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Temporary Foreign Workers in Canada: Are They Really Filling Labour Shortages?

A temporary foreign worker program is unlikely to be a comprehensive solution to labour shortages. Although there are clear benefits to the economy if short-term excess labour demand is filled, the costs of a weakly designed program can be quite high in the medium term.

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THE STUDY IN BRIEF

Since easier access to a large supply of foreign labour might generate undesirable incentives on the part of both employers and prospective workers, a Temporary Foreign Worker (TFW) program requires careful design. Failure at any stage of the process – at time of hiring, during employment, or at the end of the contract – is likely to create significant negative effects on domestic workers and, in the medium term, on the temporary foreign workers themselves.

When choosing between domestic and foreign workers, employers are naturally concerned about labour costs and labour productivity. Therefore, a key design feature of any TFW program is the hiring conditions it imposes on employers – conditions that must deal with regional or occupational labour market shortages.

Between 2002 and 2013, Canada eased the hiring conditions of TFWs several times, supposedly because of a reported labour shortage in some occupations, especially in western Canada. By 2012, the number of employed TFWs was 338,000, up from 101,000 in 2002, yet the unemployment rate remained the same at 7.2 percent. Furthermore, these policy changes occurred even though there was little empirical evidence of shortages in many occupations. When controlling for differences across provinces, I find that changes to the TFWP that eased hiring conditions accelerated the rise in unemployment rates in Alberta and British Columbia.

The reversal of some of these changes in 2013 is welcome but probably not sufficient, largely because adequate information is still lacking about the state of the labour market, and because the uniform application fee employers pay to hire TFWs does not adequately increase their incentive to search for domestic workers to fill job vacancies.

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The goal of a temporary foreign worker (TFW) program is to accommodate shortages of labour that otherwise would cause wages to rise substantially or possibly stop production because of the difficulty of finding resident workers.

A TFW program ensures that employers have relatively rapid access to the workers they need. Foreign workers, if they do not have access to permanent residency, act as temporary complements to labour until domestic workers are available. Such a program also allows employers to access a broader set of potential workers to find the most suitable employees. An effective TFW program, therefore, can make a positive contribution to smoothing economic development.

Since easier access to a large supply of foreign labour might generate undesirable incentives on the part of both employers and prospective workers, a TFW program requires careful design. Failure at any stage of the process – at time of hiring, during employment, or at the end of the contract – is likely to create significant negative effects on domestic workers and, in the medium term, on the temporary foreign workers themselves. In recent years, Canada's Temporary Foreign Worker Program (TFWP) has often made the news, but rarely have stories generated positive feelings about it. Among them are the BC Federation of Labour's challenge of HD Mining International in northern British Columbia, which obtained permits to hire more than 200 temporary foreign workers (CBC 2012); the discriminatory treatment of some temporary foreign workers once they are in Canada;¹ and the

potential development of an illegal labour force (CICS News 2013).

Employers are concerned about labour costs and labour productivity, so, when they can choose between domestic and foreign workers, they will hire the workers costing the least for the same productivity. Therefore, a key design feature of any TFW program is the hiring conditions it imposes on employers, who must deal efficiently with regional or occupational labour market shortages. This policy feature is the focus of this *Commentary*.

Over the past decade, the federal government relaxed several of the conditions to obtain a Labour Market Opinion (LMO) – an application to hire TFWs to Employment and Social Development Canada, formerly Human Resources and Skills Development Canada (HRSDC) proving that there exist labour shortages that domestic workers cannot fill. In spring 2013, however, following a couple of highly publicized cases that might have involved losses of job opportunities for Canadian residents, Ottawa reversed some of these changes. Such modifications raise a couple of questions: Beyond anecdotes, did easier access to temporary foreign workers adversely affect resident workers' employment? If so, are the recent changes adequate or could other policy changes make Canada's TFWP more efficient?

I thank C. Busby and J. Richards for early suggestions. I also thank D. Benjamin, D. Grey and C. Worswick, anonymous external commentators, and several members of the C.D. Howe Institute for their comments. All remaining errors are mine.

1 For example, in December 2008, the BC Human Rights Tribunal ruled that construction companies were discriminating against Latin American workers in terms of salaries and expenses paid to them compared with those paid to European workers, and ordered the companies to pay compensation (BCHRT 2008).

I find that, between 2007 and 2010, the Expedited Labour Market Opinion (E-LMO) pilot project allowed employers in Alberta and British Columbia faster and relatively cheaper access to foreign workers because of purportedly deep shortages of labour in some occupations. I further show that the pilot project contributed to increasing unemployment in some occupations. As a consequence, the current TFWP would protect resident workers from displacement more effectively if the newly introduced fee-per-job-application were made specific to some firms' characteristics and if better information were available about such features as the skill level required to fill vacancies. Also, a cap on annual TFW entries likely would make a positive impact on the efforts of employers to fill, and workers to find, vacancies in the labour market.

HOW TEMPORARY FOREIGN WORKERS CONTRIBUTE TO THE LABOUR MARKET

When there is a lack of domestic workers to fill jobs, one way to smooth the functioning of the domestic labour market and to avoid losses of output is through the efficient "circular migration" of temporary foreign workers. A TFW program prevents wages from rising precipitously and drastically increasing the costs of production and it allows jobs to be filled relatively quickly, which prevents interruptions in production.² If TFWs are not entitled to become permanent

residents but must return home when no longer needed or when their legal temporary stay expires, economic forces are expected, after a short time, to correct labour market imbalances and permit resident workers to fill the jobs.³ Thus, one of the fundamental conditions of an economically efficient TFW program is that the labour shortage be a short-term phenomenon (Dustmann, Bentolila, and Faini 1996).⁴ When jobs are attractive to resident workers, the difficulty lies in identifying whether the labour shortage is a short-lived sudden expansion in demand or the result of long-lasting, fundamental changes in the economy. In the latter case, especially if TFWs can be hired for several continuous years, as in Canada, resident workers are likely to be affected adversely if no consideration is given to addressing the mismatch created by structural changes between types of jobs and resident workers' qualifications. Hence, a well-functioning TFW program allows employers to hire foreign workers only if there is no available resident, for a short period of time, and if the conditions of employment do not undermine the rebalancing of the labour market.

Past Experience

Many TFW programs were put in place in European countries after the Second World War to contribute to economic reconstruction in the face of severe shortages of labour. For example, in the 1960s and early 1970s, the national unemployment

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- 2 Unfortunately, little research focuses on the contribution of TFWs to production (see Sweetman and Warman 2010). Beine, Coulombe, and Vermeulen (2013) analyze the relationship between TFWs and the potential for resources-based industries, when energy prices increase, to draw workers from other sectors and drive up labour costs – a common symptom of the phenomenon known as the "Dutch disease." They find that some of the adverse consequences of energy sector booms have been somewhat mitigated by TFWs in Canada.
 - 3 Historically, these programs were called "guest-worker programs" for that reason. In the 1980s and 1990s, only Switzerland among European countries offered the possibility of guest workers' becoming permanent residents after a certain number of years on fixed-length contracts (see Gross 2006).
 - 4 An example in many Western economies is that of seasonal jobs in agriculture. Such short-duration jobs are unattractive to resident workers and are usually filled by TFWs, who often return home with a job contract for the following year.

rate was 1.4 percent in Germany, 1.8 percent in Austria, and 2.3 percent in France; in the 1980s, it was less than 1 percent in Switzerland (OECD 1999, table 2.15). Throughout the 1950s and 1960s, this policy was influenced mainly by rapid economic expansion. In the 1970s, however, the deterioration of the labour market following the first oil shock and domestic political pressures led to the elimination of the TFW program in West Germany and to stricter controls on entries in France and Switzerland.⁵

Those early European experiences added much information about how to design TFW programs with minimal adverse effects. So, in the 1990s, when many high-income countries again resorted to such programs, they were designed with characteristics that were quite different from those of the earlier programs. For one thing, national unemployment rates were much higher than before⁶ and the argument for TFW programs was that they were needed to fill labour shortages in specific sectors, occupations, or regions. So governments had to ensure that employers would search actively for resident workers to fill vacancies before turning to temporary foreign workers. The result in most cases has been a set of constraining rules, called the labour market test, which governments use to determine that the hiring of TFWs will not adversely affect the ability of resident workers to find jobs (Ruhs 2006).

