

## **Sectoral Labour Market Adjustment in the Provinces of Ontario and Quebec**

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Some studies have begun to look closely at labour market adjustments following structural shifts which may be regarded as representing major changes to regional relationships (Dussel Peters 1995; Ehrenberg 1994). It has been argued that labour markets should be examined at a disaggregated level, specifically considering age-sex and possibly racial cohorts (Gabriel and Macdonald 1996; Anderson and Dimon 1999).

The objective of this research is to investigate variances in age-cohort employment patterns in Ontario and Quebec, through the application of a modified version of the shift-share model. While past studies have investigated the employment prospects of different age-sex cohorts in relation to variables such as education levels, minimum wages, and retirement age (Bottoms 1981; Hostland 1995; Human Resources Development Canada 1995), this research offers an alternative interpretation by utilising the shift-share model to explore age-cohort employment patterns on a regional scale. Adapted to take into account different age groups, the shift-share model is employed to investigate employment prospects, according to industrial concentration, in Ontario and Quebec. The procedure involves focusing on annual employment changes, extending over the time period 1976 to 1995, examined at the one, two, and three-digit SIC level of industrial aggregation by age group in Ontario and Quebec. In the process of separating employment by industry in Ontario and Quebec for different age groups, the shift-share model provides the basis for determining the most competitive among the various age-sex cohorts.

Table 1 shows the age profile of the labour force for both Ontario and

**TABLE 1 Labour Force Composition by Age-sex Cohort (%)**

<b>Quebec</b>	1976	1985	1995
Male 15-24	15.4	11.9	8.4
Male 25-54	40.4	40.3	41.9
Male 55+	7.4	6.5	5.4
Female 15-24	12.7	10.3	7.4
Female 25-54	20.4	28.0	33.9
Female 55+	2.7	2.9	2.9
<b>Ontario</b>	1976	1985	1995
Male 15-24	13.8	12.4	8.4
Male 25-54	39.0	37.0	39.9
Male 55+	7.9	7.2	6.0
Female 15-24	12.3	11.2	8.0
Female 25-54	23.2	28.3	34.8
Female 55+	3.8	4.0	3.8

Quebec. These data appear to indicate that Ontario's labour force is slightly older than Quebec's. The population profiles for the two provinces, however, are almost identical. The apparent differences shown in Table 1 result from differences in labour force participation rates (Table 2). Participation rates are higher in Ontario for every age-sex cohort, with the differences for the 55+ age groups, both male and female, being especially pronounced. The data in Tables 1 and 2 clearly illustrate the importance of considering age-sex specific cohorts when attempting to understand labour market adjustments.

As a further objective, the demographically enhanced shift-share model is applied to the labour markets of Ontario and Quebec for the purpose of investigating differences in regional responses to recent pressures exerted by continental integration. The issue of continental integration and its impact on the structure of regional economies recently has been of considerable interest to policy researchers (Hoberg 2000; McDougall 1991). Papers by Helliwell (1996), McCallum (1995), Engel and Rodgers (1996) and Brox (2001) have examined trade flows in an attempt to measure changes in regional relationships. It has been postulated that continental integration may accentuate regional tensions with a weakening of the national core and pressures for decentralisation and even secession, or, alternatively, may reinforce the national core and the dependence of peripheral regions on transfer payments (Paelinck and Polèse 1999). Gunderson (1998), among others, has argued that continental integration has broken the traditional core-periphery linkage in favour of international region-to-region linkages.

The remainder of the paper is organised as follows. In the following section, we describe the theoretical form of the standard shift-share model and suggest

