SCHOOL OF ENVIRONMENTAL AND FOREST SCIENCES
UNIVERSITY of WASHINGTON
College of the Environment

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Center for International Trade in Forest Products

Global Supply Chain of Illegal Wood and its Impact on the U.S. Wood Products Industry

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METHODOLOGY WORKSHOP: ESTIMATING ILLEGAL LOGGING & TIMBER TRADE

DATE: MONDAY 25TH MARCH 2019; VENUE: CHATHAM HOUSE, LONDON

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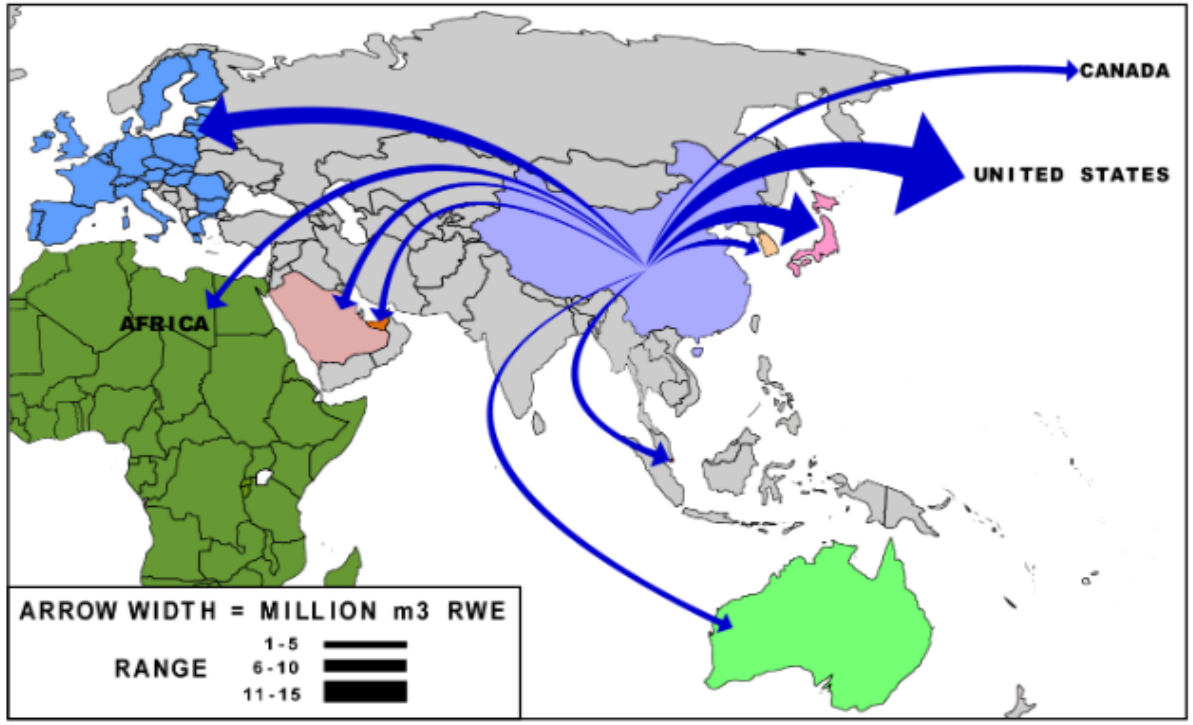
Overall Goal

The goal of the study is to develop a pragmatic understanding on how illegal timber and forest products move through the global supply chain, by identifying the key supply chain nodes within the remanufacturing and redistribution hubs, like **China** and Vietnam.



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Specific Objectives and Methods - I

Develop a data-driven analytic tool to identify Illegal Logging and Associated Trade (ILAT).

- This objective will be achieved by developing an interactive multisource global trade database for wood and wood product.
- Using a powerful MS access based software (Power BI pro), this database will provide the necessary flexibility to connect multiple data sources, manipulating, visualize, and sharing data and analysis.
- Develop **objective import source analytical tools**

Specific Objectives and Methods - II

Develop an econometric model that can provide a comprehensive understanding of the cross-sectoral and cross-national economic impacts of illegal wood trade.

- This objective will be achieved by developing a nested modeling system that will provide an estimate of illegal wood entering the global wood products supply, and evaluating its impact on various sectors of the economy.

- We opted to use the Global Trade Analysis Project (GTAP) platform, which is a computable general equilibrium (CGE) modeling system.

Specific Objectives and Methods - III

Develop country-specific and pragmatic outreach strategies, influencing and improving design and implementation of legality legislations.

- Develop specific outreach strategies to communicate effectively with public policy makers and enhance industry awareness in the remanufacturing hubs.
- Provide discussions on effective implementation of the US Lacey Act amendment of 2008 and EU-FLEGT.

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Database, Models, etc.

Three main components to this approach:

1. Development of a multi-source interactive database.
   - GTA Customs data reported by exporting and importing countries, FAO data, UN Comtrade Data, etc.
2. Identify suspicious trade flows.
   - In our case trade statistics discrepancy analysis
   - Estimating price depression as a result of illegal wood trade
3. Develop an econometric model that simulates the impact of ILAT on legal trade of wood products and related industries.
   - We have started developing a forest products module within GTAP

CINTRAFOR Interactive Database (under construction)

