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

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1. Introduction

Bilateral trade in softwood lumber is the subject of a long standing and ongoing dispute between Canada and the United States (US) (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 the 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 (BBF) 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.\(^4\)

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.\(^5\) 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 1996-2001), total exports of softwood lumber from the named provinces declined by 2%. However, total exports from the non-named provinces rose by a whopping 75%. Even though lumber exports from the largest producers (the named

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\(^4\) Zhang (2001) estimates that the anticipated increase in lumber price in the US due to the SLA was 16% for its first four years.

\(^5\) 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.
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%.

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 US and Canada. Although this agreement is still not 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, for example, Zhang, and Hussain (2004), Gulati and Malhotra (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 A. V. (1984) for a survey). In our test we follow a recent application of the ‘gravity’ equation by MacCalum (1995). Our results indicate that the SLA had a significant impact on the exports of non-SLA provinces. We find that the exports from these provinces increased more than 4 times once the SLA restriction was in place. However, we find that the SLA did not significantly reduce the level of exports from the provinces named in the SLA. We find that export from SLA provinces decreased by 5%, but, 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 antidumping investigation. A brief list of articles that look at the trade effects of antidumping duties is given below. Prusa (1997) looks at the trade effects of a broad set of US antidumping actions in the manufacturing industries. He concludes that antidumping duties restrict trade from the countries named to be dumping and finds evidence of trade diversion to the countries not named in the antidumping petition. In contrast with Prusa (1997), Vandenbussche et al. (1999) find no evidence of trade diversion from antidumping petitions in the European Union. Similarly, Niels (2003) does not find evidence of trade diversion from antidumping duties in Mexico.

We structure this paper as follows. In Section 2 we provide a brief history of the US-Canadian softwood lumber dispute. In Section 3 we discuss the trends in provincial softwood lumber exports to the US from 1990-2002. In Section 4 we discuss the gravity model used in this paper and the data and its sources. We present our results in Section 5, and conclude in Section 6.

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 policies regarding allocation and pricing of softwood lumber did not constitute a countervailable subsidy to its softwood lumber industry.\(^6\)

<table>
<thead>
<tr>
<th>Countervailing Duty Investigations</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Softwood Lumber I: 1982</td>
<td>US authorities decided no subsidy</td>
</tr>
<tr>
<td>Softwood Lumber II: 1986</td>
<td>15% provisional duty. Replaced by 15% export tax in MOU</td>
</tr>
</tbody>
</table>

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),

\(^6\) 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.
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.\(^7\)

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.\(^8\)

Subsequently, Canada appealed the ruling at the dispute settlement body of the Canada US Trade Agreement (CUSTA). A prolonged period of litigation under the CUSTA followed.\(^9\) 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 US 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 February 23rd 1995).

\(^7\) The difference between stumpage revenues received by provincial governments and applicable government costs was used to determine whether subsidy existed.

\(^8\) The methodology used to determine the counterviable duty differed from the one used in the 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 licenses.

\(^9\) The panels overturned 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.
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 February 2, 1996 the US coalition for fair lumber imports announced its intentions to petition if no pact was reached by February 15th. Under this pressure, the five year SLA, (from April 1, 1996 to March, 31, 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 April 1st 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 (please see http://www.cbc.ca/news/background/softwood_lumber/ for recent developments).

3. Trends in Canadian Exports

Using data from Industry Canada we find that during the period between the MOU and the Softwood Lumber Agreement (1992-95) softwood exports from Canada to the US (measured in Canadian Dollars) rose in value by 130% (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%. Exports from the remaining provinces rose in value by 155%. 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 1996-2001 total softwood exports from these provinces fell in value by 2%.
However, total softwood exports from the provinces not named in the SLA rose by 75% in value. This increase in lumber exports from non-named provinces was so significant, that despite the presence of a significant import restriction in the form of the SLA, total exports from Canada to the US rose by 17% in value.

**Table 2: Provincial Effects**

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Provinces named in SLA*</td>
<td>147%</td>
<td>119%</td>
<td>-2%</td>
</tr>
<tr>
<td>Provinces not named</td>
<td>513%</td>
<td>155%</td>
<td>75%</td>
</tr>
<tr>
<td>All of Canada</td>
<td>174%</td>
<td>130%</td>
<td>17%</td>
</tr>
</tbody>
</table>

*Provinces with restricted access to the US market (Alberta, British Columbia, Ontario, Quebec).

