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Canadian Firm and Job Dynamics

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Abstract

To understand better Canada's smooth reallocation of labor in response to the recent commodity price boom, but seemingly poor productivity performance, this paper examines job and firm dynamics in Canada relative to the United States. Overall, it finds that while Canada's labor market efficiency seems comparable to that of the United States, product market rigidities appear to be reducing Canada's capacity for creative destruction, hence undermining productivity growth.

JEL Classification Numbers: J62, J63, J64, O51

Keywords: job creation, job destruction, firm births, firm deaths, labor and product market efficiency, productivity, creative destruction

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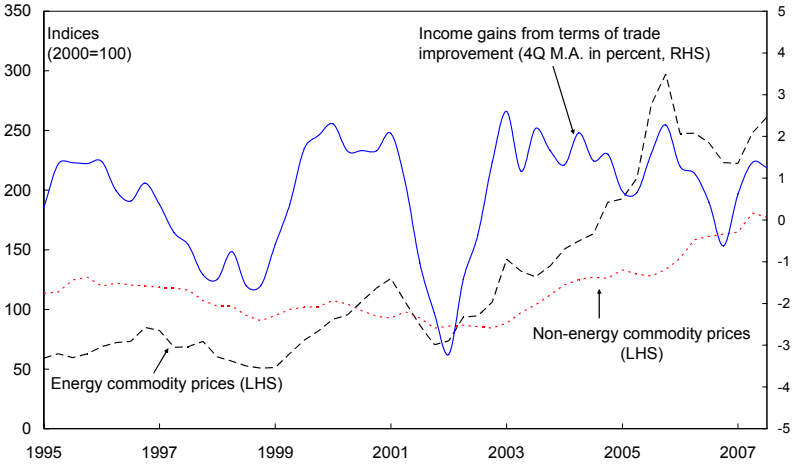
I. INTRODUCTION

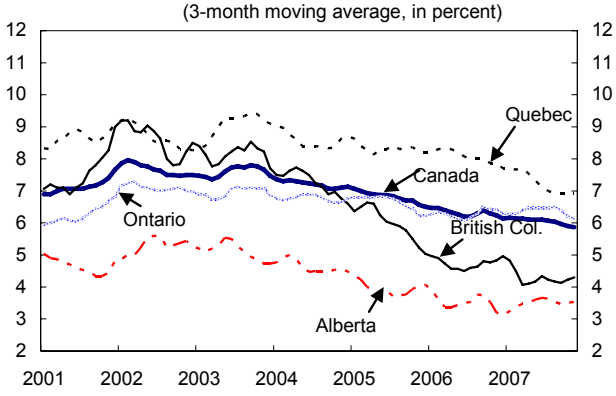
The commodity price hikes of the last 5 years have led to a large transfer of capital and labor from the manufacturing-based central provinces to the more natural resources-based western provinces in Canada (Figure 1). Despite the large labor market frictions this has created, unemployment rates have steadily declined across all provinces, as job losses in manufacturing have been more than offset by gains in construction, mining, and services, as well as interprovincial migration (Figure 2). Thus, Canada appears to have managed the resource reallocation from the commodity price boom smoothly. Both in terms of overall labor and total factor productivity, however, Canada's productivity performance has been poor when compared to several industrial countries, including the United States (Figure 3).

Figure 1. Commodity price developments



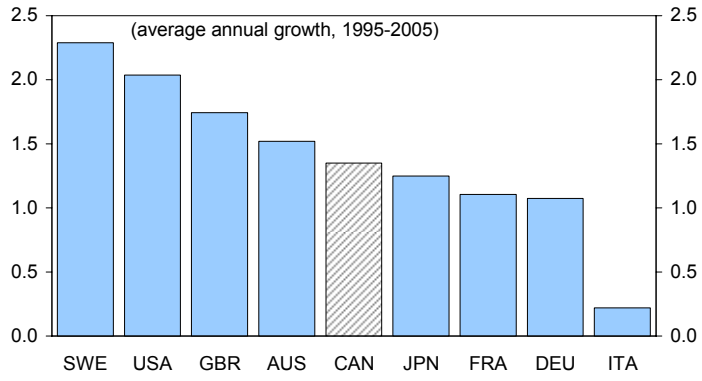
Source: Haver Analytics; and IMF staff calculations.

Figure 2. Unemployment rates across provinces, 2001- Nov. 07
(3-month moving average, in percent)



Source: Haver Analytics; and IMF staff calculations.

Figure 3. Labor productivity



Source: OECD

This paper provides more texture to this picture by looking at firm and job dynamics in Canada. In the last fifteen years, there has been a change in focus in the economic literature. Labor market flow data such as job creation, job destruction, and unemployment flows are routinely discussed, as well as simple stock measures like unemployment and vacancy rates. There are two reasons for this: the pioneering work of Davis and Haltiwanger (1990, 1992, and 1996) in developing measures of job creation and destruction, and the development of search theoretic models (see Pissarides (1990) and Blanchard and Diamond (1990, 1992)) which suggest that looking at flow data is necessary for explaining certain labor market behavior. For example, Mortensen and Pissarides (1994) show that the movements of

unemployment and vacancies are not sufficient to identify whether a shock is reallocative or aggregate. To do this, we need to look at job creation and job destruction, which Balakrishnan and Michelacci (2001) do using a structural vector autoregression framework.

More generally, Blanchard and Portugal (2000) question what one can learn about labor market efficiency by looking simply at unemployment rates. They show that behind similar unemployment rates in the United States and Portugal lie two very different labor markets. Unemployment duration is three times longer in Portugal than the United States. Symmetrically, flows of workers into unemployment are three times lower in Portugal. They argue that higher unemployment protection makes the Portuguese labor market more sclerotic than that of the United States.

The way Canada has dealt with the large reallocative shock associated with the commodity price boom suggests that it has a flexible labor market. But like with the case of Portugal, could a low unemployment rate mask certain inflexibilities in labor and product markets? The poor productivity performance of Canada relative to the United States suggests that this is a question worth investigating and, indeed, provides the motivation for this paper.

