Regional Productivity and Income Convergence in Canada Under Increasing Economic Integration

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Regional disparities in such factors as wages and incomes have long been a concern of developed and developing countries. The concern has emanated from both equity and efficiency considerations. Equity issues arise if the gains from being part of a country appear to be unfairly divided, and especially if some parts of the country appear to be permanently falling behind and bypassed by economic progress. Efficiency issues arise because disparities can be a sign that resources are not being allocated efficiently. Sustained differences in wages that reflect differences in productivity, for example, can mean that labour is not being reallocated from where its productivity is low to where it is high. Sus-tained differences in unemployment rates can mean that labour is not being reallocated from areas where it is under utilized to where it is more fully utilized. (1)

Equity and efficiency pertaining to regional inequalities are also inter-related. Lack of social access to the gains of being part of a country can lead to political and social instability that can result in efficiency costs. In such circumstances, resources have to be devoted to restore stability, property rights can become ill-defined, and capital may be reluctant to enter given the investment uncertainty. As well, if transfer payments have to be instituted to ensure a degree of equity, these can blunt the market signals that serve to reallocate resources to their most valued uses. Furthermore, the taxes needed to raise the revenues for the transfers can create distortions that also have efficiency costs. Once taxes and transfers become a significant part of the landscape, real re-sources get devoted to rent seeking activities to obtain the transfers and avoid the taxes. Clearly, issues of equity and efficiency are inextricably entwined.

The purpose of this paper is to analyze regional convergence of productivity, wages and incomes in Canada. The Canadian case is of interest for a variety of reasons. It is a country characterized by considerable regional disparities that have led to important social policy responses. In fact, the first annual review of the Economic Council of Canada (1964) asserted that one of the economic goals of the country was an equitable distribution of rising incomes. Of particular note, the equitable distribution referred to regional income and not necessarily personal income distribution. Inequalities between regions appeared to be more important than inequalities of the personal distribution of income within a region. (2)

Being a geographically large country with substantial heterogeneity in resource endowments and accesses to markets, regional issues have always been important in Canada. These have been compounded by the fact that while natural trade and

communication lines run North-South, Confederation and the 49th parallel have shifted trade, communication and transportation in the East-West direction. Greater economic inter-dependence within the Western Hemisphere will test the viability of the East-West regional links. The issue is compounded further by the special case of Quebec, with its distinct language, culture and legal system, and the possibility of its separation from Canada. These issues have given greater impetus to regional alliances within different parts of Canada: the Atlantic provinces (especially to mitigate the effects of being isolated from the rest of Canada if Quebec separates); Quebec with its "distinct society"; Ontario (with its industrial and financial base); the Prairies and Western provinces with their agriculture and resource base; and British Columbia (with its orientation to the Pacific Rim). Such regional issues are of increased importance given the fact that greater economic interdependence is giving rise to a focus on the region as opposed to the country as the appropriate unit of analyses (Courchene 1985).

Policy responses in Canada have always had an important -- and often controversial -- regional dimension. Equalization payments are prominent whereby equal per capita grants are provided to the provinces financed out of general tax revenues, with the equalization aspect coming from the fact that higher federal tax revenues are extracted from wealthier regions. Federal unemployment insurance has a number of aspects that favour certain regions, such as easier eligibility and longer benefit durations in regions of high unemployment. Federal policies have also taxed the rents from oil and natural gas rewards, to distribute throughout the country.

While the Canadian case of regional convergence is clearly interesting given the importance of these regional issues, the study should shed light on a broader set of question of more general interest.[(3)] Is there a general tendency towards convergence in per capita levels of output or income across countries, and does this have implications for regional convergence within countries like Canada? Has there been regional convergence in Canada in such dimensions as productivity, wages and incomes? What are the forces or mechanisms giving rise to or inhibiting such convergence? What has been the impact of trade liberalization and what is the expected impact of further economic integration throughout the Western Hemisphere? Does convergence mean that the poorer regions will convergence upwards at the expense of the wealthier regions experiencing falling real incomes, or can there be upward improvement for all, with convergence occurring because of larger gains going to the poorer regions? What policy implications flow from answers to such questions?

While the analysis focuses on issues of labour adjustment associated with such convergence, it eclectically draws on the extensive literature, much of it recent, that has emerged in related areas: growth convergence and preconditions for growth; migration, resource rents and equalization payments; spatial convergence and the growth and decline of cities; neighbourhood effects and the social transmission of inequality; interjurisdictional competition for investment and jobs; and trade liberalization and factor price equalization. For each of these areas, the basic theory and evidence is presented, followed by a discussion of the implications for regional convergence of productivity, wages and incomes. In that vein, the empirical analysis of this paper is in the time-

honoured tradition of "vulture-metrics" -- soaring over the remains left by others, occasionally scooping down to selectively pick the best.

Growth Convergence and Preconditions for Growth

As indicated in Barro and Sala-i-Martin (1995) convergence generally refers to the tendency of some measure (for example, per capita GDP or income) to converge across units like different countries, or regions within countries. Convergence occurs if the growth rate of the measure, over a specified time period, is negatively related to the initial level of the measure at the beginning of that time period; that is, if the poorer country or region grows more rapidly than the richer country or region so that the poorer unit tends to catch up to the richer one in terms of the measure like per capita GDP or income. This convergence can be unconditional if it simply involves the gross relationship between growth and the initial level of the variable, or it can be conditional if it also controls for other factors that affect growth rates, such as savings, trade distortions, and political, financial and institutional stability.

Conventional Neoclassical Growth Models

Conventional growth models imply that there should be a convergence of growth rates as wealthier more capital intensive economies should grow more slowly, and poorer less capital intensive economies should grow more rapidly. There are a variety of mechanisms that can foster such convergence: diminishing returns to capital; technology transfers; emulation of research and development; migration; and a high income elasticity of demand for leisure and quality of life. For example, returns to investment should be higher in the region with lower capital stock, given diminishing returns. The poorer region should be able to emulate the successful technology and research and development of the wealthier region, without having to pay for the expensive development and failures. Migration from regions of low productivity, low wages, and high unemployment to regions of the opposite characteristics should reduce those differentials that gave rise to the incentive to migrate in the first place. High income regions may use their wealth to buy leisure and quality of life and therefore grow more slowly than poorer countries that are eager to emulate higher consumption standards. Clearly, there are various mechanisms that can foster convergence amongst countries, as well as amongst regions within countries.