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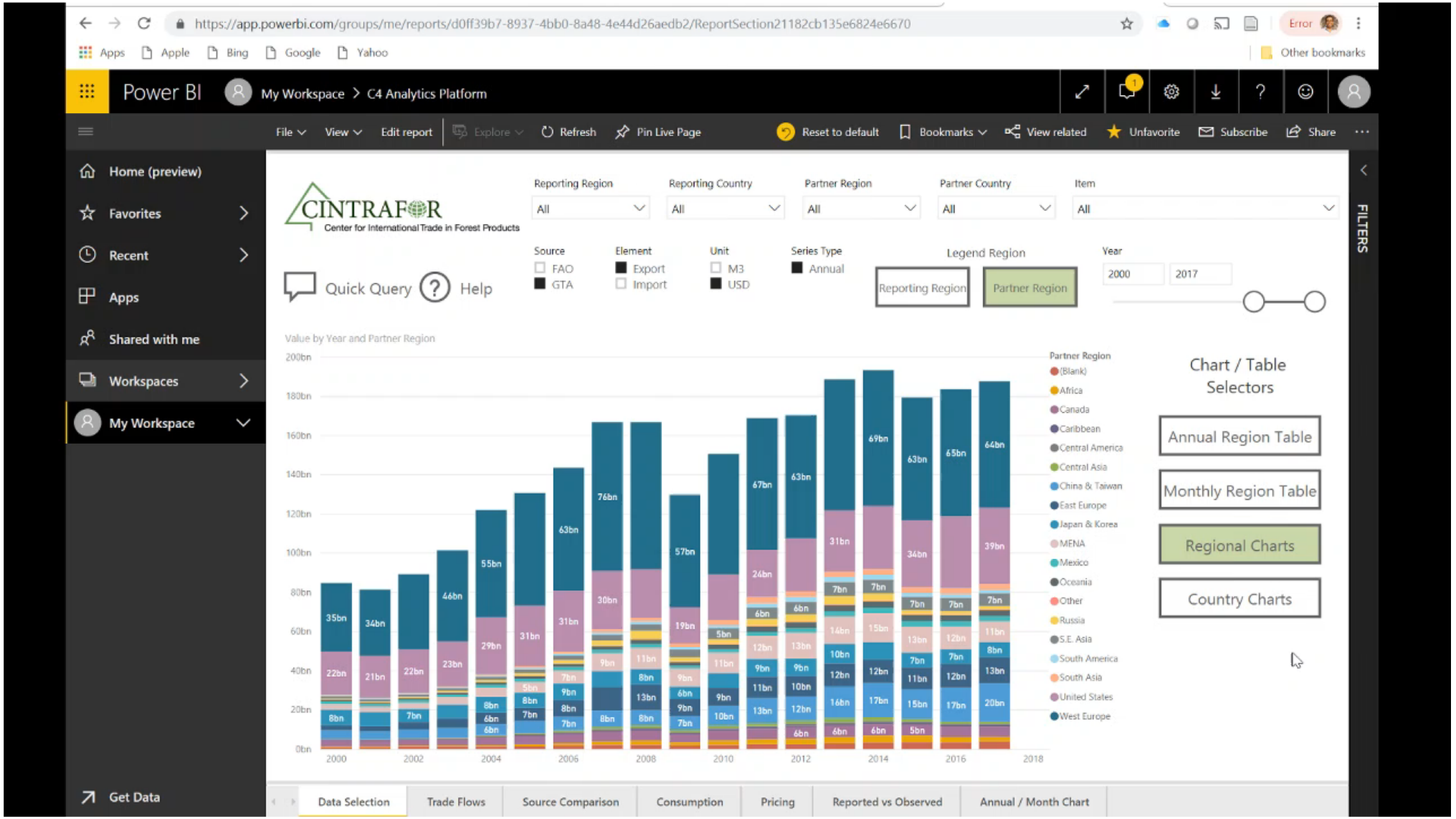


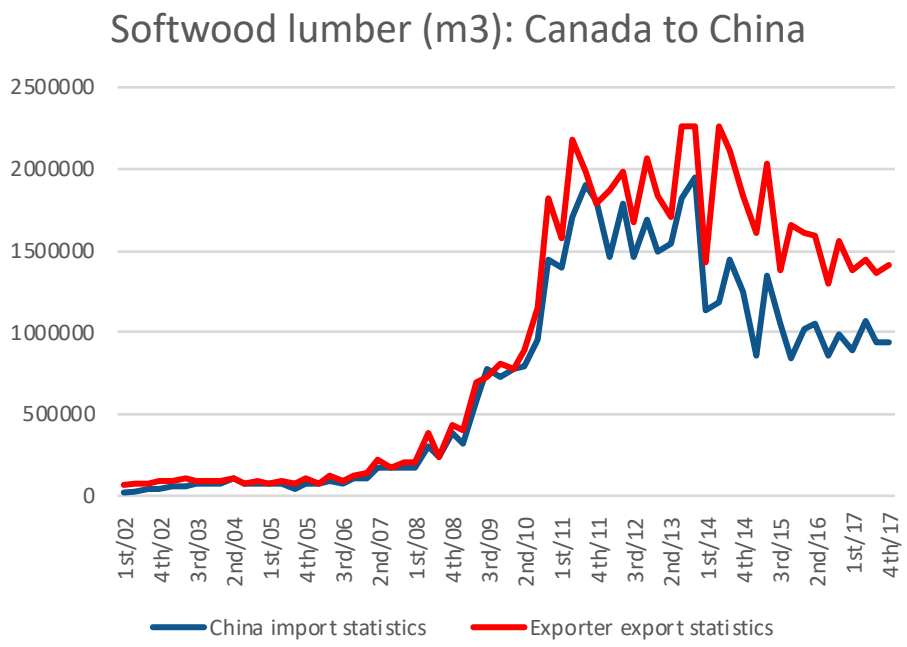
Estimating Illegal Logging and Associated Trade

Two common methods for estimating illegal logging and wood products trade are wood balance analysis and import source analysis (IURFRO 2016).

1. **Wood balance analysis** compares timber inputs (production plus imports) and outputs (consumption plus exports). Where a deficit emerges and cannot be otherwise explained, it is interpreted as an indication of illegality.
2. **Import source analysis** multiplies estimated illegal logging rates in source countries by trade volumes.
3. A more **objective import source analysis** – using ***trade data discrepancies*** (i.e., the mismatch between the data reported by the exporting country to that of the importing country).

What are Trade Statistic Discrepancies?

Discrepancies in trade statistics are generally termed as **‘normal/benign’,** and are attributed to a wide variety of intentional and unintentional factors.



For example:
Unit conversion issues from Scribner Scale to Metric Scale

Trade Statistic Discrepancies

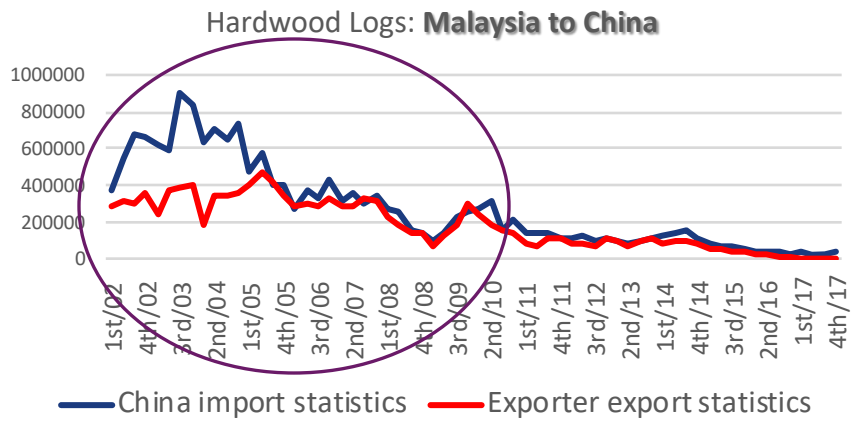
However, in some instances within the forest products sector, such discrepancies cannot be justified as 'normal', and can be associated with systemic factors that distort the trade statistics, including:

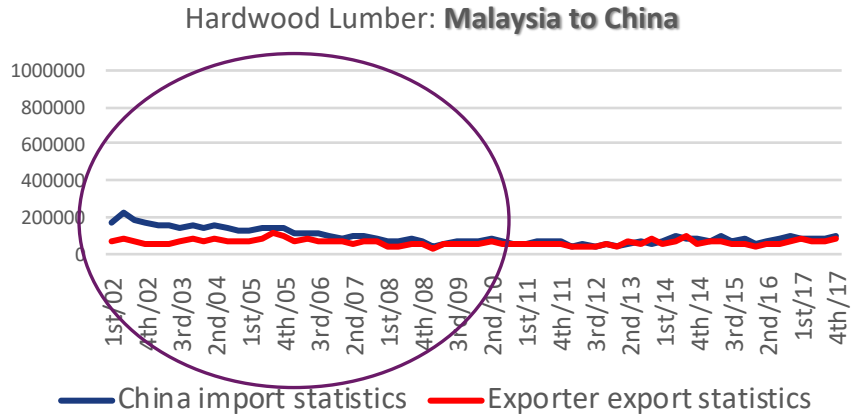
I. illegal smuggling that avoids detection at the source country

