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When a ban is not a ban: The case of British Columbia's log export restrictions

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Abstract

This paper uses a partial equilibrium trade model to evaluate British Columbia's (BC) log export restrictions. The results of a recently published paper on the topic rely on two key assumptions. They assumed BC has a ban on log exports and that any incremental BC log exports will not affect the world price for logs. This note uses the same data, but a more nuanced model, to show that from BC's perspective unlimited log exports is not necessarily preferred to a policy allowing limited log exports.

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1 Introduction

A recently published paper in *The World Economy* by Fooks et al., (2013) attempts to evaluate the efficiency gains from the removal of natural resource export restrictions by using log exports from the Canadian province of British Columbia (BC) as a case study. However, the authors mistake the current suite of policies surrounding log exports imposed by the provincial and federal governments as a log export ban. Although some of the language within the BC *Forest Act* may be interpreted as being suggestive of a prohibition on log exports, the *Forest Act* also allows for numerous exemptions (MFLNRO, 2013). An overview of the log export exemption process is available from the website of the BC Ministry of Forests, Lands and Natural Resource Operations (MFLNRO, 2013). To export a log in BC, a log producer must offer the log for sale first to domestic buyers, and then apply to a government sanctioned committee that then decides whether the log is deemed surplus to domestic needs (i.e., if any domestic offers for purchase are 'fair'). If the log is deemed to be surplus, then the log producer must obtain both a provincial and a federal export permit. There are also areas that have received blanket exemptions that allow them to sell the logs cut to whomever they wish. In 2007, BC exported over 4% of the total timber harvest[1] (BC Stats, 2013; NFD, 2013; author's calculations). And in 2011 the number of logs exported increased to almost 8% of the total timber harvest[2]. Logs exported from BC sell for substantially more on average than logs sold domestically on the Vancouver Log Market; by failing to account for these existing rents from the export of BC logs to Japan, China, Korea, and the United States, the analysis of Fooks et al., (2013) compares a policy of unilateral free trade in BC logs against an alternative policy (a log export ban) that is merely hypothetical and therefore, provides an incorrect estimate of the efficiency gains of a policy change.

The purpose of this note is to apply the data used in Fooks et al., (2013) to the partial equilibrium trade model used by Van Kooten (2014) and Wood (2014) to analyze BC's log export policies. Van Kooten (2014), who looks at the BC market as a whole, and Wood (2014), who looks specifically at the Coastal BC region, both conclude that a policy restricting BC log exports, if the export process is not too inefficient, is preferable to removing these restrictions unilaterally. However, both studies do show that an outright ban on log exports is the least efficient policy.

Furthermore, the simple model used by Fooks et al., (2013) may not adequately account for the sensitivity of log prices in the Chinese and Japanese log markets to increased exports of BC logs. By using a more sophisticated, yet still simple, model, it will be shown that the preferred policy depends specifically on the size of the elasticity of excess demand for BC logs in the foreign markets. The contribution of this note is to build on the Fooks et al., (2013) analysis by more accurately representing the current government policies surrounding log exports in BC and accounting for the sensitivity of the foreign markets to increased BC log exports. Furthermore, unlike Van Kooten (2014) and Wood (2014), this note uses the specific numbers used by Fooks et al. (2013).

2 The Model

A partial equilibrium trade model has been used by Van Kooten (2014) and Wood (2014) to evaluate BC's log export policies. The model abstracts the current log export process as an export quota system where a restricted amount of logs, Q_R are exported from BC. The model reflects the domestic market for logs and the international market for BC logs. Domestic supply and demand for logs are assumed to be linear and given by the following equations:

$$p_d = \alpha - \beta q_d,\ \ \alpha, \beta \geq 0, \tag{1}$$

$$p_s = a + b q_s,\ \ a, b \geq 0. \tag{2}$$

Domestic demand and supply are represented on the left-hand side of Figure 1. Where this analysis diverges from Fooks et al., (2013) is that it attempts to model foreign demand for BC logs including current levels of log exports. The excess demand curve for BC logs on world markets is

$$ED = A - BQ,\ \ A, B \geq 0, \tag{3}$$

[1]Exports were 3.339 million cubic metres and total harvest was 75 million cubic metres.
[2]Exports were 5.449 million cubic metres and total harvest was 69 million cubic metres.