Endogenous Growth Models

The more recent endogenous growth literature emphasises that the very process of growth may generate externalities or positive spillover effects that generates further growth.[(4)] The spillovers may be associated with new investment and capital accumulation, since the private actors are not always able to appropriate the full benefits from their innovations, technological change and capital accumulation -- patents notwithstanding. The positive spillovers may also be associated with human capital formation, as the ideas, education, and training of some individuals may positively affect others and the market does not extract full payment. In such circumstances, wealthier more capital intensive

countries (physical and human capital) may continue to grow rapidly as growth generates the positive spillover effects that generates further growth. Conversely, poorer countries may not be able to accumulate the physical and human capital to generate the positive spillovers to facilitate a take-off into self-sustained growth.

Pre-Conditions for Growth

Both the conventional and endogenous growth and development literature thereby emphasize that certain interrelated pre-conditions may be necessary for sustained growth. These include: savings and investment; a basic infrastructure of education and training (so as to at least facilitate emulating the new technology and research and development, and perhaps to generate the learning spillovers); political stability and property rights to encourage the investment in physical and human capital; macroeconomic stability to foster savings, investment and political stability and property rights; internal competitiveness and non-distorted markets to meet the external competitive challenges; and an outward orientation, in part to encourage internal competitiveness.

The parallels with regions within a country are obvious. In essence, there are strong forces to encourage poorer regions to grow more rapidly than wealthier regions and for regional convergence thereby to occur. However, poorer regions may also fall further behind, if they do not have the pre-conditions for growth and if there is insufficient investment in physical or human capital to generate positive spillovers that would foster further growth. The problems may be compounded by migration (which is easier across regions within a country) if the more educated and skilled leave and the less educated and skilled tend to return.

Impact of Interdependence on Growth Convergence

Increased economic interdependence can have opposing effects on convergence, including regional convergence. It may foster convergence by opening up new sources of investment into the poorer region and facilitating technology transfers and the emulation of research and development. As well, by facilitating migration from low-productivity, low-wage, high-unemployment regions to high-productivity, high-wage, low-unemployment regions, increased economic interdependence should facilitate the convergence of productivity, wages and unemployment. In essence, increased economic interdependence should enhance convergence through fostering the flows of trade, investment, migration and technology that facilitate resources being allocated to their most productive uses. On the other hand, if the new investment and human capital (including migration) is attracted to the existing high stocks of physical and human capital (because of the agglomeration spillovers) then increased economic interdependence can lead to further divergence.

Evidence on Growth Convergence

The recent empirical evidence on international growth convergence does suggest that there is a tendency for convergence, in that less developed countries and regions tend to

grow more rapidly than do the more developed countries and regions.[(5)] However, when a wide range of heterogeneous countries are compared, the very poorest and least developed countries are often completely left behind if they do not have the basic pre-conditions for growth as discussed previously. For this reason, convergence may not occur if a wide range of heterogeneous countries are compared, or if there are no controls for other factors that otherwise inhibit growth in the poor countries.

Based on Canadian evidence from 1968-1992, Lee and Coulombe (1995) find that there has been regional convergence in earnings and to a lesser extent in labour productivity, but not in unemployment rates. The convergence has been fairly slow, with the half-life of the differential being about 15 years for earnings per hour and 28 years for labour productivity measured as output per hour. [(6)] The convergence is also much slower (about half these rates) when measured on a per capita rather than per hour basis, so that per capita regional living standards are much slower to converge than is productivity (measured on a per hour basis). That is, convergence is strongest on an hourly basis, less strong on a per worker basis (because of sustained divergence in hours of work), and slowest on a per capita basis (because of sustained divergence in unemployment rates). In essence, per capita incomes are not converging as rapidly as per hour labour productivity because of sustained differences in hours of work and especially unemployment.

Their analysis leads Lee and Coulombe (1995) to draw strong policy implications about the role of labour market adjustment, especially as it is slowed by unemployment insurance. They conclude (1995: 52): "Regional disparities in unemployment rates appear to impede convergence in living standards across Canada. This slow regional labour market adjustment may, in part, be due to government policies such as regionally extended unemployment benefits and interprovincial trade barriers and, in part, be due to union density which can create impediments to convergence in earnings, unemployment rates and various measures of output". They also conclude (1995: 53): "The key to reduce regional disparities in regional living standards in Canada is to reduce regional disparities in unemployment rates. There are many possible solutions for this. We suggest the best way to do it is to facilitate adjustments in the labour market by eliminating regional distortions such as regionally extended unemployment benefits and the perverse subsidy to seasonable employment that comes out of the UI system".

If economic and political integration foster convergence, one would expect to observe more rapid convergence across regions within countries than across different countries, given the greater degree of integration within countries than across countries. Yet Coulombe and Lee (1995) cite evidence indicating the speed of convergence across regions within countries (including Canada) to be about the same as between the OECD countries. Whether this reflects different starting points, or the impact of income maintenance programs within countries, or other policies that can inhibit convergence (many of which are discussed in the following sections) is an interesting and important question.

While the analysis of Lee and Coulombe (1995) focused on regional labour productivity and employment income, Milne and Tucker (1992) also examined regional personal

income (earned income plus transfers) as well as employment or earned income. They document that from 1926 to the Post World War II period, earned income and personal income were fairly similar, since transfer payments were small. Both also fluctuated considerably. Beginning in the 1950s, however, the inter-provincial dispersion in personal income became much smaller than the dispersion in earned income, since much of the dispersion in earned income was offset by transfer payments, notably those associated with equalization payments in 1957 and the liberalization of unemployment insurance in 1971.

Based on the Barro and Sala-i-Martin (1991, 1992) models that documented convergence across U.S. states, Milne and Tucker (1992) also find convergence in both earnings and post-transfer personal income across Canadian provinces over the period 1930-1990. That is, poorer provinces tended to experience more rapid growth in earnings and income than did wealthier provinces. Convergence was similar for both earnings and post-transfer income except in the decade of 1970, when per capita post-transfer income converged much more rapidly than did earnings. They suggest that this likely reflects changes in the transfer payments that occurred over that period, notably the liberalization of unemployment insurance.

