# Canadian Regional Labour Market Evolutions: A Long-Run Restrictions SVAR Analysis

**Abstract:** Canada's high reliance on commodities can work against its constitutionally mandated goal of regional equity in economic development, while also inhibiting macroeconomic performance and limiting monetary policy effectiveness. Yet, flexible and integrated regional labour markets can help achieve both equity and macroeconomic goals. Therefore, this study examines the dynamics of Canadian provincial labour markets using a long-run restrictions structural vector autoregression (SVAR) model. Labour market fluctuations are decomposed into the parts arising from shocks to labour demand (new jobs), labour supply through migration (new people), and internal labour supply (original residents). The results suggest that demand innovations primarily underlie provincial labour market fluctuations. Despite significant geographic and language barriers that could impede their performance, there also is little overall evidence to suggest that provincial labour markets are more sluggish or less flexible than U.S. state labour markets. Finally, original residents benefit slightly more from increased provincial labour demand compared to findings for U.S. states.

## 1. Introduction

The Canadian national labour market may in some sense be a misnomer. It might be better described as a collection of very distinct regional labour markets—e.g., Atlantic Canada, Québec, Ontario, the Prairies, and British Columbia. Like other advanced economies, differing industry compositions and sub-national governments distinguish Canada's regional labour markets. Compared to the United States, Canadian regional labour markets are separated both by greater distance and language.

Thus, economists have long questioned whether the diverse Canadian labour market is integrated (Courchene, 1970, Courchene and Harris, 2000; Emery and Levitt, 2002; Coe and Emery, 2004). The importance of this issue is heightened by the nation's dependence on commodities and goods production, which due to differing regional specializations, likely increases regional asymmetries and overall volatility. Yet wage adjustments and migration could promote regional integration and increase macroeconomic stability.

The inhibiting effect of distance on regional labour market flexibility reflects the core-periphery nature of Canada's economic geography. For example, the peripheral Prairie labour market is separated by vast distance from the core southern Ontario labour market—its nearest substantive labour market to the east. Likewise, the Québec labour market assumes some peripheral characteristics because of language. Perhaps because of these vast differences, there is tremendous concern for regional equity as exemplified by a constitutional obligation for the federal government to provide equalization payments to "have not" provinces, complemented by a range of programs to encourage regional development.

Questions of labour market flexibility and the degree of national integration have become paramount as NAFTA has hastened economic integration with the U.S., strengthening north-south continental links rather than east-west inter-provincial links (Courchene and Harris, 2000). The flexibility of regional labour markets is also a key factor in deciding whether Canada should maintain an independent currency or seek a currency union with its North American neighbors (McKinnon, 1963; Mundell, 1961; Courchene and Harris, 2000; Beine and Coulombe, 2003). If migration is inadequate in smoothing asymmetric regional demand shocks, a stronger argument could be made in support a North American currency union (Obstfeld and Peri, 1998; Partridge and Rickman, 2005).

Given the importance of labour market flexibility in relation to regional equity, macroeconomic

performance, and increasing economic integration with the U.S., this study assesses Canadian provincial labour market dynamics. We employ a structural vector autoregression (SVAR) model with long-run identifying restrictions akin to Blanchard and Quah (1989) and Galí (1999). The SVAR model allows us to separate regional labour demand shocks that increase employment (and ultimately population) from labour supply shocks, including those associated with an increase in the number of people (and in turn, jobs) (Partridge and Rickman, 2003; 2006).

Several questions are addressed with provincial-level SVAR models. First, we explore whether fluctuations in provincial employment result more from firms creating new jobs (i.e., positive labour demand shocks) or from people creating new jobs through migration (i.e., labour supply shocks). The jobs versus people debate forms the core of regional labour-market analysis and has implications for whether economic development policies should focus on job creation (productivity/labour demand) or quality of life (attracting people). We then explore the degree to which fluctuations in provincial net migration arise from labour demand versus labour supply innovations. If migration flows are primarily in response to regional demand shocks, then migration serves to equilibrate regional labour markets, enhancing macroeconomic stability. If instead, the flows are due to changes in preferences towards amenities and quality of life, migration could be a source of regional asymmetries (Partridge and Rickman, 2006). We then assess how fast provincial labour markets adjust to asymmetric shocks.

Finally, to help appraise the effectiveness of the myriad of regional economic development programs, we examine whether original residents or new residents take the newly created jobs in response to a demand shock. If migrants take the new jobs, then one would question whether development policies are fulfilling their goals. In all of this analysis, we compare Canadian responses to the U.S. case. The U.S. is a typical standard of a flexible *laissez-faire* labour market with large migration flows and rapid adjustments that enhance macroeconomic performance (e.g., Siebert, 1997; Partridge and Rickman, 2005), providing an excellent benchmark to appraise the disparate Canadian regional labour markets.

The results suggest there is tremendous heterogeneity among regional labour markets with Atlantic Canada and Québec at one pole, western Canada at the other pole, and Ontario in between. Generally, we find that fluctuations in provincial employment and migration are caused more by innovations in labour demand (jobs) than innovations in migration (people). The latter result suggests that compared to the

U.S., migration in Canada is less a source of shocks, and more a response to regionally asymmetric demand shocks, enhancing macroeconomic stability. Moreover, we find that provincial labour markets adjust faster than U.S. states. In summary, there is little evidence that provincial labour markets are less flexible than their state counterparts. Finally, we find that about one-third of newly created jobs in a province are taken by their original residents in response to a demand shock, leaving some scope for economic development efforts. Yet, we detect considerable variability with migrants taking almost all demand-induced jobs in Atlantic Canada, while taking fewer jobs in Ontario and British Columbia.

**2. Modeling Canadian Provincial Labour Market Fluctuations**

To provide more background on Canadian labour markets, long-run trends and fluctuations in 1976-2003 provincial employment are shown in Figures 1-3. They illustrate the provincial shares of total national employment, benchmarked to the province's average over the 28-year span (=100). Newfoundland, Prince Edward Island, Nova Scotia, and New Brunswick represent the Atlantic Provinces shown in Figure 1. Figure 2 displays Québec and Ontario, while Figure 3 presents Manitoba, Saskatchewan, Alberta, and British Columbia.

As shown in Figure 1, among the Atlantic Provinces, only Prince Edward Island had an employment share in 2003 above its mean for the 1976 to 2003 period. Québec experienced a dramatic decline in its long-run employment share (Figure 2), while Ontario's employment share finished 2003 above its mean for the sample period. Among the remaining provinces (Figure 3), Manitoba and Saskatchewan experienced dramatic declines, while Alberta and British Columbia experienced robust increases.

In addition to the long-run patterns of growth and decline, there were also substantial fluctuations in the employment shares. Descriptive statistics of the annual rates of change in employment shares appear in Table 1. The means in column 1 confirm the long-run growth patterns shown in Figures 1-3. Column 2, however, shows that the largest fluctuations in annual changes occurred in Alberta, Newfoundland, British Columbia, Prince Edward Island, and Saskatchewan. The smallest fluctuations occurred in Ontario and Québec, which is likely partly attributable to their economies being more diversified.[1]

[1]Their lower volatility is also likely partly attributable to their large employment shares. For example, because of its economic size, a large percentage increase in Ontario employment has a significant effect on the Canadian total, which dampens the increase in Ontario's employment share. We account for this effect in later analysis.

Table 2 contains correlation coefficients for the annual rates of change in provincial employment shares. High correlations imply that particular provinces are economically synchronized. The correlations of relative employment share changes are smaller than they are for changes in employment levels because the common cycle has implicitly been removed in calculating the shares (Partridge and Rickman, 2005). Overall, 20 of the 45 correlations are positive, but only four are equal to 0.30 or higher. Saskatchewan and Manitoba are the most positively correlated. Ontario and British Columbia are most negatively correlated, whereas Ontario and Québec are also slightly negatively correlated. Both Ontario and Québec are very negatively correlated with Alberta, consistent with Storer's (1996) assumption that the own-provincial business cycles of Alberta and central Canada are asymmetric. In general, most provinces do not appear to be highly synchronized with their neighbors.

Fluctuations in the employment shares can occur because of provincially asymmetric shocks or asymmetric responses to national and provincial shocks (Røisland, 2005). Asymmetric shocks can originate from either the demand or supply side of the labour market. Below we provide an approach for disentangling the sources of provincial labour market fluctuations.

