NB-IRDT

New Brunswick Institute for Research, Data and Training

THE ECONOMIC IMPACTS OF MIGRATING FROM NEW BRUNSWICK TO ALBERTA/SASKATCHEWAN AND RETURN TO NEW BRUNSWICK

PROJECT INFO

PROJECT TITLE

The Economic Impacts of Migrating from New Brunswick to Alberta/Saskatchewan and Return to New Brunswick

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RESEARCH TEAM

This project was completed with the assistance of analysts at NB-IRDT

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EXECUTIVE SUMMARY

New Brunswick (NB) experiences substantial outmigration of its residents and since 2003, Alberta and Saskatchewan (AB/SK) have emerged as top destinations for NB out-migrants. The correlates of inter-provincial migration have been studied but less is known about the correlates of return migration and the earnings "consequences" of return migration for the migrant and the home economy. To the extent that the oil price collapses of 2008 and 2014 were unanticipated, migration to AB/SK from NB, and return migration to NB, may reflect exogenous variation in labour market opportunities affording an opportunity to identify the causal impacts of migration for out-migrants, return migrants and the NB economy.

Using taxfiler data from Statistics Canada, we investigate whether NB residents who move to Alberta or Saskatchewan (AB/SK) and then return to NB have comparable characteristics and earnings to both NB workers who move to and remain in AB/SK and workers who stayed in NB. We find that compared to non-migrants, NB migrants to AB/SK are younger, more likely to be male and less likely to be married. The probability of returning to New Brunswick falls with the time spent in AB/SK. Amongst the migrants from NB, those who choose to return to NB are younger, more likely to be male, working in construction and not married.

In terms of earnings before and after migration, it appears that migration from NB to Alberta and Saskatchewan was equally advantageous in terms of earnings gains for male return migrants and permanent migrants prior to return to New Brunswick. Female return migrants did not have the same earnings gain as female permanent migrants in Alberta/Saskatchewan. The surprising result is that the return migrants did not experience any earnings gains in excess of those of New Brunswickers who never left the province. This runs counter to the expectation that often underlies population policies that increasing the labour supply can cause growth of the economy but agrees with the OECD assessment that return migration is not likely to drive economic growth. Instead, return migration is likely symptomatic of the opportunities being created in the home economy. Growth in population and GDP in NB is more likely to occur from strategies focused on promoting investment and technical progress. The improvement in labour market conditions will result in more migration to NB and more retention of population.

Our results on the earnings impacts of return migration suggests that policies aimed at increasing marketable human capital through training and experience will not cause higher incomes of the individuals in NB. Policies aimed at increasing the number of return migrants or immigrants will not cause growth of the economy. What will increase GDP, immigration and return migration in NB are policies and institutions aimed at increasing labour demand through increased investment in capital stocks and technical progress.

INTRODUCTION

New Brunswick (NB) experiences substantial outmigration of its residents, particularly among younger residents, traditionally to Ontario, Nova Scotia and Quebec. Since 2003, however, Alberta and Saskatchewan (AB/SK) have emerged as top destinations for NB out-migrants matching the numbers moving to Ontario on average though with considerably more fluctuation over the period, reflecting the volatility of oil and gas prices which drive the Alberta economy. The correlates of inter-provincial migration have been studied but less is known about the correlates of return migration and the earnings "consequences" of return migration for the migrant and the home economy.[1] To the extent that the oil price collapses of 2008 and 2014 were unanticipated, migration to AB/SK from NB, and return migration to NB, may reflect exogenous variation in labour market opportunities affording an opportunity to identify the causal impacts of migration for out-migrants, return migrants and the NB economy. We can study who leaves and who returns to see if they are a "positive" or "negative" selection of New Brunswickers -- Are out-migrants the lesser or better of the NB citizens? Are return migrants the lesser of the migrants?[2]

The contribution of return migrants to the development of their home economy can arise from a combination of resources (human and financial) they transfer before and at the time of their return and the economic returns to those resources. The OECD (2008) describes three classes of resources that return migrants transfer to the home economy -- their human capital gains in terms of experience and education acquired abroad; financial capital in the form of accumulated savings, and social capital obtained from their migration experience. These resources can have a direct impact on GDP growth and indirect impacts. Return migrants may create new businesses, transfer or adopt new technologies, or disseminate new ideas and better business practices for the home economy that they were exposed to in the host economy. Return migrants could help improve the functioning of markets in the home economy. Whether NB benefits from return migrants in the form of a net gain in human capital and GDP for the province depends on whether the return migrant's human capital increased compared to what would have been the case had they chosen not to migrate and whether the increased human capital is "fully employed", i.e., employed in its highest value activity in NB.

Using taxfiler data from Statistics Canada, we investigate whether NB residents who move to Alberta or Saskatchewan (AB/SK) and then return to NB have comparable characteristics and earnings to both workers who remain in AB/SK after moving from NB and workers who remained in NB[3]. We find that compared to those non-migrants, NB migrants to AB/SK are younger, more likely to be male and less likely to be married. The probability of returning to New Brunswick falls with the time spent in AB/SK. Amongst the migrants from NB, those who choose to return to NB[3]are younger, more likely to be male, working in construction and not married.

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[1] Finnie, 1999; Audas and McDonald, 2003. Recently, Chan and Morissette (2016) used administrative data to assess the impact of regional earnings differences on young men's likelihood of: a) moving to Alberta b) becoming an interprovincial employee in Alberta. To do so, they exploit spatial variation in earnings growth plausibly induced by the increases in world oil prices that took place during the 2000s. They estimate that the increase in young men's migration induced by changes in the regional earnings structure represents 12% to 24% of the job vacancies observed in Alberta during that period.

[2] The experience of return migrants can also offer insight into the economic returns to immigration to NB. Return migrants do not face the same disadvantages as international immigrants at the time of migration. They migrate into NB knowing the language, the culture and the province hence their returns to migration are a clear signal of the value of adding migrant human capital to NB.

[3] We include migrants to SK because of the high degree of labour market integration between AB and SK.

In terms of earnings before and after migration, it appears that migration from NB to Alberta and Saskatchewan was equally advantageous in terms of earnings gains for male return migrants and permanent migrants prior to return to New Brunswick. Female return migrants did not have the same earnings gain as female permanent migrants in Alberta/Saskatchewan. The surprising result is that the return migrants are not showing any earnings gains in excess of those of NB workers who never left the province. This runs counter to the expectation that often underlies population policies that increasing the labour supply can cause growth of the economy but agrees with the OECD assessment that return migration is not likely to drive economic growth. Instead, return migration is likely symptomatic of the opportunities being created in the home economy. Growth in population and GDP in NB is more likely to occur from strategies focused on promoting investment and technical progress. The improvement in labour market conditions will result in more migration to NB and more retention of population.

BACKGROUND

To explain return migration, we have to consider that standard explanations and models of migration are inadequate for return migration where return migrants have been observed with negative income differentials from return. A 2008 OECD report investigating return migration in the context of international migration identified five explanations for return migration:

1) failure to integrate into the host country
2) individual preferences for their home country
3) achievement of a savings objective
4) improved employment opportunities in the home economy from experience acquired abroad
5) macroeconomic situations in the destination and home economies.[4]

1) Failure to integrate in the host economy

From this perspective, return migrants are those individuals who had faulty information about labour market opportunities in the host economy[5]. They may underestimate difficulties for labour market integration related to recognition of qualifications or of putting their professional experience to profitable use. The migrants may underestimate the cost of living, particularly housing, which leads to an overestimation of their expected standard of living and capacity to save in destination economy. Migration in this case reflects a failure of the person's migration plan and return migration is expected to be prompt and more likely the poorer is access to information about the host economy

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[4]A 2008 OECD report addressed what is known about return migration, mostly focusing on international migrants. International migration within the European Union compares to interprovincial migration within Canada in terms of freedom of movement, credential recognition etc…

[5]NB playwright and performer Marshall Button described the Dalhousie NB characters known as "Boston Dickies" – Acadians who left for Boston but came home shortly after with his "tail between his legs" and a "quirky Boston accent that stayed with him for the rest of his life" when it didn't work out for him on the job front. Marshall Button, "How to build a wall and make New England pay," The Times & Transcript, May 24, 2017.

2) *Individual preferences for consumption in home economy*

This explanation for return migration posits that migrants have an exogenous preference for consumption in the home economy and bear a utility loss after migration. Higher income in the host economy needs to be sufficient to offset the utility loss of migration. It is possible that it is optimal for the migrant to return to the home economy even if the income differential is negative from returning.[6]

3) *Achievement of savings objective*

If migration to the host economy was for the purposes of gaining higher income and savings to finance an investment project or consumption (including inactivity) in the home economy then decision to return to the home economy would be unrelated to the negative income differential associated with return to the home economy. If the migrant accumulates savings while in the host economy they are accumulating resources to spend on consumption upon return to the home economy. The migrant returns when the marginal benefit of higher savings is less than the marginal cost of lost utility associated with residing abroad. If migrants have an expectation of returning home, migrants smooth their consumption over the lifecycle by saving more or working harder in the host economy than after they return to the home economy (OECD 2008, pages180-181). In the case of entrepreneurs, migration can be a strategy to overcome problems of access to the credit market in the home economy. Return migration would be related to the amount of accumulated savings and the time horizon for receiving a return on the business investment in the home economy.

4) *Human capital formation and improved employment opportunities at home*

Migrants acquire human capital in the host economy in terms of experience and exposure to new technological environments. Because of migration, human capital may accumulate at a more rapid rate than in the home economy and the human capital may be differentiated qualitatively from that obtained in the home economy. With the improvement in their human capital, return migrants may expect better earnings and employment opportunities upon their return to the home economy than had they not migrated. With this explanation there is an expectation that return migrants demonstrate an earnings premium in comparison to the counterfactual of never having migrated. The challenge with identifying these returns is that migrants, and return migrants, are selected populations compared to their peers who never migrated and/or did not choose to return home. Whether the selection is positive, higher quality workers return, or negative, lower quality workers return, depends on the host economy being studied and on the sex of the return migrant.

5) *Macroeconomic conditions in the destination and home economies*

Migrants who choose to remain at the destination economy or to return home consider macroeconomic conditions in both economies. Exposure to unemployment is an important reason for migration. Return migration is more likely when employment opportunities improve in the home economy.

The contribution of return migrants to the development of their home economy arises from a combination of resources (human and financial) they transfer before and at the time of their return and the returns to those resources. The OECD describes three classes of resources that return migrants transfer to the home economy --

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[6] But since migration has already occurred, return migration implies that the utility loss estimated by the individual prior to migration is lower than the one he actually experienced and/or that the income gains of moving to the home country have been overestimated. In other words, there must be an interaction between the preference for the home economy and some mis-calculation of the costs and benefits for both migration AND return migration to occur.

[7] In addition, the selection implies not only that individuals may have different potential earnings at a given age (i.e. difference in intercepts), but also that their intrinsic earnings growth (the one they would have experienced in the absence of migration) may differ (i.e. different slopes in their age-earnings profiles). For return migrants, there are two selection issues: a) the selection associated with the migration decision (e.g. migrants might be less risk-averse than stayers), b) the selection associated with the return decision (e.g. return migrants might be less resilient to a negative income shock than permanent migrants).

their human capital gains in terms of experience and education acquired abroad; financial capital in the form of accumulated savings, and social capital obtained from their migration experience. These resources can have a direct impact on GDP growth. Return migrants may create new businesses; transfer or adopt new technologies, or disseminate new ideas and better business practices for the home economy that they were exposed to in the host economy. If return migrant experiences in the host economy help improve the functioning of markets in the home economy, or if they contribute to a more risk-taking and entrepreneurial culture in the home economy, then return migrants also have indirect effects on GDP growth.

Whether or not return migrants represent a net gain to the home economy's stock of human capital depends on two distinct issues -- a) whether the migrating worker's human capital increased as compared with the counterfactual of never having migrated, b) whether this increased human capital ends up being fully employed upon return to the home economy (For example, a migrant's managerial skills could increase more by staying 3 years with a large oil company in Alberta than by working in a small firm in NB). It could be the case as well that the jobs performed in the host economy are too different and disconnected from jobs in the home economy yielding no return to the human capital acquired abroad.