Helliwell and Chung (1991) also find evidence of inter-provincial convergence of growth rates of both factor productivity and real per capita GDP over the period 1961-1989. Helliwell (1994) also finds that provinces with high income and low unemployment rates tend to attract more migrants, both from abroad and from other provinces (and vice-versa for provinces with low income and high unemployment rates). He highlights that such migration would normally foster convergence in per capita income, although this may be offset by the fact that migrants may bring considerable monetary and human capital, as well as generate positive spillover effects and aggregate demand effects through consumption spending.

Although earlier empirical studies of regional productivity and income differences tended not to strictly test for convergence (a negative relationship between initial levels of income and subsequent growth in that income), they still shed light on convergence issues. For example, based on Canadian manufacturing data for the 1961-1977 period, Denny and Fuss (1982) find that regional differences in labour productivity are greater than total factor productivity, suggesting that differences in non-labour factors of production account for some of the differences in measured labour productivity. They find indirect evidence of convergence in that interprovincial differences in total factor productivity are lower in the 1970s than in the 1960s.

Empirical evidence presented in Sharpe (1990) suggests the following generalizations pertinent to regional productivity and income convergence in Canada:

- considerable regional disparities exist in per capita GDP and personal income (the later including transfer payments);
- disparities are greater for GDP than for personal income because of the equalizing effect of transfer programs that favour the poorer regions;

- disparities in both GDP and personal income have declined over the period 1961 to 1988;
- disparities in per capita GDP are about equally due to differences in labour productivity and to differences in employment rates of the population; differences in the age structures of the population and hours of work were not important;
- differences in labour productivity were due mainly to differences in technological innovation and human resource development (education, literacy and training); differences in capital-labour ratios, natural resource endowments, and industrial structure played only a small role;
- labour productivity grew most rapidly in the region with the lowest level of productivity (Atlantic provinces) mainly because of improvements in the capital-labour ratio and in levels of education;
- federal government expenditures account for a large and growing component of GDP in the poorest region (Atlantic provinces);

  slightly more than half of the improvement of the income position of that region is accounted for by such federal expenditures, with expenditures on goods and services, transfers to individuals and transfers to governments being of about equal importance; and,

- while successful in reducing income disparities, such policies have not been successful in reducing unemployment disparities.

In general, this evidence seems consistent with a convergence story where productivity differences set in motion increases in capital investment (both physical and human capital) in the low productivity regions, and this in turn fostered convergence in productivity and ultimately in incomes. Transfer programs also fostered convergence in post-transfer income, although the extent to which they slowed down market forces that may have hastened the convergence of productivity and pre-transfer income remains an unanswered and interesting question.

Migration, Rents and Convergence

The previous discussion on growth convergence highlighted the potential importance of migration as a mechanism that can affect convergence. [(7)] In general, we think of migration as fostering convergence as people move from areas of low productivity and low wages to areas of high productivity and high wages. This mechanism is undoubtedly at work. However, migration can have other effects that can foster divergence. If the "best leave" and the "worst return" then migration can lead to a compositional change in the populations that can lower the productivity and income of the sending region. The likelihood of this occurring is enhanced by the fact that the more educated are likely to leave a declining region. Outmigrants may also be a select group in terms of unobserved characteristics such as motivation and initiative.[(8)]

Migration can also lead to divergence if the migration brings savings and investment capital, as is likely the case. Migration may also lead to divergence if it goes to human

capital clusters that generate positive spillover effects along the lines of those discussed in the endogenous growth literature. [(9)] In such circumstance, the sending region looses not only the human capital of the migrant but also the positive spillover externalities. Conversely, the receiving region grows even more rapidly because of the positive spillover effects. If the productivity spillovers are not fully internalized into wages, then productivity divergence may be more prominent than wage divergence, and convergence of wages and marginal products need not occur.

Convergence of marginal products also need not occur if the migration is in response to rents rather than arbitrage opportunities generated by real productivity differences. The public finance literature on fiscal federalism discusses this possibility in the context of rents generated by natural resource developments in a particular region.[(10)] The rents may be used to pay for local public services or reduced taxes. This in turn may encourage in-migration in response to the attractive fiscal tax-expenditure package. Such migration would be inefficient since it would lower marginal products (and wages, if labour were paid its marginal product) in those regions. Marginal products could differ by region because of the migration, not because of its absence as an equilibrating force. The potential for such inefficient migration has given rise to a possible efficiency rationale for equalization payments to offset the tendency for that type of migration.

Such inefficient migration could be induced by sources of rents other than those generated by natural resource wealth. Sources of rents could include: union wage rents that could differ across provinces because of different union density or abilities to extract such rents; public sector wage rents that may reflect different provincial government pay practices or the federal government policy of paying uniform wages across the country; and regulatory wage rents that reflect regional differences in regulatory practices. In all these circumstances, migration to the high-wage areas, if it could not dissipate the rents, would simply lead to inefficient queuing for those high-wage jobs. Certainly, the reduced likelihood of obtaining the coveted job could deter in-migration, but this may be offset by unemployment insurance that offsets some of the costs of the "wait unemployment".

Transfer payments that may go to low-wage, high-unemployment areas (and that are not equalization payments designed to deter rent seeking migration) can also reduce the efficient outmigration that could raise wages and lower unemployment in these areas. Transfers may also be a "magnet", attracting in-migration that again is dictated by the receipt of transfers and not by marginal product differences.

Clearly, migration need not be efficiency enhancing if it is dictated by natural resource or other rents, or deterred by transfers that are not designed to offset rent seeking migration. Rather than arbitraging marginal productivity differentials, migration may enhance such differentials if it is dictated by rents or transfers.

