

Economic Performance of a Government Controlled Stumpage System

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Organization

- **Ontario Timber Pricing or Stumpage System**
- **Economic Performance**

Ontario Timber Pricing

Components of Timber Price (Stumpage):

1. **Forest Renewal Charge**
2. **Forestry Futures Charge**
 - a) **Forest Resource Inventory**
 - b) **Forest renewal & protection not otherwise funded**
3. **Price or Payments to Consolidated Revenue Fund:**
 - a) **Minimum component**
 - b) **Residual value (RV) component**

Ontario Timber Pricing

~\$7.88 - \$?/m³

Total Timber Charges

Payments to Consolidated Revenue Fund

- Residual Value (RV) Component

\$0 - \$?/m³

~\$2.76/m³

- Minimum Component

~\$0.48/m³

Forestry Futures Trust Fund Charge

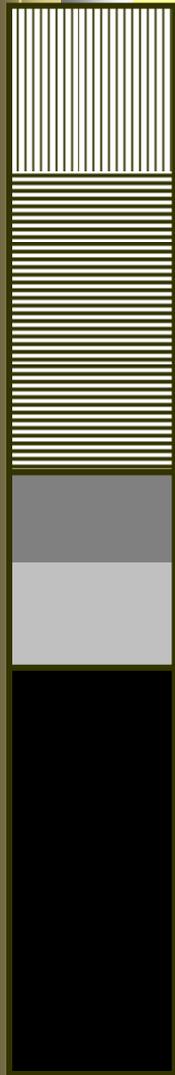
- Renewal, Protection not otherwise funded
- Forest Resource Inventory

~\$1.04/m³

Forest Renewal Trust Fund Charge

- Management Unit specific
- Species/species group specific

~\$3.60/m³



Residual Value Component of Price

Residual Value (RV) Component (\$/m³):

**Based on Residual Timber Value (RTV) - derived
demand pricing**

**Increases/decreases with market prices of
lumber, pulp, etc. (sometimes \$0.00/m³)**

Calculated monthly

Residual Value Component

Residual Value (RV) Component (\$/m³):

Representative Lumber Price (\$/Mfbm)

- Total Production Costs (\$/Mfbm)
- Allowance for Profit & Risk (\$/Mfbm)

= Residual Value (\$/Mfbm)

x 29%
= Crown Portion of RV (\$/Mfbm)

divide Utilization Factor (m³/Mfbm)

= Residual Value Charge (\$/m³)

Economic Performance

- **Main Issue - can the administratively set stumpage price reflect the competitive market value?**
- **A. Relationship between stumpage price and the final product price (Co-integration and causality)**
- **B. Rent capturing ability and performance vis-à-vis other systems**
- **C. Indirect issues – dumping of Ontario's lumber in the US**

A. Stumpage Price and the Final Product Price

- **Stumpage prices are already based on market prices – so they should increase or decrease with the relevant market prices.**
- **Theoretically – stumpage price should also have an impact on end product price.**
- **So end product price \Leftrightarrow stumpage (both ways are possible).**

A. Stumpage Price and the Final Product Price

- **Test the co-integration between the market price of end product and the relevant stumpage price, and the direction of causality**
- **Two price series are co-integrated - long-run equilibrium - which means that they generally move together**
- **The stumpage price co-integrated with the relevant market price - the stumpage price has the potential to reflect the market value.**

A. Stumpage Price and the Final Product Price

- **Three products: lumber, composites and pulp**
- **Two softwood lumber species group: spruce-pine-fir (SPF), and white pine and red pine (two grades for lumber). Together about 98% of softwood production in Ontario.**

Data include:

- **Market prices of these products (June 1995 – February 2005)**
- **The stumpage prices of SPF and white pine and red pine timber used to produce these products**