THE CANADIAN TEMPORARY FOREIGN WORKER PROGRAM

Canada's TFWP was set up in 1973 to fill short-term labour needs for skilled workers, seasonal agricultural workers and live-in caregivers (OECD 1998). In July 2002, the program started to cover all types of low-skilled workers through the "Pilot project for occupations requiring lower levels of formal training (NOC C and D)." Today, there are several channels of entry for TFWs, with different constraints on domestic employers' search for local workers.⁷ For the occupations considered in this *Commentary*, employers must first obtain approval of an LMO from Employment and Social Development Canada⁸ and foreign candidates must apply for a work permit to Citizenship and Immigration Canada (CIC), which considers health and security factors, with the final entry decision made by border officers.

To obtain an LMO, the employer must fulfill a number of conditions – namely, that the job offer is genuine; the wages and working conditions are comparable to those offered to Canadians working in the same occupations; employers conducted reasonable efforts to hire or train Canadians for the job; the foreign worker is filling a labour shortage; the employment of the foreign worker will directly create new job opportunities or help retain jobs for Canadians; the foreign worker will transfer new skills and knowledge to Canadians; and the hiring

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- 5 For details about the evolution of TFW programs in France and Germany, see Martin and Miller (1980), and in Switzerland, Gross (2006).
 - 6 The average unemployment rate in member countries of the Organisation for Economic Co-operation and Development (OECD) between 1998 and 2008 was 6.6 percent (OECD 2009, annex table 14); in Canada, the current rate is 7.1 percent.
 - 7 NOC C and D represent low-skilled categories (see the note at the bottom of Table 2). For a detailed description of the process and its legal flaws, see Nakache (2013).
 - 8 It is worth noting that obtaining an LMO is not a necessary condition for all types of TFWs. For example, companies hiring workers through intra-firm transfers or from a country with an international agreement like NAFTA, do not need to search locally first. Also, some provincial programs do not require LMO applications. As a result, in 2011, 36.8 percent of TFWs who entered Canada worked for employers who obtained a LMO (see Box 1 for more details). One common feature is that when hired, a TFW has a fixed-term contract with a specified employer.

of the foreign worker will not affect a labour dispute or the employment of any Canadian involved in such a dispute (HRSDC 2013a).⁹

These conditions are meant to ensure that the TFWP does not adversely affect domestic workers' employment opportunities. In 2002, with the extension of the program to low-skilled workers, additional conditions were imposed for those workers, including the payment of return airfare by the employer, proof of medical insurance coverage for the duration of the job contract, support from employers to find suitable accommodation, and registration under the relevant provincial workers' compensation regime.

It should be noted, however, that companies that hire workers through intra-firm transfers or from a country with an international agreement such as the North American Free Trade Agreement do not require an LMO and do not need to search for domestic workers first. Also, some provincial programs do not require LMO applications. As a result, in 2011, only 36.8 percent of TFWs who entered Canada worked for employers who had obtained an LMO (see Box 1 for more details).

Changes in LMO and Hiring Conditions

To assess accurately the validity of the labour market test, Employment and Social Development Canada requires precise information about the state of the labour market for the occupation in the region specified in each application. Given the diversity of provincial and regional labour markets, such monitoring is extremely time consuming and expensive. Long processing times have led the federal government to relax constraints on the hiring of TFWs, thus reducing the cost of hiring them relative to that of domestic workers, and

possibly generating incentives for employers to limit their search for domestic workers.

For example, in November 2006, regional occupation lists were established to reduce the time required to obtain an LMO. Employers could then apply directly to the nearest Service Canada Centre and the required period of job advertising was shortened from two–three weeks to one week (Canada n.d.). The occupation lists were eliminated on January 1, 2009, and a 14-day advertising period became the norm for all occupations as a condition for an LMO approval (HRSDC 2009). In February 2007, the length of permits issued to low-skilled workers was extended from one to two years. As the federal government noted, “[t]he change acknowledged that employers often needed such workers for longer than one year and provided greater stability for them as well as workers themselves” (CIC 2013a). In April 2011, the length of time that TFWs may work in Canada was increased to four years, after which they must return home and must wait four years before they apply for another work permit (CIC 2013b).

In September 2007, under rising pressure from employers in western Canada, HRSDC introduced the “Expedited Labour Market Opinion (E-LMO) Pilot Project” in Alberta and British Columbia (CIC 2013a). The goal was to reduce backlogs in certain occupations and to accelerate the processing of LMO applications. The time to obtain an LMO was shortened from about five months to five days, but to ensure fast processing, employers first had to prove eligibility by stating that their applications were consistent with their business, and that they had been operating for at least twelve months with one employed worker; they also had to confirm their statements by phone, and agree to be subjected to a compliance review (HRSDC 2008a). The expedited

9 In the case of low-skilled workers, the employment contract must be attached to the LMO application. Also, employers in Quebec must obtain a Quebec Acceptance Certificate in addition to meeting the federal LMO criteria.

Box 1: How Temporary Foreign Workers Are Hired

Canadian employers who want to hire TFWs must follow one of two procedures, depending on the type of workers they hire. One requires them to obtain a Labour Market Opinion from Employment and Social Development Canada before applying to Citizenship and Immigration Canada for a work permit; the other involves a prospective TFW applying directly to CIC.

LMO required: If an LMO is required, the employer must fulfill certain conditions meant to ensure that domestic workers would not be affected adversely by the hiring of foreign workers. In 2011, an LMO was required for 36.8 percent of entries by TFWs (see the table below).

No LMO required: If an LMO is not required, the prospective TFW applies directly to CIC for a work permit, and the department then assesses the genuineness of the job offer, meaning that, among other conditions, “the offer is consistent with the reasonable employment needs...both in terms of occupation and business-wise” (CIC 2011, section 3.3.2.). Two broad categories of TFWs enter through this process: workers coming from countries with which Canada has an international agreement such as the North America Free Trade Agreement or the General Agreement on Trade in Services; and those who would contribute to Canada’s interests, such as those who would enter under exchange programs (youths, teachers), intra-company transfers, for research and study (academics, post-doctoral students), those coming to Canada under active pilot projects with a given province designed to attract specific workers and charitable or religious workers (CIC 2013c). In 2011, these TFWs represented 49.5 percent of total entries. In addition, in some provincial nominee programs, employers do not need an LMO to hire workers residing abroad; as a result, the number of entries under such provincial programs grew from 359 in 2009, the first year for which data are available, to 2,518 in 2011.

Entry of Temporary Foreign Workers, 2002, 2006 and 2011

	2002	2006	2011
Entries	110,616	138,461	190,842
<i>With LMO</i>	<i>49,831</i>	<i>65,492</i>	<i>70,222</i>
Live-in caregivers	4,678	9,078	5,882
Seasonal agricultural workers	18,622	21,254	24,134
Information technology workers	831	2,131	606
Low- and high-skilled workers	25,700	33,029	39,600
<i>Without LMO*</i>	<i>60,785</i>	<i>72,969</i>	<i>120,620</i>
International agreements	18,320	15,934	24,901
Workers contributing to Canadian interests	37,730	56,083	94,481
Provincial nominee programs	n.a.	n.a.	2,518

* Including applicants who are permanent residents.

Source: CIC (2012).

process was available initially for 12 selected occupations, and was increased to 33 occupations in January 2008.¹⁰ The pilot project was terminated in April 2010. A similar policy modification, the “Accelerated Labour Market Opinion (A-LMO),” was introduced in April 2012 for managers and skilled occupations across Canada, whereby employers who meet the eligibility criteria may obtain a positive A-LMO within 10 business days based on “the genuineness of the job offer; the wage offered; and whether the job offer is likely to fill a labour shortage” (HRSDC 2013d, 1).

