marital fertility and nuptiality.

Key Words — **Ontario, 1851, fertility, nuptiality**

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Introduction

The present study of fertility in a North American setting begins with the works of two Canadian researchers, Lorne Tepperman (1974) and Marvin McInnis (1972, 1977) and extends their type of analysis to the 1851 Census of Upper Canada. To date, these are the only studies which have systematically tried to explain fertility and nuptiality in that geographical area during the nineteenth century. Yet, in the 1850s, Upper Canada was the centre of much of British North America's agricultural and commercial activities and had the largest population of the British North American colonies. Also, that part of the Empire experienced very rapid growth in the 1850s. Therefore, a study of fertility and nuptiality at the beginning of that important decade will add a new dimension to the history of Canada in the middle of the nineteenth century.

While McInnis examines some fertility data for 1851, he does not bring birthplace and land availability variables together in one systematic or statistical attempt to assess the relative importance of these two influences. Nor does he divide total fertility into its components of marital fertility and nuptiality, which are defined later in this paper. Tepperman divides total fertility into its component parts, but he looks only at 1871 when Upper Canada had passed out of its phase as a rural-agricultural colony as compared to 1851. This study will attempt to do what former studies have omitted and, at the same time, will relate total fertility to land availability as a measure of economic opportunity. The goal of the present study, then, is the examination of cultural-birthplace explanations of fertility differences as opposed to "economic" causes of these differences during a year when Upper Canada was still a predominantly rural-agricultural economy.

Nuptiality, Marital Fertility and Total Fertility: Some Determinants

For this study of mid-nineteenth century fertility patterns, the fertility variable of interest is the ratio of children under 10 years of age to all females between the ages of 15 and 49. The data base is the published Volume 1 (Personal Census) of the 1851-52 Census of the Canadas. While other operationalizations of a fertility ratio might be possible, the one used here is convenient since this census lists children under five by single years of age and people five and older by five-year age cohorts up

to age 20, with ten-year age groups after that. Moreover, this definiton has been employed by researchers in Canada and the United States (McInnis, 1972; Vinovskis, 1978). McInnis notes that this measure is, however, subject to some biases caused by infant, child and female mortality, misenumeration and age-selective migration, but it may be acceptable to assume that these biases apply uniformly to all census districts (McInnis, 1972:5). This problem is partially overcome in the statistical analysis later in the paper by including explanatory variables which may be related to, and cause some of, the above.

As in Ansley Coale's analysis (1969), Tepperman's (1974) study of Canadian fertility in 1871, and Avery Guest's (1981) study of U.S. fertility in 1900, the ratio of children under 10 years of age to all females between the ages of 15 and 49 (to be called, in this study, the total fertility ratio) can be divided into two parts: (*a*) the ratio of married women between the ages of 15 and 49 to all women between the ages of 15 and 49 (nuptiality ratio) and (*b*) the ratio of children under 10 years of age to married women between the ages of 15 and 49 (marital fertility ratio). Two important points need to be noted about this division. First, Coale's formulation included illegitimate as well as legitimate births in total fertility and therefore is the expression which partitioned it into these two groups. Because of data limitations, illegitimate fertility is assumed to be zero. Second, the measure of marital fertility used here is a general marital fertility rate which treats women 15 to 49 years of age as a group. It needs to be recognized that variations in the age distribution of women within the group could have significant effects on a region's fertility. The aggregate data which are used in this paper could result in a region with an age distribution of women near the older end of this spectrum having a significantly different level of marital fertility than those in another region where the age distribution favours the lower end of this range. However, the data which are available do not permit us to relate age specific marital fertility to the determinants that are used in this paper.