Data

Series	Description
SPF_{LSP} SPF_{LRP}	stumpage price of SPF timber used for lumber reference price (the lagged market price) used by the OMNR for calculation of stumpage price of SPF timber for lumber
SPF_{CSP} SPF_{CRP}	stumpage price of SPF timber used for wood composites reference price used for calculation of stumpage price of SPF timber and Pw/Pr timber for wood composites
SPF_{PSP} SPF_{PRP}	stumpage price of SPF timber used for pulp reference price used for the calculation of stumpage price of SPF timber and Pw/Pr timber for pulp
Pw/Pr_{L1SP} Pw/Pr_{LRP}	stumpage price of Pw/Pr (white and red pine) class I timber for lumber reference price used for calculation of stumpage price of Pw/Pr Class I and II timber for lumber
Pw/Pr_{L2SP} Pw/Pr_{LRP}	stumpage price of Pw/Pr class II timber for lumber reference price used for calculation of stumpage price of Pw/Pr Class I and II timber for lumber
Pw/Pr_{CSP}	stumpage price of Pw/Pr timber for composites
Pw/Pr_{PSP}	stumpage price of Pw/Pr timber for pulp

Method

1. Johansen's Multivariate Co-integration Approach

Why this approach?

- 1) A time series normally has a unit root and is a non-stationary process ~ integrated of order one ~ I(1) process.
 - a. **I(1) process:** $y_t = \rho y_{t-1} + \varepsilon_t$, $\rho = 1$
 - b. It means: a shock today will have a long-lasting impact.
 - c. First difference is stationary I(0).

- 2) Linear regression between two I(1) processes may lead to spurious regression.

Spurious regression: high R^2 values and high t-ratios yielding results with no economic meaning.

Method

Co-integration

Co-integration approach - in case of $I(1)$ processes to avoid spurious regression.

When two (or more) series x and y are $I(1)$, but a linear combination of them, $ax + by = \varepsilon$, is stationary, i.e. $I(0)$ process, then they are co-integrated.

Co-integration indicates there is a long-run equilibrium relationship between the series.

Results

Pair of price series	Stationarity	Co-integration	Granger causality
SPF_{LSP} , SPF_{LRP}	Both I(1)	Yes	SPF_{LRP} Granger causes SPF_{LSP}
SPF_{CSP} , SPF_{CRP}	Both I(1)	Yes	SPF_{CSP} Granger causes SPF_{CRP}
SPF_{PSP} , SPF_{PRP}	Both I(0)	N/A	SPF_{PRP} Granger causes SPF_{PSP}
Pw/Pr_{L1SP} , Pw/Pr_{LRP}	Both I(1)	No	No Granger causality relationship
Pw/Pr_{L2SP} , Pw/Pr_{LRP}	Both I(1)	No	No Granger causality relationship
Pw/Pr_{CSP} , SPF_{CRP}	I(0), I(1)	N/A	N/A
Pw/Pr_{PSP} , SPF_{PRP}	Both I(0)	N/A	Pw/Pr_{PSP} Granger causes SPF_{PRP}

B. Rent Analysis

- Objectives:
- To examine the discrepancy between the administratively determined stumpage price and the market value of stumpage in Ontario;
- To examine the economic rent captured by Ontario's stumpage system;
- To compare the market performance of the administrative stumpage system with that of the auction-based stumpage system.

Method

The Enhanced Parity Bounds Model (EPBM)

- **estimates the probabilities of the administratively determined stumpage fee being equal to, more than, or less than the market value of stumpage; and**
- **estimates the discrepancy between the two values in Ontario.**

Method

Specification of the EPBM

- MN_{t-1} - mill net price of SPF lumber
- SF_t - the stumpage fee of SPF timber
- TPC_t - the total processing cost of lumber .

- **Regime 1:** $MN_{t-1} - SF_t = TPC_t + e$;
- with probability λ_1 , $e \sim N(0, \sigma_e^2)$
- **Regime 2:** $MN_{t-1} - SF_t = TPC_t + e - U + \varepsilon u$;
- with probability λ_2 , $\varepsilon u \sim N(0, \sigma_{\varepsilon u}^2)$
- **Regime 3:** $MN_{t-1} - SF_t = TPC_t + e + V + \varepsilon v$;
- with probability λ_3 , $\varepsilon v \sim N(0, \sigma_{\varepsilon v}^2)$