II. underreporting of export volumes

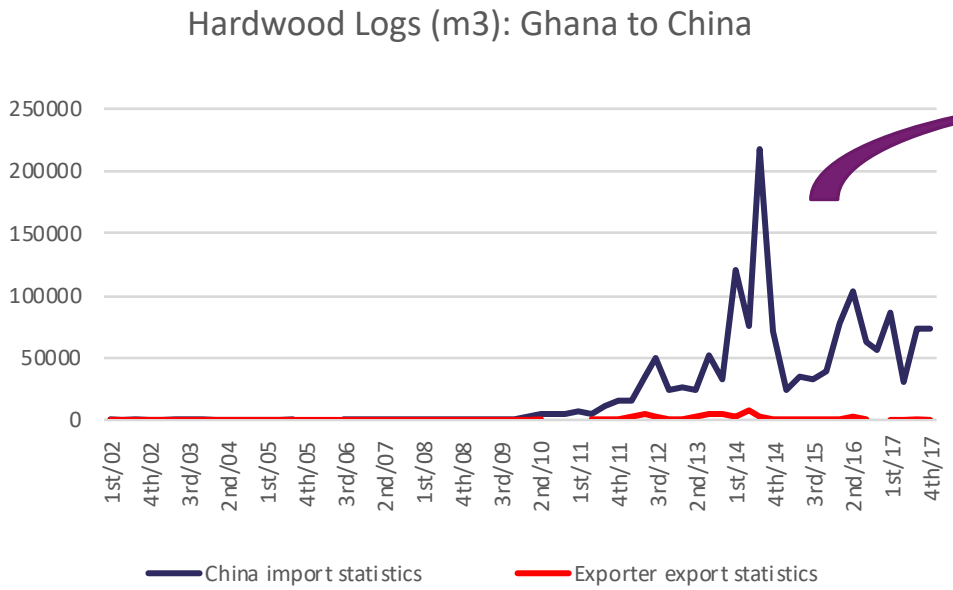
III. misrepresenting product types and product volumes

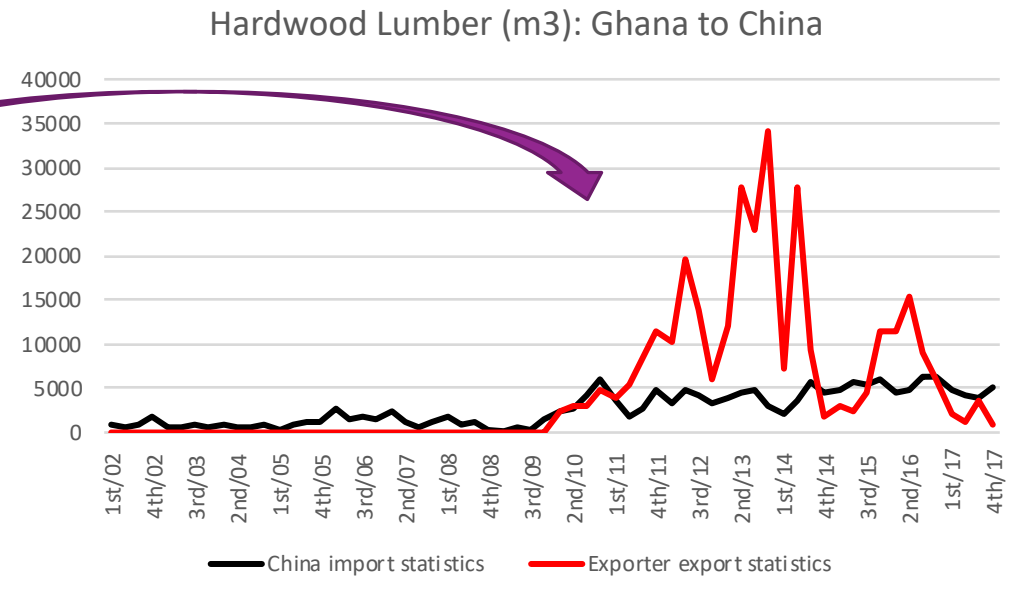
IV. misreporting of timber species





Trade Statistic Discrepancies





How We Calculated the Discrepancies

To be able to calculate true data discrepancies, we factored in a time lag to allow for transportation time.

1. We calculated a time lagged "new" export data X_{it}^{*} using Eq.(2) from ith country to China, which should equal the imports (M_{it}) reported by China for the same period from the same country.
2. Then we calculated the discrepancies using the logarithm of the ratio, as in equation 4.

$$l_{it} = \left(\frac{M_{it+1}}{M_{it}}\right)^{\frac{T}{3}} - 1 \qquad (1) \quad \text{--- Lag factor}$$

$$X_{it}^{*} = X_{it} * (1 + l_{it}) \qquad (2)$$

The equation about discrepancies is,

Where, M_{it} is the imports reported by China from exporter i; X_{it} is exports reported by country 'i' to China; I represents export country; t represents quarter; T represents transportation time period in month.

Non-lagged discrepancies is represented in Eq.(3), according to M.J. Ferrantino et al.(2012).

$$D_{it} = \ln(\frac{M_{it}}{X_{it}}) = \ln(M_{it}) - \ln(X_{it}) \qquad (3)$$

Then, we use the time lag factor to adjust the export data and the original transformed to Eq.(6).

$$D_{it} = \ln(M_{it}) - \ln(X_{it}^{*}) \qquad (4)$$

$$D_{it} = \ln(M_{it}) - \ln(X_{it} * (1 + l_{it})) \qquad (5)$$

$$D_{it} = \ln(M_{it}) - \ln\left(X_{it} * \left(\frac{M_{it+1}}{M_{it}}\right)^{\frac{T}{3}}\right) \qquad (6)$$

