Estimating Export Response in Canadian Provinces to the Canada-US Softwood Lumber Agreement

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Nous évaluons dans quelle mesure le commerce a pu se détourner des provinces nommées dans « l'Accord sur le bois d'oeuvre » au profit des provinces qui ne sont pas nommées. Nos résultats de régression indiquent que l'Accord a eu un impact important sur les exportations des provinces non nommées. En prenant en compte d'autres facteurs, l'Accord, à lui seul, aurait quadruplé les exportations de ces provinces. On estime à moins 5 pour cent l'effet correspondant pour les provinces nommées dans l'Accord. Toutefois, statistiquement, cette diminution n'est pas significative.

We estimate the degree of trade diversion from provinces named under the Softwood Lumber Agreement (SLA) to provinces not named. Our regression results indicate that the SLA had a significant impact on the exports of non-named SLA provinces. Controlling for other factors, the SLA by itself would have increased exports from these provinces four times. The corresponding effect for the provinces named in the SLA is estimated at minus 5 percent. This decrease is not, however, statistically significant.

Introduction

Bilateral trade in softwood lumber is the subject of a longstanding and ongoing dispute between Canada and the United States (see Reed 2001, for a detailed chronology). The current round of this dispute started as a US countervailing duty investigation in 1982/83. The US claimed, and still claims that fees charged for harvesting softwood on public lands by certain Canadian provincial governments are artificially low. It also claims that artificially low fees set by provincial governments constitute countervailable subsidies.

In May 1996, Canada and the US signed a five-year Softwood Lumber Agreement (SLA). Using a

tariff rate quota, the SLA voluntarily restricted US-bound exports of Canadian lumber from four provinces: Alberta, British Columbia, Ontario, and Quebec. The first 14.7 billion board feet of softwood lumber from these provinces was exported duty free. The next 650 million board feet exported was subject to a tax of $50 per thousand board feet. All further exports were subject to a tax of $100 per thousand board feet. [1]

The SLA was a fairly novel and unique trade restriction between two countries. Only imports from four provinces (the *named*/*SLA* provinces) were restricted under this agreement. Remaining provinces (the *non-named*/*non-SLA* provinces) were exempt from any restriction. They could export softwood lumber to the US duty free.[2] Given an import restriction on their biggest competitors, non-named provinces increased exports of softwood lumber to the US, quite significantly. While the SLA was in place (from 1996 to 2001), total exports of softwood lumber from the named provinces declined by 2 percent. However, total exports from the non-named provinces rose by a whopping 75 percent. Even though lumber exports from the largest producers (the named provinces) declined, the increase in exports from the non-named provinces meant that total softwood lumber exports from Canada to the US rose by 17 percent.

These preliminary numbers indicate significant trade diversion to non-named provinces. Trade diversion reduces the benefits to domestic producers from trade restrictions, and since the SLA, US producers have considered trade diversion to non-named provinces to be a serious threat. Perhaps, the most convincing evidence of this concern is in the text of the new lumber agreement being discussed by the US and Canada. Although this agreement is being finalized, there is no longer an explicit distinction between provinces. To prevent the effects of trade diversion, this deal explicitly negotiates a cap on the total export of softwood lumber from Canada.

In this paper we wish to estimate the degree of trade diversion from named to non-named provinces created by the SLA. Specifically, we test the following hypotheses. Did the Softwood Lumber Agreement cause a reduction in softwood exports to the US from the provinces named in the SLA? If it did, what was the magnitude of this reduction? Secondly, did the Softwood Lumber Agreement promote softwood exports to the US from provinces not named in the SLA? If it did, what was the magnitude of this promotion?

To our knowledge, this paper is the first to estimate any sort of trade-diverting effects of the Softwood Lumber Agreement. Most previous studies of the softwood lumber dispute focused on welfare gains to the US and Canadian producers, and final US consumers (see, e.g., Malhotra 2006; Zhang and Hussain 2004; Zhang 2001; van Kooten 2002; and Begley *et al*. 1998). While there is much discussion in policy circles of the effect of the SLA on the growth of softwood lumber exports from the Maritime provinces of Canada, there seems to be no formal analysis of this possibility. Our paper fills this void. Further, the SLA gives us the opportunity to measure trade diversion within a particular country. As most trade restrictions affect the whole country, such an estimate is unique to the literature studying trade diversion as well.

In order to measure the extent of trade diversion we use a modified cross-sectional "gravity" equation. Gravity models are well accepted in empirical trade literature (see Deardorff 1984 for a survey). In our test we follow a recent application of the gravity equation by McCallum (1995). Our results indicate that the SLA had a significant impact on the exports of non-SLA provinces. Controlling for other factors, the SLA by itself would have increased exports from these provinces four times. The corresponding effect for the provinces named in the SLA is estimated at minus 5 percent. This decrease is not statistically significant.