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

There seems to be an existing trend of higher growth in lumber exports from the non-named provinces. A simple look at the numbers does not provide convincing evidence that the SLA was 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 shall estimate the exact extent to which the SLA promoted increased growth in lumber exports from the provinces not named in the agreement.

Graph 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 SLA exports rose in
almost all of the non SLA provinces with the exception of Manitoba. Signing of SLA arrested the
growth of exports from the provinces named in SLA, except for Alberta.

**Graph 1: Log Provincial Exports, Trend before and after SLA**

Dots: Before SLA; Cross: After SLA.
4. Empirical Methodology: Gravity Model

To test these hypotheses we use an extremely simple modified ‘gravity’ equation. Measures of provincial and state GDP approximate demand in Canadian provinces and in the US states. 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 Softwood Lumber Agreement. The Canada-US exchange rate is included as it determines the relative price of Canadian lumber.

The basic ‘gravity’ equation model we seek to estimate is a reduced form with the following general specification.

\[ x_{it} = \alpha_0 + \alpha_1 y_{it} + \alpha_2 y_{USi} + \alpha_3 dist_i + \alpha_4 Ex_t + \alpha_5 R_{USi} + +\alpha_6 SLA_i + \alpha_7 REST_i + \alpha_8 SLA_i * REST_i + u_i \]

where \( x_{it} \) is log exports from province i to the US (annual), \( y_{it} \) is log GDP (Gross Domestic Product) of province i at time t, \( y_{USi} \) is log GDP of US at time t. \( dist_i \) is the log of distance from province i to the US border, \( R_{USi} \) 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 run a few variants of the above model. The second regression equation is exactly the same as the first except we use a robust regression technique for the standard errors.\(^\text{10}\)

\(^{10}\) The robust estimator of variance relaxes the assumption of independence of the observation.
In the third variant of the model, we use provincial dummies to account for any provincial differences or the unobserved provincial heterogeneity\(^{11}\). 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 fourth regression equation 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 above 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 2 specifies the coefficients that capture the aggregate effect of SLA restrictions on exports from SLA provinces and Non-SLA provinces.

<table>
<thead>
<tr>
<th></th>
<th>Constant</th>
<th>Trade effect of SLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLA Provinces</td>
<td>((\alpha_0 + \alpha_6))</td>
<td>((\alpha_7 + \alpha_8))</td>
</tr>
<tr>
<td>Non-SLA Province</td>
<td>((\alpha_0))</td>
<td>((\alpha_7))</td>
</tr>
</tbody>
</table>

Coefficient \(\alpha_6\) is the difference in the mean of log exports for SLA and non-SLA provinces. The coefficient term for the interaction variable, \(\alpha_8\), captures the difference in the effect of SLA restriction between the SLA provinces and the non-SLA provinces.

\(^{11}\) We drop variables at the provincial level (distance, Provincial GDP) as these would be controlled for by the Provincial dummies.
4.1 Data

Provincial softwood lumber exports are in Canadian Dollars. The matrix of provincial softwood lumber exports to the US is generated by Industry Canada’s Trade Data Online (see http://strategis.gc.ca/sc_mrkti/tdst/engdoc/tr_homep.html). Province level Gross Domestic Product (GDP) is in Millions of Canadian Dollars, and is from Statistics Canada’s Provincial Economic Accounts. 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 variable distance is the distance in kilometers from the single principal city of the province to the closest US border.

5. Results

The results for the gravity equation model are presented in Table 4. The third column shows the results for the basic model (Regression 1). We find an extremely significant impact of the SLA restriction on exports from non SLA provinces. The exports from these provinces increased more than 4 times \[\exp(1.658) -1\], after SLA restriction was in place. The magnitude of this effect is very high, and these results are consistent across various variants of the model.\(^{12}\) 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 SLA restricts exports from the named provinces.

The coefficient \((\alpha_q)\) 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. However, we are interested in the overall effect of SLA restriction on export of SLA provinces. This overall

\(^{12}\) We find above results to be robust across all regression equations.
effect can be captured by the sum of two coefficients: \((\alpha_x + \alpha_y)\). Using an F-test we find this sum to be statistically insignificant. This is reported in the last row of Table 4. Export from SLA provinces decreased by 5%, but, this decrease is not statistically significant. 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 their quota in the future.