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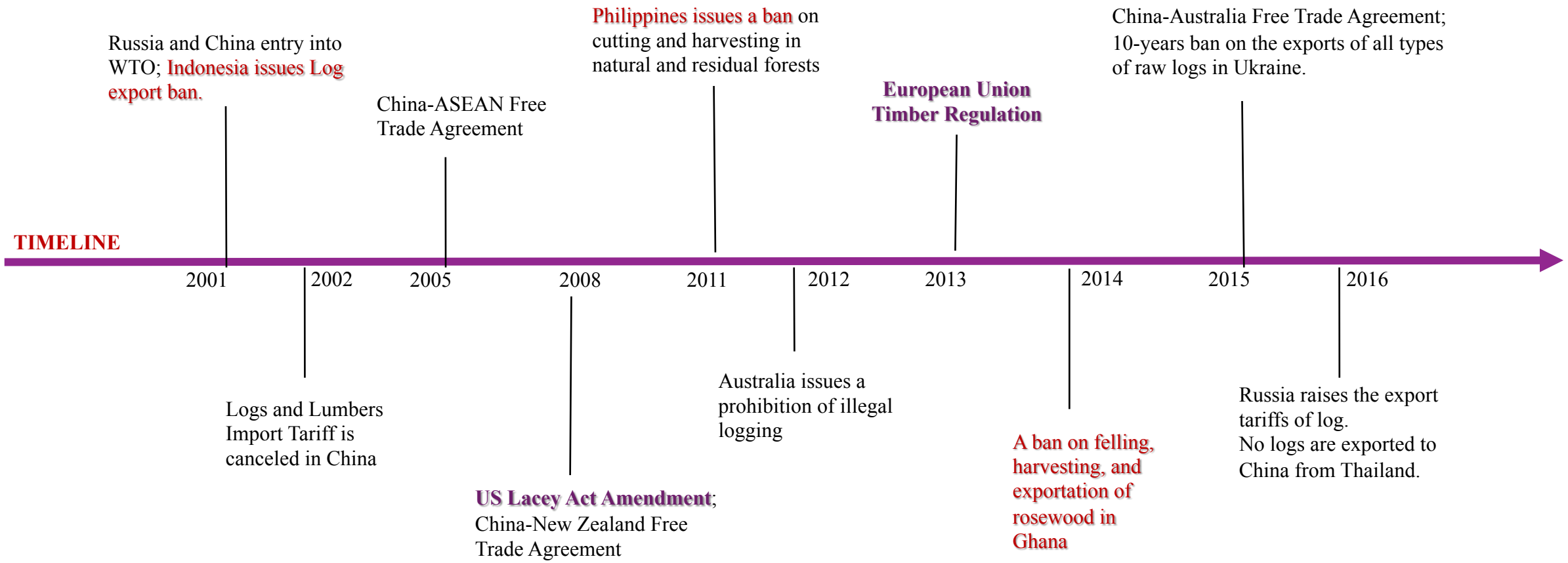
Some Aspects of Forest Trade Timeline