The theoretical model follows that implemented by Partridge and Rickman (2003; 2006) in their analyses of U.S. state labour market fluctuations. The labour market variables of interest are employment, migration, and wages. The approach separates provincial short-run innovations in these variables from persistent long-run trends. Short-run innovations in each variable are then disentangled into demand, migration, and internal supply shocks. However, structural identification of the innovations requires imposition of theoretical restrictions. Key features of the model follow below.[2]

*Regional Labour Demand*

Provincial firms produce goods and services for sale in local, national and international markets. Changes in demand for the province's output shift labour demand. Following convention, we assume constant returns to scale (CRS) in long-run production (Blanchard and Katz, 1992; Balmaseda et al., 2000). An implication of the long-run CRS assumption is that innovations in labour supply have no long-run effect on wage levels (Gamber and Joutz, 1993; Gali, 1999).[3] Only permanent productivity shifts

[2]More formal presentations can be found in Partridge and Rickman (2003; 2006).

[3]Empirical studies suggest that the CRS assumption accurately approximates reality. Ciccone and Hall (1996) found only modest agglomeration economies for the U.S. Equivalently, in response to population growth, congestion and rising land costs can offset agglomeration effects to approximate CRS (Blanchard and Katz, 1992).

(Gali, 1999) or permanent shifts in the region's terms of trade are assumed to have long-run effects on the provincial wage rate. Consistent with this assumption, Partridge and Rickman (1999) report that productivity changes were associated with shifts in U.S. state labour demand in the 1980s and 1990s. Likewise, Partridge and Rickman (2006) found U.S. demand shocks identified with this approach to be correlated with exogenous demand shifts.[4] Standard assumptions of perfect long-run mobility of capital and labour implies a constant capital/labour ratio in the long run to equalize real returns to capital across the country. *Short-run* deviations from the CRS assumption can occur because of sluggish labour-force participation and migration responses by households, and capital adjustment by firms.

Numerous factors can underlie innovations in regional labour demand. Sector specific shocks at the national level, such as those in agriculture, energy, and manufacturing, combined with differences in provincial composition of industries, can produce demand-induced relative changes in employment shares. Altonji and Ham (1990) estimated that 30 percent of provincial employment variation from Canadian sources was attributable to sectoral shocks. Additional productivity shifts can occur if there are shocks to physical capital, public capital, provincial taxes, and human capital.

Labour demand adjustments occur through intra/inter-provincial adjustments by firms. As a result of the CRS assumption, the long-run regional aggregate labour demand curve is perfectly elastic. Given the intra-nation mobility of firms and capital, a province's short-run labour demand curve is likely to be more elastic than the corresponding aggregate Canadian labour-demand curve. During short-run disequilibrium, the short-run curve shifts along the long-run curve until the wage rate consistent with the underlying level of productivity prevails–i.e., at the point where the short-run and long-run labor demand curves intersect. A long-run shift in labour productivity (or long-term shift in the region's terms of trade) produces a parallel upward move in the short- and long-run labour demand curves. Yet, determination of labour market equilibrium requires adding labour supply.

*Regional Labour Supply*

A region's labour supply is comprised of the original-resident labour force plus net labour-force migration. Current and past wage levels affect short- and medium-term flows as potential migrants weigh

[4] The exogenous labor demand measure was the state employment growth rate that would occur if all sectors in the state grew at their respective national averages, which is a common exogenous measure of demand shifts (Blanchard and Katz, 1992). This growth is larger the greater the composition of nationally-fast growing sectors in the state.

utility differentials (including amenities). Similarly, current and past job growth provides potential migrants with signals as to expected employment opportunities. Past migration affects current migration not only indirectly through affecting past job growth, but also through factors such as chain-migration and return migration.

Several potential sources of exogenous innovations to migration exist. For one, there can be short-run fluctuations in the demand for amenities (Graves and Mueser, 1993). Such innovations can result from technological changes (Rappaport, 2004), which could include improvements in automobile performance in inclement weather. Other changes can include shifts in the age composition of the labour force, and changes in provincial foreign immigration patterns, including any offsetting migration by natives (Borjas et al., 1996). Since the demand for amenities can fluctuate, such as with changes in income and wealth (Graves and Mueser, 1993), positive migration shocks may occur in provinces with more amenable climates such as British Columbia.[5] Policy changes at the provincial level can induce migration innovations such as those related to government taxes and expenditures, or the political success of the separatist movement in Québec during the 1970s (Polèse and Shearmur, 2004). Finally, other potential sources of migration innovations are demand and supply innovations in nearby provinces. A decline in demand in one province that produces net out-migration can produce a relatively positive migration supply shock in the region where the migrants disproportionately relocate.

In a similar fashion as migrants, innovations in internal labour supply can occur. Changes in union density and demographic shifts such as youth and female shares of the population (Fortin et al., 2001) can cause internal labour supply innovations. Policy changes that underlie internal labour supply innovations include changes in the provision of employment insurance (EI) benefits (Lee and Coulombe, 1995). The lower employment/population rates associated with generous social welfare programs, such as the EI program, mean that changes in program parameters affect a larger pool of nonemployed people who are marginally attached to the labour market and can more readily enter and exit employment.[6]

[5]Long-term migration trends can emerge if demand for amenities increase as wealth and income increase, (Mueser and Graves, 1995; Rappaport, 2004).

[6]There is a large literature demonstrating that EI has had an important impact on Canadian labour market behavior especially after the program was liberalized in 1971 (Card and Riddell, 1993; Lemieux and MacLeod, 2000). The EI program has historically been more generous in sub-provincial regions with higher unemployment rates both in terms that it takes fewer weeks of employment to qualify for EI and benefits can last much longer. With the higher unemployment rates in Québec and Atlantic Canada, EI is more likely to affect their labour supply behavior. For details of the current stringency of EI and the role of regional unemployment rates, see Human Resources and Skills Development Canada Program Characteristics

The long-run labour supply curve is more elastic primarily because of a delayed migration response to changes in the region's economic conditions. Given information lags and liquidity constraints faced by potential migrants in other regions (e.g., moving costs), the response of the original-resident labour force will most likely be faster than the corresponding migration response. A *long-run* shift in the region's labour supply produces a parallel shift in both the short-run and long-run supply curves. Yet, because of the horizontal long-run labour demand curve, supply shifts have no long-run effect on wage rates.

**3. Empirical Model**

The theoretical model discussed above implies that wages, employment, and migration are simultaneously determined. Since net migration is implicitly a provincial measure relative to the nation, we define employment and wage rates relative to the nation. In addition, net migration is defined as a share of the population, which then represents the rate of population change attributable to net migration; thus, employment and wage rates are likewise defined as rates of change.

An outward shift ─ i.e., a positive innovation ─ in demand increases wage rates and employment, which stimulates migration as the economy moves along the long-run aggregate supply curve. Yet, migration innovations, represented as shifts in supply, reduce wage rates in the short run as the economy moves along the short-run labour demand curve (though by assumption wage rates return to their original level in the long run), and increases employment. Likewise, innovations in internal labour supply shift the supply curve outward, temporarily depressing wage rates, and increasing employment. Thus, observed fluctuations in wage rates, employment levels, and migration flows around long-run trends, are all outcomes of a combination of innovations ─ i.e., shifts in labour demand and supply ─ and responses to innovations ─ i.e., movements along labour demand and supply curves. Below we specify a structural vector autoregression (SVAR) model, which reflects the theoretical considerations discussed above, to disentangle the sources of fluctuations in the labour market variables.

A reduced-form representation of the relationship between changes in relative wage rates ($\Delta w_t$), net migration ($m_t$), and changes in employment shares ($\Delta n_t$) can be written as:

$$x_t = C + A(L)x_{t-1} + e_t, \qquad (1)$$

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http://srv200.services.gc.ca/iiws/eiregions/uirates.aspx (last accessed on August 15, 2005 and for a history of the EI system, see the Human Resources and Skills Development Canada publication *History of the Unemployment Insurance*, last modified in July 2004 http://www.hrsdc.gc.ca/en/ei/history/unemployment_insurance.shtml and last accessed on August 15, 2005.)

where $x_t$ = the column vector $(\Delta w_t, m_t, \Delta n_t)'$

C = a vector of constant terms, which reflect persistent trends in *x*

A(L) = a matrix of polynomials $A_{ij}(l)$, where *l* denotes a lag operator

$e_t$ = is a vector of reduced-form residuals $(e_{wt}, e_{mt}, e_{nt})'$.

The persistent trend elements of C are each composites of long-term trends in firm location, migration, and internal labour supply. For example, persistent migration to amenity-rich areas would be reflected in the constant term for each variable. Similarly, there can be persistent effects associated with natural-population growth and labour-force attachment that influence the long-term trend growth of the original-resident labour force, affecting the trend elements in C. The $A_{ij}(l)$ are the reduced-form relationships between the variables, which are composites of supply responses to demand innovations and demand responses to supply innovations. Each residual then is a composite of assumed orthogonal innovations in labour demand ($\varepsilon^d_t$), migration ($\varepsilon^m_t$), and internal labour supply ($\varepsilon^n_t$), such that $e_t = A(0)\,\varepsilon_t$, where A(0) represents the contemporaneous responses of $x_t$ to the structural innovations.