In previous historical studies of Canadian fertility differences, cultural background variables have been included as explanatory factors. Tepperman (1974) includes five nationality independent variables in his explanation of nuptiality, marital fertility, and total fertility, namely the proportion of each area's population that is of English, French, German, Irish, and Scottish origin. In his study which uses census districts as the unit of analysis, McInnis (1972) discusses the role of French Canadian ethnicity in fertility. When he uses individual census data (1977), both religion and birthplace of the head of the household are included as ex-

planatory variables. All of these studies find some significant relation-
ships between birthplace-religion-ethnicity variables and fertility.
Therefore, any study of nineteenth-century Canadian fertility must in-
clude some recognition of such influences. Moreover, several studies of
fertility in the United States during that century also find that birthplace
is important (Easterlin *et al.*, 1978; Leet, 1975, 1977; Lindert, 1978;
Vinovskis, 1976, 1978).

The census of 1851-52, the data base for this study, collected data on-
ly on birthplace as opposed to ethnic origin found in later censuses.
Therefore, cultural-social influences will be captured by independent
variables which measure the proportion of certain birthplace groups
which are found in each census district. To be specific, the percentage of
a district's population which was born in (*a*) Ireland, (*b*) Canada, French
origin, (*c*) England and Wales, (*d*) Scotland and (*e*) Germany-Holland;
these are included as five separate independent variables. Of course
religion is another variable which could have been included along with
birthplace as a determinant of marriage and fertility behaviour. This has
not been done here, on the grounds that in districts with a high propor-
tion of Catholics, the same census districts also had a high proportion of
French Canadians. Since the statistical effects on fertility and nuptiality
can not be separated, religion is omitted. Let us move now to the so-
called economic determinants.

In the agricultural, mainly rural setting of the mid-nineteenth cen-
tury, land availability seems to be an important theoretical consideration
as a determinant of fertility and nuptiality. Yasukichi Yasuba argues that
the amount of available land affected average age of women at first mar-
riage, the proportions of women ever married, and the incentives of mar-
ried people to restrict family sizes, and that these in turn caused fertility
differences (Yasuba, 1962). In areas where land is relatively abundant,
land is cheap and available, and so families will have larger families. He
predicts that fertility and nuptiality will vary inversely with the ratio of
population to arable land (his operationalization of land availability).
Although Yasuba's work is extended by Colin Forster and G.S.L. Tucker
(1972), they accept his emphasis on land availability and only provided a
different definition or measurement of that variable. That issues will be
taken up again in the empirical part of this paper.

In a similar vein, McInnis hypothesizes why fertility ratios would dif-
fer in land-abundant, newly-settled frontier areas and in long-settled
areas of relatively scarce land (McInnis, 1977:203-208). He argues that if
children are assumed to be normal goods and wealth is the constraint on

household decision-making, fertility in long-settled areas will be higher since these households have a greater amount of wealth in the form of improved land. However, strong negative relative price effects may offset this income or wealth effect (see also Easterlin, 1976; Heer, 1972). McInnis argues that in newly-settled areas, the market is weakly integrated into the country's market system and many goods are expensive or unavailable. This lowers the relative price of children as they and their food and shelter are locally produced and relatively inexpensive. In long-settled areas, market goods are cheaper (a substitute for children), and the greater complexity of interpersonal relationships facing mothers raises the relative price of children. McInnis notes that these arguments may be augmented with Easterlin's comments that the backgrounds of frontier children (meager and unsophisticated living standards) encourage them to work farms that support modest consumption expectations and large families. Children from farms in long-settled areas have greater aspirations for material goods, but not proportionately greater income-producing assets, so they have smaller families.

Still following McInnis's arguments, the loneliness and greater riskiness of areas which are newly-settled with low-population densities may, in a sense, drive families to have larger families. The long-settled areas depend more on the community for support and protection, and they may even develop institutions for these purposes.

A case can be made for the role of children as producer goods, the role of children as providers for the aged and the desire to leave some inheritance to one's children as reasons for fertility and nuptiality to be higher in the land-abundant, newly-settled frontier than in the long-settled areas. In the case of the United states, in the mid- and late-nineteenth century, Easterlin suggests that parents in rural areas wanted to provide a farm for their children, especially sons, near to the family farm. As the amount of available land fell, its price rose, and it became more expensive to bequeath children enough money to purchase a nearby farm. Therefore, the demand for children fell and so did fertility (Easterlin, 1976; Easterlin *et al.*, 1978; Schapiro, 1982).

