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Temporary Foreign Workers and Regional Labour Market Disparities in Canada

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TABLE OF CONTENTS

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TEMPORARY FOREIGN WORKERS AND REGIONAL LABOUR MARKET DISPARITIES IN CANADA[1]

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4

ABSTRACT

Temporary foreign worker programmes are seen as short-term solutions to shortages of regional or occupational labour. During the past decade, Canada experienced unprecedented economic growth and some regions appeared to suffer from acute labour shortages. The country's temporary foreign worker programme was thus expanded to include all types of low-skill workers and access by employer was made easier. During the same period, wide regional discrepancies in unemployment rates persisted as the adjustment mechanism for convergence in regional labour markets did not seem to function. This paper shows that some of the persistence is due to increased availability of temporary foreign workers suggesting they are not priced correctly to avoid adverse effects on the Canadian labour market.

1. INTRODUCTION

I n this paper, we investigate whether the expansion of the Canadian temporary foreign worker programme has delayed structural adjustments and, in particular, whether it has contributed to maintain regional labour market disparities.

Temporary foreign worker (TFW) programmes have experienced a renewed interest recently. One often cited advantage is that such programmes allow employers to fill excess demand in low unemployment areas without overly long delays and thus without slowing down or stalling economic growth. Historically, they have been used by countries that did not have immigration settlement policies and had acute shortages of labour such as Austria, Belgium, France, Germany, and Switzerland. In the 1960s, there was an over-accumulation of capital in Europe due to reconstruction, and temporary foreign workers were a complement to increased women participation, internal migration and other external supplies like refugees and individuals returning from the colonies. Thus, in many cases, by allowing the reassignment of native workers to more attractive sectors, they contributed to the long-run prosperity of the country. In some cases, however, they may have contributed to delaying structural and technological adjustments by affecting relative input prices (Castles 1986).

Recently, the co-habitation of standard immigration settlement programmes and full-fledged expanding TFWP has become common (Australia, Canada, US), which may appear surprising as permanent immigration in those countries is taken as a tool to foster economic development. Temporary foreign workers are seen as a transitory solution to maintain economic growth by filling excess labour demand in the presence of rather long delays for per-

manent immigration. They are considered as an efficient tool to avoid a fast sectoral/local rise in wages and slowdown in economic growth. At the same time, wage signals are key to internal reallocation of labour. The neo-classical theory of regional adjustments posits that wage adjustments trigger labour force variations through participation and/or internal migration, which leads to convergence in unemployment across regions. Under some conditions, temporary foreign worker programmes may prevent wage adjustment, and internal labour force changes may no longer operate as spatially equalizing factors, leading to the persistence of labour market imbalances Differences in regional unemployment rates may already exist at so-called "full employment" because of moving costs and regional institutional variations, and the addition of temporary foreign workers may further increase these differences.

Many OECD countries have tailored TFW programmes to target highly skilled individuals in general (i.e., managers, university trained professionals) or skilled occupations (i.e., IT or health workers). However, in the past decade, there has been a rise in programmes for seasonal and lower-skilled workers, and Canada is no exception (OECD 2006a, Part 1.C.1.). Since the mid 1970s, the Canadian programme was designed to attract skilled workers and over time, a seasonal component (i.e. the farm worker programme) and an occupation-specific component (the live-in-caregiver programme) were introduced. In 2002, the programme was extended to ease the entry of low-skill workers. Considering the high spread of regional unemployment in Canada, it is not clear that expanding the temporary foreign worker programme in size and across all skills is a warranted policy. Hence, the specific question investigated in this paper is: Has the TFW programme adversely affected labour market prospects for long-term residents by maintaining a wide distribution of unemployment across provinces?

There are several reasons why this is an important question. Canadian provinces have long exhibited large differences in their labour market performances. However, the past decade has been particularly prosperous in terms of economic growth, yet there has been little change in relative unemployment. Moreover, those differences vary greatly across skill levels. While high-skill workers face very similar unemployment rates across the country, low-skill workers face both large disparities in unemployment rates across provinces and much higher unemployment than their high-skill counterparts. Hence, there appears to be little regional convergence of unemployment except for the most skilled. During the same period, the Canadian TFW programme has undergone significant changes, most of which have contributed to making it easier to access temporary foreign workers. Its extension to low-skill workers and a continuous relaxation of hiring conditions for employers are the two most striking features recently introduced. The question then is whether these changes were warranted given the state of the labour market. The main finding of this paper is that the recent extension of the TFW programme to low-skilled individuals has indeed had detrimental effects on the spatial adjustments of labour markets in Canada.

The paper is organised as follows. Section 2 provides a brief overview of the Canadian TFWP including evidence about its growth in recent years. Section 3 discusses regional unemployment disparities and surveys the main reasons for such disparities. Section 4 presents the model of regional adustment, which serves as basis for the empirical investigation of Section 5. Section 6 provides the study's conclusions.

2. Temporary Foreign Workers in Canada

The Canadian TFWP is made of several sub-programmes. Each has its own specificities and thus deserves a separate analysis.[1] In this paper, we consider only the skilled and unskilled TFW categories, including the seasonal agricultural worker programme. The Canadian TFWP is typical in the sense that it shares a number of characteristics with other past and present programmes[2]: Foreign workers must pre-arrange a fixed-term employment contract; workers cannot change employers during the contract; workers are not entitled to automatic family reunion; upon expiry of the permit, workers must leave the country for a defined period of time. What distinguishes programmes across time and countries are entry regulations. In Canada there is no quota, but employers must fulfill a number of conditions and pay a small administration fee ($150) and the number of entries is basically determined by employers' demand subject to a labour market test.

The labour market test takes the form of a Labour Market Opinion (LMO) that employers must obtain from the Department of Human Resources and Skills Development (HRSDC) before the Department of Citizenship and Immigration (CIC) authorizes entry of workers (HRSDC, 2009).[3] Some of the conditions for obtaining a LMO are a genuine job offer, wages and working conditions comparable to those offered to Canadians in the same occupation, proof of reasonable efforts to hire or train Canadians for the job, and evidence that the hiring of a foreign worker will not affect a labour dispute. In addi-

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1 The skilled and unskilled temporary foreign worker programme, the live-in-caretaker programme, the seasonal agricultural worker programme, and the post-graduation work permit programme are temporary worker programme with different rules. Students and refugees also fall under the regulation of the temporary foreign worker programme. The *Immigration and Refugee Protection Act (IRPA)* regulates temporary entries (CIC, 2008).

2 See Appendix I for an overview of the main characteristics of the programme.

3 Almost half of work permits are issued by CIC without HRSDC involvement (e.g. under international agreements, intra-company transferees; CIC, 2008)

tion, HRSDC considers other potential benefits such as whether the employ-ment of the foreign worker will fill a labour shortage, directly create new job opportunities or help to retain jobs for Canadians, and/or transfer new skills and knowledge to Canadians. The goal of these conditions is to ensure there is no adverse effect on the Canadian labour market. Once the Ministry has ap-proved the job offer, the foreign worker gets a copy of the LMO and can apply for a work permit to CIC.[4]

Initially, the Canadian TFW programme was intended mostly for skilled workers, but in July 2002, it was extended to all categories of occupations (HRSDC 2008).[5] Additional conditions were imposed on hiring low-skill workers, such as payment of return airfare, proof of medical insurance coverage for the duration of the job contract, providing help in finding suitable accommodation, and registration under provincial workers' compensation regime. In 2007, as some regions and sectors were experiencing unprecedented growth (i.e., the natural resource and construction sectors in the West), the government in-troduced further reforms aimed mostly at easing the labour market test for low-skill workers by decreasing the time needed to obtain an LMO. Under the so-called Expedited LMO in the Pilot Project for Occupations Requiring Lower Levels of Formal Training (NOC C and D),[6] the contract period was also extended from one to two years before the TFW must return home,[7] with a compulsory review of the wage after twelve months. Also, applications could

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4 Special conditions apply for jobs in academia, information technology, and film and entertainment (HRSDC, 2009).

5 The Canadian national occupational classification (NOC) has the following categories: 0 (management), A (usually require university education), B (usually require college education or apprenticeship training); C (usually require secondary school and/or occupation-specific training) and D (on-the-job training is usually provided). Categories 0,A,B are considered skilled (HRSDC, 2006).

6 See HRSDC (2009).

7 Many provincial governments support the application by TFW for permanent residence through the nominee programme (British Columbia, Alberta, Saskatchewan, Manitoba, New Brunswick, Newfoundland, Nova Scotia, PEI, and the Yukon territory). Professionals have always had access to these programmes, and more recently, some unskilled workers have been given access to them as well (HRSDC 2009).

now be filed electronically and the required period of job advertising by the employer was shortened from about two to three weeks to one week (OECD 2008, Table II.A1.2). Finally, provincial lists of Occupations under Pressure were established for which the process was accelerated further.