**TABLE 2 Labour Force Participation Rates by Age-sex Cohort (%)**

<b>Quebec</b>	1976	1985	1995
Male 15-24	65.1	66.9	61.4
Male 25-54	93.3	91.3	89.1
Male 55+	46.9	39.8	29.8
Female 15-24	54.6	60.0	56.5
Female 25-54	45.9	63.1	72.5
Female 55+	14.4	14.4	13.1
<b>Ontario</b>	1976	1985	1995
Male 15-24	68.7	73.9	63.8
Male 25-54	96.1	95.3	91.8
Male 55+	50.0	44.2	33.5
Female 15-24	61.8	70.0	62.9
Female 25-54	57.5	72.4	76.8
Female 55+	20.4	20.1	18.1

modifications to allow for the extension of the analysis for various age-sex cohorts in Ontario and Quebec. Part of this extension recognises the importance of accounting for age-sex-specific changes in the labour force when assessing labour-market impacts. Then, we present an example of the use of the labour-force-adjusted, age-sex-specific, shift-share model by analysing changes in the Ontario and Quebec labour markets from 1976 to 1995. Finally, we summarise the findings of the paper and suggest some policy implications of the analysis.

### Model and Data Requirements

The conventional shift-share model has been used to assess regional development as measured on the basis of such variables as income, employment and value added, by separating growth into three components:

- ▶ the national-growth component, which points to growth that would have occurred in the event that all industries in the study region displayed the same rate of growth as the reference economy average;
- ▶ the industry-mix component, which measures the effect of the existing industrial structure on regional growth by capturing the growth that would have occurred if the growth displayed by the existing regional industries matched that exhibited by the reference economy; and
- ▶ the competitive or differential-shift component, which attributes regional growth to the dynamism or attractiveness of the region and is measured residually.

The application of the shift-share model and, in particular, the relevance of the competitive shift component has received extensive attention in the literature.

While some have been critical of the conventional form and variations of the shift-share model (e.g. Houston 1967; Brown 1969; Richardson 1978), others have pointed to the analysis as a useful tool for assessing and, to some degree, predicting regional economic development and growth (Ashby 1968; Esteban-Marquillas 1972; Hellman 1976; Chalmers and Bechelm 1976; Fothergill and Gudgin 1979; Andrikopoulos 1980; Danson et al 1980; Dunn 1980; Ireland and Moomaw 1981; Arcelus 1984; Andrikopoulos et al 1987; McDonough and Sihag 1991; Keil 1992).

Rigby and Anderson (1993), Haynes and Dinc (1997), and Dinc et al (1998) have suggested modifications to the conventional shift-share analysis to account for productivity changes by incorporating output effects in addition to changes in employment. This is not feasible in this study due to the lack of data on industrial output, disaggregated by age-sex cohorts. Patterson (1991) and Andrikopoulos et al (1990) have suggested using regression techniques to explain and forecast shift-share components. Such an extension could be undertaken in the current situation. For a detailed review of the variants of the shift-share model see Loveridge and Selting (1998).

The application of the conventional shift-share analysis normally involves assessing the industrial performance of a region in relation to the reference economy (often the national economy is used as the reference economy) by considering employment, for which data are most readily available, over all age groups according to the following specification:

$$N^r = E_i^r g^n \quad (1)$$

$$I^r = E_i^r (g_i^n - g^n) \quad (2)$$

$$C^r = E_i^r (g_i^r - g_i^n) \quad (3)$$

where the national (reference) growth component,  $N^r$ , is given by regional employment in the  $i$ th industry,  $E_i^r$ , times the overall rate of employment change in the nation (reference economy),  $g^n$ . Thus the national-growth component gives the employment growth that would have occurred if the region had experienced the same growth as the reference economy. The industrial-mix component,  $I^r$ , is given by regional employment in the  $i$ th industry,  $E_i^r$ , times the national (reference) rate of employment change in the  $i$ th industry,  $g_i^n$ , less the overall rate of employment change in the nation,  $g^n$ . Thus, the industry-mix gives the growth that would have occurred in the region if each regional industry had grown at the same rate of growth for that industry in the reference economy and is often viewed as a measure of the strength of the industrial base of the region. The competitive component,  $C^r$ , is given by

regional employment in the  $i$ th industry,  $E_i^r$ , times the regional rate of employment change in the  $i$ th industry,  $g_i^r$ , less the national (reference) rate of employment change in the  $i$ th industry,  $g_i^n$ . This component is often interpreted as the locational advantage (disadvantage) of the specific industry in the region.