The paper is structured as follows: first, I provide a brief survey of the empirical job flows literature, to motivate the approach and provide some background for the results. Second, I document how I constructed comparable job creation and destruction data for Canada and the United States. I use the United States as a benchmark for Canada as it's considered to have a flexible labor market. Third, I compare job flows in the U.S. and Canada using a combination of techniques, before comparing such flows across Canadian provinces and estimating the impact of the recent reallocative shock—associated with the commodity price boom—on overall job flow dynamics. Finally, I conclude with some lessons for enhancing productivity in Canada: the key appears to be reducing product market rigidities, particularly in the central provinces.

II. Job and Firm Dynamics: What previous studies say

As noted in the introduction, labor market flow data such as job creation, job destruction, and unemployment flows are now routinely discussed, as well as simple stock measures like unemployment and vacancy rates. Because the United States is considered to have a flexible labor market, Canadian data can be usefully benchmarked against U.S. figures. However, a common problem when looking at flows across countries is the comparability of the underlying data. Indeed, for this very reason, most previous studies have only compared job flows in the manufacturing sector.

For example, in one of the few studies comparing labor market flows in Canada and the United States, Baldwin, Dunne and Haltiwanger (1998) construct manufacturing job creation and job destruction flows from 1972–1992 using the Annual Censuses of Manufactures for Canada and the Longitudinal Research Database for the United States. They find that the overall magnitude of gross job flows in the two counties are comparable and that industries with high levels of job creation and destruction in the United States also have high levels in Canada. The time series properties of job creation and job destruction are also qualitatively similar, with job destruction being much more volatile than job creation, although this facet

is more pronounced in the U.S. data. The pace of job reallocation (the sum of job creation and job destruction), however, exhibits a pronounced upward trend in Canada but is essentially trendless in the United States.

Of course, to analyze resource reallocation in Canada, in the context of the recent commodity price boom, one needs to look at flows *between* sectors. In particular, manufacturing sector employment has fallen (jobs have been destroyed) while services, mining, and construction have seen large employment gains (jobs have been created). Simply looking at flows at the industry level within the manufacturing sector would not capture this. Moreover, in terms of linking aggregate productivity performance to creative destruction, we need to look at job churning associated with firm turnover not just for manufacturing, but for the entire economy.

Some international studies have done just that, but most do not include Canada. For example, Haltiwanger, Scarpetta and Schweiger (2006) use a harmonized firm-level data-set drawn from business registers and enterprise census data that covers 16 industrial, developing, and emerging countries (excluding Canada) for the 1990s. Overall, they find that creative destruction is important, with entering and exiting firms account for about 30–40 percent of total job flows.

In sum, there hasn't been a recent study of Canadian job and firm dynamics *across* the key sectors of the economy. This paper fills this gap, which allows it to analyze the reallocation process across sectors and provinces, and make a credible comparison between Canadian and U.S. labor markets.

III. Comparing Canada and the United States

A. Finding comparable databases

For Canada, the database with the most comprehensive coverage of job and firm dynamics is the Longitudinal Employment Analysis Program (LEAP), produced by Statistics Canada.[2] It covers the entire economy, or roughly one million companies. The data is annual and at the firm level for the period 1992–2004. It covers all employers that issue an employment record to their employees for tax purposes (i.e. only excludes the self employed who do not draw a salary). I use this database to construct job and firm dynamics across 6 sectors (primary and construction, manufacturing, public services, business services, distributive services, and other services); and the four major provinces (Alberta, British Columbia, Ontario, and Quebec).[3]

[2] I thank Leonard Landry of the Business and Labor Market Analysis Division of Statistics Canada for providing me with the LEAP data.

[3] The sectors are classified using an aggregated version of NAICS codes.

There are other sources of flow data for Canada such as the Workplace Employee Survey (WES) and the Survey of Labor and Income Dynamics (SLID). But, these databases do not have the coverage of the LEAP database. For example, WES data is based on a sample of around six thousand employees, an order of magnitude less than the LEAP's coverage. Also, as we shall soon see, for the purpose of looking at Canadian relative to U.S. flows the LEAP offers the database most comparable to U.S. sources.

For the United States, Davis and Haltiwanger (1992) was the first study to come up with detailed measures of job creation and job destruction at the industry level. They did so for the manufacturing sector, using the Longitudinal Research Datafile, whose sampling frame encompasses all U.S. manufacturing establishments with five or more employees.

More recently, other databases measuring U.S. labor market flows across the entire economy have been developed. The Job Openings and Labor Turnover Survey (JOLTS) can produce job and worker flow estimates, but does not capture establishment entry or exit and only starts in December 2000. In contrast, the Business Employment Dynamics database (BED), which was first published in September 2003, does capture establishment entry and exit and provides quarterly estimates of job and firm flows since 1992. It is a virtual census, covering 98% of employers on nonfarm payrolls via reporting requirements associated with State unemployment laws. Like the LEAP, it excludes the self employed.

The BED and LEAP databases seem the natural choices to compare U.S. and Canadian job and firm dynamics, as both provide a virtual census of the entire economy and exclude the self employed. There are two key differences though: the BED database is at a quarterly frequency and at the establishment level, whereas the LEAP database is at an annual frequency and at the firm level. Overcoming these differences is what I turn to in the next subsection.

B. Converting U.S. data to the Firm Level and Annual Frequencies

I convert U.S. data to the firm level and annual frequency in two steps. First, I use the quarterly data on job creation and destruction by firm size that the Bureau of Labor Statistics (BLS) started publishing in December 2005. Clearly, the level of aggregation when you decompose by firm size is the firm rather than the establishment. Next, to convert from quarterly firm level flows to annual firm level flows, I use the conversion factors estimated by Pinkston and Spletzer (2004). They produce annual estimates of job creation, job destruction and net employment changes for 1998–2001 (decomposed into those changes associated with continuing firms and those with firm births and deaths), by extending to annual data the longitudinal linkage algorithm developed by the BLS for quarterly data.

As expected, they show that annual rates of job creation and destruction are higher than the average rates across quarters in any given year, mainly because of the increased importance of establishment openings and closings in annual data. When comparing annual job creation and destruction to the sum of four quarterly gross job creation and destruction, the former is much lower, as many quarterly changes reverse themselves during the course of a year. Annual statistics show job creation and destruction *over* a year, whereas the sum of quarterly numbers shows creation and destruction *during* a year.