Finally, in addition to changes to the labour market test, an important modification introduced in April 2002 concerned the wages paid to TFWs. Before that date, employers were required to pay “the median wage for an occupation in a specific region” (HRSDC 2013e), but the use of such a benchmark meant that TFWs might have been paid more than some Canadian workers since, statistically, 50 percent of workers are below the median value. The federal government estimated that paying TFWs the median wage was preventing the excess demand for labour from being filled and thus was slowing down the economic recovery. Under the new rules, employers were allowed to offer high-skilled TFWs up to 15 percent less than the median wage and low-skilled TFWs 5 percent less as long as it remained above the minimum wage.¹¹

In short, since 2002, the Canadian temporary foreign worker program has undergone many changes, most of them to ensure easier access to foreign workers by employers through lowering monetary

and non-monetary search costs. This suggests that labour shortages have been widespread and increasingly significant in the Canadian labour market.

Spring 2013 Changes

In the spring of 2013, a number of media-publicized cases revealed that hiring through the TFWP was a preferred option for many employers, with some even inclined to take undesirable steps to prove that domestic workers were not available. As a consequence, TFWs were being hired to fill jobs for which unemployed domestic workers might have been qualified. In the HD Mining case in northern British Columbia, for example, the company set as a job condition the ability to speak Chinese, which obviously affected the chances of a domestic worker’s being hired (CBC 2012).

At the end of April 2013, the federal government reacted by announcing several changes to the TFWP and adding some specificity to the regulations. Among the changes was the elimination of the flexibility of wage setting around median values and the temporary suspension of the A-LMO policy. In addition, employers now must advertise all positions for four weeks, and English and French are the only possible required languages unless another is shown to be essential. Employers must pay a \$275 fee per requested position through LMO in addition to the cost of a visa (\$150). Finally, in order to obtain an LMO, companies are asked additional questions that will provide information about the impact of the application on the labour market and

10 The choice of occupations was based on their being in high demand and on easy accessibility of labour market information; about 25 percent of applications for LMOs in British Columbia and Alberta at the time were for the occupations listed. To apply, employers had to confirm that they had made “reasonable efforts” to hire domestic workers, that there was no ongoing labour dispute involving the positions to be filled, and that the working conditions and wages fulfilled the required conditions. Compliance with the rules was checked at a later date. According to CIC, out of 250 reviews, 30 did not follow the rules. See Canada (2009); CIC (2013a); HRSDC (2007).

11 This new wage determination did not apply to seasonal agricultural workers or live-in caregivers (HRSDC 2013e).

ensure that the program is not making it easier for companies to outsource jobs abroad.¹²

In light of these changes, two questions arise. First, beyond anecdotes, has easier access to temporary foreign workers adversely affected domestic workers' job opportunities? Second, if that is the case, are the policy modifications introduced in 2013 adequate or should other modifications be considered?

LMOs AND THE LABOUR MARKET

The labour market test – that is, the need to obtain an LMO – is key to ensuring that employers give priority to domestic workers in hiring. The E-LMO pilot project was put in place because of growing delays in obtaining a decision through the regular LMO process and because employers in western Canada reported having great difficulty finding workers with adequate skills. An understanding of the TFWs who came in under this pilot project and of the unemployment situation at the time can provide insight into the existence of labour shortages.

Hiring Confirmations through LMOs

An LMO application can cover any number of TFWs. It is the first step in the process under the jurisdiction of Employment and Social Development Canada before Citizenship and Immigration Canada and border officers make their own decision, and it reflects the position of the federal government with respect to the state of the labour market.

Figure 1 shows the number of TFW positions confirmed (TFW confirmations) through LMOs

in Alberta and British Columbia, the two provinces that had access to the E-LMO pilot project, and in the rest of Canada. One striking feature is the sudden acceleration of TFW confirmations in the two western provinces, which, in 2007, obtained a larger number of TFW confirmations than the rest of Canada combined; in 2008, they obtained confirmations for more than 94,000 TFWs, twice as many as the rest of Canada (Table 1, column 1). In 2011, after the pilot project was terminated, the two provinces still obtained about 40 percent more LMOs than the rest of Canada, and in 2012, when the new A-LMO process was available throughout the country, Alberta and British Columbia had 72 percent more LMOs than the rest of the country. So it appears that employers in those two provinces are taking full advantage of available fast-track TFW processes.

More important, the hiring of low-skilled TFWs is similar in terms of direction and even strikingly larger in relative magnitude. In 2008, employers in the two western provinces hired more than five times the number of confirmed low-skilled TFWs through LMOs than employers in the rest of Canada (Table 1, columns 4 and 5). The following year, the numbers of low-skilled TFWs hired dropped sharply all across the country, probably because of rising uncertainty after the global financial crisis, but in 2010, the two western provinces again hired twice as many as the rest of Canada.

These facts reflect the popularity of the E-LMO and A-LMO projects. Although it is not surprising that easier access to TFWs increased the number of LMO applications, the sharp growth in authorized positions indicates that the federal government

12 The federal government also announced that it would move more forcibly to suspend and revoke work permits if the program is misused, and that employers would have to provide a plan showing the future transition toward the employment of domestic workers (Employment and Social Development Canada 2013; HRSDC 2013f).

Figure 1: TFW Positions Confirmed through LMOs, 2005–12



Source: HRSDC (2013c).

believed employers in Alberta and British Columbia were facing deep labour shortages. Initially, as noted, the E-LMO pilot project covered 12 selected occupations, but in January 2008, 21 new ones were added (see Table 2). Out of the total of 33 occupations, 19 were in skilled categories; 6 required university education and 13 required college education or an apprenticeship. The 12 remaining occupations were in low-skilled

categories and requiring one to four years of secondary education or no formal education.¹³

As Table 3 shows, in 2008, the first full year of the E-LMO pilot project, 25,568 TFWs were approved under E-LMOs, or 26.5 percent of all LMOs that year in Alberta and 30.3 percent in British Columbia. In 2009, the actual number of E-LMOs was much smaller (7,479) but still represented 22.6 percent of all LMOs in Alberta

13 See Appendix Table A-1 for the full list of occupations with their NOC-S 2006 classification and corresponding education levels.

Table 1: Temporary Foreign Worker Positions Issued through LMOs. 2005–12

	All LMOs ^a			Pilot Project for Occupations Requiring Lower Levels of Formal Training (NOC C and D) ^b		
	British Columbia & Alberta	Rest of Canada	Ratio of British Columbia & Alberta to Rest of Canada	British Columbia & Alberta	Total Rest of Canada	Ratio of British Columbia & Alberta to Rest of Canada
2005	18,557	32,680	0.57	2,041	3,590	0.57
2006	27,651	37,546	0.74	7,015	5,289	1.33
2007	50,430	44,760	1.13	24,506	7,771	3.15
2008	94,125	46,755	2.01	56,540	10,910	5.18
2009	41,635	41,000	1.02	18,765	11,710	1.60
2010	52,120	41,130	1.27	24,325	11,325	2.15
2011	61,670	45,010	1.37	27,665	12,360	2.24
2012	99,315	57,685	1.72	n.a. ^c	n.a.	-

Notes: a Number of temporary foreign worker positions on LMO confirmations, excluding seasonal agricultural workers and live-in caregivers. b Number of temporary foreign worker positions on LMO confirmations for low-skill occupations. c The definition of the low-skill category has changed and comparable statistics are not available.

Source: HRSDC (2013c), tables 3, 7, 8, 9.

Table 2: Occupations Covered by E-LMOs

Category	Total	Skill Level		
		A	B	C, D
Natural and applied sciences and related occupations	5	4	1	-
Technical and related occupations in health	3	2	1	-
Technical occupations in art, culture, recreation and sports	1	-	-	1
Sales and service occupations	11	-	2	9
Trades, transport and equipment operators and related occupations	12	-	9	3
Occupations unique to processing, manufacturing, utilities	1	-	-	1
Total	33	6	13	14

Notes: Skill level A usually requires university education; B usually requires college education or apprenticeship training; C usually requires secondary school and/or occupation-specific training (one to four years of secondary school education or up to two years of on-the-job training, specialized training courses or specific work experience; D requires no formal education, and on-the-job training is usually provided.

Source: HRSDC (2013b).