A number of empirical studies on the determinants of regional migration in Canada have tried to capture such effects by including variables to reflect natural resource rents and transfer payments as well as the more conventional determinants of migration, including income and unemployment.[(11)] The results generally confirm that migration is from low-

income, high-unemployment regions to high-income, low-unemployment regions, and that it serves to reduce those differences. [(12)] The impact of natural resource rents and transfer payments is more in dispute, albeit most studies have found that unemployment insurance has reduced regional migration, especially because of the regionally extended benefits. [(13)] Furthermore, the effect of traditional economic variables has been blunted in more recent years, as transfers and equalization payments have become more important. In essence, migration tends to foster convergence, albeit this is blunted by transfer and other payments that reduce the economic incentives to migrate.

Spatial Convergence, Convergence and the Growth and Decline of Cities

The recent literature on spatial economics and the growth of cities may also shed light on the impact of trade liberalization on regional convergence. [(14)] Cities minimize transactions and transportation costs by locating different producers as well as producers and consumers together. Their growth may also be fostered by the agglomeration externalities (akin to those of the endogenous growth literature) that can be enhanced by concentrating inter-related investment and human capital. This trades off against negative congestion externalities, that can also create costs to firms that have to pay compensating wage premiums for such externalities such as crime and long commutes.

Trade liberalization can reduce the growth and dominance of major cities by reducing transaction and transportation costs in the hinterland because "the market" is no longer only the domestic market dominated by the major cities. [(15)] This may be offset by the fact that major cities may be the centre for the finance, commerce and trade that becomes more important under and economic interdependence. As well, to the extent that the global market place enables spreading and amortizing the positive agglomeration externalities of concentrated and clustered activities, then such concentration may be fostered by increased interdependence (albeit smaller industrial parks and high-tech developments may suffice, especially in a world brought closer by advanced communications and technology). [(16)]

The implications for Canadian cities and regional convergence are not straightforward and obvious, in part because the major cities that used to feed (or feed off of) the Canadian hinterland also tend to be close to the U.S. border. There may be pressures leading to the decline of major cities since the Canadian hinterland now has more ready access to the United States, both for imports and exports. Toronto, for example, arose in prominence as a manufacturing centre in part because the tariff walls ensured that the rest of Canada was a captive market for its manufacturing goods. That protection is now being dissipated, although Toronto (and the surrounding "Golden Horseshoe") is also closely situated to much of the U.S. market and hence its fortunes may be tied somewhat to what occurs in parts of the mid-West and New York State. Furthermore, Toronto has restructured from manufacturing to more of a financial and commercial centre, and the demand for such services are likely to increase with greater economic interdependence and the associated restructuring.

Vancouver has always been more isolated from the rest of Canada and hence is unlikely to lose substantially by the fact that its surrounding hinterland now has easier access to the U.S. market. Furthermore, its prominence is enhanced by its proximity to the growing Pacific Rim, as well as to the Cascadia alliance involving the Vancouver-Seattle corridor. The effect on cities like Calgary, Halifax and Montreal will likely depend upon the extent to which they and their own hinterlands interact more with proximate U.S. markets, and they become more important as heads of newer regional trade or political alliances.

Neighbourhood Effects and the Social Transmission of Inequality

The literature on endogenous growth and the growth of cities both emphasize the importance of positive spillovers and clustering externalities in inhibiting convergence, and possible fostering divergence of growth rates and of city sizes. Similarly, the literature on neighbourhood effects, emphasises the positive and negative spillovers that can prevail as individuals cluster, both voluntarily and involuntarily, into particular neighbourhoods.[(17)] The networks and role models emanating from such neighbourhoods can foster divergence as the positive effects from good neighbourhoods are transmitted intergenerationally, as are the negative effects of bad neighbourhoods.

As applied to issues of regional convergence, that literature would suggest that to the extent that neighbourhood effects encompass or disproportionately affect particular regions, they may foster the divergence of productivity, wages and incomes across regions. Younger generations especially may be affected by the networks and role models established in their regional neighbourhood. In Newfoundland, for example, considerable concern has been expressed internally that younger generations are increasingly becoming dependent upon unemployment insurance as they adjusted their work and education decisions to their community norms that were geared to the interaction of unemployment insurance and seasonal work, especially in the fishing industry.[(18)] To the extent that such neighbourhood effects are prominent they can certainly slow the process of regional convergence, and lead to particular neighbourhoods being completely bypassed and marginalized by the process of economic interdependence.

Inter-Jurisdictional Competition for Investment and Jobs

Countries, and regions within countries, can compete for business investment and the jobs associated with that investment in a variety of ways including alterations in taxes, subsidies, regulations, and infrastructures. Increased economic interdependence fosters such inter-jurisdictional competition in a variety of ways. With trade liberalization, organizations can more easily locate in their preferred jurisdictions and export into the other more costly jurisdictions. This is especially the case with the more flexible factories of the information age that are replacing the fixed worksites of the old smoke-stack industries. Capital and labour mobility also may be influenced by the tax-expenditure package offered by different jurisdictions.

The extent to which the interjurisdictional competition is economically efficient depends in part upon the extent to which it is influenced by political factors that do not have an

economic rationale. Governments of course can dole out favours under the guise of regional development.[(19)] Increased economic interdependence likely makes such pure political acts more transparent, since costly political inefficiencies are likely to adversely affect investment and inflows of foreign capital. Also, as pointed out by McKinnon (1994, 1995), the extent to which governments engage in efficient competition depends upon the extent to which they face hard or soft budget constraints. Governments that can deficit finance and control the money supply (for example, central governments), or that are assisted by higher levels of government through transfers, often face soft budget constraints, and therefore can engage in wasteful competition -- bidding too high a price to attract new business investment.

Whatever the motivation behind such interjurisdictional competition, it can have a complicated effect on regional disparities and convergence. It can reduce disparities to the extent that declining or poorer regions can outbid the wealthier regions for the new investment. If, for example, the social opportunity cost of the public infrastructure in a region is close to zero (because that region has declined irrevocably) then it may make economic sense for that region to charge a zero price for the use of that infrastructure. Similarly, such regions may be willing to compete on the basis of reduced regulatory costs, including labour regulations. This can foster convergence by attracting investment and jobs, leading to improvements in productivity and wages in those poorer regions.