From the annual estimates of job creation and destruction produced by Pinkston and Spletzer, I back out the factors used to convert quarterly data to annual data for job creation and job destruction during 1998–2001 (Table 1). I use the average of these conversion factors and apply them to the rest of the sample. The fact that the conversion factors vary little over years considered, despite a large business cycle, suggests that this is a robust method to convert quarterly to annual flows.

Table 1. Conversion factors

	Net change	Gross job gains			Gross job losses		
		Total	Expanding firms	opening firms	Total	Contracting firms	Closing firms
Average conversion factors 1/	4.0	1.8	1.5	2.9	1.8	1.5	2.9
Annual conversion factors							
1998	4.0	1.9	1.6	3.0	1.8	1.4	3.0
1999	4.0	1.9	1.6	2.9	1.7	1.3	2.8
2000	4.0	1.8	1.5	2.9	1.8	1.4	2.9
2001	4.0	1.8	1.4	2.9	1.9	1.6	3.1

Note: Annual conversion factors calculated as the ratio of annual rates to the average of quarterly rates.
1/ Average of annual conversion factors
Source: Pinkston and Spletzer, 2004, "Annual Measures of Gross Job Gains and Gross Job Losses" Monthly Labor Review.

C. Definitions

I follow the Davis and Haltiwanger approach to defining job flows, but do so at the firm level. Job creation (*POS*) is measured as the sum of employment gains at expanding and new firms. Job destruction (*NEG*) is measured as the sum of employment losses at contracting and closing firms. Both measures are converted into rates by dividing through by the average of employment in the current and previous periods. Net employment growth (*NET*) is simply the difference between rates of job creation and destruction. Job reallocation (*SUM*) is the sum of job creation and destruction, and measures the total number of changes in employment opportunities across firms. In many ways, given the size of underlying shocks, *SUM* captures the dynamism of particular sectors of the labor market.

D. Aggregate Job Flows

Table 2 shows our estimates of job flows in both the United States and Canada during 1993–2004 and Table 3 provides some of the key correlations between the variables. While job creation and destruction rates at continuing firms have been similar in both countries, those associated with firm births and deaths are higher in the United States. Thus, levels of job reallocation have been higher in the United States. [4]

[4] As a robustness check, I compared the actual U.S. annual data for 1998–2001, from which period the conversion factors were calculated for the rest of the sample, and the Canadian data. Overall job reallocation rates were significantly higher in the United States, not just because of higher rates of job reallocation associated with births and deaths, but higher job reallocation at continuing firms as well.

Table 2. Job flows in Canada and the United States

	Net Chage	Job Creation			Job Destruction			Job reallocation
		Total	By births	By continuers	Total	By deaths	By continuers	
Canada								
period average	1.7	10.7	2.0	8.7	9.0	2.0	7.0	19.7
93-98 average	1.4	10.6	2.2	8.4	9.2	2.1	7.1	19.8
99-04 average	2.0	10.8	1.9	8.9	8.8	1.8	7.0	19.6
United States								
period average	1.2	11.5	3.1	8.3	10.3	3.1	7.2	21.8
93-98 average	1.5	12.0	3.3	8.7	10.5	3.2	7.3	22.5
99-04 average	0.8	10.9	3.0	7.9	10.1	3.0	7.1	21.0

Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

Table 3. Job flows correlations

	Correlation between Job Creation and Job Destruction	Correlation between Net Change and Job Reallocation	Variance (Job Destruction/ Job Creation)	Job Creation and Job Destruction		Net Change and Job Reallocation	
				Regression	P-value	Regression	P-value
Canada	-0.57	-0.24	1.49	-0.47	0.05	-0.45	0.45
United States	0.49	-0.05	1.08	0.49	0.09	-0.03	0.89

Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

Regarding the correlations, in contrast to the previous results for manufacturing (discussed in subsection II.B), the variance of job destruction to job creation is higher in Canada than in the United States. Also, for the United States, job creation and destruction are positively and significantly correlated; while, for Canada, they are negatively and significantly correlated. Reallocation for both countries does not appear to be related to net job creation. While the U.S. results may appear surprising in light of the previous results of Davis and Haltiwanger for the manufacturing sector, Foster, Haltiwanger, and Kim (2006) update these results through the late 1990s, showing that recent manufacturing flows display similar patterns those shown in Table 3.

As noted by many authors, however, there can be various reasons apart from labor market rigidities that can explain differences in job reallocation.

E. Rigidities, and Firm Size and Sector Composition

Higher levels of job reallocation in the United States, especially associated with firm births and deaths could lead one to think that Canada is not as good at facilitating the creative destruction process. However, there are various other possible reasons for this trend. Specifically, differences in the composition of firms and sectors between the United States and Canada could be crucial. Indeed, Haltiwanger, Scarpetta and Schweiger (2006) find that industry and firm size compositional differences explain a large fraction of overall variability

in job creation and job destruction across 16 industrial, developing and emerging countries (excluding Canada). Even controlling for this, however, significant differences remain, which their empirical results suggest could be related to differences in hiring and firing costs.

Regarding the United States, they also find that job reallocation rates decline monotonically with firm size and large disparities across industries. They argue that the latter is consistent with certain industries being exposed to greater variability in demand; more macro shocks; and may be facing a higher pace of technological progress that imposes more frequent retooling of the production process and the associated workforce. Bartelsman, Haltiwanger and Scarpetta (2005) use a harmonized set of national micro-data sources (business registers, census, or representative enterprise surveys) and find that US has a very high proportion of industries with an above-average firm size, both in manufacturing and business services. They argue that this is consistent with the idea that a large internal market tends to promote larger firms.

The key questions are: (i) how different is Canada to the United States regarding firm size and industry composition; and (ii) controlling for these differences, what would job reallocation rates look like in the two countries. To address these questions this section firstly uses the BED and LEAP databases to highlight some important differences in firm size between the two countries, before performing some panel regressions which control for firm size. Ideally, one would also control for industry composition, but this is not possible as BED data by industry is not available at the firm level, only the establishment level. As we shall see for Canadian provinces in section IV, however, controlling for firm size instead of industry doesn't change the substance of the results.

Differences in firm size between the United States and Canada

As Tables 4 & 5 show, while the distribution of employment by firm size is similar in the United States and Canada, the United States has a significantly higher share of firms which are classified as large (classified as either having more than 100 or 500 employees).

