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Canada's Immigration-Labour Market Experience

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I. Introduction

The underlying Canadian historical framework which allows us to analyze the labour market impact of Canadian immigration is owing to Dales (1964, 1966) who first merged the concepts of North American free trade and immigration. Dales argued that during Canada's first major growth period, circa 1896-1910, the combined forces of trade, immigration into Canada and Canadian emigration to the United States led to extensive economic growth -i.e. greater gross domestic product but lower income per head.¹ Dale's historical view was that at the turn of the century British and European immigration to Canada became increasingly urban and unskilled and caused labour displacement and depressed wages for urban resident Canadians.² Given free factor mobility to the United States this resulted in emigration of Canadian residents to the United States and lower wages for the remaining Canadian residents.

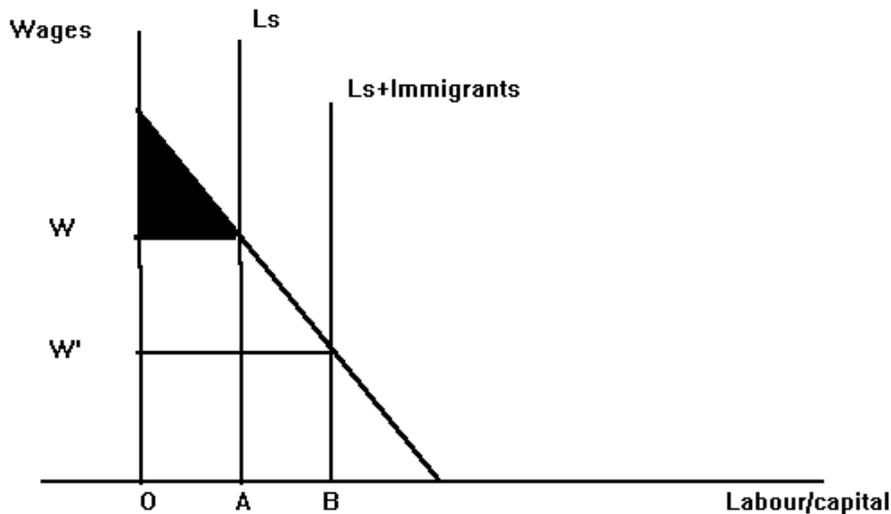


Figure 1: Static Harberger Triangle with immigration

Figure 1 presents the Harberger triangle which rationalizes this view. Given a fixed amount of capital and technology then as we add immigrants to the Canadian labour force the pre-immigration wage falls resulting in a redistribution of income as capitalists gain income. This lower wage sends skilled resident Canadians who earned the higher pre-immigration wage to the United States. Unemployment is not an outcome in the Dale's model because in this historical period wages were not sticky downward and free mobility across North America allowed the labour market to clear at any wage.

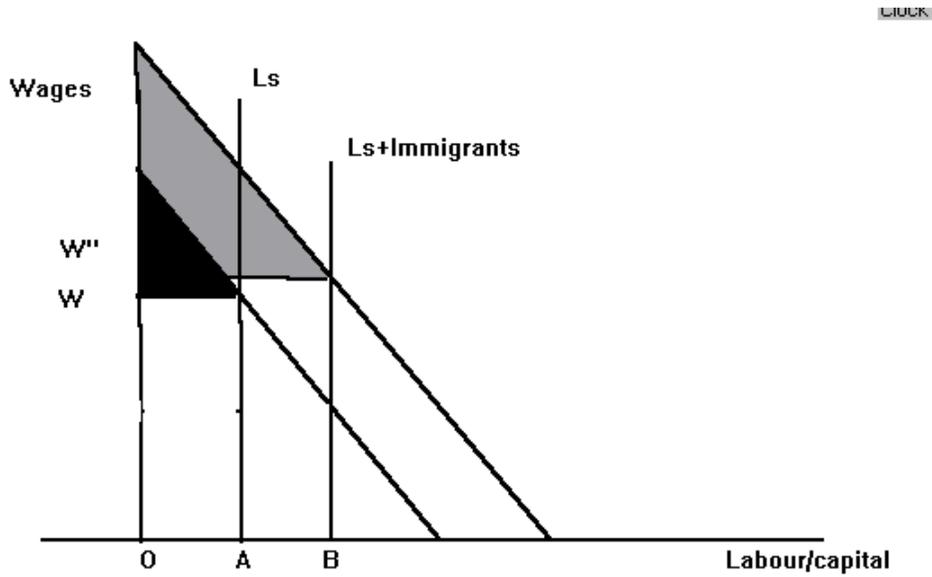


Figure 2: Dynamic Harberger Triangle with Immigration

Clearly figure 1 is a static case, if complementary capital enters the Canadian economy with the immigrant flow then figure 2 results with greater employment and higher wages and greater returns to capitalists. This would be the case of immigration inducing growth in G.D.P. and per capita income or wages.

The crucial question is what figure applies to modern day Canada with its recent high levels of immigration.