Whether this increased human capital can be put to productive use depends on whether there are sufficient employment opportunities in the home economy. (For example, whether the migrant's increased managerial skills will end up being fully utilized will depend on employment opportunities in NB). If there is an absence of jobs that provide a return to the skills acquired abroad and the return migrant does not land a higher skilled job than they would have had had they not migrated then there is no return to the incremental gain in human capital in the home economy.

Finally, return migrants may find challenges in achieving returns to their human capital as their time abroad disconnected them from the home labour market resulting in a lack of up to date information on labour demands and a lack of integration into labour market networks (e.g. "contacts") that support successful job searches. They may also lose seniority in the work place if AB/SK work experience does not count after return. In this case, return migration is a failed migration resulting in a negative earnings premium relative to the host economy. The OECD report also discusses the possibility that return migrants may have impaired social capital if the non-migrants in the home economy resent or reject them either because the return migrants are "outsiders" competing for jobs, marriages and housing or because they are seen as a privileged group.

Perhaps not surprising given the importance of macroeconomic conditions for return migration, the OECD report summarizes that policies and programs for assisting voluntary return have only a limited impact on return migration[8]. This reflects the fact that return is only an option if the political, economic and social situation in the home country is stable and attractive. Migrants are more inclined to return home if economic conditions improve and offer better opportunities to earn income. Return migration is a response to growth, rather than a driver of growth, where the resources of return migrants may boost growth already underway.

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[8] The OECD in 2008 reported that there have been no macroeconomic assessments of the effect of return migration on countries of origin but the effects would be expected to be limited due to the small size of return migrants relative to the size of the labour force. The OECD report assesses that return migration is unlikely to jumpstart a development process and reverse causality is more likely.

STUDY DESIGN & DATA DESCRIPTION

For our study, we wish to examine the characteristics and earnings outcomes of three defined groups of New Brunswickers. First, “Migrants” are NB residents who choose to change their province of residence to Alberta or Saskatchewan. Within this group we distinguish between “return migrants”, NB migrants who choose to return to NB for their province of residence, and “permanent migrants” who have AB/SK as their province of residence continuously after migration. Second, “Stayers” are persons residing in NB continuously over the study period. Stayers provide a counterfactual comparison for migrants and return migrants in particular in the sense of demonstrating earnings gains expected in the absence of migrating to AB/SK. Comparing return migrants to permanent migrants allows us to infer whether return migrants are negatively selected from the migrant population, or whether “failed migrants” are the return migrants.

This project uses data from the Canadian Employer–Employee Dynamics Database (CEEDD) developed by Statistics Canada. The analytical file used for this project draws information from three administrative datasets: 1) the 100% version of the T4 Statement of Remuneration file, 2) the 100% versions of the T1 personal master file / T1 historical file, and 3) firm-level data from the Longitudinal Employment Analysis Program (LEAP).

Observations in the T4 and T1 files were linked using Social Insurance Numbers (SIN), while LEAP information was attached to individual-level records using the Longitudinal Business Registry Number [9], which is also available in the T4 file. T4 tax files contain province of work, while T1 historical files include information on individuals who filed taxes in a given year such as province of residence as of December 31 of year t, age, sex, marital status, total earnings, coverage of pension plan, social assistance recipient, union coverage, recipient of employment insurance benefits and workers’ compensation benefits. LEAP data includes variables of firm size and industry as well as the permanent layoff indicator. The CEEDD data spans from 1997 to 2011.[10]

For our study, province of residence is defined by the province in which taxes are filed as per the T1 personal tax return. Province of work is defined by the province in which earnings are reported as per T4 tax slips issued by employers. A “stayer” is a NB resident who files taxes continuously in NB for the study period. A “migrant” to AB/SK is an individual who filed taxes in NB for at least two years before filing taxes in AB or SK. A “return migrant” from AB/SK is an individual who files taxes in NB for at least two years after having filed taxes in AB or SK. A “permanent migrant” is an individual who files taxes in AB/SK continuously after filing in NB. Finally, a “commuter” is an individual who files taxes in NB but earns some part of their income in AB/SK. “Commuters” are not mutually exclusive from “migrants” or “stayers”. Owing to data access restrictions, the statistical analysis of the dataset was conducted by Statistics Canada personnel in Ottawa and provided to the research team as tables of results.

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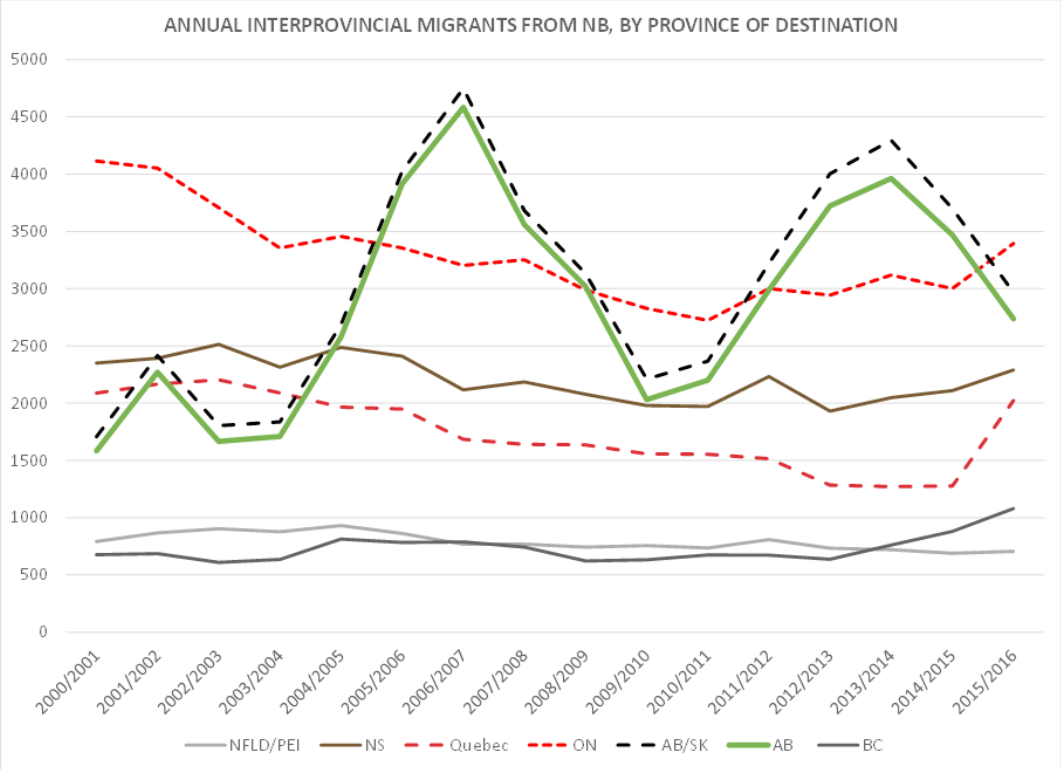
[9] Multiple SIN holders are consistently connected over years using the Greenberg file available at Statistics Canada.

[10] Unless otherwise noted, all tables provided use the 100% version of the T1 historical files (in conjunction with the other aforementioned data sets). For studies of inter-provincial migration, the T1 historical files are superior to the T1 personal master files because they include late tax filers, i.e. individuals who file their tax form later than April 30 of year t+1 (for reference year t). Since inter-provincial migrants tend to file late to a greater extent than other individuals (Messacar, 2015), the T1 historical files provide better coverage of the population of inter-provincial migrants than the T1 personal master files.

TRENDS IN MIGRATION & RETURN MIGRATION

From 2003 to the present Alberta has emerged as the most common province of destination for interprovincial migrants from NB. Numbers of NB residents migrating to Ontario and NS have been high and stable albeit with a declining trend. Numbers of migrants to AB have shown large fluctuations which reflect changing labour market demands in AB's oil driven economy. Outmigration to Saskatchewan began to increase after 2009 as the commodities boom in that province led to a strong in [11]



SOURCE: CANSIM Table 051-0019. Interprovincial migration is a change of usual place of residence from one province or territory to another. Statistics Canada defines an out-migrant as a person who takes up residence in another province or territory with reference to the province or territory of origin, and an in-migrant with reference to the province or territory

Using the CEEDD database, migration in our data set is identified as a change of residence from NB to Alberta or Saskatchewan. Our dataset includes 18,000 New Brunswick residents aged 18 to 54 who migrated to Alberta or Saskatchewan (AB/SK) between 2001 and 2008. CANSIM Table 051-0019 shows 26,000 total migrants from NB to AB/SK over the same period. From 2005 to 2008 the number of migrants nearly doubled from pre-2005 levels before returning to around 1500 per year with the collapse of oil prices after July 2008. 2005 stands out as a peak year with just over 4000 migrants to AB/SK.

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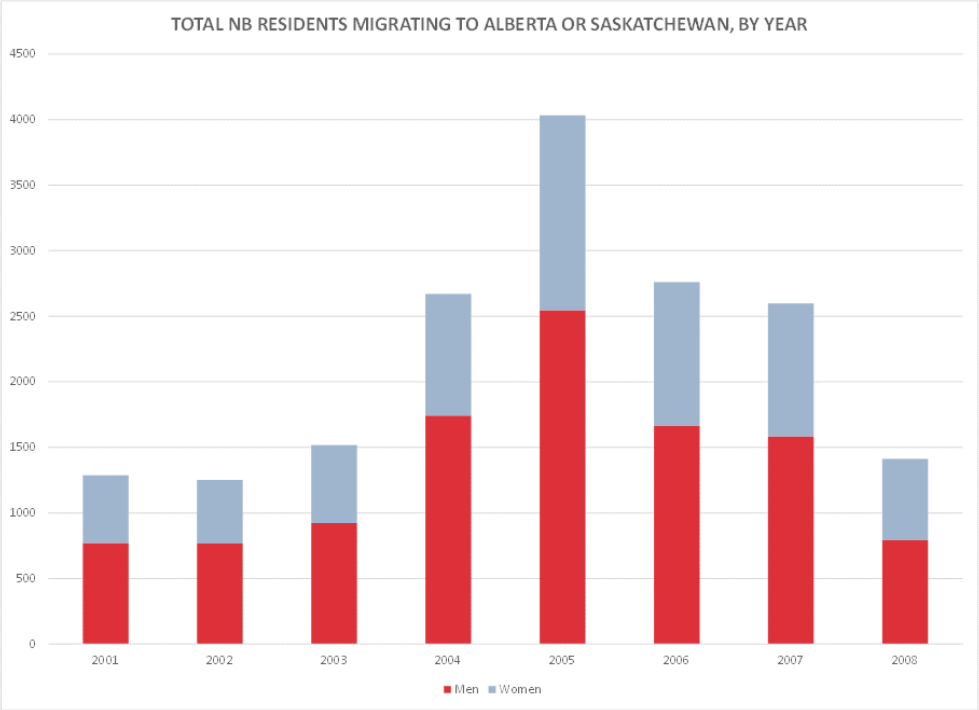
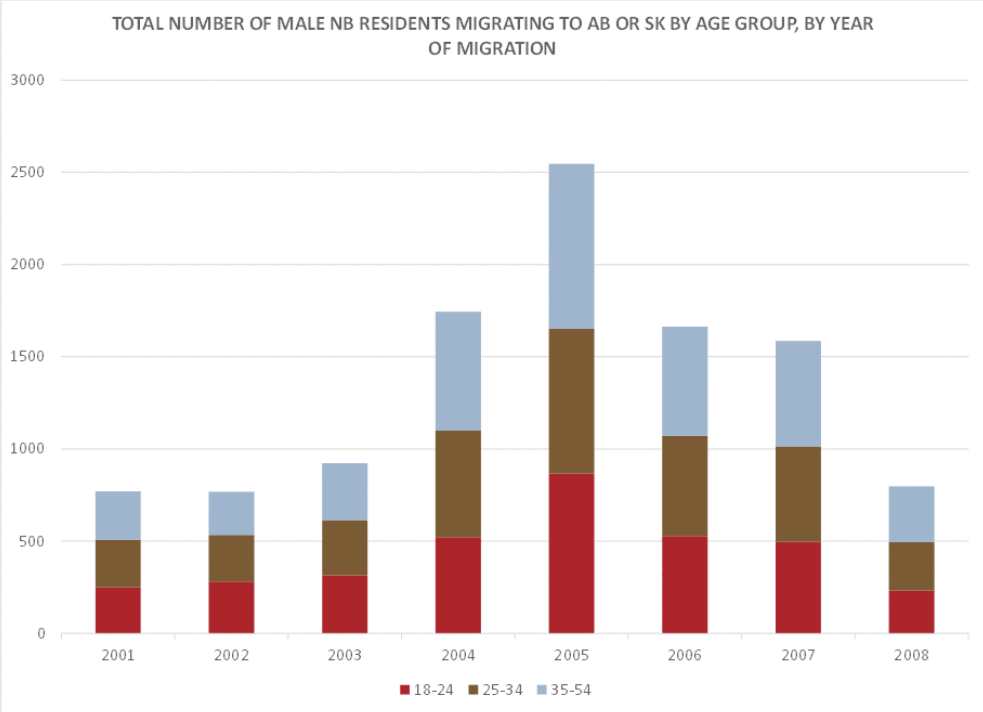
[11] Emery, J.C. Herbert (2013) "Labour Shortages in Saskatchewan," The School of Public Policy SPP Research Papers, Vol. 6(4).