It is clear from that brief description that the Canadian TFW programme has undergone broad changes to alleviate perceived labour shortages. This has been achieved by easing firms' access to foreign workers and decreasing their hiring cost; as a result, entries of temporary foreign workers have grown exponentially. As Figure 1 shows, the expected negative correlation between entries of TFWs and unemployment is clear. Since the beginning of the latest economic expansion period in 1993, unemployment declined from about 11.4 percent to 6 percent[8] in 2007 and annual entries of temporary foreign workers grew from about 101,000 to 165,200 (+63.6 percent). However, there is also evidence that shortages of labour were regional and that the low average unemployment did not reflect large divergences across provinces. In addition, these divergences persisted throughout the period, and the question is whether the expansion of the temporary foreign worker programme contributed to it. So, the next task is to show that persistent disparities characterise provincial unemployment rates.

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8 It is worth noting that in the 1970s and 1980s when Switzerland had a similar programme, the overall unemployment rate in that country was less than 2 percent (Gross 2006). In addition, New Zealand experienced a sharp increase in temporary foreign workers after unemployment fell below 4 percent in 2004 (OECD 2007).

FIGURE 1: ENTRIES OF TEMPORARY FOREIGN WORKERS AND UNEMPLOYMENT IN CANADA (1980-2007).
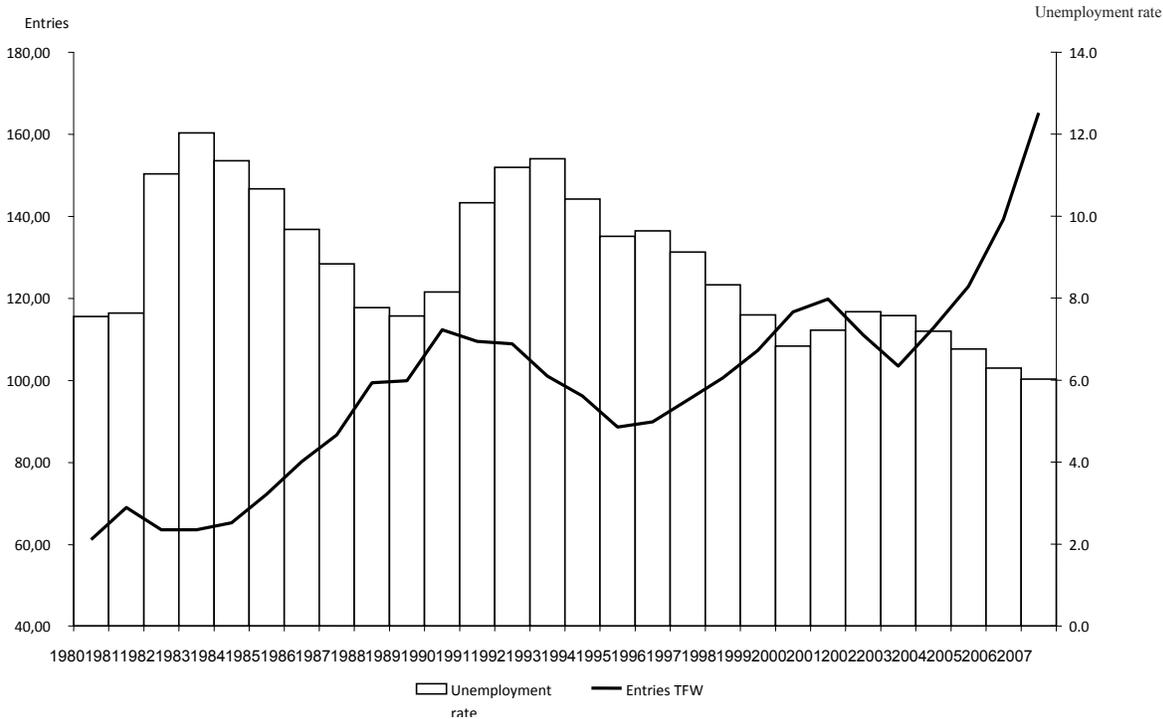
Sources: Entry data provided by CIC; Statistics Canada (2008).

3. REGIONAL UNEMPLOYMENT IN CANADA

In an integrated economy, labour market disparities are more likely to arise under regional aggregate demand shocks than national shocks in part because of regional specialisation in economic activity (Jimeno and Bentolila 1998; Decressin and Fatas 1995). In recent years, shocks in Canada have been mostly regional. For example, Figure 2 shows regional employment growth in deviation from national employment growth for 1987–1993 vs. 1993–2007. There is relatively low correlation between the two periods suggesting that regional shocks have become relatively more prominent. This evolution is confirmed by the results of the estimation of the impact of national employment growth on provincial employment growth. The adjusted R^2 varies between 0.066 for BC and 0.920 for Ontario (see Table AII.1 in Appendix II for detailed

results). The adjusted R² are low for non-manufacturing and small provinces (BC, Saskatchewan, New Brunswick, PEI and Newfoundland) and for a majority of provinces, the elasticity of national employment is significantly different from one. This evidence is consistent with the general view that in recent years, energy-rich provinces have had more impact in determining Canada's economic growth, and internal reallocation of labour should have occurred. Next, we turn to evidence of a recent increase in the persistence of labour market disparities.

FIGURE 2: AVERAGE PROVINCIAL EMPLOYMENT GROWTH IN DEVIATION FROM NATIONAL: 1987-1993 VS. 1993-2007
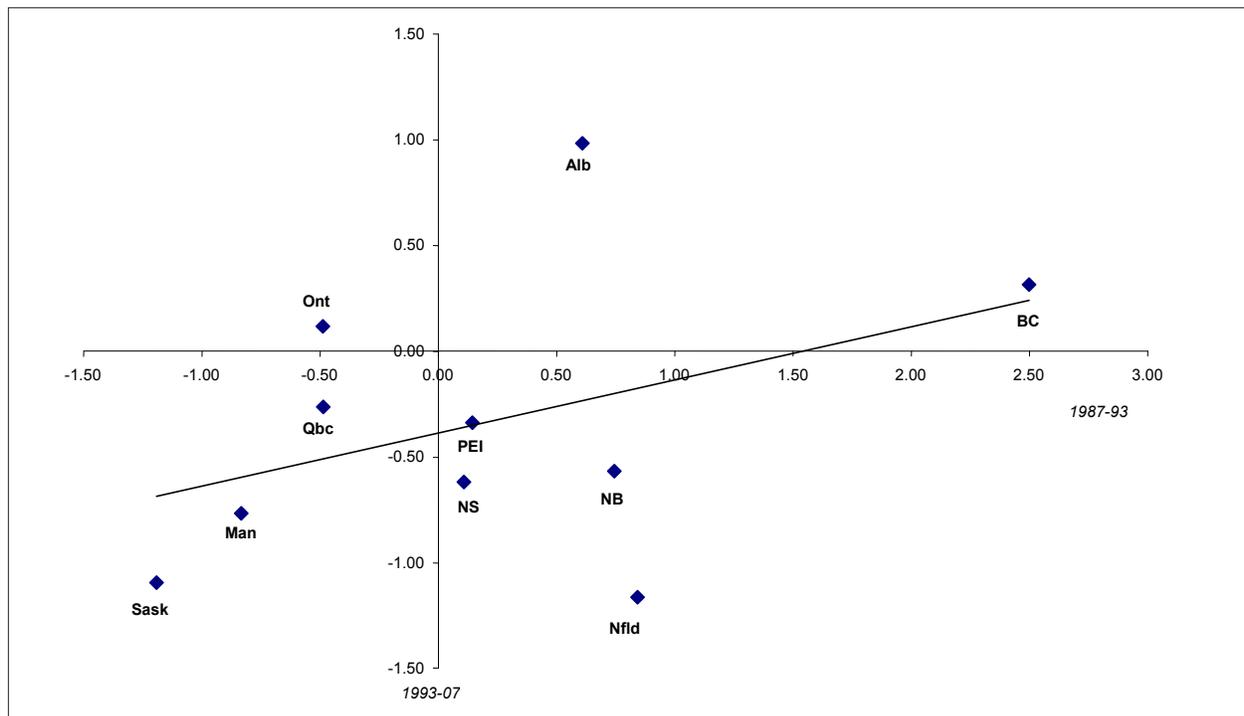
Although such persistence has been observed in the Canadian literature for decades (see for example, Lazar 1977), it is still important to confirm labour market disparities for the period of interest in this study. Table 1 provides the first piece of evidence of increased persistence in provincial unemployment divergence for the last two periods of expansion (defined as steady de-

cline in overall unemployment; see Figure 1). It shows that the simple correlation among provincial unemployment rates between the beginning and end of both periods (i.e., 1983 and 1989; 1993 and 2007) increased from 0.772 to 0.982.[9] One way to confirm this persistence is to look at the ranking of the provinces. During the 1980s' expansion, only one province (Newfoundland) kept its ranking between the first and last year. During the latest expansion, however, four provinces (Ontario, Nova Scotia, PEI and Newfoundland) maintained the same ranking. Furthermore, this inertia is driven by low-skill unemployment rates (see Table 2). While only two provinces kept the same ranking for university-educated people, five and four provinces did not change rank for the low-skill categories C and D respectively; moreover, all provinces except Alberta moved by only one rank in the D occupation category. Also worth noting is the fact that average unemployment rates in categories C and D are much higher than those for skilled people (i.e., categories A and B). Further evidence of the slow adjustment in provincial unemployment rates is given in Table 3, where unit root tests (Augmented Dickey-Fueller, i.e., ADF) are conducted over the longest available sample with quarterly observations (1976.1–2007.4). All provinces' unemployment rates have a unit root and thus show high persistence except Ontario. Quebec and Alberta are borderline cases at 11percent and 12 percent significance respectively.