Table 3: Positions Confirmed through LMOs and E-LMOs, Alberta and British Columbia, 2007–10

	2007 (Sep–Dec)	2008	2009	2010 (Jan–Jun)
Alberta				
Total ^a	36,030	65,860	27,235	38,260
E-LMOs	788 (2.2%)	17,475 (26.5%)	6,155 (22.6%)	2,050 (5.4%)
British Columbia				
Total	13,600	26,685	13,235	12,450
E-LMOs	529 (3.9%)	8,093 (30.3%)	1,324 (10.0%)	160 (1.3%)

a The total number of positions excludes seasonal agricultural workers, live-in caregivers and managers because such occupation categories were not eligible for E-LMOs.

Source: HRSDC (2013c), tables 3, 7, 9.

and 10 percent in British Columbia. Clearly, the E-LMO pilot project led to greater hiring of TFWs in the two provinces thanks to the faster confirmation process put in place under the project both before and after the financial crisis hit the Canadian economy. This raises questions about the depth of the labour shortages Alberta and BC employers faced.

Unemployment in Alberta and British Columbia

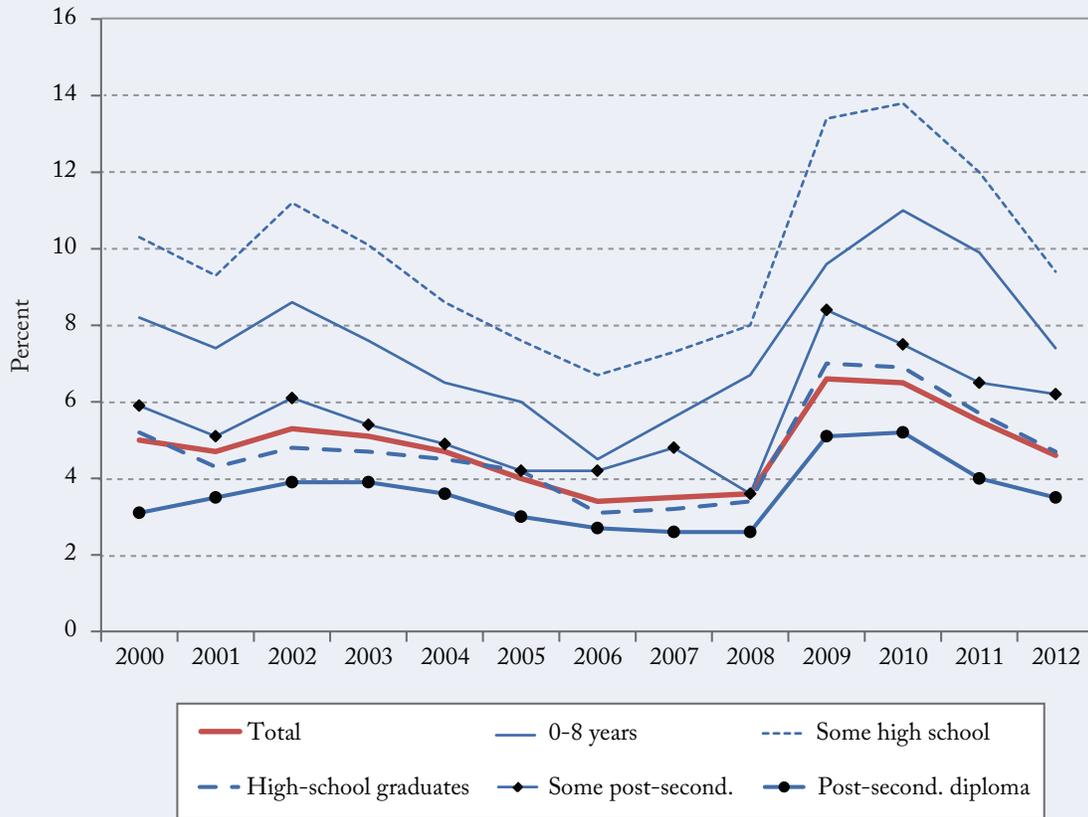
Total unemployment in the two provinces, in fact, was relatively low by Canadian standards in the early years of this century (2000–2005, see Figures 2 and 3): around 5 percent in Alberta and 7 percent in British Columbia, which suggests that employers might have been facing labour shortages.¹⁴ Since almost 40 percent of the occupations in the E-LMO projects were in low-skilled categories, however,

it is important to look at unemployment rates in occupations requiring different education levels.

When the low-skilled TFWP was introduced in 2002, domestic workers with only some high-school education faced an unemployment rate of 11.2 percent in Alberta and 16.9 percent in British Columbia. Although the unemployment rates for such workers declined steadily in the following years, they remained much higher than the provincial averages (again, see Figures 2 and 3). In 2007, when there were large backlogs in LMO applications, the rates were 7.3 percent and 8.4 percent in Alberta and British Columbia, respectively. In 2009, when the E-LMO policy was fully in place, the rate hit 13.4 percent and 15.5 percent, respectively, while total unemployment rose to 6.6 percent and 7.7 percent in the two provinces. Domestic workers with high school graduation experienced similar changes in unemployment rates, although at slightly lower levels.

14 The natural rate of unemployment in Canada is considered to be around 6–7 percent (see Fortin 2000).

Figure 2: Unemployment Rate by Educational Attainment, Alberta, 2000–12



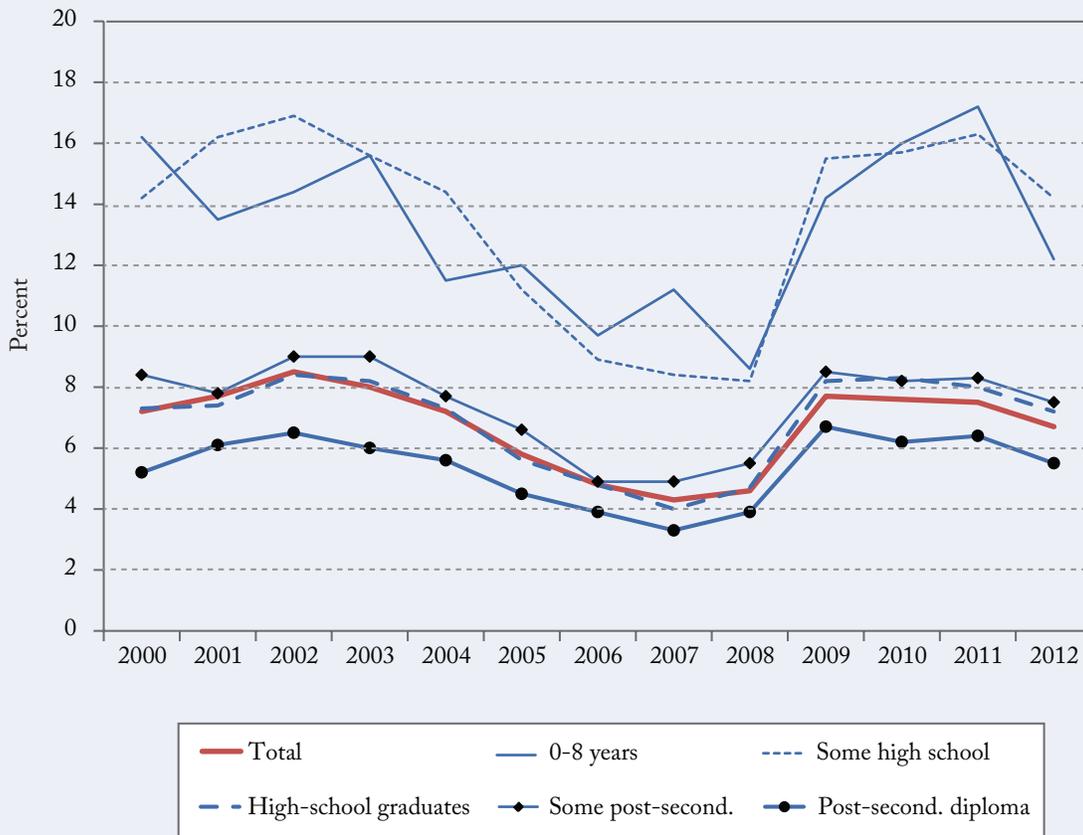
Source: Statistics Canada, CANSIM database, table 282-0004.