Table 6 shows that in terms of job creation and destruction, a substantially bigger share is accounted for by firms with more than 500 employees in the United States than in Canada. Looking at some of the other details, while Canada has a relatively higher share of job reallocation at continuing firms accounted for by firms with less than 20 employees, the opposite is true for job reallocation associated with firm births and deaths. Indeed, in the United States, nearly 80 percent of all job reallocation associated with firm births and deaths takes place at firms with less than 20 employees.

Table 4. Distribution of employment by firm size in Canada and the United States

	Number of employees				
	Total	0 to 19	20 to 99	100 to 499	500+
	Share (percent)				
Unites States					
1990	100	20.2	20.4	18.0	41.4
1991	100	20.4	20.1	17.4	42.1
1992	100	20.5	19.9	17.4	42.1
1993	100	20.5	19.9	17.5	42.2
1994	100	20.2	19.9	17.7	42.1
1995	100	19.9	19.9	17.9	42.4
1996	100	19.6	19.8	18.0	42.6
1997	100	19.4	19.7	18.0	43.0
1998	100	18.9	19.4	17.9	43.8
1999	100	18.7	19.2	17.8	44.3
2000	100	18.4	19.1	17.9	44.6
2001	100	18.3	19.0	17.8	44.9
2002	100	18.6	19.9	17.5	44.0
2003	100	18.9	19.9	17.4	43.8
2004	100	19.1	19.3	17.6	44.0
Canada					
1990	100	22.0	16.8	12.8	48.4
1991	100	20.9	17.8	14.2	47.1
1992	100	21.3	17.6	13.8	47.4
1993	100	21.6	17.9	13.9	46.6
1994	100	21.6	18.1	14.2	46.1
1995	100	21.6	18.2	14.4	45.9
1996	100	21.7	18.4	14.4	45.4
1997	100	21.6	18.8	14.8	44.9
1998	100	21.4	18.8	14.8	45.0
1999	100	21.3	18.8	15.1	44.8
2000	100	20.6	18.8	15.3	45.2
2001	100	20.6	18.9	15.5	45.0
2002	100	20.7	19.0	15.4	44.9
2003	100	20.6	19.0	15.2	45.1
2004	100	20.8	19.0	15.4	44.8

Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

Table 5. Distribution of firms by firm size in Canada and the United States

	Number of employees				
	Total	0 to 19	20 to 99	100 to 499	500+
	Share (percent)				
Unites States					
1990	100	86.8	10.8	1.9	0.4
1991	100	87.3	10.5	1.9	0.4
1992	100	87.4	10.4	1.8	0.4
1993	100	87.5	10.3	1.8	0.4
1994	100	87.3	10.5	1.9	0.4
1995	100	87.1	10.6	1.9	0.4
1996	100	87.0	10.7	2.0	0.4
1997	100	86.9	10.7	2.0	0.4
1998	100	86.8	10.8	2.0	0.4
1999	100	86.7	10.8	2.0	0.4
2000	100	86.5	11.0	2.1	0.4
2001	100	86.6	10.9	2.1	0.4
2002	100	86.8	10.7	2.0	0.4
2003	100	87.1	10.6	2.0	0.4
2004	100	87.1	10.6	1.9	0.4
Canada					
1990	100	93.5	5.5	0.8	0.2
1991	100	92.9	5.9	0.9	0.2
1992	100	93.1	5.8	0.9	0.2
1993	100	93.0	5.8	0.9	0.2
1994	100	93.0	5.9	0.9	0.2
1995	100	92.8	6.0	1.0	0.2
1996	100	92.7	6.1	1.0	0.2
1997	100	92.6	6.2	1.0	0.2
1998	100	92.5	6.2	1.0	0.2
1999	100	92.5	6.2	1.0	0.2
2000	100	92.3	6.3	1.1	0.2
2001	100	92.2	6.5	1.1	0.3
2002	100	92.0	6.6	1.1	0.2
2003	100	92.0	6.6	1.1	0.3
2004	100	92.2	6.4	1.1	0.2

Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

Table 6.Percentage share of gross job gains and losses by firm size in Canada and the United States 1993 to 2004

	Number of employees				
	Total	0 to 19	20 to 99	100 to 499	500+
Canada					
Gross job gains	100	38.7	27.1	22.4	11.8
At expanding firms	100	32.3	28.8	25.4	13.6
At opening firms	100	63.9	20.4	10.8	4.8
Gross job losses	100	40.0	26.0	22.0	12.1
At contracting firms	100	34.8	27.3	23.6	14.3
At closing firms	100	57.0	21.1	17.0	4.9
Net Change	100	32.1	32.5	24.8	10.6
United States					
Gross job gains	100	37.7	23.4	15.7	23.2
At expanding firms	100	29.6	25.2	17.9	27.3
At opening firms	100	79.2	14.2	4.5	2.1
Gross job losses	100	38.5	23.5	15.5	22.5
At contracting firms	100	30.8	25.2	17.5	26.5
At closing firms	100	76.0	15.3	5.9	2.8
Net Change	100	25.1	21.5	18.9	34.5

Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

In sum, there are some important differences in firm size composition and the associated contribution to job reallocation in the United States and Canada. Thus, controlling for these differences will be key to understanding the drivers of job reallocation.

Panel regressions across the United States and Canada

One obvious way to isolate country effects from firm size composition effects is to perform panel regressions. I follow Baldwin, Dunne, and Haltiwanger (1998) and run regressions of the following form:

$$sum_{ist} = \beta_0 + \beta_{can} * DCAN + \sum_{s=1}^{3} \beta_s Size_s + \sum_{t=93}^{03} \beta_i Time_t + \varepsilon_{ist}$$

Where sum_{ist} is job reallocation in country *i,* firm size category *s*, and time *t*. *DCAN* is a country dummy variable (DCAN =1 for Canada, i.e. the benchmark country is the United States), $Size_s$ represents a set of 3 size dummies (where the size categories are the same as in Tables (4–6) and the benchmark size is for firms with more than 500 employees), and $Time_t$ represents a set of eleven time dummies (the excluded year is 1993), and ε_{ist} is the residual.