To summarise, graphical, numerical and statistical evidence all point toward increased persistence in divergences for provincial unemployment rates in the past decades driven by lower-skill categories. Concurrently, the long expansion period since 1993 has witnessed a large increase in the use of temporary foreign workers, with a shift toward low-skill workers.

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9 The early 1980s pattern of regional unemployment is also highly correlated with that from the mid-1960s to late 1970s (OECD 1989, Annex 3, Table 3.D.1). Also, the Theil index confirms that, among OECD countries, Canada experienced the largest increase in the dispersion of regional unemployment rates between 1993 and 2003 after Italy and Spain (OECD 2006b, Figure 2.7).

TABLE 1: PROVINCIAL UNEMPLOYMENT DISTRIBUTION

	Unemployment					Ranking			
	1983	1989	1993	2007		1983	1989	1993	2007
British Columbia	13.9	9.1	9.7	4.2	British Columbia	7	5	4	2
Alberta	11.0	7.2	9.6	3.5	Alberta	4	2	3	1
Saskatchewan	7.7	7.4	8.3	4.2	Saskatchewan	1	3	1	2
Manitoba	9.5	7.5	9.3	4.4	Manitoba	2	4	2	4
Ontario	10.5	5.0	10.9	6.4	Ontario	3	1	5	5
Quebec	14.2	9.6	13.3	7.2	Quebec	8	6	7	6
New Brunswick	15.0	12.1	12.6	7.6	New Brunswick	9	8	6	7
Nova Scotia	13.5	9.9	14.4	8.0	Nova Scotia	6	7	8	8
PEI	12.4	13.8	17.0	10.4	PEI	5	9	9	9
Newfoundland	18.2	15.6	20.2	13.6	Newfoundland	10	10	10	10
Correlation	0.772		0.982		Same ranking	1		4	
Canada	12.0	7.6	11.4	6.0					

Source: Statistics Canada (2008)

TABLE 2: PROVINCIAL SKILL UNEMPLOYMENT RATES

	A		B		C		D	
	1993	2007	1993	2007	1993	2007	1993	2007
British Columbia	5.6	3.0	8.4	3.3	9.3	4.9	15.9	11.1
Alberta	5.3	2.4	8.7	2.6	8.9	4.7	14.3	5.4
Saskatchewan	4.3	2.1	7.1	3.2	8.0	5.4	9.6	5.7
Manitoba	5.6	2.8	7.2	3.3	9.7	4.4	12.4	7.6
Ontario	5.3	4.3	9.0	5.0	12.0	7.8	13.3	9.4
Quebec	7.2	3.6	10.9	5.9	14.3	9.2	19.7	16.1
New Brunswick	4.9	2.8	10.2	5.9	12.5	8.4	20.8	19.6
Nova Scotia	7.7	3.8	12.4	6.7	14.3	8.4	24.3	17.2
PEI	5.4	4.8	11.6	7.1	14.3	9.5	28.6	20.0
Newfoundland	6.6	4.3	16.5	11.7	18.2	14.6	31.3	26.7
Canada	5.8	3.7	9.6	4.9	11.6	7.1	15.1	12.5
	Rankings							
	A		B		C		D	
	1993	2006	1993	2006	1993	2006	1993	2006
British Columbia	6.	5.	3.	3.	3.	3.	5.	5.
Alberta	3.	2.	4.	1.	2.	2.	4.	1.
Saskatchewan	1.	1.	1.	2.	1.	4.	1.	2.
Manitoba	6.	3.	2.	3.	4.	1.	2.	3.
Ontario	3.	8.	5.	5.	5.	5.	3.	4.
Quebec	9.	6.	7.	6.	7.	8.	6.	6.
New Brunswick	2.	3.	6.	6.	6.	6.	7.	8.
Nova Scotia	10.	7.	9.	8.	7.	6.	8.	7.
PEI	5.	10.	8.	9.	7.	9.	9.	9.
Newfoundland	8.	8.	10.	10.	10.	10.	10.	10.
# with same ranking	2		4		5		4	

Source: Statistics Canada (2008)

TABLE 3: AUGMENTED DICKEY-FUELLER TESTS FOR UNIT-ROOT IN PROVINCIAL UNEMPLOYMENT: 1976.1–2007.4

$$\Delta urate_{j,t} = c + \gamma urate_{t-1} + \sum_{i=1}^{4} \beta_i \Delta urate_{i,t-i} + \varepsilon_t$$

	γ[a]	p-value[b]	Adj.R^2
Newfoundland	-.096 (-1.667)	0.446	0.702
Prince Edward Island	-.085 (-1.738)	0.410	0.875
Nova Scotia	-.075 (-2.107)	0.243	0.752
New Brunswick	-.064 (-1.612)	0.473	0.815
Quebec	-.082 (-2.535)	0.110	0.652
Ontario	-.130 (-4.105)	0.001	0.615
Manitoba	-.069 (-2.009)	0.283	0.566
Saskatchewan	-.086 (-2.366)	0.154	0.733
Alberta	-.059 (-2.482)	0.122	0.405
British Columbia	-.060 (-2.169)	0.218	0.399
Canada	-0.094 (-3.562)	0.008	0.721

[a] The critical t-values for the ADF test are -3.484 at 1%, -2.885 at 5%, -2.579 at 10%.[b] MacKinnon (1996) one-sided p-values.

The neo-classical model of labour market adjustment suggests that regional divergences are not sustainable. Imbalances trigger relative wage changes, which generate changes in labour force participation as well as encourage employers to adjust their input mix or relocate. Persistent discrepancies then exist because of long-run differences in equilibrium unemployment rates or slow operation of the equilibrium mechanism. Specifically, if temporary worker programmes are not priced adequately, employers and individuals might be discouraged from considering alternatives (Ruhs 2002).

Theoretically, observed persistence in unemployment divergences can come from two sources: differences in equilibrium unemployment and sluggish adjustment toward the equilibrium.[10] Countries' differences in equilibrium unemployment are commonly attributed to differences in labour market institutions, such as social programmes and wage-setting mechanisms. In Canada, province-specific public policies have been shown to contribute to persistent

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10 The literature on the causes of persistent regional unemployment is vast (see Elhorst, 2003, for a survey). Here, we review only the issues relevant to the Canadian case.

dispersion in unemployment.[11] Johnson and Kneebone (1991) for instance find that minimum wage legislation and unemployment insurance generosity are the main reasons for divergences in provincial unemployment rates between 1960 and 1986. They estimate that the natural rate of unemployment in 1980 was highest in Newfoundland at 14.8 percent and lowest in Albert at 4 percent.[12] They attribute these discrepancies to different structural factors such as unemployment insurance generosity and relative minimum wage rates as well as to different responses to these structural factors. In 1996, the Unemployment Insurance (UI) programme was substantially reformed and renamed Employment Insurance (EI); it still encompasses strong regional-specific aspects that allow unemployed workers to qualify faster and collect benefits for a longer period in higher unemployment regions.[13] These features are likely to have perpetuated regional unemployment differences.

With shocks becoming more "regional" since the start of the growth period in 1993, it is expected that adjustments in the supply of labour occurred through internal migration and labour force participation adjustments. Table 4 provides inter-provincial flows for fourteen years before and after the peak of unemployment in 1993. Generally, internal migration flows decreased over time despite shocks being more region-specific. All provinces except Alberta experienced a decrease in in-migration, and all but Newfoundland and BC experienced a decrease in out-migration. As expected, simple correlations between total migration and unemployment are mostly negative, and it weakens over time in all provinces.

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11 See Day and Winer (2001), Section 4, for example.

12 New Brunswick was the 2nd highest with 11.6%, followed by PEI (11%), Nova Scotia (10.4%), Quebec (10.2%), BC (7.5%), Ontario (6.9%), Manitoba (5.8%), and Saskatchewan (4.5%).

13 For example, required number of hours of insurable employment in qualifying period range from 700 in regions with less than 6 percent unemployment to 420 in regions with more than 13 percent unemployment (Service Canada, 2008). See also Day and Winer (2001), Appendix D, for a description of some of the changes in UI parameters since 1966.