It appears that the state of the labour market for workers with lower education levels was not a strong consideration when the E-LMO list, which included 13 low-skilled occupations, was established. Alternatively, it is not clear that the labour market test conditions – such as requiring employers to “[conduct] reasonable efforts to hire or train Canadians for the job” (HRSDC, 2013a) – were sufficiently stringent. Accordingly, did the E-LMO pilot project play a role in the rise in unemployment in Alberta and British Columbia that occurred while the project was in place?

The Impact of the E-LMO Pilot Project

The regional focus of the E-LMO pilot project makes it close enough to a natural experiment that can be used to investigate whether easier access to TFWs on the part of employers affected unemployment in the two provinces. If relevant labour market characteristics are similar across all provinces, it is then possible to evaluate whether some differences in unemployment changes between the two western provinces and the rest of Canada can be attributed to the E-LMO pilot

Figure 3: Unemployment Rate by Educational Attainment, British Columbia, 2000–12



Source: Statistics Canada, CANSIM database, table 282-0004.

program given that contemporaneous shocks, as well as different regional responses to economic shocks, can be accounted for.¹⁵ Box 2 shows that two particularly important features are consistent

across provinces: employers’ use of the TFWP and the evolution of the labour market across skills levels.

Because well-known factors affect unemployment levels across provinces in different ways, the analysis

15 A natural experiment allows one to evaluate the impact of a policy by comparing outcomes between two similar groups. One, the reference group, does not experience the change in policy; the other, the treatment group, does experience the change in policy. After controlling for time and group impacts on outcomes, remaining differences in outcome for the treatment group are attributable to the policy change. The methodology is difference-in-difference analysis in this case, since outcomes are unemployment changes in occupation categories covering listed occupations in E-LMO for the treatment group (Alberta and British Columbia) and the reference group (other provinces) before (2003–06) and during the implementation of E-LMO (2007–10). See Appendix B for details.

focuses on the speed of changes in unemployment (rather than on changes in levels).¹⁶ Based on the labour market test conditions, two types of impacts are possible: (i) a faster rise in unemployment if the labour market test became less effective in protecting domestic workers' access to jobs under the E-LMO project, which would suggest that TFWs were substitutes for local workers; or (ii) a slower rise (or even a decrease) in unemployment, if the hiring of TFWs created new job opportunities for domestic workers, as the labour market test conditions suggest, in which case TFWs complemented domestic workers.

The results show that the E-LMO pilot project did, in fact, accelerate rising unemployment levels in Alberta and British Columbia (Table 4, top panel). As well, the two western provinces generally experienced more variability in unemployment than did the rest of Canada. Changes in the unemployment rates in the two provinces were larger when unemployment was declining before 2007. In Alberta and British Columbia it declined by 2.9 and in the rest of Canada, by 1 percentage point. Changes were also larger when unemployment was increasing after 2007; 3.4 percentage points increase in Alberta and British Columbia versus 1.4 percentage points in the rest of the country. As a result, on average, the variation in the unemployment rate during the whole period was 2.3 percentage points in the rest of Canada and 6.2 percentage points in Alberta and British Columbia, which suggests that the E-LMO project potentially accelerated the rise in unemployment by about 3.9 percentage points in the two provinces between 2007 and 2010.

Using the simplest natural experiment methodology, however, has possible shortcomings. One is that factors contemporaneous to the E-LMO project are assumed to have the same impact on occupations across all provinces which may not be the case. For example, the financial crisis may not have had the same effect on unemployment changes in Alberta and British Columbia as in the rest of the country. Using a more sophisticated methodology to control for possible differences during the E-LMO implementation period, the positive impact of the E-LMO project is very similar. There are, however, different impacts across types of occupations and some experienced no acceleration in unemployment (see Gross, forthcoming).

Since the economies of the two western provinces are dominated by natural resources, which might generate faster changes in the unemployment rate because of the high variability of commodity prices, I also compared Alberta and British Columbia with two other provinces whose economies depend heavily on natural resources – namely, Saskatchewan and Newfoundland and Labrador. Again, however, I find that the rise in the unemployment rate accelerated in the two western provinces during the E-LMO pilot project (Table 4, bottom panel).

When I estimate the impact of the E-LMO project on the unemployment rate separately for the two western provinces, I find, not surprisingly, that it is smaller for Alberta (3.1 percentage points) than for British Columbia (4.8 percentage points). The difference is in part due to a 12-percentage-point increase in the unemployment rate among

16 Analyzing the speed of the change in unemployment allows one to control for various factors that generate different changes in unemployment independently of the E-LMO project. For example, employment insurance eligibility conditions and the structure of the local economy generate differences in unemployment levels across provinces (see Gross and Schmitt 2012).

Table 4: Change in Unemployment Due to the Implementation of the E-LMO Pilot Project

Comparison with the Rest of Canada			
	Alberta & British Columbia	Rest of Canada	Difference
	<i>(percentage points)</i>		
Before E-LMO (2002–06)	-2.88 (0.46)	-0.95 (0.23)	-1.93 (0.52)
During E-LMO (2007–10)	3.36 (0.46)	1.36 (0.23)	2.00 (0.52)
Change between two periods	6.24 (0.65)	2.32 (0.33)	3.93 (0.73)
Comparison with Two Natural-Resources-Producing Provinces			
	Alberta & British Columbia	Saskatchewan & Newfoundland and Labrador	Difference
	<i>(percentage points)</i>		
Before E-LMO (2002–06)	-2.88 (0.50)	-0.91 (0.50)	-1.97 (0.70)
During E-LMO (2007–10)	3.36 (0.50)	1.21 (0.50)	2.15 (0.70)
Change between two periods	6.24 (0.70)	2.13 (0.70)	4.12 (0.99)

Note: Standard deviations in parentheses.

construction labourers and surveyors' helpers, occupations in the lowest skills category, between 2007 and 2010. The result is consistent with British Columbia's mediocre performance in employing people with low education levels (see Box 2, Figure A).

In sum, there was no obvious shortage of labour, especially of workers with low skills levels, in the two western provinces during the course of the E-LMO pilot project, and making it easier for employers there to access TFWs did increase the unemployment rate among domestic workers. This suggests that relaxing labour market test conditions for some occupations was not a desirable policy, and by lowering employers' constraints on hiring TFWs, the federal government reduced the incentives for employers to search for domestic workers to fill job vacancies. These findings, combined with other research that shows the contribution of the standard TFWP in maintaining interprovincial differences in

unemployment (Gross and Schmitt 2012), indicate weaknesses in the design of the program.

POLICY IMPLICATIONS

A sound TFW program should give priority to domestic workers for jobs. If there is no obvious labour shortage, employers must have strong incentives to search actively for domestic workers before turning to TFWs. The effectiveness of the labour market test and other conditions is indispensable in this task. Employers will undertake a more active search for domestic workers if hiring TFWs is relatively more difficult, if TFWs do not appear to be more suitable than domestic workers, and if available labour clearly does exist beyond just the local area. Hence, the following three conditions must be well designed: the relative financial cost of hiring TFWs; the non-monetary costs of hiring TFWs; and information about the state of the domestic labour market.

Box 2: Similarities in Labour Market Characteristics

For a policy change to be considered a natural experiment, relevant labour market characteristics must be similar across all provinces. Two features are important in this case: employers' use of the TFWP, and the evolution of the labour market across skills levels.

Employers' use of the TFWP: The table below shows the intensity of TFW employment across provinces, measured as the ratio of TFWs present in Canada at year-end and total employment.* In the 2002–06 period, before the E-LMO pilot project was in place, Prince Edward Island and New Brunswick had the lowest number of TFWs per thousand employed people (about 2.3). Most provinces had a rate between 3.5 and 5.0. Ontario had a much higher rate (9.5), between the rates for Alberta and British Columbia, suggesting there were also major labour shortages in that province, although Ontario was not included in the E-LMO pilot project. So, generally, employers across the whole country were involved in using the TFWP.