The structural innovations can be derived from the reduced-form residuals with identification of A(0): $\varepsilon_t = A(0)^{-1} e_t$. Knowledge of A(0) also facilitates calculation of the impulse responses of each variable to the orthogonal shocks:

$$x_t = [I - A(l)l]^{-1} A(0)\,\varepsilon_t = \phi(l)\,\varepsilon_t, \qquad (2)$$

where $\phi(l)$ is a 3 *x* 3 matrix of responses of the three variables to each innovation. However, A(0) is underidentified and restrictions must be imposed on the impulse responses.

Identification can proceed from the variance-covariance matrix of the reduced-form VAR ($\Sigma_e$):

$$\Sigma_e = E(e_t e_t') = A(0)E(\varepsilon_t \varepsilon_t')(A(0))' = A(0)\Sigma_\varepsilon(A(0))', \qquad (3)$$

where $\Sigma_\varepsilon$ denotes the variance-covariance matrix of the structural errors. The expression in equation (3) contains 18 ($2n^2$) unknown parameters. The estimated variance-covariance matrix of the reduced-form residuals, normalization of the diagonal $\Sigma\varepsilon$, and assuming the structural shocks are orthogonal, provides fifteen restrictions. Thus, only three (n(n-1)/2) other restrictions are required for identification of A(0).

The long-run assumption of CRS in the theoretical model provides two additional restrictions. With labour demand the only innovation-influence on long-run wage levels, the cumulative impulse responses of wage rates to each labour supply innovation equal zero. Thus, $\Sigma_i \phi_{vsi}(l)=0$ for variable *v* equal to the

wage rate, and migration and internal labour supply innovations *s*, where *i* denotes the response period. The remaining identifying assumption is that the cumulative migration impulse to innovations in internal labour supply equals zero. This restriction is not grounded in our theory, but is based on the belief that cumulative migration flows are relatively unaffected by internal labour supply innovations. If inaccurate, the restriction could lead to an understatement of the role of internal labour supply innovations in provincial labour market fluctuations. Nevertheless, we assess the accuracy of the restriction by examining how binding it appears ─ i.e., how readily cumulative-migration-impulse responses to internal labour supply innovations return to zero. Indeed, Blanchard and Quah (1989) show that even if there are small long-run effects where long-run impulses are constrained equal to zero, the SVAR identifying assumptions still produce approximately correct results.[7]

A distinguishing feature of this SVAR approach when compared to recent reduced-form regional VAR approaches (e.g., Blanchard and Katz, 1992) is that contemporaneous shocks in labour supply are allowed (by migrants and the original-residents). In contrast, these reduced-form VAR approaches simply assume that all contemporaneous innovations are attributable to labour-demand shocks, which is a stringent short-run assumption.[8] In this model, unless the region's labour-supply curve is perfectly inelastic, the wage increase associated with a favorable demand shock induces an increase in the labour-force participation of the original residents. In fact, Decressin and Fatás (1995) find that labour force participation is the primary response to demand shocks in Europe. Likewise, labour-force participation and unemployment rates are not assumed to be long-run stationary processes, as in reduced-form VAR approaches. This would have implicitly forced migration to satisfy *all* long-run changes in employment, and employment/population rates would not change in the long run (Obstfeld and Peri, 1998).

**4. Empirical Implementation**

The SVAR model is separately implemented for each Canadian province using annual data from 1976 to 2003. Because of our interest in the potential labour market heterogeneity, impulse responses are individually estimated for each province. Defining the variables relative to the nation differences out common national cyclical effects. Because of their economic size, for British Columbia, Alberta, Ontario,

[7]Identification of A(0) also facilitates calculating the share of variable *v*'s forecast variance (VDF) that is attributable to each innovation.

[8]Long-run restrictions are usually less restrictive than short-run exogeneity restrictions (Stock and Watson, 2001). For other concerns with Blanchard and Katz's VAR approach, see Rowthorn and Glyn (2006).

and Québec, the national benchmark estimate excludes the province's contribution to the national total. Other provinces are small such that their inclusion does not significantly affect the national total.

Provincial employment estimates are from the Labour Force Survey. Wage rates are annual earnings estimates obtained by multiplying weekly earning estimates of employees (SEPH) by 52. Migrants are annual inter-provincial migrants and do not include immigrants from outside Canada for that year. All data were obtained from Statistics Canada.

Finiteness of cumulative impulse responses—i.e, period-specific impulse responses dampening to zero in the long run—requires stationarity of the SVAR variables. Therefore, relative employment growth, wage rate growth, and the rate of internal migration, are tested for stationarity for each of the ten provinces. Based on Augmented Dickey-Fuller tests, unit roots in the relative growth rates were rejected in 22 of the 30 cases. The number of lags used in testing the three variables in each province was based on the optimum lag length for the VAR model according to the optimum Schwarz Bayesian Information Criterion (BIC) statistic.[9] The Schwarz BIC criterion is chosen because it tends to yield shorter lag structures than other alternatives, where a shorter lag length has been suggested as one approach to improving the reliability of inferences drawn from SVAR models (Faust and Leeper, 1997).[10] Similar unit root test results were obtained with the Dickey Fuller-GLS test. Because of the low power of these unit root tests in small samples, additional assessments of nonstationarity were performed by examination of the impulse response functions. As discussed in the next section, despite the failure to reject a unit root for 8 cases, in no case was there non-finiteness in the cumulative impulse responses.[11] Thus, we specify the SVAR in terms of growth rates.

Since the long-run-restrictions SVAR approach is an alternative to co-integration for capturing long-run equilibrium relationships, co-integration tests were not performed.[12] The long-run restrictions SVAR approach has the advantage of allowing us to identify the underlying structural determinants with a smaller sample size than generic co-integrated models, though the advantage of the co-integration

[9]Basing the unit root tests on the optimal lag length for the variable itself, rather than on the three-variable SVAR system, did not lead to increased rejection of the unit root hypothesis.

[10]The optimal lag length was found to equal one for all cases, except for Québec in which the optimal lag length was two. But following the practice of Partridge and Rickman (2003), to improve identification, lag lengths of two were used for Saskatchewan and Prince Edward Island, while a lag length of three was used for Québec.

[11]In the absence of defining the variables as rates of change, the impulse responses were routinely explosive, indicating the necessity of expressing the variables in rates of change.

[12] Quah (1995) and Hansson (1999) discuss the close relationship between SVAR models that are integrated of order one or less (such as ours) and structural common-trends co-integration models.

approach is it allows the "data to speak" without restrictions.[13]

**5. Results**

Before presenting the results, we first assess the empirical validity of our long-run identifying restrictions. Variance decompositions of provincial migration and employment growth at 1, 2, and 16-year intervals are then presented to appraise the respective roles of labour demand versus supply in describing provincial labour market fluctuations. This discussion also aids our assessment of the degree to which migration smoothes over the asymmetric demand shocks characterizing the different commodity- and manufacturing-based regional economies that string from east to west. Finally, we assess whether favorable provincial demand shocks lead to new jobs for the original residents, or whether the benefits simply accrue to new migrants, who may not be the intended beneficiaries.

*5.1 Assessing the Identification Assumptions*

Although restrictions are imposed on three of the long-run impulse response functions, all short-run, and the remaining six long-run, impulse response functions are unconstrained; all short-run impulse responses can be either positive or negative, regardless of economic theory or *a priori* expectations. The unconstrained impulse responses in some sense serve the same purpose as standard over-identification tests (Bayoumi and Eichengreen, 1993). Namely, if the unrestricted impulse functions are consistent with economic theory, this would suggest that the model is well identified. Except for Newfoundland, we generally find the unrestricted impulse response functions are consistent with theory and the estimated provincial demand and supply innovations consistent with *a priori* expectations. The remaining nine provincial models appear to be well identified and become the focus of our analysis.[14] Additional tests—including those considering productivity shocks—also support our identification assumptions. These tests are described in more detail in the Appendix.

*5.2 Employment Variance Decomposition*

Table 3 presents the variance decomposition results for employment growth in Panel A. The estimates reveal how much of the variation in employment and migration are due to innovations in demand ($\varepsilon^d_t$), net migration ($\varepsilon^m_t$), and internal labour supply ($\varepsilon^n_t$) at 1, 2, and 16 year intervals. The

[13]Greenslade, Hall and Henry (2002) examine and discuss the substantial benefits of using economic theory to impose restrictions in co-integrated systems based on a small sample and rich theoretical underpinnings rather than treating the model solely as a statistical artifact.