I ran a variety of simple panel OLS regressions, excluding each of the dummies, and using the different components of job reallocation (associated with continuing firms or firm births and deaths) and the results are reported in Tables 7 and 8.[5] Table 7 shows that the size dummies are positive and extremely significant and that the significance of the Canada dummy depends on which job reallocation measure is used. Given the benchmark size in the regressions is firms with more than 500 employees, the sign and magnitude of the size dummies is consistent with the job reallocation rate declining monotonically as firm size increases in both countries.

Interestingly, if I use overall job reallocation, the Canada dummy is negative but only marginally significant. If I use job reallocation associated with births and deaths, then the Canada dummy is negative and strongly significant, whereas with job reallocation associated with continuing firms, the dummy is positive and strongly significant.[6] Table 8 shows the regression results when I exclude the dummies individually. It's clear from looking at the explained sum of squares that the most important set of dummy variables in explaining the variation in job reallocation are for firm size.

Consistent with the international evidence presented in Haltiwanger, Scarpetta and Schweiger (2006), such trends suggest that firm size differences drive a lot of the variation in job reallocation. However, the size and significance of the Canada dummies suggests that the United States is better at facilitating the creative destruction through firm entry and exit, but that Canada reallocates labor amongst existing firms efficiently. This points to rigidities being more pervasive in product markets than in labor markets in Canada—a theme I will return to in later sections.

F. Impact of Creative destruction on Productivity

The overall job flows and panel regressions suggest that the United States is better at facilitating creative destruction. At the same time, the United States has had better productivity performance. In this section, I briefly discuss to what extent the two trends are linked. Previous empirical studies at the plant and firm levels have decomposed aggregate labor productivity growth into two main sources: the within-firm component (growth that occurs within producers and often called the "pure productivity effect") and the between-firm component (growth that occurs because of the reallocation across individual producers and often called the "reallocation effect").

[5] As there are no lagged dependent variables nor endogeneity issues given the use of dummy variables, simple OLS regressions are sufficient for the purposes of the analysis.

[6] Similar results are obtained if I use job creation or destruction instead of reallocation, and if I use real GDP growth instead of the time dummies.

Table 7. Job reallocation
Panel regressions across Canada and the United States.

	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Dependent variable	*Total job reallocation rate*		*Job reallocation rate associated with births and deaths*		*Job reallocation rate associated with continuers*	
Country Canada	-0.81	0.15	-2.26	0.00	1.44	0.00
Size 0 to 19	29.21	0.00	16.35	0.00	12.86	0.00
Size 20 to 99	12.95	0.00	3.57	0.00	9.39	0.00
Size 100 to 499	7.82	0.00	1.56	0.04	6.25	0.00
Time 1994	-0.11	0.94	0.03	0.98	-0.13	0.78
Time 1995	-0.31	0.82	0.05	0.97	-0.35	0.46
Time 1996	-0.40	0.77	0.10	0.94	-0.49	0.29
Time 1997	-0.88	0.52	-0.11	0.93	-0.76	0.10
Time 1998	0.18	0.90	0.96	0.47	-0.75	0.11
Time 1999	-0.25	0.85	0.32	0.81	-0.55	0.24
Time 2000	-0.84	0.54	-0.09	0.94	-0.75	0.11
Time 2001	-0.79	0.56	-0.15	0.91	-0.63	0.17
Time 2002	-1.27	0.36	-0.40	0.76	-0.83	0.08
Time 2003	-1.81	0.19	-0.55	0.68	-1.23	0.01
Time 2004	-2.07	0.13	-0.81	0.54	-1.24	0.01
C	11.53	0.00	1.84	0.09	9.68	0.00
No. of Obs.	96		96		96	
R-squared	0.95		0.88		0.97	

Note: Database comprises 12 years, 4 size categories, and 2 countries
Benchmark for size class is above 500 employees
Benchmark country is the United States
Benchmark for time is 1993

Source: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

Table 8. Job reallocation associated with births and deaths
Panel regressions across Canada and the United States.

	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Dependent variable								
Job Reallocation rate associated with births and deaths								
Country Canada	-2.26	0.00	-2.26	0.14			-2.28	0.00
Size 0 to 19	16.35	0.00			16.35	0.00	16.35	0.00
Size 20 to 99	3.57	0.00			3.57	0.00	3.57	0.00
Size 100 to 499	1.56	0.04			1.56	0.07	1.56	0.03
Time 1994	0.03	0.98	0.03	0.99	0.03	0.98		
Time 1995	0.05	0.97	0.05	0.99	0.05	0.97		
Time 1996	0.10	0.94	0.10	0.98	0.10	0.94		
Time 1997	-0.11	0.93	-0.11	0.98	-0.11	0.94		
Time 1998	0.96	0.47	0.96	0.80	0.96	0.51		
Time 1999	0.32	0.81	0.32	0.93	0.32	0.83		
Time 2000	-0.09	0.94	-0.09	0.98	-0.09	0.95		
Time 2001	-0.15	0.91	-0.15	0.97	-0.15	0.92		
Time 2002	-0.40	0.76	-0.40	0.91	-0.40	0.78		
Time 2003	-0.55	0.68	-0.55	0.88	-0.55	0.71		
Time 2004	-0.81	0.54	-0.81	0.83	-0.81	0.58		
Real GDP growth							0.12	0.56
C	1.84	0.09	7.20	0.01	0.71	0.54	1.39	0.12
No. of Obs.	96		96		96		96	
R-squared	0.88		0.03		0.86		0.88	

Note: Database comprises 12 years, 4 size categories, and 2 countries
Benchmark for size class is above 500 employees
Benchmark country is the United States
Benchmark for time is 1993

Source: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

The OECD (2001) and Scarpetta (2002) have used this framework to argue that most productivity growth comes from the pure productivity effect and that, implicitly, the competitive process is of little importance in Canada. Baldwin and Gu (2006), however, argue that the traditional decomposition used in this literature is misspecified. Rather than holding labor shares constant, the decomposition should hold output shares constant to get the pure productivity effect. Applying this method to Canada, they get a much higher contribution of reallocation than previous studies. Indeed, their results suggest that output reallocation and competition account for most of the overall labor productivity growth in Canadian manufacturing over a 10-year period.