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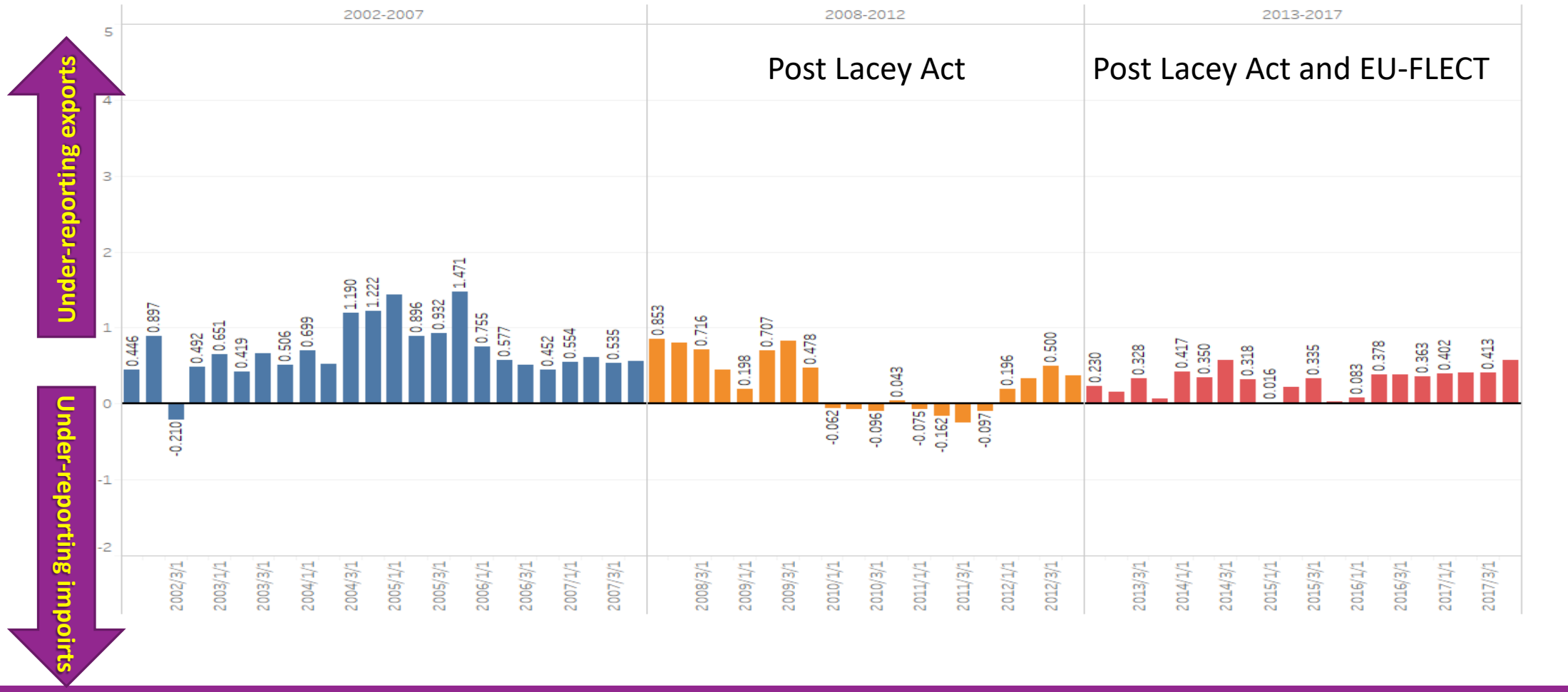
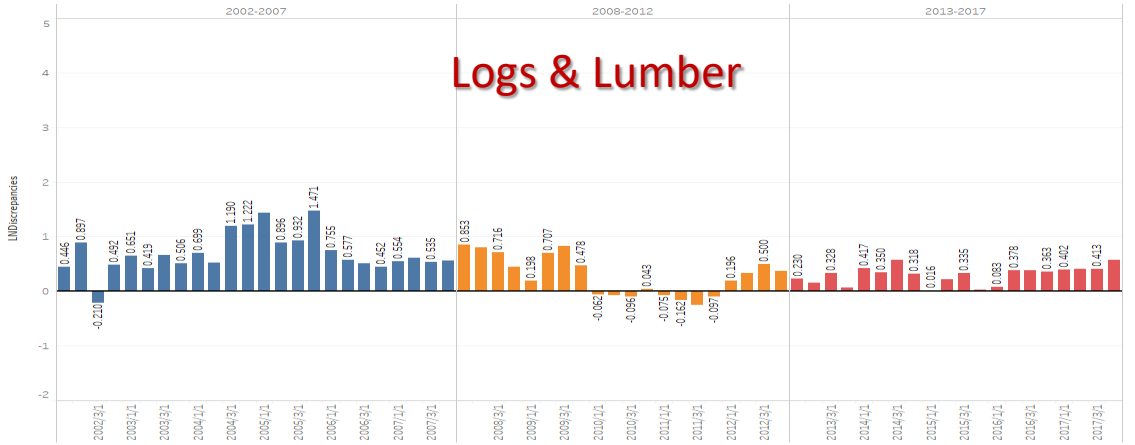
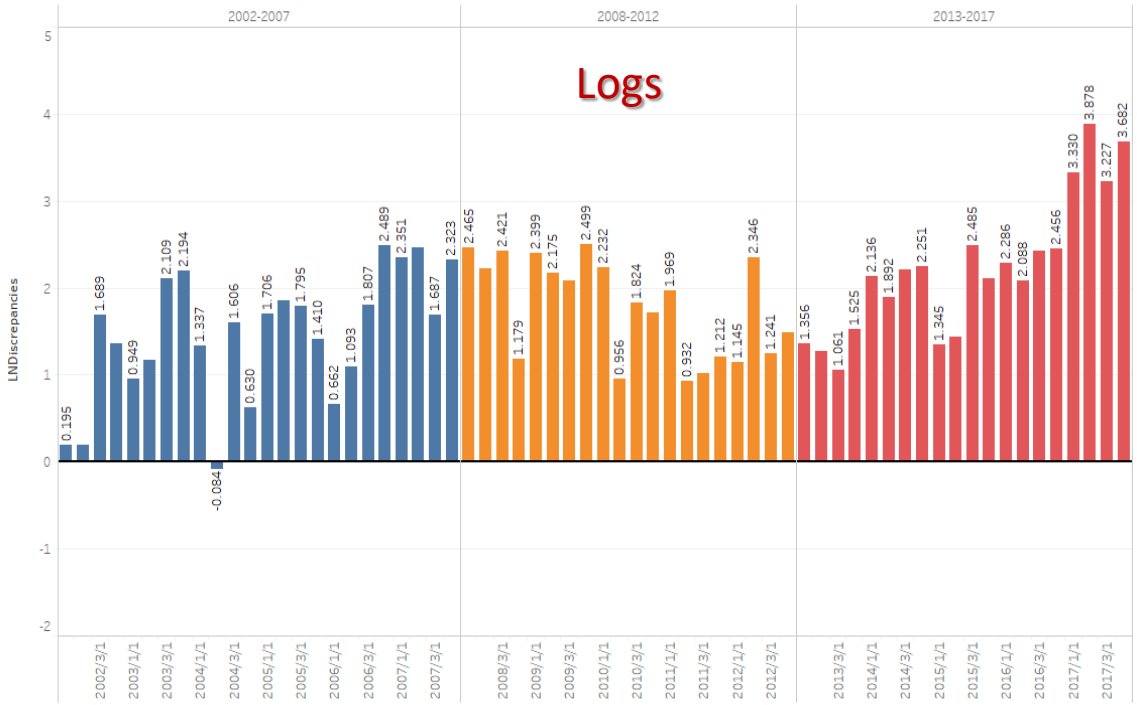
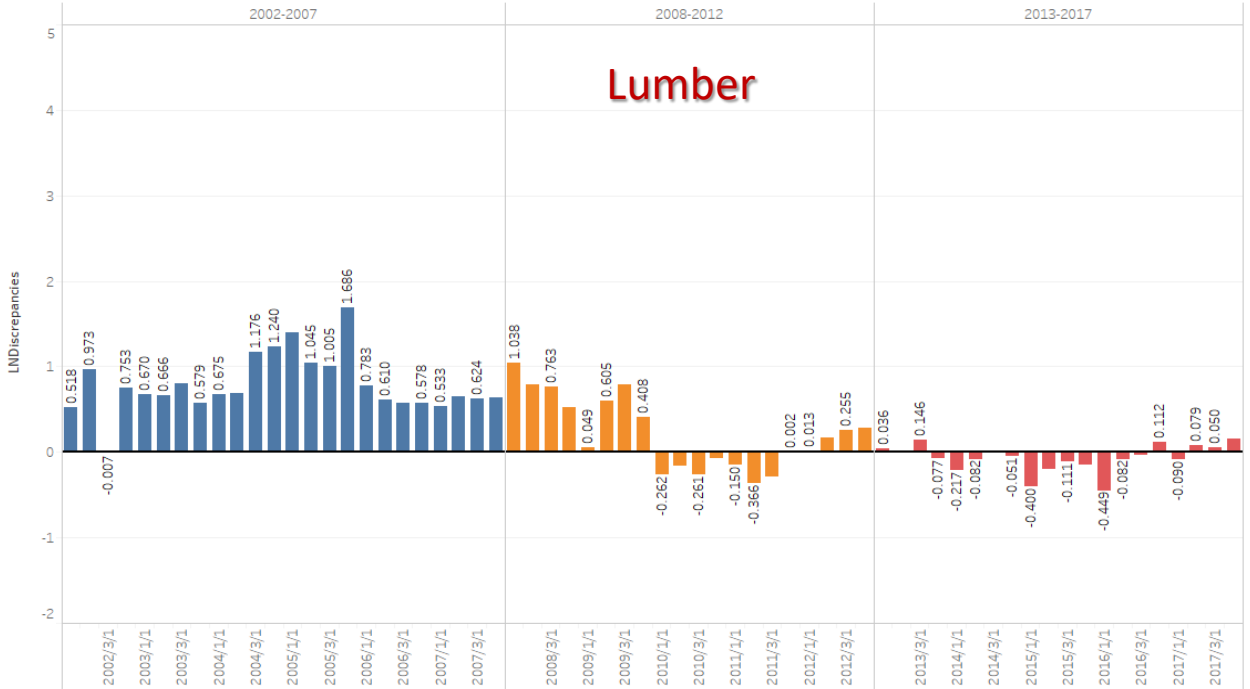
Discrepancies in Log & Lumber Trade Statistics