Figure 3 Canada's Historical Immigration Flows

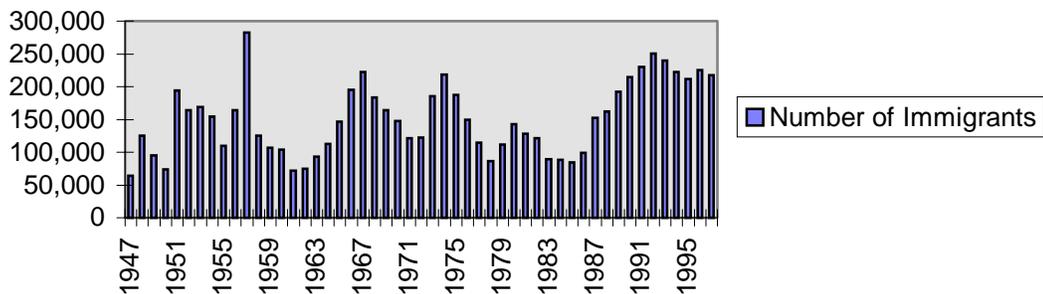


Figure 3 depicts the recent historical fluctuations in immigration levels. It is clear that Canada's modern immigration flows are subject to yearly fluctuations. The post-war yearly flows have ranged from a high of nearly

300,000 (1958) to a low 85,000 (1985). These levels partially reflect policy responses to Canada's changing macro-economic conditions. Econometric analysis has argued that these historical fluctuations were partially a response to changes in the Canadian unemployment rate (Marr and Siklos, 1995) while others argued that political considerations determined these levels (Green and Green, 1995).³ Even subject to these modern day policy restrictions, the most recent immigration inflows conform to some of Dale's historical pre-conditions for wage compression and labour displacement. The 1996 Canadian Census reveals that 85% of all immigrants - and 93% of those who arrived between 1991-96 (1.03 million) lived in a census metropolitan area. In fact, 71% of post 1991 immigrants moved to Toronto (40%), Vancouver (18%) and Montreal (13 %). The result of this rapid urban immigration has left Toronto and Vancouver with 42 % and 35% of their respective populations foreign-born in 1996. In contrast, (circa 1996) only 17% of Canada's population was foreign-born. Clearly, Dale's first condition -urbanized immigration- is being met in the modern Canadian immigration experience.

Dale's second condition, namely free trade with the United States has once again appeared with the advent of both the FTA and later NAFTA. Under the latter agreement and changes in the 1990 United States Immigration Act substantial Canadian emigration to the United States has again appeared (DeVoretz-Laryea, 1997). Could it now be possible that Dale's view of wage compression or labour displacement has again re-appeared ?

Before attempting to answer this question we must note substantial modern day differences. First, unlike Dale's historical period some present day Canadian immigrants possess substantial financial and human capital (Coulson and DeVoretz, 1993) which implies that labour markets in some regions or sectors may have gained (figure 2) while others may have experienced wage compression and labour displacement (figure 1).

Next, current Canadian immigration policy differs markedly from Dale's historical period under the 1910 Immigration Act which essentially only excluded unhealthy or criminal elements (Green, 1995). In contrast, Canada's 1976 Immigration Act and subsequent revisions has led to three separate entry categories: refugee, family class and economic with the latter consisting of entrepreneurs, investors and "points" assessed independent movers. Table 1 sets out the criteria for entry under the independent class for the "points" assessed components.

Table 1: Canada's Points System circa 1992

Category		Potential Points
	Long term	
Education		12
Age		10
Occupational Demand		10
Occupation skill		15
Experience		8
Personal Suitability		10
	Short term	
English/French		15
Arranged Employment		10
Levels Control		10
Total		100

Source: D. Green (1995) p. 338

Those who were economically assessed clearly must meet human and/or financial capital and labour market criteria.⁴ The central question remains: how frequently was this points based selection system used throughout our study period? During the 1968-1976 period or prior to the current 1978 Immigration Act the majority of principle immigrant applicants (73%) were screened via a point system for their economic suitability. In contrast, in the 1980's the majority (71 per cent) of the post-1980 immigrants were not economically assessed in the post-1978 period. During the 1980's immigrants either entered as reunited family members (53 per cent) or refugees (18 per cent). By 1995 the distribution again changed with over 50% of the newer immigrants entering via the economic class.⁵ These fluctuating policy conditions from predominately economic admissions (1967-1980) to largely family class entrants (1980's) to once again a majority of economic class entrants (post-1994) must be kept in mind when we later review the econometric literature of the late 1980's and 1990's. The supposition is that the figure 1 with its attendant labour displacement and earnings degradation would appear whenever the majority of immigrants are not economically assessed and vice-versa.

Canada's labour markets, especially for immigrants are both widely separated geographically and diverse in terms of ethnicity, source countries of immigrants and size of the resident foreign-born stock. Again, keeping in mind the Dales' paradigm we would expect less human capital and lower wages for the foreign-born population if any city met the pre-conditions for figure 1. We now turn to census information to test for these stylized facts across Canada's major recipient cities.

