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Analysis

The raw and the carved: Shipping costs and ivory smuggling

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ABSTRACT

The recent and rapid increase in elephant poaching has caused international alarm. A fixed-effects panel-data regression model was employed to identify possible causes of this upsurge. Ivory seizures were categorised as worked or raw. These categories were also divided into four weight classes ranging from under 10 kg to over 1000 kg. With Africa being the source of ivory and much of the poached ivory destined for Asia it was hypothesised that smugglers would respond to shipping costs. The results showed that shipping costs, especially for large shipments, were correlated to smuggling levels. Other factors include global interest rates, which motivate stockpiling by criminal organisations. Stability in Africa as measured by refugee numbers correlates to raw ivory seizures. The data describes a scenario where three forces converged to escalate poaching in the late 2000s. Raw ivory was being made increasingly available at a time from Central African range states, when criminal organisations desired larger stockpiles of tusks. The sharp decline in shopping costs gave them the means to take advantage of this.

1. Introduction

Poaching levels of African elephants have in recent years surged to an appalling level. Since 2007 the illegal traffic in ivory has more than doubled (UNEP et al., 2013). In 2011 the number of elephants killed annually was estimated to be 25,000 animals (UNEP et al., 2013). Poaching appears to have accelerated since 2009 (CITES et al., 2013). The human cost of this includes a rising death toll of wildlife rangers (Dell'Amore, 2012). This slaughter is now a pressing international conservation issue.

The increase in poaching is reflected in the seizure rates of raw ivory (Fig. 1). Seizures of worked ivory are much lower and do not exhibit the dramatic increase that has occurred with raw ivory. The recent increase is also dominated by seizures over 100 kg (CITES et al., 2013; Underwood et al., 2013). This seizure metric is supported by evidence from shrinking wild populations and collation of kill reports (CITES et al., 2013; Underwood et al., 2013).

The challenge is to explain this dramatic surge in seizures. Why are over 30,000 elephants (Wittmeyer et al., 2014) now being poached? Poaching levels accelerated in the late 2000s and the estimated volume of ivory trafficked has greatly increased (CITES et al., 2013). Has demand for ivory by consumers in a short space of time increased by perhaps over double? Could there be other factors at play?

Previous research on the ivory black-market has already identified some factors that influence poaching levels (CITES et al., 2013; Underwood et al., 2013). These include affluence in China and poor governance in Africa. These however, did not change dramatically in the late 2000s. Governance accounts for some of the cross-sectional variation in poaching levels in Africa (Underwood et al., 2013). Affluence in East Asia and especially China has been growing steadily and is likely a slow, steady trend rather than a surprising recent trigger.

One variable overlooked to date is transport costs. Ivory is sourced in African range states and sold in distant markets in Asia (CITES et al., 2013). It is also sold in Africa in domestic markets and markets outside of Asia. Nonetheless, the importance of East Asian markets is indicated by the quantity of ivory being intercepted in those markets (Underwood et al., 2013). All shipments over 500 kg since 2008 have been destined for Asia (UNEP et al., 2013). This paper tests the hypothesis that transport cost, specifically along the shipping route, is an important determinant of smuggling activity.

In January 2013 I was able to inspect ivory stockpiles in China. I was impressed by the bulk and weight of ivory in the storerooms. This emphasised that ivory is a heavy product. Its value increases if the tusks are large and intact (Stiles, 2004). This means that some of the value of the ivory is destroyed if it is cut into smaller pieces for concealment.

There is already evidence that smugglers consider shipping costs to be important. Two-thirds of shipments over 500 kg intercepted since

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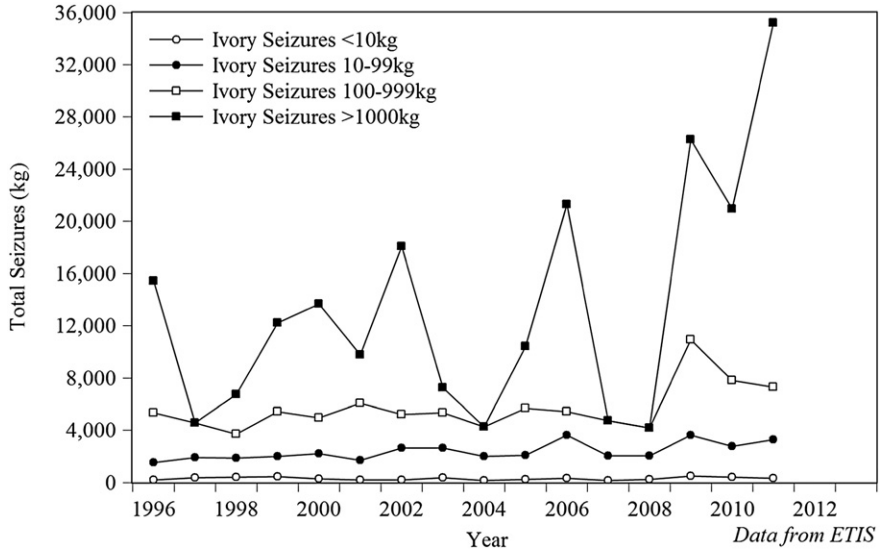

Fig. 1. Total seizures of raw ivory by weight.