The study of trade diversion for the SLA is similar to previous studies of the trade effects of anti-dumping duties. These duties also target individual countries and permit the possibility of trade diversion from countries not named in the anti-dumping investigation. A brief list of articles that look at the trade effects of anti-dumping duties is given below. Prusa (1997) looks at the trade effects of a broad set of US anti-dumping actions in the manufacturing industries. He concludes that anti-dumping duties restrict trade from the countries named to be dumping and finds evidence of trade diversion to the countries not named in the anti-dumping petition. In contrast with Prusa (1997), Vandenbussche, Konings and Springael (1999) find no evidence of trade diversion from anti-dumping petitions in the European Union. Similarly, Niels (2003) does not find evidence of trade diversion from anti-dumping duties in Mexico.

We structure this paper as follows. In the next section we provide a brief history of the US-Canadian softwood lumber dispute. In the third section we discuss the trends in provincial softwood lumber exports to the US from 1990 to 2002. The fourth section discusses the gravity model used in this paper and the data and its sources. Our results are then presented and the conclusions follow.

The US-Canada Softwood Lumber Dispute: A Brief History up to the Softwood Lumber Agreement

In Table 1 we list the main countervailing duty investigations involving softwood lumber and their outcomes in the current round of the dispute. The first countervailing investigation is commonly termed Softwood Lumber I. Concern over rising Canadian lumber imports resulted in a petition for a countervailing duty (CVD) in October 1982. The petition alleged that Canadian provincial and federal governments were subsidizing softwood lumber production by selling the right to cut timber on public lands at artificially low prices. In the ensuing investigation the International Trade Administration (ITA), a dispute settlement body in the US Department of Commerce, ruled that Canada's

Table 1
History of the Softwood Lumber Agreement

Countervailing Duty Investigations	*Outcome*
Softwood Lumber I: 1982	US authorities decided no subsidy
Softwood Lumber II: 1986	15% provisional duty. Replaced by 15% export tax in MOU
Softwood Lumber III: 1991	After Canada unilaterally terminates MOU countervailing case filed: interim bonding requirement. Canada wins appeal against countervailing duty in CUSTA (1993 and 1994). US revokes duties against Canadian lumber (Aug. 1994). Bilateral consultation process for softwood established.

policies regarding allocation and pricing of softwood lumber did not constitute a countervailable subsidy to its softwood lumber industry.[3]

The dispute was revived in May 1986 by US interests grouped under the Coalition for Fair Lumber Imports (CFLI). The coalition requested US authorities to impose a countervailing duty on Canada's softwood lumber exports to the US. In this new phase (called Softwood Lumber II), the facts of the case, as well as the applicable law, had not materially changed from the first phase in 1982/83. However, the Canadian share of the US softwood lumber market had risen from 28.5 percent in 1983 to 31.6 percent in 1985 (see Gagné 1999). This time the International Trade Administration reversed its prior decision. It found Canadian stumpage rates to be countervailable, and imposed a 15 percent provisional duty.[4]

In December 1986, US and Canada agreed to a memorandum of understanding (MOU) under which Canada imposed a 15 percent tax on its exports to the US. In Canada, there was resentment against the MOU. Further, during this period British Columbia (the single largest exporter of softwood lumber) replaced its export charge by permanently increased stumpage rates. In October 1991, Canada unilaterally terminated the memorandum of understanding. This was met almost immediately by interim duties on Canadian lumber. A third countervailing duty investigation (Softwood Lumber III) was initiated. In May 1992, the ITA issued a final determination which set the countervailing duty at 6.51 percent.[5]

Subsequently, Canada appealed the ruling at the dispute settlement body of the Canada-US Trade Agreement (CUSTA). A prolonged period of litigation under CUSTA followed.[6] The duty imposed was disallowed by CUSTA, and finally revoked by the US government in 1994. Following this revocation a period of mostly free trade followed. This was a phase of euphoria in bilateral relations between US and Canada. When President Clinton visited Ottawa (February 1995) after the North American Free Trade Agreement both American and Canadian governments viewed trade disputes such as Softwood Lumber as minor irritants in a phase of increasing integration (as reported by Leo Ryan in a news report for the *Journal of Commerce,* on 23 February 1995).