Another important feature is the trend in the annual entries of TFWs. During the E-LMO pilot project, even though the duration of the permits was initially doubled in 2007 and later increased to four years in 2011, there was a steady growth in entries, suggesting shortages did not exist only in Alberta and British Columbia (see the figure below).** As a result, the TFW employment ratio rose by about 3 or more per thousand employees in six of the other eight provinces. Thus, not only were all provinces familiar with the TFWP, but the intensity of foreign worker employment increased substantially across the whole country. So, part of the large increase in intensity in the two western provinces is not necessarily due to the introduction of the E-LMO pilot project.

Evolution in unemployment: Provinces should exhibit similar evolution in unemployment by education categories linked to the occupations covered by the E-LMO pilot project. As the figure below shows, unemployment in occupations requiring a post-secondary diploma and those requiring only one to four years of secondary school or zero to eight years of formal education rose in Alberta and Ontario, and decreased in British Columbia, Saskatchewan, New Brunswick and Newfoundland and Labrador, with a mixed record in other provinces. Thus, provinces did experience similar evolution in unemployment, whether or not they were included in the E-LMO project. These results allow one to conclude that the E-LMO was a natural experiment, and that changes in unemployment in the two western provinces not due to factors affecting the whole country can be attributed to easier access to TFWs by employers there.

*The fact that the ratio is measured in December suggests that seasonal agricultural workers are not included, which makes it more consistent with the other numbers used in this *Commentary*. Unfortunately, there is no more accurate measure of TFWs present in Canada.

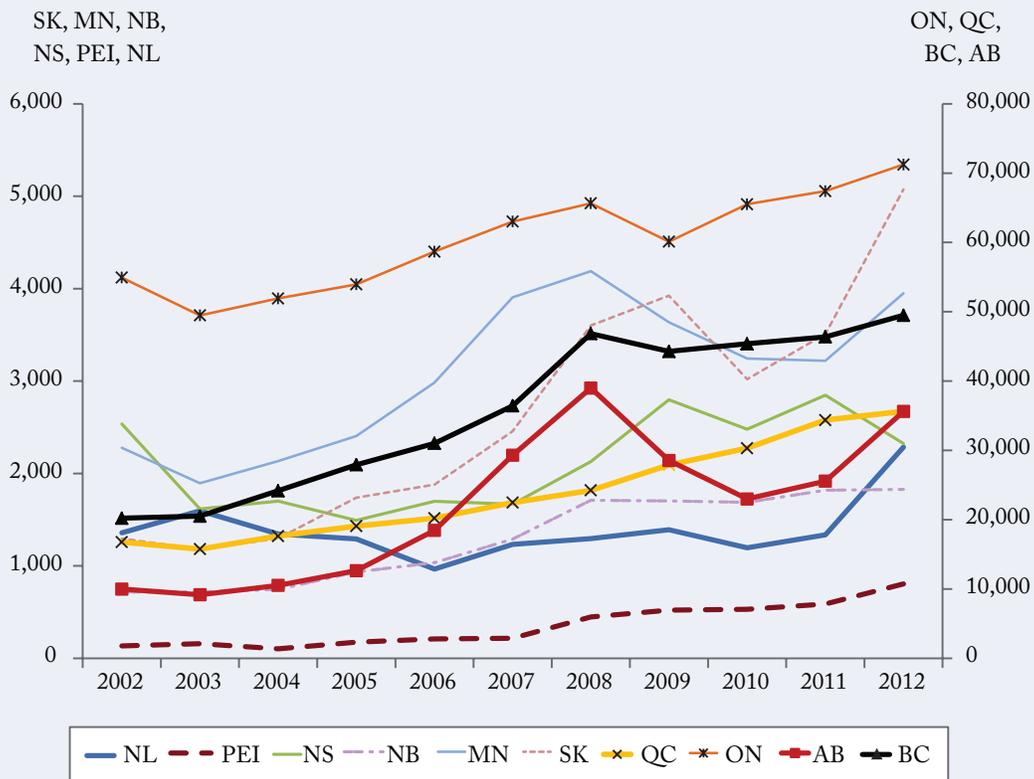
**The average correlation between the TFW entries in British Columbia and other provinces is 0.88, and between Alberta and other provinces it is 0.72.

Box 2 cont'd: Ratio of TFWs to Total Employment, 2002–06 and 2007–10

	2002–06	2007–10	Change
Newfoundland and Labrador	4.4	5.6	1.1
Prince Edward Island	2.4	7.7	5.3
Nova Scotia	3.5	6.3	2.8
New Brunswick	2.3	5.7	3.4
Quebec	4.8	7.4	2.6
Ontario	9.5	14.0	4.4
Manitoba	4.3	8.4	4.1
Saskatchewan	3.7	9.2	5.6
<i>Alberta</i>	<i>8.1</i>	<i>26.9</i>	<i>18.8</i>
<i>British Columbia</i>	<i>13.1</i>	<i>26.6</i>	<i>13.5</i>

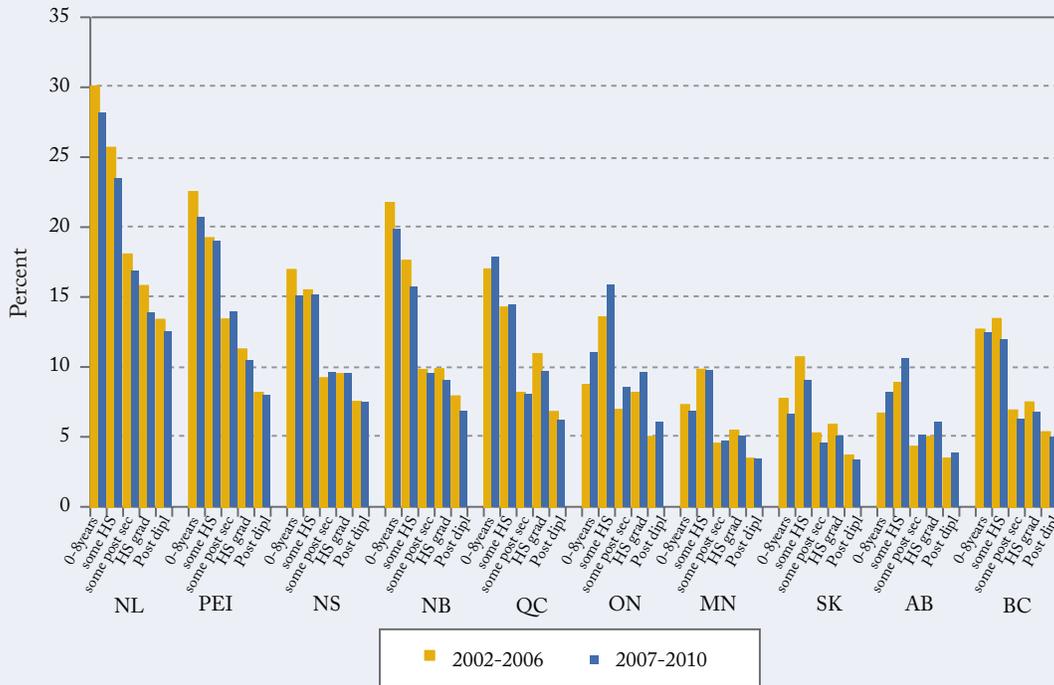
Sources: CIC (2012); Statistics Canada, CANSIM database, table 282-0010.

Box 2 cont'd: Annual Entries of TFWs



Source: CIC (2012, 2013a).

Box 2 cont'd: Average Unemployment Rates by Education Levels



Source: Statistics Canada, CANSIM database, table 282-0004.