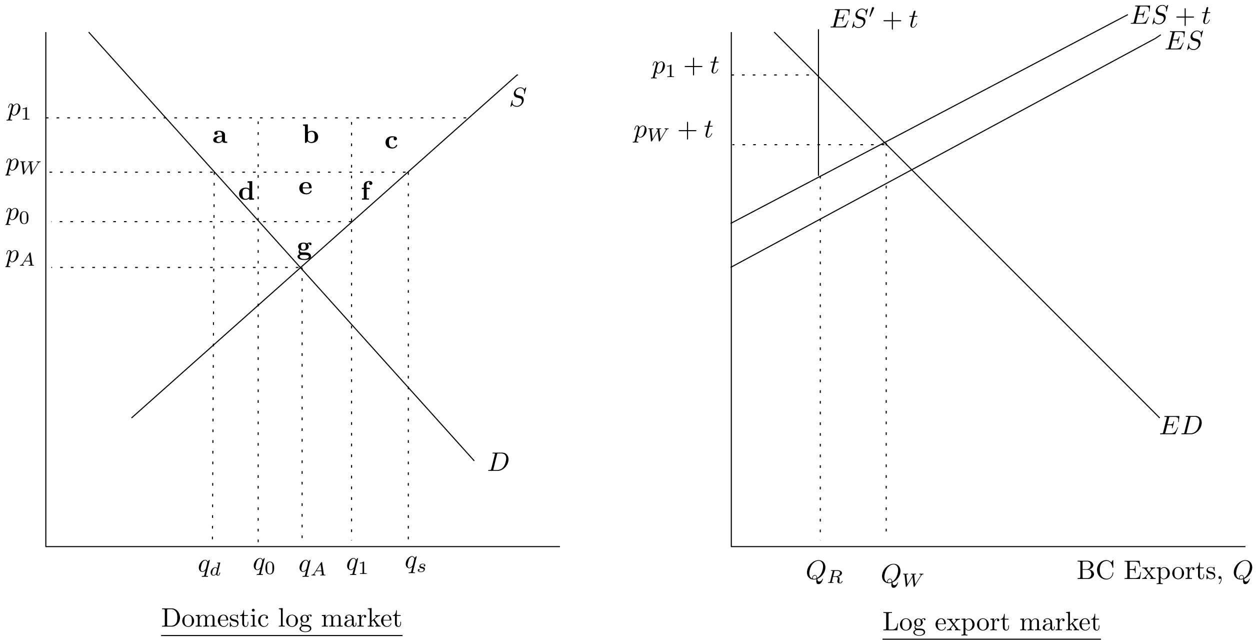

Figure 1: The market for BC logs

where $Q = q_s - q_d$. The excess supply function is derived from equations (1) and (2).[3] After adding transportation costs, t the excess supply function can be written as

$$ES + t = \frac{\beta a + \alpha b}{b + \beta} + t + (\frac{b\beta}{b + \beta})Q. \tag{4}$$

The excess demand, ED and excess supply, ES curves are displayed on the right-hand side of figure 1. Under a policy restricting, but not prohibiting exports, the excess supply curve is kinked at the quota level of exports (represented by $ES' + t$ in figure 1). Current BC exports, Q_R sell for $p_1 + t$ in the foreign market (domestic log exporters receive p_1), whereas domestically consumed logs, q_0 only garner p_0.

A policy change to unilaterally remove all export restrictions on BC logs leads to Q_W log exports[4] that sell for a lower price of $p_W + t$ (where excess demand intersects excess supply plus transportation costs). Domestic log consumers now face a higher price of p_W and decrease consumption from q_0 to q_d. Domestic log producers now increase harvest from q_1 to q_s. Log producers gain areas **d** and **f**, but they lose area **b**. It is thus an empirical question of whether BC figures to gain from a move to free trade in logs.

One of the two key assumptions used by Fooks et al., (2013) is that the excess demand curve is perfectly inelastic, i.e., horizontal. If it were, then an increase in BC exports will not lead to a decrease in the world price for BC logs and, therefore, area **b** will not be lost, and the gains will be areas **a**+**c**+**d**+**f**. However, a study by Niquidet and Tang (2013) estimates the elasticity of excess demand for Canadian logs (all of which originate from BC) in the Chinese and Japanese markets and finds values of -1.40 for China and -1.67 for Japan. These estimates suggest that excess demand for Canadian logs is inelastic but far from perfectly inelastic.

The second key assumption of Fooks et al., (2013) is that BC currently enforces a total log export ban. Under a log export ban, log producers cannot export any logs; therefore, quantity supplied equals the quantity demanded domestically, q_A for price p_A. This autarkic scenario does not compare favorably to either free trade in logs or restricted exports. Moving from the current level of restricted exports leads to a net reduction in surplus of areas **b**+**e**+**g**. Moving from a policy of free trade leads to a net reduction in surplus of areas **d**+**e**+**f**+**g**.