Nevertheless, in late 1995 there was renewed pressure on the US government to limit softwood imports. Given that the Canadian softwood lumber industry had incurred large litigation costs to win Softwood Lumber III they were willing to look for a negotiated bilateral solution. Despite ongoing negotiations, on 2 February 1996 the US CFLI announced its intentions to petition if no pact was reached by 15 February. Under this pressure, the five-year SLA (from 1 April 1996 to 31 March 2001), was accepted by both the sides. Even these five years of SLA were marred by further disputes. The US customs, on at least three occasions, reclassified products from tariff codes outside the SLA into codes covered by the agreement. Also, during this period, British Columbia's stumpage reduction was challenged by the US under the dispute settlement provisions of the agreement.

Since the end of the SLA on 1 April 2001 the softwood lumber dispute has been in the news once again. Another countervailing duty was imposed by US authorities (August 2001). But since then another bilateral agreement has been agreed in principle, and more recently, WTO and NAFTA rulings have been announced on the dispute.[7]

Trends in Canadian Exports

Using data from Industry Canada we find that during the period between the MOU and the Softwood Lumber Agreement (1992 to 1995) softwood exports from Canada to the US (measured in Canadian dollars) rose in value by 130 percent (without

adjusting for inflation). In the same period, total exports from Alberta, British Columbia, Ontario, and Quebec (the provinces named in the SLA) rose in value by 119 percent. Exports from the remaining provinces rose in value by 155 percent. Thus, it seems that exports from the provinces not named in the SLA were already on a higher growth path than the traditional lumber exporters named in the SLA.

As one would expect, during the Softwood Lumber Agreement, exports from the named provinces fell. From 1996 to 2001 total softwood exports from these provinces fell in value by 2 percent. However, total softwood exports from the provinces not named in the SLA rose by 75 percent in value. This increase in lumber exports from non-named provinces was so significant, that despite the presence of an important import restriction in the form of the SLA, total exports from Canada to the US rose by 17 percent in value (Table 2).

The trend of a higher growth in softwood exports for non-named provinces holds true even when we look at data from 1990 to 2002. From 1990–2002 despite the existence of several different trade restrictions, total softwood exports from Canada to the US rose by 174 percent. Exports from traditionally large producers (the provinces named in the SLA) rose by 147 percent, and the lumber exports from the provinces not named in the SLA rose by a whopping 513 percent in value.

To put these numbers in context it is also useful to take a look at the percentage of softwood exports to the US originating from the non-named provinces. In 1990, only 4.7 percent of all Canadian softwood lumber exports to the US originated from the non-named provinces. However, by 2002 this percentage had increased to almost 11 percent. This increase is also reflected in the averages presented below in Table 3.

While these numbers indicate export diversion from the named provinces to the non-named provinces, they are not convincing evidence that the SLA is the primary reason for the increase in exports from the non-named provinces. Our aim for this paper is to find such evidence. Using econometric tools we estimate the exact extent to which the SLA promoted increased growth in lumber exports from the provinces not named in the agreement.

TABLE 2
Growth in Provincial Exports to the United States

	All Years (1990–2002) (%)	*Before SLA (1990–1995) (%)*	*During SLA (1996–2001) (%)*
Provinces named in SLA*	147	119	–2
Provinces not named	513	155	75
All of Canada	174	130	17

Note: *Provinces with restricted access to the US market (Alberta, British Columbia, Ontario, and Quebec).
Source: Industry Canada's Trade Data Online at strategis.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html.

TABLE 3
Percentage of Total Exports to the United States

	Average – All Years (1990–2002) (%)	*Average before SLA (1990–1995) (%)*	*Average in SLA (1996–2001) (%)*
Provinces named in SLA*	91.68	94.73	89.06
Provinces not named	8.32	5.27	10.94

Note: *Provinces with restricted access to the US market (Alberta, British Columbia, Ontario, and Quebec).
Source: Industry Canada's Trade Data Online at strategis.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html.

Figure 1 highlights the trend in provincial exports (we use log provincial exports, which is also the dependent variable in our regression equations). After the signing of the SLA, exports rose in almost all of the non-SLA provinces with the exception of Manitoba. Signing of the SLA arrested the growth of exports from the provinces named in the SLA, except for Alberta.

Empirical Methodology: Gravity Model

To test these hypotheses we use a simple modified gravity equation. Measures of provincial and state gross domestic product (GDP) approximate demand in Canadian provinces and in the US states. In some versions we include estimates of standing timber stock in each province as a proxy for available supply from each province. Interest rates are included due to their influence on demand for new homes in the US (a major source of softwood demand). Interest rates are important as the period prior to the SLA was marked by a recovering US economy with low interest rates. These conditions boosted the housing market and could have caused the strong growth in exports from both SLA and non-SLA provinces in that period. In contrast, high interest rates in the US (thus a somewhat depressed housing market), and a mild recession marked the years under the SLA. The Canada-US exchange rate is included as it determines the relative price of Canadian lumber.