The numbers of migrants are evenly distributed across three age groups, 18-24, 24-34 and 35-54 but as a proportion of age group population size, migration from NB to AB/SK is more prevalent among the 18 to 24 year old age group. For 18 to 24 year old males, migrants to AB/SK represented 1% of the population of that age in 2001 and just over 4.5% of the age group population in 2005. By 2008 the male migrants aged 18 to 24 are 1.3% of the age group population [12]. Migrants as a proportion of age group population are monotonically lower in the higher age groups. For males aged 35 to 54, migrants are never more than 1% of the population over the 2001 to 2009 period.



Migration is measured as a change of residence from NB to Alberta or Saskatchewan. An alternative to migration is for NB residents to commute to Alberta or Saskatchewan to work. These individuals are identified in tax records based on T4 information on where they earned their income. Where migration numbers drop after a peak in 2005, more New Brunswick males commuted to work in AB/SK. This trend is particularly pronounced for males aged 35 to 54 which is not surprising given the greater likelihood that these individuals would have families and children. Commuting is less prevalent among females in New Brunswick. Because the population of migrants and commuters is not mutually exclusive, commuting NB resident numbers cannot be directly compared to migrant NB numbers.

[12] Chan and Morissette (2016, Chart 3, page 23) show that migration to Alberta by younger NB males is common to that for all of Canada.



Return migration to NB from AB/SK is substantial. Table 2 shows that for three cohorts of migrants from NB (migrated in year 2001, 2005 and 2007), three years after migration around 1/3 have returned to NB long enough to file taxes in the province. For the earlier cohorts, by 2011 over 40% of migrants had returned to NB. Males aged 35 to 54 at the time of migration and females aged 25 and over are less likely to have returned to NB by 2011. Table 3 shows similar statistics for the same cohorts for return migrants who remained in NB at least three years after returning. ¼ to to 1/3 of return migrants ultimately remain in NB. Comparing Table 2 with Table 3 it is clear that a sizeable portion of return migrants from the 2001 migration cohort did not remain in NB for at least 3 years after return which possibly reflects the poor labour market conditions in NB after 2004 with decline in the goods producing sector, forest products in particular.

Who migrates to AB/SK? Who returns to NB?

Table 4 shows that migrants from NB to AB/SK are drawn from the younger working age population (mean age 31 compared to 38 for stayers). Migrants are also more represented by males than stayers. Not surprisingly given the younger ages of migrants, they are less likely than the stayer population to be married or in a common law relationship in the year prior to migration. They are less likely to be in a job with union status or have a pension plan. Migrants seem more likely to have previously commuted to AB/SK for work compared to non-migrants. In terms of industry prior to migration, construction, manufacturing and public service each represent 12% of the migrants. Only 3% of migrants had employment in the industries mining, oil and gas extraction.

Table 5 compares the characteristics of return migrants to NB with permanent migrants from NB who stay in AB/SK. Return migrants are comparable to permanent migrants in terms of age but less likely to be married or in a common law relationship. Males are more likely to be return migrants. Return migrants have lower unconditional average earnings in AB/SK than permanent migrants from NB and are less likely to have a pension plan. In terms of industry, males in construction trades are prominent amongst return migrants.

Regression Models: The earnings consequences of migration and return migration

Because of the heterogeneous characteristics of migrants from NB to AB/SK, return migrants and stayers, the unconditional earnings in Table 6 may be misleading for understanding the returns to migration and return migration. For this reason, we pursue a regression analysis to get a clearer picture of the impact of migration on earnings. In the regression individual-level log earnings (lnY_i,) are regressed on a gender indicator, a quadratic term in age, indicator variables for year of migration cohorts and an indicator variable that identifies return migrants to an omitted reference group of interest.[13] For estimating the returns to migrating from NB to AB/SK we use the sample of return and permanent (non-returning) migrants.[14] For estimating the returns to return migration to NB we use a sample of return migrants and stayers – NB residents who have not migrated to AB/SK. Our estimation strategy allows us to avoid deflation issues while answering the question: how does the earnings growth of return migrants compare, all else equal, to non-returning migrants and stayers?

The estimated age-standardized cross-group differences in earnings growth rates obtained from the aforementioned regression models can be inspected to assess whether the degree to which return migrants fare better than stayers varies across cohorts. We are also able to assess whether return migrants are negatively or positively selected with respect to earnings.

We define t-1, as the last year prior to migration, and t+r-1 as the last year prior to return migration We start by estimating the following first model that includes year effects (θt) and gender-specific age-earnings profiles (Xi t-1) to explain pre-migration earnings:

(1) $\ln Yi_{t-1} = \theta t + Xi_{t-1}\,\beta 1 + \alpha 10\ Return\_migrant_i + \varepsilon\ i_{t-1}$

In equation 1, stayers have been excluded from the sample and permanent migrants are the omitted group. α10 represents the difference in average earnings of return migrants prior to migration to AB/SK from that of permanent migrants after controlling for age and other observable characteristics.[15]

Next, we estimate models of post migration earnings of return migrants in AB/SK -- how do earnings of return migrants compare with those of permanent migrants at t+r-1?

(2) $\ln Yi_{t+r-1} = \theta t + Xi_{t+r-1}\,\beta 1 + \alpha 11\ Return\_migrant_i + \lambda\ \ln Yi_{t-1} + \varepsilon\ i_{t+r-1}$

The model specification in 2 includes lnYi_t-1, pre-migration earnings, as a regressor. Since earnings in t-1 contains information about worker ability, including it in equation 2 can be considered to partially control for negative selection at t-1. Because individuals' earnings are likely to be serially correlated over the fairly short time interval we consider, lnYi_t-1 will likely be correlated with the error term in the right-hand side of equation 2 and thus, will be endogenous. Hence, λ will not have a causal interpretation. This does not pose a problem because our focus is not to estimate the causal impact of lnYi_t-1 on lnYi_t+r-1, but instead is to estimate α11 while conditioning on lnYi_t-1.

Equation 2 is the analog of equation 1. It yields estimates of α1 at t+r-1, rather than t-1. Comparing the α10 and α11 obtained from equations 1 and 2 allows us to assess whether earnings differences between return migrants widened or narrowed from t-1 to t+r-1.

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[13] We also estimate specifications that use first differences in the logarithm of earnings and in the levels (dollars) of earnings.

[14] Our assignment of New Brunswick taxfilers to the stayer, permanent migrant and return migrant samples is based on the observed migration outcome by 2013. We do not model the endogenous selection or dynamic influences on the assignment of individuals to the groups.

[15] Since earnings measured for a single year might capture to a good extent idiosyncratic shocks unrelated to worker ability, we pool earnings from t-2 and t-1 to get a better measure of earnings differences due to selection.

At this point, we have evidence, from equations 1 and 2 about the possible negative selection of return migrants relative to permanent migrants at both t-1 and t+r-1. The key question that remains is whether even after accounting for negative selection migration is beneficial for return migrants compared to the counterfactual that they had never migrated.

We pool data on return migrants and stayers at t-1 and t+r+1, the year following return migration, and we estimate the following equations for the sample of stayers and return migrants:

(3) $\ln Yi\_t\text{-}1 = \theta t + Xi\ t\text{-}1\ \beta 1 + \alpha 10\ Return\_migrant\_i + \varepsilon\ i\ t\text{-}1$

(4) $\ln Yi\_t{+}r{+}1 = \theta t + Xi\ t{+}r{+}1\ \beta 1 + \alpha 11\ Return\_migrant\_i + \lambda\ \ln Yi\_t\text{-}1 + \varepsilon\ i\_t{+}r{+}1$

If earnings differences between return migrants and stayers narrow from t-1 to t+r+1, then this narrowing is evidence that migration is beneficial for return migrants if in the absence of migration, return migrants would not have experienced faster earnings growth than stayers. [16] Equation 4 answers the following question: comparing two individuals with similar characteristics and similar earnings in t-1, does the return migrant have higher earnings than the stayer in t+r+1? A positive value of α_{11} in equation 4 would suggest that migration is beneficial for return migrants. [17]

Table 7 presents the coefficient estimates for regression models of earnings prior to migration and prior to return migration for NB residents migrating to AB/SK. The models distinguish between out-migrants who later return to NB and those that do not. The specifications include controls for the age at migration, expected age-earnings increases between migration time points, the year of migration and marital status at the time of migration. The parameter of interest is the difference in earnings between return migrants and migrants who remain in AB/SK. The difference in earnings prior to migration, and prior to return migration, gives us an idea as to whether there are systematic differences in the human capital of NB residents who migrate and remain in AB/SK versus those that at some point return to NB.

Table 7 shows that male return migrants have lower earnings than the permanent migrants in the two years prior to migration in New Brunswick. In the two years prior to the return migration to NB, return migrants have lower earnings that permanent migrants in AB/SK but the difference is not significantly different from the earnings gap prior to migration in NB. Overall, there is no significant difference in the earnings growth due to migration to AB/SK for return migrants and permanent migrants. [18]

For female migrants, return migrants have lower earnings prior to migration than permanent migrants and the earnings gap increases in size after migration to AB/SK. The earnings gain from pre-migration earnings for the return migrants from moving to AB/SK is nearly 25% less than for the female permanent migrants in the two years prior to return migration.

It is interesting to note that the dollar value of the lower earnings gains for male and female return migrants compared to their permanently migrating peers is around $2500. The large percentage decrease for female return migrants reflects their lower level of earnings.

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[16] This maintained assumption about counterfactual earnings growth is necessary to infer that migration is beneficial for return migrants. Whether this counterfactual holds is unclear. Since the administrative data used contains no information on workers' education, the aforementioned equations cannot control for education. As a result, it is plausible that, conditional on age, some highly educated return migrants might display lower earnings than less educated stayers at t-1 but might have experienced faster earnings growth than these less educated stayers in the absence of migration. While equations 2 and 4 control for the past level of earnings, they do not control for past earnings growth, which is a key factor implicit in this maintained assumption.

[17] Since there are lot of stayers, it will be easier to have common support, in terms of having comparable past earnings lnYi_t-1 across groups, in equation 3 than in equation 1.

[18] Comparing Table 2 with Table 3 it is clear that a sizeable portion of return migrants do not remain in NB. As the regression sample includes only those persons with two full years in NB after return migration, this may be an issue of negative selection in terms of who stays longer term in NB after returning.

Table 8 compares earnings of return migrants to NB and NB residents who did not move over the study period (stayers). Prior to migrating, male return migrants earned less than male stayers but significantly more in the two years after they returned. There is a significant earnings gain of around $6500 for men in NB who migrated over those who stayed representing 25% to 35% more than the earnings gain of stayers. The same is not true for females. Female return migrants have $1500 to $2000 less of an earnings gain than stayers representing as much as a 25% deficit compared to stayers.