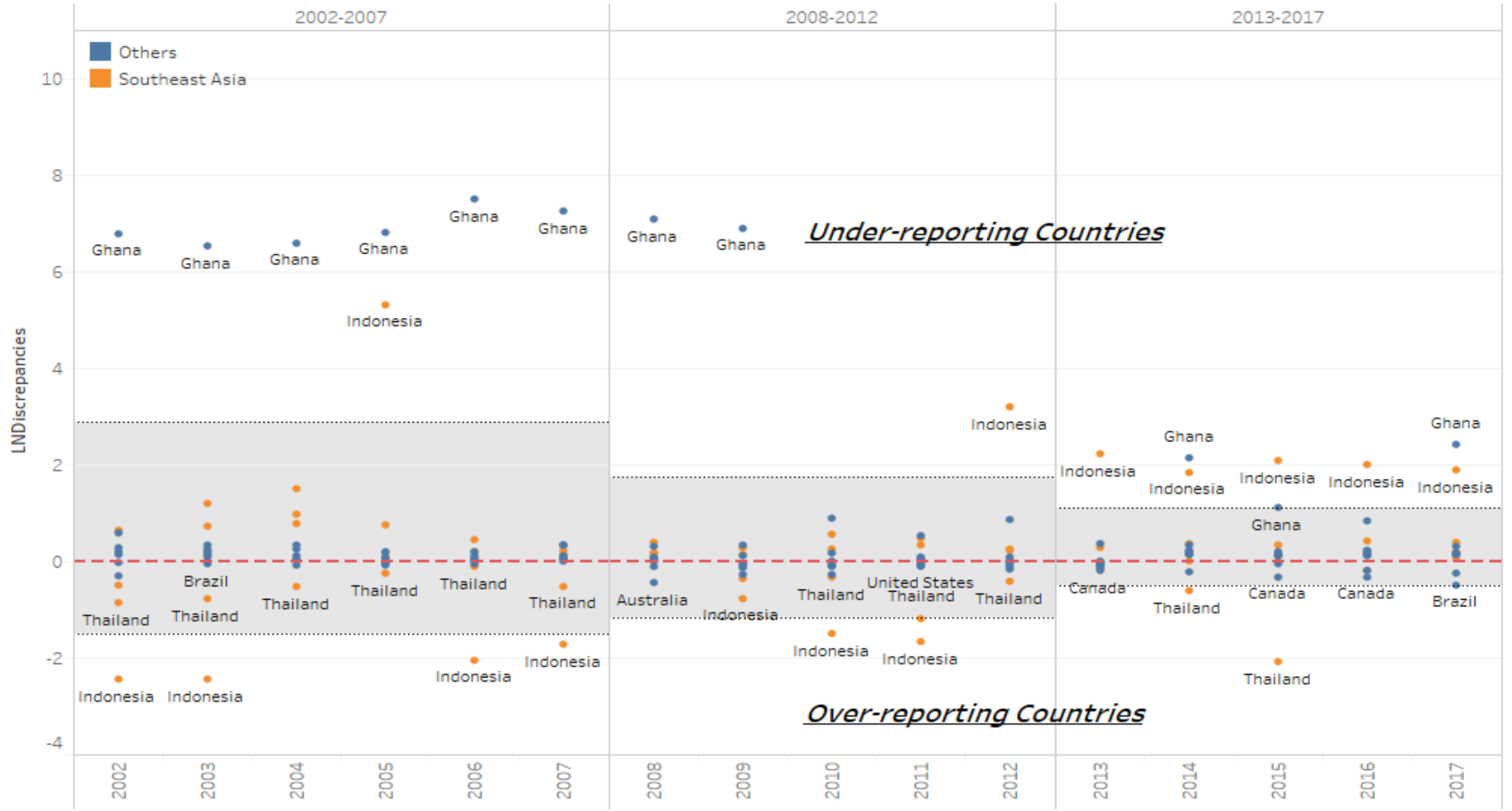
Discrepancies in Log & Lumber Trade statistics







Discrepancies in Log & Lumber Trade Statistics



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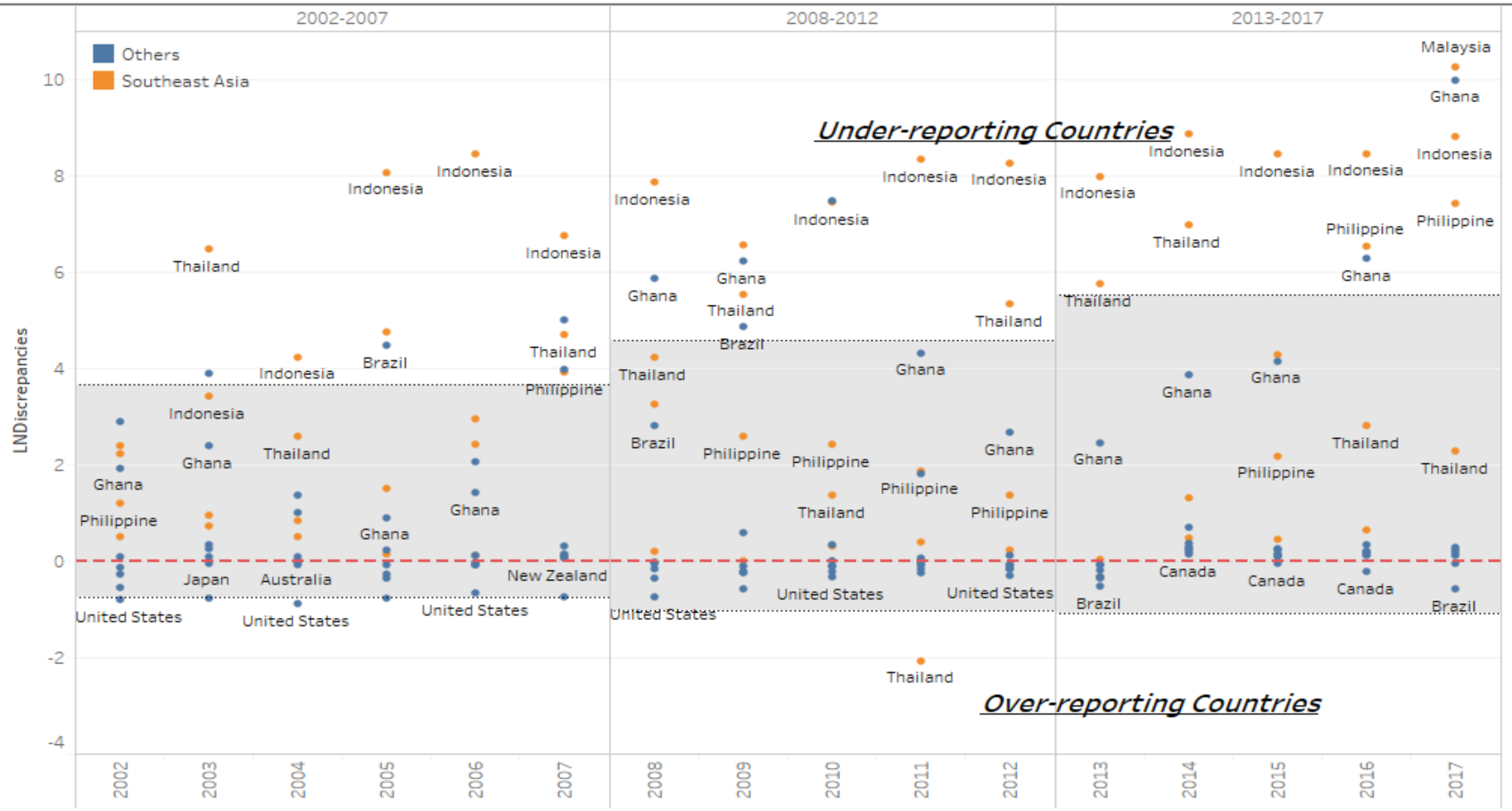
Discrepancies in Log Trade Statistics