Table 2
Social and Economic Attributes of Vancouver's Population by Birth Status:1991

Variable	Canadian-born ^a	All Foreign-born ^b	Econ. Canadian ^c	Econ. Foreign-born ^d
Age	31.87 (21.18) ^e	43.26 (19.18)	38.95 (9.84)	42.04 (10.19)
Education	12.79 (2.87)	12.38 (4.12)	13.49 (2.69)	13.29 (3.69)
Highest Level of Schooling				
Elementary	46.6	47.0	35.9	36.4
Non-University	26.6	23.6	31.4	28.3
University	26.7	29.4	32.6	35.4
Family Size	2.94 (1.44)	2.94 (1.46)	2.57 (1.30)	3.05 (1.38)
Married	35.2	59.5	56.3	73.3
Wages and Salaries	18365.46 (21743.41)	14902.82 (20018.0)	28462.45 (22793.78)	23452.41 (21449.38)
Hours Worked	23.07 (21.01)	21.15 (21.30)	33.74 (17.77)	33.13 (18.11)
Weeks Worked	40.9 (16.14)	39.59 (16.90)	44.79 (13.13)	42.53 (14.92)
Full-Time Work	78.4	82.0	86.5	86.8
Prof. Occupation	24.2	24.0	29.5	26.5
Skilled Occup.	29.1	28.3	31.5	29.7
Low-Skilled Occupation	46.7	47.7	39.0	43.8

Source: Laryea (1997, p. 15).

^a All persons in all ages born in Canada.

^b All persons in all ages born outside Canada.

^c All persons aged 25-65 born in Canada and in the labour force.

^d All persons aged 25-65 born outside Canada and in the labour force.

^e Figures in parentheses are the standard deviations.

Table 3
Social and Economic Attributes of Toronto's Population by Birth Status:1991

Variable	Canadian-born^a	All Foreign-born^b	Econ. Canadian^c	Econ. Foreign-born^d
Age	29.30 (20.74) ^e	42.11 (18.29)	38.70 (10.44)	41.74 (10.32)
Education	13.05 (3.05)	11.97 (4.31)	13.77 (2.87)	12.85 (3.95)
Highest Level of Schooling				
Elementary	48.1	54.0	36.8	44.3
Non-University	22.1	20.9	26.5	24.9
University	29.8	25.1	36.7	30.8
Family Size	3.14 (1.42)	3.01 (1.46)	2.68 (1.30)	3.09 (1.38)
Married	33.4	60.5	59.2	73.4
Wages and Salaries	21171.89 (24500.17)	18003.51 (21686.42)	32601.61 (25590.70)	26646.88 (22400.23)
Hours Worked	24.64 (20.89)	22.90 (21.12)	35.74 (16.51)	34.09 (17.21)
Weeks Worked	42.13 (15.68)	42.12 (15.68)	46.62 (11.46)	44.62 (13.58)
Full-Time Work	33.4	86.9	89.4	91.3
Prof. Occupation	28.7	23.4	35.7	25.6
Skilled Occup.	26.4	26.4	28.2	27.5
Low-Skilled Occupation	44.8	50.2	36.1	46.9

Source: Laryea (1997, p. 16).

Notes: See Table 2.

Table 4
Social and Economic Attributes of Montreal's Population by Birth Status:1991

Variable	Canadian-born ^a	All Foreign-born ^b	Econ. Canadian ^c	Econ. Foreign-born ^d
Age	33.73 (20.93) ^e	42.73 (19.08)	39.53 (10.11)	42.10 (10.27)
Education	11.96 (3.75)	11.39 (4.74)	12.98 (3.35)	12.39 (4.47)
Highest Level of Schooling				
Elementary	56.1	55.8	46.3	46.0
Non University	21.7	17.0	23.8	19.1
University	22.2	27.2	29.9	34.9
Family Size	2.90 (1.34)	3.02 (1.50)	2.67 (1.23)	3.10 (1.41)
Married	34.4	58.1	52.4	70.5
Wages and Salaries	16279.00 (19793.12)	12808.00 (18941.54)	26260.61 (20639.23)	20812.17 (21157.92)
Hours Worked	21.31 (20.40)	19.03 (21.08)	32.95 (16.76)	31.53 (18.84)
Weeks Worked	41.51 (15.96)	39.65 (16.98)	44.95 (13.15)	41.98 (15.56)
Full-Time Work	81.5	85.9	88.0	89.8
Prof. Occupation	25.1	26.7	29.4	28.8
Skilled Occup.	28.4	24.9	30.2	25.8
Low-Skilled Occupation	46.5	48.4	40.4	45.4

Source: Laryea (1997, p. 18)

Notes: See Table 2.

A quick perusal of tables 2-4 indicates that both differences in labour market performance and attributes arise between the foreign-born and Canadian populations in each city. In Vancouver *circa* 1991 the foreign-born head of household in Vancouver is 3 years older, was more likely to be married but, worked 2.2 weeks less per year than his Canadian-born counterpart. The foreign-born head of household in Vancouver earned \$5,010 less than his Canadian-born cohort ,perhaps owing to fewer weeks worked and greater employment in low skilled occupational groups. In Toronto (table 3) and Montreal (table 4) the foreign-born populations obtain similar demographic values as in Vancouver with similar wage gaps of \$5,100 and \$5, 448 arising between the economically active foreign-born and Canadian born heads of households. Two points are clear. There is little variance in the (uncontrolled) earnings performance of immigrants across Canada's three major immigrant receiving areas. Secondly, the representative foreign-born male head of household earned 16-18 % less earnings in 1991 regardless of the destination city.