The Relative Financial Cost of Hiring TFWs

The financial cost of hiring TFWs consists of wages and additional administrative costs that the regulations impose. In the absence of a TFW program, a local shortage of labour would force employers to raise wages substantially to attract domestic workers, possibly from other regions or occupations. For this reason, many countries impose high fees on employers wanting to hire TFWs. The United States, for example, charged up to \$2,325

per application in 2013 for the appropriate visa; part of the fee is used to train domestic workers, which thus contributes to rebalancing labour markets. In Singapore, companies must pay skills-specific and industry-specific monthly levies for each employed TFW. In both countries, fees are higher for employers that depend heavily on TFWs; fees also vary by firm size.¹⁷ Naturally, a financial charge must be combined with the employers' obligation to pay at least the same wage to TFWs

17 In the United States, in addition to a base processing fee (\$325), most employers must pay a Fraud Prevention and Detection fee (\$500) and an *American Competitiveness and Workforce Improvement Act* fee (\$750 or \$1,500, depending on the size of the firm). In addition, since 2010, firms with more than 50 employees and more than 50 percent working on temporary visas have had to pay an additional \$2,000 fee (United States 2013). In Singapore, monthly levy rates vary according to the dependency ceiling, which varies across sectors – for example, for low-skilled occupations, the fee represents about 25 percent of the monthly wage. In Canada, the visa fee and flight costs for low-skilled workers were less than 5 percent of the monthly wage when the length of TFWs' contracts was two years; the relative size of these administrative costs has been cut in half since TFWs' contracts were extended to four years (Gross and Schmitt 2012).

as they do to domestic workers so that the cost is not passed on to workers. Moreover, in case of long TFWs' contracts, such as the four-year contracts in Canada, it is important that policy stimulates the rebalancing of labour markets. Thus, wages should not be kept low over many years. High specific and possibly time-dependent fees would create incentives for employers to raise wages while searching for domestic workers.

As noted, the federal government recently eliminated employers' ability to set wages for TFWs below the median wage paid to domestic workers and introduced a \$275 fee per job application. Both changes raise the cost of hiring TFWs. Only a future analysis will provide a precise evaluation of the actual impact of these changes, but it is worth considering that the fee is remarkably low compared with what the United States charges. Although the fee might cover administrative costs, it is hardly large enough to provide a strong incentive for employers to search for domestic workers to fill job vacancies¹⁸ – it is far lower, for example, than the cost of relocating a domestic worker from another province. As well, the fee is the same for all employers, instead of rising with firms' dependency on TFWs, which would increase their incentive to attract domestic workers rather than rely increasingly on TFWs over time. A higher fee would also help finance training of otherwise unqualified domestic workers.

The Non-monetary Costs of Hiring TFWs

The non-monetary costs of hiring TFWs concern mostly employers' requirement to pass the labour market test conditions and to ensure that they search actively for domestic workers to fill job vacancies. There are problems, however, with this

process. Among them is the difficulty of evaluating whether TFWs actually are filling identifiable labour shortages. The federal government generates forecasts of labour market states over 10-year periods using information on employment, unemployment, wages and participation rates (see for example, HRSDC 2008), but these forecasts are either unavailable at provincial occupational levels or are considered unreliable at such disaggregated levels (Lefebvre, Simonova, and Wang 2012). Also, there is evidence that the evaluation process undertaken by Service Canada's regional offices lacks meticulousness (Auditor General of Canada 2009, chap. 2). Thus, as Ruhs (2006, 19) states, “[labour market] tests have proved notoriously difficult to implement in practice.... Clearly, without the right incentives and enforcement, any labour market test simply becomes a bureaucratic obstacle that serves neither employers nor local workers.”

As well, employers should be induced to search beyond narrowly defined local markets. There is evidence that, during past economic booms, domestic workers temporarily migrated in large numbers to dynamic regions such as Alberta, but interprovincial migration decreased substantially during the most recent boom (Barnetson and Foster 2014). There are several reasons for this lower interprovincial migration, but these aside, it is still the case that the TFWP is hindering the reduction of interprovincial unemployment gaps by limiting employers' incentives to offer domestic workers to migrate to fill job vacancies (Gross and Schmitt 2012).

Other countries with TFW programs, particularly those with programs covering all types of occupations, place a cap on the number of TFWs that may enter each year – for example, South Korea's TFW program, which covers all sectors

18 Legislation – most notably the *Financial Administration Act and User Fees Act* – currently prevents Ottawa from raising more money than required to process an LMO claim.

under a three-year renewable contract, had a quota of 110,000 TFW entries in 2007 (OECD 2008, table II.A1.1.). A cap would give employers an incentive to search beyond local markets by offering higher wages, and might encourage domestic workers to keep looking for employment if they know they face less competition from TFWs. A survey of construction workers in Vancouver between December 2008 and January 2009, for example, revealed that low-skilled domestic workers believed that TFWs had an adverse effect on their ability to find jobs, with 64 percent stating that TFWs, in fact, were not needed (Gross 2011).

Another way to control TFWP excesses would be to limit TFWs to specific industries or occupations with very low unemployment rates, as many OECD countries – such as France, Italy, New Zealand, Spain, the United Kingdom and the United States – have done (OECD 2008), which would make it easier to monitor the availability of domestic workers in those sectors. Indeed, for decades, Canada has had a seasonal agricultural temporary foreign worker program and a live-in-caregiver program, neither of which has ever raised concerns about increasing unemployment among Canadian workers as it has always been clear that there are labour shortages in those occupations. While specific occupations and sectors would be identified through adequate information about the labour market, annual quotas could be negotiated periodically and implemented in cooperation with employers' associations (Abella 2006).

Information about the State of the Labour Market

The accurate documentation of short-term labour shortages is a key element of any TFW program that does not adversely affect domestic workers. And employers might believe that TFWs can fill job vacancies adequately, and at a lower cost, because of the nature of foreign training and the potentially large number of applicants. Hence, accurate information about characteristics of

available domestic workers is necessary if employers are to undertake an appropriate labour search within Canada.

In addition, having the best available information about the actual state of the labour market could increase employers' compliance with the regulations as government agencies would be better able to determine if a true labour shortage exists. The federal government has not collected precise information about vacancies for decades, however – a shortcoming that has been identified as a major gap in labour market information (see the Advisory Panel on Labour Market Information 2009, chap. 3).

Since 2011, the monthly Business Payroll Survey has included a question about how many vacant positions firms have in the last business day of the reference month (Statistics Canada 2013), but such information is aggregated only by industry and province; there are no data on vacancies by occupation or skill level. Many countries with TFW programs ensure accurate information about the state of their labour markets through the application process. In many European countries – including Finland, France, Iceland, Italy, the Netherlands, Norway and Portugal – employers file applications to hire TFWs in local public labour offices (OECD 2008, table II.A1.2.). A main responsibility of these offices is to match unemployed people with job vacancies, and to do so they maintain detailed information about the availability of workers and types of vacancies countrywide (Constant and Tien 2011; United Kingdom 2013).

Accurate information about the state of the labour market is also needed to evaluate whether labour shortages are temporary or structural. One problem with TFW programs is that they have sometimes been used to fill what in fact were permanent jobs. In Germany, for example, as Collinson (1993, 52) notes, the “rotation’ model proved inefficient in its attempts to balance the manpower needs of employees....The basic flaw in the German recruitment policies was the notion that temporary workers should fill what were

essentially permanent jobs. Rotation of workers conflicted with employers' concern for continuity in a trained workforce.... Gradually it became clear that most of Germany's foreign workers would not leave." Recent changes to Canada's TFWP increasing the time that an open position must be advertised (to a minimum of four weeks) do not obviously improve domestic workers' access to available jobs in a world with imperfect information, nor are they likely to increase employers' knowledge about available domestic workers or the government's awareness of the nature and location of labour shortages.

Since developing local labour offices on the European model might be expensive, perhaps the federal government could significantly improve the information it needs by adding a question in the Monthly Business Payroll Survey about the recruiting difficulties firms have encountered by skill levels during a given period.¹⁹ Such statistics would improve the government's overall picture of the labour market when deciding about LMOs and help target support for training. The development of a more comprehensive national job bank, as well as federal announcements for job-matching services via a database of vacant positions, also should be encouraged.

The Need for More Policy Changes

Changes to the temporary foreign worker program in 2013 mostly represent a return to the more stringent LMO process that was in place in the early 2000s, and thus are likely to increase employers' incentives to search more thoroughly for domestic workers to fill job vacancies. The changes, however, do not address two main issues. One, as we have seen, is the continuing inadequacy of

information about the state of the labour market; clear information about the nature of vacancies (demand) and the availability of domestic workers (supply) is necessary to ensure that foreign workers fill actual temporary shortages. Another issue is that of application fees, which should depend on criteria such as the size of the firm and the intensity of its use of TFWs to avoid, for example, penalizing small firms that really need TFWs. Some portion of the fees also should be used to improve domestic workers' training; as well, higher fees likely would lead to slightly higher wages in occupations with labour shortages – both of which would contribute to rebalancing local or occupational labour markets. Finally, a cap on annual TFW entries would influence firms' and workers' search intensity until better information and a different fee structure are put in place.