[14]Experimentation with other lag lengths failed to improve the performance of the Newfoundland SVAR model.

unweighted Canadian average is displayed next, followed by the corresponding U.S. averages for the lower 48 states reported by Partridge and Rickman (2003; 2006).

In terms of employment innovations, the strongest difference between the U.S. and Canada is that provincial employment fluctuations are slightly more influenced by innovations in the original provincial labour force.[15] Given the historic generosity of Canadian EI benefits and other social welfare programs in the North American context (Coulombe and Day, 1999; Partridge, 2001), it is not surprising that internal labour supply changes are more influential in Canada. Consistent with the perception that EI is relatively more generous in Atlantic Provinces and plays a greater role in their economies, internal labour supply innovations accounted for over 60 percent of period one employment volatility in the three (reported) Atlantic Provinces.[16]

The jobs-versus-people dichotomy is usually based on whether fluctuations in business activity (labour demand) or migration generate greater employment changes. In comparing the forecast variances attributable to innovations in demand (jobs) versus migration (new people), it is clear that labour demand is the more important cause of provincial employment fluctuations on average, consistent with the average pattern for the U.S. Yet, this masks significant regional heterogeneity in responses. For example, Partridge and Rickman (2003) found that demand shocks play a much more important role in commodity-intensive Farm states, and especially in Energy states. Similarly in Canada, about two-thirds of the average variability in employment is due to demand shocks in the four primary-sector-dependent western provinces. For energy-abundant Alberta, labour demand shocks account for 80-90 percent of employment fluctuations around the long-run trend over all forecast horizons. For Ontario and its eastern counterparts, demand shocks account for less than one-fourth of employment variability on average, which indicates labour supply adjustments are more important than labour demand in explaining employment variability. Economic migrants have long been attracted by the wide range of good job opportunities in Ontario, especially in Greater Toronto, while migrants who "fail" and move on, or return migrate, produce fluctuations in Ontario's employment.

[15]Recall that the variance decomposition measures its variation around the long-run trend. For example, the factors causing (say) Ontario employment to vary around its long-run trend likely differ from what is causing Ontario to have a different long-run trend growth rate than (say) Alberta.

[16]Another potential reason for internal labour supply innovations playing a stronger role in Atlantic Canada is its geographic isolation from the rest of Anglophone Canada. Besides language, distance is a strong detriment to cross-provincial migration (Courchene, 1970).

*5.3 Migration Variance Decomposition.*

Panel B of Table 3 presents the corresponding variance decomposition of provincial migration flows. On average, in period 1, we see that *structural* demand ($\varepsilon^{d}_{t}$) and migration ($\varepsilon^{m}_{t}$) innovations play an equal role in causing fluctuations in reduced-form migration responses ($e_{mt}$). Yet, by the second period onward, demand shocks play a much larger role than own-migration shocks. Such demand-oriented migration flows may underlie Coe and Emery's (2004) finding that Canadian regional labour markets are more integrated in terms of quantity adjustments than wage/price adjustments.

Compared to the U.S., Canadian migration innovations are much more influenced by demand innovations, especially in period 1. Migration primarily serves to smooth out regional wage and unemployment responses to asymmetric demand shocks, increasing labour market flexibility (Obstfeld and Peri, 1998). Conversely, U.S. migration fluctuations are often influenced by own-migration innovations that relate to amenity driven flows to the American Sunbelt, which do not reflect adjustment responses to equilibrate labour markets after asymmetric demand shocks (Partridge and Rickman, 2006), and instead serve as a source of regionally asymmetric shocks.

Not surprisingly, the Canadian average obscures significant East-West variation in the underlying causes of fluctuations in-migration flows. Consistent with U.S. patterns uncovered by Partridge and Rickman (2006), variation in migration flows in the resource and farming intensive western provinces are much more driven by demand shocks than own migration shocks. The case of British Columbia, Canada's Sunbelt, is particularly interesting. Unlike the U.S. Sunbelt, in which migration flows are more influenced by own-innovations, British Columbia's net migration is more influenced by demand innovations. While this likely relates to the importance of commodities and the export intensiveness of the British Columbia economy, it also relates to its geographic isolation in Canada. British Columbia lies next to the vibrant Alberta economy and is thousands of kilometers from core-Canada with its population base in southern Ontario and Québec. Psychic and pecuniary moving costs may simply overwhelm British Columbia's amenity benefits for most Canadians considering a move.

It is not surprising that migration is less influenced by demand shocks in Atlantic Canada given the traditional importance of federal equalization payments to the region and in EI affecting labour supply behavior and reducing migration flows (Coulombe and Day, 1999). Likewise, given that French speaking

Québecers are less likely to find job opportunities outside of the province (Courchene, 1970; Dickie and Gerking, 1998), it is not surprising that demand shocks are not an important cause of variation in its migration flows. The relatively strong own-migration innovations in Québec are likely related to the ebbs and flows of French-Québec separatism (Polèse and Shearmur, 2004). For Ontario, demand shocks play a somewhat more important role than own-migration shocks, suggesting that the mechanism driving its variation in-migration flows differs somewhat from that driving its employment fluctuations. Nevertheless, for both employment and migration, economic migrants play a key role in demand and supply fluctuations in Ontario.

*5.4. Speed of Adjustment*

Table 4 contains the speed of adjustment for each province, which is measured by the number of years it takes for the cumulative response to equal 95 percent of the maximum response. The bottom of Table 4 contains the Canadian average, with and without Atlantic Canada, and the corresponding average for the lower 48 U.S. states taken from Partridge and Rickman (2006).

Again, there is no evidence that Canadian regional labour markets are less flexible than those in the U.S. While the average adjustment speeds for wages and migration are similar between Canada and the U.S., Canada contains faster average employment responses to demand and supply innovations. The rapid adjustment process in Atlantic Canada is one reason for the relatively rapid Canadian average across all three categories. Québec also has rapid employment adjustments, although it has very sluggish wage and migration responses.[17] Québec and the Atlantic Provinces typically have lower employment/population rates, suggesting there is a large pool of nonemployed individuals who are marginally connected to the labour market. To be sure, since nonemployed individuals already reside in the province, they respond more quickly to demand shocks than migrants.[18] Thus, it is not clear whether a high degree of migration responsiveness is necessary for labour market responsiveness and flexibility.[19]

[17]It is possible that Québec's sluggish wage and migration responses relate to language barriers for migration and a relatively greater reliance on administrative wage setting procedures including collective bargaining.

[18]Despite an entirely different approach, Coe and Emery (2004) also found relatively rapid responses for unemployment rates in Atlantic Canada and Québec. In a sense, our finding of relatively high flexibility for Canadian labour markets is consistent with Stanford's (2005) contention that tightening of Canadian social welfare programs in the 1990s did not greatly change labour market flexibility.

[19]Rapid labour market adjustment—though good for macroeconomic stability—is not the same as maximizing average income or labour productivity. The low employment/population rates that can facilitate rapid employment responses in Eastern Canada are likely associated with other economic inefficiencies. For example, generous EI and high union densities may reduce national economic efficiency, but it does not appear to impede the integration of provincial labour markets.

With a relatively *laissez faire* reputation, Alberta's relative sluggishness may come as a surprise. Yet, this reflects the same pattern Partridge and Rickman (2006) identified for U.S. energy states and is consistent with Beine and Coulombe's (2003) finding that Alberta's cyclical shocks are quite persistent. Partridge and Rickman attributed the slow energy state adjustment to less than perfect labour mobility across industries and the international scope of energy shocks. For example, if energy prices sharply fell, it is not as if an Albertan energy worker could migrate to (say) Saskatchewan's or Newfoundland's energy sectors and readily find work because the entire Canadian energy industry would be struggling. Another potential cause of the more general sluggish adjustment in Alberta is economic agents might take time to assess whether energy price shocks are permanent or transitory.

*5.5. Who Benefits from Demand Led Job Growth?*

Canadian policy has long emphasized the importance of regional equity as reflected by large federal transfers and equalization. There have also been significant federal efforts to enhance regional economic development. Provincial and local governments have likewise stressed economic development.

It is not clear, however, whether a province's original residents actually benefit from regional economic development. Blanchard and Katz (1992) contend that virtually all newly created (U.S.) state jobs are quickly taken by new migrants, suggesting that original residents do not ultimately benefit. However, Bartik's (1993) literature review suggests that migrants take only 60-90 percent of the newly created (state) jobs, leaving some scope for original residents to benefit in the long run. Economic development efforts have even a much larger potential payoff for original residents in the short run, as migrants only take about 30-50 percent of jobs in the first two years. Yet, despite the importance placed on regional equity in Canada, Canadian evidence is sketchy.