TABLE 4: INTER-PROVINCIAL MIGRATION FLOWS

	Canada	NL	PEI	NS	NB	QC	ON	MB	SK	AB	BC
In-migration											
1980-93	4435706	118284	42614	254334	181448	350572	1172212	247532	245181	852174	891187
1993-07	4093971	116434	37932	224651	157924	310843	951631	196251	232760	1043558	757396
Out-migration											
1980-93	4435706	159910	42432	252892	192160	524757	1045732	313497	339005	882265	594420
1993-07	4098011	180801	37977	246468	178857	448102	954574	254973	289461	725984	701860
Total migration (In+Out)											
Total 1980-93	-	278194	85046	507226	373608	875329	2217944	561029	584186	1734439	1485607
Total 1993-07	-	315347	80663	503524	358902	815257	2044875	486344	561308	1874698	1574483
Correlation between unemployment and net-migration											
1980-93	-	-0.720	-0.701	-0.882	-0.698	-0.409	-0.777	-0.898	-0.481	-0.894	-0.814
1993-07	-	-0. 342	-0.506	-0.221	-0.597	0.177	0.063	0.489	-0.220	-0.691	-0.009

Source: Statistics Canada (2008).

Past and recent literature on Canada, even though relatively scarce, confirms the weakening of the response of internal migration to regional labour market states. Grenier (2008) argues that the mobility of the working age population across Canada has decreased between the mid-1970s and the mid-1990s, a result also found by Cousineau and Vaillancourt (2001). Coulombe (2006) shows that inter-provincial migration does not respond to regional shocks but does respond to more fundamental changes such as rural/urban structure or long-term differences in unemployment. The early literature from the 1980s shows that the lack of mobility between Canadian regions is mainly due to government policies and unemployment insurance in particular (for example, Shaw 1986 and Polese 1981), a point reaffirmed in Day and Winer (2001), who expand the study to income taxes and provincial per capita spending. Cousineau and Vaillancourt (2001) point toward an aging population and a more equal distribution of income due in part to transfer programmes as factors influencing migration rather than unemployment inequality. Finally, one of the consequences of low inter-provincial migration is

wage inequality; hence, among factors affecting wage inequality, one should find those affecting migration. Dickie and Gerking (1998) find that in addition to transfer payment, relocation costs are strongly related to wage differentials.[14] Among those costs, age, education and language are identified as mobility costs. In an earlier study of Atlantic Canada only, Drewes (1987) argues that persistently high unemployment in the region was due to inappropriately high wages imported from other Canadian regions.

   In conclusion, there is ample evidence indicating large persistent disparities exist across provincial labour markets in Canada. Several studies confirm that such persistence reflects different equilibria due to social programmes' incentives. The presence of large regional shocks, however, is expected to trigger some migration flows, which, according to the evidence, did not occur. While there is compelling evidence that inertia is due to standard economic factors, there is also evidence that persistence in the divergence of provincial labour markets has increased recently while internal mobility has decreased. This coincides with the temporary foreign worker programme being expanded in regions under large positive demand shocks. Hence, it is natural to investigate whether the expansion of the TFWP contributed to slowing further interprovincial adjustments in Canada.

4. THEORY

   To investigate the possible role of temporary foreign worker programs in contributing to persistence in regional unemployment divergence, we adapt Blanchard and Katz's model of the labour market (1992). The model is com-

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14 The literature on provincial income convergence (see, for example, Helliwell 1996; Coulombe and Tremblay 2007) is not reviewed here as it is not directly related to the focus of our paper.

posed of four equations: a short-run demand for labour, a wage-setting rela-
tion, a labour supply and a long-run regional labour demand.[15]

$$w_{j,t} = -a(S_{j,t} + TF_{j,t} - u_{j,t}) + z_{j,t} \qquad (1)$$

$$w_{j,t} = -bu_{j,t} + X_j^W \qquad (2)$$

$$S_{j,t+1} - S_{it} = cw_{j,t} - gu_{j,t} + X_j^S \qquad (3)$$

$$z_{j,t+1} - z_{j,t} = -dw_{j,t} + X_j^D \qquad (4)$$

The four equations are: In these equations, the variables are measured
relatively to their national values. Equation (1) represents the short-run de-
mand for labour where wage at time t in province j depends negatively (i.e.,
$a>0$) on employment in that province, $(S_{j,t}+TF_{j,t} -u_{j,t})$, (i.e., domestic labour
force plus the stock of temporary workers minus unemployment)[16] and on the
position of the demand, $z_{j,t}$, for given employment level. Equation (2) captures
the relationship between unemployment and wage. It is assumed that higher
unemployment is associated with lower wage ($b>0$). Also the more sensitive
wage becomes with respect to change in unemployment (i.e., the higher b is),
the more flexible the labour market of province j is. The variable X_j^W includes
all variables other than unemployment that may affect the regional wage (such
as unemployment benefits). In (3), the increase in the relative labour supply,
whether through relative natural growth of the population, relative increase in
participation or relative internal migrations captured by the variable X_j^S, also
comes from a high relative wage or a low relative unemployment rate. It is
fair to say that the natural growth of population is not likely to play a large
role compared to internal migrations or change in participation rates as the la-
bour supply is relative to the national average. Thus in X_j^S, the main variables
are the ones affecting migration, whether it is the mild weather and the West

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15 In our theoretical considerations, we ignore stochastic shocks that may affect the demand and supply of
    labour.
16 If S measures the logarithm of the labor force and u is the unemployment rate then the logarithm of em-
    ployment is approximately given by $S-u$ (see Blanchard and Katz 1992).

Coast lifestyle of BC, the metropolitan lifestyle of Toronto, the French culture of Quebec, or changes in immigration laws. The last equation (4) determines the position of the demand of labour and thus the attractiveness of a particular province as far as the firms are concerned. A lower wage makes it more attractive while X_j^D contains the non-wage factors making a province attractive, such as relative technological progress that affect the goods produced in province j and thus the relative demand for labour, as well as amenities in province j other than wage, such as infrastructure, local taxes, regulatory and labour relations environment or even natural resources—in short, everything that affects the location decision of firms in province j relative to other provinces.

The long-term solution of the above model ($u_{j,t}=u_{j,t+1}$) for the unemployment rate as a function of the temporary foreign workers and of the other exogenous variables influencing (1)-(4) can be found to be

$$u_{j,t} = \frac{1}{ag+b(ac+d)}\left(aX_j^S + (d+ac)X_j^W - X_j^D + a(TF_{j,t+1} - TF_{j,t})\right) \qquad (5)$$

The regions can have different long-run unemployment rates because of different specific factors. Thus a positive shift in the labour supply (through X_j^S), a decrease in the labour demand (through X_j^D), a positive shift in the regional determination of the wage (through X_j^W), or a positive shift in the supply of temporary workers contribute to increasing the unemployment rate of region j.

We add to this model an equation that determines the change in the number of temporary workers and, following the conditions for the LMO process, we assume that such a change does not depend on wage but negatively on the level of unemployment and other factors such as the cost of bringing TFW:

$$TF_{j,t+1} - TF_{j,t} = -hu_{j,t} + X_j^T \qquad (6)$$

where $h>0$. Equations (5) and (6) are useful separately, but of course, a reduced form for the unemployment rate can also be derived such that,

It is worth noting that the presence of temporary workers *lowers* the elasticity of every standard variable determining the equilibrium unemployment rate with respect to their value without temporary workers, in addition

$$u_{j,t} = \frac{1}{a(g+h)+b(ac+d)}[aX_j^S + (a+d)X_j^W - X_j^D + aX_j^T] \qquad (7)$$

to having a direct effect on $u_{j,t}$. This is the case because $h>0$ enters the denominator of the reduced-form unemployment rate. Not surprisingly, lower hiring costs for temporary workers (i.e., higher X_j^T) increase the equilibrium unemployment rate.

5. ESTIMATIONS AND RESULTS

The estimation is for a semi-log linear form of the unemployment reduced form in (7), such that:

$$(u_{j,t} - u_t) = c_j + \sum_S a_S X_{j,t}^S + \sum_D b_D X_{j,t}^D + \sum_W d_W X_t^W + \sum_T g_T X_t^T + e_{j,t} \qquad (8)$$

where $(u_{j,t} - u_t)$ is the difference between province j total unemployment and national unemployment and *Xs* are in deviations from national values unless otherwise indicated.