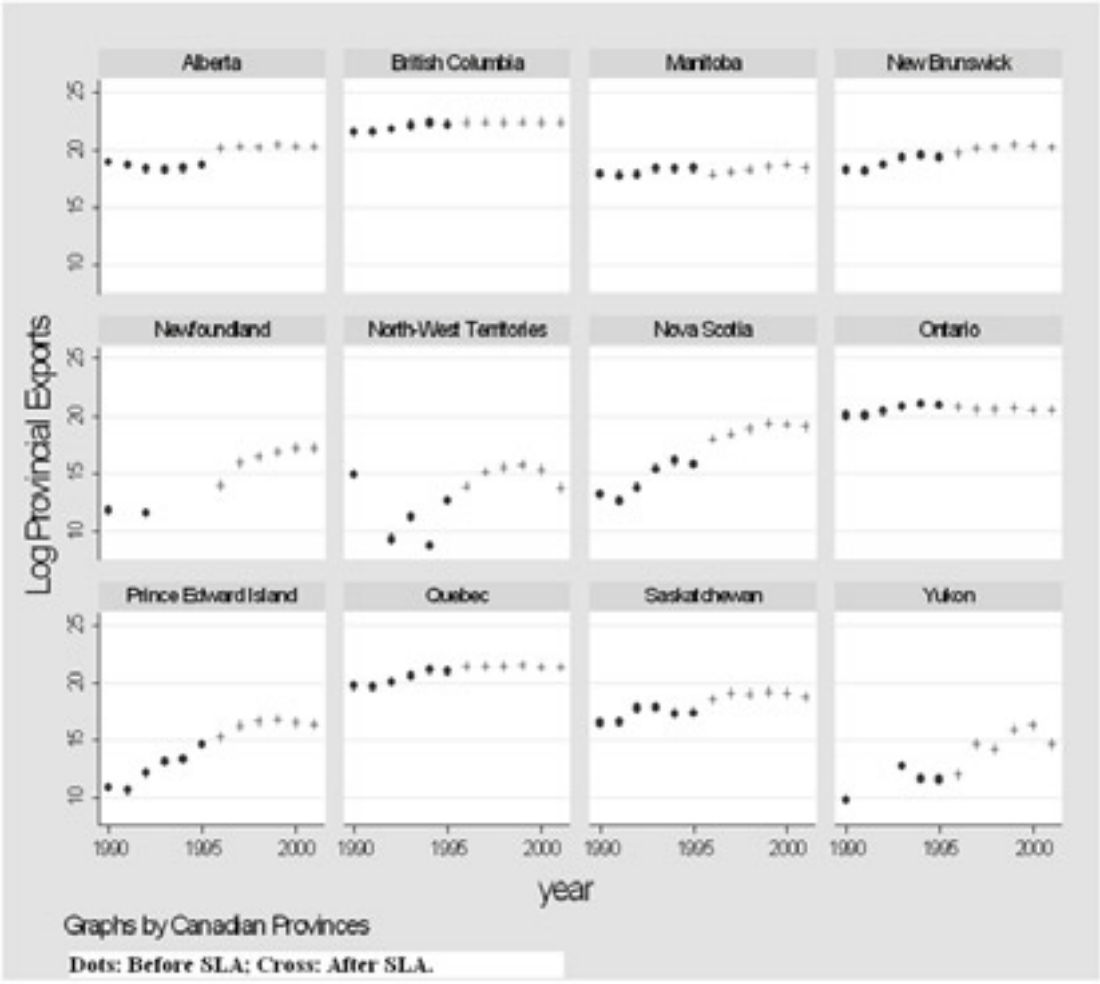
One version of the gravity equation model we seek to estimate has the following specification.

$$x_{it} = \alpha_0 + \alpha_1 y_{it} + \alpha_2 y_{USt} + \alpha_3 dist_i + \alpha_4 Ex_1 + \alpha_5 R_{USt} + + \alpha_6 SLA_i + \alpha_7 REST_t + \alpha_8 SLA_i * REST_t + u_t \quad (1)$$

where x_{it} is log value of exports from province i to the US (annual), y_{it} is log GDP of province i at time t, and y_{USt} is log GDP of US at time t; $dist_i$ is the log of distance from province i to the US border, R_{USt} is the US rate of interest, and Ex_t is the US-Canada exchange rate. *SLA* is a dummy variable, for SLA provinces, that takes the value 1 for provinces restricted by SLA and 0 for the non-SLA provinces (1990–2002). REST is a dummy for the years SLA was in place and takes the value 1 for years 1996–2001 and 0 otherwise. SLA*REST is an interaction term; it is a dummy variable which takes the value 1 for SLA provinces for the years that SLA was in place.