Method

- **Regime 1:** at the parity bounds

$$(\Rightarrow MN_{t-1} - TPC_t = SF_t \Rightarrow SF_t = RTV_t)$$

- **Regime 2:** inside the parity bounds

$$(\Rightarrow MN_{t-1} - TPC_t = SF_t - U \Rightarrow SF_t > RTV_t)$$

- **Regime 3:** outside the parity bounds

$$(\Rightarrow MN_{t-1} - TPC_t = SF_t + V \Rightarrow SF_t < RTV_t)$$

Data

- Time series data (June 1995 – January 2007)
 - 1) MN (\$Cdn/mbf) = reference price – transaction cost – product modifier
 - The reference price is the price that the OMNR has been used to determine the residual value of stumpage
 - It is the market price of one SPF lumber product in a US market or a weighted average price of various lumber products in the Great Lakes and Toronto markets.
 - 2) TPC = delivered wood cost (excluding Stumpage prices) + direct and indirect manufacturing cost + 20% return on capital employed
 - 3) SF = stumpage fee charged for the amount of timber used to produce one mbf of lumber

Results

Parameter	EPBM		
	Estimate	SE	t-statistic
λ_1 (Regime 1)	0.044	0.033	1.34
λ_2 (Regime 2)	0.390	0.089	4.36**
λ_3 (Regime 3)	0.565	0.098	5.75**
U	60.00	10.28	5.84**
V	54.00	10.59	5.10**
σ_e	4.00	1.64	2.43**
$\sigma_{\varepsilon U}$	37.00	6.10	6.07**
$\sigma_{\varepsilon V}$	45.00	6.52	6.90**
n	140		
Log likelihood	-789.20		

Results

- During the period in study, $SF = RTV$ in about 6 month, $SF > RTV$ in about 55 months, $SF < RTV$ in about 79 months;
- When $SF > RTV$, the stumpage price paid by the softwood lumber producers was on average \$Cdn11.76/m³ higher than the market value; and
- When $SF < RTV$, the stumpage prices paid by the softwood lumber industry were less than the market value by \$Cdn10.59/m³ on average.

Results

- Over a period of June 1995 to Jan 2007
Underpayment by the industry - \$Cdn1124.98 million.
Overpayment by the industry - \$Cdn692.96 million.
Net underpayment by the industry - \$Cdn432.01 million,
which is 16% of the total economic rents available.
- However underpayment was concentrated during the early phase of the new stumpage system, and the OMNR refined its stumpage system in March 1999

June1995-March1999 April 1999-Jan 2007

Underpayment	(\$790.6 million)	(\$334.3 million)
Overpayment	\$34.5 million	\$658.5 million
Net	(\$756.1 million) (underpayment)	\$324.2 million (overpayment)

Results

Post-SLA Period

Underpayment \$190.0 million

Overpayment \$539.5 million

Net (overpayment) \$349.5 million

- In addition, the industry also paid about \$USD503.47 million import duties to the US govt.

Results

- So during the tariff regimes – the industry paid high SF and bore high cost of import tariff.
- Moreover, the softwood lumber markets in the US and Canada are getting worse.
- The industry will continue to pay a stumpage price higher than market value for at least two more years.
- The industry will also pay 2.5% - 5 % export tax and their export is restricted by the quota.

MPS and RV

- **BC Market pricing system (MPS) – US auction-based system: transaction evidence approach**
 - competitive bids determine the market value of stumpage
 - Regression analysis to determine the stumpage prices
- **Problems with the MPS**
 - The success relies on high competition between the bidders
 - US did not exempt the BC from duties anyway
 - High transaction cost compared to RV system, net rent collected may be less even if gross rent is higher

MPS and RV

- Niquidet and van Kooten found that because of lack of competition in the northern zones of BC, bids were less than the true value by \$Cdn 1.47-2.64/m³.
 - Particularly, in one zone dominated by only one significant manufacture – bids were less than the true value by \$Cdn 12.56/m³. (equal to the transportation cost to the sawmill in an adjacent zone)
 - They also found that the regression approach biases the true value – underestimate the value of higher-valued stands and overestimate the value of lower-valued stands.
 - The imposition of the CVD resulted in a decline in bids by \$C5.21/m³ – not the intention of BC Govt or the US Govt
- while in the case of RV approach, industry pay more stumpage due to increase in prices due to CVD and CVD is not counted as cost

MPS and RV

- **Comparison between our results and these findings indicates:**
 - Both the MPS and RV-based system may underestimate or overestimate the market value in the short-run;
 - When there is lack of competition, which is the case in Northern Ontario, the MPS may generate a lower stumpage price;
 - The MPS is more difficult to implement given the different competitive levels in the different regions of BC and Ontario.