Moving to other explanatory variables besides land availability, Yasuba also expects that fertility will vary inversely with urbanization and industrialization that raise the cost of raising children, reduce their value as contributors to family income, increase the employment opportunities of women, make available cheaper competing goods and services, and facilitate the spread of knowledge (especially on birth control). The case of the urban industrial society as an explanatory variable dates

from the first days of the demographic transition theory (Caldwell, 1976; Notestein, 1945).

One of the most prolific recent writers on the demographic transition from high to low fertility has been J.C. Caldwell. His explanation of this secular decline is stated in terms of an intergenerational wealth transfer model where during the high fertility period, the transfer is from the young to the old, and later, during the low fertility period, the transfer reverses itself and is from the old to the young (Caldwell, 1976, 1978, 1981; Caldwell and Ruzicka, 1978). He puts special stress on schooling and formal education as contributing to the transfer reversal and examines the Australian case in detail (Caldwell and Ruzicka, 1978). The desire for schooling and its associated costs forces parents to forego some of their own personal wants and so shifts wealth to the younger generations. Education reduces the potential for work of children by requiring tem to be absent from the home and workplace while attending school and by making such tasks seem unfitting. Education, of course, increases the direct costs of children for such things as school supplies. Education may accelerate cultural changes which emphasize the middle class ethos of fewer children but more money spent on each one. The link between nuptiality and education is through its investment aspect. As education is looked upon as one means of opening up more employment prospects, as a way to move to the expanding urban areas and as a matter of upward mobility, young adults postpone marriage, raise the average age of first marriage and thus reduce nuptiality.

These economic determinants suggest adding three independent variables to the birthplace variables already noted: (a) the ratio of total population attending school to the total population under the age of 20 - SCHPOP (to capture the educational effect), (b) the ratio of total "urban" population to the total population - URBANPOP (urban means towns and villages as noted in the census) and (c) the ratio of the total population to the total improved acres in 1921 - CULTIV (the measure used here of land availability; 1921 is used to reflect the maximum amount of land ever cultivated in each county).

The land availability variable used here was suggested by McInnis in his 1972 study and reflects data which are available for 1851 in Upper Canada. While it might be more appropriate to use improved acres in 1851 in the numerator, data are unavailable. The ratio of population in 1851 to total "ever" improved acres serves as a proxy measure of the amount of land which was available for cultivation at that date. The higher this ratio, the less land was available in 1851, and the lower should

be marital fertility, nuptiality and total fertility. Note again that the denominator of this land availability variable is total improved acres and not total acres or total cleared acres. There would be problems with using the latter variables because some land can never be brought into cultivation due to its poor agricultural characteristics or because of climatic conditions. Therefore, the total population of each district is compared to only improved land that was brought under cultivation. It is hypothesized that there is an inverse relationship between SCHPOP and the three dependent variables. The last section leads to the hypothesis that URBANPOP is also inversely related to total and marital fertility, but no relationship is stated between URBANPOP and nuptiality because the type of causation seems unclear. Linear ordinary least squares regressions are run for the independent variables using 41 counties of Upper Canada in 1851 as the unit of analysis.

Before proceeding to the results, one modification was made to the urbanization variable (URBANPOP). In the agricultural-rural setting of the mid-nineteenth century, urbanization and the size of rural population to improved acreage or land availability are closely tied because both are part of the settlement process. Successful agricultural growth was part and parcel of the urban growth process (Leet, 1977). Part of urbanization reflects the land availability in a county. Since a land availability variable is included (CULTIV), the urban population variable needs to reflect only the other influences of an urban atmosphere on fertility and nuptiality and can leave out the agricultural growth process. Therefore, URBANPOP is regressed on CULTIV, and the residuals from this regression are included as an independent variable in the regression for fertility and nuptiality to reflect "pure" urban influences.