In this paper, the shift-share analysis is extended beyond its conventional application of assessing regional industrial performance by accounting for the impact of economic growth or decline in Ontario or Quebec on particular age-sex cohorts. The competitive component is further adjusted to take into account labour-force growth attributed to each specific age-sex cohort in Ontario or Quebec. To accommodate the effect of regional economic performance on particular age-sex cohorts and the effect of labour-force growth on the competitive component, the conventional shift-share model is modified according to the following specification:

$$N_a^r = E_{ia}^r g^n \quad (4)$$

$$I_a^r = E_{ia}^r (g_i^n - g^n) \quad (5)$$

$$C_a^r = E_{ia}^r (g_{ia}^r - g_i^n) \quad (6)$$

$$C_{ia}^r = E_{ia}^r [(g_{ia}^r - g_i^n) - g_{ia}^r] \quad (7)$$

where the national growth component,  $N_a^r$ , is given by the regional (Ontario or Quebec) employment in the  $i$ th industry for a particular age-sex cohort,  $E_{ia}^r$ , times the overall rate of employment change in the nation (reference economy),  $g^n$ ; the industrial-mix component,  $I_a^r$ , is given by regional employment in the  $i$ th industry for the particular age-sex group,  $E_{ia}^r$ , times the national rate of employment change in the  $i$ th industry,  $g_i^n$ , less the overall rate of employment change in the nation,  $g^n$ ; the competitive component,  $C_a^r$ , is given by regional employment in the  $i$ th industry for the particular age-sex cohort,  $E_{ia}^r$ , times the regional rate of employment change in the  $i$ th industry for the particular age-sex cohort,  $g_{ia}^r$ , less the national rate of employment change in the  $i$ th industry,  $g_i^n$ ; and the competitive component adjusted for regional labour-force growth of the particular age-sex cohort,  $C_{ia}^r$ , is given by regional employment in the  $i$ th industry for the particular age-sex cohort,  $E_{ia}^r$ , times the regional rate of employment change in the  $i$ th industry for the particular age-sex cohort,  $g_{ia}^r$ , less the national rate of employment change in the  $i$ th industry,  $g_i^n$ , together, less the regional rate of employment change in the  $i$ th industry for the particular age-sex cohort adjusted for labour-force growth for the particular age-sex

cohort,  $a$ , in the region,  $g_{la}^r$ .

Thus, our disaggregated version of the model treats each specific age-sex cohort, in each region, as a separate sub-region of its own, in reference to aggregate economic performance.<sup>1</sup> Accordingly, the national growth component gives the employment change that would have occurred if the employment for the particular age-sex cohort in Ontario or Quebec had matched the overall national overall average for all age-sex cohorts, i.e., the reference economy. The industrial mix component gives the employment growth that would have occurred for the particular age-sex cohort for a given industry in Ontario or Quebec, if the industry employment growth had been at the relevant national average for that industry. The industrial mix is interpreted as a measure of the structural strength (weakness) of the industrial base of the region. The competitive share component is interpreted as the locational advantages (disadvantages) of each age-sex employment cohort for each particular industry, measured by the actual employment growth for each age-sex cohort in the relevant Ontario or Quebec industry minus the relevant national average growth for that particular industry. The labour-force adjusted competitive component measures Ontario and Quebec employment growth for a given industry at the age-sex cohort level relative to the change in the labour-force participation for that age-sex cohort in Ontario or Quebec. This component is interpreted as the net demand impact for the specific age-sex cohort after adjustment for age-sex specific supply of labour.

The raw data utilised in the computations have been retrieved from IVISION BROWSER, which is a Windows-based software package.<sup>2</sup> The IVISION BROWSER is a table-authoring software tool with the capability of creating custom multi-dimensional tables from a statistical data base, including Statistics Canada Labour Force Survey data secured for the purposes of this paper. Based on annual averages by the two-digit standard industrial code, multi-dimensional tables for the period extending from 1976 to 1995 have been constructed, to provide gender-specific and total employment data for Ontario and Quebec.