We also run the above regression with x_{it} as the log quantity of exports from province i into the US

FIGURE 1
Log of Provincial Exports
(trends before and after SLA)



(annual). This allows us to control for price changes that might drive the value of exports. The remaining specification is exactly the same as that described above. Finally, we also run a version where instead of provincial GDP as an independent variable we include an estimate of the provincial stock of standing timber. Formally, y_{it} in this specification is the standing stock of timber in province i at time t. As a final test for robustness we also include a modified distance variable (we describe this distance variable in greater detail later in the data section).

For each version of the regression described above we include three additional specifications. First, we replicate the primary equation described above and use a robust regression technique for the standard errors.[8] In the third specification we include provincial dummies to account for any provincial differences or the unobserved provincial heterogeneity.[9] The first two regression equations did control for some observed provincial differences: mainly provincial GDP and the provincial difference in distance from the US border. However, there might be other differences across provinces (observed/unobserved), which can be controlled via provincial dummies. In the final (fourth) specification we include year dummies to control for aggregate yearly shocks. The year dummies also control for exchange-rate and US federal-rate movements over time, so these can be dropped from the equation. US GDP is also dropped from this equation as it changes yearly and does not have any cross-sectional variation (we are using yearly GDP estimates). The results for these specifications are presented in Tables 5 to 7.

This model is quite rich in its results. We are able to obtain the trade effects for SLA provinces and non-SLA provinces separately by using the interaction term. Table 4 specifies the coefficients that capture the aggregate effect of SLA restrictions on exports from SLA provinces and non-SLA provinces.

Coefficient α_6 is the difference in the mean of log exports for SLA and non-SLA provinces. The coefficient term for the interaction variable, α_8, captures the difference in the effect of SLA restriction between the SLA provinces and the non-SLA provinces.

TABLE 4
Interpreting Coefficients from the Gravity Equations

	Constant	*Trade Effect of SLA*
SLA provinces	$(\alpha_0 + \alpha_6)$	$(\alpha_7 + \alpha_8)$
Non-SLA provinces	(α_0)	(α_7)

Data

The value of provincial softwood lumber exports is in Canadian dollars. The matrix of the value of provincial softwood lumber exports to the US is generated by Industry Canada's Trade Data Online (see strategis.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html). Provincial export quantity data is not provided at the Trade Data Online database and is thus constructed using Statistics Canada's International Trade Statistics provided in the Canadian Socio-economic Information Management Database. Province level GDP is in millions of Canadian dollars, and is from Statistics Canada's Provincial Economic Accounts. Data on the volume of timber assets in cubic metres is from an annual series published by Natural Resources Canada. Data on United States (US) GDP is from the US Bureau of Economic Analysis. The yearly average of the effective federal funds rate from the board of governors of the Federal Reserve System is used as the interest rate in this paper. The yearly average of the Canada-US exchange rate is also from the board of governors of the Federal Reserve System. Finally, the two distance variables are given below. The primary distance variable used is the distance in kilometres from the single principal city of the province to the closest US border. In some regressions we also include a distance variable that focuses on the location of the forest industry. This distance variable reflects the distance from major forestry locations in the province to the closest major city in the US.[10]

RESULTS

The results for the three gravity equations are presented in Tables 5 to 7. In each table the third column includes the results for the basic model (Regression 1). In each regression we find a significant impact of the SLA restriction on exports from non-SLA provinces. For instance, consider results from Regression 1 in Table 5 (the value regression). Exports

from non-named provinces increased more than four times [exp(1.658) –1], after SLA restriction was in place (from variable α_7). The magnitude of this effect is very high, and these results are consistent across various variants of the model.[11] The sign of the coefficient is also consistent with our expectations; provinces with free access to the US market would experience an increase in their exports, once the SLA restricts exports from the named provinces.[12]

The coefficient (α_8) on the interaction term SLA*Restriction shows the difference in export performance of SLA provinces compared to the non-SLA provinces. We can see that relative to the non-SLA provinces, exports from SLA provinces decreased significantly. This variable is negative and significant across all specifications in Tables 5 to 7. However, we are interested in the overall effect of SLA restriction on export of SLA provinces. This overall effect can be captured by the sum of two coefficients: ($\alpha_7 + \alpha_8$). Using an F-test we find this sum to be statistically insignificant across the specifications tested (reported in the last row of Tables 5 to 7). Export from SLA provinces decreased by 5 percent, but this decrease is not statistically significant.[13] What the results imply is that SLA did not significantly reduce the level of exports from these provinces. A possible explanation can be the method by which SLA quotas were allocated by the Canadian government. As these quotas were handed out based on the previous years' performances, companies might have tried to keep their exports to the US high so as to maintain future quotas.