The Regression Results

This study uses the 42 census districts which were enumerated in the census of 1851-52 for Upper Canada (Ontario) as the unit of analysis and excludes the five large cities of Ottawa, Kingston, London, Hamilton and Toronto. Therefore the data relate to rural areas, but some towns and villages remain in the data because they could not be removed; some examples are Brantford, Port Hope, Prescott, Belleville, Chatham and Galt. Since they could not be removed, this is an additional reason for including the "urbanization" influence as a separate independent variable.

This does, however, make the interpretation of that variable somewhat different.

Early analysis of the fertility and nuptiality ratios by district indicated that Grey district had vary extreme values. While 60 per cent of the females in Upper Canada between the ages of 15 and 49 were married, this was the case for only 35 per cent in Grey; with an average marital fertility of 2.55 for Upper Canada, Grey's marital fertility ratio was 3.74 — much higher than any other district. Either there were special factors which influenced these variables in Grey or there is something wrong with the data. Rather than present two sets of results, Grey will be omitted from the statistical results. Therefore all regressions have 41 observations; ordinary least squares procedures are used.

To see if differences in nuptiality, marital fertility and total fertility are due to variations across counties in population by birthplace, each dependent variable is regressed against the five birthplace-composition variables that were noted in the previous section. Table 1 presents the regression results.

There is considerable variation in the estimated levels of marital fertility across birthplaces, with those born in Ireland and Scotland having the highest, England the lowest, and French Canadians and Germany-Holland being intermediate. The five birthplace variables "explain" 39.6 per cent of the total variation in marital fertility. Nuptiality also varied widely with those born in Germany-Holland having the highest level, Ireland the lowest, and England, Scotland, and French Canadians intermediate. The birthplace variables are relatively unsuccessful in tracking nuptiality since only 14.3 per cent of its variation is accounted for in the regression. In contrast, 34.6 per cent of the variation in total fertility is accounted for by birthplace variables. The results imply that those born in Germany-Holland and Scotland have the highest total fertility, Ireland and French Canadian being intermediate, and England having the lowest.

Each birthplace group appears to achieve its level of total fertility in somewhat different ways. The high level of total fertility for Germany-Holland (2.99) is composed of intermediate marital fertility (3.0) and high nuptiality (1.04). The high figure of total fertility for Scotland (2.42) is made up of the opposite, namely high marital fertility (3.46) and intermediate nuptiality (0.76). Very interesting is the figure for Ireland because it is constructed from very high marital fertility (3.78) and very low nuptiality (0.53). The intermediate to low total fertility of French Canadians (1.79) represents intermediate to low marital fertility (2.83)

TABLE 1. REGRESSION RESULTS FOR MARITAL FERTILITY,
NUPTIALITY AND TOTAL FERTILITY WITH BIRTHPLACE AS
THE INDEPENDENT VARIABLE

	Coefficient	t-value	β Coefficient	Elasticity at Means	R^2
Marital Fertility:					.396
Intercept	2.24*	24.64			
Ireland	1.54*	4.54	.58	.104	
French Canadian	.59*	1.66	.22	.009	
England	-1.48*	-2.38	-.32	-.043	
Scotland	1.22*	2.50	.32	.039	
Germany-Holland	.76	.98	.12	.003	
Nuptiality:					.143
Intercept	.58*	23.95			
Ireland	-.05	-.51	-.07	-.013	
French Canadian	.07	.76	.12	.005	
England	.18	1.11	.17	.022	
Scotland	.18	1.38	.21	.024	
Germany-Holland	.46*	2.25	.34	.008	
Total Fertility:					.346
Intercept	1.28*	18.32			
Ireland	.82*	3.14	.42	.091	
French Canadian	.51*	1.86	.26	.014	
England	-.40	-.83	-.11	-.019	
Scotland	1.14*	3.02	.40	.061	
Germany-Holland	1.71*	2.84	.38	.012	

* Significant at the 5% level.

and low nuptiality (0.65). Finally, the low total fertility for England
(0.88) is a combination of low marital fertility (0.76) and low nuptiality
(.76); the counties with higher percentages of people born in England had
both low marital fertility and low marriage rates.