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1. Alternatively, one could treat the national performance of specific age-sex cohorts as the reference economy and conduct the shift-share analysis independently for each age-sex component. Our approach allows us to compare the performance of specific age-sex cohorts to the overall level of economic performance, while the alternative approach would give a more direct measure of the relative status of an age-sex cohort compared to same cohort nationally.
  2. The IVISION BROWSER is a software package licenced to Human Resources Development Canada and is only available to the general public by special request through the Applied Research Department located in Hull, Quebec, Canada.

## Analysis

The results of the traditional version of the shift-share model, for the periods 1976 to 1985 and 1986 to 1995, are presented in Table 3<sup>3</sup>. Some aggregate results are clearly evident from these tables. The national growth rate of total employment in the earlier period is approximately 20 %, while in the later period, it is approximately 15 %, reflecting the impact of the severe and prolonged recession in the early nineties.

Turning to the industrial mix components, also shown in Table 3, we find that only the finance and service sectors are sources of relative growth in employment in both periods.<sup>4</sup> On the other hand, agriculture, manufacturing, transportation, communications and other utilities, and public administration are net employment losers in both periods. The results from the remaining three sectors are mixed: other primary and trade are relative gainers in the earlier period, but net losers in the later period, while construction is a net employment gainer in the later period, but not in the earlier period.

The results obtained for the competitive share effects<sup>5</sup> (Table 3) suggest that six industries in Ontario – agriculture; manufacturing; construction; transportation, communications and other utilities; trade; and services – displayed growth rates in excess of national industrial rates of growth in the 1976-1985 period. However, in the second (1986-1995) period, only three industries (transportation, communications and other utilities; finance, insurance and real estate; and services) exhibited growth rates exceeding national industrial rates of growth.

Finally, according to the competitive share effect, in Quebec two industries (agriculture; and finance, insurance, and real estate) in the 1976-1985 period, and one industry in the 1986-1995 period experienced rates of growth above national industrial growth rates.

Quebec has fewer industries than Ontario experiencing growth rates in excess of the national industrial growth rates. However, like Ontario in the second 1986-1995 period, it witnessed a decline in the number of industries showing growth rates above the national industrial rates of growth.

As noted below, the findings obtained for the competitive share effect become somewhat modified when examined on the basis of age-sex cohorts and when adjustments are made for the effect of labour-force growth.

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3. The data reported in the tables represent growth rates over the periods, that is, the shift-share components, divided by the initial employment figures.
  4. A positive industrial mix implies that the industry in question is growing faster than the national average.
  5. A positive competitive share points to a regional industry outperforming the same industry nationally.

**TABLE 3 National Growth, Industrial Mix and Traditional Competitive Share Components of the Shift-Share Model**

	National Growth	
	(1976-1985)	(1986 - 1995)
	0.200	0.150
	Industrial Mix	
	(1976-1985)	(1986 - 1995)
Agriculture	-0.199	-0.247
Other Prim ary	0.026	-0.145
Manufacturing	-0.159	-0.150
Construction	-0.268	0.037
TCOU	-0.124	-0.026
Trade	0.032	-0.051
Fin. Ins ur. & R.Est.	0.076	0.081
Service	0.228	0.173
Public Admin.	-0.017	-0.159
	Ontario Traditional Competitive Share	
	(1976-1985)	(1986 - 1995)
Agriculture	0.096	-0.031
Other Primary	-0.317	-0.151
Manufacturing	0.100	-0.086
Construction	0.092	-0.102
TCOU	0.079	0.049
Trade	0.043	-0.029
Fin. Ins ur. & R.Est.	-0.086	0.106
Service	0.002	0.035
Public Admin.	-0.068	-0.009
	Quebec Traditional Competitive Share	
	(1976-1985)	(1986 - 1995)
Agriculture	0.115	-0.077
Other Prim ary	-0.357	-0.018
Manufacturing	-0.126	0.074
Construction	-0.082	-0.085
TCOU	-0.056	-0.069
Trade	-0.048	-0.005
Fin. Ins ur. & R.Est.	0.008	-0.107
Service	-0.079	-0.116
Public Admin.	-0.025	0.036