[3]Rearrange equations (1) and (2) in terms of q_d and q_s, subtract q_d from q_s while setting $p_d = p_s = ES$, and solve for ES.

[4]$Q_W = \frac{A - (\frac{\beta a + \alpha b}{b + \beta} + t)}{B + (\frac{b\beta}{b + \beta})}$.

Combining the two key assumptions of the Fooks et al. (2013) analysis leads them to attempt to estimate areas **a+b+c+d+e+f+g** instead of estimating areas **d+f-b**. Their inaccurate policy representation also forces them to use p_0 instead of p_A as the autarkic price.

3 Results

For the sake of illustration, I apply the Fooks et al., (2013) parameter values to the more nuanced model outlined in the previous section. They assume an exported log sells for 124.94 USD per cubic metre (net of transportation costs) and a domestically sold log garners 103.95 USD per cubic metre. For the BC timber harvest they take the 10-year annual average for BC from 1998 to 2007 and round up to get 77 million cubic metres; however, because I will be incorporating exports into the model I will use the unrounded value of 76,569,075 m^3 (NFD, 2013; author's calculations). The 10-year annual average of logs exported from BC from 1998 to 2007 is 3,167,159 m^3 (BC Stats, 2013; author's calculations).

Table I: Selected Parameter Values

Parameter	p_1	p_0	q_1	q_0	Q_R	ϵ_d	ϵ_s	ϵ_{ED}	t
Value	124.94	103.95	76,569,075	73,401,916	3,167,159	-1.1008	1.0302	-1.54	10

Notes: The price parameters are 2007 USD per cubic metre and the quantity parameters are cubic metres.

The parameters α, β, a, b, A, and B from equations (1), (2), and (3) are unknown, but can be solved for given values of elasticity of demand (ϵ_d), elasticity of supply (ϵ_s), and elasticity of excess demand (ϵ_{ED}). The values of ϵ_d and ϵ_s estimated and then used by Fooks et al., (2013) will be adopted. The midpoint (-1.54) between the Chinese and Japanese elasticities of demand for Canadian logs estimated by Niquidet and Tang (2013) are selected for ϵ_{ED}.

Fooks et al., (2013) avoid the need to incorporate transportation costs by assuming that the world price is perfectly inelastic. I assume a value of t of \$10 per cubic metre, however, the sign of the results is unaffected by this value. All the assumed parameter values are displayed in Table I.

Table II: Results

Policy change	%Δ Export Price	%Δ Domestic Price	%Δ Exports	%Δ Harvest	Δ Welfare
Restricted exports to free trade	-16.42%	0.46%	23.4%	0.48%	-64.8 mill
Restricted exports to autarky	n/a	-1.98%	-100%	-2.05%	-69.7 mill
Free trade to autarky	n/a	-2.43%	-100%	-2.51%	-4.97 mill

Notes: The welfare change numbers are 2007 USD.

The selected parameter values can be used to solve for p_W, Q_W, p_A, q_A, q_s, and q_d, that are essential for calculating the change in welfare between policies (see Wood (2014) for explicit formulas). The results of different policy change scenarios are displayed in Table II.[5] A policy change from restricted exports to free trade in logs leads to a 16.42% drop in the price for BC logs in foreign markets ($p_W = 104.43$); whereas, the domestic price only increases by 0.46%. The net welfare change is -64.8 million dollars; in other words, area **b** is larger than areas **d** and **f** in figure 1. This result is completely contrary to the Fooks et al., (2013) result.

Figure 2 plots the net change in welfare given different values of ϵ_{ED}. It is clear that free trade becomes preferable to export restrictions as the value of ϵ_{ED} becomes more negative. The policies are equivalent at a value of ϵ_{ED} of roughly -36. However, -36 is far from the published estimates of Niquidet and Tang (2013) of -1.4 for China and -1.67 for Japan.

It should be noted that Fooks et al. (2013) were essentially analyzing the third case displayed in Table II; the welfare cost imposed by a complete log export ban with free trade in logs as the alternative. Their

[5] The R code for the calculations is available from the author upon request.