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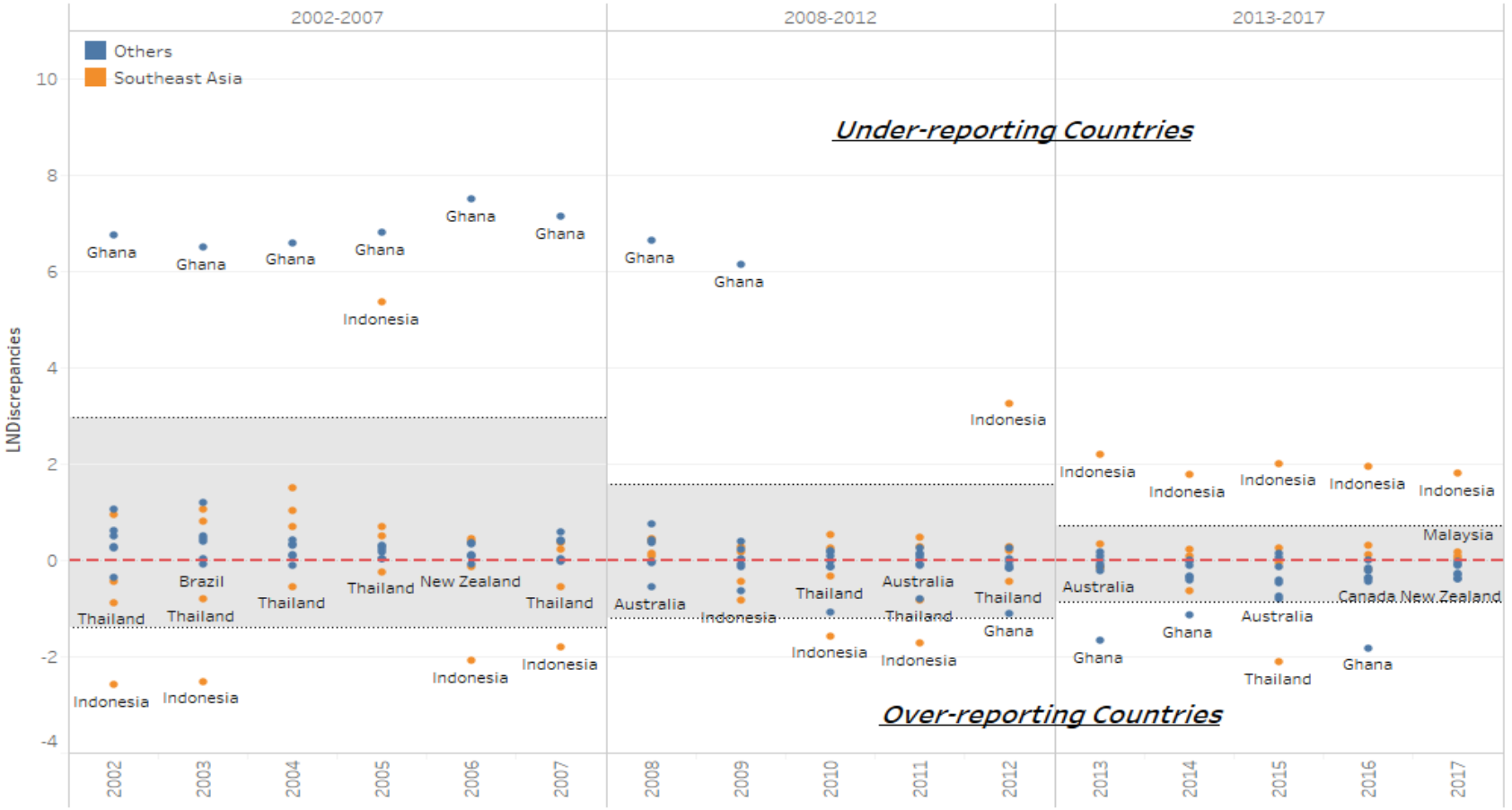
Discrepancies in Lumber Trade



Estimating the True Economic Costs Associated with ILAT

USING COMPUTABLE GENERAL EQUILIBRIUM MODELING FRAMEWORK

Building GTAP Forestry Database

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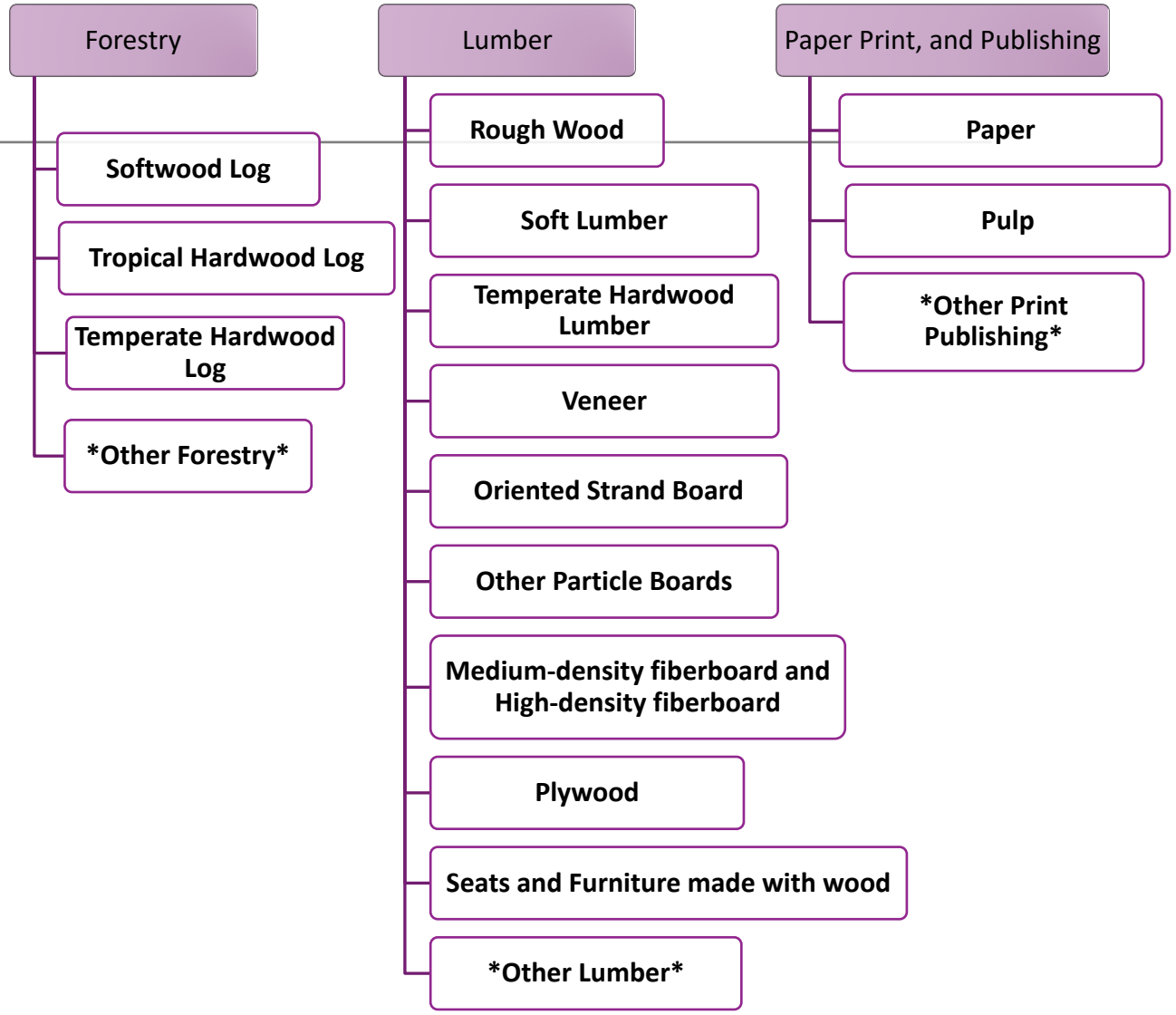
Global Trade Analysis Project (GTAP) is a well-documented, tested, and widely applied CGE model (Haddad, Britz and Börner, 2019).