NB return migrants in the sample that produces the estimates in Table 8 are individuals who returned to New Brunswick and had at least 2 years of data for which their province of residence (as of December 31) was Alberta or Saskatchewan (the migration spell) and then at least 2 years of data for which their province of residence was New Brunswick. For the 2 years that appeared to mark a return to New Brunswick, more than 70% (1,609 out of 2,205) of return migrants had some paid employment income in Saskatchewan or Alberta at some point during the 2 years after "return migration". Close to 20% (424 out of 2,205) of return migrants have some paid employment income in Saskatchewan or Alberta in the second year of return migration, i.e. in the second year during which their province of residence has been switched back to New Brunswick. [19]

This suggests that a good portion of the extra earnings growth experienced by male return migrants in Tables 8 and 8.1 is due to employment income being earned in Saskatchewan or Alberta, provinces with relatively high costs of housing. This in turn raises non-trivial deflation issues. For example, if some of the return migrants still hold or share an apartment in AB/SK, then the extra earnings growth documented so far in Tables 8 and 8.1 is, in real terms, overestimated. One would ideally want to take account of the additional housing costs associated with having a job in AB/SK when running these earnings regressions. But tax data contain no such information.

When we restricted the sample of return migrants whose earnings were only from NB in the year of return and the year after, the earnings gains of male return migrants relative to stayers is no longer large and positive. It is a significant earnings deficit of nearly $5000. For females, the size of earnings gain deficit compared to stayers is significant and $8,600. Since only around 20% of return migrants had only earnings in NB in the two years after return migration the sample sizes are small. Consequently, we also estimated models using only the earning from the second year after return rather than the average of earnings in the first two years after return. For both males and females, the earnings gain of return migrants is significantly lower than for stayers by around $4000.

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[19] New Brunswick would benefit from the one year increase in taxable income of the return migrants.

DISCUSSION

Consistent with the OECD summary of the importance of macroeconomic conditions in the home and host economies, the timing of the rise in out-migration from NB was likely due to both push factors from the struggling NB economy and the pull factors from the western Canadian commodities boom. GDP growth in AB and SK was strong but steady after 2001. In NB, after 2004 the goods producing sector, forest products in particular, experienced a sharp contraction. Despite signs of labour market improvement and investment activity in NB after 2006, outmigration to Alberta remained high until 2009 when oil prices sharply contracted. Future investigation of migration trends for NB should investigate the relative importance of push versus pull factors which could be identified through more detailed information about which locations in NB are the sources of out-migrants. As Chan and Morissette (2016) have shown, widening inter-regional earnings differences tend to pull individuals towards the most dynamic regions.

Overall it appears that migration from NB to Alberta and Saskatchewan was equally advantageous for male return migrants and permanent migrants. Female return migrants did not have the same earnings gain as female permanent migrants in AB/SK. The surprising result is that the return migrants are not showing earnings gains that match those of stayers -- NBers who never left the province. It could be the case that return migrants are penalized in the NB labour market upon return perhaps in terms of diminished opportunities upon return (e.g. lack of local labour market information or networks). Or it could be the case that return migrants are less motivated to work after return resulting in lower earnings. If return migrants accumulate savings and other assets while in Alberta, they may not have the same need to work as long hours (income effect of non-labour income). For females, perhaps return migration coincides with family and fertility decisions. Or, the lower earnings gain of return migrants compared to stayers could reflect where the stayers work and reside in NB compared to return migrants. Peters (2017) has shown that the majority of return migrants after 2011 were locating outside of the NB CMAs. Peters shows that after 2011 the majority of NBers migrating to AB/SK are not from the NB CMAs suggesting that return migration is NBers returning home rather to an opportunity in urban NB. The earnings deficit of return migrants and stayers could reflect the differential changes in labour market opportunities and wages between CMA and non-CMA New Brunswick.

UNDERSTANDING THE RETURNS TO RETURN MIGRATION

In terms of the explanations for return migration from the OECD, our results could be consistent with any of them. For females, the failure to integrate into the AB/SK labour market and the NB labour market after return is a possible explanation for the negative earnings differentials they have compared to permanent migrants and stayers. On the other hand, female return migrant preferences for consumption in the NB economy, which includes leisure or family formation, could be another explanation.

For males, there is no evidence in support a failure to integrate into the AB/SK labour market. If male return migrants do have less earnings growth than NB stayers, then their success in AB/SK makes it harder to conclude that they have failed to integrate into the NB labour market. The lower earnings than stayers upon return could reflect that they have savings and their lower work effort reflects lifecycle smoothing of work effort and consumption. It is also possible that the human capital acquired in AB/SK allowed them to get as good a job as they did in NB given the slack demand in the labour market.

Our results on the earnings outcomes of return migration agree with the OECD view that return migration does not cause economic growth and is likely a response to growth and opportunities in NB. Olson Jr. (1996) has argued that the marketable human capital of migrants (skills, work ethic, entrepreneurial personality and related characteristics) would normally be expected to increase an individual's money income. Higher income economies like Alberta/Saskatchewan have higher capital to labour ratios.[20] Thus the earnings gain from moving from NB to AB/SK likely reflects that the migrant's marketable human capital has a higher marginal product in AB/SK. The absence of a positive return in the form of higher earnings after return migration to NB supports the Olson Jr. view that it is labour demand that determines the value of a worker's marketable human capital.

Our results on the earnings impacts of return migration suggest that policies aimed at increasing marketable human capital through education levels, training and experience will likely not cause higher incomes of the individuals in NB. Policies aimed at increasing the number of return migrants or immigrants will not cause growth of the economy. What will increase GDP, immigration and return migration in NB are policies and institutions aimed at increasing labour demand through increased investment in capital stocks and technical progress.

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[20] For capital to labour ratios in the Canadian provinces, see McKenzie and Ferede (2017). Olson Jr. (1996) dismisses selection bias of migrants compared to stayers as useful for explaining the large increases in earnings and marginal products of the migrants themselves after migrating to the richer economy.

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TABLES:

Sample design and variable definitions by tables

Table 1

The sample consists of individuals whose province of residence as of December 31 of year t is New Brunswick (NB) AND who filed in t-1, t and t+1. The t-1 restriction ensures we have earnings in t-1. The t+1 restriction is needed to identify migrants.

The following individuals are excluded from the sample:

1) PSE students in the process of completing their studies, as measured by individuals who claim tuition fees for full-time PSE both in t and t+1, regardless of their province of residence in t+1.

2) high school students pursuing PSE, as measured by Individuals aged 18 to 24 who did not claim ANY tuition fees for PSE in t AND who claimed tuition fees for FULL-TIME PSE in t+1.

Migrants are individuals whose province of residence as of December 31 of year t+1 is Alberta or Saskatchewan.

Interprovincial employees (IPEs) are individuals whose province of residence as of December 31 of year t is NB (as measured from T1 records) but whose main job (the job with the highest annual wages and salaries) is located in Alberta or Saskatchewan in year t (as measured from T4 records). This excludes individuals who are on their way to move to NB, i.e. whose province of residence as of December 31 of year t is Alberta or Saskatchewan but whose province of residence as of December 31 of year t+ 1 is NB.

Note that individuals who are IPEs in year t might decide to migrate to Alberta or Saskatchewan in year t+1. Hence, as currently defined, IPEs and migrants are not necessarily mutually exclusive.

Table 2 and Table 3

The base sample includes migrants in each cohort. For those migrants who migrate out of and into NB multiple times, only their first return is taken into account.

Table 4

The first three columns measure: among residents in NB who have the listed characteristics, what % leave NB from t to t+1 over the period of 2001 to 2008, while the last column depicts the distribution of migrants of the eight cohorts broken down by the outlined characteristics.

The total earnings are defined by the sum of t4 employment earnings recorded in the T1 tax file and the total net self-employment earnings.

The main job is defined as the job with the highest employment earnings in a given year.
The earnings are adjusted using province specific CPI and they are in 2014 constant dollars.

Table 5

The first three columns measure: among 8-cohort migrants who have the listed characteristics, what % return to NB from t to t+1, while the last column outlines the distribution of those who return to NB according to the listed characteristics.
The earnings are adjusted using province specific CPI and they are in 2014 constant dollars.

Table 5.5

The definition of migrants is the same as that in Table 1- out-migrants, while the stayers are defined as those who stay in NB from t to t+1. The base sample is the same as that in Table 1-out-migrants.
The earnings are adjusted using province specific CPI and they are in 2014 constant dollars.

Table 5.6

The base sample is consistent with that in Table 1 – out-migrants. The returning migration has the same definition as that in Table 2.
The earnings are adjusted using province specific CPI and they are in 2014 constant dollars.

Table 6

The definitions of migrants, returners and stayers are the same as those used in Table 1, Table 2 and Table 5.5.

As mentioned at the bottom of Table 6, there are deflation issues when comparing earnings growth of inter-provincial migrants to those of: a) return migrants, b) stayers. For return migrants and stayers, real earnings growth can be computed simply by using the New Brunswick Consumer Price Index All Items. Using the same deflator for individuals who migrated to Alberta and Saskatchewan will lead to an overestimation of real earnings growth for this group since the CPI takes account only of temporal variation in prices but does not take account of cross-regional variation in, say, housing costs, i.e. does not account for the fact that housing costs are much higher in Alberta than in NB.

APPENDIX 1

MAGNITUDE OF OUT-MIGRATION FLOWS
USING T1 HISTORICAL FILE (T1H): LATE FILERS INCLUDED

Table 1H: How many NB residents migrated to Alberta or Saskatchewan during the oil boom? T1H

year t	2001	2002	2003	2004	2005	2006	2007	2008
year t+1	2002	2003	2004	2005	2006	2007	2008	2009
	number of individuals migrating to Alberta or Saskatchewan from year t to year t+1							
I. Number								
Men								
18-24	250	281	316	522	867	529	498	233
25-34	257	253	298	577	785	543	517	261
35-54	263	234	310	645	894	591	571	303
Women								
18-24	165	160	187	271	504	352	314	188
25-34	172	164	227	309	449	349	343	183
35-54	180	160	178	346	533	396	355	244
	percentage of individuals migrating to Alberta or Saskatchewan from year t to year t+1							
II. Percentage								
Men								
18-24	1.23	1.36	1.54	2.64	4.57	2.89	2.76	1.28
25-34	0.57	0.57	0.68	1.35	1.89	1.35	1.32	0.67
35-54	0.23	0.21	0.28	0.58	0.81	0.54	0.53	0.28
Women								
18-24	0.87	0.84	1.01	1.50	2.89	2.09	1.88	1.13
25-34	0.37	0.36	0.50	0.69	1.02	0.82	0.81	0.44
35-54	0.16	0.14	0.16	0.31	0.48	0.36	0.32	0.22

Note: the sample consists of individuals whose province of residence as of December 31 of year t is NB AND who filed in t-1, t and t+1. The t-1 restriction ensures we have earnings in t-1. The t+1 restriction is needed to identify migrants.

The following individuals are excluded from the sample:
1) *PSE students in the process of completing their studies*, as measured by individuals who claim tuition fees for full-time PSE both in t and t+1, regardless of their prov_res in t+1.

2) *high school students pursuing PS*E, as measured by individuals aged 18 to 24 who did not claim ANY tuition fees for PSE in t AND who claimed tuition fees for FULL-TIME PSE in t+1.

Migrants are those whose province of residence as of December 31 of year t+1 is Alberta or Saskatchewan.

APPENDIX 2

MAGNITUDE OF RETURN MIGRATION FLOWS
USING T1 HISTORICAL FILE (T1H): LATE FILERS INCLUDED

Table 2: What % of migrants (who left NB for SASK ALTA from t to t+1) returned to NB afterwards, regardless of the duration of their return in NB

	cumulative percentage who have returned by								
year of return	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
2001-2002 cohort									
Men									
18-24	16%	26%	29%	32%	34%	39%	40%	43%	44%
25-34	16%	24%	29%	34%	36%	39%	42%	42%	42%
35-54	14%	19%	23%	25%	27%	29%	31%	33%	35%
Women									
18-24	19%	32%	35%	40%	43%	46%	48%	50%	53%
25-34	12%	17%	22%	24%	27%	32%	34%	35%	35%
35-54	11%	18%	22%	23%	25%	27%	29%	30%	32%

	cumulative percentage who have returned by				
year of return	**2007**	**2008**	**2009**	**2010**	**2011**
2005-2006 cohort					
Men					
18-24	19%	30%	37%	42%	45%
25-34	17%	25%	33%	36%	39%
35-54	17%	26%	34%	39%	43%
Women					
18-24	16%	27%	34%	38%	41%
25-34	13%	21%	28%	31%	33%
35-54	12%	21%	29%	33%	35%

	cumulative percentage who have returned by		
year of return	**2009**	**2010**	**2011**
2007-2008 cohort			
Men			
18-24	28%	37%	41%
25-34	22%	29%	35%
35-54	20%	27%	32%
Women			
18-24	21%	30%	34%
25-34	15%	24%	28%
35-54	18%	24%	29%

Note: Individuals who returned to NB may have stayed there for 1 year only.