Results for the regression, including provincial dummies, are listed in the fifth column in all three tables. The explanatory power of the model increases when we include provincial dummies; we again find a statistically significant effect of SLA restrictions on the exports of non-SLA provinces. The last column shows the results for the regression equation 4, which includes year dummies. As stated earlier, we find almost identical results for the various variants of the gravity equation. This demonstrates the robustness of our results across the regression equations.

Now consider other variables in our regressions. The US rate of interest has a positive effect on exports from Canadian provinces in the regressions where provincial GDP is included as an independent variable. This is counterintuitive. In contrast, once we remove provincial GDP and instead include provincial timber assets, the rate of interest has the right sign, but is not significant. These results probably imply that the rate of interest might be capturing other unobserved time-provincial, or time-related effects. Log provincial distance from US border is negative and statistically significant across all specifications. This is according to our expectations and implies that distance plays a significant role in the level of provincial export to the US. Consider this parameter from the first regression in Table 5. We get a significantly large coefficient of 1.266 for the log distance variable. Interestingly, this coefficient is very similar to what McCallum (1995) obtains for his study of US and Canada trade. It is also relatively higher than other international studies. A possible explanation is the relatively higher cost of land and air transport compared to water transport. Further in both Tables 5 and 6, provincial GDP is found to be positively correlated with provincial exports. From the first regression of Table 5, the elasticities of provincial exports with respect to own GDP, US GDP and distance are respectively 1.0, –2, and –1. Finally, across all specifications where the provincial GDP is included, the SLA dummy is found to be positive. This probably reflects that the SLA provinces export a significantly higher level of softwood lumber to the US as compared to the non-SLA provinces.

Robustness to Distance Measure and Timber Assets

We also include a set of regressions to evaluate the impact of using a different measure for distance and the effect of using timber assets. These results are included in Table 8. In the first regression we reproduce the first regression from Table 5. In the second regression we run the same regression with the second measure of distance (distance of lumber region to major city). In the third regression we run the first regression from Table 5 after replacing

TABLE 5
Regression Results – Dependent Variable Log of Provincial Exports (value)

Dependent Variable: Log of Value of Exports	*Regression 1*	*Regression 1 (robust)*	*Regression 2*	*Regression 3*
(α_1) Log provincial GDP	0.951 (6.08)**	0.951 (6.75)**		0.951 (6.06)**
(α_2) Log US GDP	–2.351 –0.6	–2.351 –0.64	–1.04 –0.33	
(α_3) Log provincial distance from US border	–1.266 (7.24)**	–1.266 (8.01)**		–1.263 (7.20)**
(α_4) Exchange rate	6.65 –1.45	6.65 –1.46	5.963 –1.6	
(α_5) US rate of interest	0.175 (1.96)+	0.175 (1.71)+	0.175 (2.41)*	
(α_6) Dummy for provinces named in SLA	0.895 (1.76)+	0.895 (1.73)+	3.704 (7.19)**	0.884 (1.73)+
(α_7) Dummy for years SLA was in place	1.658 (2.62)**	1.658 (3.21)**	1.677 (3.26)**	2.56 (5.72)**
(α_8) Dummy for SLA provinces during SLA	–1.707 (3.37)**	–1.707 (4.06)**	–1.723 (4.19)**	–1.692 (3.33)**
(α_0) Constant	Yes	Yes	Yes	Yes
Year dummies	No	No	No	Yes
Provincial dummies	No	No	Yes	No
Observations	149	149	149	149
R-squared	0.82	0.82	0.89	0.83

[a]Regression 1-Testing the null: ($\alpha_7 + \alpha_8$) = 0; F(1, 140) = 0.01; Prob>F = 0.9225

Notes: Absolute value of t statistics in parentheses.
+ significant at 10%; * significant at 5%; ** significant at 1%.
[a] The F test was carried out for all the regression equations with similar results (the effect on SLA provinces' exports is not found to be significant).