Other Evidence

In the United States:

- Spelter (2005) found that RV estimates of stumpage prices were more or less than the reported prices ;
- However, over 5 years, the deviations even-out each other.
- More importantly, Forest service prices, determined by auctions, were substantially lower than the RV calculations.

Discussion

What do these results mean?

- 1) Administratively determined prices may not be lower than the prices determined by auctions in the long-run;
- 2) The prices determined by auctions may not result in true market value.
- 3) Therefore, the RV-based stumpage system is as good as the auction-based system in an area where there is lack of competition.

Discussion

We are not alone on this!

- **Leefers and Potter-Witter (2006) compared four public agency stumpage pricing systems in the Lake States, US, where forests have similar species composition, but managed under different systems, and concluded the RV system is the best method for Ontario!**

C. Dumping of Ontario's Timber

Objective: to examine whether the softwood lumber producers in Ontario have dumped softwood lumber to their major market in the US?

Legal Background for AD cases

- **Dumping is defined as:**
 - the introduction of a product into the commerce of another country at less than its normal value
- **Dumping occurs when the export price is:**
 - **(a) less than the comparative domestic price**, in the ordinary course of trade, for the like product when destined for consumption in the exporting country, or,
 - (b) in the absence of such domestic price, is less than either:**
 - (i) the highest comparable price** for the like product for export to **any third country** in the ordinary course of trade, or
 - (ii) the constructed value** of the product, which is the **aggregation of the cost of production** of the product in the country of origin plus a reasonable **amount for selling, administrative and other costs, and for profit.**

Legal Background for AD cases

- **Dumping margin** = normal value – export price
- It is crucial to determine what the normal value is.
- By definition, **home market price** should be used as the normal value when it is available. But it can be disregarded, when **it is not in the ordinary course of trade**.
- **It may be treated as not being in the ordinary course of trade** when it is below the cost of production and therefore be ignored in the determination of normal value **if certain criteria are met**:
 1. such sales are made within an extended period of time
 2. in substantial quantities, and
 3. do not provide for the recovery of all costs within a reasonable period of time.

Legal Background for AD cases

- WTO system allows “protection” in specific cases by means of trade remedy measures
 - In case of dumping which has caused materially injury to a domestic industry or retarded the establishment of a domestic industry, **an ADD at a level less than or equal to the margin of dumping may be levied on imports from the particular source.**

US Antidumping Law:

- Dumping is defined by the US antidumping law as import sales at “less than fair value”, where the primary meaning of fair value **is the price in the home market of the exporter.**
- However, sales below the cost of production may also be considered dumping.

US Determination of Dumping

In the case of softwood lumber

- **Cost of Production**
 - USDOC used a value-based weighted average for different grades, but used a volume-based weighted average for different sizes
- **Normal Value**
 - Home market price when it was higher than the cost of production;
 - Below cost sales were treated as not being in the ordinary course of trade, **thus were disregarded for determining the normal value.**

US Determination of Dumping

- **Zeroing method for calculating the dumping margin**
 - set the dumping margin at zero for each sale in the US markets that has export price exceeded normal values for certain products in investigation because they demonstrate negative dumping margins, which could offset positive dumping margins.

An example of zeroing method:

Normal value	Export price	Dumping margin
300	350	-50
300	400	-100
300	200	100
300	250	50

Economic Perspective on the Determination of Dumping

- Sales below cost, standard economic theory suggests: firms may incur economic losses in short-run, continue in business as long as they are able to recover the variable cost, and they are able to have at least normal profit in the long-run.
- Hence standard economic theory suggests that **home market prices** should be used for determination of normal value, as long as home market prices are equal or higher than the variable cost.
- In addition, the margin of dumping should be determined on the basis of **long-term behavior** of markets **and not the short-term behavior**, and the export prices both above and below the normal value should be included in the calculation of margins.