APPENDIX 3

MAGNITUDE OF RETURN MIGRATION FLOWS
USING T1 HISTORICAL FILE (T1H): LATE FILERS INCLUDED

Table 3: What % of migrants (who left NB for SASK ALTA from t to t+1) returned to NB afterwards AND stayed in NB for at least 3 years

	cumulative percentage who have returned by ____ and stayed at least 3 years						
year of return	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
2001-2002 cohort							
Men							
18-24	11%	18%	20%	21%	23%	26%	27%
25-34	13%	19%	23%	27%	29%	32%	34%
35-54	10%	14%	17%	19%	20%	22%	24%
Women							
18-24	15%	24%	25%	28%	31%	33%	35%
25-34	10%	15%	19%	21%	24%	28%	31%
35-54	9%	15%	18%	18%	19%	21%	23%

	cumulative percentage who have returned by ____ and stayed at least 3 years		
year of return	**2007**	**2008**	**2009**
2005-2006 cohort			
Men			
18-24	15%	24%	29%
25-34	13%	20%	25%
35-54	14%	21%	28%
Women			
18-24	13%	22%	26%
25-34	12%	19%	24%
35-54	11%	19%	25%

	cumulative percentage who have returned by ____ and stayed at least 3 years
year of return	**2009**
2007-2008 cohort	
Men	
18-24	21%
25-34	17%
35-54	16%
Women	
18-24	17%
25-34	12%
35-54	15%

Note: Individuals who returned to NB HAVE STAYED THERE FOR AT LEAST 3 YEARS.

APPENDIX 4

CORRELATES OF LEAVING NB
USING T1 HISTORICAL FILE (T1H): LATE FILERS INCLUDED

Table 4: Correlates of leaving NB --- 8 cohorts pooled

	Percentage who left NB from t to t+1 by:			% distribution
	Men	Women	Both sexes	Both sexes
I. Earned in t-1				
Less than zero	0.8%	0.5%	0.7%	0.2%
$0	1.1%	0.6%	0.8%	3.1%
$1- $15,000	1.4%	0.8%	1.1%	40.8%
15,000-25,000	1.0%	0.5%	0.8%	18.1%
$25,000-40,000	0.7%	0.4%	0.5%	16.7%
$40,000-60,000	0.6%	0.3%	0.5%	12.3%
$60,000 or more	0.5%	0.2%	0.4%	8.8%
II. Earned in t				
Less than zero	0.6%	0.7%	0.6%	0.2%
$0	0.5%	0.6%	0.5%	0.5%
$1- $15,000	1.3%	0.8%	1.0%	36.2%
15,000-25,000	1.2%	0.6%	0.8%	20.6%
$25,000-40,000	0.8%	0.4%	0.6%	18.7%
$40,000-60,000	0.6%	0.3%	0.5%	13.1%
$60,000 or more	0.5%	0.2%	0.4%	10.8%
III. Had a pension plan at some point in t				
Yes	0.6%	0.3%	0.5%	24.3%
No	1.0%	0.7%	0.8%	75.7%
IV. Were unionized at some point in t				
Yes	0.6%	0.3%	0.4%	18.8%
No	0.9%	0.6%	0.8%	81.2%
V. Received EI benefits at some point in t				
Yes	1.1%	0.5%	0.9%	36.0%
No	0.7%	0.5%	0.6%	64.0%
VI. Received SA benefits at some point in t				
Yes	1.3%	0.8%	1.0%	4.8%
No	0.8%	0.5%	0.7%	95.2%
VII. Received Workers' Compensation benefits at some point in t				
Yes	0.8%	0.5%	0.7%	1.8%
No	0.9%	0.5%	0.7%	98.2%

Continued on next page

APPENDIX 4 CONTINUED

CORRELATES OF LEAVING NB

Table 4: Correlates of leaving NB --- 8 cohorts pooled

	Percentage who left NB from t to t+1 by:			% distribution
	Men	Women	Both sexes	Both sexes
VIII. Commuted to Alberta/Sask at some point in t				
Yes	11.9%	22.8%	13.5%	13.0%
No	0.7%	0.5%	0.6%	87.0%
IX. Had their main job in year t in:				
Construction	1.4%	0.7%	1.3%	11.5%
Mining, oil and gas extraction	1.4%	1.1%	1.4%	2.7%
Manufacturing	0.7%	0.4%	0.6%	11.7%
Public services	0.9%	0.4%	0.6%	12.0%
Other	0.8%	0.5%	0.6%	62.1%
X. Had their main job in year t in firms with:				
1-19 employees	0.8%	0.5%	0.7%	24.5%
20-99 employees	0.9%	0.6%	0.7%	22.1%
100-499 employees	0.9%	0.7%	0.8%	18.5%
500 or more employees	0.9%	0.4%	0.6%	34.9%
XI. Were laid-off in t-1				
Yes	1.6%	0.8%	1.3%	16.3%
No	0.8%	0.5%	0.6%	83.7%

Among residents in NB who have certain characteristics, what % left NB from t to t+1
Among migrants who left NB from t to t+1, the distribution of characteristics

APPENDIX 5.5

USING T1 HISTORICAL FILE (T1H): LATE FILERS INCLUDED

Table 5.5: Characteristics and earnings of out-migrants from NB and of stayers, by year of migration

migrating from to	2001 2002	2002 2003	2003 2004	2004 2005	2005 2006	2006 2007	2007 2008	2008 2009
Average age								
Out-migrants	30.8	30.2	30.3	31.5	31.0	31.4	31.6	31.8
Stayers	37.5	37.6	37.8	38.0	38.2	38.3	38.4	38.4
% males								
Out-migrants	62.9%	63.0%	63.3%	68.0%	65.2%	62.1%	63.0%	58.3%
Stayers	52.1%	51.8%	51.7%	51.6%	51.2%	51.0%	50.9%	50.9%
% married or common-law								
Out-migrants	35.0%	34.7%	33.3%	34.1%	33.5%	31.9%	33.7%	35.1%
Stayers	60.8%	60.1%	59.9%	59.1%	59.3%	59.4%	59.4%	59.4%
Average earnings in year t								
Out-migrants	37063	32610	33058	32384	30402	31951	35133	41075
Stayers	44984	43631	42365	42144	41887	42217	42712	43578
Median earnings in year t								
Out-migrants	25573	23574	25006	22982	21951	23792	26704	29731
Stayers	37225	36017	35092	34870	34772	35281	35705	36405
% with a pension plan in year t								
Out-migrants	25.1%	25.0%	28.1%	24.3%	18.6%	23.0%	26.9%	33.2%
Stayers	35.0%	35.7%	36.3%	35.9%	36.9%	37.5%	38.4%	39.3%

APPENDIX 5.6

USING T1 HISTORICAL FILE (T1H): LATE FILERS INCLUDED

Table 5.6: Considering out-migrants, characteristics of those who returned to NB and those who did not, by year of migration

migrating from to	2001 2002	2002 2003	2003 2004	2004 2005	2005 2006	2006 2007	2007 2008	2008 2009
Average age								
Returned	30.3	29.5	30.9	31.7	31.2	31.3	30.9	31.6
Did not return	31.9	31.1	30.9	32.0	31.6	32.0	32.3	32.5
% males								
Returned	60.2%	64.5%	61.9%	69.1%	66.4%	64.6%	65.1%	57.3%
Did not return	59.6%	59.2%	60.3%	62.7%	61.0%	57.6%	59.0%	56.2%
% married or common-law								
Returned	30.5%	30.3%	29.9%	32.0%	31.8%	28.5%	27.3%	26.7%
Did not return	39.9%	40.4%	38.4%	39.6%	38.4%	36.6%	39.6%	39.0%
Average earnings in year t								
Returned	21880	20919	21652	21668	21266	23909	26689	32543
Did not return	29482	26515	27477	27301	26465	27340	30638	35142
Median earnings in year t								
Returned	15438	14934	15030	15792	15074	17487	19367	19612
Did not return	19717	18670	20526	18938	18701	20182	23687	25900
% with a pension plan in year t								
Returned	19.7%	17.2%	22.4%	17.7%	14.8%	16.7%	18.0%	22.6%
Did not return	24.2%	26.2%	27.4%	24.7%	18.3%	23.5%	28.0%	32.3%

APPENDIX 6

EARNINGS "CONSEQUENCES" OF LEAVING AND RETURNING
USING T1 HISTORICAL FILE (T1H): LATE FILERS INCLUDED

Table 6: Considering migrants who left NB from year t to year t+1
1) were in NB both in t-1 and t (year t is the year prior to migration)
2) spent all years in SASK ALTA when they are out of NB
3) returned to NB and stayed there for at least 2 years
how did they fare relative to: a) migrants who stayed continuously in SASK ALTA
b) NB stayers who stayed continuously in NB

		Average of 2-year average unconditional earnings			Median of 2-year average unconditional earnings			
	2004-2005 cohort of migrants aged 18 to 54			**growth rate**			**growth rate**	N
		2003-2004	2007-2008		2003-2004	2007-2008		
c1	returned in 2007 and stayed in NB from 2007 to at least 2008	19773	33569	69.8	12525	21586	72.3	186
	stayed in SASK ALTA continuously from 2005 to 2008	26247	60591	130.8	18062	54655	202.6	1431
	stayed in NB continuously from 2003 to 2008	31177	35312	13.3	24293	28733	18.3	305981
		2003-2004	2008-2009		2003-2004	2008-2009		
c2	returned in 2008 and stayed in NB from 2008 to at least 2009	24162	36453	50.9	17006	25261	48.5	130
	stayed in SASK ALTA continuously from 2005 to 2009	26685	62854	135.5	18370	54747	198.0	1197
	stayed in NB continuously from 2003 to 2009	31303	36289	15.9	24466	29389	20.1	299156
		2003-2004	2009-2010		2003-2004	2009-2010		
c3	returned in 2009 and stayed in NB from 2009 to at least 2010	23186	35774	54.3	16781	27672	64.9	113
	stayed in SASK ALTA continuously from 2005 to 2010	26872	63745	137.2	18378	56674	208.4	1054
	stayed in NB continuously from 2003 to 2010	31426.5	36508	16.2	24626	29556	20.0	292701
		2003-2004	2010-2011		2003-2004	2010-2011		
c4	returned in 2010 and stayed in NB from 2010 to at least 2011	24856	48051	93.3	17079	38739	126.8	55
	stayed in SASK ALTA continuously from 2005 to 2011	26964	67758	151.3	18370	59322	222.9	951
	stayed in NB continuously from 2003 to 2011	31523.4	36389	15.4	24791	29589	19.4	287746
	2005-2006 cohort of migrants aged 18 to 54	2004-2005	2008-2009		2004-2005	2008-2009		
c5	returned in 2008 and stayed in NB from 2008 to at least 2009	19840	32688	64.8	14747	24680	67.4	300
	stayed in SASK ALTA continuously from 2006 to 2009	26462	60780	129.7	18479	51930	181.0	2069
	stayed in NB continuously from 2004 to 2009	31680	36347	14.7	24812	29453	18.7	301440
		2004-2005	2009-2010		2004-2005	2009-2010		
c6	returned in 2009 and stayed in NB from 2009 to at least 2010	23525	32314	37.4	16426	24531	49.3	215
	stayed in SASK ALTA continuously from 2006 to 2010	27019	61427	127.3	19061	52842	177.2	1819
	stayed in NB continuously from 2004 to 2010	31810	36685	15.3	24986	29768	19.1	294556
		2004-2005	2010-2011		2004-2005	2010-2011		
c7	returned in 2010 and stayed in NB from 2010 to at least 2011	22739	37968	67.0	14428	21405	48.4	113
	stayed in SASK ALTA continuously from 2006 to 2011	27501	65292	137.4	19321	57098	195.5	1688
	stayed in NB continuously from 2004 to 2011	31927	36689	14.9	25144	29942	19.1	289287