The results from the demographically enhanced version of the model,<sup>6</sup> applied to each age-sex cohort in Ontario and Quebec, are shown in Tables 4 and 5, for youth (ages 15-24), prime age (ages 25-54), and older workers (over 55) respectively. We find a negative competitive share effect for young workers in all industries in Ontario in the 1986-1995 period. In the same time period, in comparison to Ontario, the competitive share effect for young workers in Quebec is found to be positive for only young female workers in agriculture and other primary industries. In Ontario, the adjustment for labour-force growth in the 1986-1995 period converts the competitive share effect from negative to positive for young female workers in the agriculture industry. In Quebec, in the same time period, the adjustment for labour-force growth results in the competitive share effect changing from negative to positive for young male workers in the public administration industry and young female workers in the trade industry.

In the earlier 1976-1985 period, the competitive share effect for young workers in Ontario is positive for young male workers in agriculture and service industries and young female workers in agriculture, manufacturing, and construction industries. This represents a better situation than that which is observed in the later 1986-1995 period where the competitive share effect is found to be negative for young male and female workers across all industries. In Quebec, the competitive share effect for young workers in the 1976-1985 period is consistent with the performance observed in the later 1986-1995 period, except that further to agriculture and other primary industries, the competitive share effect is positive for young female workers in the construction industry. The adjustment for labour-force growth in the earlier period results in the competitive share effect in Ontario changing from positive to negative for young male workers in the agriculture industry and young female workers in the agriculture and manufacturing industries. In Quebec, the adjustment for labour-force growth in the 1976-1985 period produces a change in the competitive share effect from negative to positive for young male workers in the agriculture and service industries and from negative to positive for young female workers in the trade industry.

In both Ontario and Quebec, the results obtained for the competitive share effect points to a decline in the employment performance for young workers from the 1976-1985 to the 1986-1995 period, as each province experienced a decline in the number of industries showing a positive competitive share effect for the young workers cohort. Based on the findings obtained for young workers, there does not appear to be any evidence suggesting differences between Ontario and Quebec related to pressures from continental integration.

Turning to adult workers in Ontario in the 1986-1995 period, we find the

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6. In this version, the competitive share component is modified to include the relative employment structure of each age-sex cohort in the regional industry, compared with the national position of the same industry. The competitive share effect is further modified for regional labour-force growth corresponding to each age-sex cohort.

**TABLE 4 Demographically Enhanced Competitive Share for Ontario Workers**

Competitive Share (1986 - 1995)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	-0.309	-0.019	0.157	-0.096	-0.064	0.146
Other Primary	-0.436	-0.346	-0.088	-0.308	-0.200	0.457
Manufacturing	-0.459	-0.607	0.008	0.080	-0.206	-0.001
Construction	-0.558	-0.198	0.006	0.006	-0.078	0.207
TCOU	-0.390	-0.201	0.118	0.298	-0.297	-0.352
Trade	-0.357	-0.198	0.226	0.074	-0.256	-0.116
Fin. Insur. & R.Est.	-0.232	-0.593	0.279	0.300	-0.188	-0.156
Service	-0.259	-0.409	0.210	0.234	-0.120	-0.221
Public Admin.	-0.366	-0.663	0.049	0.332	-0.402	-0.212
Adjusted for Labour Force (1986 - 1995)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	-0.079	0.174	-0.089	-0.469	0.003	0.095
Other Primary	-0.206	-0.153	-0.335	-0.681	-0.134	0.406
Manufacturing	-0.229	-0.414	-0.239	-0.293	-0.139	-0.052
Construction	-0.328	-0.005	-0.241	-0.367	-0.011	0.156
TCOU	-0.160	-0.008	-0.129	-0.075	-0.231	-0.403
Trade	-0.127	-0.005	-0.021	-0.299	-0.189	-0.167
Fin. Insur. & R.Est.	-0.002	-0.400	0.032	-0.073	-0.121	-0.207
Service	-0.029	-0.216	-0.037	-0.139	-0.053	-0.272
Public Admin.	-0.136	-0.470	-0.198	-0.041	-0.336	-0.263
Competitive Share (1976 - 1985)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	0.098	0.072	-0.028	0.423	-0.048	0.642
Other Primary	-0.744	-0.432	-0.198	1.062	-0.337	-0.332
Manufacturing	-0.104	0.005	0.116	0.238	0.028	0.117
Construction	-0.034	0.292	0.036	0.685	0.376	0.816
TCOU	-0.368	-0.489	0.106	0.752	0.031	0.420
Trade	-0.001	-0.105	-0.014	0.224	-0.195	-0.071
Fin. Insur. & R.Est.	-0.498	-0.568	-0.114	0.271	0.062	0.086
Service	0.150	-0.109	-0.172	0.170	-0.128	0.009
Public Admin.	-0.410	-0.310	-0.089	0.381	-0.268	-0.065
Adjusted for Labour Force (1976 - 1985)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	-0.027	-0.083	-0.210	-0.109	-0.189	0.291
Other Primary	-0.869	-0.587	-0.380	0.530	-0.478	-0.683
Manufacturing	-0.229	-0.150	-0.066	-0.294	-0.113	-0.234
Construction	-0.159	0.137	-0.146	0.153	0.235	0.465
TCOU	-0.493	-0.644	-0.076	0.219	-0.110	0.069
Trade	-0.126	-0.050	-0.196	-0.308	-0.336	-0.422
Fin. Insur. & R.Est.	-0.623	-0.723	-0.296	-0.261	-0.078	-0.265
Service	0.025	-0.265	-0.354	-0.362	-0.269	-0.342
Public Admin.	-0.535	-0.464	-0.271	-0.151	-0.409	-0.416