Economic Perspective on the Determination of Dumping

In view of these theoretical economic rational

- we consider a longer time span ranging
- the delivered price in Toronto is used as normal value; and
- the export price is represented by the weighted average delivered price in the US.
- **Softwood lumber products are sold in two major markets -Toronto and the Great Lakes**
 - These products are shipped from mills to the two markets directly.
 - Producers charge delivered prices to the customers in the two markets.

Economic Perspective on the Determination of Dumping

- If the two markets have equivalent prices - the price differential should equal the difference in the transaction costs from mills to the two markets.
- If all these data are available, we can simply compare them and determine the margin of dumping;
- However, we don't have the accurate time series data on the transaction costs from mills to the two markets, only some estimates are available and so the difference in the transaction costs (termed as extra transaction costs from Toronto to the Great Lakes).
- In this case, parity bounds model can be used to estimate the 95% confidence interval of the difference in the transaction costs.

Methodology

Specification of the EPBM

- P_{GLt} - adjusted delivered price in the Great Lakes
 - P_{TORt} - the delivered price in Toronto
 - ETC_t - the extra transaction cost from Toronto to the Great Lakes
-
- **Regime 1:** $P_{GLt} - P_{TORt} = ETC_t + e;$
assumed to occur with probability λ_1 , $e \sim N(0, \sigma_e^2)$
 - **Regime 2:** $P_{GLt} - P_{TORt} = ETC_t + e - U + \varepsilon_u;$
with probability λ_2 , $\varepsilon_u \sim N(0, \sigma_{\varepsilon_u}^2)$
 - **Regime 3:** $P_{GLt} - P_{TORt} = ETC_t + e + V + \varepsilon_v;$
with probability λ_3 , $\varepsilon_v \sim N(0, \sigma_{\varepsilon_v}^2)$

Methodology

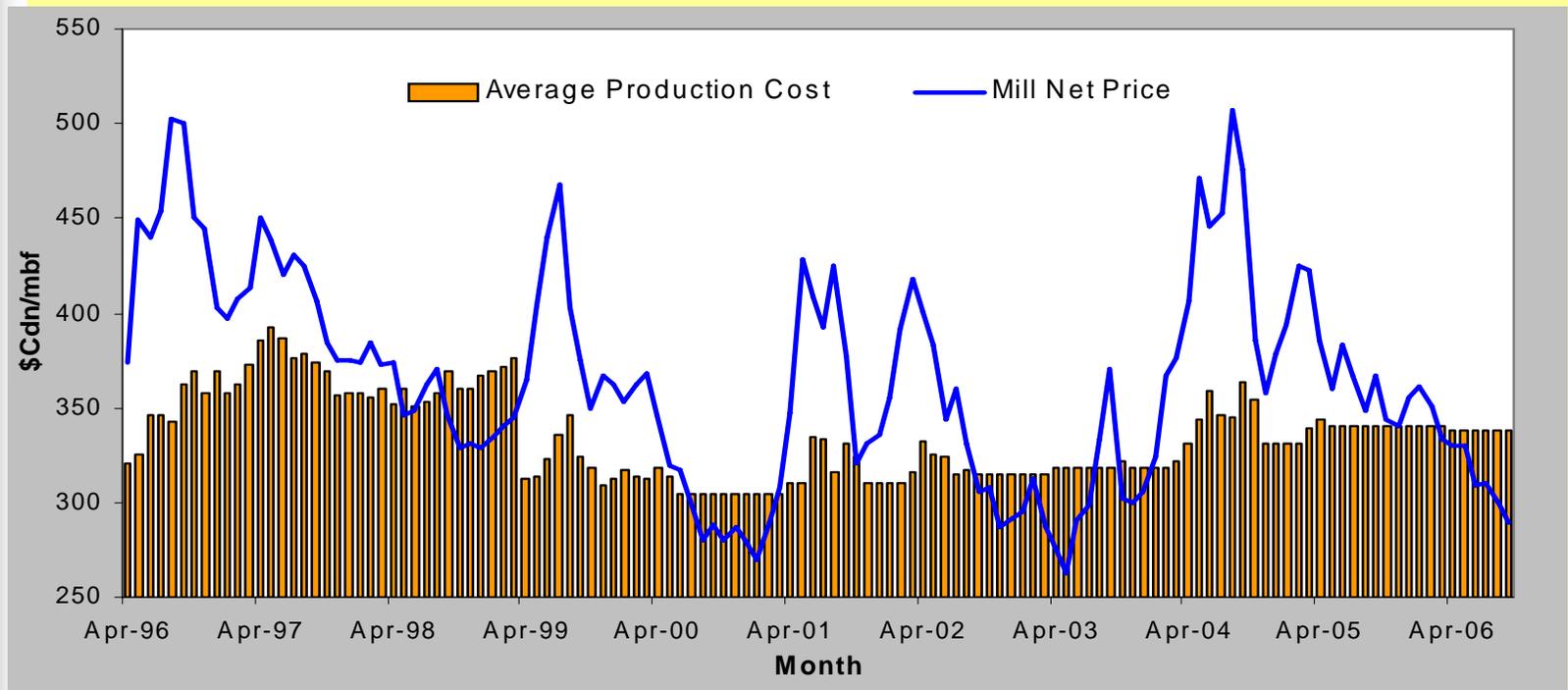
- **Regime 1** indicates that the price differentials were equal to the extra transaction costs (ETC); - the prices in the two market are equivalent
- **Regime 2** indicates that the price differentials were less than the ETC; - the price in in the Great Lakes is less than the price in Toronto
- **Regime 3** indicates that the price differentials were more than the ETC. – the price in the Great Lakes is more than the price in Toronto
- If regime 2 lasted for long-period of time, and the loss was not recovered within reasonable period of time, then dumping has occurred; otherwise, not dumping.