Supply shocks, X_j^S, are represented by provincial birth rates deviations (*Birthr$_{j,t}$*) which influence women labour force participation, and by provincial

urbanisation rate deviations ($Urban_{j,t}$) to capture internal migration (Coulombe 2006).[17] A decrease in the birth rate and an increase in urbanisation have an adverse effect on unemployment. Demand shocks, X^D, are represented by provincial specific demand shocks ($Busc_{j,t}$) and the log of real oil price ($Loilp_t*D_j$). Because of Canada's diversified industrial structure, persistent differences can be caused by variations in the energy price. The effect is made province-specific using provincial dummies (D_j). It is expected that a rise in oil price increases unemployment rates in most provinces except Alberta, British Columbia and possibly Newfoundland. Wage shocks, X_j^W, are captured by Employment Insurance (EI) parameters. Three alternative EI measures are tested: the provincial length of qualifying and collection periods in deviations ($EIqual_{j,t}$, $EIcoll_{j,t}$) and a distance weighted dispersion of collection periods ($EIben_{j,t}$). An increase in the qualifying period is expected to decrease dispersion in unemployment while an increase in collection period has the opposite effect. Other province-specific institutions likely to affect wage determination that are also taken into account are unionisation rates ($Union_{j,t}$) and minimum wages ($Lminw_{j,t}$). Finally, the temporary foreign worker policy parameter, X_j^T, is measured by TFW–specific non-wage hiring costs not applicable to resident workers. The bulk of these costs are travel costs that employers are obligated to pay for unskilled TFWs since 2002; they are measured with the time-varying log of the real price to fly one mile on international travel from the US ($Ltrav_t*D_t$). The impact is measured from the start of the pilot project for low-skill TFWs in 2002 (D_t is 1 from 2002 to 2007, and 0 otherwise). It is expected that an increases in the relative cost of hiring temporary foreign workers decreases regional unemployment as employers find it more advantageous to look for local workers. Other additional hiring costs for TFWs that

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17   All the variables are described in details in Apprendix III with basic descriptive statistics and simple correlations.

are province-specific, such as health premiums during the waiting period, are accounted for in the fixed effect.[18]

To summarise, the basic empirical specification is:

$$(u_{j,t} - u_t) = c_j + a_1 Busc_{j,t} + a_2 Birthr_{j,t} + a_3 Urban_{j,t} + a_4 EIqual_{j,t}$$

$$+ a_5 (Ltrav_t * D_t) + \sum_{p=6}^{15} a_p (Loilp_t * D_j) + e_{j,t} \qquad (9)$$

The model is estimated on a panel dataset for unemployment divergences from national for ten provinces over seventeen years (t=1991 to 2007) using cross-sectional fixed effects (FE). First, the relevance of the statistical methodology is investigated, and then the robustness of results is tested with alternative variables and measures.

In Table 5, columns 1 and 2, the validity of province-specific fixed effects is confirmed by the significance of the Hausman test. In column 2, the significant coefficients have the expected sign. Generally the results show that a rise in relative provincial aggregate demand decreases unemployment and increasing the EI qualifying period decreases unemployment dispersion. Also, since the introduction of the pilot project for low-skill TFWs in 2002, the higher costs of hiring foreign workers have decreased divergences in unemployment. Before discussing the results further, we evaluate the validity of the results by correcting for some of the possible shortcomings of FE estimations.

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18 The three-month waiting period is covered by employers' paying for private coverage only in British Columbia (www.health.gov.bc.ca), Ontario (www.health.gov.on.ca), Quebec (www.ramq.gouv.qc.ca), and New Brunswick (www.health.gnb.ca).

TABLE 5: PROVINCIAL UNEMPLOYMENT DEVIATION: ALTERNATIVE METHODOLOGIES

		OLS	FE ESTIMATION	STRICT EXOG. TEST BIRTH RATE	WITH TREND (HETEROGEN.)	WHITE ROBUST CROSS SECTION SE
		1.	2.	3.	4.	5.
X^D	$Busc_{j,t}$ $Loilp_t*D_j$	-8.06 (4.0)***	-8.33 (5.7)***	-7.84 (5.3)***	-7.59 (5.2)***	-8.33 (4.9)***
	NL	.772 (3.2)***	-1.41 (4.7)***	-1.04 (3.2)***	-1.75 (5.4)***	-1.41 (3.1)***
	NS	-.575 (2.4)**	.927 (2.9)***	.797 (2.3)**	.610 (1.8)*	.927 (3.7)***
	PEI	-.444(1.6)	-.946 (2.8)***	-1.16 (3.0)***	-1.31 (3.6)***	-.946 (2.5)**
	NB	-.708 (2.7)***	.871 (3.0)***	1.09 (3.5)***	.516 (1.6)	.871 (3.4)***
	QC	.290 (1.3)	.459 (1.4)	.592 (1.6)	.154 (0.5)	.459 (1.6)
	ON	.208 (0.9)	1.10 (3.7)***	1.08 (3.4)***	.728 (2.2)**	1.10 (8.0)***
	MB	-.370 (1.8)*	.472 (1.3)	.390 (1.0)	.217 (0.6)	.472 (1.5)
	SK	-.601 (2.7)***	.191 (0.6)	.352 (1.0)	-.111 (0.3)	.191 (0.6)
	AB	-.117 (0.6)	-1.20 (4.0)***	-1.19 (3.6)***	-1.51 (4.8)***	-1.20 (6.0)***
	BC	.152 (0.7)	-.080 (0.3)	.220 (0.6)	-.478 (1.4)	-.080 (0.2)
X^S	$Birthr_{j,t}$	-.573 (1.9)*	.301 (0.9)	.178 (0.4)	.245 (0.7)	.301 (1.0)
	$Urban_{j,t}$	-.129 (4.3)***	.102 (1.5)	.097 (1.4)	.135 (2.0)**	.102 (1.2)
X^W	$Elqual_{j,t}$	-.602 (9.4)***	-.670 (11)***	-.655 (10)***	-.676 (11)***	-.670 (7.9)***
X^T	$Lftrav_t*D_t$	-.099 (1.8)*	-.086 (2.2)**	-.092 (2.4)**	-.130 (3.0)***	-.086 (2.9)**
	$Birthr_{j,t+1}$	-	-	.091 (0.2)	-	-
	Time	-	-	-	.039 (2.6)**	-
	Adj R^2	0.977	0.988	0.989	0.989	0.988
	n	10	10	10	10	10
	t	17	17	16	17	17
	Log likel.	-127.6	-62.8	-52.9	-59.0	-62.8
	Hausman F-test for FE	-	F(9,141)=18.4 [.0000]	-	-	-

All estimations include fixed effect except column 1. Absolute t-values. in parentheses.

*,**,*** significant at 10 %, 5%, and 1 % respectively.

One of the conditions needed in order for the results to be consistent and in line with the equilibrium reduced-form is strict exogeneity of the explanatory variables; that is, future Xs and the unobserved heterogeneity term are not correlated with the error term in any period [i.e., $E(\varepsilon_{j,t}|x_{j,1},x_{j,2}, ... x_{j,n},c_j)=0$, t=1, ...n; Woolridge 2002, 2007). The most likely candidate for endogeneity is the birth rate variable. Many studies have treated fertility as endogenous to women labour force participation and instruments used in macro studies

are fertility-related policy variables (see, for example, Klerman 1999; Bailey 2006; Angrist and Evans 1996). It is also possible that unemployment influences future birth rates. Following Woolridge (2007), we introduce $Birthr_{j,t+1}$ as additional explanatory variable to test for strict exogeneity (Table 5, column 3), and it is not significant indicating strict exogeneity is not violated. Another source of correlation with c_j, is time-varying province-specific effects, which are not taken into account (i.e., the fixed effect captures only mean effects). So, we introduce a time trend for each cross-section which is, however, likely to reduce efficiency. In column 4, the time trend is significant and overall, the results remain quite stable. The coefficient of the travel cost variable, which varies only over time, however, increases in size and significance, possibly a result of collinearity with the time trend (simple correlation -0.821). Finally, cross-panel correlation may exist since the observations are for regions within a given country possibly subjected to common shocks. When White cross-section standard errors are used (column 5), some levels of significance weaken but overall the results remain unchanged.

Considering the time dimension is relatively long (ten years), another concern is serial correlation within panels, especially since persistence in deviations has been demonstrated. An AR(2) specification for the estimated error from the specification in Column 2 shows that within panel serial correlation is unlikely.[19] Following all these results, we conclude that the bias in the FE estimation is not too large and efficiency is adequately corrected for.

The next step is to test the robustness of results to changes in variables and measurements. In Table 6, the first modification relates the EI insurance characteristics. In column 1 and 2, the collection period and the distance

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19 The results are: $e_{j,t}=0.01+0.129\ e_{j,t-1}+0.087e_{j,t-2}$ with p-value=0.12 and 0.26 respectively for the coefficients on the lagged estimated errors.

TABLE 6: PROVINCIAL UNEMPLOYMENT DEVIATION: ALTERNATIVE EXPANATORY VARIABLE MEASURES.