**TABLE 5 Demographically Enhanced Competitive Share for Quebec Workers**

Competitive Share (1986 - 1995)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	-0.263	0.414	-0.077	0.086	-0.278	0.131
Other Primary	-0.250	0.176	-0.035	0.598	0.057	0.787
Manufacturing	-0.316	-0.482	0.180	0.354	-0.261	0.332
Construction	-0.476	-0.729	0.011	0.002	-0.057	-0.605
TCOU	-0.406	-0.459	-0.072	0.287	-0.224	-0.484
Trade	-0.256	-0.062	0.056	0.198	-0.136	-0.349
Fin. Insur. & R.Est.	-0.737	-0.851	0.062	0.188	-0.114	-0.343
Service	-0.401	-0.457	-0.089	0.064	-0.360	-0.097
Public Admin.	-0.089	-0.613	-0.044	0.389	-0.125	0.503
Adjusted for Labour Force (1986 - 1995)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	-0.021	0.650	-0.231	-0.267	-0.187	-0.001
Other Primary	-0.008	0.413	-0.189	0.245	0.148	0.655
Manufacturing	-0.074	-0.245	0.026	0.001	-0.170	0.200
Construction	-0.234	-0.492	-0.143	-0.351	0.034	-0.737
TCOU	-0.164	-0.222	-0.226	-0.066	-0.133	-0.616
Trade	-0.014	0.175	-0.098	-0.155	-0.045	-0.481
Fin. Insur. & R.Est.	-0.495	-0.613	-0.092	-0.165	-0.023	-0.475
Service	-0.159	-0.220	-0.243	-0.289	-0.269	-0.229
Public Admin.	0.153	-0.377	-0.198	0.036	-0.034	0.372
Competitive Share (1976 - 1985)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	-0.038	0.132	0.126	0.147	0.146	0.795
Other Primary	-0.638	0.212	-0.297	0.342	-0.455	0.791
Manufacturing	-0.368	-0.395	-0.047	0.040	-0.086	-0.183
Construction	-0.202	0.067	-0.147	1.385	-0.024	0.985
TCOU	-0.571	-0.504	0.043	0.485	-0.197	0.017
Trade	-0.224	-0.031	-0.108	0.285	-0.240	0.261
Fin. Insur. & R.Est.	-0.283	-0.619	-0.016	0.779	0.012	1.290
Service	-0.038	-0.283	-0.178	0.180	-0.387	-0.296
Public Admin.	-0.605	-0.403	-0.048	0.842	-0.344	0.256
Adjusted for Labour Force (1976 - 1985)						
Industry/Cohort	(15-24)		(25-54)		(55+)	
	Male	Female	Male	Female	Male	Female
Agriculture	0.051	0.164	-0.008	-0.444	0.120	0.532
Other Primary	-0.549	0.244	-0.431	-0.249	-0.482	0.528
Manufacturing	-0.279	-0.363	-0.181	-0.551	-0.113	-0.446
Construction	-0.113	0.099	-0.281	0.796	-0.051	0.722
TCOU	-0.483	-0.473	-0.091	-0.106	-0.224	-0.246
Trade	-0.135	0.001	-0.242	-0.306	-0.267	-0.002
Fin. Insur. & R.Est.	-0.194	-0.587	-0.150	0.188	-0.015	1.027
Service	0.051	-0.251	-0.311	-0.411	-0.414	-0.559
Public Admin.	-0.516	-0.371	-0.182	0.251	-0.371	-0.007