Having examined the influence of birthplace separately, Table 2
presents the results using only the three "economic" variables. The land
availability, schooling and urban variables account for 38.9 per cent of
total fertility, 15.6 per cent of marital fertility, and 14.9 per cent of nup-
tiality. All variables are significant at the five per cent level in the total
fertility regression, while land availability and urbanization are signifi-
cant in the marital fertility regression, with land availability and school-

TABLE 2. REGRESSION RESULTS FOR TOTAL FERTILITY, MARITAL FERTILITY AND NUPTIALITY WITH LAND AVAILABILITY, SCHOOLING AND URBANIZATION AS INDEPENDENT VARIABLES

	Coefficient	t-value	Coefficient	Elasticity at Means	$\bar{R}$	F
Total Fertility:					.389	9.50
CULTIV	-1.31**	-3.03	-.41	-.077		
SCHPOP	- .57**	-2.32	-.32	-.104		
URBANPOP	- .52**	-1.81	-.22	-.007		
Intercept	1.81**	27.56				
Marital Fertility:					.156	3.47
CULTIV	-1.27**	-1.85	-.29	-.045		
SCHPOP	- .25	- .64	-.10	-.028		
URBANPOP	- .96**	-2.10	-.31	-.007		
Intercept	2.73**	26.13				
Nuptiality:					.149	3.34
CULTIV	- .21*	-1.37	-.22	-.031		
SCHPOP	- .18**	-2.04	-.33	-.082		
URBANPOP	- .02	.15	.02	.001		
Intercept	.67**	28.88				

** Significant at the 5% level
* Significant at the 10% level

ing significant in the nuptiality regression. All coefficients have the hypothesized signs. Perhaps more important is the relative significance of the three variables in each relationship. For total fertility, the β coefficients indicate that land availability has the most important influence on the dependent variable. It is followed, in descending order of importance, by schooling and urbanization. In the regression for marital fertility, land availability and urbanization are about equally important according to the β coefficients; the coefficient on schooling is insignificant. For nuptiality, the most important variable is schooling, with land availability next in order. It seems that the linkage between schooling and nuptiality was strong even in the mid-nineteenth century. In counties where the proportion attending school was relatively high, marriage rates

were relatively low. Urbanization is not statistically significant. This division of total fertility into its two parts has proven interesting because the significant determinants are different for each and from total fertility.

Relationships may now be examined that look at birthplace, land availability, schooling and urbanization all together. The first to be taken up is total fertility. In each case, several regressions were run with different combinations of the independent variables, but only the few necessary to capture the essence of the results are presented. Table 3 has two regressions with total fertility as the dependent variable. When all eight independent variables are included, land availability, urban population, Ireland birthplace and German-Holland birthplace are significant at the five per cent level; schooling is insignificant at the 10 per cent level. Recall that using only birthplace variables or only the other variables "explained" 34.6 per cent of the total variation in the

TABLE 3. FULL REGRESSIONS FOR TOTAL FERTILITY

	Coefficient	t-value	β Coefficient	Elasticity at Means	$\bar{R}^2$	F
1.						
CULTIV	-1.39*	-3.02	-.43	-.082		
SCHPOP	- .38	-1.27	-.21	-.071		
URBANPOP	- .50*	-1.86	-.22	-.006		
IRISHPOP	.55*	2.21	.28	.062		
FRCANPOP	.01	.02	.01	.001		
ENGPOP	-.28	- .66	-.08	-.014		
SCOTPOP	.04	.07	.01	.019		
GERMHOLPOP	1.62*	2.99	.36	.011		
Intercept	1.67*	10.31				
					.496	5.92
2.						
CULTIV	-1.41*	-3.49	-.44	-.082		
SCHPOP	- .40*	-1.72	-.22	-.073		
URBANPOP	- .50*	-1.90	-.22	-.006		
IRISHPOP	.55*	2.35	.28	.061		
GERMHOLPOP	1.62*	3.04	.36	.011		
FRCANPOP	- .01	- .02	-.01	-.001		
ENGPOP	.28	- .67	-.08	-.013		
Intercept	1.68*	17.03				
					.511	6.97