Results for the regression including provincial dummies, is listed in the fifth column. The explanatory power of the model increases when we include provincial dummies; we again find 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 signs for their coefficient are also consistent with our expectations. The US rate of interest has a positive effect on exports from Canadian provinces\(^\text{13}\). Log provincial distance from US border is negative and statistically significant, implying that distance plays a significant role in the level of provincial export to the US. 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. Provincial GDP is found to be positively correlated with provincial exports. The elasticities of provincial exports with respect to own GDP, US GDP and distance are respectively 1.0, -2, and -1.3 according to the first

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\(^{13}\) We used various interaction terms to see if these results were different for difference provinces but did not find any of those to be significant, we do not report them here.
regression equation. The SLA dummy is found to be positive implying that SLA provinces export a significantly higher level of Softwood lumber to the US as compared to the non-SLA provinces.

6. Conclusion

Canada and the US have a rich history of trade disputes and trade measures on trade of softwood lumber. One particular trade measure was the recent Softwood Lumber Agreement. This trade measure was unique, in the way, that it imposed restrictions only on the exports of four provinces to the US. This unique 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 exports from provinces not named in the SLA found their exports promoted on average due to the SLA, the provinces named in the SLA did not seem to experience a statistically significant decline in exports on average. 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 the lingering and long standing softwood lumber dispute between these two countries.
### Table 4: Regression Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Regression 1</th>
<th>Regression 1 (robust)</th>
<th>Regression 2</th>
<th>Regression 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\alpha_1$  Log Prov. GDP</td>
<td>0.951</td>
<td>0.951</td>
<td>0.951</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(6.08)**</td>
<td>(6.75)**</td>
<td>(6.06)**</td>
<td></td>
</tr>
<tr>
<td>$\alpha_2$  Log US GDP</td>
<td>-2.351</td>
<td>-2.351</td>
<td>-1.04</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.6</td>
<td>-0.64</td>
<td>-0.33</td>
<td></td>
</tr>
<tr>
<td>$\alpha_3$  Log prov. distance from US border</td>
<td>-1.266</td>
<td>-1.266</td>
<td>-1.263</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(7.24)**</td>
<td>(8.01)**</td>
<td>(7.20)**</td>
<td></td>
</tr>
<tr>
<td>$\alpha_4$  US Canada Exchange Rate</td>
<td>6.65</td>
<td>6.65</td>
<td>5.963</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-1.45</td>
<td>-1.46</td>
<td>-1.6</td>
<td></td>
</tr>
<tr>
<td>$\alpha_5$  US Rate of Interest</td>
<td>0.175</td>
<td>0.175</td>
<td>0.175</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.96)+</td>
<td>(1.71)+</td>
<td>(2.41)*</td>
<td></td>
</tr>
<tr>
<td>$\alpha_6$  Dummy for Prov. named in SLA (SLA dummy)</td>
<td>0.895</td>
<td>0.895</td>
<td>3.704</td>
<td>0.884</td>
</tr>
<tr>
<td></td>
<td>(1.76)+</td>
<td>(1.73)+</td>
<td>(7.19)**</td>
<td>(1.73)+</td>
</tr>
<tr>
<td>$\alpha_7$  Dummy for years SLA rest. in place (Restriction)</td>
<td>1.658</td>
<td>1.658</td>
<td>1.677</td>
<td>2.56</td>
</tr>
<tr>
<td></td>
<td>(2.62)**</td>
<td>(3.21)**</td>
<td>(3.26)**</td>
<td>(5.72)**</td>
</tr>
<tr>
<td>$\alpha_8$  Dummy for SLA prov. during SLA (SLA*Restriction)</td>
<td>-1.707</td>
<td>-1.707</td>
<td>-1.723</td>
<td>-1.692</td>
</tr>
<tr>
<td></td>
<td>(3.37)**</td>
<td>(4.06)**</td>
<td>(4.19)**</td>
<td>(3.33)**</td>
</tr>
<tr>
<td>$\alpha_9$  Constant</td>
<td>25.59</td>
<td>25.59</td>
<td>17.489</td>
<td>13.728</td>
</tr>
<tr>
<td></td>
<td>-0.88</td>
<td>-0.97</td>
<td>-0.74</td>
<td>(6.01)**</td>
</tr>
<tr>
<td>Year Dummies</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Provincial Dummies</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Observations</td>
<td>149</td>
<td>149</td>
<td>149</td>
<td>149</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.82</td>
<td>0.82</td>
<td>0.89</td>
<td>0.83</td>
</tr>
</tbody>
</table>

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

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.)
References