competitive share effect to be positive in all cases except for adult male workers in other primary industries and adult female workers in agriculture and other primary industries. A similar pattern is observed in Quebec in the 1986-1995 period, as the competitive share effect for adult workers is found to be predominantly positive except for adult male workers in the agriculture, other primary, transportation, communications and other utilities, service and public administration industries. In the 1986-1995 period, the adjustment for labour-force growth has a significant impact on the competitive share effect for adult workers in Ontario causing it to convert from positive to negative in all cases except for adult male workers in the finance, insurance and real estate industry. In the same 1986-1995 time period, the adjustment for labour-force growth, while not as extensive as that observed for Ontario, does have a considerable impact on the competitive share effect for adult workers in Quebec. The adjustment for labour-force growth in Quebec in the 1986-1995 period, results in a change from positive to negative in all industries except for adult male workers in manufacturing and adult female workers in other primary, construction and public administration.

In the 1976-1985 period, the competitive share effect in Ontario is found to be positive for adult female workers in all industries and adult male workers in the manufacturing, construction and transportation, communications and other utilities industries. In Quebec in the 1976-1985 period, the competitive share effect is positive for adult female workers in all industries and for adult male workers in the agriculture and transportation, communications and other utilities industries. The adjustment for labour-force growth for adult workers in Ontario, in the earlier 1976-1985 period causes the competitive share effect to become negative in all cases except for adult female workers in the other primary, construction and transportation, communications and other utilities industries. A similar impact is observed in Quebec, as the adjustment for labour-force growth for adult workers in the 1976-1985 period converts from positive to negative in all cases except for adult female workers in the construction, finance, insurance and real estate, and public administration industries.

The transition from the 1976-1985 to the 1986-1995 period for adult workers is consistent for Ontario and Quebec, as the competitive share effect, with very few exceptions, remains positive across the various industries between the two periods. Again, the results obtained for adult workers fail to demonstrate differences between Ontario and Quebec attributed to pressures from continental integration.

In respect to the older worker cohort, in the 1986-1995 period, the competitive share effect in Ontario is found to be negative throughout, except for older female workers in the agriculture, other primary and construction industries. A similar performance is observed for older workers in Quebec in the same 1986-1995 period, as the competitive share effect is negative for most industries except for older male workers in the other primary and older female workers in the agriculture, other primary, manufacturing and public

administration industries. The adjustment for labour-force growth in the 1986-1995 period only causes the competitive share effect for older workers to change in one case in Ontario, as it converts from a negative to a positive for older male workers in the agriculture industry. The impact created by the adjustment for labour-force growth for older workers in Quebec in the 1986-1995 period is just as limited as the situation observed in Ontario in the same time period where the competitive share effect converts from a positive to a negative for older male workers in the construction industry and from a positive to a negative for older female workers in the agriculture industry.

