Does Trade Pave a Way for Wildlife Trafficking?

Shreya Sethi[1], Bishal K. Chalise[2]

1.Department of Humanities and Social Sciences, Indian Institute of Technology-Bombay, India
2.Niti Foundation, Nepal

ABSTRACT

Globally there is a unanimous agreement about increasing threat to wildlife due to illegal wildlife trafficking. Being a transboundary environmental issue, this requires agreements between countries to curb the problem. Since, the latter half of 20th century regional economic integration has deepened. Often these have a spill over effect on environment. Thus looking at one such spill over effect, this study aims to link the impact of goods trade and regional economic integration on wildlife trade. The study includes data from 172 countries from 1986 to 2015. Data is sourced from the CITES, the World Development Indicator and the Mario Larch's Regional Trade Agreements Database. Key findings of the paper include 1) an increase in the volume of goods trade positively impacts the wildlife trade transactions, 2) regional economic integration do not have a statistically significant impact on the wildlife trade transactions. While, one of the major limitations of the paper under reporting of wildlife trade transactions across temporal and spatial space.

JEL Codes: Q56, Q57, F13, F18

Key Words: Illegal Wildlife Trade (IWT), Volume of Trade, Free Trade Agreements, Regional Economic Integration

INTRODUCTION

Illegal Wildlife Trade (IWT) is a major threat to biodiversity conservation (Broad et al. 2003; Butchart et al. 2010; Challender et al. 2015). Globally, there is high and a growing demand for wild plants and animals and derivatives. Mostly the wild species are a source of a wide variety of goods which includes food items, medicines (specifically Traditional Chinese Medicine), pets, decorative displays, fashion accessories, cultural items, industrial resins and extracts etc. (Ng and Tan. 1997; TRAFFIC. 2008). This high demand for illicit wildlife products is threatening the existence of many endangered species. Assessment of the illegal wildlife trade is difficult due to its clandestine nature. Studies suggest that illegal wildlife trade excluding the

Correspondence: 1. sethishreya7@gmail.com, 2. bishalkchalise@gmail.com

illegal wildlife timber trade and illegal fishing is between 7.8 to 10 billion USD (Van Uhm. 2016).

There is local and national demand but a large volume of wildlife is traded internationally. Main motivating factor for wildlife traders is huge sums of profits (Green and Shirley. 1999; Wood. 2001; Stoett. 2002; Auliya. 2003; Blundell and Mascia. 2005; Schlaepfer et al. 2005; Nijman and Shepherd. 2007). Though, Convention on International Trade in Endangered Species of Fauna and Flora (CITES) regulates the commercial trade in wildlife and prohibits trade in species which are at high risk of extinction. Yet, due to the covert nature of illegal trade and paucity of overarching studies of legal trade our understanding on international trade networks is inadequate (Symes et al. 2017).

Seizures at major transportation hubs is making headlines in the recent years. According to TRAFFIC, the wildlife trade monitoring network, transportation is the backbone of global trade, and wildlife traders rely on land, air and sea carriers to smuggle products across the globe[3]. Often, wildlife products are declared as traded good. Like in April 2015, South African Airways (SAA) Cargo shipment had illegal ivory which was declared as machine spare parts in transit to Australia and destined for Malaysia. Also, in March, 2014 Singapore Customs confiscated raw ivory tusks weighing about a ton, which were declared as coffee berries and destined for an Asian country. In another seizure in 2013, a Red Sandalwood (45 tonnes) consignment worth 5 million US dollars was being shipped from India to Singapore, falsely declared as "hot lime pickles" and "casting wheels"[4]. Thus, the above arguments can help us deduce that as the goods trade flourishes it paves way for illegal trade to grow.

In the present study, we aim to test whether the volume of trade affects the volume of wildlife transactions while, controlling for other economic factors. Secondly, with the rise in regional integration as measured by number of Free Trade Agreements signed by each nation increases the number of wildlife trade transactions taking place. Spanning a time horizon of 1986 to 2015 the study covers 172 countries to test the aforementioned hypotheses.