		EI COLLECT PERIOD	EI WEIGHTED QUAL. PERIOD	NON-LINEAR QUALIFYING	UNION	MIN. WAGE	HOUSE PRICES
		1.	2.	3.	4.	5.	6.
X^D	$Busc_{j,t}$	-8.84 (7.5)***	-10.3 (8.4)***	-7.95 (5.2)***	-8.36 (4.9)***	-8.13 (4.5)***	-8.48 (4.4)***
	$Loilp_t * D_j$						
	NL	-.876 (3.1)***	-.913 (3.5)***	-1.10 (2.2)**	-1.38 (3.3)***	-1.44 (3.0)***	-1.44 (3.0)***
	NS	.351 (1.7)*	-.005 (0.1)	.823 (3.0)***	.935 (3.7)***	.901 (3.7)***	0.791 (2.9)***
	PEI	-.775 (3.0)***	-.992 (4.1)***	-1.03 (2.7)***	-.943 (2.6)**	-.967 (2.5)**	-.950 (2.6)**
	NB	.737 (1.7)*	.161 (0.5)	.867 (3.1)***	.881 (3.3)***	.908 (3.3)***	.878 (3.5)***
	QC	.405 (1.7)*	.202 (0.8)	.429 (1.5)	.447 (1.6)	.385 (1.4)	.416 (1.3)
	ON	1.16 (10)***	.979 (12)***	1.11 (7.9)***	1.11 (8.4)***	1.33 (6.3)***	1.07 (9.6)***
	MB	.235 (1.0)	.598 (2.2)**	.305 (1.0)	.473 (1.5)	.363 (1.0)	0.138 (1.2)
	SK	.083 (0.3)	.477 (2.2)**	-.084 (0.3)	.181 (0.5)	.217 (0.7)	.073 (0.3)
	AB	-1.17 (6.8)***	-.783 (4.2)***	-1.28 (7.2)***	-1.21 (5.2)***	-1.16 (6.3)***	-1.24 (7.0)***
	BC	-.307 (0.7)	-.242 (0.6)	.046 (0.1)	-.075 (0.2)	.077 (0.2)	.047 (0.1)
X^S	$Birthr_{j,t}$	.004 (0.1)	-.174 (0.7)	.337 (1.1)	.318 (1.1)	.442 (1.3)	.287 (1.0)
	$Urban_{j,t}$	.056 (0.7)	.068 (0.9)	.06 (0.8)	.105 (1.3)	.089 (1.0)	-
X^W	$Elqual_{j,t}$	-	-	-.679 (8.9)***	-.671 (7.9)***	-.646 (8.6)***	-.676 (7.5)***
	$Elcoll_{j,t}$	.267 (7.4)***	-	-	-	-	-
	$Elben_{j,t}$	-	31.5 (12)***	-	-	-	-
	$Elqual_{j,t}^2$	-	-	-.024 (1.8)*	-	-	-
	$Union_{j,t}$	-	-	-	.003 (0.1)	-	-
	$Lminw_{j,t}$	-	-	-	-	.200 (1.3)	-
	$Lhousp_{j,t}$	-	-	-	-	-	-.005 (0.1)
X^T	$Lftrav_t * D_t$	-.086 (2.9)***	-.077 (2.8)***	-.036 (3.6)***	-.086 (2.9)***	-.089 (3.0)**	-.093 (3.6)***
	Adj R^2	0.986	0.988	0.989	0.988	0.989	0.988
	n	10	10	10	10	10	10
	t	17	17	17	17	17	17
	Log likel.	-77.3	-68.6	-61.3	-62.8	-61.7	-64.1

Absolute t-values. in parentheses. *,**,*** significant at 10%, , 5%, and 1% respectively. White cross-section standard errors.

TABLE 6: PROVINCIAL UNEMPLOYMENT DEVIATION: ALTERNATIVE EXPLANATORY VARIABLE MEASURES CON'T.

		FE ESTIMATION	FLIGHT COST WEIGHTED C,D	FLIGHT COST	RELATIVE FLIGHT/ DOMESTIC COST
		7.	8.	9.	10.
X^D	$Busc_{j,t}$	-8.33 (5.7)***	-8.29 (4.9)***	-8.29 (4.8)***	-8.38 (5.0)***
	$Loilp_t {}^*D_j$				
	NL	-1.41 (4.7)***	-1.39 (3.1)***	-1.41 (3.1)***	-1.43 (3.2)***
	NS	.927 (2.9)***	.941 (3.7)***	.916 (3.7)***	.906 (3.6)***
	PEI	-.946 (2.8)***	-.932 (2.5)**	-.937 (2.5)**	-.964 (2.6)**
	NB	.871 (3.0)***	.885 (3.4)***	.871 (3.3)***	.850 (3.4)***
	QC	.459 (1.4)	.475 (1.7)*	.470 (1.6)	.432 (1.6)
	ON	1.10 (3.7)***	1.12 (8.1)***	1.12 (8.0)***	1.09 (7.8)***
	MB	.472 (1.3)	.485 (1.5)	.482 (1.5)	.478 (1.5)
	SK	.191 (0.6)	.206 (0.7)	.196 (0.6)	.196 (0.6)
	AB	-1.20 (4.0)***	-1.18 (5.9)***	-1.19 (5.9)***	-1.18 (5.8)***
	BC	-.080 (0.3)	-.065 (0.2)	-.081 (0.2)	-.063 (0.2)
X^S	$Birthr_{j,t}$	.301 (0.9)	.298 (1.0)	.299 (1.0)	.311 (1.1)
	$Urban_{j,t}$	.102 (1.5)	.102 (1.2)	.103 (1.2)	.101 (1.2)
X^W	$Elqual_{j,t}$	-.670 (11)***	-.671 (7.9)***	-.671 (7.9)***	-.670 (7.9)***
X^T	$Lftrav_t {}^*D_t$	-.086 (2.2)**	-	-	-
	$LftravCD_t {}^*D_t$	-	-.032 (-3.0)***	-	-
	$Lftrav10Mi_t {}^*D_t$	-	-	-.021 (2.7)***	-
	$(Lftrav_t - Ldtrav_{i,t})^* D_t$	-	-	-	-.234 (3.0)***
	Adj R^2	0.988	.988	.988	.988
	N	10	10	10	10
	T	17	17	17	17
	Log likel.	-62.8	-62.7	-63.0	-62.7

Absolute t-values in parentheses. *,**,*** significant at 10%, 5%, and 1% respectively. White cross-section standard errors.

weighted collection period are used instead of the qualification period. Both are significant with the expected sign and the specification with the weighted collection period variable performs slightly better in terms of overall explanatory power. In columns 3, a non-linear impact of EI qualifying parameters is weak but significant, suggesting that an increase in the number of weeks necessary to qualify has larger impact where it is already harder to qualify. Next we test for two more provincial institutions relevant to labour market flexibility, i.e., unionisation (column 4) and minimum wage (column 5). Neither is significant. In column 6, the housing price is substituted for urbanisation rate as the exogenous factor that affects internal migration. Like relative urbanisation, it is not significant.

The last robustness tests are for three alternative measures of the hiring cost of TFWs (the results with the original measure are reproduced in column (7) for easier comparison). First, since employers are liable for travel costs only for low-skill workers, the latter variable is weighted by the provincial shares of TFW in categories C and D. In 2000, the share of low-skill TFW entries was 25 percent for Canada as a whole, only slightly lower than the average over the previous twenty years (i.e., average 1980–2000, 28.6 percent). Between 2002 and 2007, the average share was 37.9 percent reaching a maximum of 45.1 percent in 2007. Unskilled non-agricultural workers represented only 6.9 percent of all temporary foreign workers in 2000 and by 2007, their share was 19.3 percent. The weighting process makes the travel cost variable province-specific as well as time varying. Second, the cost of travelling is measured as the cost of a ten-thousand-mile flight. The distance is chosen as an average proxy for TFWs as the majority of them come from Europe and North and Central America, even though the percentage of total entries declined from about 68 percent in 1998 to 51 percent in 2007 (CIC

2008b). These measures implicitly hold constant the hiring cost premium for out-of-province workers. As such, the third measure attempts to take some of these costs into account. It is the cost of a ten- thousand-mile flight relative to the weighted cost of flying from any province within Canada. Note, however, that factors not easily measurable such as social and ethnic networks or cultural preferences, which may be time variant as inter-provincial and international migration develop,[20] are still not taken into account. In columns 8 to 10, the results are generally robust to these changes, indicating that the expansion of the programme to low-skill workers did have an adverse impact on the Canadian labour market.

Finally, we also estimate by instrumental variable fixed effect (IVFE) a semi-structural model (i.e., equations (5) and (6) in Section 4) with relative entries of temporary foreign workers as explanatory variable. The measures for TFWs are total entries per province relative to national ($LTFW_{j,t}$) and total non-seasonal entries per province relative to national ($LNATFW_{j,t}$). The results in Table 7 show that for both variables, the effect is positive and significant at 10 and 5 percent respectively and thus, more yearly entries of TFWs increase regional unemployment dispersion.