Other trends appear in the Canadian-born household data in tables 2-4. Canadian-born households are headed by individuals that are younger (3 years), less likely to be married with greater education and higher professional

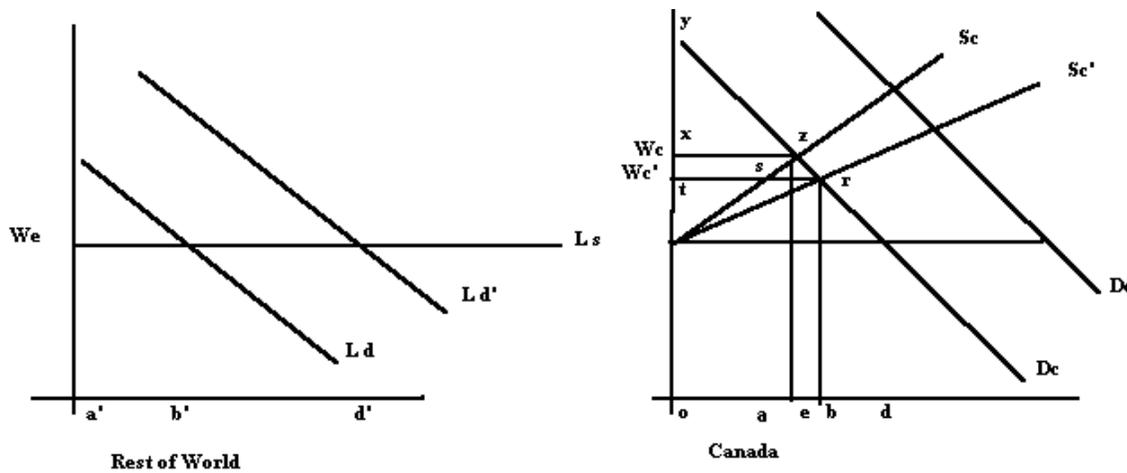
occupational status and who work two more weeks per year than their foreign-born cohort. As noted above the Canadian-born earn on average approximately \$5,000 more per household.

In sum, several of Dale's pre-conditions for employment displacement and earnings degradation appear in Canada's major urban centers circa 1991. First, the Canadian-born urban population has more human capital with greater (ie.16-18%) earnings than the foreign-born. The foreign-born earnings shortfall in turn lowered the average income in these three cities circa 1991. The major point still remains: do these conditions result in Canadian unemployment and/or earnings decline for the Canadian-born ? We now turn to these issues.

II. Labour Displacement

To analyze the displacement (or wage compression) issue, elasticities of substitution between immigrant labour and Canadian-born labour must be computed from a production function which has been specified for all relevant Canadian industries. To clarify the estimating procedure a theoretical exposition of the displacement phenomenon follows.

Figure 4: Labour Market Displacement Model



Consider an immigrant receiving country that produces a single, non-exported output, by means of two inputs, capital, and homogeneous labour. The left panel of figure 4 presents a situation in which the world supply of labour is perfectly elastic at wage rate (We).⁶ The right panel shows the labour market in the immigrant receiving country, i.e. Canada. If labour were to seek its maximum earnings, with negligible transportation and other costs, and with no institutional impediments, then, (od) workers would migrate to Canada. Thus, the

Canadian labour supply would consist entirely of the foreign born and its wage rate would fall to the world equilibrium level, or, (W_e). On the other hand, if Canada closed its borders, the wage rate in Canada would be (W_c). In addition, if independent events such as a rise in product price or increased complementary capital appeared in the economy, then these supply shifts induced by immigration could be offset by labour demand shifts. For example, with a partially open immigration policy (i.e. supply shifts to S_c') the original equilibrium wage W_c would rise to W_c with a shift in the demand curve equal to D_c' . This would result in no domestic labour displacement and a rising wage rate.

Under a more realistic scenario for Canada immigrants arrive under a binding quota of ($a_b=a_b'$) workers, thus an increase in the labour supply from (S_c) to (S_c') would result. In particular, this restraint on immigration appears appropriate for Canada after 1978 (Akbar and DeVoretz 1992). Now this limited increase in immigration, (a_b), would have two important labour market consequences. First, the domestic wage rate would fall to (W_c'), and total employment would rise from (o_e) to (o_b). However, domestic employment declines from (o_e) to (o_a). Thus, immigrants displace domestic workers by the amount (a_e). Second, when the wage rate falls from (W_c) to (W_c'), labour earnings change from (o_xz_e) to ($o_t_r_b$), of which ($o_t_s_a$) accrues to Canadian-born workers and ($a_s_r_b$) to immigrants. The earnings of Canadian-born workers have fallen from (o_xz_e) to ($o_t_s_a$). On the other hand, returns to non-labour inputs or capital, have risen from (x_y_z) to (t_y_r). Hence, in this intermediate case Canadian capital owners benefit from immigration, while others, native-born labour, are injured. Finally, the existing wage differential of ($W_c'-W_e$), relative to the immigrant's opportunity cost is no doubt, substantial. Given such a substantial wage differential, a queue would form with immigrant applications exceeding yearly available slots.

The actual wage and employment changes resulting from any immigration flow depend upon the domestic elasticities of labour demand and supply, the magnitude of the quota, and other assumptions implicitly embedded in figure 4. For example, the more inelastic the demand and supply relationships, the greater will be the reduction of domestic wages due to any given amount of immigration. Moreover, the displacement effect will be greater, the more elastic is the labour supply and the less elastic is labour demand. We offer the following production function to estimate the relevant cross elasticities for modern day Canada.

$$Y_i = f(K_i, N_i, B_i, D_i) \tag{1}$$

where:

Y_i = Value added in industry i . K_i = Capital stock in industry i .