The paper has been divided into four sections; the first section deals with the introduction to the growing problem of wildlife crime and the background on how legal trade opens

[3] Source: Save the Rhino website. Link: https://www.savetherhino.org/rhino_info/thorny_issues/the_transportation_industry_and_the_illegal_wildlife_trade

[4] Source: InSYNC, Singapore Customs E-Newsletter. Link: https://www.customs.gov.sg/~/media/cus/files/insync/issue29/article4.pdf

opportunities for illicit trade. The second section covers the research methodology including sources and justification of data collected and hypothesis testing. The third section discusses the results and major findings. Finally, conclusion of the study would be enumerated in the fourth section. combat

BACKGROUND

The world is seeing an unprecedented economic and financial integration since the latter part of the 20th century. This is particularly true in case of proliferation of regional trading agreements (European Central Bank, 2005). To pursue such an integration there is a need to harmonize transboundary issues such as trade, regulatory frameworks and policies, regional infrastructure and management of shared natural resources (The World Bank, 2013). With an increasing regional economic integration, there is a need for collaborative action to combat illegal wildlife trade (Kecse-Nagy et al. 2014).

It has been argued since the inception of World Trade Organization, its main focus lies on ensuring smooth trade flows through reduced tariff, removing non-tariff barrier to cross-border trade, among other. However, the global trade regime generally ignores animal protectionism (Lurié & Kalinina. 2015). Traditionally, trade agreements have been perceived to have negative impacts on animals. Free Trade Agreements (FTA's) open markets, create business and employment opportunities, and can increase economic growth, new increased access to markets. This leads to increases in legal and illegal trade in a wide variety of products, including wildlife and wildlife products. Elimination of trade barriers, enables countries with large animal endowments to supply the world. Thus, putting a strain on the wild animal population. This has led to rise in awareness to include a clause on combating wildlife crime in the FTA's like as been done by the Trans-Atlantic Trade and Investment Partnership (TTIP) (World Animal Protection & Humane Society International 2015). Further, in certain FTA's parties have decided to 1) reaffirm commitments made under the multilateral environmental agreements (MEA's), 2) combatting wildlife trafficking issues and illegal, unregulated and unreported fishing (IUU) and finally, 3) addressing animal welfare concerns relating to farm animals and animals used for research and testing (ibid.).

Australia, Japan, Mexico, Singapore, and United States featured among the top importers of at least one protected animal or plant listed by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). Also, there are the countries which have the highest number of signed FTA's (Engler & Parry-Jones. 2007).

Lenzen et al. (2012) has shown that 30 percent of wildlife is threatened as a result of international trade and routes of trade. Demand from consumers in in developed countries are a major cause. Threat to species is facilitated due to supply chains that originate in developing countries which are rich in biodiversity and with export-oriented agriculture, fishing and forestry industries. Also, Felbab-Brown (2011) implied that the expansion of legal trade provides access as a result of which wildlife can be illegally sourced and traded. A study conducted by Patel (2015) using the healthmap, wildlife trade database for specific species has found there is a possibility of association between legal goods trade and illegal wildlife trade, but limited data availability has been cited as a reason for a weak causality between the two.

In a recent study aimed at testing impact of trade openness on illegal ivory trade concluded that trade motivates poaching and increased poaching leads to building stockpiles of ivory. While, the secondary results of the study highlight that legal trade masks growing illegal trade and poverty simulates poaching (Schoder. 2017)

Drawing inferences from the outside of economic literature it has been found that openness of trade enhances states abilities to intervene in reducing drug trafficking within drug-producing countries, but not within drug-consuming countries (Bartilow and Eom. 2009).

Thus, the following research is aimed to study the impact of increased volume of goods trade and regional trade integrations on illegal wildlife transactions. This is based on the assumption that the wildlife trade uses the channel of goods trade to avoid detection. This can be further justified with increased involvement of the customs departments globally, in combatting wildlife crime. Further, in 2014 MoU was signed between United Nations Council on Trade and Development and CITES to create a join database (Automated System of Customs Data: ASYCUDA) to monitor the flow of wildlife products and to ensure that trade does not hamper conservation of species[5].