Data

- **Delivered price in Toronto: weighted average price of the SPF softwood lumber products sold in Toronto market**
- **Delivered price in the Great Lakes: weighted average price of the SPF softwood lumber products sold in the Great Lakes (deducting the CVD and ADD paid by the exporters)**
- **Extra transaction costs = the transaction costs from mills to the Great Lakes – the transaction costs from mills to Toronto**
- **Period covered: April 1996 to September 2006**

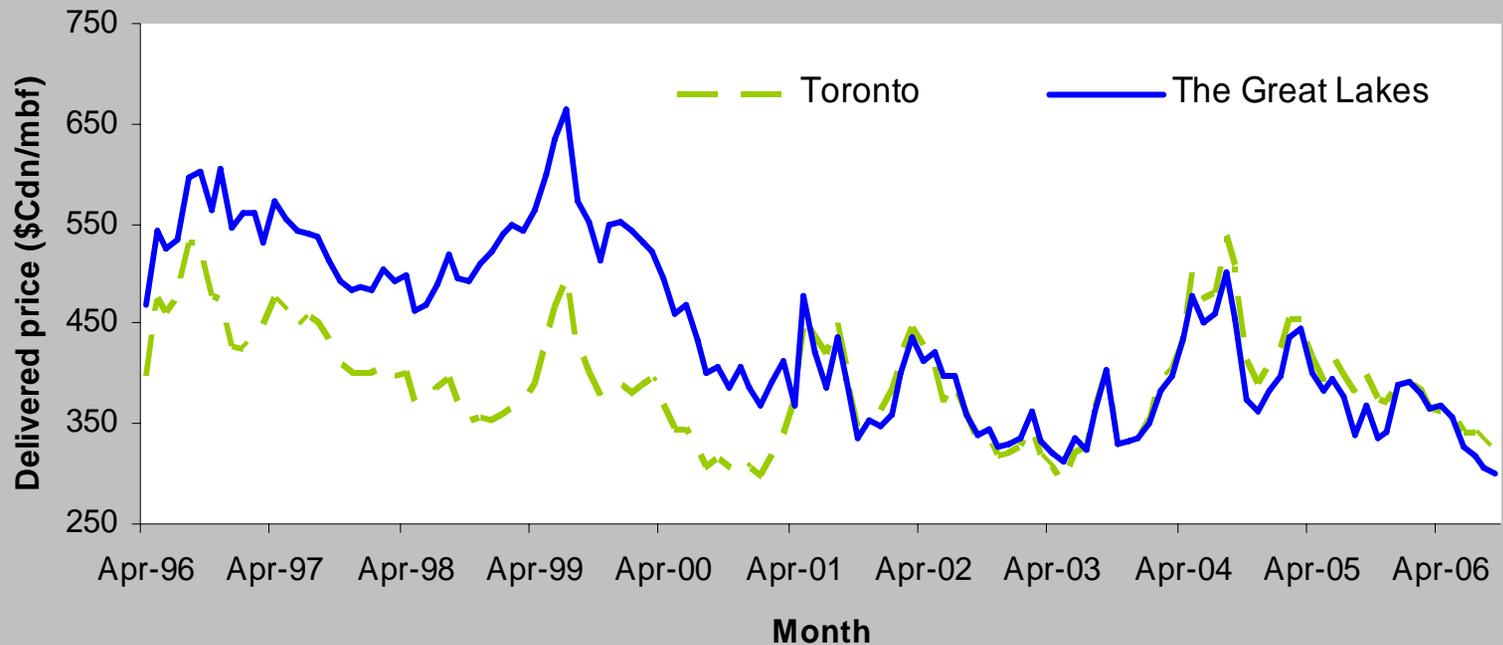
Data

Toronto market



It shows that the mill net price was normally higher than the average production cost and the producers only lost from Toronto market temporarily (for a few months). Hence, it provides further evidence that it is reasonable for us to use the market price in Toronto as the normal value.

Data



The delivered price in Toronto and the adjusted delivered prices in the Great Lakes (CVD, ADD and ETC were subtracted from the delivered price). It shows during the SLA, the price in the Great Lakes was also greater than the price in Toronto; therefore, no dumping occurred during the SLA. However, during the post-SLA, the two prices were closely the same with one price being above the other, on occasions. So the answer to the dumping issue is not clear.

Results

Parameter	Toronto		
	Estimate	SE	t-statistic
λ_1 (Regime 1)	0.543	0.13	4.11***
λ_2 (Regime 2)	0.244	0.07	3.30***
λ_3 (Regime 3)	0.213	0.10	2.14**
U	30.00	3.47	8.64***
V	65.00	23.01	2.82***
σ_e	10.00	1.97	5.07***
$\sigma_{\varepsilon u}$	2.00	6.70	0.30
$\sigma_{\varepsilon v}$	40.00	10.03	3.99***
n		66	
Log likelihood	-316.46		

Note: SE: Standard error; ***, ** and * indicate significant at the 1%, 5% and 10% levels, respectively.