E_i = Employed labour in industry i aged 15 years and over who were born in Canada.

B_i = Employed labour in industry i aged 15 years and over who were born abroad and migrated Canada prior to 1981.

D_i = Employed labour in industry i aged 15 years and over who were born abroad and migrated to Canada after 1981.

The above production function was estimated in translog form for 125 Canadian manufacturing and non-manufacturing industries using 1986 data (DeVoretz, 1989). In terms of employment these, 125 industrial groupings represent approximately 93 per cent of the Canadian labour force circa 1985.

Table 5
Elasticities of Factor Complementarities: 1986
107 Industries

Elasticity	Value	Std. Error	t-value ^a
Between native-born - earlier immigrants (Cn,b)	-0.97	.48	-0.47
Between native-born - recent immigrants (Cn,d)	-0.96	1.05	1.01
Between native-born - capital (Cn,k)	0.91	1.02	1.93**
Between recent immigrants - capital (Cd,k)	1.03	0.97	1.00
Between earlier - recent immigrants (Cb,d)	1.18	.39	0.47

Notes:

a) A single asterisk indicates significance at the .05 level of significance.

Source: DeVoretz (1989)

Table 5 reports the estimated elasticities of Complementarity. For convenience, pre-1981 immigrants are termed earlier immigrants, and those arriving later termed recent immigrants. This distinction between immigrant vintages is an attempt to explicitly recognize the hypothesis that the two immigrant pools are drawn from different populations. It is observed from Table 5 that the elasticities of substitution between Canadian-born workers and earlier immigrants as well as between Canadian-born workers and recent immigrants are negative. This negative elasticity value implies that immigrant labour substitutes for Canadian-born labour. However, the corresponding t-values indicate that the elasticity coefficients are not statistically significant at the .05 level. Hence, the hypothesis that there is no displacement of Canadian-born workers by immigrants can be accepted for both the earlier and recent immigrant flows. Furthermore, it is also important to note that both the earlier and recent immigrants' affect the employment of Canadian-born to the same extent (the elasticity values are identical). Hence, the hypotheses that the pre and post-1981 immigrant pool have differential substitution effects with respect to the Canadian-born labour force must be rejected. Thus, circa 1986 there is no evidence to support the Dales' displacement hypothesis at least for the entire economy.

FOREIGN-BORN INTENSIVE INDUSTRIES

Critics are quick to note that Dales' hypothesis applies to individual industries which contain a high concentration of immigrants. The most obvious tactic to detect any significant substitution effect is to select those industries with a high concentration of foreign-born under the supposition that more foreign-born in the labour force would cause more substitution. A highly concentrated foreign-born industry is defined as any 3 digit S.I.C. industry group with a greater than 23 per cent foreign-born labour force since this is one standard deviation greater than the average.

Several features of these selected industries are important to note. First, although many of the selected 59 industries are characterized by an unskilled labour force using labour intensive techniques (e.g., bakeries, clothing, and food processing) many groupings are highly skilled (e.g. Universities, machine shops, metal stamping.) Thus,

no generalization appears a priori for this sub-set of industries other than the pre-selected degree of concentration of foreign-born workers. Why a heavy concentration of foreign-born workers in this bizarre set of industries would cause displacement is open to speculation. One implicit hypothesis is that the job vacancy criteria under the 1978 Immigration Act may have been inappropriately applied (DeVoretz 1995) or that members of the family reunification class entered some or all of these foreign-born labour intensive industries.

Table 6
Elasticities of Factor Complementary: Above Average
Foreign-born Intensive Industries: 1986

Elasticity between:	Value	Std. Error	t-value ^a
Canadian-born - Earlier Immigrants (Cn,b)	-.67	9.2	-6.3
Canadian-born - recent Immigrants (Cn,d)	-.63	1.5	.97
Canadian-born - Capital (Cn,k)	.79	.92	.73
Recent Immigrants - Capital (Cd,k)	2.2	.68	1.51
Earlier Immigrants - Recent Immigrants (Cb,d)	.23	2.0	.46

Notes: a) A single asterisk indicates significance at the .05 level of significance.
Source: (DeVoretz, 1989)

Table 6 reports the calculated elasticities of complementarity and associated test statistics for the foreign-born intensive industrial groupings. One result is obvious. Now, in these industries both recent and earlier immigrants are significant substitutes for Canadian-born labour and the Dales' hypothesis holds. However, capital is still not a significant complementary input to either recent or earlier immigrants. Finally, old and more recent immigrants are not substitutes for one another. These findings are in sharp contrast to the Canadian economy-wide results reported in Table 5.

Given the above results the actual degree of displacement between Canadian-born and foreign -born workers can be calculated for this subset of 59 foreign-born intensive industries. For example, in the meat and poultry, clothing, and University industry groups the absolute marginal displacement of Canadian-born workers for each one-per cent rise in their immigrant labour force is respectively; 214, 582, 268 Canadian-born.