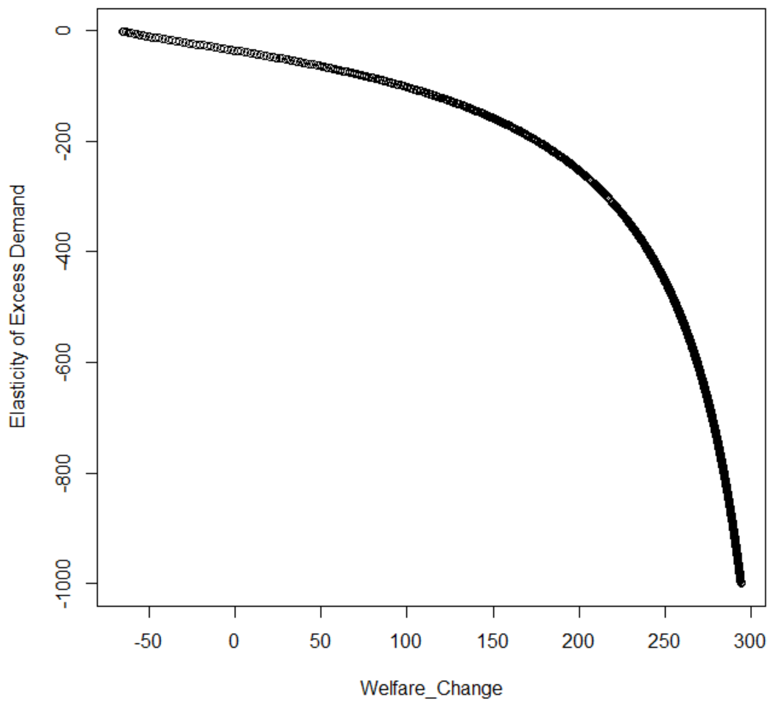

Figure 2: Sensitivity to ϵ_{ED}

results estimated the costs as $347 million when assuming no change in the world price. However, when the change in the world price is as estimated by Niquidet and Tang (2013) the welfare loss is much less ($4.97 million).

4 Conclusions

Fooks et al, (2013) made two key assumptions that lead them to conclude that there are efficiency gains from the removal of BC's log export restrictions. First, they assumed that log exports in BC are banned. Second, they assumed that the export price obtained for BC logs is insensitive to increased BC exports. This note relaxes these assumptions in a partial equilibrium trade model that takes into account both current log exports from BC and the response to additional BC log exports in foreign markets.

The main results contradict the Fooks et al., (2013) conclusions and suggest that the current policy of restricting log exports is potentially more beneficial to BC than a policy allowing unlimited log exports. This suggests further analysis should focus on how to make the current export approval process more efficient, such as moving to an export quota as modeled here. However, the results do hinge on how substitutable BC logs are for those sold on international markets; if BC logs are sufficiently substitutable ($\epsilon_{ED} = -37$), then a policy of free trade in logs is preferred (consistent with Fooks et al., (2013). However, the existing published estimates by Niquidet and Tang (2013) of this key parameter are much smaller in magnitude.

As a closing thought, it should be noted that although a policy of restricting log exports is beneficial from a BC perspective, it is not from a global perspective. When moving from a policy of restricting log exports to free trade in logs, area **b** in figure 1 is lost by log producers in BC but captured by log consumers in foreign countries. In this respect, free trade is unambiguously welfare improving. This raises the potential for Canada and BC to use the removal of their log export restrictions as a bargaining chip to obtain equivalent concessions in trade negotiations with Japan and China.

References

BC Stats (2013) *Log exports*, Government of British Columbia, http://www.bcstats.gov.bc.ca/StatisticsBySubject/BusinessIndustry/Forestry.aspx, as of August 27, 2013.

Fooks, Jacob R., Steven J., Dundas, and Titus O. Awokuse (2013). "Are there efficiency gains from the removal of natural resource export restrictions? Evidence from British Columbia" *World Economy* 36, 1098-1114.

Forest Act, R.S. BC. 1996, c.157, s.127.

Ministry of Forests, Lands and Natural Resource Operations [MFLNRO] (2013) *Procedures for the Export of Timber*, Government of British Columbia, http://www.for.gov.bc.ca/het/export-procedure.htm, as of October 24, 2014.

National Forestry Database [NFD] (2013) *Volume of Roundwood Harvested by Ownership, Category, and Species Group, 1990-2011*, http://nfdp.ccfm.org/data/detailed/html/detailed_5120_p_BC.html, as of August 27, 2013.

Niquidet, Kurt and Jingwen Tang (2013) "Elasticity of demand for Canadian logs and lumber in China and Japan" *Canadian Journal of Forest Research* 43, 1196-1202.

Van Kooten, G. Cornelius (2014) "Is Free Trade the End All Be All? The Case of Log Exports" REPA Working Paper 2014-01, Department of Economics, University of Victoria.

Wood, Joel (2014) *Log Export Policy for British Columbia*, Fraser Institute: Vancouver, Canada.