TABLE 6
Regression Results – Dependent Variable Log of Provincial Exports (quantity)

Dependent Variable: Log of Quantity of Exports	*(1)*	*(2)*	*(3)*	*(4)*
(α_1) Log provincial GDP	1.008	1.008		1.007
	(6.45)**	(7.16)**		(6.39)**
(α_2) Log US GDP	0.312	0.312	1.671	
	(0.08)	(0.08)	(0.52)	
(α_3) Log provincial distance from US border	–1.331	–1.331		–1.329
	(7.62)**	(8.65)**		(7.54)**
(α_4) Exchange rate	3.917	3.917	3.256	
	(0.85)	(0.86)	(0.86)	
(α_5) US rate of interest	0.198	0.198	0.199	
	(2.23)*	(1.92)+	(2.72)**	
(α_6) Dummy for provinces named in SLA	0.856	0.856	9.818	0.849
	(1.68)+	(1.57)	(17.91)**	(1.65)
(α_7) Dummy for years SLA was in place	1.018	1.018	1.031	2.172
	(1.61)	(1.97)+	(1.98)*	(4.84)**
(α_8) Dummy for SLA provinces during SLA	–1.409	–1.409	–1.424	–1.396
	(2.79)**	(3.42)**	(3.42)**	(2.74)**
(α_0) Constant	Yes	Yes	Yes	Yes
Year dummies	No	No	No	Yes
Provincial dummies	No	No	Yes	No
Observations	149	149	150	149
R-squared	0.84	0.84	0.90	0.84

[a]Regression 1-Testing the null: ($\alpha_7 + \alpha_8$) = 0; F(1, 140) = 0.33; Prob>F = 0.56

Notes: Absolute value of t statistics in parentheses.
+ significant at 10%; * significant at 5%; ** significant at 1%.

TABLE 7
Regression Results – Stock Regression

Dependent Variable: Log of Value of Exports	*(1)*	*(2)*	*(3)*	*(4)*
(α_1) Log provincial stock of timber	2.209	2.209		2.208
	(6.56)**	(7.20)**		(6.41)**
(α_2) Log US GDP	3.753	3.753	–1.040	
	(1.11)	(1.16)	(0.33)	
(α_3) Log provincial distance from US border	–1.048	–1.048		–1.058
	(4.95)**	(5.53)**		(4.88)**
(α_4) Exchange rate	1.423	1.423	5.963	
	(0.37)	(0.38)	(1.60)	
(α_5) US rate of interest	–0.093	–0.093	0.175	
	(1.08)	(0.95)	(2.42)*	
(α_6) Dummy for provinces named in SLA	–0.538	–0.538	9.213	–0.539
	(2.54)*	(2.53)*	(17.02)**	(2.49)*
(α_7) Dummy for years SLA was in place	1.285	1.285	1.677	3.688
	(2.33)*	(2.22)*	(3.26)**	(7.58)**
(α_8) Dummy for SLA provinces during SLA	–1.734	–1.734	–1.723	–1.749
	(4.03)**	(4.09)**	(4.19)**	(3.98)**
(α_0) Constant	Yes	Yes	Yes	Yes
Provincial dummies	No	No	Yes	No
Year dummies	No	No	No	Yes
Observations	93	93	150	93
R-squared	0.89	0.89	0.89	0.89

[a]Regression 1-Testing the null: ($\alpha_7 + \alpha_8$) = 0; F(1, 84) = 0.65; Prob>F = 0.4211

Notes: Absolute value of t statistics in parentheses.
+ significant at 10%; * significant at 5%; ** significant at 1%.

TABLE 8
Regression Results – Robustness with New Distance Variable and Stock Estimate

Dependent Variable: Log of Value of Exports		*(1)*	*(2)*	*(3)*	*(4)*
(α_1)	Log provincial GDP	0.951 (6.08)**	1.576 (11.50)**		
(α_2)	Log US GDP	–2.351 (0.60)	–3.771 (1.04)	3.753 (1.11)	0.735 (0.23)
(α_3)	Log provincial distance from US border	–1.266 (7.24)**		–1.048 (4.95)**	
(α_4)	Exchange rate	6.650 (1.45)	7.262 (1.73)+	1.423 (0.37)	4.674 (1.32)
(α_5)	US rate of interest	0.175 (1.96)+	0.142 (1.73)+	–0.093 (1.08)	–0.057 (0.70)
(α_6)	Dummy for provinces named in SLA	0.895 (1.76)+	0.036 (0.07)	–1.538 (2.54)*	–0.640 (1.07)
(α_7)	Dummy for years SLA was in place	1.658 (2.62)**	1.832 (3.11)**	1.285 (2.33)*	1.445 (2.73)**
(α_8)	Dummy for SLA provinces during SLA	–1.707 (3.37)**	–1.738 (3.78)**	–1.734 (4.03)**	–1.603 (3.98)**
(α_3)	Log distance forest regions-US cities		–2.673 (9.43)**		–1.152 (3.75)**
(α_1)	Log provincial stock of timber			2.209 (6.56)**	2.149 (7.45)**
(α_0)	Constant	Yes	Yes	Yes	Yes
	Observations R-squared	149 0.82	138 0.84	93 0.89	84 0.88
Null ($\alpha_7 + \alpha_8$) = 0	F test Value Prob greater than F (DF)	0.01 0.9225 (1,140)	0.02 0.8805 (1,129)	0.65 0.4211 (1,84)	0.09 0.7610 (1,75)