Clearly, the degree of displacement depends directly upon the labour intensive nature of the industry and the absolute number of Canadian-born workers in the industry. In general, across the pre-selected 59 industries a one per-cent rise in foreign-born labour would have reduced Canadian-born employment circa 1980 by 2,543 workers.

This section posed one central question 'Do immigrants displace Canadian-born workers?. First, economy-wide there is no modern evidence circa 1986 that the post-war stock of immigrants significantly displaced Canadian-born workers. In addition, this lack of substitution was invariant to date of arrival. Also, economy-wide, immigrants did not require a significant amount of physical capital upon entry while an expansion of the Canadian-born labour force did. This lack of economy-wide capital Complementarity for immigrants, we

believe, was a result of the on average high human capital content embedded in Canadian immigrants upon arrival circa 1967 to the 1990's. (Coulson and DeVoretz, 1993).

However, in the foreign labour intensive industries, significant labour substitution occurred between the foreign-born and Canadian born. A combination of factors, including a greater than average foreign labour content, and a large share of value added attributed to physical capital led to labour displacement in this sector. Equally important, under these conditions it is found that in this foreign intensive sub-sector, recent immigrants required a significant increase in physical capital. Moreover, the foreign intensive industrial sub-group does not conform to the stereotypical view of immigrant entry level industries. In fact, these industries include firms which use unskilled labour intensively, and other firms, which use highly skilled human capital intensively. These two types of immigrant streams reflect the two broad components of the overall immigrant flows which resulted from the post-1967 policy regimes. Immigrant policies after 1967 simultaneously selected immigrants with a greater level of human capital (1967-73) while later policies (post 1978) expanded the family reunification class reducing human capital (Coulson and DeVoretz 1993). This indicates the inherent policy dilemma of attempting to simultaneously achieve humanitarian and economic goals and avoid labour displacement.

Other Macro Studies of Labour Market Impacts

The results obtained by Akbari and DeVoretz (1992), which addressed the issue of job displacement in the early 1980s in Canada, were cross-sectional tests i.e. snapshots. The question still remains if there is historical relationship between immigration levels and unemployment rates. Specifically, are higher contemporary immigration levels followed by higher unemployment rates, and do governments reduce immigration levels after a bout of high unemployment. Furthermore, has either relationship changed during the modern era of immigration. Siklos and Marr (1995) employing cointegration analysis, provided a series of tests to capture the macroeconomic relationship between unemployment and immigration for the period 1926 to 1993. They concluded that immigration levels and unemployment rates were negatively related. That is, increases in unemployment are associated with a subsequent reduction in immigration levels, and this inverse relationship was more pronounced for the post 1946 period vis-à-vis the entire 1926-93 era.

Furthermore, disaggregating the data by immigrant country of origin, Siklos and Marr (1995) discovered that Asian immigration levels declined more after a rise in unemployment rates, compared to other source countries such as Europe and the United States.

The policy conclusions from these results obtained by Siklos and Marr is that Canada's tap-on tap-off policy aimed at controlling the immigration-unemployment trade-off may is not an optimal strategy. This is because the policy focuses on gross immigration flows. Furthermore, Canada has large regional variations in unemployment rates and structural differences across labour markets, which confound the simple tap-on tap-off policy. The policy should

rather focus on or curtail the independent class immigrants (i.e. the ones endowed with the human capital skills and thus more likely to enter the labour force).

III. Wage Compression

Figure 2 indicates that in addition to labor displacement, immigration can lead to higher or lower wages for the resident labor force. For example, two mutually exclusive outcomes for wage and labor displacement appear in figure 2. First, immigration under an expanding labor demand curve leads to greater native-born wages and employment due to the accompanying complementary human capital in the migration flow. In the opposite case both earnings degradation and labor displacement occur in the native-born labor force if immigrants have little complementary human capital. We now turn to the econometric results which sort through these wage outcomes.

Most existing studies on the effects of immigration on wages, for example Grossman (1982), Lalonde and Topel (1991), Altonji and Card (1991), and Roy (1997), rely on variations in immigration levels across cities or Census Metropolitan Areas (CMA's) to identify the consequent change in relative wages of immigrants and the native-born. Friedberg and Hunt (1995) refer to this approach as cross-section differencing. A problem with cross-section differencing is that, in the presence of free trade within the recipient country and coupled with capital or labour mobility the result may be factor price equalization. Thus an uneven distribution of immigrants across the country may not result (in the long run) in cross-section wage differences, since wages may be equalized by flows in goods or factors. Secondly, because immigrants are likely to be the most mobile of workers as Newbold (1996) has established for Canada, they will probably move to those regions whose demand shocks have led to higher wages. Thus, an endogeneity problem ensues, prompting a naïve econometrician to possibly conclude that greater immigrant densities will lead to higher wages.

To overcome these shortcomings, Laryea (1997) employs an age-cohort technique, developed by Suen (1994) to estimate the effects of immigration on wages. This approach estimates a two-stage Constant Elasticity of Substitution (CES) model that aggregates immigrant groups by age cohorts and aggregate cohorts into effective labour, which is used to study the substitution relationships between age cohorts and between immigrant groups. One advantage of this immigrant cohort size approach is that immigrant age cohorts are not mobile at any one point in time.