One characteristic of the provincial SVAR impulse functions is that we use employment growth *rates*, but net migration is reported as a share of the population. However, in response to a favorable economic development policy (positive demand shock), the percent of new jobs taken by new economic migrants is likely to be greater than their corresponding share of the population. For the U.S., the vast amount of amenity-driven migration to the Sunbelt and related retirement migration suggests the typical American migrant is less attached to the labour market than an economic migrant. Thus, in response to a labour demand shock, Partridge and Rickman (2006) contend the migration share of population should be

scaled up somewhere between 1.07 and 1.46 to reflect the greater labour market attachment of U.S. economic migrants. We follow this approach for Canada by scaling the migration share up by 1.20, which is an intermediate estimate. This is obtained by noting that the 1996 share of the population 60 years and over is 16.35 percent and by assuming that economic migrants are always less than 60 (1.20=1/(1-.1635)). Although we believe the estimate of 1.20 is a reasonable representation of Canada to illustrate the job versus people issue, we recognize there are reasons to believe that, depending on the province, it can be either an over- or an under-estimate.[20]

Figure 4 reports the average wage, employment, net-migration, and scaled net-migration responses to a one-standard deviation demand shock. There is a relatively lower employment response to demand shocks for the typical province compared to the typical U.S. state response detected by Partridge and Rickman (2003) ─i.e, the ratio of the employment response to the demand-identifying wage shock is smaller for the typical province. This indicates a steeper long-run Canadian labour supply curve.

Although there appears to be less provincial employment responsiveness to demand shocks compared to the U.S., this obscures significant provincial heterogeneity (not shown). For example, in Atlantic Canada and Québec, the long-run employment response is very small, implying a steep long-run supply curve.[21] This is consistent with geographic isolation and language barriers reducing migration labour supply adjustments. The story differs for Ontario and the provinces to the west. A one-standard deviation labour demand shock produces about a 1.5 percent long-run employment increase on average in the Prairie Provinces and over 3 percent increases in Ontario and British Columbia, while long-run wage increases are in the 1.5 to 2 percent range. Thus, our findings are consistent with Coe and Emery (2004) that labour market market fluctuations in Québec and Atlantic Canada are primarily reflected in the long run by wage changes, while those in Ontario and to the west are reflected more in quantity changes.

Turning to who gets the new jobs, migrants or original residents, compare the employment response to the adjusted migration response in Figure 4. The average provincial employment response is nearly maximized by the third year, while it is not until about the sixth year that migration nears its peak. Using

[20]The 1.20 adjustment could be an overestimate as younger adults are more likely to migrate, which suggests a higher than average share of non-working children family members migrating with them. Also suggesting an overestimate, older relatives who are not in the labour force could chain migrate and many economic migrants may be unemployed in their new location. A factor suggesting an underestimate is that a higher share of adult economic migrants is more likely to be attached to the labour force compared to the typical adult migrant. See the notes to Figure 7 for the source of the 60 and over population share.

[21]For Québec, the long-run wage response is 1 percent, while the long-run employment response is 0.2 percent.

our adjusted migration response, about 23 percent of newly created jobs are taken by migrants in the first year, which rises to 42 percent in the second period. Thus, in the typical province, original residents initially capture the vast majority of newly created jobs through some combination of lower unemployment and greater labour force participation. Continued in-migration reduces the net gains for original residents, and by the seventh period, inter-provincial migrants take over two-thirds of the jobs, settling at just over 68 percent of the jobs in the long run. Thus, original residents fill about one-third of newly created jobs in a province in the long run, suggesting that economic development has long-term scope for increasing original-resident labour-force participation and reducing unemployment.

Past research suggests that U.S. regional labour markets primarily adjust in the medium and long-run through migration, while European labour markets respond more through changes in labour-force participation or unemployment rates (Blanchard and Katz, 1992; Decressin and Fatás, 1995; Jimeno and Bentolila, 1998; Obstfeld and Peri, 1998). The importance of internal labour supply adjustments in Figure 4 indicates that Canadian labour supply adjustments to asymmetric regional shocks fall in between the U.S. and European responses. To be sure, the estimated share of jobs taken by original (provincial) residents in Canada is just above the best-guess estimates from Bartik (1993) for the U.S.

The average national result obscures significant heterogeneity across provinces and broader regions. This is shown in Figure 5, which presents for the first, second, and sixteenth periods, the estimated share of new jobs taken by migrants for Canada, Atlantic Canada (net of Newfoundland), Québec, Ontario, Prairies, and British Columbia. In Atlantic Canada, although original residents initially take the vast majority of the new jobs, migrants eventually take more jobs than are actually created. Recall that a one standard deviation demand shock produces very modest employment gains in Atlantic Canada, which means the 100 percent plus figure shown in period sixteen for Atlantic Canada does not reflect a large swarm of migrants. Although scaling the migration share up by 20 percent likely overstates how many of the new jobs are taken by economic migrants in Atlantic Canada, these results suggest that few newly created (i.e., demand-induced) jobs go to original residents in the long run. These findings somewhat question the rationale for extensive Atlantic Canada economic development efforts to stimulate demand.

It is not surprising that with language barriers, economic migrants take almost none of the newly created jobs in Québec in the first two periods. However, this share rises to over 60 percent in period 16.

Nonetheless, given the relatively small number of jobs created in response to a one standard deviation demand shock in Québec, there are relatively few economic migrants taking new jobs in the province. Conversely, the relatively large Québec wage response suggests original residents benefit more from higher wages than from new jobs.[22]

Migrants also take a relatively small share of jobs in Ontario and British Columbia, reaching only 40-45 percent of the new jobs by even the 16th period. A partial cause for the low figure is economic migrants may take an even higher share of newly created jobs than suggested by our 20 percent scaling. Yet if we were to assume that every single migrant worked—i.e., none were unemployed, had nonemployed spouses, or young children—that would still imply that migrants would take only 70-80 percent of the newly created jobs in these two provinces.

Finally, the migrant response in the three Prairie Provinces is actually closest to the national "norm" with migrants eventually taking just over 83 percent of the newly created jobs. Yet, migrants take greater shares of newly created jobs in Saskatchewan and Manitoba, leaving less scope for successful economic development to benefit original residents (not shown). Given the long-standing economic struggles in Saskatchewan and Manitoba, as well as for Atlantic Canada, the higher migrant responsiveness may relate to a relatively high share of return migrants who are waiting for opportunities to return to their "home" province. Moreover, in the case of these provinces, perhaps creating jobs for the original residents may be a secondary goal to attracting migrants and stabilizing population.

**6. Summary and Conclusion**

Using a structural vector autoregression model based on long-run restrictions, we examined the dynamics of Canadian provincial labour markets. The dynamics were examined primarily in terms of the implications for Canada achieving regional economic equity and macroeconomic stability.

We found little evidence that Canada possessed a less flexible macro labour market relative to the United States. Migration and internal labour supply responded more rapidly to asymmetric demand shocks in Canada. In addition, demand shocks primarily underlay provincial labour market fluctuations, in which internal migration primarily served to smooth out the effects of provincially asymmetric demand shocks. This stands in contrast to U.S. findings where migration was nearly as significant a source of

[22]Finding expected labour demand/supply patterns across provinces further supports our identifying restrictions.

regionally asymmetric shocks as demand. Even though the long-run supply curve was found to be steeper in the typical province, there was a more rapid wage adjustment process to move it to the long-run equilibrium. Therefore, despite evidence of north-south demand linkages with U.S. states, provincial labour markets appeared sufficiently flexible and integrated for Canada to achieve comparable macroeconomic stability and regional equity. Finally, internal labour supply plays an important role in provincial labour market fluctuations.

Regarding the question of who benefits from economic growth, the national average suggested a slightly higher share of original residents benefit from demand-led provincial economic development programs than is typical in the U.S. However, the national average obscured tremendous variability. In the long run, migrants take nearly all of the jobs in Atlantic Canada, Manitoba, and Saskatchewan, while original residents gain nearly half of the jobs in the rest of Canada. If reducing unemployment or benefiting the original residents were a goal of Canada's regional development programs, one would question the wisdom of providing aid to Atlantic Canada, Manitoba, and Saskatchewan. Yet, given the need to attract and retain population in these regions, regional economic development may still be appropriate, but policymakers and the electorate should know what they are getting from these expensive efforts including the effects of federal equalization payments to "have not" provinces. Remaining unanswered is the optimal approach for bringing economic development to Canada's lagging-regions.