Notes: Absolute value of t statistics in parentheses.
+ significant at 10%; * significant at 5%; ** significant at 1%.

provincial GDP with provincial timber assets. Finally, in the fourth regression we present results for the same regression with an additional change with the second distance measure.

Across all these regressions we find that the trade effect of the SLA (α_7) on non-named provinces is positive and significant with slight differences in magnitude. The trade effect of the SLA on named provinces from the variable (α_8) is also always negative and statistically significant across all three regressions. The overall effect of the SLA on named provinces (a joint test of significance of $\alpha_7 + \alpha_8$) is, however, still insignificant across all specifications.

Conclusion

Canada and the US have a rich history of trade disputes and trade measures on softwood lumber. One particular measure was the recent Softwood Lumber Agreement. This trade measure was unique in imposing restrictions on exports to the US on only four provinces. This agreement also gives us a unique opportunity to estimate trade diversion within a country.

In this paper we estimate the effect on exports on provinces named in the SLA, and those not named in the SLA. We find that while provinces not named in the SLA found their exports promoted, the named provinces did not experience a statistically significant decline in exports. In future research, we intend to expand our study of trade diversion to countries beyond Canada. We would like to estimate the change in exports to the rest of the world due to the lingering and longstanding softwood lumber dispute between these two countries.

Notes

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[1]Zhang (2001) estimates that the anticipated increase in lumber price in the US due to the SLA was 16 percent for its first four years.

[2]The reason for this exemption was that most lumber harvested in these provinces was on private lands. Since the argument for the import restriction was based on provincial government stumpage rates, the import restriction was not applied to these provinces.

[3]The "specificity test" of an export subsidy was not met. This was because this stumpage rate was valid for all producers and did not target exporters specifically.

[4]The difference between stumpage revenues received by provincial governments and applicable government costs was used to determine whether subsidy existed.

[5]The methodology used to determine the countervailable duty differed from the one used in Softwood Lumber II. This time round the finding of subsidy was based on the difference between stumpage rates under the small business program in Canada and rates of major licences.

[6]The panels overturned the ITA's and ITC's findings. The US went on to challenge the panel's decision. After a further investigation the panel upheld its previous decision.

[7]See www.cbc.ca/news/background/softwood_lumber/ for recent developments.

[8]The robust estimator of variance relaxes the assumption of independence of the observation.

[9]We drop variables at the provincial level (distance, provincial GDP) as these would be controlled for by the Provincial dummies.

[10]The construction of this measure involves a few steps. First, using two maps from the Atlas of Canada (atlas.gc.ca/site/english/index.html) we determine one, or sometimes two, regions that best represent a location that is close to productive forest stock and sawmills. Then we pick a central city in that region and estimate its distance to a major US city. The closest major US city was chosen from a list of the top 50 cities in the US by population according to the 1990 census. This gives us three cities closest to the Canadian border: Seattle, Minneapolis, and Boston). In case there are two cities for a province we include the average distance amongst these two cities.

[11]The variable α_7 is positive and significant in all three Tables 5 to 7 and is not significant only in Regression 1 from Table 6 (the quantity regression).

[12]We can be fairly sure that this increase in exports by non-SLA provinces does not reflect a rerouting of lumber from SLA provinces. This is because exports of softwood lumber during the SLA were carefully linked to the province of origin. The purpose of this was solely to ensure that exporters from the SLA provinces did not reroute their exports through unrestricted provinces. The relevant safeguards are detailed in the original SLA agreement's Article IV, points 1 to 7. These include information required from the exporters, independent data collection by provinces and US customs, reconciliation of this data, and potential exporter inspections following data inconsistencies. To see the text of the agreement see www.dfait-maeci.gc.ca/eicb/softwood/pdfs/treaty-e.pdf.

[13]In order to explore this result further, we ran a regression with a broken trend term for SLA provinces during the SLA (the regression results can be requested from the authors). This broken trend term tests whether there was a statistically significant change in the trend of exports from the named provinces. We found this broken trend term to be statistically insignificant, implying that the percentage change in exports from named provinces did not linearly differ over time in the SLA.

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