METHODOLOGY

Data

Data were obtained from WCMC-CITES database (http://www.unep-wcmc.org/citestrade, downloaded in May 2018). The database gave comparative statistics of wildlife trade across species across time which was about 2.2 billion entries, the data was filtered to 55000 trade

[5] Source: UNCTAD website: Link: http://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=804&Sitemap_x0020_Taxonomy=UNCTAD%20Home

entries. For the purpose of the study the database was filtered on the following parameters: 1) Only Appendix I species (fauna and flora both) have been considered;

2) From the given source codes of the database only the following terms: **F1:** Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof. **I**: Confiscated or seized specimens. **R:** Ranched specimens: specimens of animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood. **U:** Source unknown. **W:** Specimens taken from the wild. **X:** Specimens taken in "the marine environment not under the jurisdiction of any State", have been considered to make the database.

3) From the given purpose codes: **H:** Hunting Trophy, **P:** Personal and **T:** Commercial and undefined transactions have been considered.

Given the CITES database[6] limitations, the final dataset included Appendix I species of fauna and flora which have been sourced from wild and traded as hunting trophy, commercial use or personal use. This conforms with the definition of Appendix I species that is "Appendix I lists species that are the most endangered among CITES-listed animals and plants. They are threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial, for instance for scientific research. In these exceptional cases, trade may take place provided it is authorized by the granting of both an import permit and an export permit (or re-export certificate)."[7] Further, the data is modified based on the number of transactions from each exporting country in a particular year.

Data on volume of trade, exports, imports, gross domestic product and other economic variables has been obtained from the World Bank database (http://databank.worldbank.org/data/reports.aspx?source=World-Development-Indicators,

[6] **Note** that the reliability of the records in the CITES database is entirely dependent on the accuracy at which CITES Parties report these data. It has been well-documented that there are large discrepancies between officially reported import and export figures and the actual imports or export figures (Blundell and Mascia 2005; Nijman and Shepherd 2007), and indeed in the present analysis frequently reported quantities differed significantly between the importing and the exporting Party. Likewise, there are discrepancies between source codes, with switches between e.g. wild-caught and captive-bred, and for specific taxa from certain countries significant numbers of individuals declared as captive-bred are in fact wild-caught (see Nijman and Shepherd 2009 for a case study on the export of alleged captive-bred reptiles from Indonesia). In the present analysis it was not possible, however, to assess to what extent these discrepancies are intentional.