- Several partial equilibrium models exist for forestry sectors.
- GTAP will be the first CGE model for forestry sectors, containing a global trade and Input-Output (IO) dataset linked with each other (Narayanan et al 2012 and Aguiar et al 2016).

A SplitCom program, developed by Mark Horridge at Centre of Policy Studies (CoPS), is used to realize the sector dis-aggregation.

- 3 original forestry sectors were disaggregated into 17 sectors

Original and New GTAP sectors



Assumptions for Modeling in GTAP

Using GTAP, we can estimate the impact of illegal logging on the global economy either by modeling an increase in supply or a decrease in price.

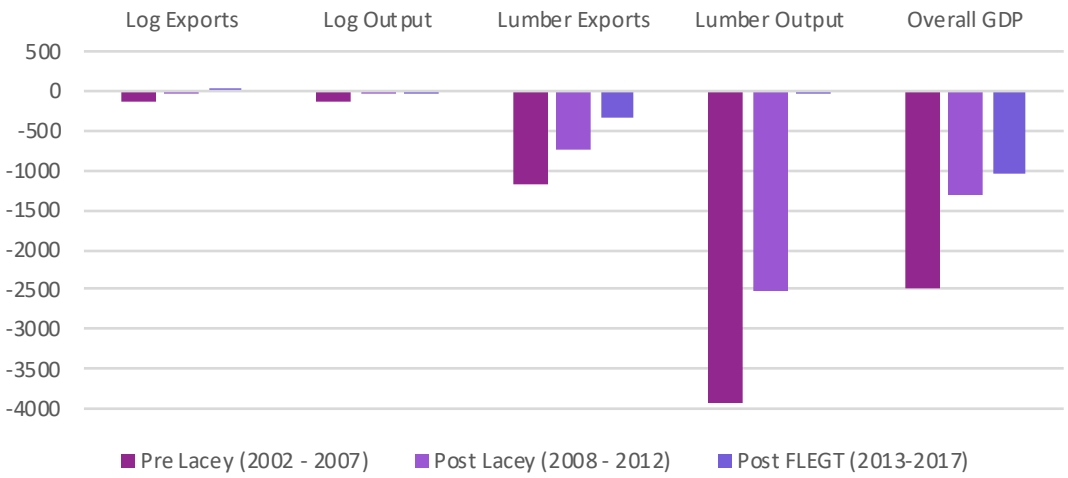
These price/supply impacts are fed into our newly developed GTAP forestry model as shocks. We have done this for three time periods:

1. Pre-Lacey Act (2002-2007)
2. Post-Lacey Act (2008-2012)
3. Post-EU FLEGT (2013-2017)

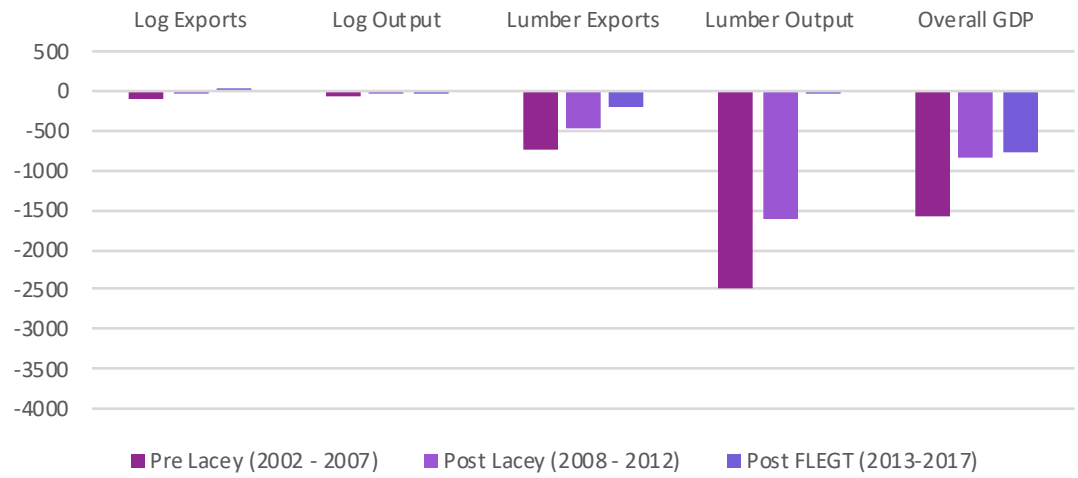
Following are the broad results for the log and lumber sectors, in terms of the impact of illegal logging on different variables (in millions if USD). We varied the assumption of 5%, between 2.5% and 7.5%, i.e., 50% above and 50% below, and performed a systematic sensitivity analysis, thereby coming up with the numbers in the graphs on the next slide.

Impact on the US economy

Scenario: Illegal wood traded at 7.5% lower than fair price in China



Scenario: Illegal wood traded at 2.5% lower than fair price in China



Impact of the lumber sector changes are much more significant for the US economy. During 2002-2007 period, the losses were $ 2.5-4 billion in output and $ 0.7-1.2 billion in exports. During 2013-2017, this fell to $ 0.2-0.3 billion of export losses and $ 0.02-0.03 billion of production losses.

GDP losses of about 1.5-2.5 billion get mitigated to around 1 billion in the other two scenarios.

Summary

1. Based on the limited analyses we have undertaken, we can conclude that any effective control on illegal logging can have profound positive impact on output and exports of logging and lumber sectors in the US, with a large economy-wide effect in terms of GDP as well. Roughly, the GDP savings may be over a billion USD.
2. However, it may be noted that (i) the database, (ii) the discrepancy analysis, and (iii) the GTAP forestry module are independent of each other and can be paired-up with other methods and approaches.
3. We should acknowledge the drawbacks of the discrepancy analysis and the GTAP model.

Thank you

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