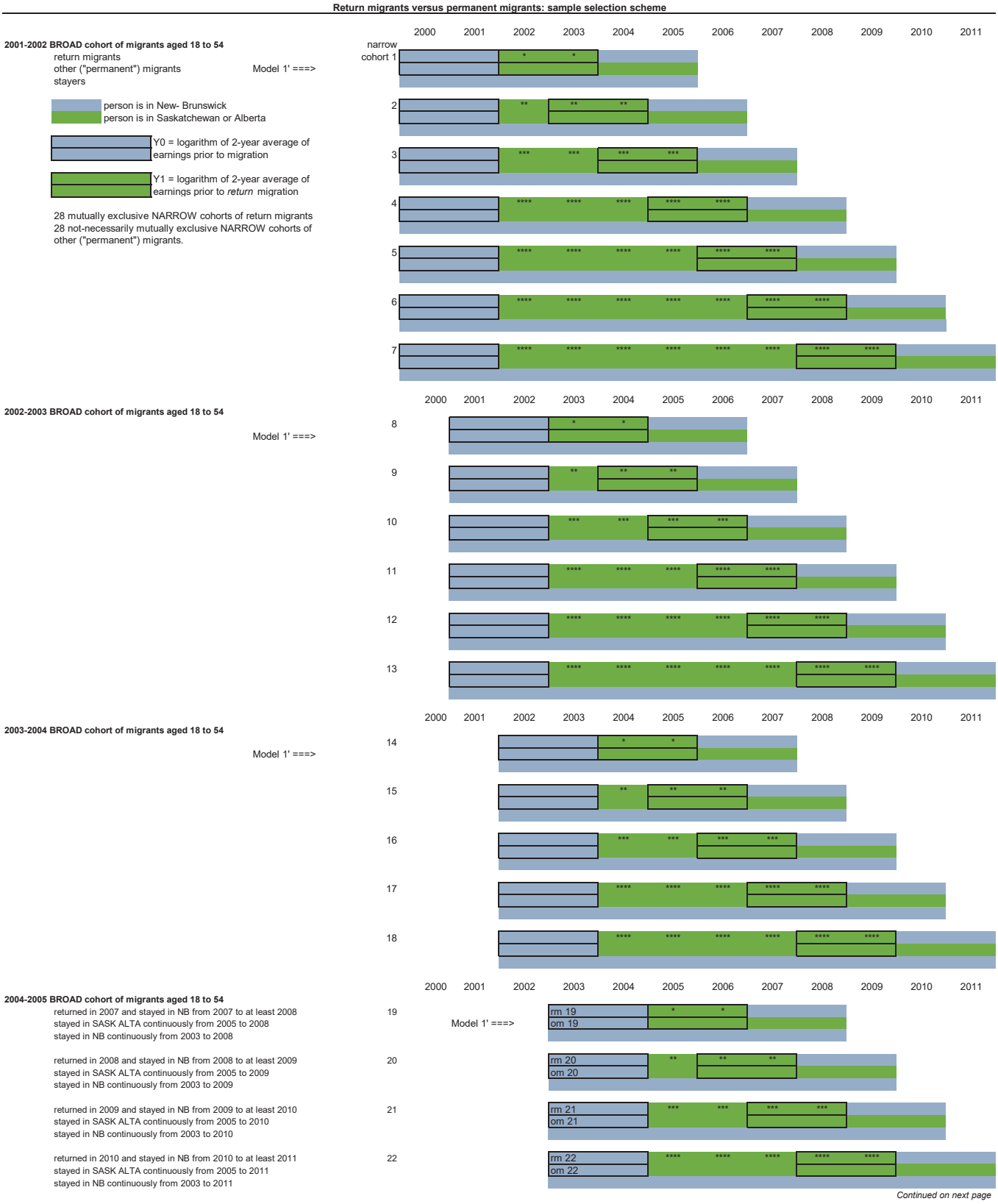
Note: Earnings are deflated using the temporal Consumer Price Index (All Items) for New Brunswick. Doing so over-estimates the growth in real earnings for individuals who migrated to SASK ALTA and stayed there continuously. To get a sense of the degree of overestimation, one can look at the following numbers for median rent, based on the Survey of Household Spending (SHS):

Median annual rent by province, 2001-2002 and 2007-2008

	2001-2002	2007-2008
New Brunswick	5,940	6,636
Saskatchewan	5,796	7,500
Alberta	7,680	10,560

In 2007-2008, the median rent in Alberta was about twice as high as the median rent in New Brunswick in 2001-2002. Thus, the growth rates of real earnings for migrants who stayed in SASK ALTA continuously are substantially over-estimated by using the temporal CPI for New Brunswick (or for Canada). No price index in Canada currently takes account of BOTH the temporal variation and the spatial variation in the cost of living. The temporal CPIs take account of the temporal variation within provinces while the cross-CMAs CPIs take account only of the spatial variation at a given point in time.

APPENDIX 7 SCHEME



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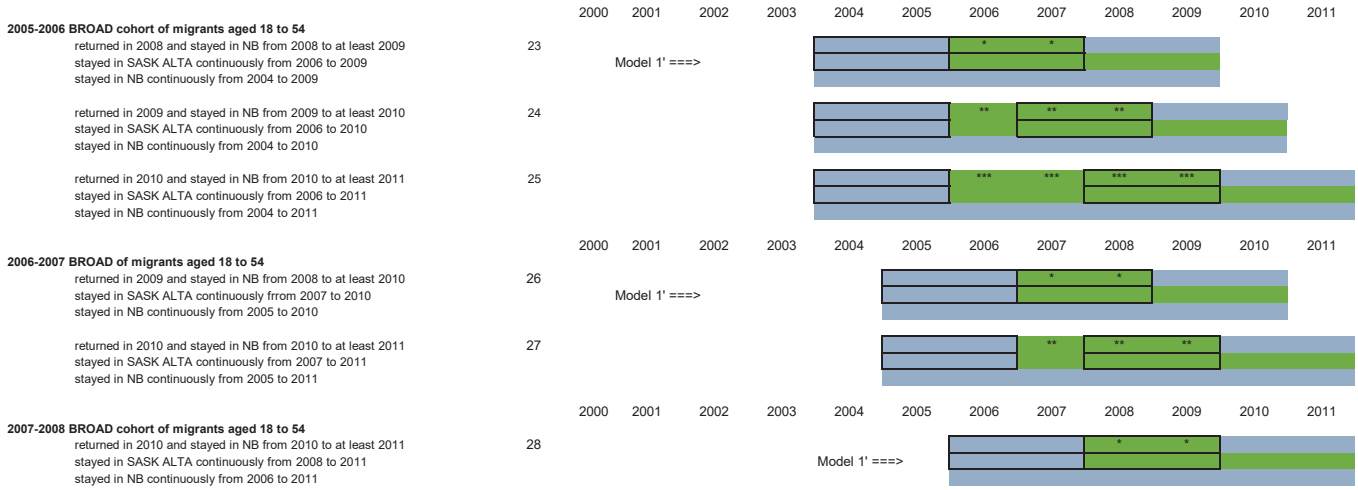
APPENDIX 7 SCHEME CONTINUED

Return migrants versus permanent migrants: sample selection scheme



TOTAL = 28 cohorts (7+6+5+4+3+2+1) of return migrants.

define Y_i_0 as the log of : the average of Y_i_t-1 and Y_i_t
define Y_i_1 as the log of: the average of Y_i_t+r-2 and Y_i_t+r-1, where Y_i_t+r-1 is the year prior to return migration

estimate:
$Y_{i\_0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$ (1) : earnings differences for Y0 age = 2 years prior to migration
$Y_{i\_1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$ (2) : analog of (1) for Y1
$Y_{i\_1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$ (3) : controls for BROAD cohort effects
$Y_{i\_1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + \lambda*Y_{i\_0} + u_i$ ((4) : controls for BROAD cohort effects and Y0
Y_i_1 - $Y_{i\_0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$ (5) : imposes λ= 1

The timing of Period 0 earnings is uniquely determined by the BROAD cohort, hence θ_t and θ_c cannot both be in equation 1.
The timing of Period 1 earnings is NOT uniquely determined by the BROAD cohort, hence θ_t and θ_c can both be in equations 3-5.

Omitted group = other migrants
θ_t = period indicators; θ_c = BROAD cohort indicators; X_i = gender-specific age-earnings profile (f, age, age2, age*f, age2*f)

Compare alpha's across specifications.

The 28 NARROW cohorts of return migrants will be mutually exclusive. The 28 NARROW cohorts of other migrants will <u>not</u> be mutually exclusive. To account for the correlation of earnings across cohorts of other ("permanent") migrants, use standard errors clustered at the person level (casenum).

APPENDIX 7

Table 7: Log earnings differences (α) between return migrants and other migrants --- broad sample
(There are 28 treatment groups of return migrants and 28 control groups of other migrants)

Dependent variable	Y0	Y1	Y1	Y1	ΔY	
	Model 1	Model 2	Model 3	Model4	Model 5	Model 7 (2016 dollars)
I. Men 18-54 with positive wages at some point in the 2 years prior to migration						
α	-0.107***	-0.139**	-0.131**	-0.086†	-0.027	-3,043**
	(0.028)	(0.047)	(0.046)	(0.044)	(0.046)	(1,182)
N Return migrants	1,334	1,334	1,334	1,334	1,334	1,334
Other migrants	4,291	4,291	4,291	4,291	4,291	4,291
Total	5,625	5,625	5,625	5,625	5,625	5,625
Number of person-periods	14,702	14,702	14,702	14,702	14,702	14,702
II. Men 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration						
α	-0.125***	-0.122**	-0.114**	-0.056	0.010	-2,727*
	(0.021)	(0.043)	(0.042)	(0.041)	(0.042)	(1,256)
N Return migrants	1,244	1,244	1,244	1,244	1,244	1,244
Other migrants	3,996	3,996	3,996	3,996	3,996	3,996
Total	5,240	5,240	5,240	5,240	5,240	5,240
Number of person-periods	13,672	13,672	13,672	13,672	13,672	13,672
III. Women 18-54 with positive wages at some point in the 2 years prior to migration						
α	-0.075†	-0.276**	-0.317***	-0.264**	-0.242**	-3,817***
	(0.042)	(0.101)	(0.099)	(0.093)	(0.093)	(874)
N Return migrants	737	737	737	737	737	737
Other migrants	2,727	2,727	2,727	2,727	2,727	2,727
Total	3,464	3,464	3,464	3,464	3,464	3,464
Number of person-periods	9,130	9,130	9,130	9,130	9,130	9,130
IV. Women 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration						
α	-0.091***	-0.262**	-0.305***	-0.239**	-0.214*	-3,958***
	(0.028)	(0.095)	(0.093)	(0.090)	(0.090)	(984)
N Return migrants	618	618	618	618	618	618
Other migrants	2,315	2,315	2,315	2,315	2,315	2,315
Total	2,933	2,933	2,933	2,933	2,933	2,933
Number of person-periods	7,680	7,680	7,680	7,680	7,680	7,680
Controls						
2-year period	yes	yes	yes	yes	yes	yes
Broad cohort	no	no	yes	yes	yes	yes
Log earnings prior to migration (Y0)	no	no	no	yes	no	no
Marital status prior to migration	no	no	no	no	no	no

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001.