Moreover, a more recent international study, by Bartelsman, Haltiwanger and Scarpetta (2005), using a harmonized set of national micro-data sources (business registers, census, or representative enterprise surveys), finds that the contribution of net entry to overall labor

productivity is generally positive in most countries, accounting for between 20–50 percent of total productivity growth.

Another way of testing for the impact of creative destruction on productivity would be to look at the correlation across industries of the rates of productivity growth and labor turnover associated with births and deaths. In the same vein, one could try to look at how consistent across industries are the Canada-United States differences in labor turnover with the Canada-United States differences in productivity. As mentioned earlier in the paper, the challenge regarding the latter is getting U.S. data by industry at the firm level rather than the establishment level. For this reason, while further analyzing the link between creative destruction and productivity is clearly merited, it is beyond the scope of this paper and something I leave to future research.

In sum, more recent studies argue that output reallocation has a major impact on productivity. This suggests that facilitating creative destruction can significantly enhance productivity. This is not just through creative destruction reallocating resources towards more productive uses, but also indirectly through the effects of increased market contestability.

IV. Reallocation and Comparing Across Canadian Provinces

Next, I turn to analyzing the question of the relative performance of the Canadian provinces and quantifying the impact of the recent major reallocative shock (associated with the commodity price boom) on job reallocation. As discussed in subsection III.A, the LEAP does not just provide national economy wide data, but job and firm flows across provinces and sectors. The data across sectors allow us to estimate the importance of reallocative shocks in job churning, while data across provinces help determine if some provinces are more sclerotic than others.

A. National versus Provincial Trends

As Table 9 shows, the West, particularly Alberta, appears to have had a more dynamic labor market—both in terms of net employment gains and job reallocation. Ontario has the low job reallocation rates reflecting both low job creation and destruction rates**.** Although not shown in Table 9, the variance of job destruction relative to job creation is also the highest in Alberta (it is the lowest in Ontario).

However, this could reflect regional differences in sectors and firm size rather than provincial differences in labor and product market flexibility. Indeed, some have suggested that the larger share of manufacturing in the central provinces could explain their lower rates of job reallocation relative to the western provinces. As the results from the panel regressions for Canada and the United States, along with evidence in Table 10, show, sector and firm size have a large impact on job reallocation. Table 10 confirms the notion that manufacturing has low job reallocation rates, with only public services having a lower rate. Next, we follow the approach of section III.E to separate out the different causes of job reallocation.

Table 9. Job flows across Canadian provinces

	Net Change	Job Creation			Job Destruction			Job Reallocation
		Total	by births	by continuers	Total	By deaths	by continuers	
Canada								
period average	1.7	10.7	2.0	8.7	9.0	2.0	7.0	19.7
93-98 average	1.4	10.6	2.2	8.4	9.2	2.1	7.1	19.8
99-04 average	2.0	10.8	1.9	8.9	8.8	1.8	7.0	19.6
Quebec								
period average	1.4	10.9	2.1	8.8	9.5	2.3	7.2	20.4
93-98 average	0.9	10.6	2.0	8.6	9.7	2.2	7.5	20.3
99-04 average	1.8	11.1	2.2	9.0	9.3	2.3	7.0	20.4
Ontario								
period average	1.5	10.3	1.9	8.3	8.8	1.8	7.0	19.0
93-98 average	0.8	9.5	1.8	7.8	8.8	1.7	7.1	18.3
99-04 average	2.0	10.8	2.1	8.7	8.8	1.8	6.9	19.6
Alberta								
period average	3.1	13.7	2.2	11.5	10.6	2.0	8.6	24.4
93-98 average	2.5	13.5	2.3	11.2	11.0	2.1	8.9	24.6
99-04 average	3.4	13.9	2.2	11.7	10.4	2.0	8.5	24.3
British Columbia								
period average	2.0	12.4	2.3	10.1	10.4	2.0	8.4	22.8
93-98 average	2.9	12.8	2.4	10.4	10.0	2.0	8.0	22.8
99-04 average	1.4	12.1	2.2	9.9	10.7	2.1	8.6	22.7

Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; and IMF staff calculations.

Table 10. Average job flows across Canada by industry and firm size, 1993 to 2004

	Net Change	Job Creation			Job Destruction			Job Rellocation
		Total	by births	by continuers	Total	By deaths	by continuers	
Industry								
Primary and Construction	31.8	17.0	3.3	13.7	14.8	3.1	11.6	31.8
Manufacturing	18.6	10.1	1.2	8.9	8.5	1.3	7.2	18.6
Public services	11.1	5.8	1.0	4.8	5.3	1.2	4.1	11.1
Business services	25.4	14.2	2.9	11.3	11.2	2.5	8.7	25.4
Distributive Services	19.7	10.8	1.9	8.9	8.9	1.9	7.0	19.7
Other services	25.0	13.6	3.6	10.0	11.4	3.0	8.3	25.0
Size								
0 to 19	2.6	19.0	6.3	12.6	16.4	5.5	10.9	35.3
20 to 99	2.6	13.3	2.0	11.3	10.6	2.1	8.5	23.9
100 to 499	2.0	11.0	1.1	9.9	9.0	1.6	7.4	20.0
500+	0.9	5.8	0.5	5.3	4.9	0.5	4.5	10.7

Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; and IMF staff calculations.

B. Panel Regressions

As mentioned in subsection III.D, ideally I would run panel regressions with time, province, sector and firm size dummies. The LEAP data used in this paper, however, only has three dimensions: time, province, and *either* sector or firm size. Thus, I can run panel regressions

in the spirit of section III.A but include provincial dummies instead of country dummies, and *either* firm size or sector dummies:

$$sum_{pst} = \beta_0 + \sum_{p=1}^{3} \beta_p \, \Pr ov_p + \sum_{s=1}^{3} \beta_s Size_s + \sum_{t=93}^{03} \beta_i Time_t + \varepsilon_{pst}$$

$$sum_{pit} = \beta_0 + \sum_{p=1}^{3} \beta_p \, \Pr ov_p + \sum_{i=1}^{5} \beta_i Sector_i + \sum_{t=93}^{03} \beta_i Time_t + \varepsilon_{pit}$$

Where sum_{pst} is job reallocation in province *p,* firm size category *s*, and time *t*. Sum_{pit} is job reallocation in province *p,* sector *i*, and time *t.* $\Pr ov_p$ is a province dummy variable, $Size_s$ represents a set of 3 size dummies (where the size categories are the same as in Tables (4–6), $Sector_i$ is a set of five sector dummies, and $Time_t$ represents a set of eleven time dummies, and ε is the residual.