## Appendix

The following presents evidence to support our conclusion that the nine provincial SVAR models (i.e., all provinces except Newfoundland) are well identified. In results not shown, consistent with theory, wages, migration, and employment respond positively to demand shocks for all periods in each of the nine provinces. Migration and employment similarly respond positively to migration shocks for all periods in each province. Wages immediately respond negatively to migration shocks for seven of the nine provinces, with the cumulative response gradually returning to zero in the long run, consistent with the restriction that supply shocks have no long-run effect on wages. In the other two cases, the cumulative wage response becomes negative by the third period in Québec, while for Prince Edward Island the cumulative response becomes negative by the second period, with both provincial cumulative responses asymptotically approaching zero in the long run. For internal labour supply shocks, employment responds positively across all periods for all provinces. In all provinces, migration immediately responds negatively to internal labour supply shocks and fairly quickly returns to zero in the long run. The rapid return to zero supports the restriction of a zero long-run cumulative migration response to internal labour supply shocks—i.e., the restriction is not very binding. In response to internal labour-supply innovations, wages respond negatively in the first period in four provinces, with the cumulative response becoming negative by the second period for three provinces, and becoming negative for the remaining two provinces by the third period. In all nine cases, cumulative long-run wage impulse responses return to zero.

Another way to assess the validity of the identification scheme is to analyze the shocks to see if they fit expected patterns. First, we computed correlations between our identified demand shocks and relative provincial labor productivity, which is measured as provincial GDP divided by employment.[23] Second, we computed correlations between estimated provincial shocks, and between provincial and U.S. shocks (produced by Partridge and Rickman 2003; 2006).

Confirming the validity of our SVAR identifying restrictions, the average correlation between our estimated provincial demand shocks and changes in labor productivity was 0.33. The largest correlation was for Alberta (r=0.64), followed by British Columbia (r=0.44), and Ontario (r=0.40). Much of the remaining variation in the demand shocks would likely relate changes in terms of trade. However, if our identifying assumptions are correct, we would expect that these changes in labour productivity to be

[23]Changes in real labour productivity is estimated by taking the annual change in real provincial GDP per worker deflated by the provincial deflator using Statistics Canada CANSIM II Tables 384-0015, 384-0002, and 384-0021.

orthogonal to our estimated labour supply shocks. Indeed, the correlations of labour productivity changes with our two estimated labour supply shocks were only 0.04 and 0.07, further supporting our restrictions.

In terms of correlations among provincial shocks, consistent with Coulombe and Day (1999) and Courchene and Harris (2000), one general pattern is Canadian regions are more linked from the demand side in a north-south manner with their U.S. state neighbors than along an east-west line across Canada. In terms of correlation of demand shocks (not shown), British Columbia is more correlated with Washington (r=0.30), Oregon, and Idaho, than it is with any Canadian province—where the correlation with Alberta is near zero.[24] Alberta is more strongly related to U.S. energy states including Wyoming and North Dakota (both with r=0.51), and Montana (r=0.43), than with its neighboring provinces. Saskatchewan is an exception. The correlation of its demand shocks with those of Manitoba equals 0.46 and with those of Alberta equal to 0.19, in which the correlations with neighboring U.S. states are much lower. Manitoba is most correlated with Minnesota (r=0.49), followed by Saskatchewan, in which there is near zero correlation with Ontario. Ontario also is slightly negatively correlated with Québec, being most strongly correlated with Michigan (r=0.36), and having positive correlations with Indiana and Ohio. Québec is most correlated with Nova Scotia (r=0.38), followed in order by positive correlations with New Hampshire, Maine, and Vermont. New Brunswick is most correlated with Nova Scotia (r=0.31), followed in order by positive correlations with New Hampshire, Maine, Vermont, and then Québec. Among nearby U.S. states, Nova Scotia is most correlated with Maine (r=0.30) and New Hampshire (r=0.24). Prince Edward Island is most correlated with Pennsylvania (r=0.27) and New York (r=0.25).

The migration shocks also follow expected patterns. Migration shocks among the Atlantic Provinces were generally positively correlated (including Québec). The correlation between Ontario's and Québec's migration shocks equals –0.34, consistent with the expected effects of the separatist movement in Québec. The correlation of migration shocks between Saskatchewan and Manitoba equals 0.53, suggesting similar causal mechanisms for migration outflows. In fact, as identified by Courchene (1970) decades ago, the correlation of migration shocks between Saskatchewan and Alberta equals –0.29, suggesting that negative migration shocks (outflows) from Saskatchewan may be generating positive migration shocks (inflows) in Alberta. In sum, the demand and supply innovations are not only consistent with theory, but also with known economic and spatial patterns with neighboring provinces and U.S. states.

[24]To match the sample periods between this study and the comparison studies, the sample period for the calculation of the correlation coefficients was restricted to 1977-1998.

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Table 1. Provincial Employment Share Growth Rates:
Descriptive Statistics

| | Mean | StdDev |
|---|---|---|
| AB | 0.82 | 1.87 |
| BC | 0.64 | 1.76 |
| MB | -0.76 | 0.84 |
| NB | -0.29 | 1.21 |
| NL | -0.59 | 1.86 |
| NS | -0.35 | 0.99 |
| ON | 0.11 | 0.67 |
| PE | -0.05 | 1.66 |
| QC | -0.43 | 0.73 |
| SK | -0.87 | 1.57 |

Note: Descriptive statistics of the growth rate in the change in the provincial share of national employment as shown in Figures 1-3.

Table 2. Correlation of Provincial Employment Share Growth Rates

| | *AB* | *BC* | *MB* | *NB* | *NL* | *NS* | *ON* | *PE* | *QC* | *SK* |
|---|---|---|---|---|---|---|---|---|---|---|
| AB | 1.00 | | | | | | | | | |
| BC | 0.30 | 1.00 | | | | | | | | |
| MB | -0.19 | -0.22 | 1.00 | | | | | | | |
| NB | -0.29 | 0.08 | 0.20 | 1.00 | | | | | | |
| NL | 0.18 | -0.12 | -0.30 | 0.11 | 1.00 | | | | | |
| NS | -0.27 | -0.41 | 0.16 | -0.00 | 0.19 | 1.00 | | | | |
| ON | -0.47 | -0.77 | -0.00 | -0.06 | 0.02 | 0.35 | 1.00 | | | |
| PE | -0.38 | -0.22 | 0.48 | 0.16 | -0.25 | 0.15 | 0.15 | 1.00 | | |
| QC | -0.58 | -0.21 | 0.04 | 0.15 | -0.10 | 0.07 | -0.10 | 0.19 | 1.00 | |
| SK | 0.15 | -0.07 | 0.56 | -0.13 | -0.22 | -0.14 | -0.16 | 0.17 | -0.18 | 1.00 |

Note: Correlations of the change in the provincial share of national employment as shown in Figures 1-3.

Table 3: Variance Decomposition[a]

Panel A Variance Decomposition of Relative Employment Growth (%)

| Province | D(1) | M(1) | IS(1) | D(2) | M(2) | IS(2) | D(16) | M(16) | IS(16) |
|---|---|---|---|---|---|---|---|---|---|
| AB | 90.5 | 5.7 | 3.9 | 85.4 | 10.0 | 4.6 | 82.1 | 12.6 | 5.3 |
| BC | 76.2 | 13.9 | 9.9 | 65.9 | 26.0 | 8.1 | 62.1 | 30.2 | 7.6 |
| MB | 61.0 | 9.8 | 29.2 | 54.9 | 12.2 | 33.0 | 54.3 | 12.4 | 33.3 |
| NB | 7.7 | 3.6 | 88.7 | 13.5 | 8.2 | 78.4 | 15.9 | 10.8 | 73.3 |
| NS | 9.1 | 33.3 | 57.7 | 10.8 | 33.5 | 55.8 | 10.9 | 33.3 | 55.8 |
| ON | 22.2 | 70.9 | 6.9 | 25.1 | 66.4 | 8.5 | 26.6 | 64.4 | 9.0 |
| QC | 37.5 | 47.3 | 15.2 | 34.3 | 51.5 | 14.2 | 40.1 | 46.4 | 13.5 |
| PE | 33.5 | 25.6 | 40.9 | 34.6 | 25.2 | 40.2 | 36.5 | 28.2 | 35.3 |
| SK | 45.2 | 38.4 | 16.4 | 48.6 | 36.9 | 14.6 | 50.0 | 35.7 | 14.3 |
| CAN AVE | 42.5 | 27.6 | 29.9 | 41.4 | 30.0 | 28.6 | 42.1 | 30.5 | 27.5 |
| US AVE[b] | 43.0 | 34.7 | 22.3 | 46.2 | 33.2 | 20.7 | 46.5 | 32.7 | 20.8 |