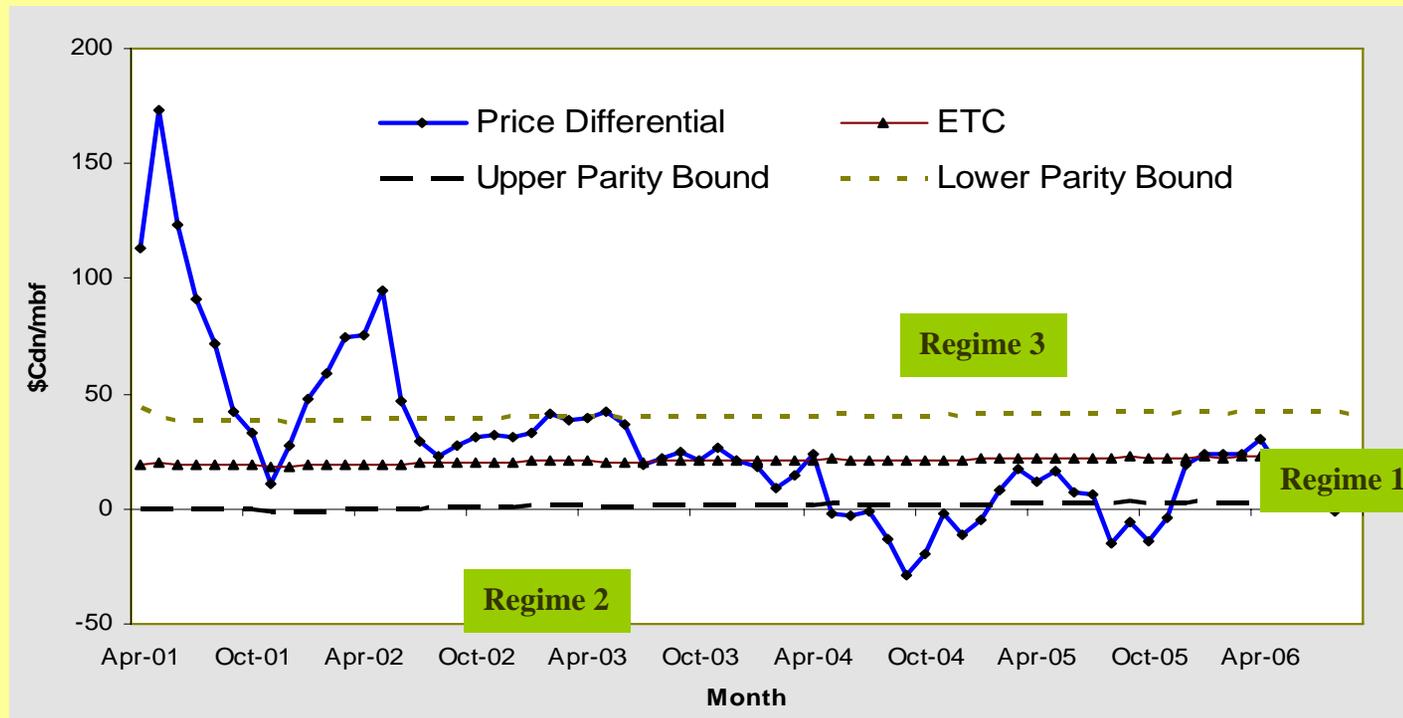
Results

- During the post-SLA, after considering the ETC, $P_{GL} = P_{TOR}$ in 36 months, $P_{GL} < P_{TOR}$ in about 16 months, $P_{GL} > P_{TOR}$ in about 14 months;
- When $P_{GL} < P_{TOR}$, the average difference between the price differential and the ETC is \$Cdn30/mbf,
- when $P_{GL} > P_{TOR}$, the average difference between the price differential and the ETC is \$Cdn60/mbf.

Results

- **The softwood lumber industry obtained \$Cdn153.19 million more from the US market than they would have obtained from Toronto during the post SLA period.**
- **The industry gained 73.08 million less or lost more by exporting the products to the Great Lakes than if they could have sold in Toronto.**
- **Therefore, in overall, they gained \$Cdn80 million more from the Great Lakes market, and the average dumping margin should be negative even after deducting the CVD and ADD from the delivered price in the Great Lakes.**

Results



The three regimes of the EPBM: Regime 1 indicating that the price differentials were equal to the extra transaction costs (ETC); Regime 2 indicating that the price differentials were less than the ETC; and Regime 3 showing that the price differentials were more than the ETC.

Conclusion and Policy Implications

- Our analysis shows that the Ontario softwood lumber industry did NOT dumped softwood lumber into the US market during both SLA and post-SLA!
- Policy implications of our analysis:
 - **The below-cost sales** should be treated as normal values as long as they are above the variable cost.
 - **The “extended period of time”** of the WTO Antidumping Agreement should be interpreted according to the business cycle of the respective product.
 - **The zeroing method** should be prohibited by the WTO rules for any country and for any circumstances as it does not allow the fair comparison between the normal value and the export prices.

Final Conclusions

- **Ontario's stumpage system – SPF (88%) working fine, but not for red and white pine (10%)**
- **RV versus MPS – what is economically best for provinces, not for the US, even if you go for MPS – dispute will not end**
- **In many cases, $RV > MPS$**
- **Dumping – economic theory, long-term perspective**