As before, the benchmark size is firms with more than 500 employees, and the benchmark year is 2004. Given that Ontario has the lowest job reallocation rates and is also the biggest province, I make that the benchmark province. Since I am also interested in comparing the dynamism of other sectors relative to manufacturing, I make that the benchmark sector.

Table 11 has the results using firm size dummies and Table 12 those with sector dummies. The results are broadly similar. The province dummies are all significant and positive (except when using firm-size dummies in the case of Quebec, for which the dummy is insignificant). As for the country regressions, the firm-size dummies are all positive and significant, and these regressions also confirm that job reallocation rates fall monotonically with firm size and account for most of the variation in job reallocation rates. Similarly, the sector dummies are all significant and, again, account for most of the variation in job reallocation rates.

Overall, the results are consistent with the international evidence in that firm size and sector differences drive much of the variation in job flows. At the same time, the provincial dummies confirm that the western provinces appear to be less sclerotic than the central provinces, with Ontario seeming to have the greatest inflexibilities. Next, I turn to the importance of reallocative shocks.

Table 11. Job reallocation by firm size
Panel regressions across Canadian provinces

	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Dependent variable								
Job Reallocation rate								
Province $_{Quebec}$	-0.11	0.77	-0.11	0.95			-0.18	0.66
Province $_{Alberta}$	3.85	0.00	3.85	0.05			3.90	0.00
Province $_{British\ Columbia}$	1.64	0.00	1.64	0.40			1.58	0.00
Size $_{0\ to\ 19}$	24.92	0.00			24.92	0.00	24.92	0.00
Size $_{20\ to\ 99}$	12.71	0.00			12.71	0.00	12.71	0.00
Size $_{100\ to\ 499}$	9.15	0.00			9.15	0.00	9.15	0.00
Time $_{1994}$	-0.21	0.75	-0.21	0.95	-0.21	0.81		
Time $_{1995}$	-0.38	0.57	-0.38	0.91	-0.38	0.67		
Time $_{1996}$	-0.99	0.14	-0.99	0.77	-0.99	0.27		
Time $_{1997}$	-2.04	0.00	-2.04	0.54	-2.04	0.02		
Time $_{1998}$	0.16	0.82	0.16	0.96	0.16	0.86		
Time $_{1999}$	-0.49	0.46	-0.49	0.88	-0.49	0.58		
Time $_{2000}$	-1.49	0.03	-1.49	0.66	-1.49	0.10		
Time $_{2001}$	-1.00	0.14	-1.00	0.77	-1.00	0.26		
Time $_{2002}$	-0.36	0.59	-0.36	0.91	-0.36	0.68		
Time $_{2003}$	-0.80	0.23	-0.80	0.81	-0.80	0.37		
Time $_{2004}$	-1.68	0.01	-1.68	0.62	-1.68	0.06		
Real GDP growth							-0.08	0.33
C	11.34	0.00	23.03	0.00	12.68	0.00	10.85	0.00
No. of Obs.	192		192.00		192.00		192	
R-squared	0.96		0.04		0.93		0.96	

Note: Database comprises 12 years, 4 size categories, and 4 provinces
Benchmark province is Ontario
Benchmark for size class is above 500 employees
Benchmark for time is 1993

Source: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

Table 12. Job reallocation by industry
Panel regressions across Canadian provinces

	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value	Coefficient	P-value
Dependent variable								
Job Reallocation rate								
Province Quebec	1.79	0.00	1.79	0.15			1.75	0.00
Province Alberta	5.00	0.00	5.00	0.00			5.03	0.00
Province British Columbia	4.15	0.00	4.15	0.00			4.12	0.00
Industry primary and Construction	11.12	0.00			11.12	0.00	11.12	0.00
Industry Public services	-10.45	0.00			-10.45	0.00	-10.45	0.00
Industry Business services	6.27	0.00			6.27	0.00	6.27	0.00
Industry Distributive Services	-0.25	0.68			-0.25	0.73	-0.25	0.68
Industry Other services	4.68	0.00			4.68	0.00	4.68	0.00
Time 1994	-0.72	0.39	-0.72	0.74	-0.72	0.48		
Time 1995	-0.73	0.39	-0.73	0.74	-0.73	0.48		
Time 1996	-1.34	0.11	-1.34	0.54	-1.34	0.19		
Time 1997	-2.53	0.00	-2.53	0.24	-2.53	0.01		
Time 1998	-0.40	0.64	-0.40	0.86	-0.40	0.70		
Time 1999	-0.93	0.27	-0.93	0.67	-0.93	0.37		
Time 2000	-2.14	0.01	-2.14	0.32	-2.14	0.04		
Time 2001	-1.72	0.04	-1.72	0.43	-1.72	0.09		
Time 2002	-1.13	0.18	-1.13	0.60	-1.13	0.27		
Time 2003	-1.70	0.04	-1.70	0.43	-1.70	0.10		
Time 2004	-2.58	0.00	-2.58	0.23	-2.58	0.01		
Real GDP growth							-0.05	0.65
C	20.54	0.00	22.43	0.00	23.27	0.00	19.38	0.00
No. of Obs.	288		288		288		288	
R-squared	0.86		0.08		0.80		0.85	

Note: Database comprises 12 years, 4 size categories, and 4 provinces
Benchmark province is Ontario
Benchmark for industry is Manufacturing
Benchmark for time is 1993

Source: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; the Business Employment Dynamics database, United Sates Bureau of Labor Statistics; and IMF staff calculations.