Panel B Variance Decomposition of Net Internal Migration (%)

| Province | D(1) | M(1) | IS(1) | D(2) | M(2) | IS(2) | D(16) | M(16) | IS(16) |
|---|---|---|---|---|---|---|---|---|---|
| AB | 59.9 | 13.9 | 26.2 | 79.0 | 8.6 | 12.4 | 79.6 | 11.4 | 9.0 |
| BC | 63.1 | 18.1 | 18.8 | 70.0 | 20.7 | 9.3 | 64.1 | 29.9 | 6.0 |
| MB | 48.5 | 20.2 | 31.2 | 61.9 | 21.5 | 16.5 | 60.6 | 23.0 | 16.4 |
| NB | 39.0 | 58.8 | 2.2 | 34.3 | 62.0 | 3.6 | 33.6 | 62.8 | 3.6 |
| NS | 29.3 | 55.6 | 15.1 | 41.5 | 46.0 | 12.5 | 40.5 | 47.7 | 11.7 |
| ON | 42.6 | 26.0 | 31.4 | 54.7 | 31.4 | 13.9 | 60.5 | 29.5 | 10.0 |
| QC | 8.7 | 82.4 | 8.9 | 17.0 | 78.2 | 4.9 | 17.1 | 80.7 | 2.2 |
| PE | 27.5 | 70.6 | 1.8 | 43.1 | 55.6 | 1.3 | 45.1 | 53.3 | 1.5 |
| SK | 49.1 | 31.9 | 19.1 | 63.5 | 29.7 | 6.8 | 75.5 | 20.7 | 3.8 |
| CAN AVE | 40.9 | 41.9 | 17.2 | 51.7 | 39.3 | 9.0 | 53.0 | 39.9 | 7.1 |
| US AVE[c] | 28.3 | 45.6 | 26.2 | 40.2 | 44.2 | 15.7 | 45.1 | 42.3 | 12.5 |

a. The variance decomposition of net internal migration at 1, 2, and 16 year intervals for labour demand (D), migration labour supply (M), and internal labour supply shocks (IS). Percent totals may not equal 100 because of rounding.

b. The average U.S. employment innovations reflect the lower 48 state average over the 1971-1998 period, based on Partridge and Rickman (2003).

c. The average U.S. migration innovations reflect the lower 48 state average over the 1971-1998 period, based on Partridge and Rickman (2006).

Table 4: Speed of Adjustment[a]

| | Wage Response Speed to Shock in | | | Migration Response Speed to Shock in | | | Employment Response Speed to Shock in | | |
|---|---|---|---|---|---|---|---|---|---|
| Region | D | M | IS | D | M | IS | D | M | IS |
| AB | 7 | 8 | 9 | 7 | 8 | 9 | 5 | 6 | 6 |
| BC | 8 | 10 | 12 | 8 | 9 | 11 | 7 | 7 | 7 |
| MB | 5 | 4 | 6 | 4 | 4 | 6 | 2 | 2 | 3 |
| NB | 1 | 5 | 8 | 4 | 4 | 4 | 1 | 2 | 1 |
| NS | 5 | 6 | 7 | 5 | 5 | 6 | 1 | 2 | 3 |
| ON | 9 | 12 | 13 | 8 | 7 | 9 | 6 | 4 | 5 |
| PE | 5 | 4 | 5 | 2 | 2 | 3 | 1 | 1 | 1 |
| QC | 9 | 16 | 4 | 12 | 11 | 10 | 1 | 6 | 1 |
| SK | 6 | 5 | 6 | 5 | 5 | 6 | 3 | 3 | 3 |
| Can Avg | 6.1 | 7.8 | 7.8 | 6.1 | 6.1 | 7.1 | 3.0 | 3.7 | 3.3 |
| w/o Atl. Can | 7.3 | 9.2 | 8.3 | 7.3 | 7.3 | 7.7 | 3.6 | 4.7 | 4.2 |
| US Avg | 6.3 | 7.9 | 8.4 | 6.8 | 6.9 | 8.3 | 5.1 | 5.2 | 5.9 |

a. Speed of adjustment reflects the number of years before 95 percent of the maximum response has occurred. See Bayoumi and Eichengreen (1993) and Partridge and Rickman (2006) for a similar responsiveness measure.