CONCLUSION

A temporary foreign worker program is unlikely to be a comprehensive solution to labour shortages. Although there are clear benefits to the economy if short-term excess labour demand is filled as quickly as possible, the costs of a weakly designed TFW program can be quite high in the medium term. Such a program clearly has the capacity to generate adverse effects, which must be minimized by regulating employers' access to TFWs.

Between 2002 and 2013, Canada eased the hiring conditions of TFWs several times, supposedly because of a reported labour shortage in some occupations, especially in western Canada. By 2012, the number of employed TFWs was 338,000, up from 101,000 in 2002, yet the unemployment rate remained the same at 7.2 percent (CIC 2012, 2013d; Statistics Canada CANSIM database, table

19 Switzerland's employment survey of firms includes questions about vacancies, recruitment difficulties and employment forecasts (Switzerland 2013).

282-0004). Furthermore, these policy changes occurred even though there was little empirical evidence of shortages in many occupations. As a result, controlling for different responses to shocks across provinces and other contemporaneous changes, I find that these modifications to the TFWP actually accelerated the rise in unemployment rates in Alberta and British Columbia. The reversal of some of these changes in 2013 is welcome but probably not sufficient, largely because adequate information is still lacking about the actual state of the labour market, and because the current uniform application fee employers pay to hire TFWs does not increase their incentive to search for domestic workers to fill job vacancies.

Labour shortages can result from workers being discouraged from looking for jobs or not considering some jobs because of low pay; they

can also result from a sudden economic shock in a sector, which creates a pressing need for employers to find specific types of workers to ensure continuing production. Ideally, a TFW program offers employers access to an indispensable temporary workforce until domestic workers become available. Employers thus should regard such foreign workers as available only for a short period, and not attempt to use the program as a way to circumvent the search for and hiring of domestic workers.²⁰ A successful TFW program thus should encourage employers to attract and train domestic workers for jobs that are permanent, possibly with federal government help, so that the labour market exhibits a better balance in the medium term. The current Canadian program, however, still falls short of this goal.

20 Some temporary workers can become permanent residents through the federal Canadian Experience Class program or provincial nominee programs but even in that case, domestic unemployed workers should be given priority.

APPENDIX A

Table A1: Occupations Included in the E-LMO Pilot Project				
	Occupation	NOC-S 2006	Category	NOC-S Skill Level
Occupations Listed September 24, 2007				
1	Carpenters	H121	Trades, transport and equipment operators and related occupations	B
2	Crane operators	H621		B
3	Hotel and hospitality room attendants	G732	Sales and service occupations	C
4	Hotel front desk clerks	G715		C
5	Food and beverage servers	G513		C
6	Food counter attendants	G961		D
7	Tour and travel guides	G721		C
8	Retail sales persons and sales clerks	G211		C
9	Registered nurses	D112	Technical and related occupations in health	A
10	Dental technicians	D223		B
11	Pharmacists	D031		A
12	Snowboard and ski instructors	F154	Technical occupations in art, culture, recreation and sport	D
Occupations Added January 14, 2008				
13	Construction labourers	H821	Trades, transport and equipment operators and related occupations	D
14	Steamfitter and pipefitters	H112		B
15	Ironworkers	H324		B
16	Heavy-duty equipment mechanics	H412		B
17	Machinists	H31		B
18	Roofers	H141		B
19	Industrial electricians	H212		B
20	Welders	H326		B
21	Surveyor helpers	H822		D
22	Courier drivers	H714		D
23	Commercial janitors and caretakers	G933	Sales and Service Occupations	D
24	Specialized cleaners	G932		D
25	Food service supervisors	G012		B
26	Industrial meat cutters	G941		B
27	Residential cleaning and support workers	G931		D
28	Mechanical engineers	C032	Natural and applied sciences and related occupations	A
29	Civil engineers	C031		A
30	Electrical and electronics engineers	C033		A
31	Petroleum engineers	C045		A
32	Mechanical engineering technologists	C132		B
33	Manufacturing and processing labourers	J31	Occupations unique to processing, manufacturing, utilities	D

Note: The Canadian national occupational classification (NOC-S) has the following categories: 0 (management), A (usually requires university education), B (usually requires college education or apprenticeship training); C (usually requires secondary school and/or occupation-specific training) and D (on-the-job training is usually provided).

Sources: HRSDC (2006, 2007, 2008a); Statistics Canada (2006).

APPENDIX B: MODEL AND VARIABLES

The model captures changes in unemployment such that

$$\Delta \text{urate}_{i,j,t} = c + \beta_1 D_k + \beta_2 D_t + \beta_3 D_{k,t} + \varepsilon_{i,t},$$

where $\Delta \text{urate}_{i,j,t}$ is the change in unemployment in occupational group i , in province j , during period t . The total number of observations is 160. The analysis compares changes in unemployment in 2002–06, before the E-LMO was implemented, and when it was in place (2007–10) using the difference-in-difference. It includes the ten provinces and eight occupational categories. For five occupations (three skilled and two low-skilled) the unemployment data are missing for several years or provinces. For one occupation in Saskatchewan, three observations were missing and a linear extrapolation was computed. So the data cover 28 out of 33 listed occupations.

The constant c captures common changes to all provinces.

The binary variable D_k captures differences in reaction between the two western provinces and the rest of the country due to economic shocks. It is equal to 1 for Alberta and British Columbia and 0 otherwise.

The binary variable D_t captures effects that might have affected changes in unemployment rates starting at the same time as the E-LMO pilot project. It is equal to 0 for the 2002–06 period and 1 for the 2007–10 period.

The binary variable $D_{k,t}$ captures the effect of the E-LMO pilot project in Alberta and British Columbia. It is measured as $D_k * D_t$ and equal to 1 for Alberta and British Columbia for the change in 2007–10 and 0 otherwise.

Table B-1: E-LMO Occupations and Unemployment Rate Categories

Occupation	Skill Level	Unemployment Rate, NOC-S 2006 Categories
Mechanical engineers, civil engineers, electrical and electronics engineers, petroleum engineers.	A	C
Mechanical engineering technologists	B	
Carpenters, steamfitters and pipefitters, roofers	B	H1
Heavy-duty equipment mechanics, machinists, industrial electricians, ironworkers, welders	B	H2-H5
Crane operators	B	H6-H7
Courier drivers	D	
Construction labourers, surveyors' helpers	D	H8
Retail sales persons and sales clerks	C	G011, G2-G3
Food service supervisors	B	G012-G4-G5
Food and beverage servers	C	
Industrial meat cutters	B	G013-G016, G7,G9
Hotel and hospitality room attendants, hotel front desk clerks, tour and travel guides	C	
Food counter attendants, commercial janitors and caretakers, specialized cleaners, residential cleaning and support workers	D	
Registered nurses, pharmacists	A	no data
Dental technicians	B	
Snowboard and ski instructors, manufacturing and processing labourers	D	

Note: See Table A-1 for skill-level definitions.

Sources: HRSDC (2006, 2007, 2008a); Statistics Canada (2006); and Statistics Canada, CANSIM database, table 2820010.

Table B-2: Statistical Characteristics of $urate_{i,j,t} - urate_{i,j,t-1}$

	Full Sample	Alberta	British Columbia	Rest of Canada	Saskatchewan	Newfoundland and Labrador
Mean	0.21	0.20	0.28	0.20	-0.14	0.44
Maximum	12.0	4.9	12.0	9.0	3.7	5.0
Minimum	-5.8	-4.9	-5.7	-5.8	-3.2	-2.8
Standard deviation	2.5	2.8	4.8	2.1	2.0	2.1
Number	160	16	16	128	16	16

Source: Statistics Canada, CANSIM database, table 282-0010.

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