[7] Source: CITES Website. Link: https://cites.org/eng/app/index.php

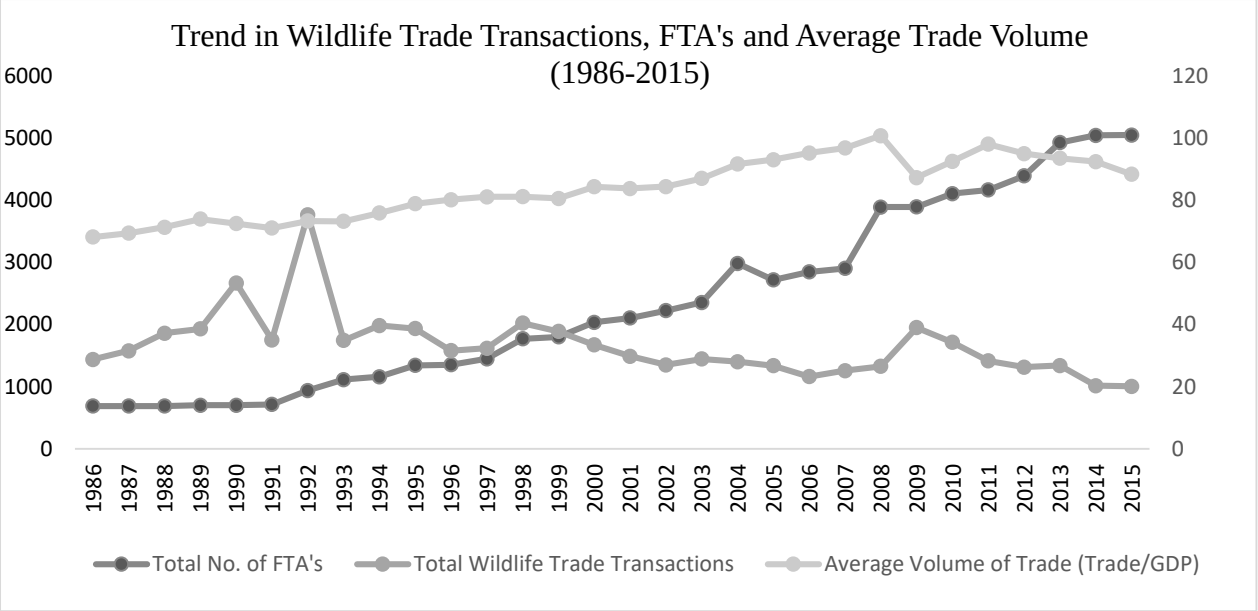
Downloaded in May, 2018). Data on Regional Trading Agreements was obtained from Mario Larch's Regional Trade Agreements Database (http://www.ewf.uni-bayreuth.de/en/research/RTA-data/index.html, Downloaded in May, 2018). Only, FTA's are being used for the following research as they are the key drivers of volume of goods trade across countries.

A panel data was generated from the above data from 1986 to 2017 across 150 countries to test the hypotheses mentioned in the paper

Preliminary Analysis

A simple graphical analysis of trends in the wildlife trade transactions, number of signed FTA's and average volume of trade can be seen in Figure 1. Here the FTA's includes sum of all signed FTA's in a particular year. The average volume of trade is the mean of total trade (exports+imports) divided by the respective Gross Domestic Product (GDP) across 172 countries taken for the study, in a given year. Finally, the wildlife trade transactions are a sum of number of transactions that happened across countries over time. It is interesting to note that the number of FTA's has been increasing across time. While, there is a downward trend in the number of wildlife trade transactions particularly, from 1998 onwards. Also, it can be seen that trends in volume of trade and wildlife trade transactions are moving in opposite directions.

In the subsequent section, we would be testing the following data using statistical techniques to give a more conclusive result.



[Figure 1]: Trend in Wildlife Trade Transactions, Number of Free Trade Agreements Signed and Volume of Trade
Source: CITES, the World Development Indicator and the Mario Larch's Regional Trade Agreements Database and Author's Calculations

Regression Analysis and Discussion

Table 1 presents the results of Pooled OLS regression. The dependent variable is year-to-year cumulative number of wildlife transaction over the study period of 1986-2015. The selection of 172 countries are based on availability of the data.

The panel 1 includes on right hand side variables that represents the trade volume and other variables that is likely to impact availability of wildlife (supply side) and demand for wildlife products (demand side) both of which likely to impact wildlife trade transaction.

The estimated coefficient for Trade percentage of GDP is positive and statistically significantly different from zero. The magnitude is sizable at 4.28 percentage points. This result suggests that increase in trade measured at share of GDP is likely increase the frequency of wildlife trade also. This result also suggests that GDP (measured at 2010 constant price) is statistically significant but trivial in magnitude. This result is counter to the findings elsewhere in the literature (Symes et al. 2017; Ngwakwe and Mokgalong. 2014) that economically richer countries promote wildlife trade thorough more demand for the wildlife related produce.

The panel 1 also includes total population as another indicator for market for demand and supply of wildlife trade. The rationale is higher the population, larger is the market for wildlife trade. The population coefficient is however not different from zero. The result is similar for

cost of export to indicate a broad proxy 'transaction cost' of wildlife trade in lieu of actual price for wildlife, which likely to influence wildlife trade across border.