C. How Important is Reallocation?

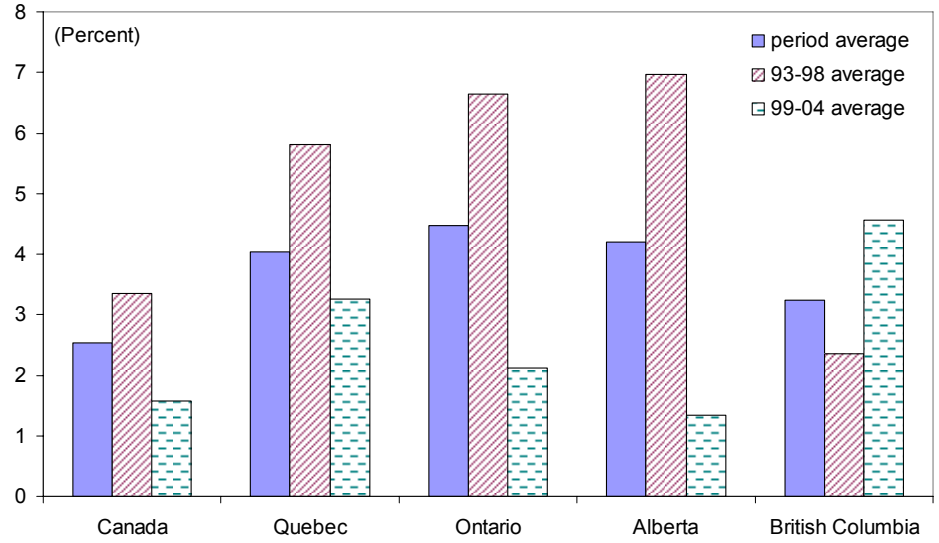
As touched upon earlier, one might expect the recent commodity boom to have resulted in a significant uptick in job reallocation. To see how important this reallocative shock has been in determining job flow dynamics, I follow the methodology first employed by Davis and Haltiwanger (1992). They propose a method for differentiating between within and between sector movements. To estimate reallocation between sectors, I use a 6-sector decomposition and the following equation (where s is the sector):

$$\sum_{s=1}^{S} \left|\text{net employment change in s}\right| - \left|\text{overall economy wide net employment change}\right|$$

To estimate reallocation within sectors, I use the following equation:

$$\sum_{s=1}^{S} |\text{job reallocation in s}| - |\text{net employment change in s}|$$

Figure 4. Ratio in percent of excess job reallocation due to between (as opposed to within) sector shifts



Sources: The Longitudinal Employment Analysis Program, Business and Labour Market Analysis Division; and IMF staff calculations.

As Figure 4 shows, job reallocation caused by sectoral shifts is small compared to job reallocation within sectors. Indeed, shifts in workers across sectors account for less than ten percent of job creation and destruction, suggesting that reallocation between industries is not a major driver of overall labor market churning. In addition, the share of job reallocation caused by sectoral shifts actually fell during 1999–04 relative to 1993–98. This is somewhat puzzling given the perceived wisdom that reallocative shocks were more pervasive during the latter period.

This confirms previous evidence from the manufacturing sector for the United States and Canada that idiosyncratic within-sector shocks are the dominant force in determining levels of job reallocation. Consistent with this, is the evidence presented in subsection III.E that Canada reallocates labor amongst existing firms efficiently—the extent to which sectoral or regional shocks can be absorbed by changes in employment of continuing firms should have a major impact on how smooth the reallocation process is. Overall, it appears that Canada has sufficiently flexible labor markets to absorb significant sectoral shocks—such as a commodity-price shock—without creating a high level of frictional unemployment.

V. Conclusions and Policy Implications

To understand better Canada's smooth reallocation of labor in response to the recent commodity price boom but seemingly poor productivity performance, this paper examines job and firm dynamics to Canada relative to the United States. Overall, it finds that while

Canada's labor market efficiency seems comparable to that of the United States, product market rigidities appear to be reducing Canada's capacity for creative destruction, hence undermining productivity growth.

In particular, while job creation and destruction rates at continuing firms have been similar in both countries during 1993–2004, those associated with firm births and deaths are higher in the United States. Moreover, panel regressions controlling for differences in the size of firms across countries show that for job reallocation associated with firm births and deaths, a Canada dummy is substantially negative and significant. This effect is smaller and only marginally significant when data on overall job reallocation is used, likely reflecting the similar level of job creation and destruction at continuing firms in Canada and the United States.

Canada's central provinces also appear more sclerotic than its western ones, although differences in industrial structure and firm size explain much of the variation. Raw data on overall job flows indicates that job creation and destruction rates have been higher in British Columbia and Alberta than in Ontario and Quebec. However, this could reflect regional differences in industries and firm size rather than provincial differences in labor and product market flexibility. Indeed, some have suggested that the larger share of manufacturing in the central provinces could explain their lower rates of job reallocation relative to the western provinces. To try to discriminate between these explanations, panel regressions that include dummy variables reflecting geographic region, industries, firm size, and year, find that differences in job creation and job destruction are mainly explained by sector and firm size dummies rather than time or province dummies. At the same time, the province dummies are significant, suggesting that British Columbia and Alberta have more dynamic product and labor markets than Ontario and Quebec.

In line with previous studies, in Canada, job reallocation caused by sectoral shifts is small compared to job reallocation within sectors. One might expect the recent commodity boom to have resulted in a significant uptick in job reallocation. However, if anything, the share of job reallocation explained by sectoral shifts has fallen over time. More generally, shifts in workers across sectors account for less than ten percent of job creation and destruction, suggesting that reallocation between industries is not a major driver of overall labor market churning. This confirms previous evidence from the manufacturing sector for the United States and Canada that idiosyncratic within-sector shocks are the dominant force in determining levels of job reallocation.

In conclusion, one explanation for the relative ease of the commodity-related reallocation process is that the implied job flows have been small compared to usual flows. This suggests that while not as dynamic as the United States, Canada has sufficiently flexible labor markets to absorb significant sectoral shocks—such as a commodity-price shock—without creating a high level of frictional unemployment.

However, the United States economy appears better at facilitating creative destruction, which may in part explain its relatively better productivity performance. Compared to the United States, Canada has similar rates of job churning for continuing firms but lower rates associated with firm births and deaths. This is consistent with Cadarelli (2005) and Bayoumi,

Klyuev, and Mühleisen (2007), which argue that Canada's worse productivity performance could reflect not being as successful in directing resources toward high-productivity sectors. The lower rate of firm turnover, which implies more limited opportunities to raise productivity through creative destruction, suggests that rigidities may be more pervasive in product markets than in labor markets. Moreover, such rigidities appear to be more pronounced in the central provinces than those in the west. This suggests that reducing product market restrictions, particularly in central provinces, could significantly enhance productivity.

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