Figure 1: Atlantic Provinces: Employment Shares

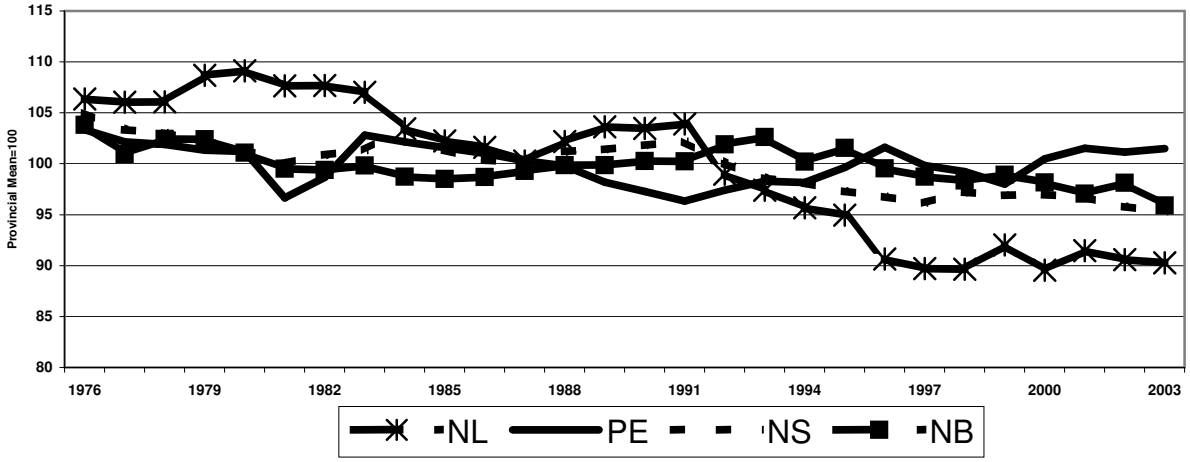



Figure 2: Ontario and Quebec: Employment Shares

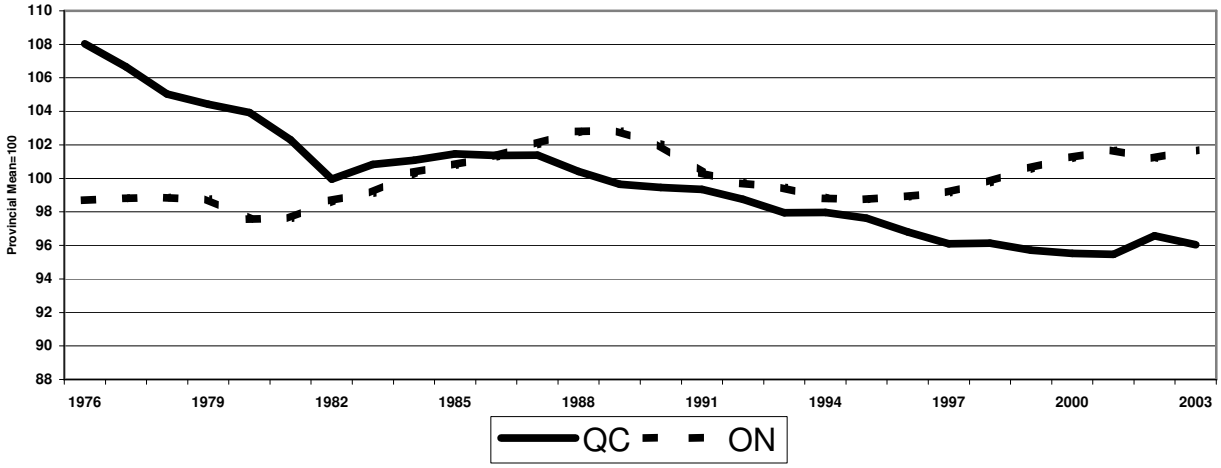
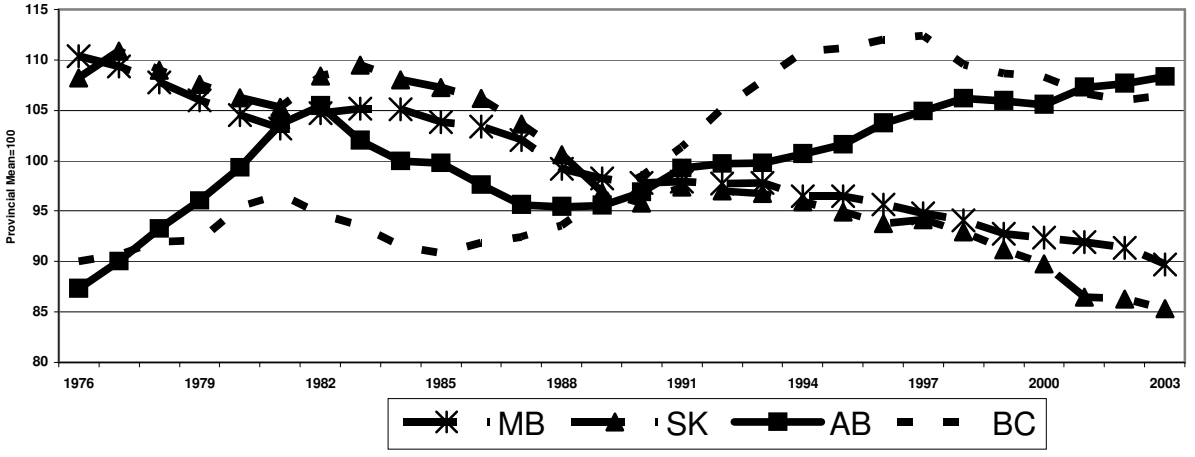
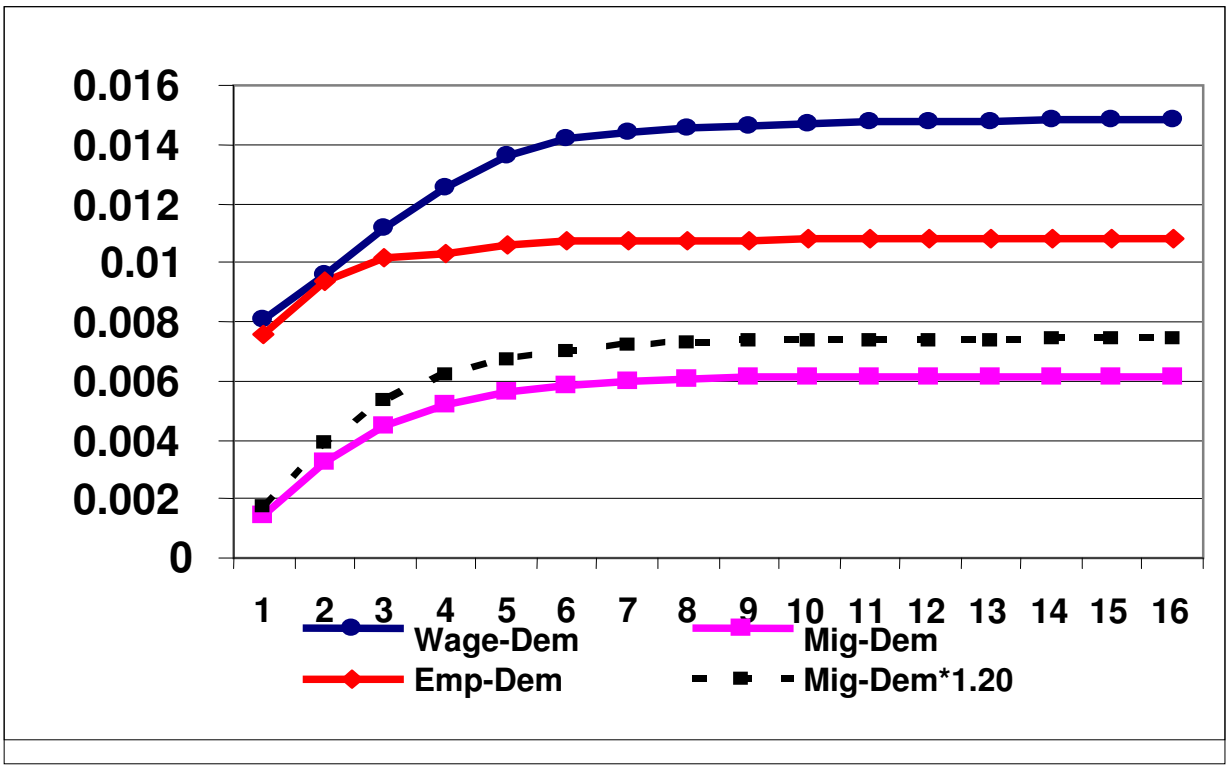



Figure 3: Western Provinces: Employment Shares



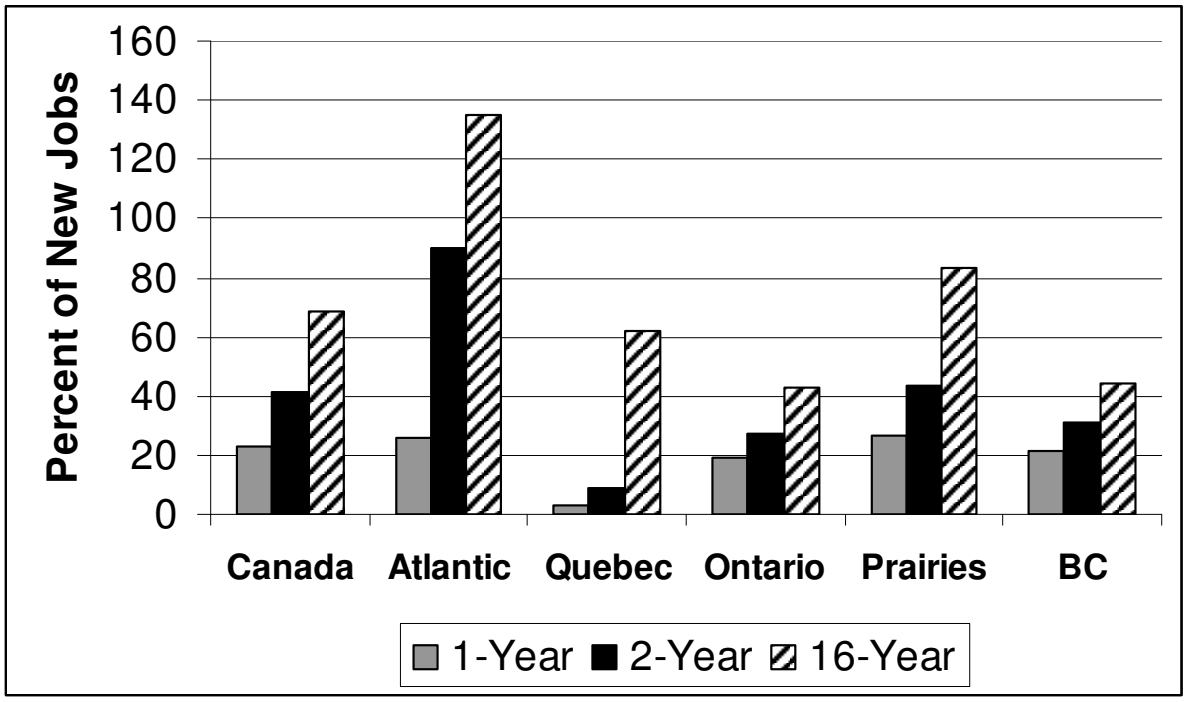

Note: The provincial share of national employment normalized to a 100 base by using the average over the period.

Figure 4: Canadian Average Wage, Employment, and Migration Response to Demand Shocks (Percent/100)




Note: The scaling the Mig-Dem by 20% is done to recognize that the greater share of economic migrants are employed than reflected by their share of the population. The age distribution data is from The 1996 age distribution is from Statistics Canada, Age (123) and Sex (3) for Population, for Canada, Provinces, Territories, Census Metropolitan Areas 1 and Census Agglomerations, 1996 and 2001 Censuses - 100% Data accessed at http://www12.statcan.ca/english/census01/products/standard/themes/RetrieveProductTable.cfm?Temporal=2001&PID=55521&GID=431515&METH=1&APATH=3&PTYPE=55440&THEME=37&AID=0&FREE=0&FOCUS=0&VID=0&GC=0&GK=0&SC=1&SR=1&RL=0&CPP=99&RPP=9999&D1=0&D2=0&D3=0&D4=0&D5=0&D6=0&d1=1 on August 10, 2005.

Figure 5: Share of Demand-Induced Jobs Taken by Migrants[a]




a. The share of new demand-shock induced jobs taken by new migrants for the indicated period. The migration response is scaled up by 20 percent to reflect that a higher share of economic migrants than denoted by their population share would be employed. The remaining share would go to original residents through labour force participation and unemployment rate changes. See the text for further details.