The other variable is forest area as percent of landmass surface area of a country. This variable is included as it likely to impact the availability of wildlife which likely promote wildlife trade, *ceteris paribus*. The coefficient is statistically significant negative number. As the wildlife transactions contains both trade in flora and fauna. This can be attributed to more flora (including timber) in the trade transactions which would reduce the forest cover.

Independent Variables	**Pooled OLS**
Trade (% of GDP)	0.0428**
	(0.021)
Population	-4.62e-08***
	(9.67e-09)
Forest Area (Share of Landmass)	-0.290***
	(0.054)
GDP (2010 Constant)	0***
	(0)
Cost of Export	0.000762
	(0.00138)
Constant	2.118
	(3.673)
Observations	764
R-squared	0.777

[Table 1]: Pooled OLS. Dependent variable is aggregate number of wildlife trade transactions across time for each of country
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Next, Table 2 presents results for our fixed effect estimation. This confirms our earlier result that formal trade on goods results in increased wildlife trade. Here, export share of GDP represents the volume of trade among countries. The magnitude of the effect is higher than before but at the lower statistical significance level. All other variables are have a negative effect on the wildlife trade.

Independent Variables	**Fixed Effect**
Export (Share of GDP)	0.168*
	(0.101)
GDP per capita	-0.00190***
	(0.000256)
Forest Area (Share of Area)	-0.465
	(0.523)
Population	-2.69e-07***
	(5.46e-08)
Constant	79.64***
	(16.51)
Observations	1,838
Number of ccountry	153
R-squared	0.051

[Table 2]: Fixed Effect Estimation. Dependent variable is aggregate number of wildlife trade transactions across time for each of country
Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

CONCLUSIONS

Our results conform with the existing literature that goods trade drives wildlife trade. This is true has legal trade helps to mask the illegal wildlife trade when transported through, the same channel. This is also, in line with the idea that the logistic chains are already in place and it allows for opportunities for wildlife trade. Thus, a strong regulatory mechanism has to be put in place to put a check on the wildlife trade transactions, especially at the entry and exit points of cargo.

While, to check for regional integration as a robustness check it was found that FTA's do not have any significant impact on the wildlife trade transactions, hence those results have been omitted from the current analysis. But, there is ongoing discussion at various international forums in consultation with CITES to include combating IWT as one of the clauses of the FTA's. The following has been incorporated in the terms of TTIP.

As very little existing literature exists on this, the research can be extended by including entry and exit points of trade like international airports and sea ports. Further, drug seizures and seizures of other related illicit criminal activities, MEA's signed between countries for combatting illegal wildlife crime like ASEAN-Wildlife Enforcement Network (ASEAN-WEN), South Asian Wildlife Enforcement Network (SAWEN) and number of threatened species in each country can be included in modelling to check for robustness. Further, the data on illegal wildlife trade should be supplemented by data from LEMIS, EU-TWIX, the World Customs Organisation Harmonised System, Species+, heathmap/wildlifetrade and other national reporting systems to establish a more complete overview of the network.

We hope our modelling framework proves a useful tool for researchers and practitioners alike.

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REFERENCES

Auliya, M., 2003. Hot Trade in Cool Creatures: a Review of the Live Reptile Trade in the European Union in the 1990s with a focus on Germany. *TRAFFIC Europe*, Brussels, Belgium.

Bartilow, H.A. and Eom, K., 2009. Free Traders and Drug Smugglers: the Effects of Trade Openness on States' Ability to Combat Drug Trafficking. *Latin American Politics and Society*, 51(2), pp.117-145.

Blundell, A.G. and Mascia, M.B., 2005. Discrepancies in Reported Levels of International Wildlife Trade. *Conservation Biology*, 19(6), pp.2020-2025.

Broad, S., Mulliken, T. and Roe, D., 2003. The Nature and Extent of Legal and Illegal Trade in Wildlife. *The Trade in Wildlife: Regulation for Conservation*, pp.3-22.