Laryea (1997) estimated the following reduced form equations from an aggregated two-staged CES production function. The equation estimated in the first stage is summarized as follows:

$$\log w_{ijk} = \alpha + X_{ijk} \gamma + \beta_j + (\rho_2 - 1) \log N_{jk} \quad (2)$$

In the second stage of the estimation procedure the following equation was estimated:

$$\log w_{ijk} = \alpha + X_{ijk} \gamma + (\rho_1 - \rho_2) \log M_j + (\rho_2 - 1) \log N_{jk} \quad (3)$$

where

w_{ijk} = wage rate of individual i in age cohort j and immigrant group k .

X_{ijk} = an array of demographic characteristics (e.g. education, experience, marital status etc).

γ, ρ_1, ρ_2 = vector of parameters to be estimated.

M_j = Labour supply from age cohort j .

N_{jk} = Number of workers from immigrant group k in age cohort j .

The above equations were estimated by Laryea (1997) using data from the public use sample tape of individual records from the 1991 Canadian census. The sample was further classified in eight five-year cohorts ranging from the 25-29 year-old age group to the 60-64 year-old age cohort. Individuals were also classified into four groups based on birth status. These are: (1) Canadians, (2) early immigrants (those who immigrated to Canada before 1970), middle immigrants (those who immigrated between 1971 and 1980), and recent immigrants (those who immigrated to Canada after 1981). The raw count of the number of persons in these 8 x 4 subgroups gives the variable N_{jk} used in the wage model.

After the initial base runs, Laryea (1997) also conducted a simulation exercise involving a 20% increase in the number of recent immigrants to ascertain the impact on wages. The results are summarized in the table below:

Table 7: The Impact of a 20% Increase in the Stock of Recent Immigrants on Wages

	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Native-Born	-.079%	-.047%	-.076%	-.102%	-.085%	-.070%	-.047%	-.037%
Early Immig.	-.079%	-.047%	-.076%	-.102%	-.085%	-.070%	-.047%	-.037%
Recent Immig.	-.086%	-.069%	-.095%	-.120%	-.103%	-.088%	-.066%	-.056%

Source: Laryea (1997).

The results show that the wage impacts of a 20% increase in recent immigration levels on the native-born and other immigrant vintages are minimal. The wage decreases associated with this hypothetical inflow is no more than 1%, ranging from -0.037% for the native born and early immigrants in the 60-64 year-old age cohort, to a high of -0.102% for recent immigrants in the 40-44 year-old age cohort. Part of the reason why these wage impacts are so small can be attributed to the relatively small percentages of immigrants making up the total labour force. For example, recent immigrants constitute only 3.8% of the effective labour supply of the 40-44 year-old age cohort, which in turn make up 18.9% of the effective aggregate labour supply. Thus economy wide it appears that the wage impacts of immigration flows are minimal and have no adverse impacts on Canadian labour markets. We conclude again that Dales' wage compression thesis does not hold in modern day Canada- at least economy-wide.

Wage Impacts by Industries: A Panel Analysis

The absence of significant wage impacts of immigration flows economy-wide can mask the potential outcomes in the various industries in the economy where once again Dales' thesis may hold. Estimating wage impacts across industries are also very important because certain industries serve as entry points for immigrants, and immigrants can potentially suppress wages of native-born workers in those industries. (See Seward and Tremblay, 1989).

Laryea (1997) estimated the following random effects model to examine the impact of foreign-born labour on native-born wages by industry:

$$w_{it} = \alpha + \beta' X_{it} + \varepsilon_{it} + u_i \quad (4)$$

where

w_{it} = hourly wage rate of native-born worker i in year t .

X_{it} = Set of exogenous variables including the proportion of foreign-born workers in various industries between 1988 and 1990.

ε_{it} = Traditional error term unique to each observation.

u_i = error term representing the extent to which the intercept of the i th cross-sectional unit differs from the overall intercept.

The above model was estimated using panel data from the 1988-1990 Labour Market Activity Survey (LMAS). The model was estimated for the total sample and then by gender to address the outstanding literature, which suggests that females in particular may suffer a double negative effect as a result of their foreign birth status and gender (See Beach and Worswick, 1993). Laryea (1997) shows that looking at the total sample, and then the male and female sub-samples separately, immigration had a positive impact on the wages of Canadians. The estimated wage elasticities suggest that a 1% increase in the overall share of foreign-born labour results in a 1.1%, 1.3% and 1.4% increase in wages for all Canadians, Canadian males and Canadian females respectively. However, when the data was disaggregated by industry, wage suppression was detected in the primary, transportation and storage, and retail and wholesale trade industries. This finding was detected in all 3 samples. The elasticities ranged from a low of 0.6% in the primary industries for the female sample, to a high of 5.9% in the transportation and storage industries for the male sample. Again, Dales' hypothesis of now wage compression is found to hold within a limited part of the Canadian economy.

IV. Brain Drain

As noted earlier Dale's argued that a third labour market adjustment was open to Canadians who felt the impact of immigration, namely movement to the USA. In fact, Canada has experienced periodic large scale movements of especially the highly trained to the United States. If figure 1 holds for an industry or region in Canada then increased immigration in the absence of a complementary capital inflow will lead to one of three possible outcomes for the resident labour force under contemporary conditions. Two outcomes have been noted above namely labour displacement (unemployment) or wage compression. Obviously emigration of displaced or discouraged Canadian resident workers is the third possibility in times of open borders (Dales). Two contemporary periods of emigration to the United States have occurred in the post-war period. Parai (1965) documented the pre-1965 movement to the USA. For the 1980's thru the 1990's DeVoretz and Laryea (1997) describe the modern

movement of Canadians to the USA. We concentrate on describing the latter flow to highlight the combined effect of trade, immigration and emigration in a North American regional setting.