Generally, the standard determinants of unemployment have the expected impact on the long-term unemployment divergences. Energy shocks increase unemployment divergence in central Canada and the Maritimes and decrease it in Western Canada and Newfoundland. As found in other studies, the EI parameters are strong contributors to maintaining unemployment dispersion. Each additional week of qualification period on average decreases provincial unemployment deviation by slightly less than 0.7 percentage points. Changes

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20 Grenier (2008) shows that immigrants tend to leave regions with few immigrants and the role of ethnic networks for new immigrants is well documented internationally and domestically (see, for example, Gross and Schmitt 2003 and McDonald 2003).

in participation through birth rate variations and urbanisation, however, do not contribute significantly to maintaining divergences as they are not significant. As expected, general regional aggregate demand variations and energy shocks have a significant effect on the dispersion of provincial unemployment.

TABLE 7: SEMI-STRUCTURAL FORM FOR PROVINCIAL UNEMPLOYMENT DEVIATION.

	SEMI-STRUCTURAL FORM IVFE (ALL TFW)	SEMI-STRUCTURAL FORM IVFE (NON-SEASONAL TFW)
	1.	2.
$Busc_{j,t}$	-8.26 (6.1)***	-8.35 (6.1)***
$Loilp_t * D_j$		
NL	-2.18 (6.9)***	-2.20 (7.1)***
NS	.840 (3.1)***	.826 (3.1)***
PEI	-1.24 (3.2)***	-1.27 (3.3)***
NB	.749 (3.7)***	.740 (3.6)***
QC	.399 (1.6)	.453 (1.9)**
ON	.777 (5.0)***	.787 (5.2)***
MB	-.063 (0.2)	-.075 (0.8)
SK	-.305 (1.2)	-.323 (1.3)
AB	1.71 (11)***	-1.74 (11)***
BC	-.249 (0.8)	-.280 (0.9)
$Birthr_{j,t}$	.101 (0.3)	.067 (0.2)
$Urban_{j,t}$	-.010 (0.1)	-.015 (0.2)
$Elqual_{j,t}$	-.787 (12)***	-.791 (13)***
$LTFW_{j,t}$	.309 (1.7)*	-
$LNATFW_{j,t}$	-	.369 (2.2)**
Adj R^2	0.989	0.989
n	10	10
t	16	16

Absolute t-values. in parentheses. *,**,*** significant at 10%, 5 %, and 1 % respectively. White cross-section standard errors not adjusted for d.f..

Instruments: lagged temporary foreign worker variable and cost of travel

Finally, since the introduction of the pilot programme for low-skill workers in 2002, hiring TFWs has had an adverse impact on unemployment divergence. The results show that a 1 percent increase in the additional cost of TFWs compared to resident workers (i.e., a 1 percent increase in the cost of a typical flight) leads to a decrease in average unemployment divergence by 0.02 per-

centage point (column 8). The widening of the availability of TFWs to all types of low skills did slow down the inter-provincial adjustment process and maintained long-term divergences in regional unemployment rates. This suggests that the LMO mechanism no longer avoids adverse effects on the Canadian labour market and/or that the hiring of TFWs may not be priced correctly. For example, a doubling of the application fee (from $150 to $300), which approximately corresponds to a 10 percent increase in the cost of the flight at the mean, could decrease average unemployment divergence by about one-fifth of a percentage point (i.e., the average unemployment divergence would be around 1 percent instead of 1.26 percent). It is difficult to discuss the absolute size of the effect as there is no comparable study; nonetheless, the effect is not negligible and the robustness of the results throughout the experiments suggests that abandoning the careful targeting of temporary foreign worker programme has a long-term impact on the labour market perspective of resident workers. Some countries clearly conscious of such potential effect have adopted complex mechanisms to price the hiring of TFWs more accurately. Singapore, for example, imposes a monthly levy on employers hiring TFWs; the levy is industry-specific, skill-specific and rises with the employers' dependency level on temporary foreign workers (Singapore Government 2009).

6. CONCLUSION

Temporary foreign worker programmes are designed to alleviate short-term specific labour shortages and are not expected to have long-term adverse effects on internal labour markets. Yet this paper shows that the expansion of the Canadian temporary foreign labour programme has contributed to maintaining wide regional unemployment dispersions. Regional imbalances in the labour market can persist for two main reasons: divergences in the equilibrium

unemployment mostly due to institutional differences and lack of functioning in the adjustment process triggering internal changes in the labour supply. Canada, despite fifteen years of steady growth, still exhibits large persistent differences in provincial unemployment, and these have been reinforced recently by regional demand shocks. Some province-specific institutions, such as the employment insurance scheme, have contributed significantly to these differences. However, this paper shows that the inter-provincial adjustment mechanism has also been slowed down by the expansion of the temporary foreign worker programme to unskilled occupations in 2002. While the expansion of this program was accompanied by a labour market test, the pricing of low-skill TFWs was not set correctly to avoid adverse effects on the Canadian labour market. The pricing has been too low to encourage employers to seek workers from high-unemployment provinces before applying for authorisation to hire temporary foreign workers. Considering this is the first attempt to evaluate the impact of relaxing the targeting of a temporary foreign worker programme, it is clear that further study is especially needed to evaluate the size of that impact.

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APPENDIX I: TEMPORARY FOREIGN WORKER PROGRAMME IN CANADA (EXCLUDING THE SEASONAL AGRICULTURAL WORKER PROGRAM AND LIVE-IN CAREGIVERS)

Entry of skilled and unskilled temporary workers

Employers submit demand that demonstrates that:
- Wage and working conditions are consistent with Canadian standards for the occupation.
- Employers have conducted reasonable efforts to hire or train Canadians (Advertising).
- TFW will not affect labour dispute at the workplace.

Government (HRSDC/ CIC) allocates permits (no quota).
- Human Resources and Social Development Canada (HRSDC) reviews application for basic conditions.
- HRSDC also considers direct job creation/retention for Canadians; transfer of skills to Canadians; fill labour shortage (i.e., TFW will have a neutral or positive impact on Canada's labour market).
- HRSDC issues a Labour Market Opinion (LMO) for the period of the permit.
- Citizenship and Immigration Canada (CIC) determines whether the person is eligible for entry into Canada.

Skilled

NOC: 0, A, B.
12 months work, 4 months home
Spouse may work without prior job offer if principal has job for at least 6 months
(CIC 2008, 5.38.)

Unskilled[a]

Low Skill Pilot (LSP) project 2002: NOC: C, D
Labour contracts specifying:
- Return airfare paid
- Medical insurance for full period
- Accommodation
- Registered under Workers' Compensation Board
- Spouse cannot work without positive LMO (CIC 2008a, 5.25).
- Advertise for 2 to 3 weeks.

Pilot project: Expedited LMO (ELMO, Feb. 2007, to be reviewed in September 2008)
- 24 months work, 4 months home (exclude seasonal, 8 months, and live-in caregivers, 12 months).
- Specifics about ad: 7 days in job bank, 1 week in paper
- On-line application form
- Regional occupations lists effective Nov. 15, 2006 (Alberta, BC, Man, NS, Ont, PEI, Qbc.
- Working groups with provinces (BC, Alberta, Saskatchewan, Manitoba).

[a] Not including SAWP and the live-in-caretaker porgramme.

End of contract/permit.

- Stay in Canada under some conditions:
  - Skilled workers can apply for permanent immigrant status at any time if they have permanent jobs.
  - Provincial nominee programmes allow the TFW to apply for permanent residence status within the first 6 months of residence. All provinces have such programme for professionals. Some provinces have extended it through pilots to lower skill categories.
  - Live-in caregivers can apply for permanent residence status after 2 years.
- Others, return to home country for 4 months before being eligible for a new TFW permit.

Sources: HRSDC (2009, 2008), CIC (2008a).

APPENDIX II: REGIONAL VS. NATIONAL SHOCKS

Table II.1: Common National and Provincial Employment Growth

$$(lnN_{jt} - lnN_{jt-4}) = c_j + \hat{a}_j(lnN_t - lnN_{t-4}) + ì_{jt}$$

Provinces	β_j	Adj. R²
British Columbia	.338*	0.066
Alberta	.673*	0.581
Saskatchewan	.471*	0.167
Manitoba	.650*	0.549
Ontario	1.38*	0.920
Quebec	.992	0.768
New Brunswick	.830*	0.298
Nova Scotia	1.08	0.571
Prince Edward Island	.633*	0.143
Newfoundland	1.17	0.299

$N_{j,t}$ is quarterly employment in province j, at time t and N_t is national employment in the same quarter. The sample is 1987.1 to 2007.4. Note that the weighted sum of the coefficients was not constrained to 1.

*significantly different from one at 5%, , one-sided test. Average adj.R²=0.436.

APPENDIX III: VARIABLE DEFINITIONS

Birthr$_{j,t}$ Provincial birth rates number of birth between July 1 and June 30 per hundred women aged fifteen to forty-nine years old in deviation from Canadian average (Statistics Canada 2008, Tables 510013, 510001).