Of course, regions that are extremely poor may not even have the basic infrastructure to offer at zero price (and especially at a negative price or subsidy). They may be caught in a perpetual "poverty trap" especially when competing with wealthier regions that are growing because of positive spillovers and agglomeration externalities, much of which gets capitalized into property values and hence regional tax bases that provide the means for financing further public infrastructures that attracts additional investment.

Interjurisdictional competition for investment and jobs may also have important indirect effects on regional disparities and convergence. Higher levels of government, such as the federal government in Canada, may find it increasingly difficult to finance programs that favour poorer regions. Higher taxes or federal regulatory requirements may lead to an exodus of business investment or financial capital to countries without such requirements. Increased interdependence and the associated mobility means that there are fewer fixed factors to tax.

In such circumstances, transfer or expenditure programs that favour poorer regions may dissipate (Gunderson 1990). This would be enhanced by the possibility that under trade liberalization they could also be interpreted as unfair subsidies and hence subject to countervailing duties. Furthermore, firms may be reluctant to locate into regions where they have to compete with the transfer system for labour and the transfer system has adverse effects on work incentives and human capital formation. This pressure on federal transfer payments can lead to a decline in the post-transfer income in the poorer regions and hence lead to greater post-transfer regional disparities and divergence. However, to the extent that the transfer programs themselves had discouraged the very market forces that could foster convergence (for example, migration and investment) then this may

foster convergence in pre-transfer income. Clearly, interjurisdictional competition, as it is affected by increased economic interdependence, can have a complicated set of effects on regional convergence.

Factor Price Equalization

Trade liberalization can also lead to convergence through factor price equalization. In essence, countries or regions with a comparative advantage in low-wage labour will export labour intensive goods, and countries with high-wage labour will import labour intensive goods. This increase in demand for labour intensive exports in the low-wage country will raise export prices and hence the wages of low-wage labour that produces those exports. Conversely, the fall in the price of labour intensive imports in the importing country will lower wages in that country.[(20)] This implies a tendency towards factor price equalization for the same type of labour across the trading partners. It can also lead to greater wage inequality within the high-wage country, since wages at the bottom of that wage distribution are most likely to be adversely affected by the import competition from low-wage countries.

Factor price equalization refers to an equality of factor prices of homogeneous factors of production. It does not imply an equality of wages across all trading partners because labour in different countries can embody different amounts of human capital or efficiency units. Furthermore, extremely stringent conditions are required for factor price equalization to occur. As well, any tendency for trade to lead to factor price equalization may be offset by the tendency for trade to lead to real wage improvements in all countries, largely because trade can enhance scale economies and lead to greater internal efficiencies (Bhagwati and Dehejia 1994).

To the extent that it does occur, factor price equalization can have a complicated array of effects on regional convergence. It may foster convergence in wages across trading partners. But this can have an ambiguous effect on regional wage differentials within a country because different regions may have different amounts of labour subject to the pressures of factor price equalization. It can foster regional wage divergence, for example, if the low-wage regions are adversely affected by import competition from low-wage countries, and the high-wage regions have their wages increase even more if they export human capital intensive products or services.

Factor price equalization across regions within a country will also be affected by internal trade within the country. To the extent that internal trade is enhanced by external trade, then this should foster internal factor price equalization. The opposite will occur if internal trade is reduced, for example, if goods produced by external firms outside the country are substituted for goods produced by firms in other regions of the country.

In essence, to the extent that it does occur, factor price equalization can lead to wage convergence for the same type of labour across countries that engage in more trade. But its effect on regional wage convergence within a country is ambiguous because trade

affects regions differently, and external trade can have an ambiguous effect on internal trade that could also foster factor price equalization.

The empirical literature on productivity and wage convergence via factor price equalization has tended to involve wage comparisons across countries undertaking varying degrees of trade with each other.[(21)] Sometimes the comparisons are at the disaggregate level within the same industry across countries. The following generalizations emerge from those studies:

- productivity and wage convergence does tend to occur as trade increases, and it is greater in the tradable than non-tradable sectors;
- technology transfers tend to be more important in fostering productivity convergence than in altering capital-labour ratios through investment;
- productivity growth tends to be more rapid in all industries in the low-productivity, low-wage country, suggesting that aggregate convergence tends to occur because of productivity convergence across all industries, not because of compositional shifts in the industrial structure;
- in spite of this, different countries still tend to develop comparative advantages in particular industries where they have economies of scale and agglomeration externalities; and,
- while there is a general tendency towards convergence, it is by no means automatic. Upward convergence in the low-productivity countries requires certain pre-conditions (akin to the pre-conditions for sustained growth). The high-productivity countries need not experience downward convergence, if they develop market niches in particular industries based on economies of scale and agglomeration externalities.

These same generalizations would seem to apply to convergence across regions within countries if internal trade were increased (perhaps as a complement to increased external trade). Of course, the fact that labour mobility is usually greater within a country than across countries suggest that factor price equalization should also be enhanced across regions for that reason.

A number of empirical studies have recently documented that the increased import competition from low-wage developing countries has adversely affected low-wage workers in the United States, and this has contributed to the growing wage inequality that has occurred.[(22)] In many cases, however, the impact of trade was interpreted to be quantitatively small relative to the effect of skill-biased technological change (albeit disentangling the effect of trade and technology is an obviously difficult task). Furthermore, a number of these studies have been subject to a variety of criticisms suggesting that they have overemph-asised the importance of trade and under-emphasised the importance of technological change.[(23)]

The theory and evidence on factor price equalization and on the impact of trade on wage inequality suggest that similar forces could be at work across regions within a country. To the extent that inter-regional trade is enhanced (perhaps as a complement to increased

external trade) then factor price equalization should foster productivity and wage convergence across regions. While this can reduce wage differentials for the same type of labour across regions (and this will be fostered by labour mobility), it will likely increase wage inequality within the higher-wage region since low-wage workers within that region are likely to be adversely affected by the labour intensive import competition from the low-wage region. Similarly, high-wage labour within the high-wage region is likely to benefit disproportionately from the human capital intensive exports. For the low-wage region, greater wage equality is likely to occur as wages at the bottom are raised from the increased labour intensive exports and wages at the higher end are reduced from the human-capital intensive imports. In such circumstances, it is possible for trade liberalization to foster regional convergence in productivity and wages for the same type of labour, but to increase wage inequality in the high-wage region and reduce inequality in the low-wage region, because different types of labour are affected differently from trade liberalization.