* Significant at the 5% level

dependent variable; now, with both types of variables or all variables included, $\bar{R}^2$ increases by about 15 per cent. It is clearly useful to include birthplace and non-birthplace in any explanation of total fertility, and any approach which emphasizes one but not the other would be faulty. Land availability is an important determinant of fertility. In fact, the β coefficient shows the following descending order of variables: land availability, German-Holland birthplace, Ireland birthplace, urban population and school population. Again, this ordering attests to the mixture of birthplace and other variables in an explanation of mid-nineteenth century fertility in a rural environment.

Table 1 indicates that there is a strong statistical (and perhaps causal) relationship between total fertility and the proportion of a county's population that was born in Scotland. This does not appear in Table 3, since the Scotland birthplace variable is insignificant with a very low β coefficient. An examination of the simple correlation coefficients shows a relatively high relationship (of 0.45 to 0.6) between Scotland birthplace and land availability and school population. Since the coefficients may be biased by these correlations, the second regression omits Scotland birthplace, which is arbitrary as some would argue that land availability or schooling should be left out. In any case, the results are very similar. The only major change is that the school population variable is now significant at the five per cent level.

Table 4 presents the same two regressions for marital fertility. The first regression with all eight independent variables appears to underline the importance of the birthplace variables that was noted in Table 1. There, 40.1 per cent of the variation in marital fertility was accounted for by the five birthplace variables. In contrast, the land availability, schooling and urbanization variables accounted for only 15.6 per cent of the same variation, as indicated in Table 2. It is then not surprising that when the two types of variables are combined, that the important variables are birthplaces. All these are significant at the 10 per cent level, with the proportion of population born in Ireland being the most important determinant as indicated by the β coefficient. The proportion born in England and in Scotland appear next in significance. Land availability and schooling are insignificant; only urban population is significant at the 10 per cent level.

It is evident from the second regression that part of these results are due to the collinearity between Scotland population and land availability. If the proportion of the population born in Scotland is omitted, land availability becomes significant at the five per cent level. It in fact has the

TABLE 4. FULL REGRESSIONS FOR MARITAL FERTILITY

	Coefficient	t-value	β Coefficient	Elasticity at Means	$\bar{R}^2$	F
1.						
CULTIV	− .84	−1.27	−.19	−.030		
SCHPOP	.45	1.03	.18	.050		
URBANPOP	− .64*	−1.64	−.20	−.005		
IRISHPOP	1.53**	4.25	.58	.102		
FRCANPOP	.60*	1.38	.23	.010		
ENGPOP	−1.39**	−2.28	−.30	−.040		
SCOTPOP	1.21*	1.65	.32	.039		
GERMHOLPOP	1.01*	1.31	.17	.004		
Intercept	2.20**	9.44				
					.431	4.79
2.						
CULTIV	−1.34**	−2.22	−.31	−.047		
SCHPOP	− .01	− .02	−.01	−.001		
URBANPOP	− .68**	−1.71	−.22	−.005		
IRISHPOP	1.34**	3.83	.51	.010		
GERMHOLPOP	.98	1.22	.16	.005		
FRCANPOP	.26	.66	−.10	.004		
ENGPOP	−1.20**	−1.96	−.26	−.035		
Intercept	2.50**	16.93				
					.401	4.83

** Significant at the 5% level
* Significant at the 10% level

second most important effect on marital fertility after the proportion of the population born in Ireland. Urban population and the proportion of the population born in England also influence the dependent variable in relatively important ways.