Finally, in the 1976-1985 period, the competitive share effect for older workers in Ontario is primarily positive, except for older male workers in the agriculture, other primary, trade, service and public administration industries and older female workers in the other primary, trade and public administration industries. In the 1976-1985 period, the competitive share effect in Quebec reflects the situation observed in Ontario, in the same time period, for older female workers, but not for older male workers. The competitive share effect for older female workers in Quebec in the 1976-1985 period is positive in all instances except in the manufacturing and service industries. However, the competitive share effect for older male workers in Quebec in the 1976-1985 period is negative in all industries except agriculture and finance, insurance and real estate. The impact created by the labour-force growth on the competitive share effect for older workers in the 1976-1985 period is quite extensive for the province of Ontario. The adjustment for labour-force growth causes the competitive share effect to convert from positive to negative in the manufacturing, transportation, communications and other utilities and finance, insurance and real estate industries, and for older female workers in the manufacturing, finance, insurance and real estate, and service industries. The impact on the competitive share effect for older workers in Quebec in the 1976-1985 period created by the adjustment for labour-force growth is consistent with that observed in Ontario in the same time period. The competitive share effect converts from positive to negative in a number of situations including older male workers in the finance, insurance and real estate industry, and older female workers in the transportation, communications and other utilities, trade and public administration industries.

The results obtained for the competitive share effect for both Ontario and Quebec suggests an erosion in the employment performance of older workers from the 1976-1985 to the 1986-1995 period. Between the two periods, each province witnessed a decline in the number of industries displaying a positive competitive share effect for the older workers cohort. Thus, as was the case for young and adult workers, the findings derived for older workers do not point to any real evidence of variations between Ontario and Quebec in respect to pressures from continental integration.

## Summary and Policy Recommendations

This paper had three main purposes:

- ▶ to illustrate how the traditional shift-share model may be readily expanded to analyse data disaggregated for various age-sex cohorts of the labour market;
- ▶ to show that such results can be misleading unless age-sex specific labour force changes are explicitly considered; and
- ▶ to apply the demographically enhanced shift-share model to the labour markets of Ontario and Quebec in an attempt to see whether the two provinces have reacted in a fundamentally different way to recent pressures caused by continental integration.

The results of this study clearly indicate that adult workers have fared better than either youth or older workers, in terms of relative employment growth over both periods considered. This effect appears to have become more pronounced in the latter period. However, when labour force changes are taken into account, these conclusions are modified to some extent. In that case, the relative performance of the adult workers is seen to be less favourable, with improved performance for the younger workers and relatively little change noted for the older workers. These results would tend to suggest that the recent trend towards early retirement for older workers has to some extent reduced the employment problem facing younger cohorts. When the sex cohorts are considered, it appears that, in most age groups, females have fared slightly better than corresponding male groups.

Regionally, we note that accounting for labour-force adjustment tends to make the relative position of the adult workers worse and that for younger workers better in both Ontario and Quebec. The same adjustment, however, tends to make the position of older male workers appear better in both provinces, but it worsens the position for older female workers.

While the results indicated above are found to be significant in terms of actual changes, this study has little to say concerning desired changes. For example, much of the relative declines in youth and older workers are the result of changes in participation rates rather than changes in employment opportunities. Whether such changes in participation rates are desirable, representing investment in human capital by youth, or increased consumption of leisure by older individuals, or the results of undesired discouraged-worker effects we cannot say.

The industry-mix effects are clear and not overly surprising, with agriculture, manufacturing, utilities, and public administration exhibiting weakness in both periods, and with only the finance, real estate and insurance, and service sectors showing growth in both periods.

Such results, especially when extended to more disaggregate data, provide the basis for labour training policies. Further, when considering the com-

petitive share effects, especially when disaggregated for specific age-sex cohort impacts, we note some major differences across the various regions. This implies that labour-market policies might be best addressed at a relatively localised and disaggregated level.

With respect to the possibility that the labour markets and Quebec have reacted in a fundamentally different manner to the pressures for continental integration, our conclusion is that they have not. There have been differences in the adjustments in the two provinces, but these differences appear to be in response to normal geographic and economic factors. Similar to the conclusions of Polèse (2000) and Brox (2001), we do not find evidence that Quebec is fundamentally positioning itself for secession; rather we conclude that the Quebec labour market is reacting to the same factors as Ontario.

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