Model 1: $Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$
Model 2: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$
Model 3: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 4: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + \lambda*Y_{i,0} + u_i$
Model 5: $Y_{i,1} - Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 6: $Y_{i,1} - Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$ + married
Model 7: = Model 5 where the dependent variable equals change in real earnings
Model 8: = Model 6 where the dependent variable equals change in real earnings

Omitted group = other migrants
θ_t: period indicators; θ_c: BROAD cohort indicators; X_i: age-earnings profile (age, age2)

$Y_{i,0}$ = log of : the average of $Y_{i,t-1}$ and $Y_{i,t}$, where t is the year prior to migration
$Y_{i,1}$ = log of: the average of $Y_{i,t+r-1}$ and $Y_{i,t+r-2}$, where $Y_{i,t+r+1}$ is the year prior to return migration

Standard errors are clustered at the person level

APPENDIX 7.1

Table 7.1: Log earnings differences (α) between return migrants and other migrants --- narrow sample
(There are 28 treatment groups of return migrants and 7 control groups of other migrants)

Dependent variable		Y0	Y1	Y1	Y1	ΔY	ΔY		
		Model 1	Model 2	Model 3	Model4	Model 5	Model 6	Model 7	Model 8
								(2016 dollars)	
I. Men 18-54 with positive wages at some point in the 2 years prior to migration									
α		-0.098***	-0.110*	-0.179**	-0.109*	-0.036	-0.046	-2,376†	-2,403*
		(0.027)	(0.045)	(0.055)	(0.053)	(0.056)	(0.056)	(1,245)	(1,223)
N	Return migrants	1,334	1,334	1,334	1,334	1,334	1,334	1,334	1,334
	Other migrants	4,291	4,291	4,291	4,291	4,291	4,291	4,291	4,291
	Total	5,625	5,625	5,625	5,625	5,625	5,625	5,625	5,625
Number of person-periods		5,964	5,964	5,964	5,964	5,964	5,964	5,964	5,964
II. Men 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration									
α		-0.113***	-0.087*	-0.153**	-0.068	-0.013	-0.021	-2,151	-2,177†
		(0.020)	(0.041)	(0.051)	(0.049)	(0.051)	(0.051)	(1,320)	(1,298)
N	Return migrants	1,244	1,244	1,244	1,244	1,244	1,244	1,244	1,244
	Other migrants	3,996	3,996	3,996	3,996	3,996	3,996	3,996	3,996
	Total	5,240	5,240	5,240	5,240	5,240	5,240	5,240	5,240
Number of person-periods		5,561	5,561	5,561	5,561	5,561	5,561	5,561	5,561
III. Women 18-54 with positive wages at some point in the 2 years prior to migration									
α		-0.082*	-0.383***	-0.347**	-0.230*	-0.201†	-0.230*	-2,218*	-2,433**
		(0.041)	(0.097)	(0.116)	(0.108)	(0.108)	(0.106)	(951)	(948)
N	Return migrants	737	737	737	737	737	737	737	737
	Other migrants	2,727	2,727	2,727	2,727	2,727	2,727	2,727	2,727
	Total	3,464	3,464	3,464	3,464	3,464	3,464	3,464	3,464
Number of person-periods		3,656	3,656	3,656	3,656	3,656	3,656	3,656	3,656
IV. Women 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration									
α		-0.095***	-0.374***	-0.390***	-0.282**	-0.263*	-0.288**	-2,576*	-2,789**
		(0.027)	(0.092)	(0.113)	(0.109)	(0.108)	(0.107)	(1,076)	(1,074)
N	Return migrants	618	618	618	618	618	618	618	618
	Other migrants	2,315	2,315	2,315	2,315	2,315	2,315	2,315	2,315
	Total	2,933	2,933	2,933	2,933	2,933	2,933	2,933	2,933
Number of person-periods		3,098	3,098	3,098	3,098	3,098	3,098	3,098	3,098
Controls									
	2-year period	yes	yes	yes	yes	yes	yes	yes	yes
	Broad cohort	no	no	yes	yes	yes	yes	yes	yes
	Log earnings prior to migration (Y0)	no	no	no	yes	no	no	no	no
	Marital status prior to migration	no	no	no	no	no	yes	no	yes

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001.

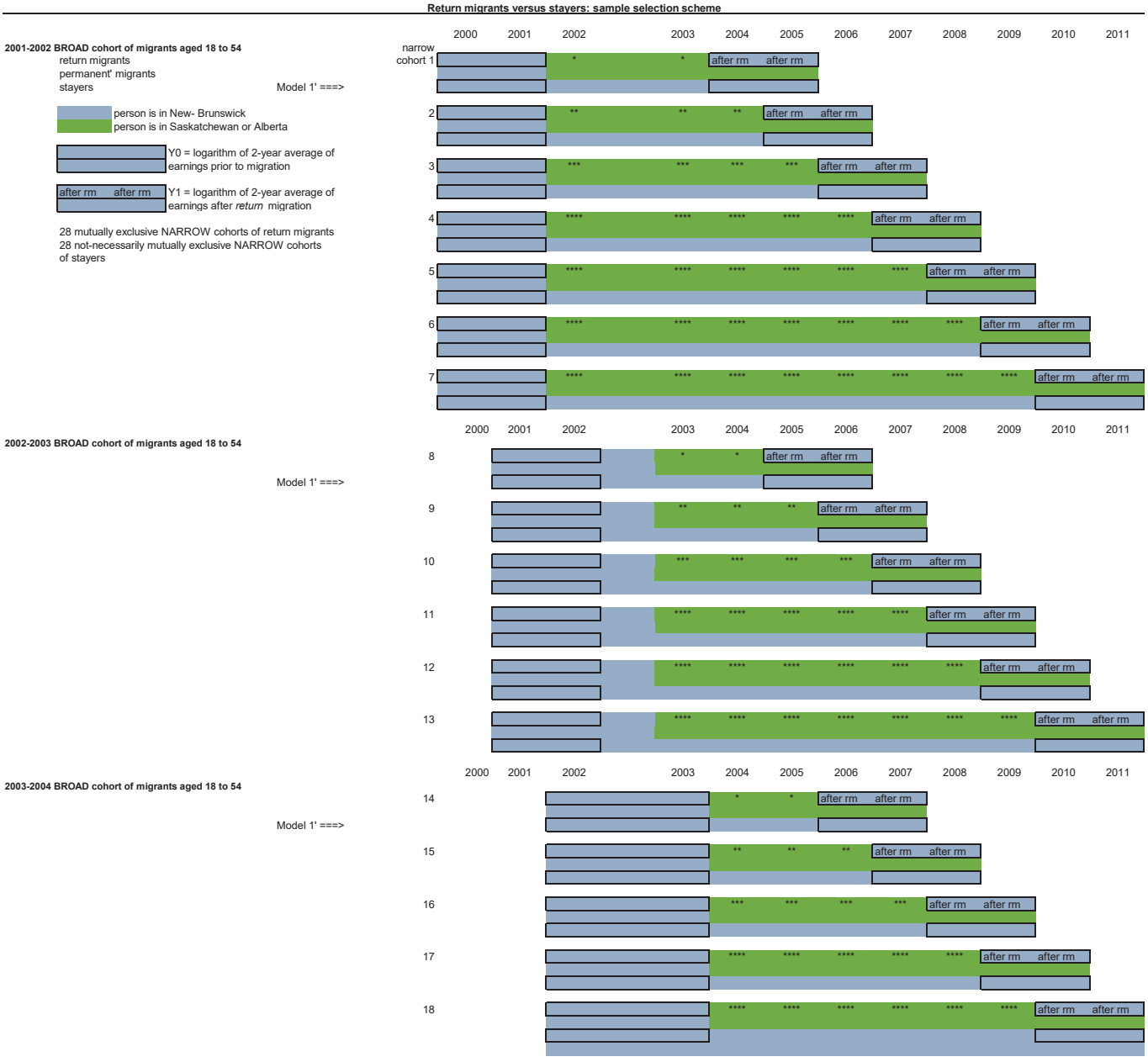
Model 1: $Y_{i,0} = X_i B + \alpha \cdot Return\_Migrant_i + \theta_t + u_i$
Model 2: $Y_{i,1} = X_i B + \alpha \cdot Return\_Migrant_i + \theta_t + u_i$
Model 3: $Y_{i,1} = X_i B + \alpha \cdot Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 4: $Y_{i,1} = X_i B + \alpha \cdot Return\_Migrant_i + \theta_t + \theta_c + \lambda Y_{i,0} + u_i$
Model 5: $Y_{i,1} - Y_{i,0} = X_i B + \alpha \cdot Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 6: $Y_{i,1} - Y_{i,0} = X_i B + \alpha \cdot Return\_Migrant_i + \theta_t + \theta_c + u_i$ + married
Model 7: = Model 5 where the dependent variable equals change in real earnings
Model 8: = Model 6 where the dependent variable equals change in real earnings

Omitted group = other migrants
θ_t: period indicators; θ_c: BROAD cohort indicators; X_i: age-earnings profile (age, age2)

$Y_{i,0}$ = log of : the average of $Y_{i,t-1}$ and $Y_{i,t}$, where t is the year prior to migration
$Y_{i,1}$ = log of: the average of $Y_{i,t+r-1}$ and $Y_{i,t+r-2}$, where $Y_{i,t+r+1}$ is the year prior to return migration

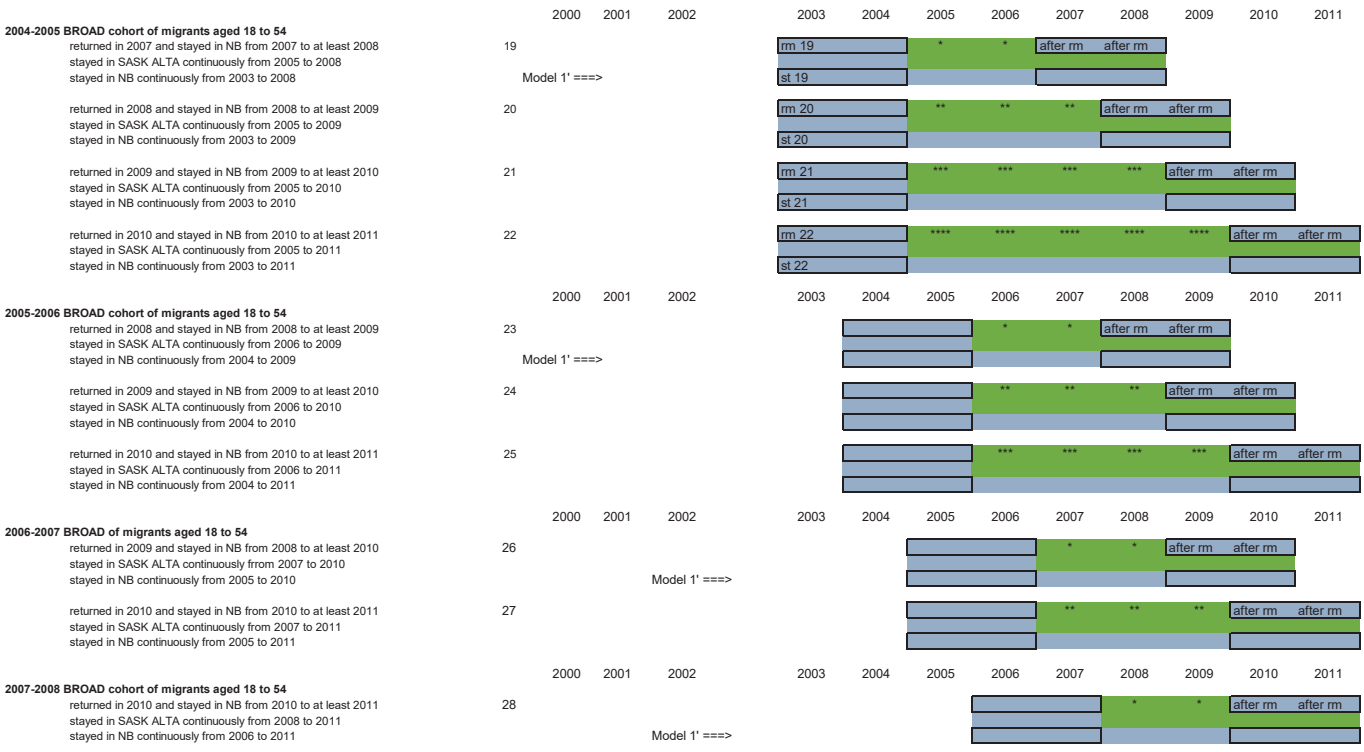
Standard errors are clustered at the person level

APPENDIX 8 SCHEME



APPENDIX 8 SCHEME CONTINUED

Return migrants versus stayers: sample selection scheme



TOTAL = 28 cohorts (7+6+5+4+3+2+1) of return migrants.

define Y_i_0 as the log of : the average of Y_i_t-1 and Y_i_t
define Y_i_1 as the log of: the average of Y_i_t+r+1 and Y_i_t+r+2, where Y_i_t+r+1 is the year after return migration

estimate:	Y_i_0 = X_i*B + α*Return_Migrant_i + θ_t + u_i	(1) : earnings differences for Y0
	Y_i_1 = X_i*B + α*Return_Migrant_i + θ_t + u_i	(2) : analog of (1) for Y1
	Y_i_1 = X_i*B + α*Return_Migrant_i + θ_t + θ_c + u_i	(3) : controls for BROAD cohort effects
	Y_i_1 = X_i*B + α*Return_Migrant_i + θ_t + θ_c + λ*Y_i_0 + u_i	(4) (4) : controls for BROAD cohort effects and Y0
Y_i_1 -	Y_i_0 = X_i*B + α*Return_Migrant_i + θ_t + θ_c + u_i	(5) : imposes λ= 1

The timing of Period 0 earnings is uniquely determined by the BROAD cohort, hence θ_t and θ_c cannot both be in equation 1.
The timing of Period 1 earnings is NOT uniquely determined by the BROAD cohort, hence θ_t and θ_c can both be in equations 3-5.