Concluding Observations

Clearly, there are strong forces at work to foster regional convergence of productivity, wages and incomes. This is manifest through a variety of interrelated ways: growth convergence; migration and its impact on the determinants of migration; the spatial convergence of city sizes; interjurisdictional competition for investment and jobs; and factor price equalization through trade liberalization. Greater economic integration associated with such factors as trade liberalization and capital mobility tend to enhance these forces.

Each of these process are also associated with forces working in the opposite direction to slow the process of convergence or even to foster divergence. These forces emanate from such factors as positive spillover externalities from physical or human capital formation in endogenous growth models, from agglomeration externalities in spatial models of city growth, and from positive and negative neighbourhood effects in models of the social and intergenerational transmission of inequality. Migration can also foster divergence if it is in response to natural resource or other rents as opposed to productivity and wage differentials. Transfer payments that can foster convergence in post-transfer incomes, can offset the market forces that otherwise may lead to convergence in pre-transfer productivity and wages.

Clearly, theoretical considerations do not give unambiguous predictions about the extent to which these forces will, on net, foster regional convergence or divergence, or how this will be altered by increased economic interdependence. The empirical evidence in each of these areas tends to suggest that regional convergence will occur in such factors as productivity, wages and incomes. Nevertheless, there is considerable variability in the convergence, and there is certainly no guarantee that the very poorest regions will converge upwards. There is a very real danger that poor regions may be bypassed by the process of integration and become increasingly marginalized, especially if they do not possess certain minimal pre-conditions for upward convergence.

With respect to the wealthier regions, their slower growth in productivity, wages and income need not imply an absolute decline in those dimensions. They may experience upward convergence around a rising living standard especially if they can develop the scale economies and positive externalities of growth and agglomeration to sustain high productivity and wages.

Transfer payments (especially important in Canada) can foster the convergence of post-transfer income, although the extent to which this "crowds out" the market forces that would otherwise foster a convergence of productivity and wages remains an open and interesting question. Such transfers are likely to be more difficult to sustain under increased economic integration; hence, the effects of market forces on convergence or divergence are likely to become more pronounced.

Clearly, there are a variety of forces that can affect the degree of convergence or divergence in such dimensions as productivity, wages and income. The impact of these different forces was analyzed here through the spectrum of the interrelated literature in various areas: growth convergence and pre-conditions for growth; migration, resource rents and equalization payments; spatial convergence and the growth and decline of cities; neighbourhood effects and the social transmission of inequality; interjurisdictional competition for investment and jobs; and trade liberalization and factor price equalization. That literature was discussed here in separate (albeit sometimes interrelated) compartments. Given the commonalities of this literature, however, our theoretical understanding of the underlying forces in this area could be advanced by developing the common underlying theoretical model that nests these as special cases of that framework. Understanding the common elements of these forces as they apply to regions, and compiling evidence on their magnitudes, will become increasingly important with the growing emphasis on regions as the appropriate unit of analysis under increased economic interdependence.

References

Ades, A. and E. Glaeser. 1995. "Trade and Circuses: Explaining Urban Giants. *Quarterly Journal of Economics*, 110: 195-227

Barro, R. 1991. "Economic Growth in a Cross-Section of Countries". *Quarterly Journal of Economics*, 105: 407-443.

Barro, R. and X. Sala-i-Martin. 1991. "Convergence Across States and Regions". *Brookings Papers on Economic Activity*, 1: 107-158.

_____. 1992. "Convergence". *Journal of Political Economy*, 100: 407-443.

_____. 1995. *Economic Growth*. New York: McGraw-Hill.

Bhagwati, J. and V. Dehejia. 1994. "Freer Trade and Wages of the Unskilled: Is Marx Striking Again?", in J. Bhagwati and M. Kosters (eds.). *Trade and Wages: Levelling Wages Down?*. Washington: AEI Press.

Boadway, R. and F. Flatters. 1981. "The Efficiency Basis for Regional Policy. *Canadian Journal of Economics*, 14: 58-77.

_____. 1982. "Efficiency and Equalization Payments in a Federal System of Government". *Canadian Journal of Economics*, 15: 613-633.

Borjas, G. 1992. "Ethnic Capital and Intergenerational Mobility". *Quarterly Journal of Economics*, 107: 123-150.

_____. 1994a. "Long-run Convergence of Ethnic Skill Differentials". *Industrial and Labor Relations Review*, 47: 553-573.

_____. 1994b. "Ethnicity, Neighbourhoods and Human Capital Externalities. NBER Working Paper 4912.

Borjas, G., R. Freeman and L. Katz. 1992. "On the Labor Market Effects of Immigration and Trade", in G. Borjas and R. Freeman (eds.). *Immigration and the Workforce*. Chicago: University of Chicago Press.

Buchanan, J. 1950. "Federalism and Fiscal Equity. *American Economic Review*, 40: 583-599.

Coulombe, S. and F. Lee. 1995. "Convergence Across Canadian Provinces, 1961 to 1991". *Canadian Journal of Economics*, 28: 886-898.

Courchene, T. 1970. "Interprovincial Migration and Economic Adjustment". *Canadian Journal of Economics*, 3: 550-576.

_____. 1981. "A Market Perspective on Regional Disparities". *Canadian Public Policy*, 7: 506-518.

Day, K. 1992. "Interprovincial Migration and Local Public Goods". *Canadian Journal of Economics*, 25: 123-144.

Denny, M. and M. Fuss. 1992. *Productivity: A Select Review of Recent Developments and the Canadian Experience*. Toronto: Ontario Economic Council.

Dollar, D. and E. Wolff. 1988. Convergence of Labor Productivity Among Advanced Economies". *Review of Economics and Statistics*, 70: 549-558.

_____. 1993. *Competitiveness, Convergence and International Specialization*. Cambridge: MIT Press.

Dollar, D., E. Wolff and W. Baumol. 1988. "The Factor-Price Equalization Model and Industry Labor Productivity: An Empirical Test Across Countries", in R. Feenstra (ed.). *Empirical Methods for International Trade*. Cambridge: MIT Press.