Recall from Tables 1 and 2 that when using either the birthplace variables or land availability, urbanization, and schooling variables, they alone accounted for about 14 per cent of the total variability of nuptiality. Table 5 presents two results when both types of variables are included. The $\bar{R}^2$ now doubles to 28 per cent in the first regression. Land availability and schooling are significant at the five per cent level, but urbanization is not. Birthplaces in Ireland, England, Scotland, and especially Germany-Holland are also significant. Again, the results underline the importance of combining both birthplace and land availability in an explanation of fertility-related variables, at least in

mid-nineteenth century Upper Canada. The β coefficients indicate the following ranking of significant variables: schooling, land availability, Scotland birthplace, Germany-Holland birthplace, Ireland birthplace, England birthplace. As in Tables 3 and 4, the second regression omits Scotland birthplace due to its correlation with schooling and land availability. The results are somewhat different. While schooling and Germany-Holland birthplace are the same, land availability is only significant at the 10 per cent level, and Ireland and England birthplace are not significant even at that level. Finally, the relatively low $\bar{R}^2$ in both nuptiality regressions indicates that the variables used here capture less of its movement than for total and marital fertility.

Conclusions

The main general conclusion is that both birthplace-cultural and "economic" variables need to be considered in any explanation of the variation of fertility and nuptiality by regions in Upper Canada in 1851. This is especially true for total fertility and nuptiality; admittedly, the cultural-birthplace variables explain as much of the variation in marital fertility as do those variables combined with the "economic" variables; but for total fertility and for nuptiality, a combination of the two types of variables explains significantly more of their variation than does each class of variables taken alone.

These results stress the importance of land in an agricultural setting, in this case Upper Canada in 1851. Total fertility, marital fertility and nuptiality are statistically related to the measure of land availability used in this study. But, the results also point to the important conclusion that birthplace is related to fertility and nuptiality. Including both land availability and birthplace variables significantly raises the amount of the variation in fertility and nuptiality which are explained.

Dividing total fertility into its two components proved to be useful since the set of significant variables differed. Land availability, urbanization, Ireland birthplace and England birthplace are significant determinants of marital fertility; for nuptiality, land availability, schooling and Germany-Holland birthplace proved to be important.

The year 1851 is the focus of this study because that was the first census of Upper Canada (Ontario) for which a report of this kind is possible; earlier censuses simply did not collect enough demographic-birthplace-economic information. The results for 1851 are certainly en-

TABLE 5. FULL REGRESSIONS FOR NUPTIALITY

	Coefficient	t-value	β Coefficient	Elasticity at Means	$\bar{R}^2$	F
1.						
CULTIV	− .33**	−2.01	−.35	−.049		
SCHPOP	− .26**	−2.43	−.49	−.122		
URBANPOP	− .05	− .54	−.08	−.002		
IRISHPOP	− .15*	−1.65	−.25	−.041		
FRCANPOP	− .13	−1.17	−.22	−.008		
ENGPOP	.21*	1.36	.20	.025		
SCOTPOP	− .25*	−1.37	−.30	−.034		
GERMHOLPOP	.37**	1.90	.28	.007		
Intercept	.74**	12.71				
					.280	2.95
2.						
CULTIV	− .23*	−1.54	−.24	−.034		
SCHPOP	− .17**	−1.99	−.31	−.079		
URBANPOP	− .04	− .45	−.06	−.001		
IRISHPOP	− .11	−1.27	−.19	−.030		
GERMHOLPOP	.38**	1.93	.28	.007		
FRCANPOP	− .06	− .59	−.10	−.004		
ENGPOP	.17	1.11	.17	.020		
Intercept	.68**	18.58				
					.261	3.02

** Significant at the 5% level
* Significant at the 10% level

couraging. Further research, however, is also suggested. The analysis should be done for periods after 1851, perhaps using census information at 10 year-intervals from 1861. It was impossible to obtain data by county for years before 1851, yet fertility and nuptiality levels of that year were influenced by information from earlier periods. If the analysis was carried out for years after 1851, it would be possible to use some prior information. As well, changes in fertility and nuptiality over one or more decades could be correlated with changes in some of the explanatory variables. Although this study dealt with Upper Canada or Ontario, admittedly a large part of Canada, the analysis could be extended to some other geographical areas in British North America, 1851 and 1861, or for Canada after 1861. Finally, the results for nuptiality are less satisfactory than for fertility; the suggestive results of this study could be extended to include other independent variables.

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