Busc$_{j,t}$ De-trended annual provincial GDP at constant 2002-prices, expenditure-based, provincial economic accounts minus de-trended annual Canadian GDP. Calculated as the estimated errors from the following regression between 1981 and 2007 for each province and Canada as a whole:

$$\ln GDP_{j,t} = c + \beta_1 Time + \beta_2 Time^2 + \varepsilon_{j,t}.$$

(Statistics Canada, 2008, Table 3840002).

D$_j$ Province specific dummy such that NL=Newfoundland; NS=Nova Scotia; PEI=Prince Edward Island; NB=New Brunswick; QC=Quebec; ON=Ontario; MB=Manitoba; SK=Saskatchewan; AB=Alberta; BC=British Columbia.

D$_t$ Dummy with value 0 until 2002 and 1 afterwards capturing the introduction of the low-skill pilot project with employers' liable for travel costs.

EIben$_{j,t}$ Sum of the weighted minimum number of weeks necessary to qualify for the benefits from any capital city. The weights are the inverse of the distance between the provinces' capital cities ($Dist_{i,j}$, K&F). Calculated for each province j, and $i \neq j$, as:

$$EIBen_{j,t} = \sum_{i=1}^{9} \frac{1}{Dist_{i,j}} \left(EIcoll_{j,t} - EIcoll_{i,t} \right)$$

EIcoll$_{j,t}$ Maximum number of weeks of collection of benefits for an individual with minimum qualifying requirements in each province in deviation from national average. From 1980 to 1996, computed by Day and Winer (2001), Appendix D, Section 3 and Table S3. From 1996 to 2007, own calculation based on the same definitions and OECD (2004), Annex 3.2.

EIqual$_{j,t}$ Minimum number of weeks of insurable employment necessary to qualify for benefits in each province in deviation from national average. From 1980 to 1996, computed by Day and Winer (2001), Appendix D, Section 1 and Table S1. From 1996 to 2007, own calculation based on the same definitions and Service Canada (2008).

Ldtrav$_{i,t}$ Log of index of real price of domestic air travel. The index is the sum of the weighted cost of travelling from any capital city. The weights are the inverse of the provincial unemployment rate for occupation C (*Urate(C)$_{i,t}$*). Calculated for each province *j*, and *i≠j*, as:

$$dtrav_{j,t} = \sum_{i=1}^{9} \frac{1}{Urate(C)_{i,t}} \left(Dist_{i,j} * costdm_t \right)$$

with *Dist$_{i,j}$* the distance between provincial capitals and *costdm$_t$*, the price in dollars a passenger pays to fly one mile on domestic travel not including taxes (ATA 2008) converted to Canadian dollars with monthly average of noon spot rate against the US$ and deflated by implicit price index from GDP for Canada, 2002=100 (Statistics Canada 2008, Tables 3840036, 1760064)).

Lftrav$_t$ Log of real price of foreign air travel. Price in cents that a passenger pays to fly one mile of international travel not including taxes (ATA 2008) converted to Canadian dollars and deflated by implicit price index from GDP for Canada (Statistics Canada 2008, Tables 1760064, 3840036).

Lftrav10Mi$_t$ Log of real price of air travel for a ten-thousand-mile mile return trip using above measure.

LftravCD$_t$ Log of real price of air travel for a ten-thousand-mile return trip weighted by province-specific shares of C and D workers without seasonal agricultural workers.

Lhousep$_{j,t}$ Log of the ratio of real provincial house price to national average. Average of monthly new housing price index (Statistics Canada 2008, Table 2820054) deflated by annual implicit price index (2002=100), GDP, provincial accounts (Statistics Canada 2008, Table 3840036). Observations from 1986 to 1995 are missing for PEI. The annual rates of change from Nova-Scotia are used for the missing values to recreate the housing index. Nova Scotia is chosen because the correlation between PEI and NS new housing price index between 1995 and 2007 is 0.976.

Lminw$_{j,t}$ Hourly minimum wages in Canada for adult workers in deviation from national average. (HRSDC 2008).   http://srv116.services.gc.ca/wid-dimt/mwa/index.aspx?report=report2&dec=3.

LNATFW$_{j,t}$ Log of the ratio of annual entries (initial and re-entries) of temporary foreign workers in province *j* without seasonal agricultural workers relative to total entries in Canada (Series provided by Citizenship and Immigration Canada).

Loilp$_t$ Real price of oil in Canadian dollars. Crude petroleum price in US$, average of Dubai, Brent and Texas, equally weighted (UNCTAD, 2008), converted to Canadian dollars with monthly average of noon spot rate against the US$ (Statistics Canada 2008, Table 1760064) and deflated by implicit price index from GDP for Canada, 2002=100 (Statistics Canada 2008, Table 3840036).

LTFW$_{j,t}$ Log of the ratio of annual entries (initial and re-entries) of temporary foreign workers in province j relative to entries in Canada (Numbers provided by Citizenship and Immigration Canada).

N$_t$, N$_{j,t}$ Total employment level for Canada and by province j. (Statistics Canada 2008, Table 2820054).

Time   Province-specific time trend.

$(u_{j,t} - u_t)$ Annual provincial unemployment rates for age fifteen years and over minus national unemployment rate (Statistics Canada 2008, Table 2820004).

Union $_{j,t}$ Provincial union rates in deviation from Canadian average (Statistics Canada 2008, Table 2820078, 2790025).

Urban$_{j,t}$ Provincial urbanisation rate in deviation from Canadian rate. Urbanisation rate is total urban population over total population. Urban population is computed as total farm and non-farm population in urban areas (i.e., more than 1000 population). Data is from census and inter-census years are extrapolated linearly (Bollman and Clemenson 2008, Appendix J).

Table A.III.1.: Descriptive Statistics

Variables	Mean	Max.	Min.	SD
Birthr$_{j,t}$	-0.02	0.91	-1.12	0.56
Busc$_{j,t}$	0.002	0.075	-0.070	0.022
EIben$_{j,t}$	-1.96D-11	0.093	-0.053	0.031
EIcoll$_{j,t}$	0	13.3	-10.5	5.32
EIqual$_{j,t}$	0	2.49	-5.25	4.60
urban$_{j,t}$	-11.92	5.45	-36.66	14.22
housep$_{j,t}$	1.00	1.36	0.69	0.09
minw$_{j,t}$	1.00	1.27	0.84	0.10
Union$_{j,t}$	0	18.97	-10.9	5.78
TFW$_{j,t}$	0.099	0.512	0.001	0.143
NATFW$_{j,t}$	0.099	0.467	0.001	0.130
oilp$_t$	36.76	64.96	20.99	14.07
ftrav$_t$*D$_t$	4.59	15.48	0	6.29
ftravCD$_t$*D$_t$	1.12	6.31	0	1.70
ftrav10Mi$_t$*D$_t$	459.8	1548.4	0	629.1
(u$_{j,t}$- u$_t$)	1.259	9.867	-3.517	3.523

Table A.III.2.: Simple Correlations

	Birth	Busc	Eiqual	Elcoll	Elben	Urban	Lhous	Lmin	Unio	LTFW	LNAT	Loilp	Ltrav	LtCD	Lt10Mi
Birthr$_{j,t}$	1														
Busc$_{j,t}$	.066	1													
Elqual$_{j,t}$	.761	.103	1												
Elcoll$_{j,t}$	-.744	-.106	-.968	1											
Elben$_{j,t}$	-.414	-.023	-.800	.846	1										
Urban$_{j,t}$	.349	-.006	.664	-.618	-.525	1									
Lhousep$_{j,t}$	.363	.162	.288	-.239	-.209	.245	1								
Lminw$_{j,t}$	.106	-.087	.400	-.447	-.426	.693	-.105	1							
Union$_{j,t}$	-.336	.008	-.306	.369	.275	-.034	-.006	.062	1						
LTFW$_{j,t}$	.169	-.017	.573	-.545	-.586	.948	.209	.725	-.101	1					
LNATFW$_{j,t}$	.160	-.016	.571	-.542	-.581	.950	.202	.722	-.098	.999	1				
Loilp$_t$	-.032	-.140	0	0	0	-.019	-.237	.009	0	-.006	-.003	1			
Lftrav$_t$*D$_t$	-.021	-.021	0	0	0	-.017	-.225	.007	0	-.008	-.003	.796	1		
LftravCD$_t$*D$_t$	.059	-.012	.044	-.030	.005	.104	-.075	.064	.029	.106	.105	.720	.907	1	
Lftrav10Mi$_t$*D$_t$	-.022	-.020	0	0	0	-.017	-.229	.007	0	-.008	-.003	.807	1.00	.906	1
Time	-.023	-.167	0	0	0	-.020	-.187	.005	0	-.003	.002	.900	.819	.736	.826