Dowrick, S. and D. Nguyen. 1989. "OECD Comparative Economic Growth, 1950-85: Catch-Up and Convergence". *American Economic Review*, 79: 1010-1031.

Economic Council of Canada. 1964. *First Annual Review: Economic Goals for Canada to 1970*. Ottawa: Queen's Printer.

Glaeser, E., H. Kallal, J. Sheinkman and A. Shleifer. 1992. "Growth in Cities". *Journal of Political Economy*, 100: 1126-1152.

Gremmen, H. 1985. "Testing the Factor Price Equalization Theorem in the EC". *Journal of Common Market Studies*, 23: 277-286.

Gunderson, M. 1983. *Economics of Poverty and Income Distribution*. Toronto: Butterworths.

_____. 1990. "Regional Dimensions of the Impact of Free Trade on Labour". *Canadian Journal of Regional Science*, 13: 243-254.

_____. 1995. "Income Transfers Under Increased Economic Integration: The Case of Newfoundland in Canada. Stanford University, North America Forum, mimeo.

Gunderson, M. and D. Hamermesh. 1991. "The Effect of Free Trade on the North American Labour Market", in C. Reynolds, L. Waverman and G. Bueno (eds.). *The Dynamics of North American Trade and Investment: Canada, Mexico and the United States*. Stanford: Stanford University Press.

Gunderson, M. and C. Reynolds. 1995. "Productivity and Wage Convergence Under Asymmetric Free Trade". Stanford University, North America Forum, mimeo.

Gunderson, M. and C. Riddell. 1993. *Labour Market Economics: Theory, Evidence and Policy in Canada*. Toronto: McGraw-Hill.

Hanson, G. 1995. "Regional Adjustment to Trade Liberalization". University of Texas, Department of Economics, mimeo.

Helliwell, J. 1994. "Convergence and Migration Among Provinces". University of Toronto, Policy and Economic Analysis Program Study 94-2.

Helliwell, J. and A. Chung. 1991. "Are Bigger Countries Better off?", in R. Boadway, T. Courchene and D. Purvis (eds.). *Economic Dimensions of Constitutional Change*. Kingston: John Deutsch Institute.

Hess, P. 1989. "The Military Burden, Economic Growth, and the Human Suffering Index: Evidence from the LDCs. *Cambridge Journal of Economics*, 13: 497-515.

Katz, L.F. and K. Murphy. 1992. "Changes in Relative Wages, 1963-1987: Supply and Demand Factors". *Quarterly Journal of Economics*, 107: 35-78.

Kormendi, R. and P. Meguire. 1985. "Macroeconomic Determinants of Growth: Cross-Country Evidence". *Journal of Monetary Economics*, 16: 141-163.

Krugman, P. 1991. "Increasing Returns and Economic Geography. *Journal of Political Economy*, 99: 483-499.

Krugman, P. and R. Livas. 1992. "Trade Policy and the Third World Metropolis". National Bureau of Economic Research Working Paper 4238.

Krugman, P. and R. Lawrence. 1993. "Trade, Jobs and Wages". NBER Working Paper 4478.

Lawrence, R. and M. Slaughter. 1993. "Trade and U.S. Wages in the 1980s: Giant Sucking Sound or Small Hiccup?". *Brookings Papers on Economic Activity: Microeconomics*.

Leamer, E. 1993. " Wage Effects of a U.S.-Mexican Free Trade Agreement", in P. Graber (ed.). *The Mexico-U.S. Free Trade Agreement*. Cambridge: MIT Press.

Lee, F. and S. Coulombe. 1995. "Regional Productivity: Convergence in Canada". *Canadian Journal of Regional Science*, 18: 39-56.

Lucas, R. E. 1988. "On the Mechanics of Economic Development". *Journal of Monetary Economics*, 22: 3-42.

McKinnon, R. 1994. "Market-Preserving Fiscal Federalism in the American Monetary Union". Stanford University, Economics, mimeo.

_____. 1995. "Intergovernmental Competition in Europe With and Without a Common Currency". Stanford University, Economics, mimeo.

Mills, K., M. Percy and L. Wilson. 1983. "The Influence of Fiscal Incentives on Interregional Migration: Canada 1961-78". *Canadian Journal of Regional Science*, 6: 207-229.

Milne, W. and M. Tucker. 1992. "Income Convergence Across Canadian Provinces: Does Growth Theory Help Explain the Process?". *Atlantic Canada Economic Association Papers*, 21: 170-182.

Mokhtari, M. and F. Rassekh. 1989. "The Tendency Towards Factor Price Equalization Among OECD Countries". *Review of Economics and Statistics*, 71: 636-642.

Murphy, K.M. and F. Welch. 1991. "Wage Differentials in the 1980s: The role of International Trade", in M. Kosters (ed.). *Workers and their Wages: Changing Patterns in the United States*. Washington D.C.: American Enterprise Institute.

_____. 1992. "The Structure of Wages". *Quarterly Journal of Economics*, 107: 285-326.

Mydral, G. 1957. *Economic Theory and Underdeveloped Regions*. London: Duckworth.

Polèse, M. 1981. "Regional Disparity, Migration and Economic Adjustment". *Canadian Public Policy*, 7: 519-525.

Rassekh, F. 1992. "The Role of International Trade in the Convergence of Per Capita GDP in the OECD, 1950-1985". *International Economic Journal*, 6: 1-15.

Rauch, J. 1993. "Productivity Gains from Geographic Concentration of Human Capital: Evidence from the Cities". *Journal of Urban Economics*, 34: 380-400.

Reynolds, C. 1992. "Will a Free Trade Agreement Lead to Wage Convergence? Implications for Mexico and the United States", in J. Bustamante, C. Reynolds and R. Hinojosa-Ojeda (eds.). *U.S.-Mexico Relations: Labor Market Interdependence*. Stanford: Stanford University Press.

Reynolds, C. and R. McCleery. 1988. "The Political Economy of Immigration Law: Impact of Simpson-Rodino on the United States and Mexico". *Journal of Economic Perspectives*, 2: 117-131.