Omitted group = stayers
θ_t = period indicators; θ_c = BROAD cohort indicators; X_i = gender-specific age-earnings profile (f, age, age2, age*f, age2*f)

Compare alpha's across specifications.

The 28 NARROW cohorts of return migrants will be mutually exclusive. The 28 NARROW cohorts of stayers will not be mutually exclusive. To account for the correlation of earnings across cohorts of stayers, use standard errors clustered at the person level (casenum).

APPENDIX 8

Table 8: Log earnings differences (α) between return migrants and stayers --- broad sample
(There are 28 treatment groups of return migrants and 28 control groups of stayers)

Dependent variable	Y0	Y1	Y1	Y1	ΔY	
	Model 1	Model 2	Model 3	Model4	Model 5	Model 7 (2016 dollars)
I. Men 18-54 with positive wages at some point in the 2 years prior to migration						
α	-0.127***	0.340***	0.200***	0.341***	0.326***	6,968***
	(0.025)	(0.049)	(0.049)	(0.047)	(0.047)	(880)
N Return migrants	1,334	1,334	1,334	1,334	1,334	1,334
Stayers	181,533	181,533	181,533	181,533	181,533	181,533
Total	182,867	182,867	182,867	182,867	182,867	182,867
Number of person-periods	3,585,961	3,585,961	3,585,961	3,585,961	3,585,961	3,585,961
II. Men 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration						
α	-0.163***	0.260***	0.116*	0.289***	0.278***	7,193***
	(0.019)	(0.046)	(0.047)	(0.045)	(0.045)	(931)
N Return migrants						
Stayers	174,685	174,685	174,685	174,685	174,685	174,685
Total	174,685	174,685	174,685	174,685	174,685	174,685
Number of person-periods	3,399,186	3,399,186	3,399,186	3,399,186	3,399,186	3,399,186
III. Women 18-54 with positive wages at some point in the 2 years prior to migration						
α	-0.232***	-0.260*	-0.393***	-0.146	-0.162	-3,285***
	(0.038)	(0.103)	(0.103)	(0.099)	(0.099)	(707)
N Return migrants	737	737	737	737	737	737
Stayers	178,032	178,032	178,032	178,032	178,032	178,032
Total	178,769	178,769	178,769	178,769	178,769	178,769
Number of person-periods	3,532,284	3,532,284	3,532,284	3,532,284	3,532,284	3,532,284
IV. Women 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration						
α	-0.245***	-0.383***	-0.534***	-0.268**	-0.290**	-4,229***
	(0.026)	(0.104)	(0.104)	(0.102)	(0.102)	(794)
N Return migrants	618	618	618	618	618	618
Stayers	163,690	163,690	163,690	163,690	163,690	163,690
Total	164,308	164,308	164,308	164,308	164,308	164,308
Number of person-periods	3,163,012	3,163,012	3,163,012	3,163,012	3,163,012	3,163,012
Controls						
2-year period	yes	yes	yes	yes	yes	yes
Broad cohort	no	no	yes	yes	yes	yes
Log earnings prior to migration (Y0)	no	no	no	yes	no	no
Marital status prior to migration	no	no	no	no	no	no

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001.

Model 1: $Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$
Model 2: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$
Model 3: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 4: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + \lambda*Y_{i,0} + u_i$
Model 5: $Y_{i,1} - Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 6: $Y_{i,1} - Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$ + married
Model 7: = Model 5 where the dependent variable equals change in real earnings
Model 8: = Model 6 where the dependent variable equals change in real earnings

Omitted group = stayers
θ_t: period indicators; θ_c: BROAD cohort indicators; X_i: age-earnings profile (age, age2)

$Y_{i,0}$ = log of : the average of $Y_{i,t-1}$ and $Y_{i,t}$, where t is the year prior to migration
$Y_{i,1}$ = log of: the average of $Y_{i,t+r+1}$ and $Y_{i,t+r+2}$, where $Y_{i,t+r+1}$ is the year after return migration

Standard errors are clustered at the person level

APPENDIX 8.1

Table 8.1: Log earnings differences (α) between return migrants and stayers --- narrow sample
(There are 28 treatment groups of return migrants and 7 control groups of stayers)

Dependent variable		Y0	Y1	Y1	Y1	ΔY	ΔY		
		Model 1	Model 2	Model 3	Model4	Model 5	Model 6	Model 7	Model 8
								(2016 dollars)	
I. Men 18-54 with positive wages at some point in the 2 years prior to migration									
α		-0.121***	0.209***	0.163**	0.346***	0.317***	0.334***	6,393***	6,466***
		(0.025)	(0.049)	(0.062)	(0.060)	(0.058)	(0.058)	(1,110)	(1,110)
N	Return migrants	1,334	1,334	1,334	1,334	1,334	1,334	1,334	1,334
	Stayers	181,533	181,533	181,533	181,533	181,533	181,533	181,533	181,533
	Total	182,867	182,867	182,867	182,867	182,867	182,867	182,867	182,867
Number of person-periods		925,199	925,199	925,199	925,199	925,199	925,199	925,199	925,199
II. Men 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration									
α		-0.159***	0.113*	0.087	0.271***	0.246***	0.255***	6,326***	6,402***
		(0.019)	(0.046)	(0.057)	(0.055)	(0.054)	(0.055)	(1,177)	(1,178)
N	Return migrants	1,244	1,244	1,244	1,244	1,244	1,244	1,244	1,244
	Stayers	173,441	173,441	173,441	173,441	173,441	173,441	173,441	173,441
	Total	174,685	174,685	174,685	174,685	174,685	174,685	174,685	174,685
Number of person-periods		876,481	876,481	876,481	876,481	876,481	876,481	876,481	876,481
III. Women 18-54 with positive wages at some point in the 2 years prior to migration									
α		-0.226***	-0.413***	-0.407**	-0.073	-0.121	-0.126	-1,447†	-1,419
		(0.038)	(0.102)	(0.131)	(0.124)	(0.124)	(0.124)	(865)	(865)
N	Return migrants	737	737	737	737	737	737	737	737
	Stayers	178,032	178,032	178,032	178,032	178,032	178,032	178,032	178,032
	Total	178,769	178,769	178,769	178,769	178,769	178,769	178,769	178,769
Number of person-periods		909,190	909,190	909,190	909,190	909,190	909,190	909,190	909,190
IV. Women 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration									
α		-0.240***	-0.579***	-0.534***	-0.210	-0.260*	-0.266***	-1,954*	-1,919*
		(0.026)	(0.103)	(0.133)	(0.131)	(0.130)	(0.130)	(970)	(971)
N	Return migrants	618	618	618	618	618	618	618	618
	Stayers	163,690	163,690	163,690	163,690	163,690	163,690	163,690	163,690
	Total	164,308	164,308	164,308	164,308	164,308	164,308	164,308	164,308
Number of person-periods		815,336	815,336	815,336	815,336	815,336	815,336	815,336	815,336
Controls									
	2-year period	yes	yes	yes	yes	yes	yes	yes	yes
	Broad cohort	no	no	yes	yes	yes	yes	yes	yes
	Log earnings prior to migration (Y0)	no	no	no	yes	no	no	no	no
	Marital status prior to migration	no	no	no	no	no	yes	no	yes

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001.

Model 1: $Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$
Model 2: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$
Model 3: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 4: $Y_{i,1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + \lambda*Y_{i,0} + u_i$
Model 5: $Y_{i,1} - Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 6: $Y_{i,1} - Y_{i,0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$ + married
Model 7: = Model 5 where the dependent variable equals change in real earnings
Model 8: = Model 6 where the dependent variable equals change in real earnings

Omitted group = stayers
θ_t: period indicators; θ_c: BROAD cohort indicators; X_i: age-earnings profile (age, age2)

$Y_{i,0}$ = log of : the average of $Y_{i,t-1}$ and $Y_{i,t}$, where t is the year prior to migration
$Y_{i,1}$ = log of: the average of $Y_{i,t+r+1}$ and $Y_{i,t+r+2}$, where $Y_{i,t+r+1}$ is the year after return migration

Standard errors are clustered at the person level

APPENDIX 8.2

Table 8.2: Log earnings differences (α) between return migrants and stayers --- narrow sample
(There are 28 treatment groups of return migrants and 7 control groups of stayers)

Dependent variable	Y0	Y1	Y1	Y1	ΔY	ΔY		
	Model 1	Model 2	Model 3	Model4	Model 5	Model 6	Model 7	Model 8
							(2016 dollars)	
I. Men 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration --- In the 2 years after return, had wages from NB only								
α	-0.194***	-0.731***	-0.602***	-0.329*	-0.367*	-0.357*	-4,733*	-4,654*
	(0.043)	(0.156)	(0.179)	(0.166)	(0.167)	(0.166)	(2,118)	(2,118)
Number of return migrants	275	275	275	275	275	275	275	275
II. Men 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration --- Had some wages from SASK ALTA in the 2 years after return								
α	-0.149***	0.352***	0.274***	0.432***	0.410***	0.419***	9,318***	9,394***
	(0.020)	(0.035)	(0.048)	(0.049)	(0.048)	(0.048)	(1,331)	(1,331)
Number of return migrants	969	969	969	969	969	969	969	969
III. Women 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration --- In the 2 years after return, had wages from NB only								
α	-0.282***	-2.258***	-2.417***	-1.985***	-2.051***	-2.055***	-8,649***	-8,625***
	(0.046)	(0.297)	(0.388)	(0.383)	(0.383)	(0.383)	(1,708)	(1.707)
Number of return migrants	182	182	182	182	182	182	182	182
IV. Women 18-54 averaging at least $5,000 (in 2016 dollars) in the 2 years prior to migration --- Had some wages from SASK ALTA in the 2 years after return								
α	-0.223***	0.122**	0.224***	0.506***	0.463***	0.457***	853	890
	(0.031)	(0.045)	(0.054)	(0.057)	(0.054)	(0.054)	(1,139)	(1,140)
Number of return migrants	436	436	436	436	436	436	436	436
Controls								
2-year period	yes	yes	yes	yes	yes	yes	yes	yes
Broad cohort	no	no	yes	yes	yes	yes	yes	yes
Log earnings prior to migration (Y0)	no	no	no	yes	no	no	no	no
Marital status prior to migration	no	no	no	no	no	yes	no	yes

† p<0.10; * p<0.05; ** p<0.01; *** p<0.001.

Model 1: $Y_{i\_0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + u_i$
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Model 3: $Y_{i\_1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 4: $Y_{i\_1} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + \lambda*Y_{i\_0} + u_i$
Model 5: $Y_{i\_1} - Y_{i\_0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$
Model 6: $Y_{i\_1} - Y_{i\_0} = X_i*B + \alpha*Return\_Migrant_i + \theta_t + \theta_c + u_i$ + married
Model 7: = Model 5 where the dependent variable equals change in real earnings
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Omitted group = stayers
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Y_{i_0} = log of : the average of Y_{i_t-1} and Y_{i_t}, where t is the year prior to migration
Y_{i_1} = log of: the average of Y_{i_t+r+1} and Y_{i_t+r+2}, where Y_{i_t+r+1} is the year after return migration

Standard errors are clustered at the person level

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