2009 were in shipping containers (CITES et al., 2013). Smugglers have a low preference for small quantities in say, suitcases and shift the bulk of their ivory in large lots (Underwood et al., 2013; UNEP et al., 2013). This reliance on shipping containers is unusual for a smuggled, wildlife product.

Criminal organisations strive to achieve economies of scale in the supply of their goods (Dick, 1995). If the average cost of shipping ivory falls as the shipment-size rises then economies of scale for shipping exist. The smuggler preference for large shipments of elephant ivory conforms to seeking economies-of-scale in transport (Ferrier, 2008). This fall in cost appears to dominate the smuggling decision. The strategy however, has a cost in terms of the seizure risk. Losing 4 tons of ivory in one shipment is a bigger cost than splitting the shipments and losing only some of them. A large shipment is strong evidence that smugglers consider lowering transport-costs as worth the risk of losing an entire shipment to interdiction.

Transport costs may therefore influence smuggling levels. Shipping costs are also highly variable because the number of transport ships is strictly limited in the short term (Fig. 2). If shipping costs are examined a relationship to seizure rates is indicated. The period 2003–5 had high shipping costs and low seizure rates. Shipping costs collapsed after the 2008 Global Financial Crisis (GFC) and interdictions of containers surged. The CITES Secretariat (2010, n26) claimed that some of the recent seizures came from elephants poached in the early 2000s. This is consistent with the high shipping costs in the mid-2000s deterring smuggling until these costs fell.

Shipping costs provide two potential explanations for the increase in poaching. One is the arbitrage explanation. Arbitrage is the process of buying goods at a low price in one market to sell at a higher price in another market. The arbitrage profit of this is the difference in the prices less the transaction costs, which include the transport-cost of the trade.

Transport costs absorb some of the arbitrage profits of smuggling. A reduction in transport costs increases arbitrage profits. It also gives a scope to increase the price offered for ivory in Africa and decrease the selling price in final markets. If prices for ivory are being lowered to consumers then ivory-sales would increase, absorbing the extra volumes being trafficked. There is however, no evidence that ivory prices are falling ('t Sas-Rolfes et al., in press).

A second explanation is that ivory is being stockpiled as an investment. Ivory can be stored at a negligible cost. If humidity levels are

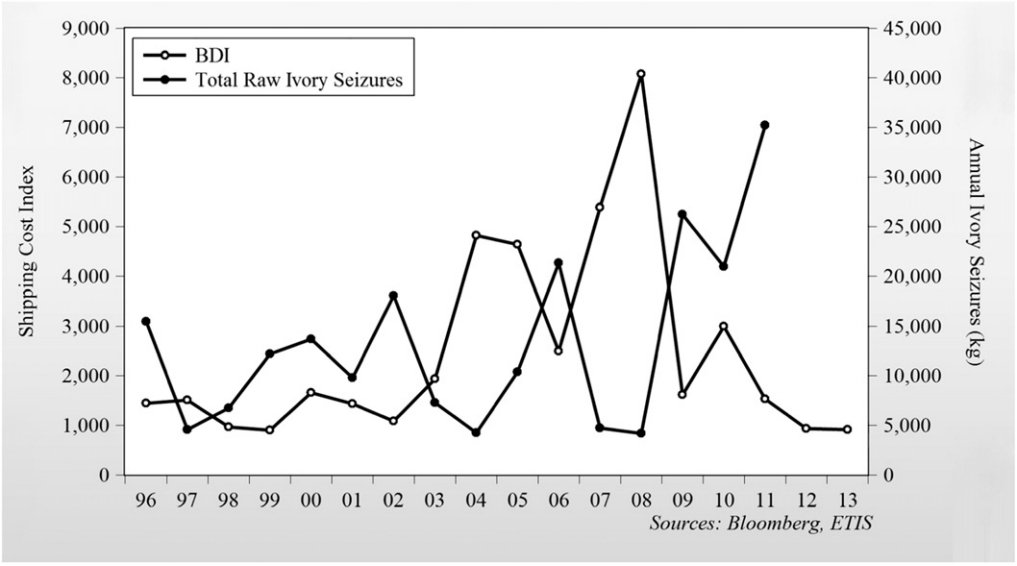

Fig. 2. Freight costs for shipping.