Butchart, S.H., Walpole, M., Collen, B., Scharlemann, J.P., Almond, R.E., Baillie, J.E., Bomhard, B., Brown, C., Bruno, J., Carpenter, K.E. and Carr, G.M., 2010. Global Biodiversity: Indicators of Recent Declines. *Science* (New York, NY), 328(5982), pp.1164-1168.

Challender, D.W., Harrop, S.R. and MacMillan, D.C., 2015. Understanding Markets to Conserve Trade-Threatened Species In CITES. *Biological Conservation*, 187, pp.249-259.

Engler, M. and Parry-Jones, R. 2007. Opportunity or threat: The role of the European Union in Global Wildlife Trade. *TRAFFIC Europe*, Brussels, Belgium.

European Central Bank. 2005. Regional Economic Integration in a Global Framework. *G-20 Workshop, 22-23 September, 2004*. Viewed on 25 May 2018

Felbab-Brown, V., 2011. The Dsappearing Act: The Illicit Trade in Wildlife in Asia. *Brookings Institution*, Washington.

Green, E. and Shirley, F., 1999. The Global Trade in Coral. *World Conservation*. Pp. 70

Kecse-Nagy, K., Zain, S. and Meibom, S.V., 2014. Regional Economic Integration Organizations: Their Role in Implementing CITES. *TRAFFIC Bulletin* , October, pp. 59-64.

Lenzen, M., Moran, D., Kanemoto, K., Foran, B., Lobefaro, L. and Geschke, A., 2012. International Trade Drives Biodiversity Threats in Developing Nations. *Nature*, 486(7401), p.109.

Lurié, A. and Kalinina, M., 2015. Protecting Animals in International Trade: A Study of the Recent Successes at the WTO and in Free Trade Agreements. *American University International Law Review*, 30(3), p.431.

Ng, P.K. and Tan, H.H., 1997. Freshwater Fishes of Southeast Asia: Potential for the Aquarium Fish Trade and Conservation Issues. *Aquarium Sciences and Conservation*, 1(2), pp.79-90.

Ngwakwe, C.C. and Mokgalong, N.M., 2014. Consumer income growth and rhino poaching in South Africa. *Environmental Economics*, *5*(3), pp.42-52.

Nijman, V. and Shepherd, C.R., 2007. Trade in Non-Native, CITES-listed, Wildlife in Asia, as Exemplified by the Trade in Freshwater Turtles and Tortoises (Chelonidae) in Thailand. *Contributions to Zoology*, 76(3), pp.207-212.

Patel, N.G., 2015. Characterization of Illegal Wildlife Trade Networks. *University of Pennsylvania.* (Doctoral dissertation).

Schlaepfer, M.A., Hoover, C. and Dodd Jr, C.K., 2005. Challenges in Evaluating the Impact of the Trade In Amphibians and Reptiles on Wild Populations. *BioScience*, 55(3), pp.256-264.

Schoder, D., 2017. Trade Openness and the Illegal Ivory Trade(Doctoral dissertation).

Stoett, P., 2002. The International Regulation of Trade in Wildlife: Institutional and Normative Considerations. *International Environmental Agreements,* 2(2), pp.193-208.

Symes, W.S., McGrath, F.L., Rao, M. and Carrasco, L.R., 2017. The Gravity of Wildlife trade. *Biological Conservation.*

The World Bank. 2013. Regional Integration in Africa. Http://bit.ly/YYu02X. Viewed on 25 May 2018

TRAFFIC (2008) What's driving the wildlife trade?. *The World Bank*, Washington

Van Uhm, D.P., 2016. The Illegal Wildlife Trade: Inside the World of Poachers, Smugglers and Traders. *Springer*, 15.

World Animal Protection & Humane Society International, 2015. *TTIP and International Wildlife Trade*, USA.

Wood, E., Collection of Coral Reef Fish for Aquaria: Global Trade, Conservation Issues and Management Strategies. *Marine Conservation Society*, UK. Available from: http://www. unep-wcmc. org/marine/GMAD/pdfs (80).