Romer, P. 1986. "Increasing Returns and Long-Run Growth". *Journal of Political Economy*, 94: 1002-1037.

_____. 1990. "Endogenous Technological Change". *Journal of Political Economy*, 98: 71-101.

Shaw, R. 1986. "Fiscal Versus Traditional Market Variables in Canadian Migration". *Journal of Political Economy*, 94: 648-666.

Sharpe, A. 1990. "Trends in Regional Disparities in Canada". *Quarterly Labour Market and Productivity Review*, Spring/Summer: 23-38.

Tovias, A. 1982. "Testing Factor Price Equalization in the EEC". *Journal of Common Market Studies*, 20: 375-388.

Watson, W. 1986. "An Estimate of the Welfare Gain from Fiscal Equalization". *Canadian Journal of Economics*, 19: 288-308.

Wilson, L. 1993. "Regional Employment Subsidies and Migration". *Canadian Journal of Economics*, 26: 288-308.

Wilson, W. 1987. *The Truly Disadvantaged: The Inner City, The Underclass, and Public Policy*. Chicago: University of Chicago Press.

Winer, S. and D. Gauthier. 1982. *Internal Migration and Fiscal Structure: An Economic Study of the Determinants of Migration*. Ottawa: Economic Council of Canada.

Zagardo, J.T. 1991. "Worldwide Convergence of Productivity Levels: Recent Empirical Evidence". *Business Economics,* October: 19-25. Helpful suggestions from the editor, two anonymous referees, and Clark Reynolds of Stanford, are gratefully acknowledged as is support from a Ford Foundation grant to the North America Forum of the Institute for International Studies at Stanford University.

1.Of course, regional differences in such factors as wages and unemployment rates need not reflect market inefficiencies. In the short-run, they can be the signals for the reallocation of resources. Even in the long-run, they can reflect equilibrium differences in the human capital and other endowments of the workforce, as well as natural rates of unemployment associated with such factors as frictional and seasonal unemployment.

2. The emphasis on regional as opposed to personal income disparities is discussed in Gunderson (1983).

3. Many of these issues are dealt with, for example, in Barro and Sala-i-Martin (1991, 1992), Krugman (1991) and Romer (1986, 1990).

4. For example, Lucas (1988) and Romer (1986, 1990) and the more recent text-book treatment in Barro and Sala-i-Martin (1995).

5. Barro (1991), Barro and Sala-i-Martin (1991, 1992), Dollar and Wolff (1993), Dowrick and Nguyan (1989), Hess (1989), Kormendi and Meguire (1985), Rassekh (1992), and Zagardo (1991). That literature is discussed, and contrasted with earlier studies, in Gunderson and Reynolds (1995). It is based on inter-country comparisons, although Barro and Sala-i-Martin (1991, 1992) also document convergence in per-capita income across the states in the United States.

6. Half life is the number of years it takes to reduce the initial gap by one-half.

7. The importance of migration in the context of increased economic integration is discussed in Reynolds (1992) and Reynolds and McCleary (1988).

8. This is one of the reasons often given in the assimilation literature for why immigrant wages often surpass the wages of native born persons of the same observable characteristics, as opposed to simply catching-up to those wages.

9. potentially destabilizing effects of migration are given in Myrdal (1957), and in the context of Canadian migration, by Polèse (1981). In the regional science literature, these are referred to as "backwash effects" or "cumulative causation".

10. Boadway and Flatters (1981, 1982), Buchanan (1950).

11. Courchene (1970, 1981), Day (1992), Mills, Percy and Wilson (1983), Shaw (1986) and Winer and Gauthier (1982).

12. This is a robust conclusion from the Canadian migration literature (Gunderson and Riddell 1993: 490).

13. Shaw (1986) finds no effect from natural resource rents, although Day (1992) finds provincial government spending on such items as health and education to significantly affect migration, and she argues that such expenditures could be financed out of resource rents. Watson (1986) estimates that even if provincial equalization payments deter migration (as found in Winer and Gauthier (1982)), only small welfare gains arise from deterring such fiscally induced migration that can occur in response to resource rents.

14. Ades and Glaeser (1995), Glaeser, Kallal, Scheinkman, and Shleifer (1992), Krugman (1991), Krugman and Livas (1992), and Rauch (1993).

15. This is emphasized in Krugman (1991) and Krugman and Livas (1992) in their discussion of why Mexico city grew under protectionism, and will decline in relative importance under NAFTA, especially relative to cities in Northern Mexico which are closer to the U.S. market. Ades and Glaeser (1995) also provide evidence that protectionism led to a concentration of population into large cities throughout the world, including in Latin America, although they emphasize the role of dictatorships and political instability in favouring the concentration of population in major cities.

16. Hanson (1995) provides evidence indicating that trade liberalization has contributed to the decline of the manufacturing belt in Mexico city, and the re-orientation towards specialized industrial centres in the North of Mexico, reflecting their lower transportation costs to the U.S. market. He finds there are some agglomeration externalities associated with clustering of upstream and downstream industries, but not with agglomeration of firms in the same industry.

17. Borjas (1992, 1994a, 1994b), Wilson (1987).

18. This is discussed in Gunderson (1995).

19. Ades and Glaeser (1995), for example, provide evidence suggesting that many Latin American and other countries have high concentrations of their population in capital cities because political power was concentrated in those cities. As such, they were able to tax the hinterland and distribute it in the capital. Migration flooded the capital (fostering further concentration) to share the wealth and to receive transfers designed to quell local unrest.

20. Gunderson and Hamermesh (1991) discuss why negative demand shocks may be absorbed by employment reductions rather than wage reductions, at least in the short-run.

21. Reviews of that literature are contained in Dollar and Wolff (1993) and Gunderson and Reynolds (1995). Specific studies include Dollar and Wolff (1988, 1993), Dollar, Wolff and Baumol (1988), Gremmen (1985), Leamer (1993), Mokhtari and Rassekh (1989), Rassekh (1992) and Tovias (1982).

22. Borjas et al. (1992), Katz and Murphy (1992) and Murphy and Welch (1991, 1992).

23. Bhagwati and Dehejia (1994), Krugman and Lawrence (1993), and Lawrence and Slaughter (1993).