Table 8 below summarizes the trends in the post-1980 Canadian emigration flows to the United States. For the pre-FTA period, or 1982-89, the gross permanent Canadian flows to the United States were 13,940 professionals and 7,883 managerial workers. In addition, in the less-than-B.A.-trained category of movers, 2,951 skilled workers and 8,104 unskilled workers emigrated to the United States between 1982-89.

Table 8
Canadian Emigration to the United States by Occupational Groups (1982-1995)

<i>Year</i>	<i>Professionals</i>	<i>Managerial</i>	<i>Skilled^a</i>	<i>Unskilled^b</i>
1982	1,690	831	264	664
1983	1,627	914	343	900
1984	1,628	996	368	933
1985	1,757	928	378	1,097
1986	1,751	971	336	1,127
1987	1,848	1,122	383	1,143
1988	1,867	934	380	1,111
1989	1,772	1,187	499	1,129
1990	2,493	1,751	752	3,571
1991	2,080	1,327	539	2,709
1992	2,384	1,853	322	2,082
1993	2,916	2,022	318	2,092
1994	2,929	1,861	262	1,798
1995	2,440	1,415	176	1,512
1982-1989^c	13,940	7,883	2,951	8,104
1990-1995^c	15,242	10,229	2,369	13,764

Source: U.S. Immigration and Naturalization Service, Demographic Statistics Branch, Statistical Yearbooks, passim 1983-96

Notes:

- a. These include workers in precision production, craft and repair occupations.
- b. These include operators, fabricators, labourers, sales, administrative support, farming, forestry, fishing and service occupations.
- c. Represents cumulative total flows for the respective years.

The corresponding immigrant numbers by skilled category for the shorter post NAFTA 1990-95 period are 15,242 professionals, 10,229 managers, and 2,369 and 13,764 skilled and unskilled movers respectively. Comparing 1982-89 to post-FTA 1990-1995, one observes a significant increase in the gross flow of Canadians to the United States in all categories but the skilled occupations. The professional occupations recorded an increase of about 9.3 percent. The growth rates for emigration flows in the managerial and unskilled occupations grew by 29.8 percent and 69.8 percent respectively after 1989. On the other hand, the skilled occupations experienced a decrease of almost 19.7 percent between the periods. Two other perspectives are available to put this outflow in context. First, DeVoretz and Laryea (1997) have estimated the Canadian taxpayer subsidy inherent in the post 1982 outflow of Canadians to the USA as \$9.1 billion (1993) or the equivalent of one major Canadian university operating solely to provide the USA graduates for this outflow. Secondly, this outflow can be described in terms of

the ratio of Canadian graduates to the Canadian emigrant outflow to the USA. In the 1991-93 period approximately 14 % of Canada's highly trained graduates emigrated to the USA (DeVoretz and Laryea, 1997). For the nursing and managerial occupations in particular the ratios emigrants to graduates were 19 and 40 percent respectively. This trans border movement of course is part of world-wide flow with Canada receiving a substantial gross human capital inflow (\$42.8 billion 1993) in the 1980's (Coulson and DeVoretz, 1993) from the rest of the world. No doubt for the post 1982 period Canada is a net recipient of educated immigrants however, this inflow occurs in the context of a substantial outflow to the USA as predicted by Dales.

Conclusion

Does Dale's gloomy thesis of wage compression, labour displacement and emigration hold for modern free trading Canada ? For limited sectors and types of human capital a portion of each aspect of Dales' thesis holds. In 59 out of 125 industries labour displacement was significant while in a fewer set of specific industries wage compression appeared. Finally, emigration to the United States in some highly trained professions has re-appeared in the midst of large scale immigration inflows,

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¹ . Given a neo-classical production function with no accompanying capital or technical change recent immigrants to Canada would lead to unemployment or lower wages or both for the resident stock of labour.

² Several Canadian studies in this historical period either depict immigrants as having little permanent impact (Pope) or as causing a substantial negative effect (Dales) on wages and jobs or actually impeding growth (Chambers and Gordon) through raising wages. No consensus has yet been reached on these conflicting interpretations of the role of early twentieth century Canadian immigration in the development process. However, a choice of any of these historical views ultimately leaves an intellectual legacy which depicts the economic impact of fin d'sicle Canadian immigration as negative or trivial.

³ Marr and Siklos argue that for the post-war period that immigration levels reacted inversely to prior unemployment levels. They find limited evidence for two way Granger causality and dismiss the possibility of immigration levels affecting Canadian unemployment.

⁴ Entrepreneurs and investors did not have to accumulate points but were required to provide employment and/or a minimum amount of capital (\$250,000-\$350,000).

⁵ . It should be noted that the economic category includes the principle applicants immediate family members.

⁶ Perfect elasticity implies that within a relevant range all the labour demanded will be supplied at the prevailing wage W_e .

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